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RAPID ASSESSMENT REPORT FOR SITE 16 BUILDING 224 ZONE G CNC CHARLESTON
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TETRA TECH

**Rapid Assessment Report
for
Site 16, Building 224**

**Zone G
Charleston Naval Complex
North Charleston, South Carolina**



**Southern Division
Naval Facilities Engineering Command**

Contract Number N62467-94-D-0888

Contract Task Order 0088

December 1999

RAPID ASSESSMENT REPORT

FOR

**SITE 16, BUILDING 224
ZONE G, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

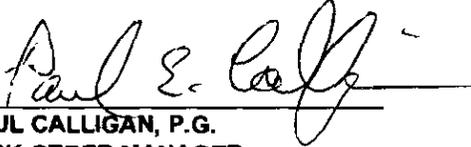
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DECEMBER 1999

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EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment (RA) for Site 16 which includes an underground storage tank (UST) and aboveground storage tank (AST) system for Building 224 at Charleston Naval Complex (CNC) Zone G, in North Charleston, South Carolina. The UST provided heating oil to the building. 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 February 24, 1999.

TtNUS performed the following actions during the RA:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate public and private potable wells, to locate utilities line areas, to locate nearby surface water bodies, and to determine surface hydrology and drainage;
- Reviewed the previously prepared Underground Storage Tank Assessment Report for UST 224 to determine boring locations and monitoring well placements;
- Conducted site survey to identify utilities and to construct a site plan;
- Performed direct push investigation, collected soil and groundwater samples for field screening of total petroleum hydrocarbons using an organic vapor analyzer;
- Collected groundwater samples from direct push borings for mobile lab screening analysis for benzene, toluene, ethyl benzene, total xylenes (BTEX), naphthalene, and diesel range organics;
- Installed three temporary piezometers;
- Installed six shallow permanent monitoring wells to approximately 12 feet below land surface (bls) and one vertical delineation well to approximately 35 feet bls;
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis of analyzed for BTEX, methyl tert-butyl ether (MTBE), and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260 and polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270;
- Collected seven soil samples for laboratory analysis of the for BTEX, and naphthalene using USEPA Method 8260, PAHs using USEPA Method 8270, total organic carbon (TOC) using USEPA Method 415.1, total recoverable petroleum hydrocarbon (TRPH) using USEPA Method 9071, and grain size analysis using sieve and hydrometer methods; and
- Surveyed monitoring well and piezometer top of casing elevations and collected depth to groundwater measurements to evaluate the groundwater flow direction.

Conclusion

One groundwater-elevation monitoring event was conducted at the site on July 22, 1999. Free product was not detected in the piezometers or monitoring wells. One groundwater sampling event was conducted on July 21 to 22, 1999. Benzene, ethylbenzene, and naphthalene constituents were the only groundwater CoCs detected above method detection limits in the groundwater samples. Benzene was detected in groundwater samples collected from CNC16M-01 (8 ug/L) and CNC16M-04 (3 ug/L). The RBSL established for benzene is 5 ug/l.

Ethylbenzene was detected in groundwater samples collected from CNC16M-02 (3 ug/L). This concentration is below the RBSL of 700 ug/L established for ethylbenzene.

Naphthalene was detected in groundwater samples collected from CNC16M01 (11 ug/L), CNC16M-02 (19 ug/L), and CNC16M-04 (3 ug/L). The groundwater RBSL for naphthalene is 10 ug/L. No dissolved chemicals of concern (CoCs) were detected in any well sampled except for an estimated 1.38 ug/L naphthalene in CNC06-M01 duplicate sample, which is below (SCDHEC's) Risk Based Screening Levels (RBSL) for naphthalene.

Seven soil samples were collected on May 14 and 17, 1999 and analyzed for BTEX and PAHs by a fix-based laboratory. Ethylbenzene was detected in soil sample CNC16-B04 at a concentration of 7 ug/kg, benzo(b)fluoranthene was detected at 220 ug/kg in soil sample CNC16-B02, and chrysene was detected at 240 ug/kg in soil sample CNC16-B02. These concentrations are below their respective Risk Based Screening Levels (RBSL) in silty soils.

Naphthalene was detected in soil samples CNC16-B03 (14 ug/kg) and CNC16-B-4 (52,600 ug/kg). The RBSL for naphthalene in silty soils is 52 mg/kg.

The downgradient extent of hydrocarbon impact to groundwater has been delineated. No free product was present in piezometers or monitoring wells. Construction worker site-specific target levels (SSTLs) were calculated to evaluate the exposure pathway for groundwater CoCs. Concentrations of benzene (0.008 mg/L) and naphthalene (0.19 mg/L) in groundwater did not exceed the site SSTLs (0.15 mg/L for benzene and 1.63 mg/L for naphthalene).

Recommendation

The maximum groundwater concentrations of all CoCs do not exceed their respective RBSLs for ingestion, dermal contact, and inhalation of groundwater by a utility worker. Because maximum concentrations of CoCs do not exceed their respective RBSLs, no further action is recommended at this site.

CERTIFICATION PAGE

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



Approved By:

Gregory D. Swanson 1/5/2000

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1.0 INTRODUCTION

Site 16 is a closed underground storage tank (UST) system which provided heating fuel to Building 224 at the Charleston Naval Complex (CNC), Zone G, 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 32312 (telephone number 850-385-9899) on behalf of the U.S. Navy Southern Division (SOUTHDIR) Naval Facilities Engineering Command (NAVFAC), 2155 Eagle Drive, North Charleston, South Carolina 29406 (telephone number 843-820-7307). Authorization to conduct the RA for the site was issued by NAVFAC under Contract Task Order (CTO) 0088. 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 February 24, 1999. Fieldwork necessary to complete the RA was performed April 30 to July 22, 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 Berkeley 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, and current utilities, is included as Figure 2.

Building 224 was used as a submarine supply and a base supply warehouse known as Servmart. It was constructed in 1972 on previously undeveloped land. UST 224 was a 5,000-gallon steel tank which supplied heating fuel oil for the building's boiler. The UST was installed in 1972 and was an underground tank placed directly into the soil. The UST was located on the southeast corner of Building 224 (Figure 3). The UST system was last in operation in March 1996 [Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth, Virginia, Environmental Detachment Charleston (SPORTENDETCHASN), 1998].

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 combat 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 224 was removed and a tank closure assessment was performed on August 18, 1998.

On August 18, 1998, UST 224 was removed, cleaned, and recycled as scrap metal. At the time of the UST removal, no corrosion, pitting, or holes were found in the tank. The UST was coated with a 3/8-inch thick layer of pitch. The UST system piping was constructed of steel and copper and ran from the vault to the building, located approximately 20 feet west of the UST. The piping from the UST to the building was removed during the closure (SPORTENDECHASN, 1998).

During the removal of the tank, no petroleum contamination or odors were identified in excavated soils or in soil samples collected during the tank removal. The Underground Storage Tank Assessment Report for UST 224 is included in Appendix A.

1.3 RECEPTOR SURVEY RESULTS

A survey of the site vicinity was conducted by TtNUS personnel to identify potential receptors for petroleum hydrocarbon contamination. The site plan (Figure 2) depicts the public utilities located within 250 feet of the former UST 224 study area. Specific information concerning the depth of utilities below land surface is currently unavailable. However, according to facility personnel, utility lines are typically located approximately 2 to 6 feet below land surface (bls) (SPORTENVDETECTAS/N, 1999). The following utility receptors were located:

- Sanitary sewer, water utility: No sanitary sewer lines were identified within a 250-foot radius of Building 224. Water mains border the east side of Building 224. The water main is connected to water lines which run along the south side of Building 224. The water main extends toward the southeast and connects to a water main south of Building 224.
- Electrical utility, gas utility: A primary subsurface electrical line is located approximately 100 feet south of UST 224. No gas utilities were identified within 250 feet of Building 224.
- Storm drain utility: No storm drain utilities were identified within 250 feet of Building 224

According to the Final RCRA Facility Investigation Report for Zone G (E/A&H, 1996) a survey of groundwater users within a 7-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 4-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 UST 224 is the Cooper River located approximately 1,100 feet to the northeast.

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 29406 (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 Plain 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 including the Ashley Formation, a pale green to olive-brown, sandy phosphoric limestone or marl, which is locally muddy and/or sandy. The Ashley Formation in the vicinity of Charleston is encountered at a depth of approximately 30 to 70 feet bls. The top of the Ashley Formation has been reported to be associated with an erosional basin and the entire Cooper Unit, including the Ashley Formation, is indicated to be approximately 300 feet thick (E/A&H, 1996).

Groundwater occurs under water table or poorly confined conditions within the Recent or Pleistocene 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

Fifteen direct push soil borings (CNC16-B01 through CNC16-B15) were advanced at Site 16 under the supervision of a TtNUS geologist between April 30 and May 27, 1999 (Figure 3). These borings ranged in depth from 8 to 30 feet bls and provided soil samples to characterize the subsurface lithology. From June 15 through June 16, 1999, six shallow monitoring wells (CNC16-MW01 through CNC16-MW06) were installed to a depth of 12 feet bls. Soil grab samples were collected during installation to describe the subsurface lithology. On July 11, 1999, a vertical delineation monitoring well (CNC16-MW-7D) was installed to 35 feet bls. During the direct push and drilling processes, lithologic samples were collected using split-spoon samplers to characterize the subsurface lithology to a depth of 35 feet bls.

Based on lithologic descriptions from the soil borings and monitoring wells, the subsurface soil generally consists of interlayers of light brown to gray sandy silt and silty sand near the surface to approximately 8 feet bls. Dark-gray to black silty sand and clay were encountered in samples from approximately 8 to 17 feet bls and 17 to 35 feet bls, respectively (Figures 4 and 5). Boring logs are presented in Appendix B.

2.1.2 Site Hydrogeology

Six shallow water table monitoring wells, CNC16-M01, CNC16-M02, CNC16-M03, CNC16-M04, CNC16-M05, and CNC16-M06, and one deep vertical delineation monitoring well, CNC16-M07D, 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 2-inch diameter, 0.01-inch machine-slotted Schedule 40 polyvinyl chloride (PVC) screen that bracketed the water table. Monitoring well CNC16-M07D 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 35 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.

One temporary, small diameter, PVC piezometer, CNC16-P01, was installed in boring CNC16-B14. The piezometer was constructed of 1-1/4-inch diameter Schedule 80 PVC threaded casing and well screen. The screen section of the piezometer was installed to bracket the water table. Piezometer CNC16-P01 was completed with a 10-foot screen section installed from 2 to 12 feet bls. The piezometer was used to inspect the groundwater for the presence of free product.

Groundwater in shallow wells at Site 16 was encountered at depths ranging from approximately 0.3 to 1.5 feet bls during the RA investigation. The recorded water-level data collected during the RA are presented in Table 1. Groundwater elevation measurements were recorded from the site monitoring wells on July 21, July 22, and September 11, 1999. Figure 6 presents the groundwater potentiometric surface recorded during the field event on July 22, 1999. The potentiometric surface maps depict a groundwater flow direction toward the southeast.

As part of the Final RCRA Facility Investigation Report for Zone G (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 G. During the tidal study, water levels were recorded in 32 wells throughout Zone G over a period of one day. Measurements were recorded every hour using data loggers. The 1-day period spanned one high tide and one low tide.

Results of the tidal survey identified the maximum fluctuation in shallow monitoring wells to be 2.46 feet. However, the general fluctuation was less than 0.5 feet. The heterogeneity of the aquifer material may limit or accentuate the tidal response in some wells. 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 prevailing natural groundwater gradient (E/A&H, 1996).

2.2 ASSESSMENT RESULTS

Fifteen soil borings were completed as part of the screening portion of the soil investigation at Site 16. Seven soil borings were completed to collect soil samples for analysis at a fixed base laboratory to confirm the chemicals of concern (CoC). The soil borings for screening evaluation were completed using a Direct Push Technology (DPT) rig. Samples were collected to evaluate subsurface soil vapors, soil contaminant concentration (via a mobile laboratory), and groundwater contaminant concentrations (via a mobile laboratory). The soil samples were collected from a maximum depth of 3 feet bls.

The soil and groundwater samples collected for mobile laboratory screening were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tert-butyl ether (MTBE), ethylene dibromide (EDB), naphthalene, and diesel range organics.

Soil samples for CoC evaluation were collected on May 14 and May 17, 1999, and analyzed for BTEX, MTBE, and EDB using U.S. Environmental Protection Agency (USEPA) Method 8260B; polynuclear aromatic hydrocarbons (PAHs) and naphthalene using USEPA Method 8070C; and total recoverable petroleum hydrocarbons (TRPH) using USEPA Method 9071A. One sample was collected for grain size determination using sieve and hydrometer analysis, one sample was collected for Target Analyte List (TAL) Metals, and one sample was collected for by Total Combustible Organics (TCO). 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 2.3.1.

A comprehensive groundwater monitoring event was conducted on July 21 and July 22, 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, MTBE, and EDB using USEPA Method 8260 and PAHs using USEPA Method 8270. Two 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.

2.3 FIELD SCREENING ASSESSMENT

2.3.1 Soil Vapor Assessment

Fifteen soil borings were completed to evaluate for soil vapors as part of the soil screening assessment at Site 16. Organic vapor analyzer (OVA) headspace measurements were recorded at 1-foot intervals from ground surface to the top of the water table. Table 3 summarizes the soil vapor screening results. Figure 3 presents the soil boring locations.

Soil vapor concentrations ranged from non detect to greater than 1,000 parts per million (ppm). Soil samples from six soil boring locations contained vapor concentrations ranging from non detect to 5 ppm. Vapor concentrations of 100 to 1,000 ppm were detected from eight soil boring locations. The highest soil vapor concentrations were detected near and at the water table at sample depths of 3 to 5 feet bls.

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

2.3.2 Soil Mobile Laboratory Results

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

As indicated in Table 4, BTEX constituents were not detected in nine of the mobile laboratory soil samples (CNC16-B03, CNC16-B05, CNC16-B06, CNC16-B07, CNC16-B08, CNC16-B09, CNC16-B10, CNC16-B11, and CNC16-B14). Benzene was detected in soil sample CNC16-B04 at 34 parts per billion (ppb), toluene at 20 ppb, ethylbenzene at 320 ppb, and total xylenes at 2,110 ppb. Ethylbenzene was detected in soil sample CNC16-B01 at 17 ppb and total xylenes at 43 ppb. Total xylenes were also detected in soil sample CNC16-B02 at 15 ppb.

Naphthalene was not detected in soil samples CNC16-B06, CNC16-B07, CNC16-B08, CNC16-B09, CNC16-B10, CNC16-B11, and CNC16-B14. Naphthalene was detected in five soil samples: CNC16-B01 (510 ppb), CNC16-B02 (19,000 ppb), CNC16-B03 (64 ppb), CNC16-B04 (39,000 ppb), and CNC16-B05 (3,800 ppb).

Diesel range organics were not detected in seven soil samples: CNC16-B05, CNC16-B06, CNC16-B08, CNC16-B09, CNC16-B10, CNC16-B11, and CNC16-B14. Diesel range organics were detected in five soil samples: CNC16-B01 (33 ppb), CNC16-B02 (270 ppb), CNC16-B03 (44 ppb), CNC16-B04 (360 ppb), and CNC16-B07 (19 ppb).

The petroleum constituents identified in the mobile laboratory samples correlate with the boring locations where the highest soil vapor concentrations were detected.

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 these data.

2.3.3 Groundwater Mobile Laboratory Results

Groundwater samples were collected from 14 soil boring locations near UST 224. Each groundwater sample was analyzed by a mobile laboratory for BTEX, naphthalene and diesel range organics using USEPA Method 8260. Table 5 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 5, BTEX constituents were reported below detection limits in groundwater samples collected from CNC16-B03, CNC16-B06, CNC16-B07, CNC16-B08, CNC16-B09, CNC16-B11, CNC16-B12, CNC16-B13, AND CNC16-B14. Benzene was detected in groundwater samples collected from CNC16-B02 (10 micrograms per liter (ug/L), CNC16-B04 (27 ug/L), CNC16-B05 (89 ug/L), and CNC16-B10 (3 ug/L). Toluene was detected in groundwater samples collected from CNC16-B04 (2.3 ug/L), CNC16-B05 (1.8 ug/L), and CNC16-B10 (1.3 ug/L). Ethylbenzene was detected in groundwater samples collected from CNC16-B05 (2.5 ug/L), and CNC16-B10 (6.3 ug/L). Total xylenes were detected in groundwater samples collected from CNC16-B01 (1.1 ug/L), CNC16-B04, (1.1 ug/L), CNC16-B05 (10.4 ug/L), and CNC16-B10 (82 ug/L).

Naphthalene was reported below detection limits in groundwater samples collected from CNC16-B06, CNC16-B08, CNC16-B09, CNC16-B11, CNC16-B12, and CNC16-B14. Naphthalene was detected in groundwater samples collected from CNC16-B01 (290 ug/L), CNC16-B02 (690 ug/L) CNC16-B03 (64 ug/L) CNC16-B04 (280 ug/L) CNC16-B05 (84 ug/L) CNC16-B07 (44 ug/L), CNC16-B10 (1,800 ug/L), and CNC16-B13 (29 ug/L).

Diesel range organics were detected in groundwater samples collected from CNC16-B01 (6.5 ug/L), CNC16-B02 (1.2 ug/L) CNC16-B03 (16 ug/L) CNC16-B04 (1.7 ug/L) CNC16-B05 (0.3 ug/L) CNC16-B06 (0.2 ug/L), CNC16-B07 (12 ug/L), CNC16-B08 (0.8 ug/L), CNC16-B09 (0.2 ug/L), CNC16-B10 (14 ug/L), CNC16-B11 (0.3 ug/L), CNC16-B12 (0.2 ug/L), and CNC16-B13 (0.1 ug/L).

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

2.4 CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER

2.4.1 Chemicals of Concern in Soil

Seven subsurface soil samples were collected from the Site 16 area for determination of CoCs. The soil boring locations are shown on Figure 3 and Table 6, summarizes the CoCs detected in the soil samples. Benzene, toluene, total xylenes, benzo(a)anthracene, benzo(k)fluoranthene, and dibenzo(a,h)anthracene were not detected in soil samples collected at the site. Ethylbenzene was detected in soil sample CNC16-B04 at a concentration of 7 micrograms per kilogram (ug/kg), and benzo(b)fluoranthene and chrysene were estimated at 220 ug/kg and 240 ug/kg, respectively, in soil sample CNC16-B02. These concentrations are below their respective Risk Based Screening Levels (RBSL) in silty soils.

Naphthalene was detected in soil samples CNC16-B03 (14 ug/kg) and CNC16-B04 (52,600 ug/kg), and estimated in soil sample CNC16-B02 at 4 ug/kg. The RBSL for naphthalene in silty soils is 52 ug/kg.

The RBSL for silty soil was based on a grain size analysis completed on sample 16SLB06-0304 indicating a silty soil matrix. Soil analytical data sheets and grain size analysis reports are provided in Appendix D. Figure 7 identifies the areal distribution of benzene detected in site soils during soil sampling conducted for the RA.

2.4.2 Chemicals of Concern in Groundwater

Table 7 presents the analytical results for CoCs detected in the groundwater samples. Groundwater analytical data sheets for the July 21 and July 22, 1999, field event are presented in Appendix D. Benzene, ethylbenzene, and naphthalene constituents were the only groundwater CoCs detected above the reporting and/or method detection limits in the groundwater samples. Benzene was detected/estimated in groundwater samples collected from CNC16M-01 (8 ug/L) and CNC16M-04 (3 ug/L). Only the detection at CNC16-M01 exceeds the RBSL of 5 ug/L established for benzene.

Ethylbenzene was detected in groundwater samples collected from CNC16M-02 (3 ug/L). This concentration is below the RBSL of 700 ug/L established for ethylbenzene.

Naphthalene was detected in groundwater samples collected from CNC16M01 (11 ug/L), CNC16M-02 (19 ug/L), and CNC16M-04 (3 ug/L). The groundwater RBSL for naphthalene is 10 ug/L. Figures 8 and 9 illustrate the groundwater areal distribution of benzene and naphthalene, respectively, for the July 21 and July 22, 1999, sampling events.

2.5 ANALYTICAL DATA

All analytical data from the August 1998 Underground Storage Tank Assessment Report are presented in Appendix A. Soil analytical data generated during this RA are summarized in Table 6. Groundwater analytical data generated during this RA are summarized in Table 7. The soil and groundwater laboratory analytical data for this RA are included in Appendix D.

2.6 AQUIFER CHARACTERISTICS AND EVALUATION

Groundwater levels were measured from the site monitoring wells on July 21 and July 22, 1999. The groundwater flow direction across the site is toward the east-southeast as illustrated on Figure 6. The hydraulic gradient between monitoring wells CNC16-M06 and CNC16-M04 was 0.0033 feet per foot (ft/ft).

As part of the Final RCRA Facility Investigation Report for Zone G, rising and falling head slug tests were conducted on eight shallow monitoring wells throughout Zone G to determine the hydraulic conductivity of the surficial aquifer (E/A&H, 1996). Slug tests were conducted by instantaneously adding (falling head) or removing (rising head) a volume (slug) of water from the well and measuring the recovering water level with a data logger. A hydraulic conductivity value was then calculated for the rising head test and 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 16. To make this determination the screened interval, proximity to the site, and general lithology were evaluated. Based on this evaluation, monitoring well 636001 was selected as the most representative well.

Well 636001 is located approximately 750 feet east of the site and is completed to a depth of 12.5 feet with a 10-foot screened interval. The geometric mean of the rising and falling head conductivities for 636001 was 0.37 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. Using Darcy's Law, the average linear velocity of groundwater may be expressed as:

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

where:

V = average velocity

K = hydraulic conductivity = 0.37 ft/day

n = volumetric porosity = 0.53
(from sieve results of 44.5% very fine sand & 7.5% clay and SCDHEC (1998))

i = most recent hydraulic gradient measurement = 0.0033 ft/ft

therefore:

$$V = \left(\frac{0.37 \text{ ft/day}}{0.53} \right) \times 0.0033 \text{ ft/ft}$$

$$V = 0.0023 \text{ ft/day}$$

In summary, the seepage velocity of the surficial aquifer was calculated to be approximately 1 foot per year based on a hydraulic conductivity of 0.37 feet per day, a hydraulic gradient of 0.0033 feet per foot, and a porosity of 53% for silty soil. Aquifer characterization graphs are provided in Appendix E.

2.7 FATE AND TRANSPORT MODEL DESCRIPTION

The Domenico Model was the fate and transport model used to model groundwater in the risk analysis. The Domenico dilution/attenuation model is presented in the SCDHEC guidance document, South Carolina Risk-Based Corrective Action for Petroleum Releases (SCDHEC, 1998). This model is very conservative in that it assumes an infinite contaminant mass condition through which groundwater flows. The model incorporates biological decay effects through a first-order decay process; however, this mechanism was ignored because SCDHEC guidance specifies that the decay rate must be assumed to be zero if site-specific decay rates have not been determined.

The impacted groundwater source area was modeled as 50 feet (15.00 m) wide and 6.56 feet (2.0 m) deep; these values are conservative defaults suggested by the American Society for Testing and Materials (ASTM) Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites (ASTM, 1997).

The maximum source concentrations are assumed to exist throughout the source area, further compounding the conservatism of the estimate. The maximum concentrations of benzene and naphthalene were 8 ug/L and 19 ug/L, respectively.

Site-specific data were used for saturated hydraulic conductivity, hydraulic gradient, and fraction of organic carbon in soil (1.31E-06 m/sec, 0.0033 ft/ft, and 0.00187 g-C/g-soil, respectively). The soil bulk density (1.25 g/cm³) and porosity (0.53 cm³/cm³) were taken from the charts on pages C3 through C5 in SCDHEC (1998) based on the sieve test results for sample 16SLB04 which indicated that the soil was 44.5% sand and 7.5% clay.

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

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

Table 8 summarizes fate and transport parameters used in modeling.

2.8 PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN

The most recent groundwater-gauging event shows that groundwater flow is primarily to the east-southeast. The current extent of impact is limited to wells CNC16-MW01 and CNC16-MW02. Figures 8 and 9 illustrate the groundwater areal distribution of benzene and naphthalene, respectively, for the July 21 and July 22, 1999, sampling events.

The Domenico model was used to predict the distance at which the tip of the plume is attenuated to RBSLs in 10 and 20 years without using degradation due to biological decay. This was done by adjusting the time to 10 years (3.15x10⁸ second) and 20 years (6.31x10⁸ second) and solving for distance (x) by trial and error. The source was assumed to be the maximum concentrations of benzene and naphthalene for the entire 10 and 20-year periods. The distance was changed separately for benzene and naphthalene until the required distance that is necessary for the concentration to attenuate to the RBSLs was determined.

Only the calculated concentrations of benzene and naphthalene at the source were greater than their respective RBSLs; therefore, these were the only chemicals for which plume distances were calculated. The model estimates that after 10 years, the concentrations of benzene and naphthalene will be 0.005 mg/L and 0.010 mg/L (RBSLs) at distances of 5 feet and 1.05 feet, respectively (Figure 10). Furthermore, after 20 years, the concentrations of benzene and naphthalene will be 0.005 mg/L and 0.010 mg/L (RBSLs) at distances of 10 feet and 2.1 feet, respectively (Figure 11). The Domenico 10-year and 20-year simulation spreadsheets are presented in Appendix F.

3.0 TIER 2 EVALUATION

3.1 COMPARISON OF ANALYTICAL RESULTS WITH RBSLs

Soil samples were collected on May 14-17, 1999. The samples were analyzed for BTEX and PAHs including naphthalene. Naphthalene was found at maximum concentration above its RBSL for clay-rich soil less than 5 feet above groundwater. The maximum naphthalene concentration was 52,600 ug/kg, and its RBSL is 52 ug/kg.

Groundwater sampling was conducted on July 21-22, 1999. Free product was not detected in any of the six wells. The remaining wells were sampled and analyzed for BTEX, MTBE, and PAHs including naphthalene. Concentrations of benzene (8 ug/L) and naphthalene (19 ug/l) exceeded their respective RBSLs of 5 ug/L and 10 ug/L. A comparison of soil and groundwater concentrations to RBSLs is summarized in Table 9.

3.2 SITE CONCEPTUAL EXPOSURE MODEL

This section focuses on the current and future land use issues concerning the site. The site, Building 224, was used as a submarine supply and a base supply warehouse. Figure 1 shows that the site is located in and surrounded by the CNC. 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. This facility is included in the BRAC activities; therefore, the future use of the facility is unknown but it is likely to remain a commercial/industrial use area.

Drinking water at the site and surrounding properties is provided by the city of Charleston water treatment plants. The closest surface water body is the Cooper River located approximately 1,100 feet northeast of the site. Potable wells and irrigation wells were not identified within 1,000 feet of the site (E/A&H, 1996). Numerous monitoring wells are located within 1,000 feet of the site (E/A&H, 1996). Groundwater at the site flows to the southeast.

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

3.3.1 On-Site Commercial Worker

An on-site commercial worker is defined as an employee who works in a commercial capacity at the site. Commercial use of the site in the future is likely; therefore, an on-site commercial worker was considered as a potential receptor. Incidental ingestion and dermal contact with impacted soil are expected to be negligible for commercial workers because they are located inside a building and surficial soil was not impacted above RBSLs. Drinking water at this site is provided by the city; therefore, ingestion of groundwater is not a complete exposure pathway. The building foundation is assumed to be sufficient to prevent volatilization from both soil and groundwater into a commercial building, and there is no history of vapors in the commercial building. It is unlikely that any additional exposure pathways will exist for future on-site workers; therefore, no complete pathways exist for either current or future commercial workers.

3.3.2 On-Site Visitor

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

3.3.3 On-Site Construction Worker

An on-site construction worker is defined as a laborer who would be involved in intrusive activities on or around the site, particularly in the area of subsurface utilities. On-site construction workers could be exposed to constituents in soil by the following pathways: inhalation of volatiles from soil, dermal contact with soil, and incidental ingestion of soil.

On-site construction workers could be exposed to constituents in groundwater by the following pathways: inhalation of volatiles from groundwater, dermal contact with groundwater, and incidental ingestion of groundwater. Utilities lie in the immediate vicinity of the impacted area, and this pathway was considered for soil and groundwater exposure to a utility worker.

3.3.4 On-Site Resident

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

3.3.5 Off-Site Resident

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

3.3.6 Surface Water

The Cooper River is located approximately 1,100 feet northeast of the site. No surface water body lies within 1,000 feet of the site; therefore, this pathway was not considered further.

3.4 IDENTIFICATION OF DATA REQUIREMENTS

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

3.5 SITE-SPECIFIC TARGET LEVELS

Soil concentration of naphthalene exceeded the RBSLs for leaching and groundwater concentrations of benzene and naphthalene exceeded RBSLs for ingestion; therefore, further evaluation was necessary.

The only identified future potential receptor is the construction (utility) worker. Site soil concentrations were compared with RBSLs for ingestion or dermal contact with surficial soil. (Surficial soil was not impacted at the site; however, for the construction worker pathway, exposure to subsurface soil is evaluated as surface soil because the worker is expected to have direct contact with the subsurface soil.)

Chemical of Concern	Maximum Concentration (mg/kg)	RBSL for Ingestion or Dermal Contact With Soil - Commercial (mg/kg)	Exceed RBSL
Naphthalene	52.6	41,000	No

As shown in the table above, the maximum soil naphthalene concentration does not exceed the RBSL. Therefore, a construction worker ingesting or contacting the impacted soil is not considered at risk and not considered for further analysis.

Groundwater RBSLs provided by the SCDHEC are for ingestion only, therefore, RBSLs were calculated for the additional pathways of dermal contact, incidental ingestion and inhalation of vapors.

Groundwater RBSLs for the construction worker were calculated for three pathways: dermal contact, incidental ingestion, and inhalation of volatiles. A target cancer risk of 1×10^{-6} and a target hazard quotient of 1 were used in the calculations. Standard defaults were used when available and applicable to a construction worker. When no standard parameters were available, conservative assumptions were used. Where possible, site-specific parameters were used for site conditions. For all pathways, the exposure frequency was assumed to be 90 days/year and the exposure duration was assumed to be 1 year. These assumptions were considered conservative based on the nature of utility work.

The dermal contact RBSLs were calculated using the procedures in Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance (EPA Peer Consultation Workshop Draft 1998). Based on expected limited contact with groundwater, the event frequency was assumed to be one event/day and the event duration was assumed to be 1 hour/event. The skin surface area available for contact was 4500 cm², based on one-fourth the skin surface area given in the risk assessment guidance document for a swimming adult.

The incidental ingestion RBSLs were calculated using the equation given in Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Interim Final), EPA/540/1-89/002 (EPA 1989). An incidental ingestion rate of 0.01 L/day was assumed based on a fraction (12.5%) of the incidental ingestion rate for a wading adult (0.01 L/hr), considered for an 8-hour work day. The incidental ingestion rate for wading adults is given in Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment (EPA Region IV 1995).

Utility lines in the area are typically 2 to 6 feet deep. The depth to groundwater at the site is shallow enough that exposure to a worker in a utility trench is considered a complete pathway. It was assumed that a construction worker might be exposed to chemicals volatilizing from standing groundwater. The inhalation RBSLs were calculated using Henry's Law:

$$RBSL_{WATER} = RBSL_{AIR}/H$$

Where H = Henry's Law constant [mg/L-air/mg/L-water]

The RBSL_{AIR} for each chemical was calculated using the equation given in the American Society for Testing and Materials (ASTM) Standard Guide for Risk-Based Corrective Action Applied to Petroleum Release Sites, Designation E 1739-95e1 (1997). SCDHEC values were used for Henry's Law constants.

The minimum RBSL for the three pathways was chosen as the RBSL for the construction worker. The following table shows the calculated RBSLs for each pathway along with the selected (minimum) RBSL:

	Dermal RBSL (mg/L)	Incidental Ingestion RBSL (mg/L)	Inhalation RBSL (mg/L)	Selected (Minimum) RBSL (mg/L)	Maximum Site Concentration (mg/L)	Exceed RBSL
Benzene	0.85	68.52	0.15	0.15	0.008	No
Naphthalene	1.63	1135.56	2.63	1.63	0.019	No

Appendix F provides the parameters and results of the RBSL calculations.

3.5.1 Soil Leachability

SSTLs were calculated for naphthalene concentrations leaching from subsurface soil to groundwater using the SCDHEC Soil Leachability Model and Selected Minimum RSBLs. Input parameters for the leachability model were determined using the figures in the SCDHEC Risk Based Corrective Action Guidelines (January 1998), soil quality and grain size data, and the Selected Minimum RBSLs calculated for the site. The soil leaching SSTLs calculated for ethylbenzene and naphthalene are provided in the following table.

CoC	Concentration in CNC16-B04/16SLB040304 (mg/kg)	Soil Leaching SSTL (mg/kg)
Naphthalene	52.6	40

The soil leaching SSTL calculated for naphthalene is 40 mg/kg. This is less than the maximum naphthalene concentration detected in subsurface soil sample at 52.6 mg/kg, which indicates naphthalene will leach into the groundwater at concentrations above the RBSL for a construction worker. The soil leachability calculations are provided in Appendix G.

3.6 RECOMMENDATIONS

The downgradient extent of hydrocarbon impact to groundwater has been delineated. The maximum groundwater concentrations of all CoCs do not exceed their respective RBSLs for ingestion, dermal contact, and inhalation of groundwater by a utility worker.

The extent of hydrocarbon impact to the soil has been delineated. However, the naphthalene concentration in soil exceeds the SSTL calculated for naphthalene leaching into the groundwater. Active corrective action to achieve Tier 2 SSTLs is recommended.

4.0 REFERENCES

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TABLE 1

**GROUNDWATER ELEVATIONS
 SITE 16, BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA
 PAGE 1 OF 1**

Well #	Total Depth of Well, ft	Top of Casing Elevation, ft (MSL)	Date Measured	Depth to Water, ft (BTOC)	Depth to Product, ft (BTOC)	Product Thickness, ft	Groundwater Elevation (MSL)
CNC16-M01	12.5	7.03	7/22/99	1.56	ND	ND	5.47
			9/11/99	2.62	ND	ND	4.41
CNC16-M02	12.5	6.64	7/21/99	1.32	ND	ND	5.32
			9/11/99	2.22	ND	ND	4.42
CNC16-M03	12.5	6.07	7/22/99	0.51	ND	ND	5.56
			9/11/99	1.66	ND	ND	4.41
CNC16-M04	12.5	5.97	7/21/99	0.61	ND	ND	5.36
			9/11/99	1.58	ND	ND	4.39
CNC16-M05	12.5	5.60	7/21/99	0.28	ND	ND	5.32
			9/11/99	1.23	ND	ND	4.37
CNC16-M06	12.5	6.45	7/22/99	0.91	ND	ND	5.54
			9/11/99	1.91	ND	ND	4.54
CNC16-M07D	35.0	6.80	7/22/99	NM	NM	NM	NM
			9/11/99	0.95	ND	ND	5.85

Notes:

MSL - Mean Sea Level
 BTOC - Below Top of Casing
 NM - Not Measured
 ND- No Free Product Detected
 ft - Feet

TABLE 2**GROUNDWATER FIELD MEASUREMENTS
SITE 16, BUILDING 224
ZONE G, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

Well I.D.	Date Sampled	Purge method	Volume (gallons)	Temp. (°C)	pH	Conductivity (uMHOS/cm)
CNC16-M01	7/22/99	PP	5.3	24.7	6.91	23.3
CNC16-M02	7/21/99	PP	5.3	25.9	7.05	9.1
CNC16-M03	7/22/99	PP	5.7	28.8	7.28	2.1
CNC16-M04	7/21/99	PP	5.8	30.1	7.26	11.1
CNC16-M05	7/21/99	PP	5.9	30.3	7.18	11.3
CNC16-M06	7/22/99	PP	5.5	27.7	7.38	7.6
CNC16-M07D	9/12/99	PP	7.5	24.9	8.00	19.0

Notes:

°C - Degrees Celsius

PP - Peristaltic pump, low flow technique

uMHOS/cm - Micro MHOS per centimeter

TABLE 3

**SUMMARY OF OVA SOIL SCREENING RESULTS
SITE 16, BUILDING 224
ZONE G, FORMER CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration (ppm)
CNC16-B01	16SSB0102	2	>50
	16SSB0103	3	>100
	16SSB0104	4	>100
CNC16-B02	16SSB0201	1	10
	16SSB0202	2	1000
	16SSB0203	3	1000
	16SSB0205	5	1000
CNC16-B03	16SSB0303	3	>100
	16SSB0304	4	>100
	16SSB0305	5	>100
	16SSB0306	6	>100
CNC16-B04	16SSB0402	2	50
	16SSB0403	3	>100
CNC16-B05	16SSB0501	1	4
	16SSB0502	2	>100
	16SSB0503	3	50
	16SSB0504	4	50
	16SSB0505	5	>1000
	16SSB0506	6	>1000
	16SSB0507	7	>1000
CNC16-B06	16SSB0601	1	5
	16SSB0602	2	5
	16SSB0603	3	50
	16SSB0604	4	50
CNC16-B07	16SSB0703	3	3
	16SSB0704	4	5
CNC16-B08	16SSB0801	1	3
	16SSB0802	2	3
	16SSB0803	3	3
	16SSB0804	4	3
CNC16-B09	16SSB0901	1	3
	16SSB0902	2	3
	16SSB0903	3	20
	16SSB0904	4	20

Notes:

OVA - organic vapor analyzer equipped with a flame ionization detector

PPM - parts per million

ND - not detected

TABLE 3

**SUMMARY OF OVA SOIL SCREENING RESULTS
SITE 16, BUILDING 224
ZONE G, FORMER CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration (ppm)
CNC16-B10	16SSB1001	1	3
	16SSB1002	2	3
	16SSB1003	3	50
	16SSB1004	4	50
CNC16-B11	16SSB1101	1	2
	16SSB1102	2	2
	16SSB1103	3	2
	16SSB1104	4	2
CNC16-B12	16SSB1201	3	>100
	16SSB1202	4	>100
CNC16-B13	16SSB1301	1	2
	16SSB1302	2	2
	16SSB1303	3	2
CNC16-B14	16SSB1401	1	3
	16SSB1402	2	15
	16SSB1403	3	>100
CNC16-B15	16SSB1501	1	ND
	16SSB1502	2	ND
CNC16-MW-7D	16SSB1601	1	ND

Notes:

OVA - organic vapor analyzer equipped with a flame ionization detector

PPM - parts per million

ND - not detected

TABLE 4

**SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR SOIL
SITE 16, BUILDING 224
ZONE G, FORMER CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

Sample Location	Sample Identification	Sample Depth (feet)	Laboratory Screening Data (PPB) ⁽¹⁾					
			Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Diesel Range Organics
CNC16-B01	16SFB01-0304	2-3	<5.0	<5.0	17	53	510	33
CNC16-B01 ⁽²⁾	16SFB01-0304	2-3	<5.0	<5.0	6.3	43	480	NA
CNC16-B02	16SFB02-0304	2-3	<5.0	<5.0	<5.0	15	19000	270
CNC16-B03	16SFB03-0304	3-4	<5.0	<5.0	<5.0	<5.0	64	44
CNC16-B04	16SFB04-0304	3-4	34	20	320	2110	39000	360
CNC16-B05	16SFB05-0203	2-3	<5.0	<5.0	<5.0	<5.0	3800	<10
CNC16-B06	16SFB06-0304	3-4	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC16-B07	16SFB07-0304	3-4	<5.0	<5.0	<5.0	<5.0	<5.0	19
CNC16-B08	16SFB08-0304	3-4	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC16-B09	16SFB09-0304	3-4	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC16-B10	16SFB10-0304	3-4	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC16-B11	16SFB11-0304	3-4	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC16-B14	16SFB14-0304	3-4	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC16-B14 ⁽²⁾	16SFB14-1011	3-4	<5.0	NA	NA	NA	NA	<10

NOTES:

⁽¹⁾ Laboratory screening data were analyzed using USEPA Method 8260. Compounds not detected are reported as less than the instrument detection limit.

⁽²⁾ Duplicate sample

PPB - parts per billion

TABLE 5

**SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR GROUNDWATER
SITE 16, BUILDING 224
ZONE G, FORMER CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

Sample Location	Sample Identification	Laboratory Screening Data (PPB) ⁽¹⁾					
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Diesel Range Organics
CNC16-B01	16GFB01-10	<1.0	<1.0	<1.0	1.1	290	6.5
CNC16-B02	16GFB02-09	10	<1.0	<1.0	<1.0	690	1.2
CNC16-B03	16GFB03-12	<5.0	<5.0	<5.0	<5.0	64	15
CNC16-B03 ⁽²⁾	16GFB03-12	NA	NA	NA	NA	NA	16
CNC16-B04	16GFB04-12	27	2.3	<1.0	1.1	280	1.7
CNC16-B04 ⁽²⁾	16GFB04-12	6.4	<1.0	<1.0	<1.0	170	NA
CNC16-B05	16GFB05-12	89	1.8	2.5	10.4	84	0.3
CNC16-B06	16GFB06-12	<1.0	<1.0	<1.0	<1.0	<1.0	0.2
CNC16-B07	16GFB07-08	<1.0	<1.0	<1.0	<1.0	22	12
CNC16-B07 ⁽²⁾	16GFB07-08	<1.0	<1.0	<1.0	<1.0	44	NA
CNC16-B08	16GFB08-08	<1.0	<1.0	<1.0	<1.0	<1.0	0.8
CNC16-B09	16GFB09-08	<1.0	<1.0	<1.0	<1.0	<1.0	0.2
CNC16-B10	16GFB10-08	3	1.3	6.3	82	1800	14
CNC16-B11	16GFB11-08	<1.0	<1.0	<1.0	<1.0	<1.0	0.3
CNC16-B12	16GFB12-08	<1.0	<1.0	<1.0	<1.0	<1.0	0.2
CNC16-B13	16GFB13-07	<1.0	<1.0	<1.0	<1.0	29	0.1
CNC16-B14	16GFB14-08	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1

NOTES:

⁽¹⁾ Laboratory screening data were analyzed using USEPA Method 8260. Compounds not detected are reported as less than the instrument detection limit.

⁽²⁾ Duplicate sample

PPB - parts per billion

NA = Not analyzed

TABLE 6

**SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL
SITE 16, BUILDING 224
ZONE G, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

Soil Boring / Sample No.	Sample Date	Benzene (ug/kg)	Toluene (ug/kg)	Ethyl- benzene (ug/kg)	Xylenes (total) (ug/kg)	Benzo(a) anthracene (ug/kg)	Benzo(b) fluoranthene (ug/kg)	Benzo(k) fluoranthene (ug/kg)	Chrysene (ug/kg)	Dibenzo(a,h) anthracene (ug/kg)	Naphthalene (ug/kg)
RBSL ⁽¹⁾		5	478	364	1119	17687	7042	5593	3146	21265	52
CNC16-B01 / 16SLB010203	17-May-99	< 5	< 5	< 5	< 5	< 430	< 430	< 430	< 430	< 430	< 5
CNC16-B02 / 16SLB020203	17-May-99	< 6	< 6	< 6	< 6	< 430	220 ^(j)	< 430	240 ^(j)	< 430	4 ^(j)
CNC16-B02 / 16SLB020203D	17-May-99	< 6	< 6	< 6	< 6	< 430	< 430	< 430	< 430	< 430	4 ^(j)
CNC16-B03 / 16SLB030304	14-May-99	< 7	< 7	< 7	< 7	< 460	< 460	< 460	< 460	< 460	14.00
CNC16-B04 / 16SLB040304	14-May-99	< 6	< 6	7.00	< 6	< 4600	< 4600	< 4600	< 4600	< 4600	52600.00
CNC16-B05 / 16SLB050203	17-May-99	< 6	< 6	< 6	< 6	< 430	< 430	< 430	< 430	< 430	< 6
CNC16-B06 / 16SLB060304	14-May-99	< 5	< 5	< 5	< 5	< 460	< 460	< 460	< 460	< 460	< 5
CNC16-B10 / 16SLB100304	14-May-99	< 6	< 6	< 6	< 6	< 430	< 430	< 430	< 430	< 430	< 6
CNC01TL00103	03-May-99	< 5	<5	<5	<5	NS	NS	NS	NS	NS	<5
CNC02TL00201	13-May-99	< 5	<5	<5	<5	NS	NS	NS	NS	NS	<5

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

NA - Not Analyzed

NS = Not Sampled

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

⁽²⁾ Trip blank

^(j) Indicates the presence of an analyte at a concentration less than the reporting limit and greater than the detection limit.

TABLE 7

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
 SITE 16, BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA

Monitoring Well/ Sample No.	Sample Date	Benzene (ug/L)	Ethyl- benzene (ug/L)	Toluene (ug/L)	Xylenes (total) (ug/L)	Naphthalene (ug/L)	Benzo(a) anthracene (ug/L)	Benzo(b) fluoranthene (ug/L)	Benzo(k) fluoranthene (ug/L)	Chrysene (ug/L)	Dibenzo(a,h) anthracene (ug/L)	MTBE (ug/L)
RBSL ⁽¹⁾		5	700	1000	10000	10 ⁽²⁾	10 ⁽²⁾	10 ⁽²⁾	10 ⁽²⁾	10 ⁽²⁾	10 ⁽²⁾	40
CNC16M-01 / 16GLM0101	21-Jul-99	8	< 5	< 5	< 5	11 ^(j)	< 10	< 10	< 10	< 10	< 10	< 5
CNC16M-02 / 16GLM0201	21-Jul-99	< 5	3 ^(j)	< 5	< 5	18 ^(j)	< 10	< 10	< 10	< 10	< 10	< 5
CNC16M-02 / 16GLM0201D	21-Jul-99	< 5	3 ^(j)	< 5	< 5	19 ^(j)	< 10	< 10	< 10	< 10	< 10	< 5
CNC16M-03 / 16GLM0301	21-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC16M-04 / 16GLM0401	21-Jul-99	3 ^(j)	< 5	< 5	< 5	3 ^(j)	< 10	< 10	< 10	< 10	< 10	< 5
CNC16M-05 / 16GLM0501	21-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC16M-06 / 16GLM0601	21-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC16M-07D / 16GLM7D01	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC16-TL ^(j) / 16TL00601	21-Jul-99	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	< 5

All concentrations are in ug/L.

NA - Not analyzed

⁽¹⁾ South Carolina Department of Health and Environmental Control Risk Based Screening Levels for ground water.

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

⁽³⁾ Trip blank

^(j) Indicates presence of analyte at a concentration less than the reporting limit and greater than the detection limit.

TABLE 8

**FATE AND TRANSPORT INPUT PARAMETERS
SITE 16, BUILDING 224
ZONE G, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

Parameter	Domenico Dilution/Attenuation Model⁽¹⁾
Hydraulic Conductivity [m/sec]	1.31E-06
Hydraulic Gradient [ft/ft]	0.0033
Porosity	0.53
Estimated Plume Length [ft]	NA
Soil Bulk Density [kg/L]	1.25
Fractional Organic Carbon	0.002
First Order Decay Rate ^(a) [sec ⁻¹]	0
Modeled Plume Length [ft]	NA
Modeled Plume Width [ft]	NA
Source Width [ft] ^(a)	15
Source Thickness [ft] ^(a)	2
soluble Mass [kg]	Infinite ^(b)

(1) - *South Carolina Risk-Based Corrective Action for Petroleum Releases*
South Carolina Department of Health and Environmental Control, 1988.

(a) - Stated values are default values.

(b) - Assumption of the Domenico Model.

See SCDHEC guidance for chemical-specific partition coefficient (k_{oc}) values.

TABLE 9

COMPARISON OF MAXIMUM CONCENTRATIONS TO RBSLs
 SITE 16, BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Concern	Maximum Concentration (Soil) (mg/kg)	RBSLs (Soil) (mg/kg) ^(a)	Maximum Concentration (GW) (mg/L)	RBSLs (GW) (mg/L) ^(b)
Benzene	< 0.007	0.005	0.005	0.005
Toluene	< 0.007	0.478	< 0.005	1
Ethylbenzene	0.007	0.364	0.003	0.7
Xylenes	< 0.007	11.119	< 0.005	10
MTBE	NA	NA	< 0.005	0.04
Naphthalene	52.6	0.052	0.019	0.010

(a) - From Risk-Based Corrective Action for Petroleum Releases, Table B4, Depth to GW - <5 ft, SCDHEC RBCA Guidelines, 1998.

(b) - From Risk-Based Corrective Action for Petroleum Releases, Table B1, SCDHEC RBCA Guidelines, 1998.

GW - Groundwater

RBSLs - Risk Based Screening Levels

Shaded cell indicates the concentration exceeded the RBSL.

TABLE 10

**EXPOSURE PATHWAY ASSESSMENT - CURRENT LAND USE
SITE 16, BUILDING 224
ZONE G, 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	Area of Building 224 below grade is above water table and not expected to act as a basement. No explosion hazard.	
	Explosion Hazard	No		
Groundwater	Ingestion	No	No current groundwater pathways complete. Drinking water provided by city.	
	Dermal contact	No		
	Inhalation	No		
Surface Water	Ingestion	No	No surface water bodies within 1,000 feet	
	Dermal contact	No		
	Inhalation	No		
Surficial Soil	Ingestion	No	No surficial soil impact.	
	Dermal contact	No		
	Inhalation	No		
Subsurface Soil	Ingestion	No	No current complete pathways.	
	Dermal contact	No		
	Inhalation	No		

TABLE 11

**EXPOSURE PATHWAY ASSESSMENT - FUTURE LAND USE
SITE 16, BUILDING 224
ZONE G, 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	Area of Building 224 below grade is above water table and not expected to act as a basement. No explosion hazard.	
	Explosion Hazard	No		
Groundwater	Ingestion	Yes	Groundwater exposure by potential construction worker (most likely in utility corridor). Both direct exposure and exposure by soil leaching to groundwater evaluated.	No additional data needed.
	Dermal contact	Yes		
	Inhalation	Yes		
Surface Water	Ingestion	No	No surface water bodies within 1,000 feet.	
	Dermal contact	No		
	Inhalation	No		
Surficial Soil	Ingestion	No	Volatilization of CoCs will occur before receptor enters the trench to work.	No additional data needed.
	Dermal contact	No		
	Inhalation	No		
Subsurface Soil	Ingestion	Yes	Soil exposure by potential construction worker (most likely in utility corridor). Although there is no surficial soil impact, subsurface soil evaluated as surface soil for construction worker as direct contact likely in utility trench.	
	Dermal contact	Yes		
	Inhalation	No		

ACAD: 01.24cm.08.dwg 08/20/99 HJP



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

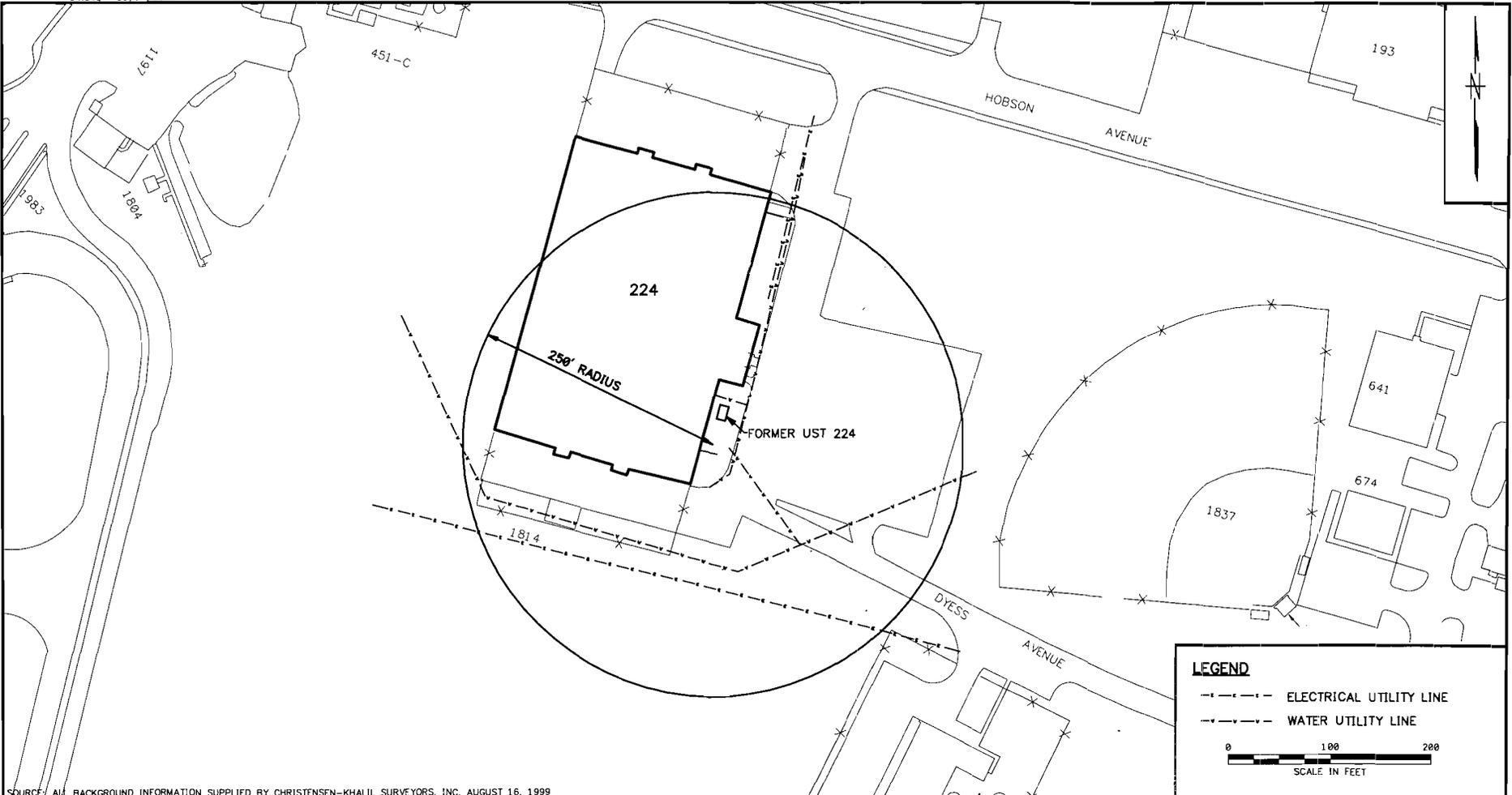


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HJP	8/20/99
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
AS NOTED	



SITE LOCATION MAP
SITE 16, BUILDING 224
ZONE G, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO.	
N0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 1	0



LEGEND

- - - - - ELECTRICAL UTILITY LINE
- - - - - WATER UTILITY LINE

0 100 200
SCALE IN FEET

SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC, AUGUST 16, 1999

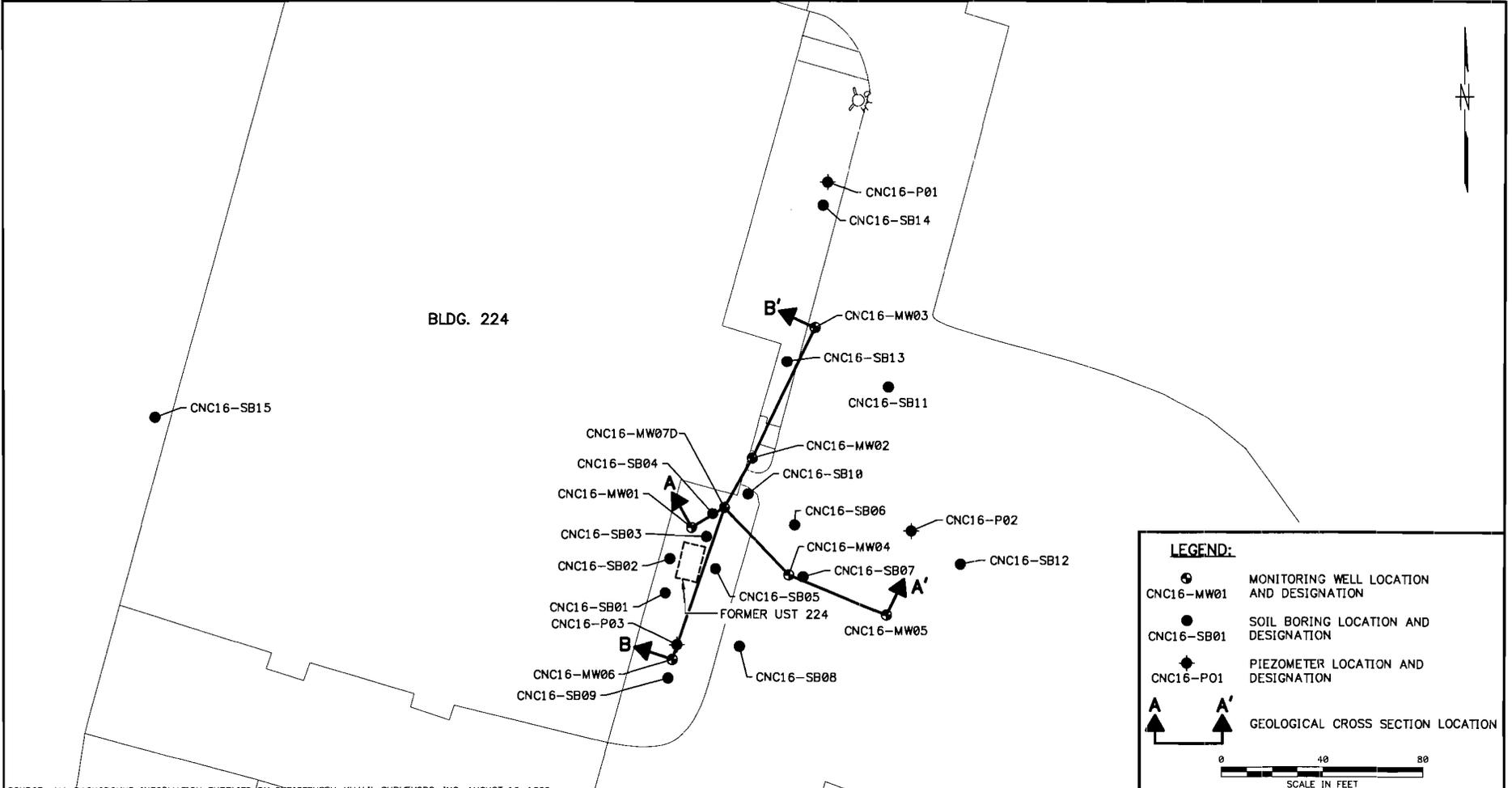
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 8/24/99
 CHECKED BY DATE
 COST/SCHED-AREA
 SCALE AS NOTED



SITE VICINITY MAP
 SITE 16, BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2	REV. 0



SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC. AUGUST 16, 1999

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

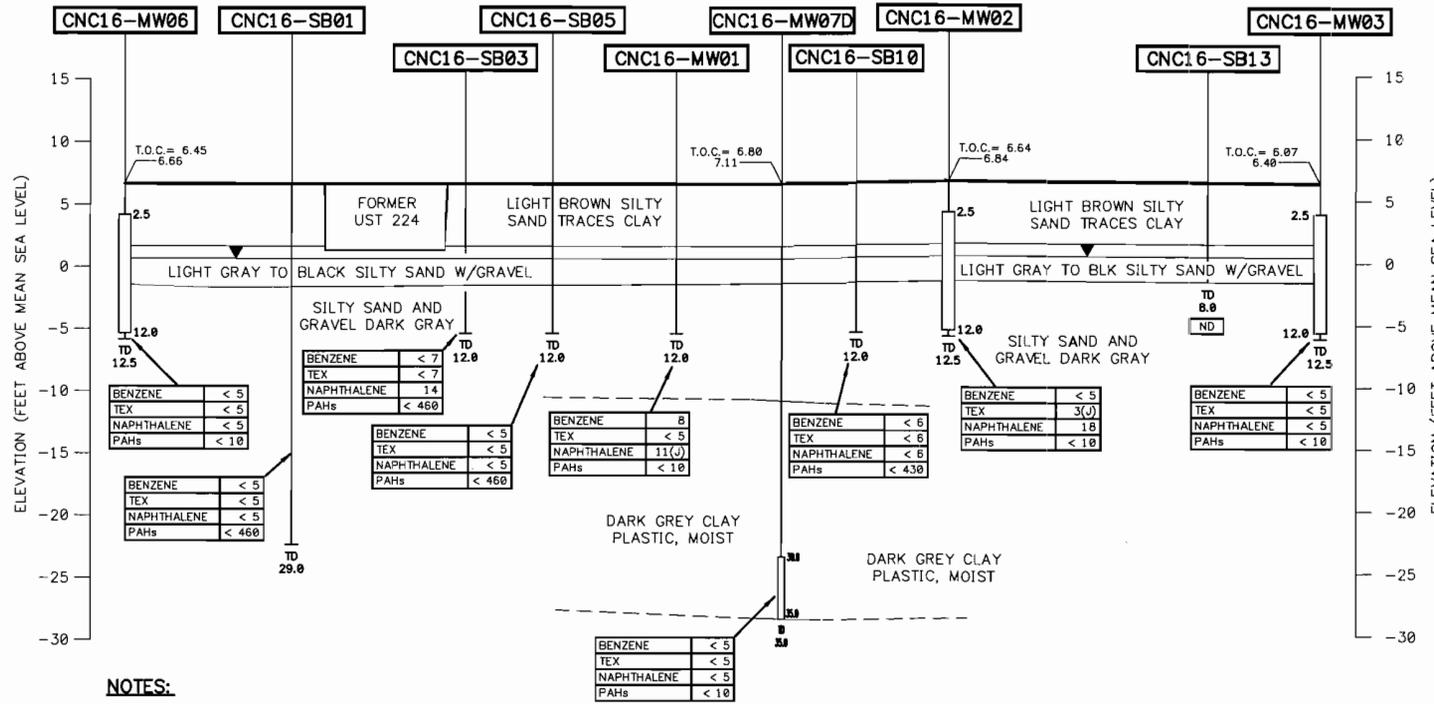


SITE MAP AND SAMPLING LOCATIONS
 SITE 16 BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA

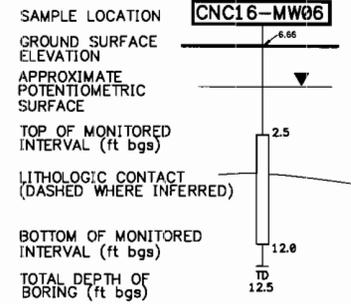
CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3	REV. 0

**SOUTH
B**

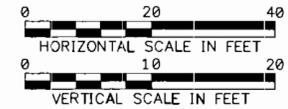
**NORTH
B'**



LEGEND



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



NOTES:

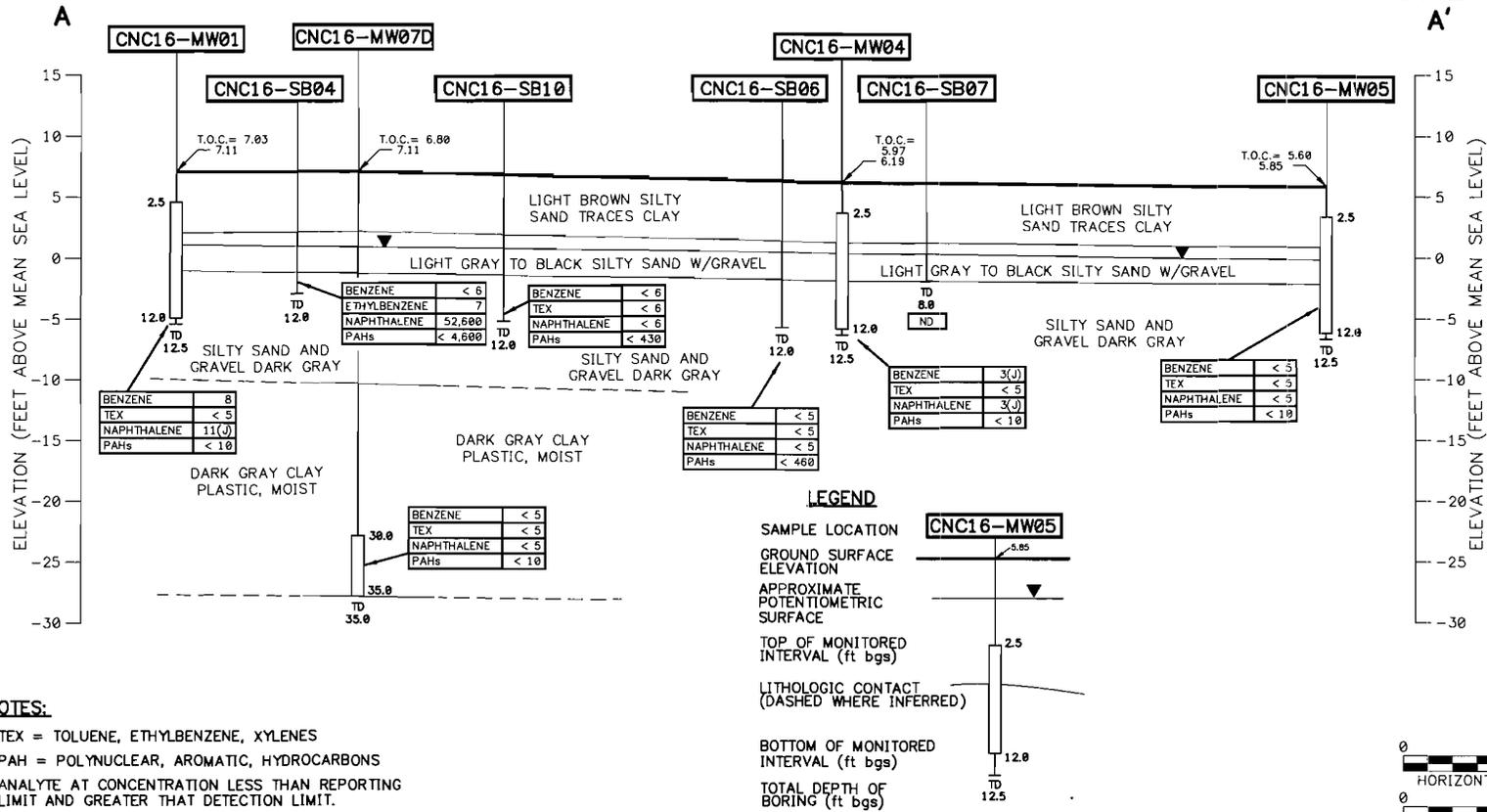
- 1) TEX = TOLUENE, ETHYLBENZENE, XYLENES
- 2) PAH = POLYNUCLEAR, AROMATIC, HYDROCARBONS
- 3) ANALYTE AT CONCENTRATION LESS THAN REPORTING LIMIT AND GREATER THAT DETECTION LIMIT.
- 4) ND = NO ANALYTICAL DATA COLLECTED. LIMIT AND GREATER THAT DETECTION LIMIT.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE		CONTRACT NO. 0124		
							MF	10/20/99		APPROVED BY	DATE	
										APPROVED BY	DATE	
										DRAWING NO. FIGURE 5	REV. 0	

GEOLOGIC CROSS SECTION B-B'
SITE 16, BUILDING 224
ZONE G CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

NORTHWEST

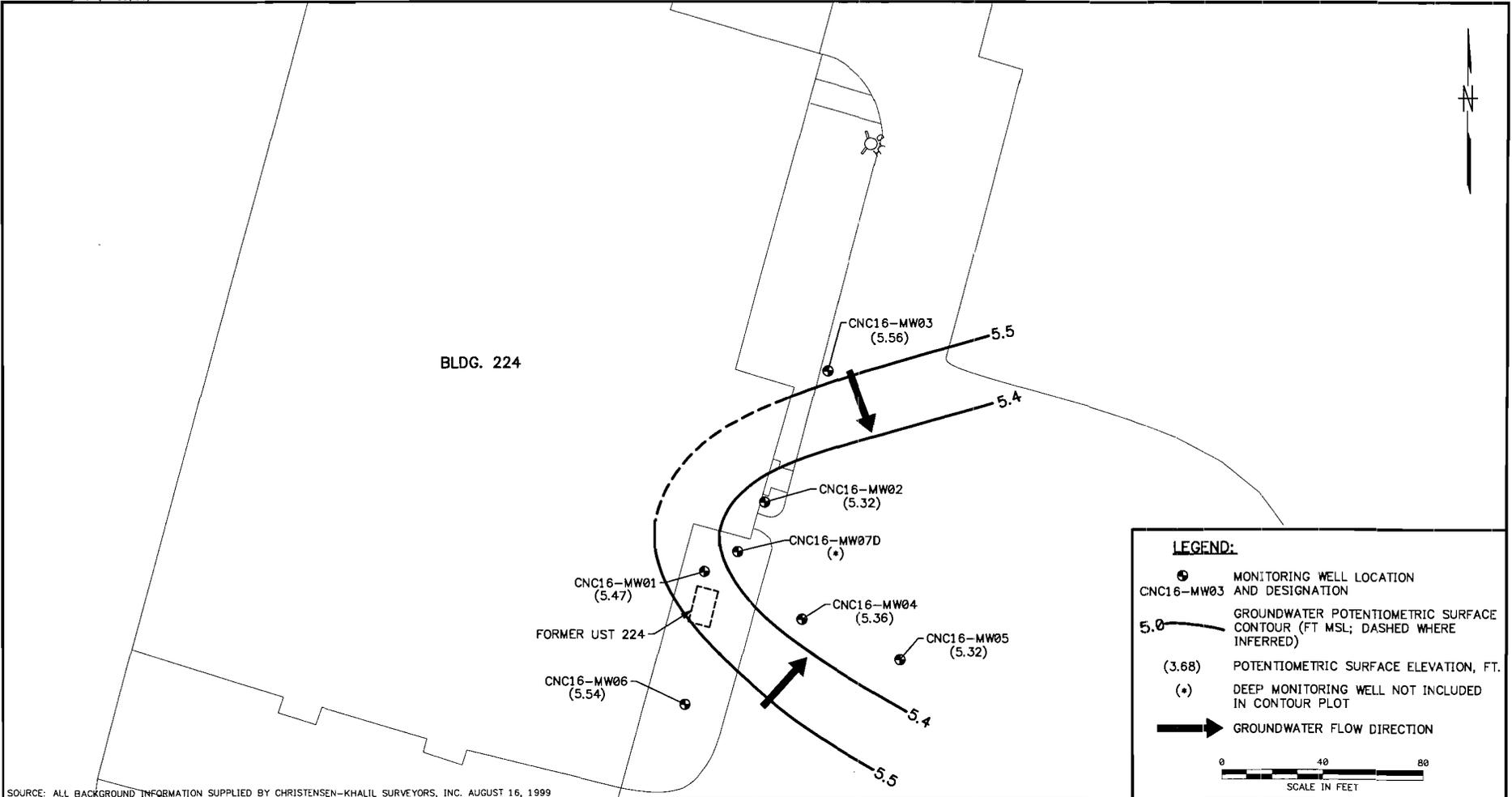
SOUTHEAST



NOTES:

- 1) TEX = TOLUENE, ETHYLBENZENE, XYLENES
- 2) PAH = POLYNUCLEAR, AROMATIC, HYDROCARBONS
- 3) ANALYTE AT CONCENTRATION LESS THAN REPORTING LIMIT AND GREATER THAN DETECTION LIMIT.
- 4) ND = NO ANALYTICAL DATA COLLECTED. LIMIT AND GREATER THAN DETECTION LIMIT.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE		GEOLOGIC CROSS SECTION A-A' SITE 10, BUILDING 224 ZONE G CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO.	
							MF	10/20/99			0124	
							COST/SCHED-AREA				APPROVED BY	DATE
							SCALE AS NOTED				APPROVED BY	DATE
										DRAWING NO.	REV.	
										FIGURE 4	0	



SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC. AUGUST 16, 1999

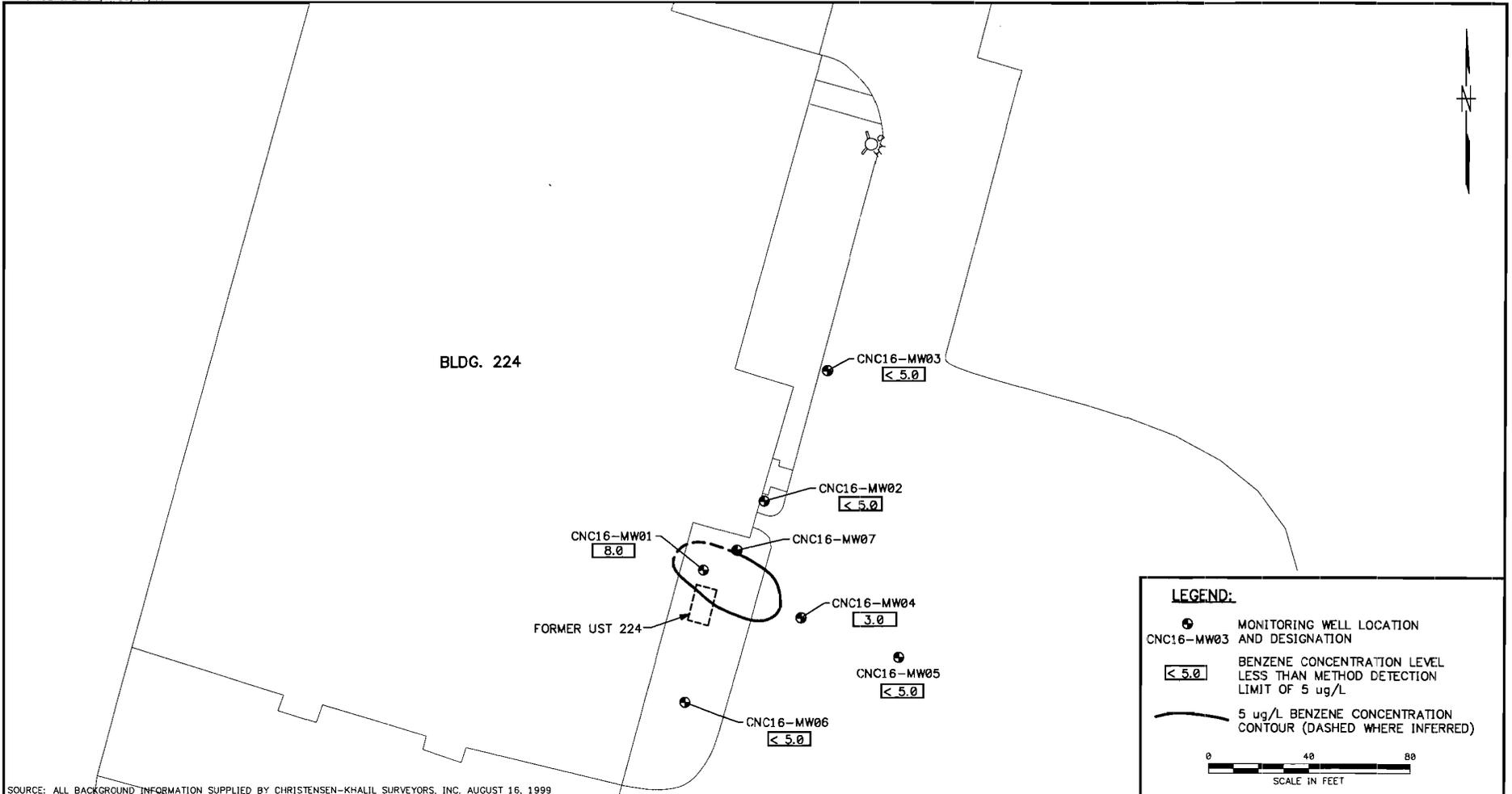
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY MF 10/20/99
 DATE 10/20/99
 CHECKED BY
 DATE
 COST/SCHED-AREA
 SCALE AS NOTED



GROUNDWATER POTENTIOMETRIC MAP
 (JULY 22, 1999)
 SITE 16 BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 6	REV. 0



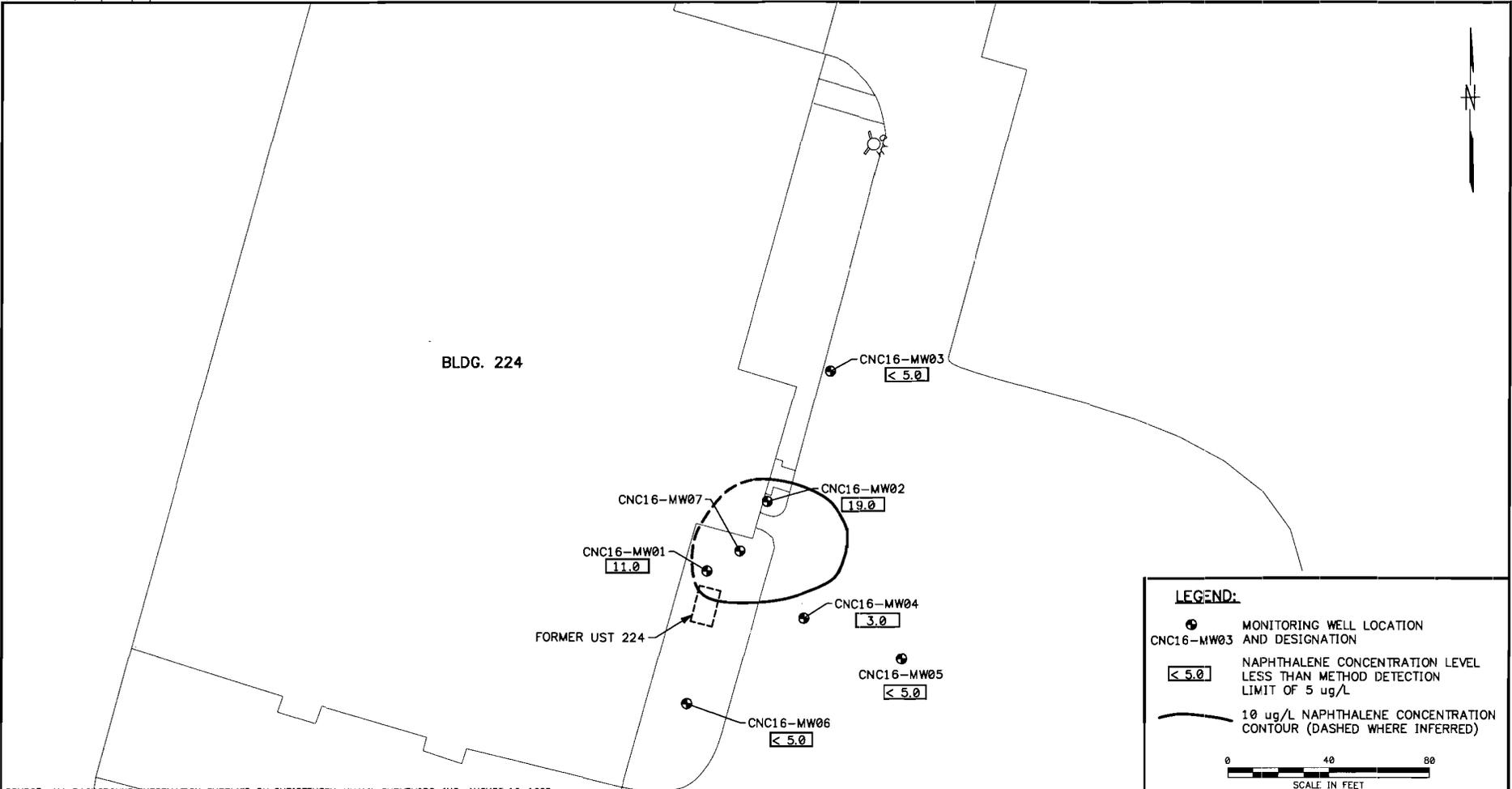
SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC. AUGUST 16, 1999

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE
							MF	10/20/99
							CHECKED BY	DATE
							COST/SCHED-AREA	
							SCALE	AS NOTED



GROUNDWATER BENZENE CONCENTRATION
MAP (JULY 20, 21, 1999)
SITE 16 BUILDING 224
ZONE G, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 8	REV. 0



SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC. AUGUST 16, 1999

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MF 10/19/99

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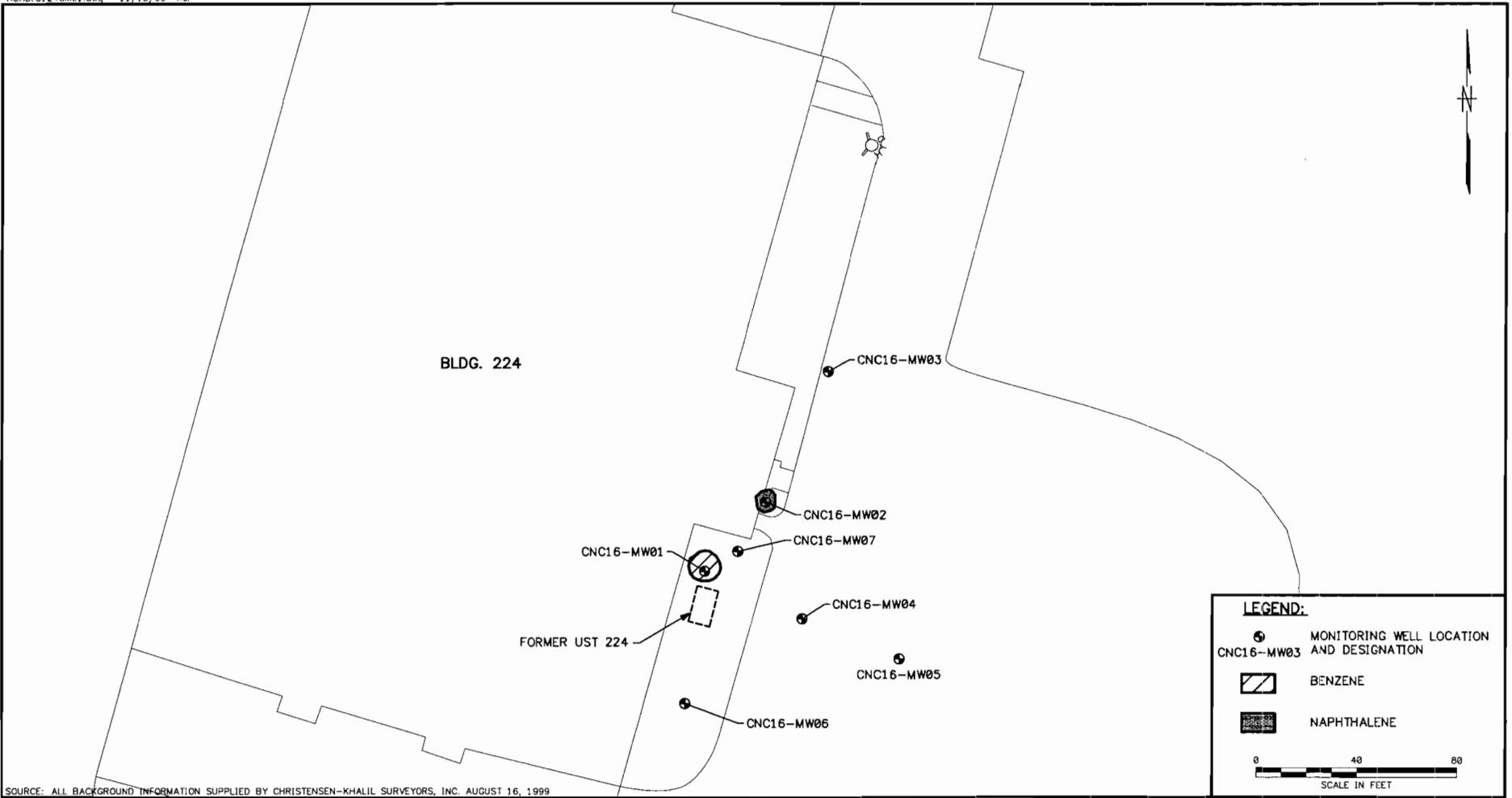
COST/SCHED-AREA

SCALE
AS NOTED



GROUNDWATER NAPHTHALENE CONCENTRATION
MAP (JULY 20, 21, 1999)
SITE 16 BUILDING 224
ZONE G, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 9	REV. 0



SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC. AUGUST 16, 1999

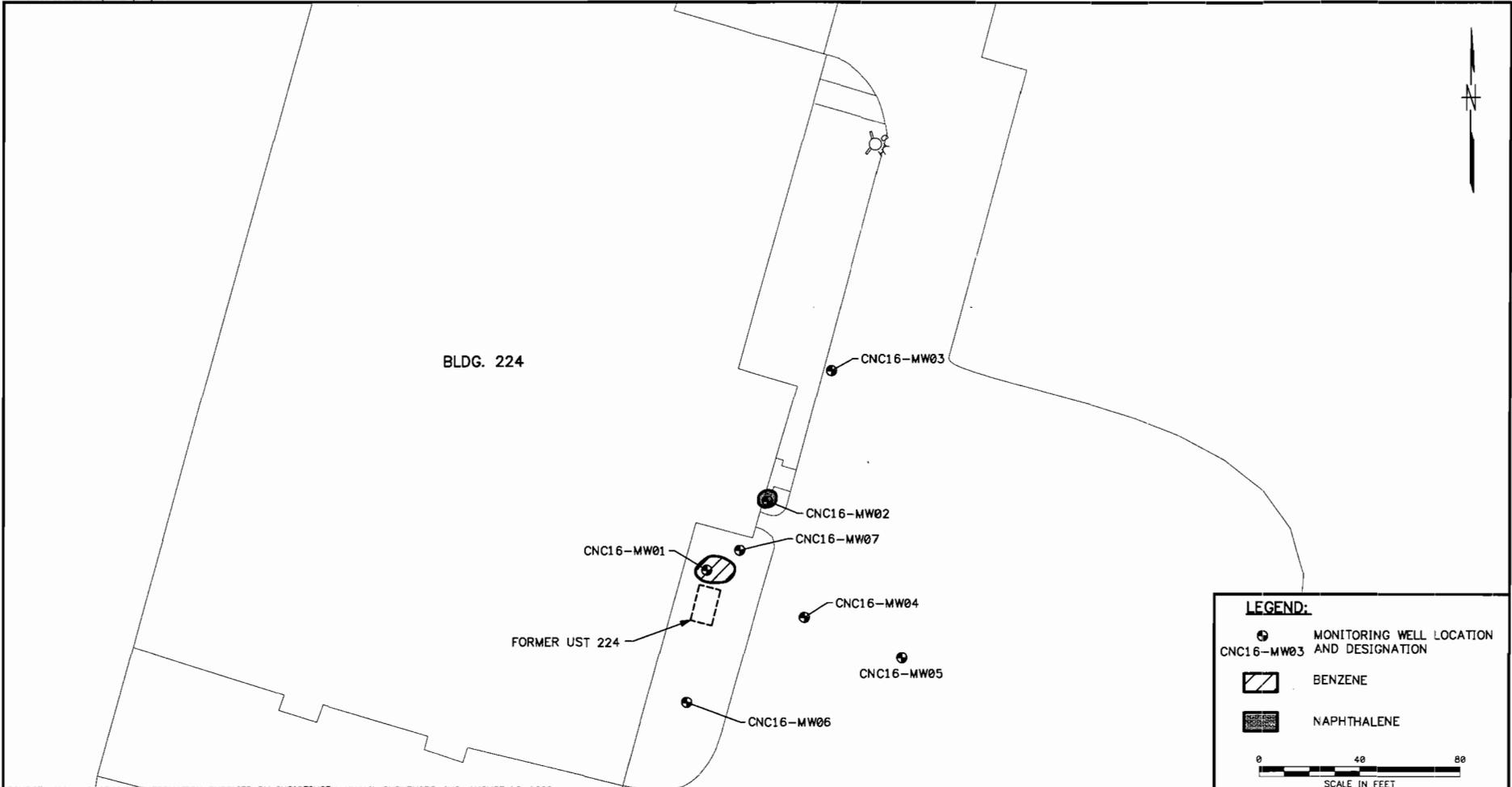
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE
HJP 10/20/99
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED



PREDICTED 10-YEAR MIGRATION
SITE 16 BUILDING 224
ZONE G, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO.
0124
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. REV.
FIGURE 10 0



SOURCE: ALL BACKGROUND INFORMATION SUPPLIED BY CHRISTENSEN-KHALIL SURVEYORS, INC. AUGUST 16, 1999

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 10/20/99
 CHECKED BY DATE
 COST/SCHED-AREA
 SCALE AS NOTED



PREDICTED 20-YEAR MIGRATION
 SITE 16 BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 11	REV. 0

APPENDIX A

UNDERGROUND STORAGE TANK ASSESSMENT REPORT - UST 224



DEPARTMENT OF THE NAVY

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

5090
Code 1849
6 Oct 98

Mr. Mark Perry
Tetra Tech NUS
Foster Plaza 7
661 Anderson Drive
Pittsburgh, PA 15220-2745

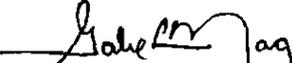
**ADDITIONAL UNDERGROUND STORAGE TANK ASSESSMENT REPORT
ZONE "G"**

Dear Mr. Perry:

Enclosed is an additional assessment report (UST 224) that was not included in the original documents that were forwarded. This tank was located in Zone "G". Please include this with the Zone "G" statement of work. Thanks.

If you have any questions please contact me at (843) 820-7307.

Sincerely,


GABRIEL L. MAGWOOD
Remedial Project Manager

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

Submit Completed Form to:

Date Received
State Use Only

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: 843 Telephone Number: 743-9985 Contact Person: Henry N. Shepard II, P. E.			

II SITE IDENTIFICATION AND LOCATION

Site I.D. #:	Unregulated		
Facility Name:	Charleston Naval Base Complex, Building 224		
Street Address:	Hobson Avenue		
City:	North Charleston, 29405-2413	County:	Charleston

III CLOSURE INFORMATION

Closure Started: 18 Aug 1998	Closure Completed: 17 Sept 1998
N/A	SPORTENVDETCNASN
Consultant	UST Removal Contractor
Number of USTs Closed: 1	

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

I certify that I have personally examined and am familiar with the information submitted in this and all attached documents; and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate and complete.	
Henry Shepard II, P. E.	
Name (Type or Print)	
Signature	

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.....

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5
Fuel oil					
5,000 gal			*		
1972					
Steel					
3/96					
9'					
N					
N					
R					
N					
N					

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

UST 224 was removed, drained, cut open at both ends, and cleaned with a steam cleaner. It was then cut up for recycling as scrap metal. (See Attachment III.)

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

The sludge, waste water, and residual fuel oil from UST 224 were recycled.

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

UST 224 was covered with a 3/8" thick protective coating. The tank was in good condition, no pitting or holes were found.

VI. PIPING INFORMATION

- A. Construction Material.....
- B. Distance from UST to Dispenser.....
- C. Number of Dispensers.....
- D. Type of System P/S.....
- E. Was Piping Removed from the Ground? Y/N....
- F. Visible Corrosion or Pitting Y/N.....
- G. Visible Holes Y/N.....
- H. Age.....

Note 1: UST 224 supplied heating fuel oil to building 224.

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5
Steel & Copper					
20' See note 1					
1 See note 1					
S					
Y					
N					
N					
1972					

- 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

Building 224 was built in 1972. It was used as a submarine supply and a base supply warehouse, known as Servmart.

VIII. SITE CONDITIONS

Yes No Unk

	Yes	No	Unk
<p>A. Were any petroleum-stained or contaminated soils found in the UST excavation, soil borings, trenches, or monitoring wells?</p> <p>If yes, indicate depth and location on the site map.</p>		X	
<p>B. Were any petroleum odors detected in the excavation, soil borings, trenches, or monitoring wells?</p> <p>If yes, indicate location on site map and describe the odor (strong, mild, etc.)</p>		X	
<p>C. Was water present in the UST excavation, soil borings, or trenches?</p> <p>If yes, how far below land surface (indicate location and depth)?</p> <p><u>See note 1.</u></p>	X		
<p>D. Did contaminated soils remain stockpiled on site after closure?</p> <p>If yes, indicate the stockpile location on the site map.</p> <p>Name of DHEC representative authorizing soil removal:</p> <p>_____</p>		X	
<p>E. Was a petroleum sheen or free product detected on any excavation or boring waters?</p> <p>If yes, indicate location and thickness.</p>		X	

Note 1: UST excavation, at 9' below GSL, approximately 18" deep. During the preliminary phase of the excavation no groundwater was encountered, however, a storm drain was accidentally broken by the back hoe. It rained before work could be completed. Rainwater runoff from the roof of the building flooded the hole with 18" of water via the broken storm drain. This water was sampled as SPORT 0885-1.

X. SAMPLING METHODOLOGY

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

After the removal of UST 224 soil and groundwater samples were taken. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

Sample jars were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Soil samples were extracted at the tank ends just above the groundwater level. Samples for volatiles were taken using the Encore sampler and T-handle. The groundwater sample was taken from the bottom center of the excavation.

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 SPORTENVDETHASN until they were transferred to General Engineering Laboratories for analysis as documented in the attached Chain-of-Custody Record.

XI. RECEPTORS

Yes No

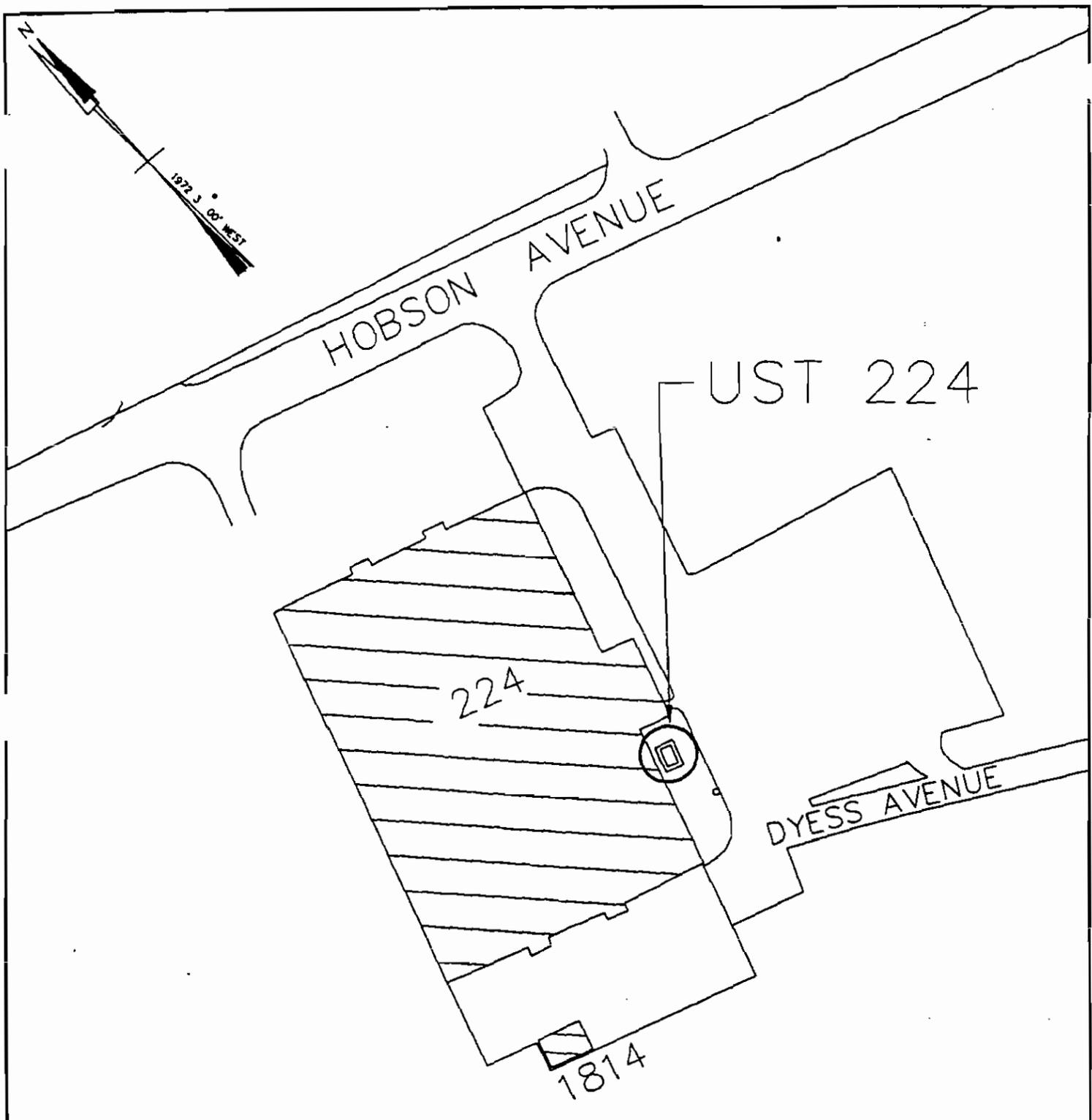
A.	<p>Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system?</p> <p>If yes, indicate type of receptor, distance, and direction on site map.</p>		X
B.	<p>Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system?</p> <p>If yes, indicate type of well, distance, and direction on site map.</p>		X
C.	<p>Are there any underground structures (e.g., basements) located within 100 feet of the UST system?</p> <p>If yes, indicate the type of structure, distance, and direction on site map.</p>		X
D.	<p>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?</p> <p>If yes, indicate the type of utility, distance, and direction on the site map. [water, storm drain, fire hydrant]</p>	X	
E.	<p>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?</p> <p>If yes, indicate the area of contaminated soil on the site map.</p>		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



UST 224

224

1814

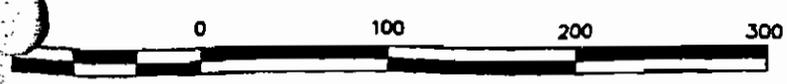
DYESS AVENUE

HOBSON AVENUE

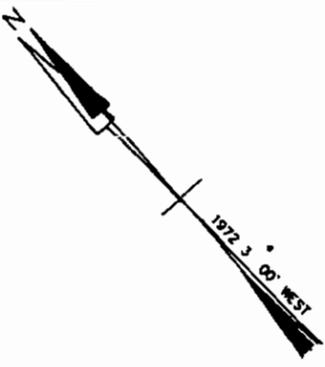
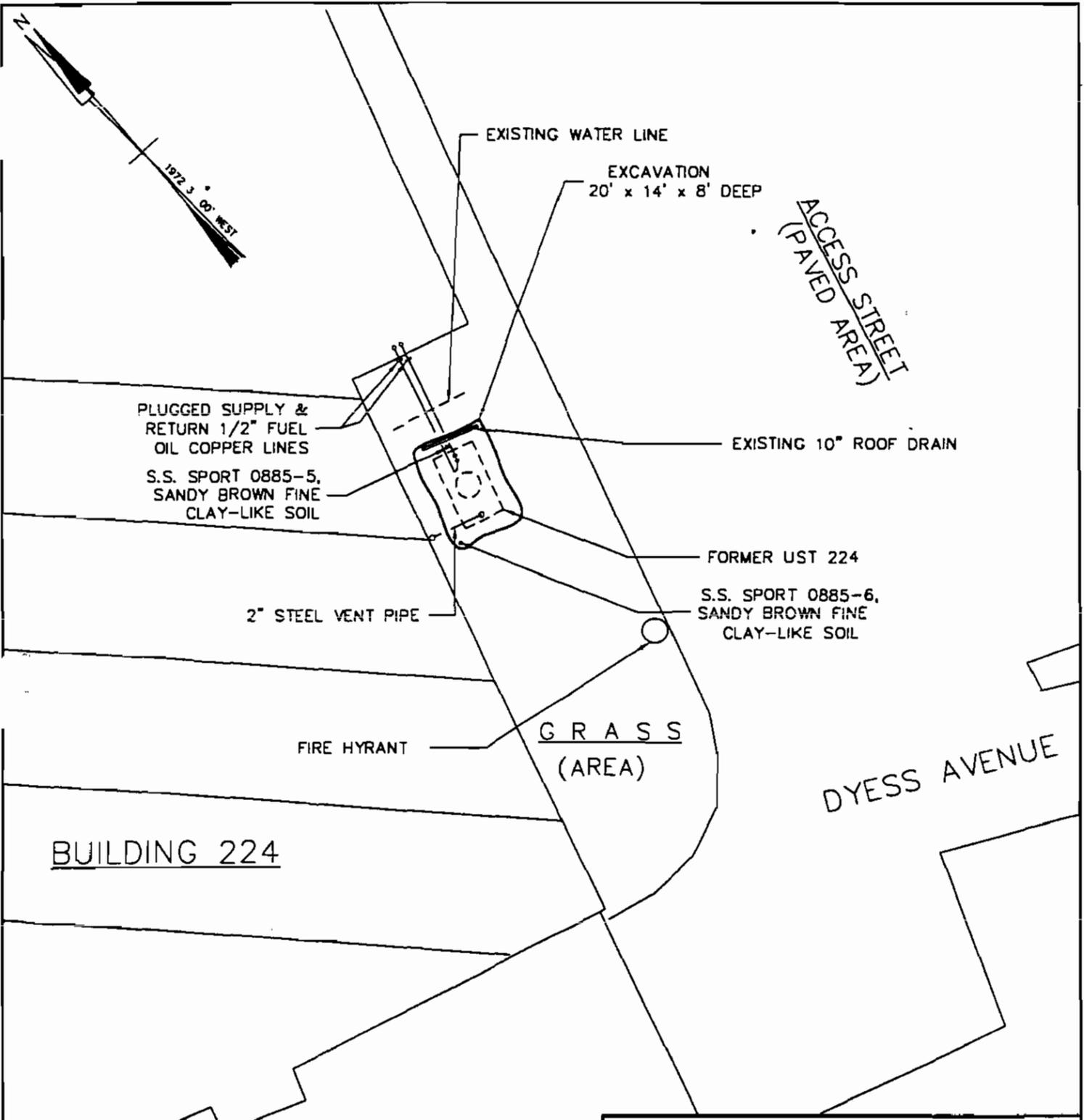
SPORTENVDETHASN
1899 North Hobson Ave.
North Charleston, SC 29405-2108
Ph. (803) 743-6777

Site Map 1
UST 224
Charleston Naval Base
Charleston, SC

DWG DATE: 19 AUG 98 DWG NAME: NS-224_1



GRAPHIC SCALE



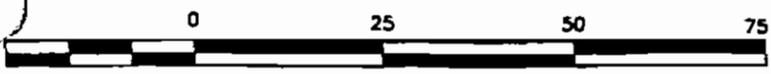
BUILDING 224

GRASS
(AREA)

DYESS AVENUE

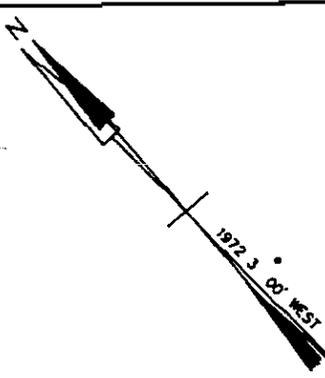
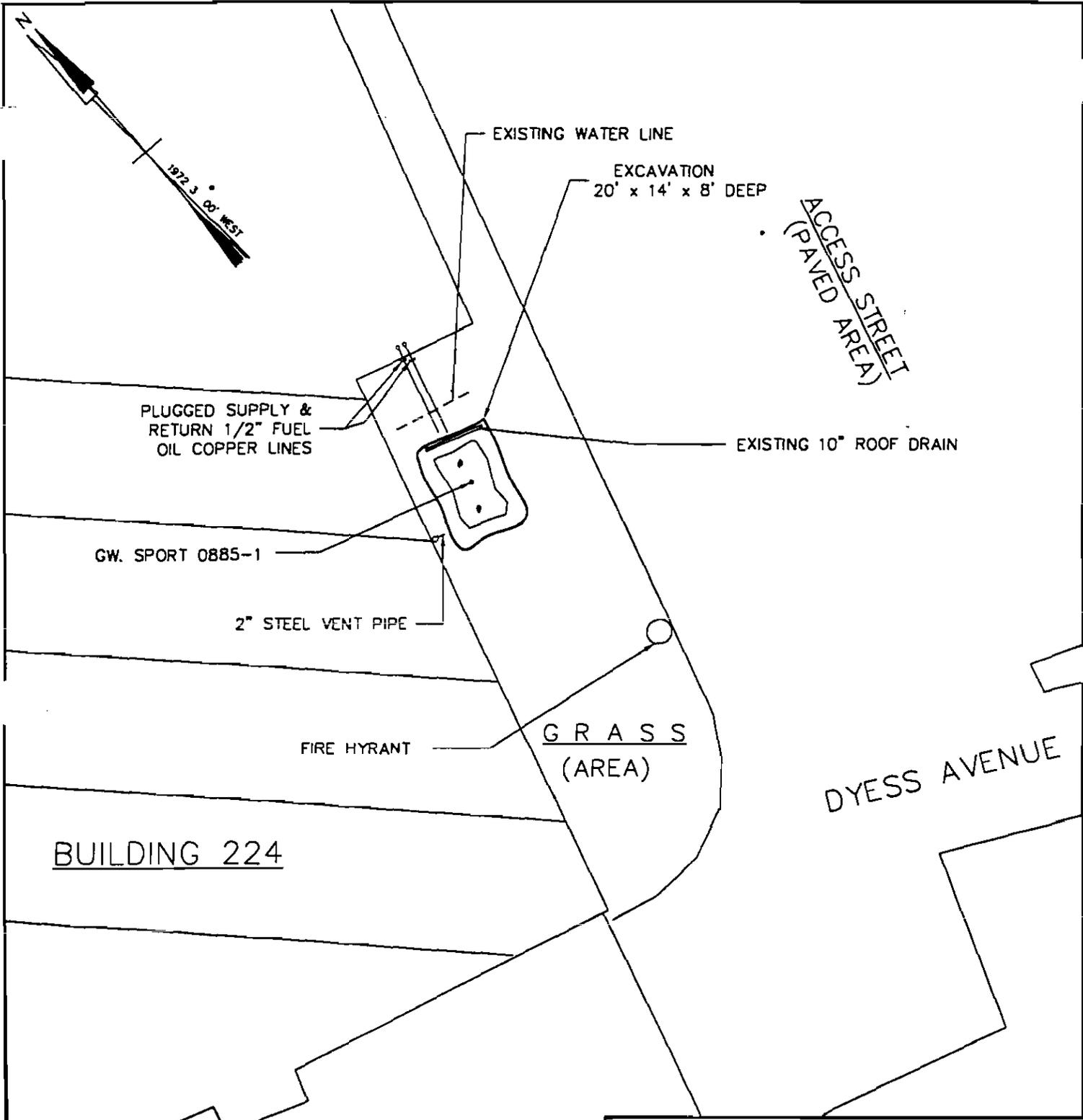
LEGEND

S.S. - SOIL SAMPLE



GRAPHIC SCALE

SPORTENVDETHASN 1899 North Hobson Ave. North Charleston, SC 29405-2108 Ph. (803) 743-6777	
Site Map 2 UST 224 Charleston Naval Base Charleston, SC	
DWG DATE: 20 AUG 98	DWG NAME: NS-224_2



1972 3 00 WEST

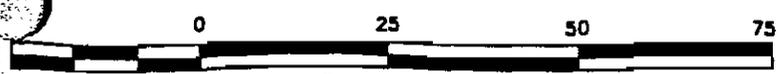
BUILDING 224

G R A S S
(AREA)

DYESS AVENUE

LEGEND

GW. - GROUNDWATER SAMPLE



GRAPHIC SCALE

SPORTENVDETHASN
1899 North Hobson Ave.
North Charleston, SC 29405-2108
Ph. (803) 743-8777

Site Map 3
UST 224
Charleston Naval Base
Charleston, SC

DWG DATE: 18 SEP 98 | DWG NAME: NS-224_3

UST 224

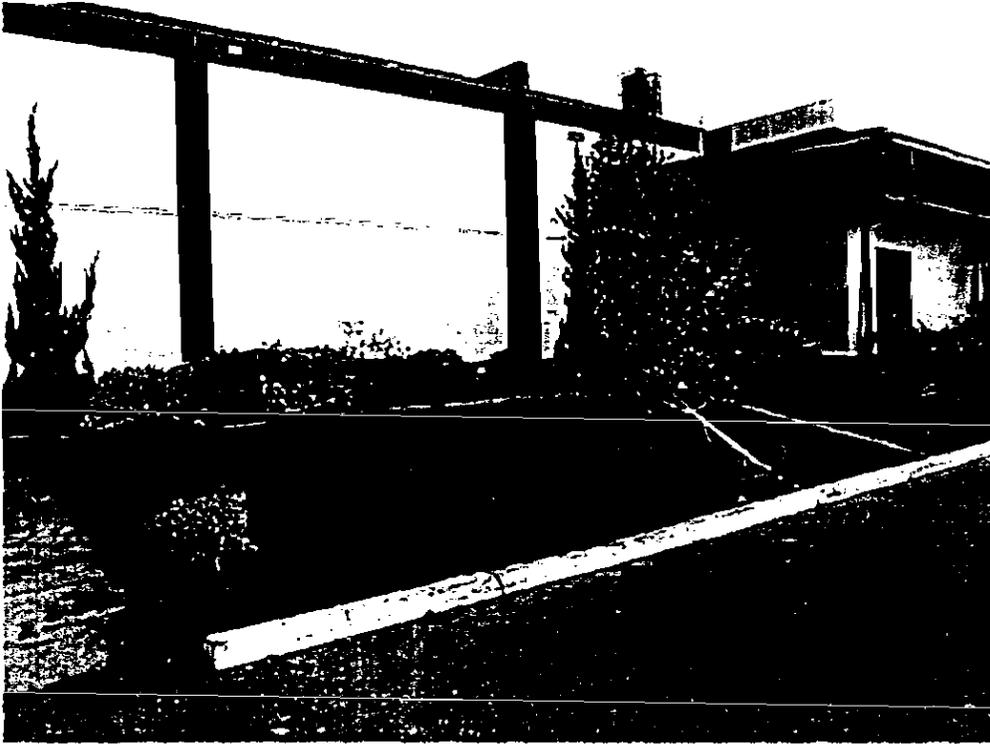


Photo 1: UST 224 site.

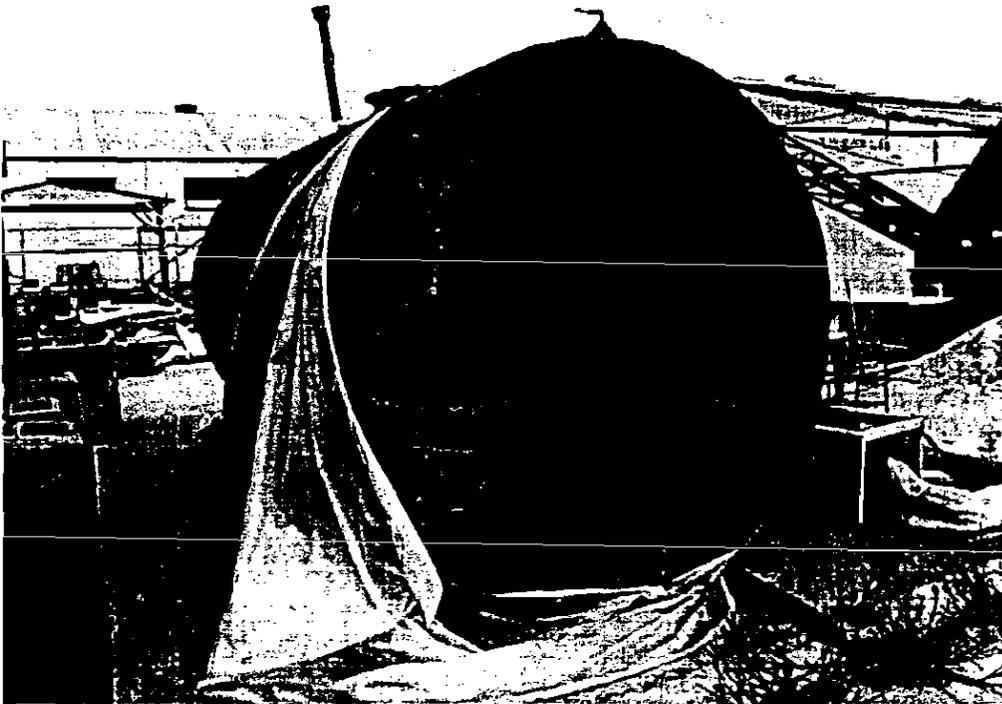


Photo 2: UST 224

UST 224

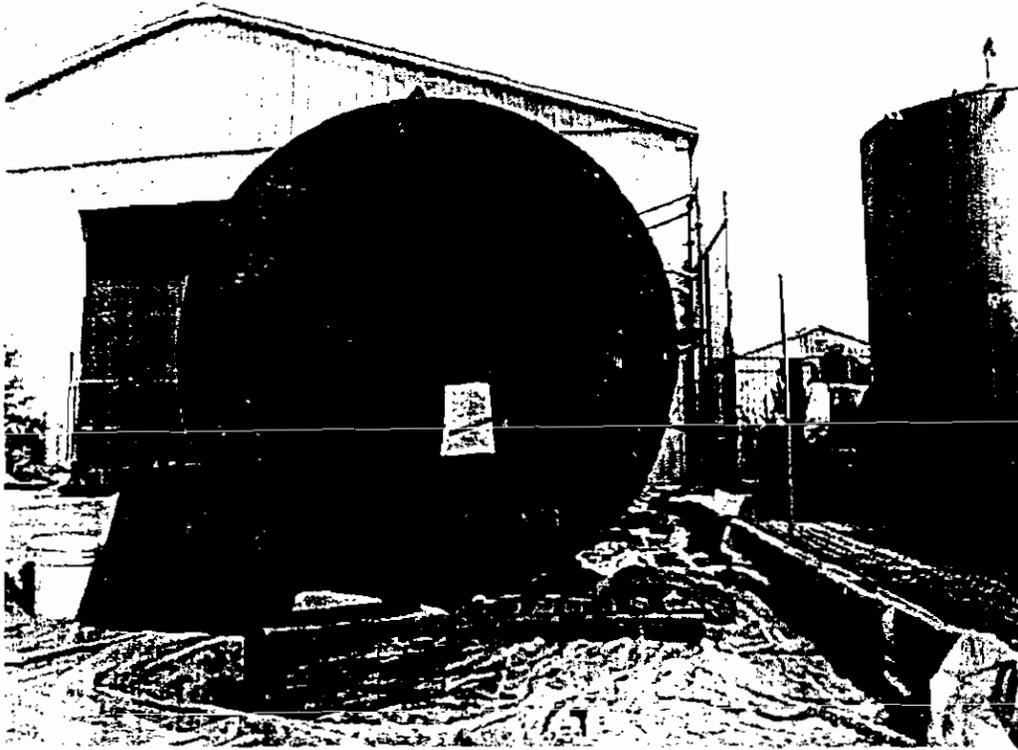


Photo 3: UST 224 during cutting and cleaning.

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

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8
NC	233	
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

Page 1 of 2

Sample ID : SPORT0885-1
 Lab ID : 9808666-01
 Matrix : GroundH2O - Runoff
 Date Collected : 08/18/98
 Date Received : 08/19/98
 Priority : Routine
 Collector : Client

stormwater

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene		6.47	0.250	1.00	ug/l	1.0	TCL	08/21/98	2145	129327	
Ethylbenzene		9.93	0.230	1.00	ug/l	1.0					
Naphthalene		41.7	0.420	1.00	ug/l	1.0					
Toluene		7.90	0.220	1.00	ug/l	1.0					
Xylenes (TOTAL)		55.3	0.620	2.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX+NAP-8260B	79.9	(60.2 - 139.)
Dibromofluoromethane	BTEX+NAP-8260B	112.	(70.6 - 152.)
Toluene-d8	BTEX+NAP-8260B	95.8	(68.4 - 135.)

M = Method	Method-Description
M 1	SW846 8260B

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

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

U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.





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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

Page 2 of 2

Sample ID : SPORT0885-1

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 (803) 769-7386.


Reviewed By



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FL	E87156/87294	E87472/8
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Contact: Mr. Bill Hiers

Project Description: SUPSHIP Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

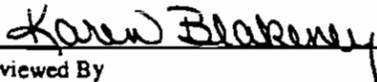
Page 2 of 2

Sample ID . SPORT0885-2

M = Method

Method-Description

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8
NC	233	
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

Page 1 of 2

Sample ID : SPORT0885-3
 Lab ID : 9808666-03
 Matrix : Soil
 Date Collected : 08/18/98
 Date Received : 08/19/98
 Priority : Routine
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.250	2.00	ug/kg	1.0	TCL	08/21/98	1431	129229	
Ethylbenzene	U	ND	0.230	2.00	ug/kg	1.0					
Naphthalene	U	ND	0.420	2.00	ug/kg	1.0					
Toluene	U	ND	0.220	2.00	ug/kg	1.0					
Xylenes (TOTAL)	J	5.19	0.620	6.00	ug/kg	1.0					

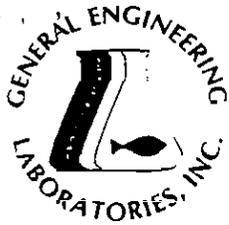
The following prep procedures were performed:
 GC/MS Volatiles (8260 High Level)

TCL 08/20/98 0800 129229 2

Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	BTEX+NAP-8260B	78.7	(53.5 - 154.)
Dibromofluoromethane	BTEX+NAP-8260B	100.	(63.4 - 136.)
Toluene-d8	BTEX+NAP-8260B	80.0	(72.1 - 137.)

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





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NC	233	
SC	10120	10582
TN	02934	02934

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cc: NPWC00197

Report Date: August 26, 1998

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Sample ID : SPORT0885-3

M = Method

Method-Description

Notes:

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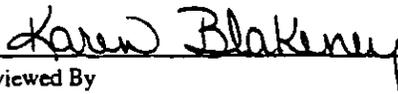
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Laboratory Certifications

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FL	E87156/87294	E87472/87
NC	233	
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

Page 1 of 2

Sample ID : SPORT0885-4
Lab ID : 9808666-04
Matrix : GroundH2O
Date Collected : 08/18/98
Date Received : 08/19/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Extractable Organics											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	J	127	71.5	143	ug/l	10.	RLC	08/25/98	1203	129147	
Acenaphthylene	U	ND	71.5	143	ug/l	10.					
Anthracene	J	123	71.5	143	ug/l	10.					
Benzo(a)anthracene	J	118	71.5	143	ug/l	10.					
Benzo(a)pyrene	U	ND	71.5	143	ug/l	10.					
Benzo(b)fluoranthene	U	ND	71.5	143	ug/l	10.					
Benzo(ghi)perylene	U	ND	71.5	143	ug/l	10.					
Benzo(k)fluoranthene	U	ND	71.5	143	ug/l	10.					
Chrysene	J	124	71.5	143	ug/l	10.					
Dibenzo(a,h)anthracene	U	ND	71.5	143	ug/l	10.					
Fluoranthene		509	71.5	143	ug/l	10.					
Fluorene		179	71.5	143	ug/l	10.					
Indeno(1,2,3-c,d)pyrene	U	ND	71.5	143	ug/l	10.					
Naphthalene	U	ND	71.5	143	ug/l	10.					
Phenanthrene		728	71.5	143	ug/l	10.					
Pyrene		481	71.5	143	ug/l	10.					

The following prep procedures were performed:

GC/MS Base/Neutral Compounds

GMS 08/20/98 1500 129147 2

Comments:

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





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STATE	GEL	EPI
FL	E87156/87294	E874728
NC	233	
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

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Sample ID : SPORT0885-4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	0.00*	(43.0 - 108.)
Nitrobenzene-d5	M610	0.00*	(35.0 - 111.)
p-Terphenyl-d14	M610	0.00*	(33.0 - 125.)

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

Notes:

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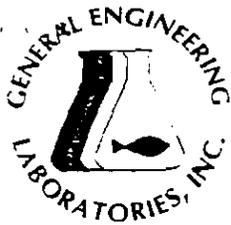
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Reviewed By

Karen Blakeney





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NC	233	
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

Page 1 of 2

Sample ID : SPORT0885-5
 Lab ID : 9808666-05
 Matrix : Soil
 Date Collected : 08/18/98
 Date Received : 08/19/98
 Priority : Routine
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	J	0.603	0.232	2.00	ug/kg	1.0	TCL	08/20/98	2256	129229	
Ethylbenzene	U	ND	0.213	2.00	ug/kg	1.0					
Naphthalene	U	ND	0.390	2.00	ug/kg	1.0					
Toluene	U	ND	0.204	2.00	ug/kg	1.0					
Xylenes (TOTAL)	J	0.752	0.575	6.00	ug/kg	1.0					
Extractable Organics											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	ND	85.0	330	ug/kg	1.0	JPA	08/24/98	2248	129262	2
Acenaphthylene	U	ND	91.6	330	ug/kg	1.0					
Anthracene	U	ND	62.1	330	ug/kg	1.0					
Benzo(a)anthracene	U	ND	58.9	330	ug/kg	1.0					
Benzo(a)pyrene	U	ND	55.6	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	ND	101	330	ug/kg	1.0					
Benzo(ghi)perylene	U	ND	58.9	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	ND	85.0	330	ug/kg	1.0					
Chrysene	U	ND	45.8	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	ND	55.6	330	ug/kg	1.0					
Fluoranthene	U	ND	78.5	330	ug/kg	1.0					
Fluorene	U	ND	78.5	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	137	330	ug/kg	1.0					
Naphthalene	U	ND	75.2	330	ug/kg	1.0					
Phenanthrene	U	ND	75.2	330	ug/kg	1.0					
Pyrene	U	ND	62.1	330	ug/kg	1.0					

The following prep procedures were performed:
 GC/MS Volatiles (8260 High Level)

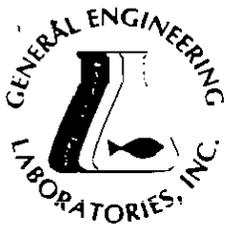
TCL 08/20/98 0955 129229 3

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9808666-05



GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8
NC	233	
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

Page 2 of 2

Sample ID : SPORT0885-5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
GC/MS Base/Neutral Compounds							HDB	08/21/98	1200	129262	4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	88.7	(30.0 - 115.)
Nitrobenzene-d5	M610	90.1	(23.0 - 120.)
p-Terphenyl-d14	M610	75.1	(37.3 - 128.)
Bromofluorobenzene	BTEX+NAP-8260B	86.8	(53.5 - 154.)
Dibromofluoromethane	BTEX+NAP-8260B	84.5	(63.4 - 136.)
Toluene-d8	BTEX+NAP-8260B	79.8	(72.1 - 137.)

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

Notes:

The qualifiers in this report are defined as follows:

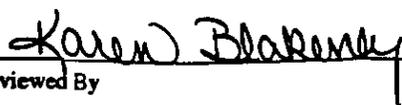
ND indicates that the analyte was not detected at a concentration greater than the detection limit.

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.


Reviewed By

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GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87194	E87472/8
NC	233	
SC	10120	10382
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

Page 1 of 2

Sample ID : SPORT0885-6
 Lab ID : 9808666-06
 Matrix : Soil
 Date Collected : 08/18/98
 Date Received : 08/19/98
 Priority : Routine
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	J	0.940	0.222	2.00	ug/kg	1.0	TCL	08/20/98	2325	129229	
Ethylbenzene	J	0.630	0.204	2.00	ug/kg	1.0					
Naphthalene	J	0.878	0.373	2.00	ug/kg	1.0					
Toluene	J	1.26	0.195	2.00	ug/kg	1.0					
Xylenes (TOTAL)	J	2.30	0.550	6.00	ug/kg	1.0					
Extractable Organics											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	ND	85.0	330	ug/kg	1.0	JPA	08/24/98	2318	129262	2
Acenaphthylene	U	ND	91.6	330	ug/kg	1.0					
Anthracene	U	ND	62.1	330	ug/kg	1.0					
Benzo(a)anthracene	U	ND	58.9	330	ug/kg	1.0					
Benzo(a)pyrene	U	ND	55.6	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	ND	101	330	ug/kg	1.0					
Benzo(ghi)perylene	U	ND	58.9	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	ND	85.0	330	ug/kg	1.0					
Chrysene	U	ND	45.8	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	ND	55.6	330	ug/kg	1.0					
Fluoranthene	U	ND	78.5	330	ug/kg	1.0					
Fluorene	U	ND	78.5	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	137	330	ug/kg	1.0					
Naphthalene	U	ND	75.2	330	ug/kg	1.0					
Phenanthrene	U	ND	75.2	330	ug/kg	1.0					
Pyrene	U	ND	62.1	330	ug/kg	1.0					

The following prep procedures were performed:
 GC/MS Volatiles (8260 High Level)

TCL 08/20/98 1000 129229 3

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9808666-06



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STATE	GEL	EPI
FL	E87156/87294	E87472/8
NC	233	
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: August 26, 1998

Page 2 of 2

Sample ID : SPORT0885-6

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
GC/MS Base/Neutral Compounds							HDB	08/21/98	1200	129262	4

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	87.0	(30.0 - 115.)
Nitrobenzene-d5	M610	84.0	(23.0 - 120.)
p-Terphenyl-d14	M610	78.2	(37.3 - 128.)
Bromofluorobenzene	BTEX+NAP-8260B	106.	(53.5 - 154.)
Dibromofluoromethane	BTEX+NAP-8260B	89.5	(63.4 - 136.)
Toluene-d8	BTEX+NAP-8260B	79.7	(72.1 - 137.)

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

Notes:

The qualifiers in this report are defined as follows:

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

U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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

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 (843) 743-6482

TANK ID & LOCATION

UST 224; Building 224, Hobson Ave., Charleston Naval Base, N. Charleston, SC

DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning
& Disposal Area
Charleston Naval Complex

TYPE OF TANK

Fuel oil

SIZE (GAL)

5,000 gal.

CLEANING/DISPOSAL METHOD

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

DISPOSAL CERTIFICATION

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

Carl Jenkins 9/13/98
Carl Jenkins (Date)

APPENDIX B

GEOLOGIC BORING LOGS

BORING LOG

PROJECT NAME: CNC Site 16 Bldg. 224 BORING NUMBER: CNC-16B01
 PROJECT NUMBER: NO124 Zone G DATE: 4-30-99
 DRILLING COMPANY: _____ GEOLOGIST: SISCO
 DRILLING RIG: F-250 w/ 5400 DRILLER: Coleman

16 SB01-030A

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
0																	
	1				Soft Lt Brown												
	2				"		Sandy silt tr. clay		Moist		50+						
X	3				" Gray		Silty Org. Clay		Moist		100+						
	4		3		Med Silt		Same as above 50mm gravel		Wet		100+						
	5																
	6																
	7																
	8		0														
	9																
	10																
	11																
	12		0														
	13																
	14																
	15																
	16		0														
	17																
	18																
	19																
	20		0.5		Gray		Sandy silt, some gravel		SATURATED		100+						
	21																
	22																
	23																
	24		0														
	25																

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.
 Remarks: _____
 Converted to Well: Yes _____ No X Well I.D. #: _____
 Drilling Area Background (ppm): 2

BORING LOG

PROJECT NAME: CNC Site 16 Bldg. 224 BORING NUMBER: CNCL6B03
 PROJECT NUMBER: ND124 Zone G DATE: 4.30.99
 DRILLING COMPANY: Tidewater GEOLOGIST: Greg Sisco
 DRILLING RIG: F250 w/ 5400 DRILLER: Mark

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 5" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	0																	
	1						silty sand											
	2						" "		moist									
X	3						" "		moist	100t								
	4		3'				silty organic clay		wet	100t								
	5						" "		wet	100t								
	6						" "		wet	100t								
	7						" "		wet	100t								
	8		3'				silty organic clay			100t								
	9						" "		Saturated	100t								
	10						" "		Saturated	100t								
	11						" "		wet	100t								
	12		3'				" "		wet	100t								
					ECB													

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____ Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: Zone G Site 116 BORING NUMBER: CNC16B05
 PROJECT NUMBER: NB124 Bldg. 224 DATE: 4-30-99
 DRILLING COMPANY: Tidewater GEOLOGIST: GREG SISCO
 DRILLING RIG: F250 w/ 5400 DRILLER: MARIE COLEMAN

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	0																	
	1																	
S	X																	
	2																	
	3																	
	4		4'															
	5																	
	6																	
	7																	
	8		3'		black													
	9																	
	10																	
	11																	
	12		0															
				EOB														

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area
Background (ppm):

Converted to Well: Yes No Well I.D. #: _____

BORING LOG

PROJECT NAME: CNC Site 16 Bldg. 224 BORING NUMBER: CNC 16-B06
 PROJECT NUMBER: NO124 Zone G DATE: 5-1
 DRILLING COMPANY: _____ GEOLOGIST: SISCO
 DRILLING RIG: F250 M 5400 DRILLER: M. COLEMAN

Sample No. and Type or RQD	Depth (Fl.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Fl.) or Screened Interval	MATERIAL DESCRIPTION		U S C S	Remarks	PID/FID Reading (ppm)					
					Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole*	Driller BZ**	
0														
	1	/					Backfill, asphalt,	Dry	5					
	2	/					crusher run, etc	Dry	5					
	3	/					H ₂ A. Sandy silt w/ some clay	Moist	40					
	4	/	4				" "	Moist	50					
	5	/					---							
	6	/					Silty sand	Wet						
	7	/					" "	Wet						
	8	/	3				BK. Silty sand w/ some clay and gravel	Wet	100+					
	9	/					---	SATURATED						
	10	/					---	"						
	11	/					---	"						
	12	/	0				---	"						
							EOB	CR						

*When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area
Background (ppm): 3

Converted to Well: Yes _____ No X Well I.D. #: _____

BORING LOG

PROJECT NAME: CNC Site 16 Bldg. 224 BORING NUMBER: 16-BQB
 PROJECT NUMBER: ND124 Zone G DATE: 5-1
 DRILLING COMPANY: _____ GEOLOGIST: SISCO
 DRILLING RIG: 250 w/ 5400 DRILLER: COLEMAN

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
0																	
1							Asphalt fill		Dry	3							
2							11 gravel		Dry	3							
3							4 Br. Sandy silt		Dry	3							
4			4				Med. silt		Moist	3							
5																	
6																	
7							Silty sand		Saturated	20+							
8			2				Black 11 some small gravel		"	50+							
							EOB										

*When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area
Background (ppm): 3

Converted to Well: Yes _____ No X Well I.D. #: _____

BORING LOG

PROJECT NAME: CNC Site 16 Bldg. 224 BORING NUMBER: CNC 16-B09
 PROJECT NUMBER: ND124 Zone G DATE: 5-1
 DRILLING COMPANY: _____ GEOLOGIST: SISCO
 DRILLING RIG: 250 w/ 5400 DRILLER: SOLEMAN

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows / 6" or ROD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
0																		
1					DRY BR.		Sandy Silt		DRY		3							
2					DRY BR.		"		DRY		3							
3					YELLOW BROWN		"	trace clay	MOIST		20							
4			4				"	"	MOIST		20							
5					Gray		Silty sand		SATURATED									
6							"	"	"									
7					DRY GRAY		"	"	MOIST									
8			4		Black		"	trace clay	MOIST									
				EOB														

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Converted to Well: Yes _____ No X Well I.D. #: _____

Drilling Area 3
 Background (ppm): _____

BORING LOG

Page 1 of 1

PROJECT NAME: CNC Site 16 Bldg. 224 BORING NUMBER: CNC 16 - B10
 OBJECT NUMBER: ND124 Zone G DATE: 5-1
 DRILLING COMPANY: _____ GEOLOGIST: S/SO
 DRILLING RIG: 250 w/ 5400 DRILLER: COLEMAN

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
0																	
	1								DRY	3							
	2								Concrete, fill	DRY	3						
X	3								fill	DRY	50						
	4		3						to Lt. Brown to yellow Sandy silt	Moist	50						
	5																
	6								gray Sandy silt	Saturated							
	7								Yellow " "	"							
	8		3						Black " " small gravel	Moist							
					EOB												

When rock coring, enter rock brokeness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area 2
 Background (ppm): _____

Converted to Well: Yes _____ No X Well I.D. #: _____

BORING LOG

PROJECT NAME: CNC Site 16 Bldg. 224 BORING NUMBER: CNC 16-B14
 PROJECT NUMBER: NO124 Zone G DATE: 5-3
 DRILLING COMPANY: _____ GEOLOGIST: SISEO
 DRILLING RIG: 250 w/ 5400 DRILLER: COLEMAN

Sample No. and Type or RQD	Depth (FT) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FT) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole	Driller BZ				
	0																
	1				Brown		Silty Sand		Moist		3						
	2				Lt. Brown		" "		Moist		15						
X	3				" "		" "		Wat		100+						
	4		0														
	5																
	6																
	7																
	8		1		Black		Sandy silt		Saturated								
	9																
	10																
	11																
	12																
<div style="border: 1px solid black; border-radius: 50%; padding: 20px; width: fit-content; margin: auto;"> <p style="font-size: 1.2em;">I installed Piezometer w/ 10' of screen (2' to B1)</p> </div>																	

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area
Background (ppm): 3

Converted to Well: Yes No Well I.D. #: _____

BORING LOG

PROJECT NAME: Site 16 Bldg. 224 BORING NUMBER: CNC 16 B 15
 PROJECT NUMBER: NO 124 Zone G DATE: 5/27/99
 DRILLING COMPANY: Columbia GEOLOGIST: BDH
 DRILLING RIG: Strataprobe DRILLER: RB

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
				0.3'	med br		Topsoil, silt		d. moist				0
S-1 @ 1428	4	2.8/4	1.1'	hard br	lt		Clay, sandy		dry to d. moist	2/4			w/ filter
				fin	br		Clay, sandy more sand @ base		moist to wet	0			
				5.2'	tan		Sand, silty sl. clayey		wet				
S-2 @ 1433	8	2.9/4	7.2'										0
				fin	med gray		Organic matter ~ 1-2" clay, silty, sil. organic (woody) odor		d. moist	230			
							TD 8'						

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area
Background (ppm):

Converted to Well: Yes No Well I.D. #: _____

BORING LOG

PROJECT NAME: Chab. Naval Complex BORING NUMBER: CNC 16 - MW 7D
 PROJECT NUMBER: NO 124 Zone G Site DATE: 6/15/99
 DRILLING COMPANY: Custom Drilling GEOLOGIST: Mark Darrington
 DRILLING RIG: B-61 Mobile (8.25" ID HSA) DRILLER: Darrell Martin

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FT) or Screened Interval	MATERIAL DESCRIPTION		U S C S	Remarks	PID/FID Reading (ppm)				
					Soil Density/Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole**	Driller BZ**
	0							Background = 1.5					
	15			15	lt. Brn	No S.S. samples collected. Cuttings: Lt. Brown silty sand, 1/4 grain, w/ sorted, dry, no petro. odors		No petro. odors					
1	15	WOH	24"	16.5	lt. Brn	Silty sand w/ gravel, m-c grain present		No petro. odors	12			0.0	
	16												
	17			17.0	DK Gray	Clay, plastic, moist, some shells	CL	No petro. odors	17			0	
2	17	30	24"		DK Gray	Clay, plastic, moist, some shells top	CL	No petro. odors					
	18	0											
	19												
3	19	10	24"		DK Gray	(same as above)	CL	No petro. odors	19			0	
	20	0				No shells		(some) smell					
	21												
4	21	10	24"		DK Gray	(same as above)	CL	No petro. odors	6.2			0	
	22	0				No shells							
	23												
5	23	WOH			DK Gray	(same as above)	CL						
	24					No shells.							
	25			25.5	Br.	Lignite/Peat/Organic		Strong sulfur odor					
	26			26.0		No sample - sampler advanced from 25-28							
	27					by weight of Hammer (WOH)							
6	28	WOH	24"		DK Gray	Clay (as above)	CL	sulfur odor					
	30					w/ some shells							

* When rock coring, enter rock brokenness.

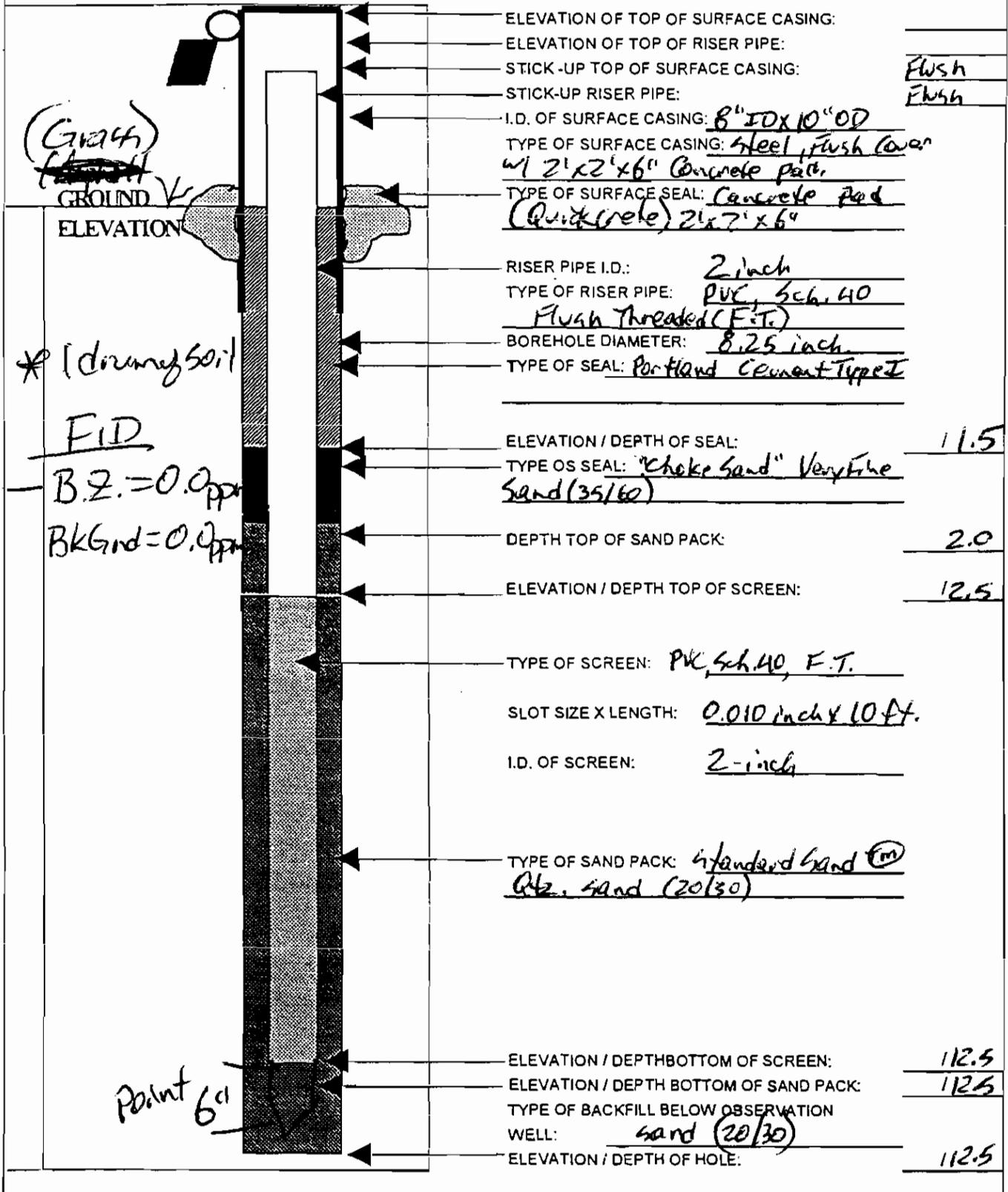
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Telescoped well/surface casing (6" dia) set @ 0-20' bgs. Background (ppm): 1.5 Drilling Area

Converted to Well: Yes No Well I.D. #: CNC 16 - MW 7D

OVERBURDEN MONITORING WELL SHEET

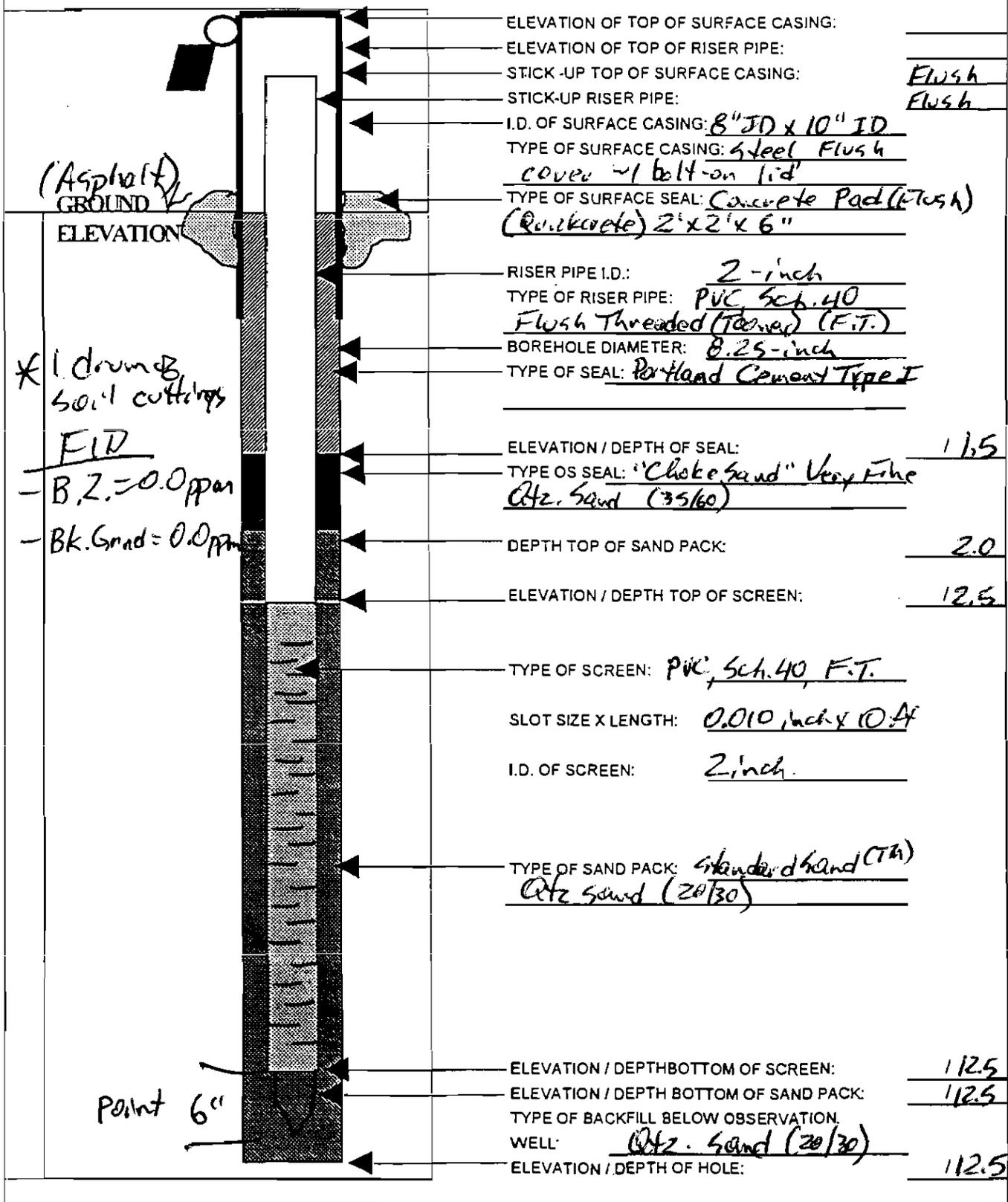
PROJECT <u>Chas, Naval Complex</u>	LOCATION: <u>Site 16/Zone G</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>NO 124 Bldg. 224</u>	BORING <u>CNK 16 - MW01</u>	METHOD: <u>BPT 4.25" HSA</u>
ELEVATION _____	DATE <u>6/16/99</u>	DRILLING <u>Darrell Martin</u>
FIELD GEOLOGIST <u>Mark Damsky</u>		DEVELOPMENT: <u>NA</u>
<u>In former USF basic area.</u>		



ELEVATION OF TOP OF SURFACE CASING:	_____
ELEVATION OF TOP OF RISER PIPE:	_____
STICK-UP TOP OF SURFACE CASING:	<u>Flush</u>
STICK-UP RISER PIPE:	<u>Flush</u>
I.D. OF SURFACE CASING:	<u>8" ID x 10" OD</u>
TYPE OF SURFACE CASING:	<u>Steel, Flush Cover w/ 2' x 2' x 6" Concrete pad.</u>
TYPE OF SURFACE SEAL:	<u>Concrete Pad (Quickrete) 2' x 7' x 6"</u>
RISER PIPE I.D.:	<u>2 inch</u>
TYPE OF RISER PIPE:	<u>PVC, Sch. 40 Flush Threaded (F.T.)</u>
BOREHOLE DIAMETER:	<u>8.25 inch</u>
TYPE OF SEAL:	<u>Portland Cement Type I</u>
ELEVATION / DEPTH OF SEAL:	<u>11.5</u>
TYPE OS SEAL:	<u>"choke sand" Very Fine Sand (35/60)</u>
DEPTH TOP OF SAND PACK:	<u>2.0</u>
ELEVATION / DEPTH TOP OF SCREEN:	<u>12.5</u>
TYPE OF SCREEN:	<u>PVC, Sch. 40, F.T.</u>
SLOT SIZE X LENGTH:	<u>0.010 inch x 10 ft.</u>
I.D. OF SCREEN:	<u>2-inch</u>
TYPE OF SAND PACK:	<u>Standard Sand (M) Qtz. sand (20/30)</u>
ELEVATION / DEPTH BOTTOM OF SCREEN:	<u>112.5</u>
ELEVATION / DEPTH BOTTOM OF SAND PACK:	<u>112.5</u>
TYPE OF BACKFILL BELOW OBSERVATION WELL:	<u>sand (20/30)</u>
ELEVATION / DEPTH OF HOLE:	<u>112.5</u>

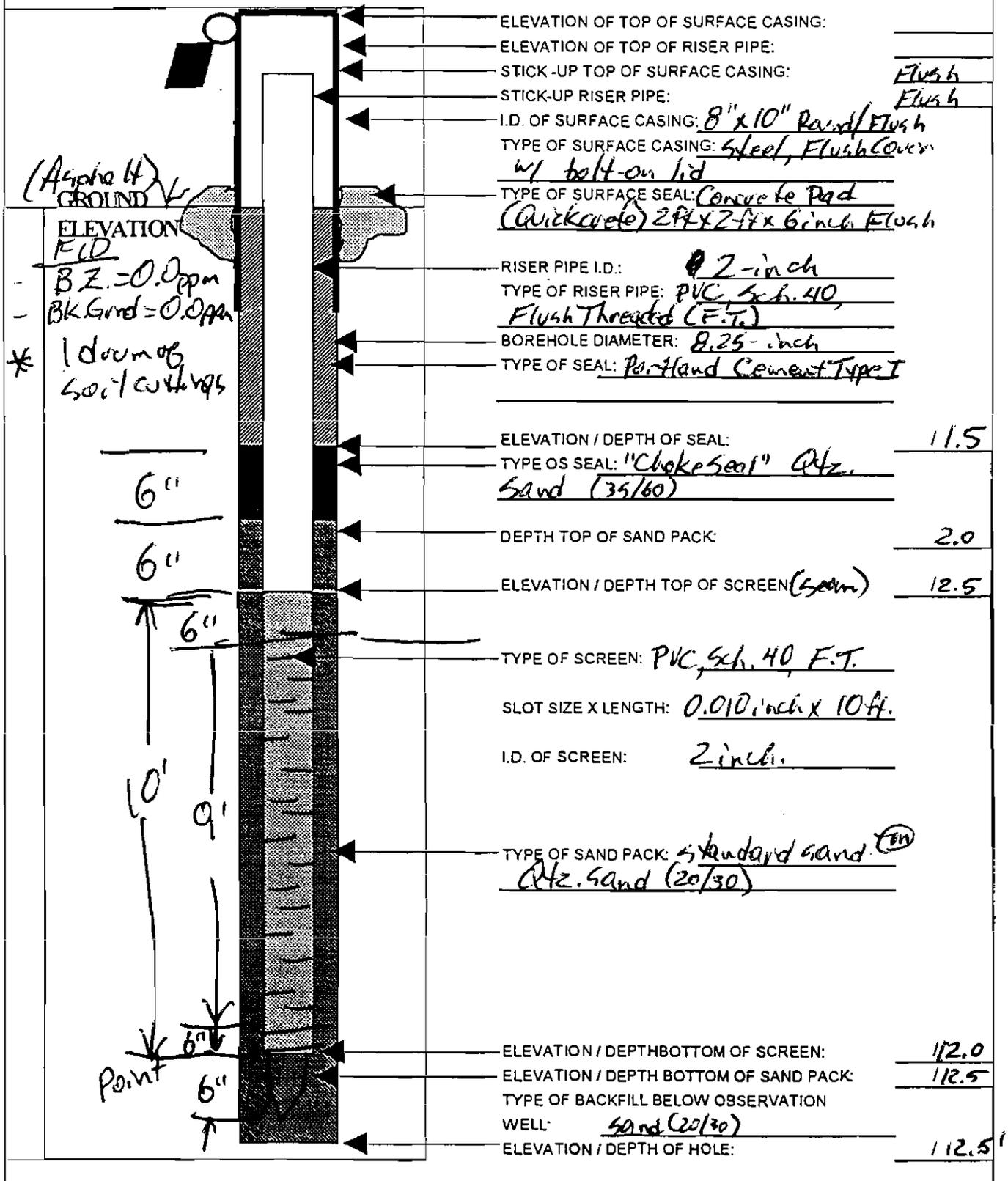
OVERBURDEN MONITORING WELL SHEET

PROJECT <u>Chas. Naval Complex</u>	LOCATION: <u>S. Field Zone G</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>N 0124 Bldg. 224</u>	BORING <u>CNC16-MWC2</u>	METHOD: <u>DPT 4.25" HSA</u>
ELEVATION _____	DATE <u>6/16/99</u>	DRILLING <u>Donnell Martin</u>
FIELD GEOLOGIST <u>Mark Dennington</u>		DEVELOPMENT: <u>NA</u>



OVERBURDEN MONITORING WELL SHEET

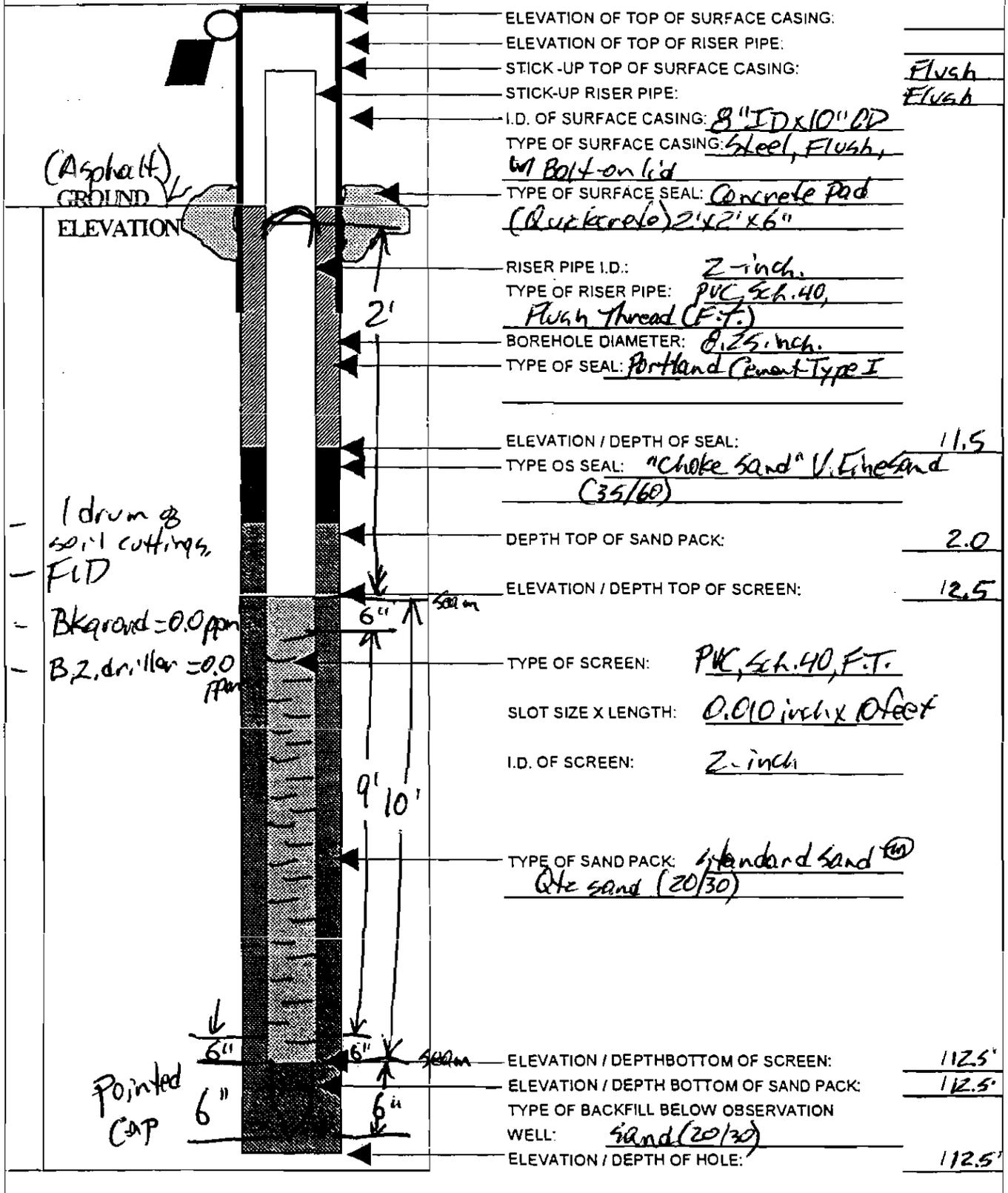
PROJECT <u>Chas. Naval Complex</u>	LOCATION <u>Site 16/Zone G</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>N0124 Bldg. 224</u>	BORING <u>CNC16-MW03</u>	METHOD: <u>DPT 4.25" HSA</u>
ELEVATION _____	DATE <u>6/16/99</u>	DRILLING <u>Darrell Martin</u>
FIELD GEOLOGIST <u>Mark Darrington</u>		DEVELOPMENT: <u>NA</u>



OVERBURDEN MONITORING WELL SHEET

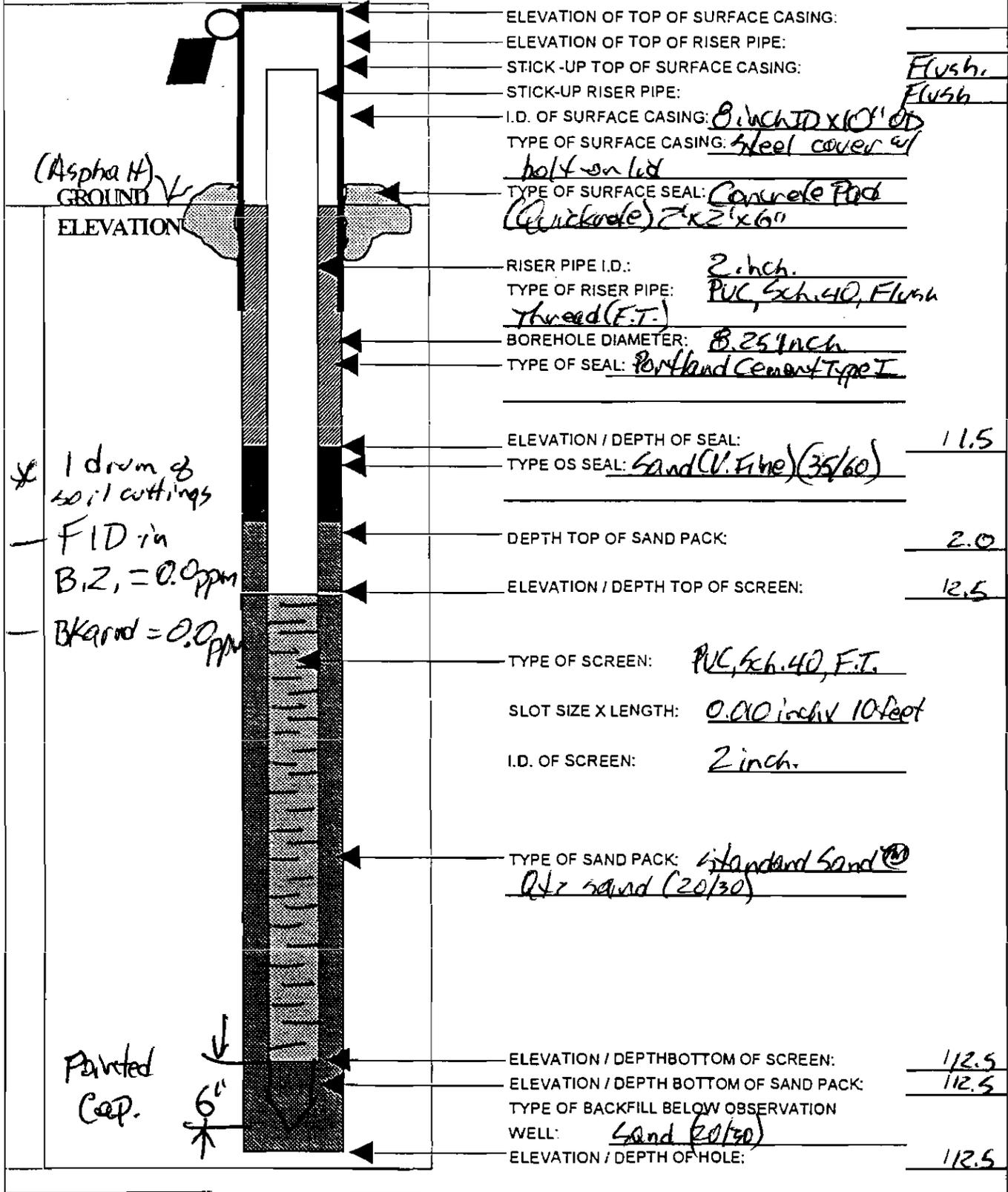
BORING NO.: CNC16-mw04

PROJECT <u>Chas. Naval Complex</u>	LOCATION: <u>Site 16/Zone G</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>N0124 Bldg. 224</u>	BORING <u>CNC16-mw04</u>	METHOD: <u>DPT 4.25" HSA</u>
ELEVATION _____	DATE <u>6/15/99</u>	DRILLING <u>Darrell Markin</u>
FIELD GEOLOGIST <u>Mark Darrington</u>		DEVELOPMENT: <u>NA</u>



OVERBURDEN MONITORING WELL SHEET

PROJECT <u>Chas. Naval Complex</u>	LOCATION: <u>Site 16 - Zone G</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>N 0124 Bldg. 224</u>	BORING <u>CNC16 - MW5</u>	METHOD: <u>4 2 1/2" ID HSA</u>
ELEVATION _____	DATE <u>6/15/99</u>	DRILLING <u>Darrell Martin</u>
FIELD GEOLOGIST <u>Mark Damich</u>		DEVELOPMENT: <u>N</u>
<u>Using 4.25 inch ID HSAs.</u>		<u>FID in B 2 =</u>



ELEVATION OF TOP OF SURFACE CASING: _____

ELEVATION OF TOP OF RISER PIPE: _____

STICK-UP TOP OF SURFACE CASING: Flush

STICK-UP RISER PIPE: Flush

I.D. OF SURFACE CASING: 8 inch ID x 10' OD

TYPE OF SURFACE CASING: Steel cover w/ half on lid

TYPE OF SURFACE SEAL: Concrete Pad (Quickcrete) 2' x 2' x 6"

RISER PIPE I.D.: 2 inch

TYPE OF RISER PIPE: PVC, Sch. 40, Flush Thread (F.T.)

BOREHOLE DIAMETER: 8.25 inch

TYPE OF SEAL: Portland Cement Type I

ELEVATION / DEPTH OF SEAL: 11.5

TYPE OF SEAL: Sand (U. Fine) (35/60)

DEPTH TOP OF SAND PACK: 2.0

ELEVATION / DEPTH TOP OF SCREEN: 12.5

TYPE OF SCREEN: PVC, Sch. 40, F.T.

SLOT SIZE X LENGTH: 0.010 inch x 10 feet

I.D. OF SCREEN: 2 inch

TYPE OF SAND PACK: Standard Sand #1 Quartz sand (20/30)

ELEVATION / DEPTH BOTTOM OF SCREEN: 112.5

ELEVATION / DEPTH BOTTOM OF SAND PACK: 112.5

TYPE OF BACKFILL BELOW OBSERVATION WELL: Sand (20/30)

ELEVATION / DEPTH OF HOLE: 112.5

1 drum of soil cuttings

FID in B, 2, = 0.0 ppm

B Karnd = 0.0 ppm

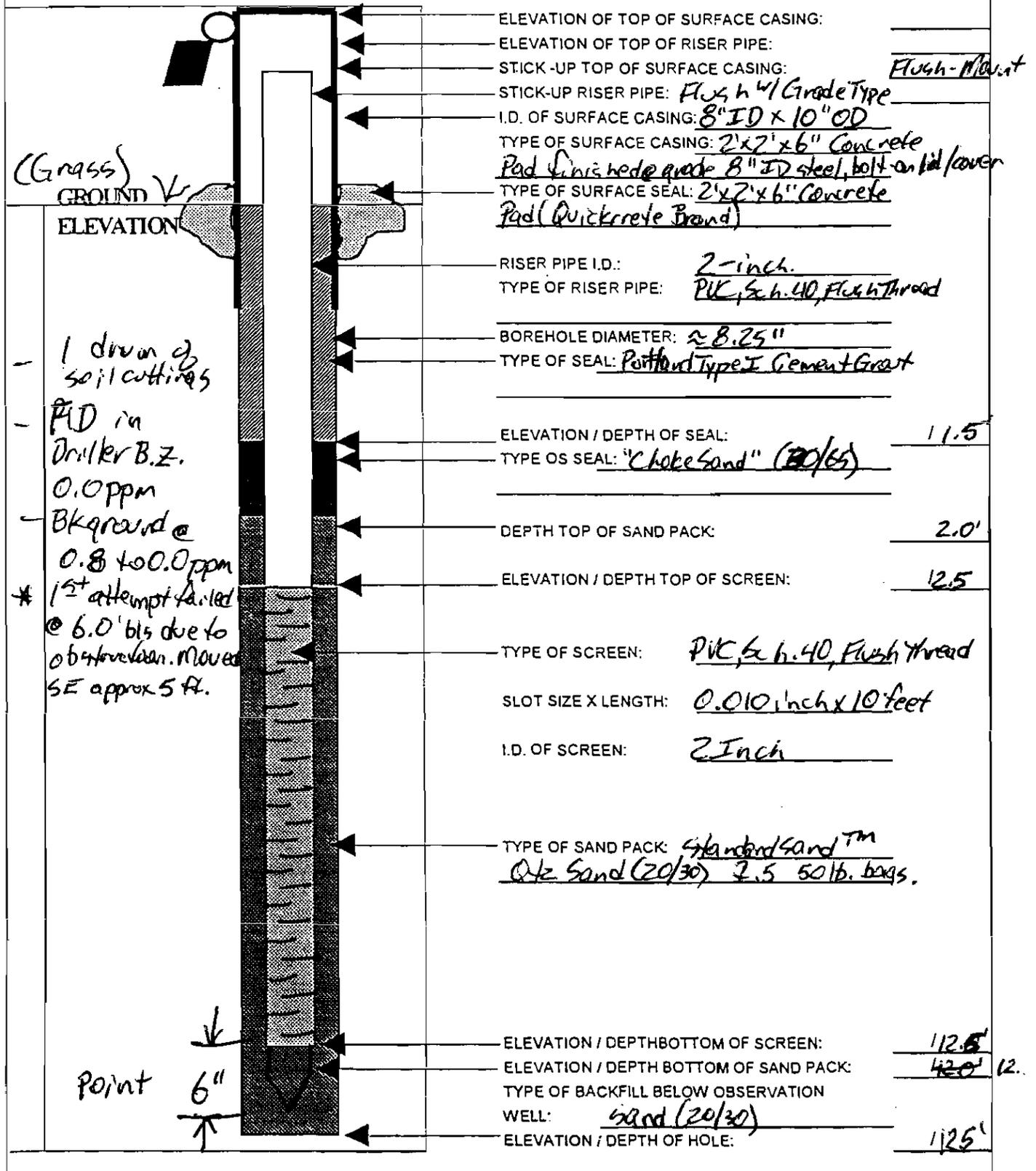
Painted Cap.

6"

OVERBURDEN MONITORING WELL SHEET

BORING NO: CNK-16-MW06
(up gradient well)

PROJECT <u>Chas. Naval Complex</u>	LOCATION: <u>CNK-16-MW6</u>	DRILLER <u>Custom Drilling</u>
PROJECT NOS: <u>16 NO124 Bldg. 224</u>	BORING: <u>CNK-16-MW6</u>	METHOD: <u>DPT-4.25" HSA</u>
ELEVATION _____	DATE: <u>6/15/99</u>	DRILLING: <u>Darrell Martin</u>
FIELD GEOLOGIST: <u>Mark Darrington</u>		DEVELOPMENT: <u>NA</u>
Drilled using 4.25" HSA; No split-spore sampling conducted		1410 Drilling Completed



(Grass) GROUND ELEVATION

- 1 drum of soil cuttings

- PID in Driller B.Z. 0.0 ppm

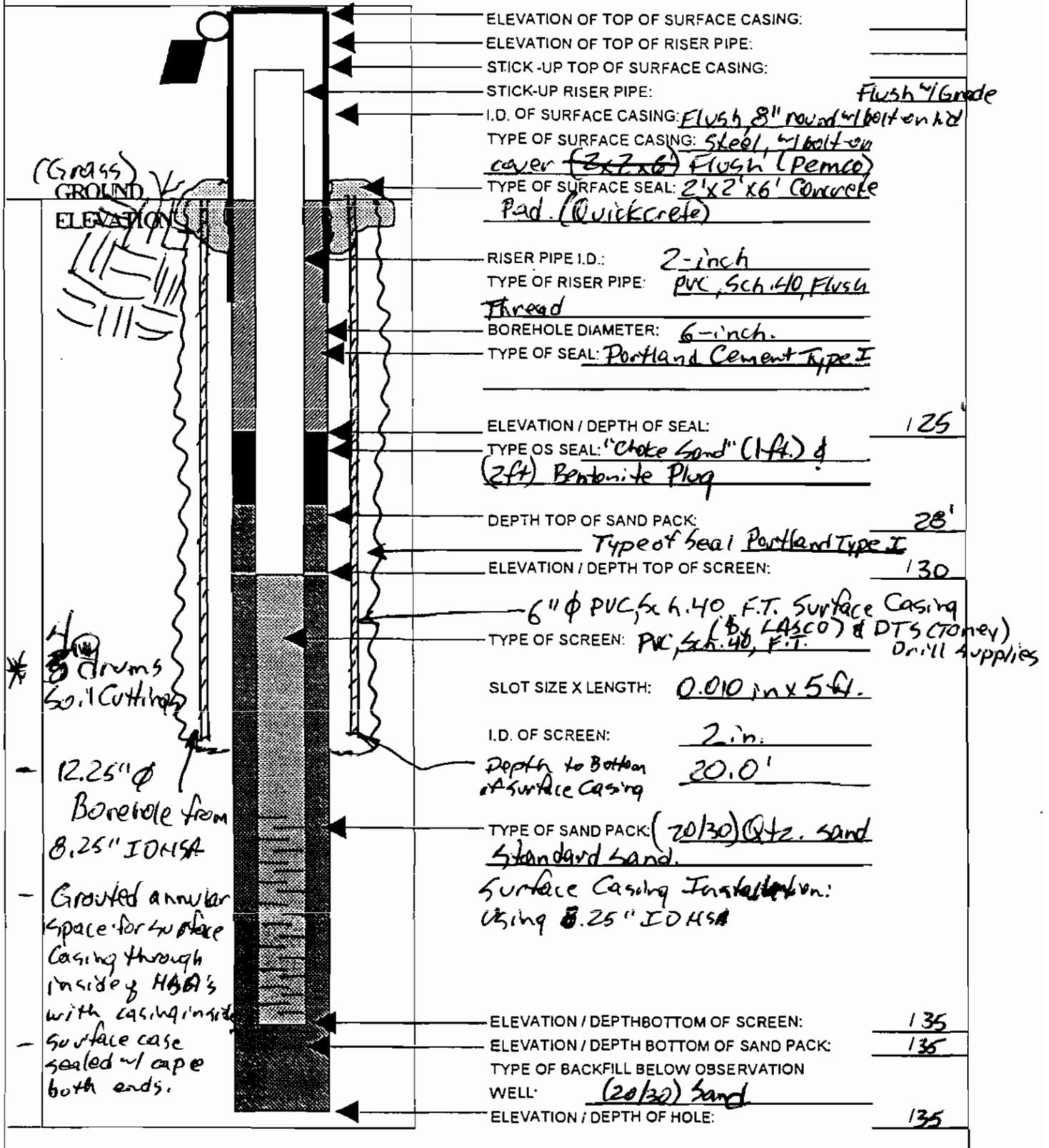
- Background @ 0.8 to 0.0 ppm

* 1st attempt failed @ 6.0' bts due to obstruction. Moved SE approx 5 ft.

Point 6"

OVERBURDEN MONITORING WELL SHEET

PROJECT: <u>Chas. Naval Complex</u>	LOCATION: <u>Bldg. 224 (S. 1616)</u>	DRILLER: <u>Donnel</u>
PROJECT NO.: <u>N 0129 Site 116</u>	BORING: <u>CNC16-MW1D</u>	METHOD: <u>DPT HSA</u>
ELEVATION: _____	DATE: <u>6/15/99 & 7/11/99</u>	DRILLING: <u>Custom Drilling</u>
FIELD GEOLOGIST: <u>M. Darrington</u>		DEVELOPMENT: <u>NA</u>



APPENDIX C

FIELD SAMPLING DATA SHEETS

SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: <u>Site 16 Building 224</u>	Sample ID No.: <u>16SLB01-0203</u>
Project No.: <u>N 0124 Zone G</u>	Sample Location: <u>CNC 1601</u>
<input type="checkbox"/> Surface Soil	Sampled By: <u>JA/TB</u>
<input checked="" type="checkbox"/> Subsurface Soil	C.O.C. No.: _____
<input type="checkbox"/> Sediment	Type of Sample:
<input type="checkbox"/> Other: _____	<input type="checkbox"/> Low Concentration
<input type="checkbox"/> QA Sample Type: _____	<input type="checkbox"/> High Concentration

GRAB SAMPLE DATA:			
Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
5/11/99 <u>5/11/99</u>	<u>2-3'</u>	<u>dark brown</u>	<u>sandy silt</u>
Time: <u>0810</u>			
Method: _____			
Monitor Reading (ppm): <u>80</u>			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>BTEX, EOB</u>	<u>4 En Core</u>	<input checked="" type="checkbox"/>	
<u>PAH</u>	<u>1 4oz jar</u>	<input checked="" type="checkbox"/>	

OBSERVATIONS / NOTES:	MAP:
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Circle if Applicable:	Duplicate ID No.:	Signature(s): <u>Janet Borkenight</u>
<input type="checkbox"/> MS/MSD		

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name:	<u>Site 16 Bldg. 224</u>	Sample ID No.:	<u>16SLB02-0203</u>
Project No.:	<u>N0124 Zone G</u>	Sample Location:	<u>CNC 1602</u>
<input type="checkbox"/> Surface Soil		Sampled By:	<u>JA/TB</u>
<input checked="" type="checkbox"/> Subsurface Soil		C.O.C. No.:	_____
<input type="checkbox"/> Sediment		Type of Sample:	
<input type="checkbox"/> Other:	_____	<input type="checkbox"/> Low Concentration	
<input type="checkbox"/> QA Sample Type:	_____	<input type="checkbox"/> High Concentration	

GRAB SAMPLE DATA:

Date:	<u>5/17/99</u>	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	<u>0625</u>	<u>2-3'</u>	<u>dark brown</u>	<u>sandy silt</u>
Method:				
Monitor Reading (ppm):	<u>20</u>			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>BTEX, EDB</u>	<u>4 EnCore</u>	<u>✓</u>	
<u>PAH</u>	<u>1 4oz jar</u>	<u>✓</u>	

OBSERVATIONS / NOTES:

MAP:

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Circle if Applicable:

Signature(s):

<input type="checkbox"/> MS/MSD	Duplicate ID No.:	
	<u>16SLB02-0203D</u>	<u>Janet Rankin/jt</u>

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: <u>Site 16 Bldg. 224</u> Project No.: <u>N0124 Zone G</u> <input type="checkbox"/> Surface Soil <input checked="" type="checkbox"/> Subsurface Soil <input type="checkbox"/> Sediment <input type="checkbox"/> Other: _____ <input type="checkbox"/> QA Sample Type: _____	Sample ID No.: <u>16SLB03-0304</u> Sample Location: <u>CNC1603</u> Sampled By: <u>JA/TB</u> C.O.C. No.: _____ Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
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GRAB SAMPLE DATA:			
Date: <u>5/14/99</u>	Depth: <u>3'-4'</u>	Color: <u>dark brown</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>silt</u>
Time: <u>1545</u>			
Method:			
Monitor Reading (ppm): <u>ND</u>			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>PAH</u>	<u>1 4oz jar</u>	<input checked="" type="checkbox"/>	
<u>BTEX</u>	<u>4 EnCore</u>	<input checked="" type="checkbox"/>	

OBSERVATIONS / NOTES: <div style="height: 100px;"></div>	MAP: <div style="height: 100px;"></div>
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Circle if Applicable:		Signature(s): <u>Janet Baknyjt</u>
MS/MSD	Duplicate ID No.:	

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: <u>Site 16 Bldg. 224</u>	Sample ID No.: <u>16SLB04-0304</u>
Project No.: <u>N0124 zone G</u>	Sample Location: <u>CNC1604</u>
<input type="checkbox"/> Surface Soil	Sampled By: <u>JATB</u>
<input checked="" type="checkbox"/> Subsurface Soil	C.O.C. No.: _____
<input type="checkbox"/> Sediment	Type of Sample:
<input type="checkbox"/> Other: _____	<input type="checkbox"/> Low Concentration
<input type="checkbox"/> QA Sample Type: _____	<input type="checkbox"/> High Concentration

GRAB SAMPLE DATA:			
Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>5/14/99</u>	<u>3'-4'</u>	<u>dark grey</u>	<u>silt with clay</u>
Time: <u>1535</u>			
Method: _____			
Monitor Reading (ppm): <u>23,000</u>			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>TPH</u>	<u>1 4oz jar</u>	<input checked="" type="checkbox"/>	
<u>PAH</u>	<u>1 4oz jar</u>	<input checked="" type="checkbox"/>	
<u>metals</u>	<u>1 2oz jar</u>	<input checked="" type="checkbox"/>	
<u>BTEX</u>	<u>4 EnCore</u>	<input checked="" type="checkbox"/>	
<u>Grain Size/Hydrometer</u>	<u>2 32oz jars</u>	<input checked="" type="checkbox"/>	

OBSERVATIONS / NOTES:	MAP:

Circle if Applicable:	Signature(s): <u>Janet Borkenight</u>
MS/MSD	Duplicate ID No.: _____

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name:	<u>Site 16 Bldg. 224</u>	Sample ID No.:	<u>16SLB05-0203</u>
Project No.:	<u>NOL24 Zone G</u>	Sample Location:	<u>CNC 1605</u>
<input type="checkbox"/> Surface Soil		Sampled By:	<u>JA/TB</u>
<input checked="" type="checkbox"/> Subsurface Soil		C.O.C. No.:	_____
<input type="checkbox"/> Sediment		Type of Sample:	
<input type="checkbox"/> Other:	_____	<input type="checkbox"/> Low Concentration	
<input type="checkbox"/> QA Sample Type:	_____	<input type="checkbox"/> High Concentration	

GRAB SAMPLE DATA:			
Date:	<u>5/17/99</u>	Depth	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	<u>0845</u>	<u>2-3'</u>	<u>clay sand</u>
Method:			
Monitor Reading (ppm):	<u>90</u>		
		<u>dark orangish brown</u>	

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>PAH</u>	<u>1 4oz jar</u>	<input checked="" type="checkbox"/>	
<u>BTEX</u>	<u>4 EnCore</u>	<input checked="" type="checkbox"/>	

OBSERVATIONS / NOTES:	MAP:

Circle if Applicable:	Signature(s):				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">MS/MSD</td> <td style="width: 50%;">Duplicate ID No.:</td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	MS/MSD	Duplicate ID No.:			<u>Janet Brakenridge</u>
MS/MSD	Duplicate ID No.:				

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: <u>Site 16 Bldg. 224</u> Project No.: <u>NOB4 zone G</u>	Sample ID No.: <u>16SLB06-0304</u> Sample Location: <u>CNC 1604</u> Sampled By: <u>JA/JB</u> C.O.C. No.: _____
<input type="checkbox"/> Surface Soil <input checked="" type="checkbox"/> Subsurface Soil <input type="checkbox"/> Sediment <input type="checkbox"/> Other: _____ <input type="checkbox"/> QA Sample Type: _____	Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration

GRAB SAMPLE DATA:			
Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>5/14/99</u>	<u>3-4'</u>	<u>orangish brown</u>	<u>slt with clay, moist</u>
Time: <u>1450</u>	3-4'		<u>silt</u>
Method:			
Monitor Reading (ppm): <u>2</u>			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>TOC</u>	<u>1 4oz jar</u>	<input checked="" type="checkbox"/>	
<u>PAH</u>	<u>1 4oz jar</u>	<input checked="" type="checkbox"/>	
<u>BTEX/EDB</u>	<u>4 EnCore</u>	<input checked="" type="checkbox"/>	

OBSERVATIONS / NOTES: 	MAP:
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Circle if Applicable:		Signature(s): <u>Janet Banker JA</u>
MS/MSD	Duplicate ID No.:	

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name:	<u>Site 16 Bldg. 224</u>	Sample ID No.:	<u>16 SLBID-0304</u>
Project No.:	<u>NO124 Zone G</u>	Sample Location:	<u>CNC 16 10</u>
<input type="checkbox"/> Surface Soil		Sampled By:	<u>JA/TB</u>
<input checked="" type="checkbox"/> Subsurface Soil		C.O.C. No.:	_____
<input type="checkbox"/> Sediment		Type of Sample:	
<input type="checkbox"/> Other:	_____	<input type="checkbox"/> Low Concentration	
<input type="checkbox"/> QA Sample Type:	_____	<input type="checkbox"/> High Concentration	

GRAB SAMPLE DATA:			
Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>5/14/99</u>	<u>3'-4'</u>	<u>brown</u>	<u>silty</u>
Time: <u>1505</u>			
Method:			
Monitor Reading (ppm): <u>50</u>			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>BTEX/EDB</u>	<u>4 EnCore</u>	<input checked="" type="checkbox"/>	
<u>PAH</u>	<u>1 4oz 4oz jar</u>	<input checked="" type="checkbox"/>	

OBSERVATIONS / NOTES:	MAP:

Circle if Applicable:	Duplicate ID No.:	Signature(s):
<input type="checkbox"/> MS/MSD		<u>Jesset Benkenicht</u>

GROUNDWATER SAMPLE LOG SHEET

Page of

Project Site Name: <u>CNC 16 Bldg. 224</u> Project No.: <u>NO124 Zone G</u> <input type="checkbox"/> Domestic Well Data <input checked="" type="checkbox"/> Monitoring Well Data <input type="checkbox"/> Other Well Type: _____ <input type="checkbox"/> QA Sample Type: _____	Sample ID No.: <u>16GLMØ1Ø1</u> Sample Location: <u>MW-1</u> Sampled By: <u>JRN</u> C.O.C. No.: _____ Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
--	--

SAMPLING DATA:									
Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other	
Time:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA	
<u>7-22-99</u>									
<u>1055</u>									
Method:									

PURGE DATA:								
Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
<u>7-22-99</u>								
Method: <u>Slow Purge</u>	Initial	<u>6.78</u>	<u>23.2</u>	<u>24.0</u>	<u>31</u>	<u>2.40</u>		
Monitor Reading (ppm):	1	<u>6.90</u>	<u>23.0</u>	<u>24.5</u>	<u>12</u>	<u>1.90</u>		
Well Casing Diameter & Material	2	<u>6.92</u>	<u>23.5</u>	<u>24.4</u>	<u>4</u>	<u>1.90</u>		
Type: <u>P.U.C. 2"</u>	3	<u>6.91</u>	<u>23.3</u>	<u>24.2</u>	<u>Ø</u>	<u>1.89</u>		
Total Well Depth (TD):	<u>12.45</u>							
Static Water Level (WL):	<u>1.56</u>							
One Casing Volume (gal/L):	<u>1.75</u>							
Start Purge (hrs):	<u>0815</u>							
End Purge (hrs):	<u>0959</u>							
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
<u>BTEX, MTBE, Ethyl, EDX</u>	<u>HCl</u>	<u>3 x 40 ml Vials</u>	<u>7-22-99</u>
<u>Dissolved. Metformin</u>	<u>HCl</u>	<u>1 " 11 " 11 " 11 "</u>	<u>11</u>
<u>PAH</u>	<u>—</u>	<u>2 x 1 L amber</u>	<u>11</u>
<u>Amino's</u>	<u>—</u>	<u>1 x 500 ml plastic</u>	<u>11</u>

OBSERVATIONS / NOTES:

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

GROUNDWATER SAMPLE LOG SHEET

Page of

Project Site Name: <u>CNC 16 Bldg. 224</u> Project No.: <u>NO124 Zone G</u> <input type="checkbox"/> Domestic Well Data <input checked="" type="checkbox"/> Monitoring Well Data <input type="checkbox"/> Other Well Type: _____ <input type="checkbox"/> QA Sample Type: _____	Sample ID No.: <u>16G6M0301</u> Sample Location: <u>MW-3</u> Sampled By: _____ C.O.C. No.: _____ Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
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SAMPLING DATA:								
Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
<u>7-22-99</u>								
<u>11:30</u>								
Method:								

PURGE DATA:								
Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
<u>7-22-99</u>								
Method: <u>Slow Purge</u>	Initial	<u>6.55</u>	<u>9.1</u>	<u>24.6</u>	<u>16</u>	<u>0.72</u>		
Monitor Reading (ppm):	1	<u>7.01</u>	<u>2.88</u>	<u>27.6</u>	<u>3</u>	<u>0.72</u>		
Well Casing Diameter & Material Type:	2	<u>7.18</u>	<u>2.40</u>	<u>27.4</u>	<u>4</u>	<u>0.70</u>		
	3	<u>7.28</u>	<u>2.11</u>	<u>28.8</u>	<u>19</u>	<u>0.71</u>		
Total Well Depth (TD):	<u>12.29</u>							
Static Water Level (WL):	<u>0.51</u>							
One Casing Volume(gal/L):	<u>1.9 gal.</u>							
Start Purge (hrs):	<u>0824</u>							
End Purge (hrs):	<u>1019</u>							
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
<u>BTEX, MTBE, Naph, EOB</u>	<u>HCl</u>	<u>3x 40 ml vials</u>	<u>7-22-99</u>
<u>Dissolved Methane</u>	<u>HCl</u>	<u>2 " "</u>	<u>"</u>
<u>PAT</u>	<u>=</u>	<u>2x 1 L amber</u>	<u>"</u>
<u>Anions</u>	<u>=</u>	<u>1x 500 ml plastic</u>	<u>"</u>

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s):
<input type="checkbox"/> MS/MSD	Duplicate ID No.:	

GROUNDWATER SAMPLE LOG SHEET

Page of

Project Site Name: <u>CUC 16 Bldg. 224</u> Project No.: <u>ND124 Zone G</u> <input type="checkbox"/> Domestic Well Data <input checked="" type="checkbox"/> Monitoring Well Data <input type="checkbox"/> Other Well Type: <input type="checkbox"/> QA Sample Type:	Sample ID No.: <u>16GLM0461</u> Sample Location: <u>MW-4</u> Sampled By: <u>JA/BN</u> C.O.C. No.: Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
--	--

SAMPLING DATA:

Date: <u>7-21-99</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>1634</u>	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method:								

PURGE DATA:

Date: <u>7-21-99</u>	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: <u>slow Purge</u>	Initial	<u>5.61</u>	<u>23.1</u>	<u>29.7</u>	<u>280</u>	<u>2.06</u>		
Monitor Reading (ppm):	1	<u>5.24</u>	<u>12.5</u>	<u>30.4</u>	<u>18</u>	<u>1.50</u>		
Well Casing Diameter & Material	2	<u>7.14</u>	<u>12.0</u>	<u>30.5</u>	<u>9</u>	<u>1.56</u>		
Type:	3	<u>7.26</u>	<u>11.1</u>	<u>30.1</u>	<u>12</u>	<u>1.59</u>		
Total Well Depth (TD):	<u>12.55</u>							
Static Water Level (WL):	<u>0.61</u>							
One Casing Volume(gal/L):	<u>1.93</u>							
Start Purge (hrs):	<u>1421</u>							
End Purge (hrs): <u>1634</u>	<u>1634</u>							
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>STER, MTBE, Naph, EOB</u>	<u>HCl</u>	<u>3 x 40 ml vials</u>	<u>7-21-99</u>
<u>PAH</u>	<u>---</u>	<u>2 x 1 h amber</u>	<u>7-21-99</u>

OBSERVATIONS / NOTES:

Circle If Applicable: <input type="checkbox"/> MS/MSD Duplicate ID No.:	Signature(s):
---	-------------------

GROUNDWATER SAMPLE LOG SHEET

Page of

Project Site Name:	<u>CNC 16 Bldg. 224</u>	Sample ID No.:	<u>16GLM0501</u>
Project No.:	<u>NO124 Zone G</u>	Sample Location:	<u>MW-5</u>
<input type="checkbox"/> Domestic Well Data		Sampled By:	<u>JA/RH</u>
<input checked="" type="checkbox"/> Monitoring Well Data		C.O.C. No.:	<u> </u>
<input type="checkbox"/> Other Well Type:	<u> </u>	Type of Sample:	
<input type="checkbox"/> QA Sample Type:	<u> </u>	<input type="checkbox"/> Low Concentration	
		<input type="checkbox"/> High Concentration	

SAMPLING DATA:									
Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other	
Time:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA	
<u>7-21-99</u>									
<u>1637</u>									
Method:									

PURGE DATA:									
Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	
<u>7-21-99</u>									
Method: <u>Skew purge</u>	Initial	<u>5.54</u>	<u>22.9</u>	<u>30.3</u>	<u>216</u>	<u>1.76</u>			
Monitor Reading (ppm):	1	<u>5.32</u>	<u>13.0</u>	<u>30.5</u>	<u>20</u>	<u>1.97</u>			
Well Casing Diameter & Material	2	<u>7.10</u>	<u>12.0</u>	<u>30.5</u>	<u>12</u>	<u>2.54</u>			
Type: <u>PVC 2"</u>	3	<u>7.18</u>	<u>11.3</u>	<u>30.3</u>	<u>11</u>	<u>1.73</u>			
Total Well Depth (TD):	<u>12.47</u>								
Static Water Level (WL):	<u>0.28</u>								
One Casing Volume (gal/L):	<u>1.96</u>								
Start Purge (hrs):	<u>1421</u>								
End Purge (hrs):	<u>1637</u>								
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
<u>BTEX, MTBE, Naph, PCB</u>	<u>HCl</u>	<u>3x 40 ml vials</u>	<u>7/23/99</u>
<u>Dissolved Methane</u>	<u> </u>	<u> </u>	<u> </u>
<u>PAH</u>	<u> </u>	<u>2x 1/2 amber</u>	<u>11</u>

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s): <u>James R Hill</u>
<input type="checkbox"/> MS/MSD	Duplicate ID No.:	

GROUNDWATER SAMPLE LOG SHEET

Page of

Project Site Name: <u>CNC 16 Bldg. 224</u>	Sample ID No.: <u>16GLM0601</u>
Project No.: <u>NO124 Zone G</u>	Sample Location: <u>MW-6</u>
<input type="checkbox"/> Domestic Well Data	Sampled By: _____
<input checked="" type="checkbox"/> Monitoring Well Data	C.O.C. No.: _____
<input type="checkbox"/> Other Well Type: _____	Type of Sample:
<input type="checkbox"/> QA Sample Type: _____	<input type="checkbox"/> Low Concentration
	<input type="checkbox"/> High Concentration

SAMPLING DATA:								
Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
<u>7-22-99</u>								
<u>1030</u>								
Method:								

PURGE DATA:								
Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
<u>7-22-99</u>	Initial	<u>6.84</u>	<u>15.7</u>	<u>25.9</u>	<u>∅</u>	<u>2.25</u>		
Method: <u>Slow Purge</u>	1	<u>7.29</u>	<u>8.05</u>	<u>26.6</u>	<u>∅</u>	<u>2.65</u>		
Monitor Reading (ppm):	2	<u>7.33</u>	<u>7.80</u>	<u>27.0</u>	<u>∅</u>	<u>1.95</u>		
Well Casing Diameter & Material	3	<u>7.38</u>	<u>7.57</u>	<u>27.7</u>	<u>∅</u>	<u>1.70</u>		
Type: <u>P.U.C. 2"</u>								
Total Well Depth (TD):	<u>12.36'</u>							
Static Water Level (WL):	<u>0.91</u>							
One Casing Volume(gal/L):	<u>1.84</u>							
Start Purge (hrs):	<u>0812</u>							
End Purge (hrs):	<u>0954</u>							
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
<u>ISTEX, MTBE, Neg. BOD</u>	<u>HCl</u>	<u>3x 40 ml vials</u>	<u>7-22-99</u>
<u>Dissolved Methane</u>	<u>HCl</u>	<u>3x 40 ml vials</u>	<u>u</u>
<u>PAH</u>	<u>-</u>	<u>2x 1 L amber</u>	<u>u</u>
<u>Anions</u>	<u>-</u>	<u>1x 500 ml plastic</u>	<u>u</u>

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s):
<input type="checkbox"/> MS/MSD	<input type="checkbox"/> Duplicate ID No.:	



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: <u>Site 16 Bldg. 224</u>	Sample ID No.: <u>16GLM0601</u>
Project No.: <u>NO124 Zone G</u>	Sample Location: <u>MW-6</u>
Sampled By: <u>Z Z Z</u>	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): _____	

SAMPLING DATA:

Date:	Color	ORP (Eh)	S.C.	Temp.	Turbidity	DO	Sal.	pH
Time:	(Visual)	(+/- mv)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	(SU)
Method:								

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT CHEMetrics (Range: 0-10 mg/L) Analysis Time: _____

2 ppm

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	1-5 mg/L	200 ml	0.200 N	0.01		x 0.01	= mg/L
<input type="checkbox"/>	2-10 mg/L	100 ml	0.200 N	0.02		x 0.02	= mg/L

CHEMetrics: 2 mg/l ppm

Notes: _____

Alkalinity:

Equipment: HACH Digital Titrator AL-DT CHEMetrics (Range: _____ mg/L) Analysis Time: 1423

Filtered:

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	10-40 mg/L	100 ml	0.1600 N	0.1	& _____	x 0.1	= mg/L
<input type="checkbox"/>	40-160 mg/L	25 ml	0.1600 N	0.4	& _____	x 0.4	= mg/L
<input type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	& _____	x 1.0	= mg/L
<input checked="" type="checkbox"/>	200-800 mg/L	50 ml	1.600 N	2.0	& <u>236</u>	x 2.0	= <u>472</u> mg/L
<input type="checkbox"/>	500-2000 mg/L	20 ml	1.600 N	5.0	& _____	x 5.0	= mg/L
<input type="checkbox"/>	1000-4000 mg/L	10 ml	1.600 N	10.0	& _____	x 10.0	= mg/L

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:			

CHEMetrics: _____ mg/L

Notes: _____

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT CHEMetrics (Range: _____ mg/L) Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	10-50 mg/L	200 ml	0.3636 N	0.1		x 0.1	= mg/L
<input type="checkbox"/>	20-100 mg/L	100 ml	0.3636 N	0.2		x 0.2	= mg/L
<input type="checkbox"/>	100-400 mg/L	200 ml	3.636 N	1.0		x 1.0	= mg/L
<input checked="" type="checkbox"/>	200-1000 mg/L	100 ml	3.636 N	2.0	<u>117</u>	x 2.0	= <u>235</u> mg/L

CHEMetrics: _____ mg/L

Notes: _____

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

GROUNDWATER SAMPLE LOG SHEET

Page of

Project Site Name: <u>CNC 16</u> Project No.: <u>Site 16</u> <input type="checkbox"/> Domestic Well Data <input checked="" type="checkbox"/> Monitoring Well Data <input type="checkbox"/> Other Well Type: <input type="checkbox"/> QA Sample Type:	Sample ID No.: <u>KGGLM7D01</u> Sample Location: <u>MW7D</u> Sampled By: _____ C.O.C. No.: _____ Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
---	---

SAMPLING DATA:								
Date: <u>9-12-99</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>0755</u>	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: <u>Grouting</u>	<u>Not enough water to get readings</u>							

PURGE DATA:								
Date: <u>9-11-99</u>	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: <u>Slow Purge</u>	Initial	<u>7.6</u>	<u>26.2</u>	<u>26.4</u>	<u>174</u>	<u>1.33</u>		
Monitor Reading (ppm):	1	<u>8.00</u>	<u>19.0</u>	<u>24.9</u>	<u>435</u>	<u>0.87</u>		
Well Casing Diameter & Material Type: <u>2" PVC</u>	2							
	3							
Total Well Depth (TD): <u>35.05</u>								
Static Water Level (WL): <u>0.95</u>								
One Casing Volume (gal/L): <u>5.6</u>								
Start Purge (hrs): <u>1028</u>								
End Purge (hrs): <u>1150</u>								
Total Purge Time (min):								
Total Vol. Purged (gal/L): <u>3.5</u>								

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
<u>RTEX, MTBE, FDB, Aroclor PAH</u>	<u>HCl</u> <u>None</u>	<u>3840 ml Ucal</u> <u>2x 1L amber</u>	<u>9-12-99</u> <u>"</u>

OBSERVATIONS / NOTES:

Doing well Development & sample Purging @ same time
1110 Well Dry @ 60 gals... will let it recharge.
1150 Well Dry again after Pumping ~ 1.5 gals.
1409 Water level @ 23.4'. Will not be able to sample till 9/12/99

Circle if Applicable: <input type="checkbox"/> MS/MSD Duplicate ID No.: _____	Signature(s): _____
---	---------------------

9-12-99 0730 Abstract - WL = 11.50



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: CNC 16 Bldg.224 Sample ID No.: 16GLM0101
 Project No.: NO124 Zone G Sample Location: MW-1
 Sampled By: _____ Duplicate:
 Field Analyst: _____ Blank:
 Field Form Checked as per QA/QC Checklist (initials):

SAMPLING DATA:								
Date: <u>7 22 99</u>	Color	ORP (Eh)	S.C.	Temp.	Turbidity	DO	Sal.	pH
Time: _____	(Visual)	(+/- mv)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	(SU)
Method: _____								

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:
 Equipment: HACH Digital Titrator OX-DT CHEMetrics (Range: 0-10 mg/L) Analysis Time: 1459

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	1-5 mg/L	200 ml	0.200 N	0.01		x 0.01	= mg/L
<input type="checkbox"/>	2-10 mg/L	100 ml	0.200 N	0.02		x 0.02	= mg/L

CHEMetrics: 1.0 mg/L ppm
 Notes: _____

Alkalinity:
 Equipment: HACH Digital Titrator AL-DT CHEMetrics (Range: _____ mg/L) Analysis Time: _____
 Filtered:

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	10-40 mg/L	100 ml	0.1600 N	0.1	& _____	x 0.1	= mg/L
<input type="checkbox"/>	40-160 mg/L	25 ml	0.1600 N	0.4	& _____	x 0.4	= mg/L
<input type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	& _____	x 1.0	= mg/L
<input checked="" type="checkbox"/>	200-800 mg/L	50 ml	1.600 N	2.0	& <u>158</u>	x 2.0	= <u>316</u> mg/L
<input checked="" type="checkbox"/>	500-2000 mg/L	20 ml	1.600 N	5.0	& <u>(300)</u>	x 5.0	= <u>1500</u> mg/L
<input type="checkbox"/>	1000-4000 mg/L	10 ml	1.600 N	10.0	& _____	x 10.0	= mg/L

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:			

CHEMetrics: _____ mg/L
 Notes: _____

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

Carbon Dioxide:
 Equipment: HACH Digital Titrator CA-DT CHEMetrics (Range: _____ mg/L) Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Concentration
<input type="checkbox"/>	10-50 mg/L	200 ml	0.3636 N	0.1		x 0.1 = mg/L
<input type="checkbox"/>	20-100 mg/L	100 ml	0.3636 N	0.2		x 0.2 = mg/L
<input type="checkbox"/>	100-400 mg/L	200 ml	3.636 N	1.0		x 1.0 = mg/L
<input checked="" type="checkbox"/>	200-1000 mg/L	100 ml	3.636 N	2.0	<u>215</u>	x 2.0 = <u>430</u> mg/L

CHEMetrics: _____ mg/L
 Notes: _____

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



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: <u>CNC16 Bldg. 224</u>	Sample ID No.: _____
Project No.: <u>ND124 Zone G</u>	Sample Location: <u>MW1</u>
Sampled By: <u>? 22 GA JP</u>	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): 	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide (S²⁻):

Equipment: DR-700	DR-840	HS-C Color Chart	HS-WR Color Wheel	Analysis Time: <u>160</u>
Program/Module: 610nm	93	Other: _____		
Concentration: <u>0.03</u> mg/L				Filtered: <input type="checkbox"/>
Notes: _____				

Sulfate (SO₄²⁻):

Equipment: DR-700	DR-840	Other: _____	Analysis Time: _____	
Program/Module: _____	91			
Concentration: _____ mg/L				Filtered: <input type="checkbox"/>
Standard Solution: <input type="checkbox"/>	Results: _____			
Standard Additions: <input type="checkbox"/>	Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____			
Notes: _____				

Nitrite (NO₂⁻-N):

Equipment: DR-700	DR-840	Other: _____	Analysis Time: _____	
Program/Module: _____	60			
Concentration: <u>0.00</u> mg/L				Filtered: <input type="checkbox"/>
		Reagent Blank Correction: <input type="checkbox"/>		
		Standard Solution: <input type="checkbox"/>	Results: <input type="checkbox"/>	
Notes: _____				

Nitrate (NO₃⁻-N):

Equipment: DR-700	DR-840	Other: _____	Analysis Time: _____	
Program/Module: _____	55			
Concentration: _____ mg/L				Filtered: <input type="checkbox"/>
		Nitrite interference Treatment: <input type="checkbox"/>		
		Reagent Blank Correction: <input type="checkbox"/>		
Standard Solution: <input type="checkbox"/>	Results: _____			
Standard Additions: <input type="checkbox"/>	Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____			
Notes: _____				



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: <u>CNC 16 Bldg. 224</u>	Sample ID No.: _____
Project No.: <u>ND124 Zone G</u>	Sample Location: <u>MW 1</u>
Sampled By: <u>72295</u>	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): 	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Manganese (Mn²⁺):

Equipment: DR-700	DR- 8000 <u>8000</u>	HACH MN-5	Other: _____	Analysis Time: _____
Program/Module: 525nm	41			
Concentration: <u>2.4</u> mg/L				Filtered: <input type="checkbox"/>
				Digestion: <input type="checkbox"/>
Standard Solution: <input type="checkbox"/>	Results: _____			Reagent Blank Correction: <input type="checkbox"/>
Standard Additions: <input type="checkbox"/>	Digits Required: 0.1ml: _____	0.2ml: _____	0.3ml: _____	

Notes: _____

Ferrous Iron (Fe²⁺):

Equipment: DR-700	DR- 8000 <u>8000</u>	IR-18C Color Wheel	Other: _____	Analysis Time: _____
Program/Module: 500nm	33			
Concentration: <u>0.10</u> mg/L				Filtered: <input type="checkbox"/>

Notes: _____

Hydrogen Sulfide (H₂S):

Equipment: HS-C	Other: _____	Analysis Time: _____
Concentration: _____ mg/L	Exceeded 5.0 mg/L range on color chart: <input type="checkbox"/>	

Notes: _____

QA/QC Checklist:

All data fields have been completed as necessary:

Correct measurement units are cited in the SAMPLING DATA block:

Multiplication is correct for each *Multiplier* table:

Final calculated concentration is within the appropriate *Range Used* block:

Alkalinity *Relationship* is determined appropriately as per manufacturer instructions:

QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents:

Nitrite interference treatment used for Nitrate test if Nitrite was detected:

Title block is initialized by person who performed the QA/QC Checklist:



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: <u>Site 16 Bldg. 224</u>	Sample ID No.: _____
Project No.: <u>NO124 Zone G</u>	Sample Location: <u>MW-3</u>
Sampled By: <u>7 22 ga</u>	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): _____	

SAMPLING DATA:

Date:	Color	ORP (Eh)	S.C.	Temp.	Turbidity	DO	Sal.	pH
Time:	(Visual)	(+/- mv)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	(SU)
Method:								

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT CHEMetrics (Range: 0-10 mg/L) Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	1-5 mg/L	200 ml	0.200 N	0.01	_____	x 0.01	= _____ mg/L
<input type="checkbox"/>	2-10 mg/L	100 ml	0.200 N	0.02	_____	x 0.02	= _____ mg/L

CHEMetrics: 1.0 mg/L

Notes: _____

Alkalinity:

Equipment: HACH Digital Titrator AL-DT CHEMetrics (Range: _____ mg/L) Analysis Time: _____

Filtered:

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

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:			

CHEMetrics: _____ mg/L

Notes: _____

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT CHEMetrics (Range: _____ mg/L) Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	10-50 mg/L	200 ml	0.3636 N	0.1	_____	x 0.1	= _____ mg/L
<input type="checkbox"/>	20-100 mg/L	100 ml	0.3636 N	0.2	_____	x 0.2	= _____ mg/L
<input checked="" type="checkbox"/>	100-400 mg/L	200 ml	3.636 N	1.0	<u>220</u>	x 1.0	= <u>220</u> mg/L
<input type="checkbox"/>	200-1000 mg/L	100 ml	3.636 N	2.0	_____	x 2.0	= _____ mg/L

CHEMetrics: _____ mg/L

Notes: _____

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



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: <u>CUC16 Bldg. 224</u>	Sample ID No.: _____
Project No.: <u>ND124 Zone G</u>	Sample Location: <u>MW3</u>
Sampled By: <u>T 22 AN</u>	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <input type="checkbox"/>	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide (S²⁻):

Equipment: DR-700	DR-8 <u>90</u>	HS-C Color Chart	HS-WR Color Wheel	Analysis Time: <u>1601</u>
Program/Module: 610nm	93	Other: _____		
Concentration: <u>0.02</u> mg/L				Filtered: <input type="checkbox"/>
Notes: _____				

Sulfate (SO₄²⁻):

Equipment: DR-700	DR-8 <u>90</u>	Other: _____	Analysis Time: _____
Program/Module: _____	91		
Concentration: _____ mg/L			Filtered: <input type="checkbox"/>
Standard Solution: <input type="checkbox"/>	Results: _____		
Standard Additions: <input type="checkbox"/>	Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____		
Notes: _____			

Nitrite (NO₂⁻-N):

Equipment: DR-700	DR-8 <u>90</u>	Other: _____	Analysis Time: _____
Program/Module: _____	60		
Concentration: <u>0.00</u> mg/L			Filtered: <input type="checkbox"/>
			Reagent Blank Correction: <input type="checkbox"/>
		Standard Solution: <input type="checkbox"/>	Results: <input type="checkbox"/>
Notes: _____			

Nitrate (NO₃⁻-N):

Equipment: DR-700	DR-8 <u>90</u>	Other: _____	Analysis Time: _____
Program/Module: _____	55		
Concentration: _____ mg/L			Filtered: <input type="checkbox"/>
			Nitrite Interference Treatment: <input type="checkbox"/>
Standard Solution: <input type="checkbox"/>	Results: _____		Reagent Blank Correction: <input type="checkbox"/>
Standard Additions: <input type="checkbox"/>	Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____		
Notes: _____			



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: <u>CUC 16 Bldg. 224</u>	Sample ID No.: _____
Project No.: <u>ND124 Zone G</u>	Sample Location: <u>MW3</u>
Sampled By: <u>7 22 RA</u>	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <input type="checkbox"/>	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Manganese (Mn²⁺):

Equipment: DR-700	DR-8 __	HACH MN-5	Other: _____	Analysis Time: _____
Program/Module: 525nm	41			
Concentration: <u>0.1</u> mg/L				Filtered: <input type="checkbox"/>
Standard Solution: <input type="checkbox"/>	Results: _____			Digestion: <input type="checkbox"/>
Standard Additions: <input type="checkbox"/>	Reagent Blank Correction: <input type="checkbox"/>			
	Digits Required: 0.1ml: _____	0.2ml: _____	0.3ml: _____	

Notes: _____

Ferrous Iron (Fe²⁺):

Equipment: DR-700	DR-8 __	IR-18C Color Wheel	Other: _____	Analysis Time: _____
Program/Module: 500nm	33			
Concentration: <u>0.08</u> mg/L				Filtered: <input type="checkbox"/>

Notes: _____

Hydrogen Sulfide (H₂S):

Equipment: HS-C	Other: _____	Analysis Time: _____
Concentration: _____ mg/L	Exceeded 5.0 mg/L range on color chart: <input type="checkbox"/>	

Notes: _____

QA/QC Checklist:

All data fields have been completed as necessary:

Correct measurement units are cited in the SAMPLING DATA block:

Multiplication is correct for each *Multiplier* table:

Final calculated concentration is within the appropriate *Range Used* block:

Alkalinity *Relationship* is determined appropriately as per manufacturer instructions:

QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents:

Nitrite interference treatment used for Nitrate test if Nitrite was detected:

Title block is initialized by person who performed the QA/QC Checklist:



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: Site 16 Bldg. 224 Sample ID No.: 16GLM0601
 Project No.: NO124 Zone G Sample Location: MW-6
 Sampled By: Z Z Z Duplicate:
 Field Analyst: _____ Blank:
 Field Form Checked as per QA/QC Checklist (initials):

SAMPLING DATA:

Date:	Color	ORP (Eh)	S.C.	Temp.	Turbidity	DO	Sal.	pH
Time:	(Visual)	(+/- mv)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	(SU)
Method:								

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissoived Oxygen:
 Equipment: HACH Digital Titrator OX-DT CHEMetrics (Range: 0-10 mg/L) Analysis Time: _____
2 ppm

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	1-5 mg/L	200 ml	0.200 N	0.01	_____	x 0.01	= _____ mg/L
<input type="checkbox"/>	2-10 mg/L	100 ml	0.200 N	0.02	_____	x 0.02	= _____ mg/L

CHEMetrics: 2 mg/L ppm
 Notes: _____

Alkalinity:
 Equipment: HACH Digital Titrator AL-DT CHEMetrics (Range: _____ mg/L) Analysis Time: 14:3
 Filtered:

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	= _____ mg/L
<input type="checkbox"/>	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	= _____ mg/L
<input type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	_____ & _____	x 1.0	= _____ mg/L
<input checked="" type="checkbox"/>	200-800 mg/L	50 ml	1.600 N	2.0	_____ & <u>236</u>	x 2.0	= <u>472</u> mg/L
<input type="checkbox"/>	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	= _____ mg/L
<input type="checkbox"/>	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	= _____ mg/L

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:			

CHEMetrics: _____ mg/L
 Notes: _____

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

Carbon Dioxide:
 Equipment: HACH Digital Titrator CA-DT CHEMetrics (Range: _____ mg/L) Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Concentration
<input type="checkbox"/>	10-50 mg/L	200 ml	0.3636 N	0.1	_____	x 0.1 = _____ mg/L
<input type="checkbox"/>	20-100 mg/L	100 ml	0.3636 N	0.2	_____	x 0.2 = _____ mg/L
<input type="checkbox"/>	100-400 mg/L	200 ml	3.636 N	1.0	_____	x 1.0 = _____ mg/L
<input checked="" type="checkbox"/>	200-1000 mg/L	100 ml	3.636 N	2.0	<u>117</u>	x 2.0 = <u>234</u> mg/L

CHEMetrics: _____ mg/L
 Notes: _____

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



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: <u>CNC.16 Bldg. 224</u>	Sample ID No.: _____
Project No.: <u>ND124 Zone G</u>	Sample Location: <u>MW-6</u>
Sampled By: <u>7 22 99</u>	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): 	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide (S²⁻):

Equipment: DR-700	DR- <u>890</u>	HS-C Color Chart	HS-WR Color Wheel	Analysis Time: <u>1554</u>
Program/Module: 610nm	93	Other: _____		

Concentration: 0.07 mg/L Filtered:

Notes: _____

Sulfate (SO₄²⁻):

Equipment: DR-700	DR-8	Other: _____	Analysis Time: _____
Program/Module: _____	91		

Concentration: _____ mg/L Filtered:

Standard Solution: Results: _____

Standard Additions: Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: _____

Nitrite (NO₂⁻-N):

Equipment: DR-700	DR- <u>890</u>	Other: _____	Analysis Time: _____
Program/Module: _____	60		

Concentration: 0.00 mg/L Filtered:

Reagent Blank Correction:

Standard Solution: Results:

Notes: _____

Nitrate (NO₃⁻-N):

Equipment: DR-700	DR- <u>890</u>	Other: _____	Analysis Time: _____
Program/Module: _____	55		

Concentration: _____ mg/L Filtered:

Nitrite Interference Treatment:

Reagent Blank Correction:

Standard Solution: Results: _____

Standard Additions: Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: _____



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page of

Project Site Name: <u>CNCL6 Bldg. 224</u>	Sample ID No.: _____
Project No.: <u>NO124 Zone G</u>	Sample Location: <u>MW 6</u>
Sampled By: <u>7 22 00</u>	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <input type="checkbox"/>	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Manganese (Mn²⁺):

Equipment: DR-700 DR-840 HACH MN-5 Other: _____ Analysis Time: _____

Program/Module: 525nm 41

Concentration: 0.8 mg/L Filtered:

Standard Solution: Results: _____ Digestion:

Standard Additions: Reagent Blank Correction:

Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: _____

Ferrous Iron (Fe²⁺):

Equipment: DR-700 DR-840 IR-18C Color Wheel Other: _____ Analysis Time: _____

Program/Module: 500nm 33

Concentration: 0.03 mg/L Filtered:

Notes: _____

Hydrogen Sulfide (H₂S):

Equipment: HS-C Other: _____ Analysis Time: _____

Concentration: _____ mg/L Exceeded 5.0 mg/L range on color chart:

Notes: _____

QA/QC Checklist:

All data fields have been completed as necessary:

Correct measurement units are cited in the SAMPLING DATA block:

Multiplication is correct for each *Multiplier* table:

Final calculated concentration is within the appropriate *Range Used* block:

Alkalinity *Relationship* is determined appropriately as per manufacturer instructions:

QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents:

Nitrite interference treatment used for Nitrate test if Nitrite was detected:

Title block is initialized by person who performed the QA/QC Checklist:

APPENDIX D

SOIL AND GROUNDWATER LABORATORY ANALYTICAL DATA



October 13, 1999

Mr. Paul Calligan
Tetra Tech Nus
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

RE: Katahdin Lab Number: WP3906
Project ID: CNC Charleston
Project Manager: Ms. Andrea J. Colby
Sample Receipt Date(s): 9/14/99

Dear Mr. Calligan:

Please find enclosed the following information:

- * Report of Analysis
- * Quality Control Data Summary
- * Chain of Custody
- * Confirmation

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. This cover letter is an integral part of the ROA.

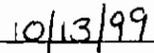
We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Sincerely,

KATAHDIN ANALYTICAL SERVICES



Authorized Signature



Date



SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON

Sample Receipt

The following samples were received on September 14, 1999 and were logged in under Katahdin Analytical Services work order number WP3906 for a hardcopy due date of October 14, 1999.

<u>KATAHDIN</u> <u>Sample No.</u>	<u>TTNUS</u> <u>Sample Identification</u>
WP3906-1	36GLM0101
WP3906-2	36GLO680004
WP3906-3	36GLM0701
WP3906-4	36GLM0401
WP3906-5	36GLM0501
WP3906-6	42GLM0401
WP3906-7	42GLM0301
WP3906-8	42GLM0201
WP3906-9	42GLM0501
WP3906-10	42GLM1401
WP3906-11	42GLM1701
WP3906-12	42GLM1501
WP3906-13	42GLM1601
WP3906-14	36GLM0201D
WP3906-15	22GLM0101
WP3906-16	22GLM0201
WP3906-17	22GLM0501
WP3906-18	22GLM0701
WP3906-19	42GLM1001
WP3906-20	42GLM1201
WP3906-21	42GLM0801
WP3906-22	42GLM0601
WP3906-23	42GLM0701D
WP3906-24	42GLM0101D
WP3906-25	42GLM1801
WP3906-26	42TL00101
WP3906-27	23TL00201
WP3906-28	36GLM0601
WP3906-29	36GLM0201
WP3906-30	36GLM0301
WP3906-31	42GLM0701
WP3906-32	42GLM0901
WP3906-33	42GLM1101
WP3906-34	42GLM0101

WP3906-35	42GLM1301
WP3906-36	23GLM0401
WP3906-37	23GLX0301
WP3906-38	23GLX0401
WP3906-39	23GLX0401D
WP3906-40	23GLM05D01
WP3906-41	23GLM0101
WP3906-42	25GLM0301
WP3906-43	25GLM0801
WP3906-44	25GLM0601
WP3906-45	25GLM0401
WP3906-46	25GLM0701
WP3906-47	16GLM7D01
WP3906-48	26GLP1201
WP3906-49	26GLP1301

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

Forty-seven aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on September 14, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5973-U and 5970-Q instruments. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ppb.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. Matrix spike/matrix spike duplicate analyses were performed on samples WP3906-5, -17, and -19.

Analyses of samples WP3906-10, -11, and -13 yielded concentrations of 1,2-dichloroethene (cis) over the upper limit of the calibration curve. Since this was not a requested analyte to be reported by the client, no laboratory action was taken.

Analysis of sample WP3906-19 was performed at a 1:5 dilution due to naphthalene concentrations, resulting in elevated reporting limits.

The initial analysis of sample WP3906-30 was performed outside of the twelve hour BFB tuning window. This was recognized during data review, and the subsequent reanalysis was outside of analytical holding times. Only the reanalysis performed outside of holding times is included in this data package.

Initial analyses of samples WP3906-36 and -44 yielded concentrations of target analytes over the upper limit of the calibration curve. Reanalyses occurred at 1:50 and 1:5 dilutions, respectively. Both sets of data for each sample are included in the data package.

Analysis of the QC samples WP3906-19MS/MSD yielded target analyte concentrations over the upper limit of the calibration curve. In accordance with the method, no laboratory action was taken with these samples.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organic Analysis

Twenty-three aqueous samples were received by Katahdin Analytical Services laboratory on September 14, 1999 for analysis in accordance with 8270C for a client specified PAH list of analytes.

Extraction of samples WP3906 3-12 and 15-18 occurred following USEPA method 3510 on September 16, 1999. A laboratory control spike/laboratory control spike duplicate pair was extracted in the batch. Samples WP3906-13 and -19-25 were extracted following USEPA method 3510 on September 17, 1999. A laboratory control sample, along with a site-specific MS/MSD pair on sample WP3906-19, was extracted in this batch. The remaining sample, WP3906-14, was extracted following USEPA method 3510 on September 20, 1999. A laboratory control sample was also extracted in this batch.

Analysis of sample WP3906-19 yielded a concentration of the analyte naphthalene over the upper limit of the calibration curve. Reanalysis occurred at a 1:2 dilution successfully. Both sets of data for this sample are included in this data package.

Initial analysis of sample WP3906-22 yielded internal standard area recovery deviations. Reanalysis yielded similar results, confirming matrix interference. Both sets of data are included in this data package.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Metals Analysis

The samples of Katahdin Work Order WP3906 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Waste", SW-846, November 1986, Third Edition.

Inductively-Coupled Plasma (ICP) Atomic Emission Spectroscopic Analysis

Aqueous-matrix Katahdin Sample Nos. WP3906- (1-25, 28-46) were digested for ICP analysis on 09/17/99 (QC Batch PI171CW0), 09/21/99 (QC Batch PI211CW0), and 09/22/99 (QC Batch PI221CW0) in accordance with USEPA Method 3010A. Katahdin Sample Nos. WP3906- (19, 46) were prepared with duplicate matrix-spiked aliquots during digestion.

ICP analyses of Katahdin Work Order WP3906 sample digestates were performed in accordance with USEPA Method 6010B, using a Thermo Jarrell Ash (TJA) Trace ICP spectrometer and a TJA 61 ICP spectrometer. All samples were analyzed within holding times and all QC criteria were met with the following comments or exceptions:

Some of the results for run QC samples (ICV, ICB, CCV, CCB, ICSA, and ICSAB) included in the accompanying data package may have exceeded acceptance limits for some elements. Please note that all client samples and batch QC samples associated with out-of-control results for run QC samples were subsequently reanalyzed for the analytes in question.

Analysis of Mercury by Cold Vapor Atomic Absorption (CVAA) Spectrophotometry

Aqueous-matrix Katahdin Sample Nos. WP3906- (1-25, 28-35) were digested for mercury analysis on 09/22/99 (QC Batch PI22HGW0), 09/25/99 (QC Batch PI25HGW0), and 09/27/99 (QC Batch PI27HGW0) in accordance with USEPA Method 7470A. Katahdin Sample No. WP3906-1 was prepared with a single matrix-spiked aliquot, and Katahdin Sample Nos. WP3906- (19, 21) were prepared with duplicate matrix-spiked aliquots during digestion.

Mercury analyses of Katahdin Work Order WP3906 sample digestates were performed using a Leeman Labs PS200 automated mercury analyzer. All samples were analyzed within holding times and all run QC criteria were met.

Wet Chemistry Analysis

Due to IC instrument failure, alternate methods were approved for work order WP3906 by Kelly Johnson-Carper for the analysis of nitrate and sulfate. Nitrate analyses (353.2) and Sulfate analyses (375.4) were performed according to the U.S. EPA, Methods for Analysis of Water and Wastes, EPA 600/4-79-020, 1979, Revised 1983. Nitrate analyses (E300) were performed according to the U.S. EPA "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA 600/R-93/100, August 1993. All samples were analyzed within analytical hold times.

The Wet Chemistry staff noted no protocol deviations.

LAB (WORK ORDER) # W03904

PAGE: 1 OF 12

COOLER: 1 OF 12

CLIENT: Tetatech NUS

COC# -

SDG# -

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FEDEX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: ASC

PROJECT: CNC CHARLESTON

mm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>2.1</u>	
6. SAMPLES RECEIVED AT 4°C OR 2°C? (ICE) ICE PACKS PRESENT (Y or N)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES⁽¹⁾: HNO₃ added to metals aliquot to bring pH < 2 : 42 GLM1001, 36 GLM0301, 42 GLM0701, 42 GLM0901, 42 GLM1101, 36 GLM0601, 36 GLM0201, 36 GLM0201, 36 GLM0401, 36 GLM0101, 36 GL0680004, 42 GLM0701 D

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

LAB (WORK ORDER) # W03904

PAGE: 2 OF 12

COOLER: 2 OF 12

COC# -

SDG# -

DATE / TIME RECEIVED: 09-14-99 ~ 09:00

DELIVERED BY: FED EX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: AJC

CLIENT: Tetradon NUS

PROJECT: CNC CHARLESTON

Wm

- | | YES | NO | EXCEPTIONS |
|--|-------------------------------------|-------------------------------------|--------------------------|
| 1. CUSTODY SEALS PRESENT / INTACT? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. CHAIN OF CUSTODY PRESENT IN THIS COOLER? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. CHAIN OF CUSTODY SIGNED BY CLIENT? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. CHAIN OF CUSTODY MATCHES SAMPLES? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 5. TEMPERATURE BLANKS PRESENT? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. SAMPLES RECEIVED AT 4°C ± 2?
<u>ICE</u> ICE PACKS PRESENT <u>Y</u> or N? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 7. VOLATILES FREE OF HEADSPACE? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. TRIP BLANK PRESENT IN THIS COOLER | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 9. PROPER SAMPLE CONTAINERS AND VOLUME? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. SAMPLES WITHIN HOLD TIME UPON RECEIPT? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 12. CORRECTIVE ACTION REPORT FILED? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |
| 13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN): | | | |

COMMENTS	RESOLUTION
TEMP BLANK TEMP (°C) = <u>1.3</u>	<u>AJC notified Jeff Alexander 9/14/99</u>
COOLER TEMP (°C) = <u>NA</u>	
(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	

LOG - IN NOTES⁽¹⁾:

* Sample matching discussed w/ P.M.
 No containers for 22661403010 - Jeff Alexander said to cross off COC
 Received pb bottle for 2566140401 - Jeff Alexander said to add to COC

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # W03906

PAGE: 3 OF 12

COOLER: 3 OF 12

COC# —

SDG# —

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FED EX

RECEIVED BY: BKR

LIMS ENTRY BY: BER

LIMS REVIEW BY / PM: AJC

CLIENT: Tetrahedra NUS

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) <u>2.6</u>	
6. SAMPLES RECEIVED AT 4°C ± 0.27 ICE ICE PACKS PRESENT Y or N?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

0000221

LAB (WORK ORDER) # WP3906

PAGE: 4 OF 12

COOLER: 4 OF 12

COC# -

SDG# -

DATE / TIME RECEIVED: 09-14-99 ~ 09:00

DELIVERED BY: FED EX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: AJC

CLIENT: Tetrahedron NUS

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>2.0</u>	
6. SAMPLES RECEIVED AT 4°C ± 0.2?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
(C) ICE PACKS PRESENT (Y or N)?				(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

0000222

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # W03904

PAGE: 5 OF 12

COOLER: 5 OF 12

COC#

SDG#

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FED EX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: AKL

CLIENT: Tetrahedn NUS

PROJECT: CNC CHARLESTON

mm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>3.2</u>	
6. SAMPLES RECEIVED AT 4°C? (ICE) ICE PACKS PRESENT Y or N?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

0000223

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative used.

LAB (WORK ORDER) # WD3906

PAGE: 6 OF 12

COOLER: 6 OF 12

COC# ---

SDG# ---

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FED EX

RECEIVED BY: BKR

LIMS ENTRY BY: BEW

LIMS REVIEW BY / PM: ATC

CLIENT: Tetra Tech NUS

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>3.1</u>	
6. SAMPLES RECEIVED AT 4°C? <u>Y</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
ICE ICE PACKS PRESENT <u>Y</u> OF <u>N</u> ?				(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # WP3906

PAGE: 7 OF 12

COOLER: 7 OF 12

COC# -

SDG# -

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FEDEX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: AJC

CLIENT: Tetatech NUS

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>3.0</u>	
6. SAMPLES RECEIVED AT 4°C ± .2?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
(ICE) ICE PACKS PRESENT (Y or N)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, residue of pH check if required. If samples required pH adjustment, record volume and type of preservative used.

LAB (WORK ORDER) # W03904

PAGE: 8 OF 12

COOLER: 8 OF 12

COC# —

SDG# —

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FED EX

RECEIVED BY: BKK

LIMS ENTRY BY: BKK

LIMS REVIEW BY / PM: AJC

CLIENT: Tetradon NUS

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>2.2</u>	
6. SAMPLES RECEIVED AT 4°C ± 2°? (ICE) ICE PACKS PRESENT (Y or N)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservatives added.

0000226

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # WP3906

PAGE: 9 OF 12

COOLER: 9 OF 12

CLIENT: Tetatech NUS

COC# —

SDG# —

DATE / TIME RECEIVED: 09-14-99 ~ 09:00

DELIVERED BY: FED EX

RECEIVED BY: BKK

LIMS ENTRY BY: BKK

LIMS REVIEW BY / PM: ASC

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>21</u>	
6. SAMPLES RECEIVED AT 4°C ± 2°?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
(C) ICE PACKS PRESENT (Y or N)?				(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL. CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

0000227

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if/ed. If samples required pH adjustment, record volume and type of preservative a/

LAB (WORK ORDER) # WD3906

PAGE: 10 OF 12

COOLER: 10 OF 12

COC# _____

SDG# _____

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FED EX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: AZL

CLIENT: Tetradon NUS

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) <u>2.1</u>	
6. SAMPLES RECEIVED AT 4°C ± 0.2? ICE ICE PACKS PRESENT (Y or N)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN): _____					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

LAB (WORK ORDER) # WP3904

PAGE: 11 OF 12

COOLER: 11 OF 12

CLIENT: Tetra Tech NUS

COC# _____

SDG# _____

DATE / TIME RECEIVED: 09-14-99 ~ 09:00

DELIVERED BY: FEDEX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: AJC

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>1.7</u>	<u>ASC notified Jeff Alexander 9/14/99</u>
6. SAMPLES RECEIVED AT 4°C / 22°C? ICE / ICE PACKS PRESENT Y or N?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN): _____

LOG - IN NOTES⁽¹⁾:

0000229

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

LAB (WORK ORDER) # WP3906

PAGE: 12 OF 12

COOLER: 12 OF 12

COC# —

SDG# —

DATE / TIME RECEIVED: 09-14-99 ~ 0900

DELIVERED BY: FEDEX

RECEIVED BY: BKR

LIMS ENTRY BY: BKR

LIMS REVIEW BY / PM: AJC

CLIENT: Tetrahedn NUS

PROJECT: CNC CHARLESTON

Wm

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>3.1</u>	
6. SAMPLES RECEIVED AT 4°C ± .27 ICE PACKS PRESENT Y or N?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

(Empty space for notes)

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

0000230



340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page ___ of ___

Client: Terra Tech NUS Inc Contact: Rosal Calligan Phone #: 8431554-4425 Fax #:

Address: NH 21 AVE H City: N. Charleston State: SC Zip Code:

Purchase Order #: Proj. Name / No.: Katahdin Quote #:

Bill (if different than above): Address:

Sampler (Print / Sign): Serry Kropa / Jay Kiley Copies To:

LAB USE ONLY WORK ORDER #: WP3906
KATAHDIN PROJECT MANAGER:

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

REMARKS:

SHIPPING INFO: FED EX UPS CLIENT

AIRBILL NO:

TEMP °C: TEMP BLANK INTACT NOT INTACT

| Fit |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| YO |

* Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	BTEX, MTBE, EDB	NAPHA	PAH	Total Lead	ANIONS Nitrate, Sulfate	Disinfectants	Methanols
23 GLM0401	9/10/99 / 1517	GW	6	3	2	1				
23 GLX0301	9/10/99 / 1535	GW	6	3	2	1				
23 GLX0401	9/10/99 / 1540	GW	6	3	2	1				
23 GLX0401D	9/10/99 / 0000	GW	6	3	2	1				
23 GLM05D01	9/10/99 / 1600	GW	6	3	2	1				
23 GLM0101	9/10/99 / 1630	GW	6	3	2	1				
23 TLO0201	9/10/99 / 0800	GW	1	1						
16 GLM7D01	9/12/99 / 0755	GW	5	3	2					
25 GLM0301	1/1510	GW	6	3	2	1				
25 GLM0801	1/1555	GW	6	3	2	1				
25 GLM0601	1/1600	GW	6	3	2	1				
25 GLM0701	9/10/99 / 1115	GW	10	3	2	1	1	3		
25 GLM0401	1/1140	GW	5	3	2	1				
26 GLP1201	1/1345	GW	5	3	2					
26 GLP1301	1/1355	GW	5	3	2					
	1									

Cooler 2 of 2

COMMENTS:

Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>9/10/99 1900</u>	Received By: (Signature) <u>[Signature]</u>	Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>9-14-99 0900</u>	Received By: (Signature) <u>[Signature]</u>
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)



340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page 2 of 3

Client: TETRA TECH NUS Contact: PAUL CALLIGAN Phone #: (850) 385-9899 Fax #: (850) 350-9860
 Ac: 1401 OVEN PARK DR 102 City: TALLAHASSEE State: FL Zip Code: 32308
 Purchase Order # _____ Proj. Name / No. _____ Katahdin Quote # _____

Bill (if different than above) _____ Address _____
 Sampler (Print / Sign) T. Thompson Copies To: _____

LAB USE ONLY WORK ORDER #: WP3906
 KATAHDIN PROJECT MANAGER _____
 REMARKS: _____
 SHIPPING INFO: FED EX UPS CLIENT
 AIRBILL NO.: _____
 TEMP°C TEMP BLANK INTACT NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

* Sample Description	Date / Time col'd	Matrix	No. of Cntrs.	Fit.	Fit.	Fit.	Fit.	Fit.	Fit.	Fit.	Fit.	Fit.	Fit.	Fit.
				OYON	OYON	OYON	OYON	OYON	OYON	OYON	OYON	OYON	OYON	OYON
<u>36GLM0601</u>	<u>91399/1015</u>	<u>GW</u>	<u>10</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>1</u>						
<u>36GLM0201</u>	<u>91399/1055</u>	<u>GW</u>	<u>10</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>1</u>						
<u>36GLM0301</u>	<u>91399/1131</u>	<u>GW</u>	<u>10</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>1</u>						
<u>21GLM0201D</u>	<u>91399/0000</u>	<u>GW</u>	<u>6</u>	<u>3</u>	<u>2</u>	<u>1</u>								
<u>22GLM0101</u>	<u>91099/1130</u>	<u>GW</u>	<u>6</u>	<u>3</u>	<u>2</u>	<u>1</u>								
<u>22GLM0201</u>	<u>91099/1110</u>	<u>GW</u>	<u>6</u>	<u>3</u>	<u>2</u>	<u>1</u>								
<u>22GLM0501</u>	<u>91099/1418</u>	<u>GW</u>	<u>6</u>	<u>3</u>	<u>2</u>	<u>1</u>								
<u>22GLM0701</u>	<u>91099/1420</u>	<u>GW</u>	<u>6</u>	<u>3</u>	<u>2</u>	<u>1</u>								
<u>22GLM0201D</u>	<u>91099/0000</u>	<u>GW</u>	<u>6</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>(BR)</u>							
/	/													
/	/													
/	/													
/	/													
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Cooler 10 F (BR)
LAU Three C.O.C

COMMENTS: Placed on ice.

Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>7/13/99 1749</u>	Received By: (Signature) <u>813458369330</u>	Relinquished By: (Signature) _____	Date / Time <u>9-14-99 0900</u>	Received By: (Signature) <u>[Signature]</u>
Relinquished By: (Signature) _____	Date / Time _____	Received By: (Signature) _____	Relinquished By: (Signature) _____	Date / Time _____	Received By: (Signature) _____



340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Client: **Tetra Tech NUS** Contact: **Paul Calligan** Phone #: **(850) 385-9899** Fax #: **(850)**
 Address: **1401 Oven Park Dr 102** City: **Tallahassee** State: **FL** Zip Code: **32308**
 Purchase Order #: _____ Proj. Name / No.: _____ Katahdin Quote #: _____

Bill (if different than above) Address: _____

Sampler (Print / Sign): **P. Halverson** Copies To: _____

LAB USE ONLY WORK ORDER #: **WP 3906**
KATAHDIN PROJECT MANAGER _____

ANALYSIS AND CONTAINER TYPE: PRESERVATIVES

REMARKS: _____
 SHIPPING INFO: FED EX UPS CLIENT
 AIRBILL NO: _____
 TEMP °C TEMP BLANK INTACT NOT INTACT

	Filt. OYON									
Metals (HNO ₃)										
BTEX, EOB, MTBE, Total Naph. (HCl)										
PAH (None)										
Dissolved Metals (HCl)										
Anions (None)										
* Sample Description										
Date / Time coll'd										
Matrix										
No. of Cntrs.										
42GLM1001										
42GLM0701										
42GLM1201										
42GLM0901										
42GLM0801										
42GLM1101										
42GLM0101										
42GLM1301										
42GLM0601										
42GLM0701										
42GLM0901										
42GLM1101										
42GLM0701D										
42GLM0101D										
42GLM1001M										
42GLM1801										

COMMENTS: _____

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
<i>[Signature]</i>	9/13/99 17:00	81345836933P	<i>[Signature]</i>	9-14-99 0900	<i>[Signature]</i>
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-3906

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 09/14/99

PHONE: 850/385-989

FAX: 850/385-986

DUE: 14 OCT

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3906-1	36GLM0101	10 SEP 1110	14 SEP	AQ
	WP3906-2	36GLO680004	10 SEP 1115		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Target Analyte List Metals, Total		2	100.00	200.00

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-3906

Project Manager: Andrea J. Colby
 ORDER DATE: 09/14/99
 PHONE: 850/385-9899
 FAX: 850/385-9860
 DUE: 14 OCT
 FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 FOSTER PLAZA 7, 661 ANDERSEN DR.
 PITTSBURGH, PA 15220

PHONE: 412/921-7090
 PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2 WP3906-3	36GLM0701	10 SEP 1120	14 SEP	AQ
WP3906-4	36GLM0401	10 SEP 1510		
WP3906-5	36GLM0501	10 SEP 1515		
WP3906-6	42GLM0401	11 SEP 1055		
WP3906-7	42GLM0301	11 SEP 1050		
WP3906-8	42GLM0201	11 SEP 1045		
WP3906-9	42GLM0501	11 SEP 1035		
WP3906-10	42GLM1401	11 SEP 1125		
WP3906-11	42GLM1701	11 SEP 1110		
WP3906-12	42GLM1501	11 SEP 1110		
WP3906-13	42GLM1601	11 SEP 1125		
WP3906-14	36GLM0201D	13 SEP		
WP3906-15	22GLM0101	10 SEP 1130		
WP3906-16	22GLM0201	10 SEP 1110		
WP3906-17	22GLM0501	10 SEP 1418		
WP3906-18	22GLM0701	10 SEP 1420		
WP3906-19	42GLM1001	12 SEP 0941		
WP3906-20	42GLM1201	12 SEP 1030		
WP3906-21	42GLM0801	12 SEP 1057		
WP3906-22	42GLM0601	12 SEP 1535		
WP3906-23	42GLM0701D	12 SEP 0000		
WP3906-24	42GLM0101D	12 SEP 0000		
WP3906-25	42GLM1801	13 SEP 0842		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Target Analyte List Metals, Total		23	100.00	2300.00
Volatile Organics by 8260B	SW8260	23	75.00	1725.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	23	125.00	2875.00
TOTALS		23	300.00	6900.00

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
 New England-ME Laboratory (207) 874-2400
 CONFIRMATION

ORDER NO WP-3906

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

ORDER DATE: 09/14/99

PHONE: 850/385-989

FAX: 850/385-986

DUE: 14 OCT

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 FOSTER PLAZA 7, 661 ANDERSEN DR.
 PITTSBURGH, PA 15220

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3	WP3906-26	42TL00101	13 SEP	14 SEP	AQ
	WP3906-27	23TL00201	10 SEP 0800		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	2	75.00	150.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4	WP3906-28	36GLM0601	13 SEP 1015	14 SEP	AQ
	WP3906-29	36GLM0201	13 SEP 1055		
	WP3906-30	36GLM0301	13 SEP 1131		
	WP3906-31	42GLM0701	12 SEP 1202		
	WP3906-32	42GLM0901	12 SEP 1206		
	WP3906-33	42GLM1101	12 SEP 1204		
	WP3906-34	42GLM0101	12 SEP 1435		
	WP3906-35	42GLM1301	12 SEP 1449		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Target Analyte List Metals, Total		8	100.00	800.00
Volatile Organics by 8260B	SW8260	8	75.00	600.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	8	125.00	1000.00
Nitrate as N	353.2	8	30.00	240.00
Sulfate	375.4	8	0.00	0.00
Methane Subcontract		8	95.00	760.00

TOTALS		8	425.00	3400.00
--------	--	---	--------	---------

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-3906

Project Manager: Andrea J. Colby

RT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

ORDER DATE: 09/14/99
 PHONE: 850/385-9899
 FAX: 850/385-9860
 DUE: 14 OCT
 FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 FOSTER PLAZA 7, 661 ANDERSEN DR.
 PITTSBURGH, PA 15220

PHONE: 412/921-7090
 PO: N7912-P99264
 PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
5 WP3906-36	23GLM0401	10 SEP 1517	14 SEP	AQ
WP3906-37	23GLX0301	10 SEP 1535		
WP3906-38	23GLX0401	10 SEP 1540		
WP3906-39	23GLX0401D	10 SEP		
WP3906-40	23GLM05D01	10 SEP 1600		
WP3906-41	23GLM0101	10 SEP 1630		
WP3906-42	25GLM0301	12 SEP 1510		
WP3906-43	25GLM0801	12 SEP 1555		
WP3906-44	25GLM0601	12 SEP 1620		
WP3906-45	25GLM0401	13 SEP 1140		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	10	75.00	750.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	10	125.00	1250.00
Lead, Total	200.7/6010	10	20.00	200.00
Elements Sample Preparation		10	0.00	0.00
TOTALS		10	220.00	2200.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6 WP3906-46	25GLM0701	13 SEP 1115	14 SEP	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	75.00	75.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	125.00	125.00
Lead, Total	200.7/6010	1	20.00	20.00
Elements Sample Preparation		1	0.00	0.00
Nitrate as N	353.2	1	30.00	30.00
Sulfate	375.4	1	0.00	0.00
Methane Subcontract		1	95.00	95.00
TOTALS		1	345.00	345.00

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-3906

Project Manager: Andrea J. Colby
ORDER DATE: 09/14/99
PHONE: 850/385-986
FAX: 850/385-986
DUE: 14 OCT
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: P.HALVERSON/T.THOMPSON/J.KRIEGERDELIVERED BY: FEDEXDISPOSE: AFTER 13

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
7	WP3906-47	16GLM7D01	12 SEP 0755	14 SEP	AQ
	WP3906-48	26GLP1201	13 SEP 1345		
	WP3906-49	26GLP1301	13 SEP 1355		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	3	75.00	225.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	125.00	375.00
TOTALS		3	200.00	600.00

ORDER NOTE: QC-II+ W/NARRATIVE
DD(KAS007QC-DB3)
CNC CHARLESTON
REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.
PITTSBURGH, PA. 15220
REPORT AND DISK

INVOICE: With Report

TOTAL ORDER AMOUNT \$13,795.00

This is NOT an Invoice

AJC/BKR

09-14Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
A-1	Insufficient sample was provided to enable laboratory to achieve the laboratory's standard Practical Quantitation Level.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
B	'B' flag denotes detection of this analyte in the laboratory method blank analyzed concurrently with the sample.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3906-47
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM7D01	AQ	9/12/99	9/14/99	9/17/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample	Method
				PQL	PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	67	%	1.0		
2-FLUOROBIPHENYL	79	%	1.0		
TERPHENYL-D14	78	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP3906-47
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/17/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM7D01	AQ	9/12/99	9/14/99	9/17/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	98	%	1.0		
1,2-DICHLOROETHANE-D4	92	%	1.0		
TOLUENE-D8	96	%	1.0		
P-BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

4B
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;091799

Lab Name: Katahdin Analytical Services

SDG No.: WP3906

Lab File ID: X2921

Lab Sample ID: SBLK;091799

Instrument ID: 5970-X

Date Extracted: 9/17/99

GC Column: RTX-5 ID: 0.25 (mm)

Date Analyzed: 09/27/99

Matrix: (soil/water) WATER

Time Analyzed: 16:30

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;091799	LCS;091799	X2922	9/27/99	5:14:00 PM
42GLM1601	WP3906-13	X2923	9/27/99	5:59:00 PM
42GLM1001	WP3906-19	X2924	9/27/99	6:43:00 PM
42GLM1001MS	WP3906-19MS	X2925	9/27/99	7:27:00 PM
42GLM1001MSD	WP3906-19MSD	X2926	9/27/99	8:11:00 PM
42GLM0801	WP3906-21	X2928	9/27/99	9:39:00 PM
42GLM1001	WP3906-19DL	X2933	9/28/99	11:59:00 AM
42GLM1201	WP3906-20	X2934	9/28/99	12:43:00 PM
42GLM0601	WP3906-22	X2935	9/28/99	1:27:00 PM
42GLM0701D	WP3906-23	X2936	9/28/99	2:12:00 PM
42GLM0101D	WP3906-24	X2937	9/28/99	2:56:00 PM
42GLM1801	WP3906-25	X2938	9/28/99	3:40:00 PM
36GLM0601	WP3906-28	X2939	9/28/99	4:24:00 PM
36GLM0201	WP3906-29	X2940	9/28/99	5:09:00 PM
36GLM0301	WP3906-30	X2941	9/28/99	5:53:00 PM
42GLM0901	WP3906-32	X2943	9/28/99	7:22:00 PM
42GLM0101	WP3906-34	X2945	9/28/99	8:50:00 PM
42GLM0601	WP3906-22RA	X2947	9/29/99	10:07:00 AM
42GLM0701	WP3906-31	X2948	9/29/99	10:51:00 AM
42GLM1101	WP3906-33	X2949	9/29/99	11:35:00 AM
42GLM1301	WP3906-35	X2950	9/29/99	12:20:00 PM
25GLM0301	WP3906-42	X2951	9/29/99	1:04:00 PM
25GLM0801	WP3906-43	X2952	9/29/99	1:48:00 PM
25GLM0601	WP3906-44	X2953	9/29/99	2:32:00 PM
16GLM7D01	WP3906-47	X2954	9/29/99	3:17:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;091799
SDG: WP3906
Report Date: 10/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;091799	AQ	-	-	9/17/99	DPD	EPA 3510	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	82	%	1.0		
2-FLUOROBIPHENYL	81	%	1.0		
TERPHENYL-D14	112	%	1.0		

Report Notes:

Katahdin Analytical Services
8270 LCS Recovery Sheet

Lab File: X2922

Sample ID: LCS;091799

Date Run: 9/27/99

Analyst: SW

Time Injected: 5:14:00 PM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	50	33.1	*66	70-130
ACENAPHTHENE	50	34.4	*69	70-130
ACENAPHTHYLENE	50	34.5	*69	70-130
ANTHRACENE	50	45.7	91	70-130
BENZO[A]ANTHRACENE	50	44.5	89	70-130
BENZO[A]PYRENE	50	44.6	89	70-130
BENZO[B]FLUORANTHENE	50	44.5	89	70-130
BENZO[G,H,I]PERYLENE	50	46.5	93	70-130
BENZO[K]FLUORANTHENE	50	46.5	93	70-130
CHRYSENE	50	53.3	106	70-130
DIBENZ[A,H]ANTHRACENE	50	44.1	88	70-130
FLUORANTHENE	50	43.5	87	70-130
FLUORENE	50	35.5	71	70-130
INDENO[1,2,3-CD]PYRENE	50	41.0	82	70-130
NAPHTHALENE	50	31.3	*62	70-130
PHENANTHRENE	50	47.5	95	70-130
PYRENE	50	48.8	98	70-130

* Out of Limits

1

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP3906-19	X2924	9/27/99	6:43:00 PM	SW	AQ	8270_99
WP3906-19MS	X2925	9/27/99	7:27:00 PM	SW	AQ	8270_99
WP3906-19MSD	X2926	9/27/99	8:11:00 PM	SW	AQ	8270_99

Compound Name	Native (ug/L)	MS Spk Amount (ug/L)	MSD Spk Amount (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD RPD (%)	RPD Limit (%)
CHRYSENE	0	56	54	45.8	44.6	82	82	60-140	2.6	30
ACENAPHTHENE	57.8	56	54	104	97.8	82	74	60-140	6.1	30
ACENAPHTHYLENE	0	56	54	35.9	37.2	64	69	60-140	3.6	30
ANTHRACENE	9.96	56	54	50.1	45.9	72	66	60-140	8.8	30
BENZO[A]ANTHRACENE	0	56	54	37.2	39.2	66	72	60-140	5.2	30
BENZO[A]PYRENE	0	56	54	35.2	41.3	63	76	60-140	16	30
BENZO[B]FLUORANTHENE	0	56	54	34.5	43.5	62	80	60-140	23	30
2-METHYLNAPHTHALENE	34.7	56	54	74.6	52.1	71	*32	60-140	*36	30
BENZO[K]FLUORANTHENE	0	56	54	34.0	42.4	61	78	60-140	22	30
PYRENE	13.2	56	54	57.6	58.9	79	85	60-140	2.2	30
DIBENZ[A,H]ANTHRACENE	0	56	54	35.2	37.8	63	70	60-140	7.1	30
FLUORANTHENE	20.8	56	54	59.1	61.9	68	76	60-140	4.6	30
FLUORENE	32.4	56	54	72.3	60.0	71	*51	60-140	18	30
INDENO[1,2,3-CD]PYRENE	0	56	54	38.2	32.0	68	*59	60-140	18	30
NAPHTHALENE	255	56	54	365	356	*197	*187	60-140	2.5	30
PHENANTHRENE	66.0	56	54	116	98.8	89	61	60-140	16	30
BENZO[G,H,I]PERYLENE	0	56	54	39.3	40.8	70	76	60-140	3.7	30

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKU17A

Lab Name: Katahdin Analytical Services

SDG No.: WP3906

Lab File ID: U0940

Lab Sample ID: VBLKU17A

Date Analyzed: 09/17/99

Time Analyzed: 8:27

GC Column: RTX-624 ID: 0.18 (mm)

Heated Purge: (Y/N) N

Instrument ID: 5973-U

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSU17A	LCSU17A	U0939	9/17/99	7:34:00 AM
16GLM7D01	WP3906-47	U0948	9/17/99	1:32:00 PM
26GLP1201	WP3906-48	U0949	9/17/99	2:08:00 PM
26GLP1301	WP3906-49	U0950	9/17/99	2:44:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: VBLKU17A
SDG: WP3906
Report Date: 10/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/17/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU17A	AQ	-	-	9/17/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	95	%	1.0		
1,2-DICHLOROETHANE-D4	88	%	1.0		
TOLUENE-D8	97	%	1.0		
P-BROMOFLUOROBENZENE	101	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: U0939

Sample ID: LCSU17A

Date Run: 9/17/99

Analyst: KMC

Time Injected: 7:34:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	50.6	101	60-140
BENZENE	50	51.2	102	60-140
ETHYLBENZENE	50	52.5	105	60-140
MTBE	50	40.8	82	60-140
NAPHTHALENE	50	48.9	98	60-140
TOLUENE	50	53.3	106	60-140
TOTAL XYLENES	150	153	102	60-140

* Out of Limits

1

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKU22A

Lab Name: Katahdin Analytical Services

SDG No.: WP3906

Lab File ID: U1018

Lab Sample ID: VBLKU22A

Date Analyzed: 09/22/99

Time Analyzed: 10:44

GC Column: RTX-624 ID: 0.18 (mm)

Heated Purge: (Y/N) N

Instrument ID: 5973-U

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSU22A	LCSU22A	U1017	9/22/99	9:54:00 AM
25GLM0601	WP3906-44DL	U1019	9/22/99	11:32:00 AM
23GLM0401	WP3906-36DL	U1021	9/22/99	12:47:00 PM
36GLM0501MS	WP3906-5MS	U1025	9/22/99	3:14:00 PM
36GLM0501MSD	WP3906-5MSD	U1026	9/22/99	3:50:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Owen Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKU22A
 SDG: WP3906
 Report Date: 10/12/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: SW8260
 Date Analyzed: 9/22/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU22A	AQ	-	-	9/22/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	110	%	1.0		
1,2-DICHLOROETHANE-D4	99	%	1.0		
TOLUENE-D8	107	%	1.0		
P-BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: U1017

Sample ID: LCSU22A

Date Run: 9/22/99

Analyst: KMC

Time Injected: 9:54:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	49.7	99	60-140
BENZENE	50	51.1	102	60-140
ETHYLBENZENE	50	48.6	97	60-140
MTBE	50	41.8	84	60-140
NAPHTHALENE	50	41.2	82	60-140
TOLUENE	50	53.6	107	60-140
TOTAL XYLENES	150	141	94	60-140

* Out of Limits

1

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP3906-5	Q6636	9/15/99	7:27:00 PM	HMP	AQ	8260_99
WP3906-5MS	U1025	9/22/99	3:14:00 PM	KMC	AQ	8260_99
WP3906-5MSD	U1026	9/22/99	3:50:00 PM	KMC	AQ	8260_99

Compound Name	Native (ug/L)	MS Spk Amount (ug/L)	MSD Spk Amount (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
TOTAL XYLENES	0	150	150	134	123	89	82	60-140	8.6	20
TOLUENE	0	50	50	51.1	46.5	102	93	60-140	9.4	20
NAPHTHALENE	0	50	50	45.6	42.6	91	85	60-140	6.8	20
MTBE	0	50	50	45.4	43.4	91	87	60-140	4.5	20
ETHYLBENZENE	0	50	50	45.6	41.8	91	84	60-140	8.7	20
BENZENE	0	50	50	48.5	44.6	97	89	60-140	8.4	20
1,2-DIBROMOETHANE	0	50	50	53.6	48.8	107	98	60-140	9.4	20



August 26, 1999

Mr. Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

RE: Katahdin Lab Number: WP3372
Project ID: CTO #68
Project Manager: Ms. Andrea J. Colby
Sample Receipt Date(s): 7/23/99

Dear Mr. Calligan

Please find enclosed the following information:

- * Report of Analysis
- * Quality Control Data Summary
- * Chain of Custody
- * Confirmation

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. This cover letter is an integral part of the ROA.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Sincerely,

KATAHDIN ANALYTICAL SERVICES

Deborah J. Nadeau
Authorized Signature

8-27-99
Date



**SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON**

Sample Receipt

The following samples were received on July 23, 1999 and were logged in under Katahdin Analytical Services work order number WP3372 for a hardcopy due date of August 22, 1999.

<u>Sample No.</u>	<u>Sample Identification</u>
WP3372-1	16TL00601
WP3372-2	16GLM0601
WP3372-3	16GLM0101
WP3372-4	16GLM0301

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

Four aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on July 23, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5972-M instrument. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ug/l.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. No matrix spike/matrix spike duplicate was performed on any of the samples in this workorder.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Method 8260B narrows this 20% maximum to 15%.

In the calibration curve analyzed in this SDG, the average %RSD for all analytes was 13.7%, making the curves acceptable.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organics Extraction and Analysis

Three aqueous samples were received by Katahdin Analytical Services laboratory on July 23, 1999 for analysis in accordance with 8270C for a client specified PAH list of analytes.

Extraction of the samples occurred following USEPA method 3510 on July 28, 1999. A laboratory control spike/laboratory control spike duplicate pair, consisting of all PAH analytes spiked into organic free water, was extracted in the batch.

The initial calibration curve analyzed in this SDG had some of the target analyte %RSD values exceeding 15 %.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Section 7.3.7.1 of method 8270C (revision 3, 12/96) narrows this 20% maximum to 15%.

In the calibration curve analyzed in this SDG, the average %RSD for all analytes was 10.1%, making the curve acceptable.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Wet Chemistry Analysis

Due to IC instrument failure, alternate methods were approved by Kelly Johnson-Carper for the analysis of nitrate and sulfate. Samples for work order WP3372 were analyzed for nitrate and sulfate in accordance with "Methods for Chemical Analysis of Water and Wastes", EPA 600/4-79-020, 1979, Revised 1983. No deviations were noted by the Wet Chemistry group.

Subcontracted Analysis

Analysis for Methane was subcontracted to an outside laboratory. This data package is provided as a separate package.

LAB (WORK ORDER) # WP 3372

PAGE: 1 OF 1

COOLER: 1 OF 1

COC# -

SDG# -

DATE / TIME RECEIVED: 7-23-99 0855

DELIVERED BY: Fed Ex

RECEIVED BY: SA

LIMS ENTRY BY: ATC

LIMS REVIEW BY / PM: ATC

CLIENT: Tetra Tech

PROJECT: CNC

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>2.2</u>	
6. SAMPLES RECEIVED AT 4°C +/- 2? <input checked="" type="checkbox"/> ICE PACKS PRESENT <input checked="" type="checkbox"/> or N?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

1 Diss. Methane has ID 16GLM0101 but time is 7-22-99 1130; Only 2 Vials for Diss Methane for sample 16GLM0301. -- labelled as 16GLM0301
 1 vial for 16GLM0101 has headspace

0000024

⁽¹⁾ Use this and additional sheets if necessary) to document samples that are received broken, compromised, C-O-C discrepancies, radiation checks, residual chlorine check, res. pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
 New England-ME Laboratory (207) 874-2400
 CONFIRMATION

ORDER NO WP-3372

Project Manager: Andrea J. Colby
 ORDER DATE: 07/23/99
 PHONE: 850/385-989
 FAX: 850/385-9860
 DUE: 22 AUG
 FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 FOSTER PLAZA 7, 661 ANDERSEN DR.
 PITTSBURGH, PA 15220

PHONE: 412/921-7090
 PO: N7912-P99264
 PROJECT: CTO #68

SAMPLED BY: CLIENT DELIVERED BY: FEDEX DISPOSE: AFTER 21 SEP

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3372-1	16TL00601	22 JUL 0700	23 JUL	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	75.00	75.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2 WP3372-2	16GLM0601	22 JUL 1030	23 JUL	AQ
WP3372-3	16GLM0101	22 JUL 1055		
WP3372-4	16GLM0301	22 JUL 1130		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	3	75.00	225.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	125.00	375.00
GC Subcontract		3	95.00	285.00
Nitrate as N	353.2	3	30.00	90.00
Sulfate	375.4	3	0.00	0.00

TOTALS		3	325.00	975.00
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ORDER NOTE: QC-IV NFESC
 DD(KAS007QC-DB3)
 CNC CHARLESTON

REPORT COPY: MS LEE LECK
 TETRA TECH NUS
 FOSTER PLAZA 7
 661 ANDERSEN DR.
 PITTSBURGH, PA 15220

FINAL PAGE

INVOICE: With Report TOTAL ORDER AMOUNT \$1,050.00
 This is NOT an Invoice

AJC
 07-23 Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

080926
 07/23/99



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note

Note Text

J

'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308
 Proj. ID: CNC CHARLESTON

Lab Number: WP3372-1
 SDG: WP3372
 Report Date: 8/25/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: SW8260
 Date Analyzed: 7/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16TL00601	AQ	7/22/99	7/23/99	7/28/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	99	%	1.0		
1,2-DICHLOROETHANE-D4	99	%	1.0		
TOLUENE-D8	105	%	1.0		
P-BROMOFLUOROBENZENE	95	%	1.0		

Report Notes:



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3372-2
SDG: WP3372
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0601	AQ	7/22/99	7/23/99	7/28/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	101	%	1.0		
1,2-DICHLOROETHANE-D4	103	%	1.0		
TOLUENE-D8	106	%	1.0		
P-BROMOFLUOROBENZENE	97	%	1.0		

Report Notes:



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Lab Number: WP3372-2
SDG: WP3372
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 8/5/99

Proj. ID: CNC CHARLESTON

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0601	AQ	7/22/99	7/23/99	7/28/99	DS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	57	%	1.0		
2-FLUOROBIPHENYL	58	%	1.0		
TERPHENYL-D14	78	%	1.0		

Report Notes:



CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3372-3
Report Date: 08/26/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 2 of 3

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED				
16GLM0101	Aqueous	CLIENT		07/22/99	07/23/99			
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	<0.050	mg/L	1.0	0.050	353.2	07/23/99	SR	
Sulfate	18.	mg/L	10	1.0	375.4	08/16/99	KW	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

08/26/99

LJO/baeajc(dw)/msm
PG23NOW1
CC: MS LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308
 Proj. ID: CNC CHARLESTON

Lab Number: WP3372-3
 SDG: WP3372
 Report Date: 8/25/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: SW8260
 Date Analyzed: 7/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0101	AQ	7/22/99	7/23/99	7/28/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	8	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	J2	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	103	%	1.0		
2-DICHLOROETHANE-D4	107	%	1.0		
TOLUENE-D8	105	%	1.0		
P-BROMOFLUOROBENZENE	101	%	1.0		

Report Notes: J



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308
 Proj. ID: CNC CHARLESTON

Lab Number: WP3372-3
 SDG: WP3372
 Report Date: 8/25/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: EPA 8270
 Date Analyzed: 8/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0101	AQ	7/22/99	7/23/99	7/28/99	DS	EPA 3510	KRT

Compound	Result	Units	DF	Sample	Method
				PQL	PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	J9	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	13	ug/L	1.0	10	10
FLUORENE	J8	ug/L	1.0	10	10
PHENANTHRENE	12	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	47	%	1.0		
2-FLUOROBIPHENYL	47	%	1.0		
TERPHENYL-D14	61	%	1.0		

Report Notes: J



CLIENT: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

Lab Number : WP-3372-4
 Report Date: 08/26/99
 PO No. : N7912-P99264
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 3 of 3

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED				
16GLM0301	Aqueous	CLIENT		07/22/99	07/23/99			
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	<0.050	mg/L	1.0	0.050	353.2	07/23/99	SR	
Sulfate	15.	mg/L	10	1.0	375.4	08/16/99	KW	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

08/26/99

LJO/baeajc(dw)/msm
 PG23NOW1

CC: MS LEE LECK
 TETRA TECH NUS
 FOSTER PLAZA 7
 661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP3372-4
SDG: WP3372
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0301	AQ	7/22/99	7/23/99	7/28/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	98	%	1.0		
1,2-DICHLOROETHANE-D4	100	%	1.0		
TOLUENE-D8	107	%	1.0		
P-BROMOFLUOROBENZENE	103	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Owen Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3372-4
 SDG: WP3372
 Report Date: 8/25/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: EPA 8270
 Date Analyzed: 8/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0301	AQ	7/22/99	7/23/99	7/28/99	DS	EPA 3510	KRT

Compound	Result	Units	DF	Sample	Method
				PQL	PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZO[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	52	%	1.0		
2-FLUOROBIPHENYL	53	%	1.0		
TERPHENYL-D14	82	%	1.0		

Report Notes:



Method Blank and Laboratory Control Sample Results

Client: Tetra Tech NUS

Work Order: WP3372

Parameter	Date of Prep	Date of Analysis	METHOD BLANK RESULTS				LABORATORY CONTROL SAMPLE RESULTS					
			Units	Concentration Measured in Blank	Acceptance Range	Practical Quantitation Level**	Units	True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)
Nitrate-Nitrogen	23-Jul-99	23-Jul-99	mg/L	< 0.050	< 0.050	0.050	mg/L	1.00	0.863	86.3	80-120	
Sulfate	16-Aug-99	16-Aug-99	mg/L	< 1.0	< 1.0	1.0	mg/L	250	227	90.8	83-112	@

** Practical quantitation level is the lowest concentration measurable for samples with normal chemical and physical composition during routine laboratory operations.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory and method specified acceptance range except as noted.

@ The laboratory uses the internally established statistical 99% confidence range as the acceptance range for this LCS.

Katahdin Analytical Services, Inc.
Quality Control Report

Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client: Tetra Tech NUS

Work Order: WP3372

DUPLICATE RESULTS

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Parameter	Katahdin Sample No	Sample Measurements				Acceptance Range		Concentration or Quantity				Matrix Spike Recovery (%)					
		Units	Rep 1	Rep 2	Mean Conc	RPD (%)	for RPD (%)	Units Only	Sampl Spike Added	Sample +Spike Dup 1	Sample +Spike Dup 2	Sample +Spike Dup 1	Sample +Spike Dup 2	Acceptance Range (%)	RPD (%)	Acceptance Range (%)	
Nitrate - N	WP3372-2	mg/L					0-20	mg/L	<0.050	0.50	0.494			98.8	75-125		0-20

RPD = Relative percent difference, which is the absolute value of the difference between two replicate results divided by the mean concentration then multiplied by 100%.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory or contract specified acceptance range except as noted. The laboratory does not use the sample duplicate and matrix spike acceptance ranges as acceptance criteria for a specific analysis. Sample duplicate and matrix spike data are used to evaluate method performance in the environmental sample matrix only. Please refer to LCS data for assessment of quality control for each parameter.

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKM28A

Lab Name: Katahdin Analytical Services

SDG No.: WP3372

Lab File ID: M1223

Lab Sample ID: VBLKM28A

Date Analyzed: 07/28/99

Time Analyzed: 9:44

GC Column: RTX-624 ID: 0.18 (mm)

Heated Purge: (Y/N) N

Instrument ID: 5972-M

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSM28A	LCSM28A	M1222	7/28/99	9:05:00 AM
16TL00601	WP3372-1	M1231	7/28/99	3:21:00 PM
16GLM0601	WP3372-2	M1232	7/28/99	4:01:00 PM
16GLM0101	WP3372-3	M1233	7/28/99	4:41:00 PM
16GLM0301	WP3372-4	M1234	7/28/99	5:19:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKM28A
 SDG: WP3372
 Report Date: 8/25/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: SW8260
 Date Analyzed: 7/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKM28A	AQ	-	-	7/28/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	89	%	1.0		
2-DICHLOROETHANE-D4	89	%	1.0		
1,2-DICHLOROETHANE-D6	98	%	1.0		
P-BROMOFLUOROBENZENE	94	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: M1222

Sample ID: LCSM28A

Date Run: 7/28/99

Analyst: DJP

Time Injected 9:05:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	45.9	92	60-140
BENZENE	50	45.6	91	60-140
ETHYLBENZENE	50	52.0	104	60-140
MTBE	50	45.6	91	60-140
NAPHTHALENE	50	54.4	109	60-140
TOLUENE	50	48.2	96	60-140
TOTAL XYLENES	150	158	105	60-140

* Out of Limits

1

0000020

4B
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;072899

Lab Name: Katahdin Analytical Services

SDG No.: WP3372

Lab File ID: Z1645

Lab Sample ID: SBLK;072899

Instrument ID: 5972-Z

Date Extracted: 7/28/99

GC Column: RTX-624 ID: 0.18 (mm)

Date Analyzed: 08/05/99

Matrix: (soil/water) WATER

Time Analyzed: 13:28

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;072899	LCS;072899	Z1646	8/5/99	2:16:00 PM
LCSD;072899	LCSD;072899	Z1647	8/5/99	3:03:00 PM
16GLM0601	WP3372-2	Z1648	8/5/99	3:50:00 PM
16GLM0101	WP3372-3	Z1649	8/5/99	4:36:00 PM
16GLM0301	WP3372-4	Z1675	8/9/99	1:10:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: SBLK;072899
SDG: WP3372
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 8/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;072899	AQ	-	-	7/28/99	DS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	60	%	1.0		
2-FLUOROBIPHENYL	57	%	1.0		
TERPHENYL-D14	78	%	1.0		

Report Notes:

Katahdin Analytical Services

LCS/LCSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
LCS;072899	Z1646	8/5/99	14:16	KRT	AQ	8270
LCSD;072899	Z1647	8/5/99	15:03	KRT	AQ	8270

Compound Name	Spk Amt ug/L	LCS Result ug/L	LCSD Result ug/L	LCS Rec (%)	LCSD Rec (%)	Rec. Limits (%)	RPD (%)	RPD Limit (%)
2-METHYLNAPHTHALENE	50	22.6	33.5	*45	*67	70-130	*39	30
ACENAPHTHENE	50	26.3	35.2	*53	70	70-130	28	30
ACENAPHTHYLENE	50	26.1	35.3	*52	71	70-130	*31	30
ANTHRACENE	50	33.7	40.7	*67	81	70-130	19	30
BENZO[A]ANTHRACENE	50	29.7	36.7	*59	73	70-130	21	30
BENZO[A]PYRENE	50	29.7	35.9	*59	72	70-130	20	30
BENZO[B]FLUORANTHENE	50	27.0	34.3	*54	*69	70-130	24	30
BENZO[G,H,I]PERYLENE	50	28.2	31.5	*56	*63	70-130	12	30
BENZO[K]FLUORANTHENE	50	35.4	42.8	71	86	70-130	19	30
CHRYSENE	50	32.2	37.6	*64	75	70-130	16	30
DIBENZ[A,H]ANTHRACENE	50	26.6	30.0	*53	*60	70-130	12	30
FLUORANTHENE	50	32.0	37.4	*64	75	70-130	16	30
FLUORENE	50	27.3	34.0	*55	*68	70-130	21	30
INDENO[1,2,3-CD]PYRENE	50	24.7	25.8	*49	*52	70-130	5.9	30
NAPHTHALENE	50	21.9	33.3	*44	*67	70-130	*41	30
PHENANTHRENE	50	30.6	38.3	*61	77	70-130	23	30
PYRENE	50	31.7	41.2	*63	82	70-130	26	30

RPD = (lcs rec - lcsd rec) / [(lcsd rec + lcsd rec)/2] * 100

* Out of Limits

/

ENSR
Air Toxics Specialty Laboratory
42 Nagog Park
Acton, MA 01720

DATE: August 24, 1999

TO: Andrea Colby
Katahdin Analytical
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098

Re: Organic Analyses of Aqueous Samples by Gas Chromatography Flame
Ionization Detection (GC/FID)

PROJECT #: **8601-008-200**

LAB ID #: **990120**

ANALYTICAL PROCEDURE:

Three (3) aqueous samples were analyzed under the guidelines of EPA SW846 Method 3810.

A Hewlett Packard 5890 series II gas chromatograph (GC) equipped with a Hewlett Packard flame ionization detector (FID) was used for the analysis. A 1.0 mL headspace aliquot of each sample was injected into the column for analysis. The operating conditions of the GC/FID are listed in Table 1. A five point calibration was performed for the target analyte, methane.

No problems occurred during sample receipt or log-in.

QUALITY CONTROL:

1. A laboratory blank was analyzed daily in the same manner as the samples. Methane was present in levels below the detection limit in the laboratory blank. Sample data has not been qualified.
2. A Matrix Spike was performed on the following sample:
WP3395-16(B)

All recoveries were within QC limits.

Date Samples Received by the Laboratory: 7/27/99

Date Analysis Started: 8/4/99

C:\My Documents\katrpt8.doc



340 County Road No. 5
 P.O. Box 720
 Westbrook, ME 04098
 Tel: (207) 874-2400
 Fax: (207) 775-4029

990120

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page ___ of ___

Client <i>Katahdin Analytical Services</i>	Contact <i>Andrea Colby</i>	Phone # () ()	Fax # () ()
Address <i>as above</i>	City	State	Zip Code

Purchase Order # _____ Proj. Name / No. _____ Katahdin Quote # _____

Bill (if different than above) _____ Address _____

Sampler (Print / Sign) _____ Copies To: _____

LAB USE ONLY WORK ORDER #: _____
 KATAHDIN PROJECT MANAGER _____
 REMARKS: *Sub to ENSR*
 SHIPPING INFO: FED EX UPS CLIENT
 AIRBILL NO: _____
 TEMP °C _____ TEMP BLANK INTACT NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

* Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt.																
				OYON	OYON	OYON	OYON	OYON	OYON	OYON	OYON	OYON	OYON							
<i>WP 3372-2</i>	<i>7-22-99/1030</i>	<i>AQ</i>	<i>3</i>	<i>X</i>																
<i>WP 3372-3</i>	<i>7-22-99/1055</i>	<i>AQ</i>	<i>3</i>	<i>X</i>																
<i>WP 3372-4</i>	<i>7-22-99/1130</i>	<i>AQ</i>	<i>3</i>	<i>X</i>																
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COMMENTS *QC-IV NFESC* Results Due: *8-5-99*

Relinquished By: (Signature) <i>[Signature]</i>	Date / Time <i>7-26-99 1515</i>	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature) <i>[Signature]</i> <i>7/27/99 @ 9:55</i>

SAMPLE LOG-IN & RECEIPT CHECKLIST

Client/Proj #: Katahdin

Proj Mgr: M. Hoyt

Lab Pool #: 990120

Inspected & Logged in by: A. MacDuff

Date Time: 7/27/99 @ 955

Sample Matrix	Number of Samples	Analysis Requested	Analyze by (date)	Storage Location
<u>Aqueous</u>	<u>3</u>	<u>methane</u>	<u>8/5/99</u>	<u>R1</u>

Circle the appropriate response:

- 1) Shipped / Hand delivered
- 2) COC present / not present on receipt
- 3) COC Tape present / not present on shipping container
- 4) Samples broken / intact on receipt
- 5) Samples ambient / chilled on receipt Temp blank = 2°C
- 6) Samples preserved correctly / incorrectly / none recommended
- 7) Received within / outside holding time
- 8) COC tapes present / not present on samples
- 9) Discrepancies / NO discrepancies noted between COCs and samples

Additional Comments: 3 vials per sample

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract:

WP3372-2(C)

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water

Lab Sample ID: 990120-1

Sample wt / vol: 32.5 ml (g/ml)

Lab File ID: KTH_013

Level: (low/med) low

Date Received: 7/27/99

% Moisture: NA

Date Analyzed: 8/4/99

GC Column: Carboxen 1004 OD: 1/16"

Dilution Factor: 1

Soil Extract Volume: NA (µl)

Soil Aliquot Volume: NA (µl)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(µg/L or PPMv) µg/L

Q

74-82-8	Methane	6200	E
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ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: WP3372-2(C)D Lab Code: Case No.: SAS NO.: SDG NO.: Matrix: (soil/water) water

Lab Sample ID: 990120-1 DIL

Sample wt / vol: 32.5 ml (g/ml)Lab File ID: KTH_017 Level: (low/med) low Date Received: 7/27/99 % Moisture: NA Date Analyzed: 8/4/99 GC Column: Carboxen 1004 OD: 1/16" Dilution Factor: 144 Soil Extract Volume: NA (µl)Soil Aliquot Volume: NA (µl)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(µg/L or PPMv) µg/L

Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) <u> </u> µg/L <u> </u>	Q
74-82-8	Methane	10000	D

1
ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: _____ ENSR _____ Contract: _____

WP3372-3(A)

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) _____ water _____

Lab Sample ID: 990120-2

Sample wt / vol: _____ 32.5 ml _____ (g/ml)

Lab File ID: __KTH_014_____

Level: (low/med) _____ low _____

Date Received: __7/27/99_____

% Moisture: _____ NA _____

Date Analyzed: __8/4/99_____

GC Column: _ Carboxen 1004 _ OD: _____ 1/16" _____

Dilution Factor: _____ 1 _____

Soil Extract Volume: _____ NA _____ (µl)

Soil Aliquot Volume: _____ NA _____ (µl)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(µg/L or PPMv) __ µg/L __

Q

74-82-8	Methane	5800	E
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ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: _____ ENSR _____ Contract: _____

WP3372-3(A) D

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) _____ water _____

Lab Sample ID: 990120-2 DIL

Sample wt / vol: _____ 32.5 ml _____ (g/ml)

Lab File ID: ___KTH_018_____

Level: (low/med) _____ low _____

Date Received: ___7/27/99_____

% Moisture: _____ NA _____

Date Analyzed: ___8/4/99_____

GC Column: _ Carboxen 1004 _ OD: ___ 1/16" _____

Dilution Factor: _____ 138 _____

Soil Extract Volume: _____ NA _____ (µl)

Soil Aliquot Volume: _____ NA _____ (µl)

CAS NO. .

COMPOUND

CONCENTRATION UNITS:
(µg/L or PPMv) ___ µg/L ___

Q

74-82-8	Methane	9300	D
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1
ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: _____ ENSR _____ Contract: _____

WP3372-4(C)

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) _____ water _____

Lab Sample ID: 990120-3

Sample wt / vol: _____ 32.5 ml _____ (g/ml)

Lab File ID: ___ KTH_015 _____

Level: (low/med) _____ low _____

Date Received: ___ 7/27/99 _____

% Moisture: _____ NA _____

Date Analyzed: ___ 8/4/99 _____

GC Column: _ Carboxen 1004 _ OD: ___ 1/16" ___

Dilution Factor: _____ 1 _____

Soil Extract Volume: _____ NA _____ (µl)

Soil Aliquot Volume: _____ NA _____ (µl)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) ___ µg/L ___	Q
74-82-8	Methane	7400	E

1
ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: _____

WP3372-4(C) D

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) _____ water _____

Lab Sample ID: 990120-3 DIL

Sample wt / vol: 32.5 ml (g/ml)

Lab File ID: KTH_019

Level: (low/med) _____ low _____

Date Received: 7/27/99

% Moisture: NA

Date Analyzed: 8/4/99

GC Column: Carboxen 1004 OD: 1/16"

Dilution Factor: 137

Soil Extract Volume: NA (µl)

Soil Aliquot Volume: NA (µl)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(µg/L or PPMv) µg/L

Q

74-82-8

Methane

13000

D

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: _____ ENSR _____ Contract: _____

VBLK01

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) _____ water _____

Lab Sample ID: MB990119

Sample wt / vol: _____ 32.5 ml _____ (g/ml)

Lab File ID: ___ KTH_006 _____

Level: (low/med) _____ low _____

Date Received: ___ NA _____

% Moisture: _____ NA _____

Date Analyzed: ___ 8/4/99 _____

GC Column: _ Carboxen 1004 _ OD: ___ 1/16" _____

Dilution Factor: _____ 1 _____

Soil Extract Volume: _____ NA _____ (μ l)Soil Aliquot Volume: _____ NA _____ (μ l)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(μ g/L or PPMv) ___ μ g/L ___

Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (μ g/L or PPMv) ___ μ g/L ___	Q
74-82-8	Methane	2.7	J

ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract:

LCS01

Lab Code: Case No.: SAS NO.: SDG NO.:

Matrix: (soil/water) water

Lab Sample ID: LCS990119

Sample wt / vol: 32.5 ml (g/ml)

Lab File ID: KTH_007

Level: (low/med) low

Date Received: NA

% Moisture: NA

Date Analyzed: 8/4/99

GC Column: Carboxen 1004 OD: 1/16"

Dilution Factor: 1

Soil Extract Volume: NA (µl)

Soil Aliquot Volume: NA (µl)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(µg/L or PPMv) µg/L

Q

74-82-8	Methane	48	
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1
ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. _____

Lab Name: _____ ENSR _____ Contract: _____

WP3395-16(B) MS

Lab Code: _____ Case No.: _____ SAS NO.: _____ SDG NO.: _____

Matrix: (soil/water) _____ water _____

Lab Sample ID: 990121-2 MS

Sample wt / vol: _____ 32.5 ml _____ (g/ml)

Lab File ID: ___KTH_023_____

Level: (low/med) _____ low _____

Date Received: ___7/28/99_____

% Moisture: _____ NA _____

Date Analyzed: ___8/4/99_____

GC Column: _ Carboxen 1004 _ OD: ___ 1/16" _____

Dilution Factor: _____ 1 _____

Soil Extract Volume: _____ NA _____ (µl)

Soil Aliquot Volume: _____ NA _____ (µl)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(µg/L or PPMv) ___ µg/L ___

Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or PPMv) ___ µg/L ___	Q
74-82-8	Methane	330	

LABORATORY CONTROL SPIKE RECOVERY

Lab Name: ENSR Contract: _____

Lab Code: _____ Case NO.: _____ SAS NO.: _____ SDG NO.: _____

Laboratory Control Sample No: LCS01

COMPOUND	SPIKE ADDED ($\mu\text{g/L}$)	LCS CONCENTRATION ($\mu\text{g/L}$)	LCS % REC #	QC LIMITS REC.
Methane	41.0	48.23	118%	50 - 150

* - Values outside of QC limits.

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ___ ENSR _____

Contract: _____

Lab Code: _____ Case NO.: _____ SAS NO.: _____ SDG NO.: _____

Matrix Spike - EPA Sample NO.: ___ WP3395-16(B) _____

COMPOUND	SPIKE ADDED (µg/L)	SAMPLE CONCENTRATION (µg/L)	MS CONCENTRATION (µg/L)	MS % REC #	QC LIMITS REC.
Methane	410.3	0	327.2	80%	50-150

Spike recovery: ___ 0 ___ out of ___ 1 ___ outside limits.

Comments:



SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON

Sample Receipt

The following samples were received on July 22, 1999 and were logged in under Katahdin Analytical Services work order number WP3350 for a hardcopy due date of August 21, 1999.

<u>KATAHDIN</u> <u>Sample No.</u>	<u>TTNUS</u> <u>Sample Identification</u>	<u>GEL</u> <u>Sample No.</u>
WP3350-1	17GLM0101	
WP3350-2	17GLM0201	
WP3350-3	17GLM0301	
WP3350-4	17GLM6D01	
WP3350-5	17GLM6D01D	
WP3350-6	16GLM0201	
WP3350-7	16GLM0201D	
WP3350-8	16GLM0401	
WP3350-9	16GLM0501	
WP3350-10	20GLM0101	9907724-01
WP3350-11	17TL00501	

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

Eight aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on July 22, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5973-U and 5972-M instruments. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ug/l.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. A matrix spike/matrix spike duplicate was performed on sample WP3350-4.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Method 8260B narrows this 20% maximum to 15%.

In the calibration curves analyzed in this SDG, the average %RSD for all analytes was 13.7% and 10.4%, making the curves acceptable.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organic Analysis

The method blank associated with the original extraction for WP3350-4 was lost during the concentration procedure. All samples in the batch were reextracted within hold time. There was not enough volume to reextract an MS/MSD for WP3350-4.

Semivolatile Organics Extraction and Analysis

Seven aqueous samples were received by Katahdin Analytical Services laboratory on July 22, 1999 for analysis in accordance with 8270C for a client specified PAH list of analytes.

Extraction of the samples occurred following USEPA method 3510 on July 26, 1999. A laboratory control spike/laboratory control spike duplicate pair, consisting of all PAH analytes spiked into organic free water, was extracted in the batch.

The initial calibration curve analyzed in this SDG had some of the target analyte %RSD values exceeding 15 %.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Section 7.3.7.1 of method 8270C (revision 3, 12/96) narrows this 20% maximum to 15%.

In the calibration curve analyzed in this SDG, the average %RSD for all analytes was 10.1%, making the curve acceptable.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Metals Analysis

The samples of Katahdin Work Order WP3350 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Waste", SW-846, November 1986, Third Edition.

Inductively-Coupled Plasma (ICP) Atomic Emission Spectroscopic Analysis

Aqueous-matrix Katahdin Sample No. WP3350-10 was digested for ICP analysis on 07/27/99 (QC Batch PG271CW1) in accordance with USEPA Method 3010A. Katahdin Sample No. WP3350-10 was prepared with duplicate matrix-spiked aliquots. The measured calcium concentration (72.5 ug/L) of the preparation blank that is associated with this QC batch is greater than the laboratory's practical quantitation levels. The measured concentration of this element in all Katahdin Sample No. WP3250-10 is more than ten times that of the preparation blank, so no corrective action was required.

ICP analyses of Katahdin Work Order WP3350 sample digestates were performed in accordance with USEPA Method 6010B, using a Thermo Jarrell Ash (TJA) Trace ICP spectrometer and a TJA 61 ICP spectrometer. All samples were analyzed within holding times and all QC criteria were met with the following comments or exceptions:

Some of the results for run QC samples (ICV, ICB, CCV, CCB, ICSA, and ICSAB) included in the accompanying data package may have exceeded acceptance limits for some elements. Please note that all client samples and batch QC samples associated with out-of-control results for run QC samples were subsequently reanalyzed for the analytes in question.

Analysis of Mercury by Cold Vapor Atomic Absorption (CVAA) Spectrophotometry

Aqueous-matrix Katahdin Sample No. WP3350-10 was digested for mercury analysis on 07/23/99 (QC Batch PG23HGW0) in accordance with USEPA Method 7470A. Katahdin Sample No. WP3350-10 was prepared with duplicate matrix-spiked aliquots.

Mercury analyses of Katahdin Work Order WP3350 sample digestates were performed using a Leeman Labs PS200 automated mercury analyzer. All samples were analyzed within holding times and all run QC criteria were met.

Wet Chemistry Analysis

Due to IC instrument failure, alternate methods were approved by Kelly Johnson-Carper for the analysis of nitrate and sulfate. Samples for work order WP3350 were analyzed for nitrate and sulfate in accordance with "Methods for Chemical Analysis of Water and Wastes", EPA 600/4-79-020, 1979, Revised 1983. No deviations were noted by the Wet Chemistry group.

LAB (WORK ORDER) # WP 3350

PAGE: 1 OF 1

COOLER: 1 OF 1

COC# —

SDG# —

DATE / TIME RECEIVED: 7-22-99 0845

DELIVERED BY: FedEx

RECEIVED BY: sa

LIMS ENTRY BY: AJC

LIMS REVIEW BY / PM: AJC

CLIENT: Tetra Tech

PROJECT: Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>8.3</u>	<i>AJC notified Paul Calligan by phone 7/22/99 & was told to proceed.</i>
6. SAMPLES RECEIVED AT 4°C +/- 2? <input checked="" type="checkbox"/> ICE PACKS PRESENT <input checked="" type="checkbox"/> or N?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾: Added HNO₃ to Metals bottle, sample 20G2M0104 to ↓ pH to < 2

0000047

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
 New England-ME Laboratory (207) 874-2400
 CONFIRMATION

ORDER NO WP-3350

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

ORDER DATE: 07/22/99
 PHONE: 850/385-985
 FAX: 850/385-986
 DUE: 21 AUG
 FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 FOSTER PLAZA 7, 661 ANDERSEN DR.
 PITTSBURGH, PA 15220

PHONE: 412/921-7090
 PO: N7912-P99264
 PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 20 SEP

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3350-1	17GLM0101	21 JUL 0850	22 JUL	AQ
	WP3350-2	17GLM0201	21 JUL 0910		
	WP3350-3	17GLM0301	21 JUL 0935		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
GC Subcontract		3	95.00	285.00
Nitrate as N	353.2	3	30.00	90.00
Sulfate	375.4	3	0.00	0.00

TOTALS		3	125.00	375.00
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LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2	WP3350-4	17GLM6D01	21 JUL 1115	22 JUL
	WP3350-5	17GLM6D01D	21 JUL 1115	
	WP3350-6	16GLM0201	21 JUL 1606	
	WP3350-7	16GLM0201D	21 JUL 1606	
	WP3350-8	16GLM0401	21 JUL 1634	
	WP3350-9	16GLM0501	21 JUL 1637	

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	6	75.00	450.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	6	125.00	750.00

TOTALS		6	200.00	1200.00
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0000049
 07/22/99

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-3350

Project Manager: Andrea J. Colby
ORDER DATE: 07/22/99
PHONE: 850/385-9899
FAX: 850/385-9860
DUE: 21 AUG
FAC.ID: CNC CHARLESTON

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264
PROJECT: CTO #68

SAMPLED BY: CLIENT DELIVERED BY: FEDEX DISPOSE: AFTER 20 SEP

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3 WP3350-10	20GLM0101	21 JUL 0950	22 JUL	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	75.00	75.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	125.00	125.00
Target Analyte List Metals, Total		1	100.00	100.00
Wet Lab Subcontract		1	55.00	55.00

TOTALS		1	355.00	355.00
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LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4 WP3350-11	17TL00501	21 JUL 0730	22 JUL	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	75.00	75.00

ORDER NOTE: QC-IV NFESC
DD(KAS007QC-DB3)
CNC CHARLESTON

REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PALZA 7
661 ANDERSEN DR.
PITTSBURGH, PA 15220

FINAL PAGE

INVOICE: With Report

TOTAL ORDER AMOUNT \$2,005.00
This is NOT an Invoice

AJC/WEST.AJC(dw)
07-23 Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
A-1	Insufficient sample was provided to enable laboratory to achieve the laboratory's standard Practical Quantitation Level.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Owen Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3350-6
 SDG: WP3350
 Report Date: 8/25/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: EPA 8270
 Date Analyzed: 8/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0201	AQ	7/21/99	7/22/99	7/26/99	DAS	EPA 3510	KRT

Compound	Result	Units	DF	Sample	Method
				PQL	PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	J9	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	51	%	1.0		
2-FLUOROBIPHENYL	47	%	1.0		
TERPHENYL-D14	42	%	1.0		

Report Notes: J



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP3350-6
SDG: WP3350
Report Date: 8/25/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0201	AQ	7/21/99	7/22/99	7/30/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	J3	ug/L	1.0	5	5
NAPHTHALENE	9	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	96	%	1.0		
1,2-DICHLOROETHANE-D4	106	%	1.0		
TOLUENE-D8	103	%	1.0		
P-BROMOFLUOROBENZENE	106	%	1.0		

Report Notes: J



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3350-7
 SDG: WP3350
 Report Date: 8/25/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: EPA 8270
 Date Analyzed: 8/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0201D	AQ	7/21/99	7/22/99	7/26/99	DAS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZO[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	52	%	1.0		
2-FLUOROBIPHENYL	47	%	1.0		
TERPHENYL-D14	52	%	1.0		

Report Notes: J



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3350-7
SDG: WP3350
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0201D	AQ	7/21/99	7/22/99	7/30/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	J3	ug/L	1.0	5	5
NAPHTHALENE	9	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	94	%	1.0		
1,2-DICHLOROETHANE-D4	102	%	1.0		
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	105	%	1.0		

Report Notes: J



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Owen Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3350-8
 SDG: WP3350
 Report Date: 8/25/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: N/A
 Method: EPA 8270
 Date Analyzed: 8/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0401	AQ	7/21/99	7/22/99	7/26/99	DAS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	54	%	1.0		
2-FLUOROBIPHENYL	50	%	1.0		
TERPHENYL-D14	48	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3350-8
SDG: WP3350
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLMD401	AQ	7/21/99	7/22/99	7/28/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	J3	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	J3	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	98	%	1.0		
1,2-DICHLOROETHANE-D4	100	%	1.0		
TOLUENE-D8	104	%	1.0		
P-BROMOFLUOROBENZENE	96	%	1.0		

Report Notes: J



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3350-9
SDG: WP3350
Report Date: 6/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 8/9/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0501	AQ	7/21/99	7/22/99	7/26/99	DAS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	J9	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZO[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	63	%	1.0		
2-FLUOROBIPHENYL	57	%	1.0		
TERPHENYL-D14	55	%	1.0		

Report Notes: J



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP3350-9
SDG: WP3350
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16GLM0501	AQ	7/21/99	7/22/99	7/28/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	100	%	1.0		
1,2-DICHLOROETHANE-D4	101	%	1.0		
TOLUENE-D8	105	%	1.0		
P-BROMOFLUOROBENZENE	99	%	1.0		

Report Notes:

Method Blank and Laboratory Control Sample Results

Client:	Tetra Tech NUS
Work Order:	WP3350

METHOD BLANK RESULTS

LABORATORY CONTROL SAMPLE RESULTS

Parameter	Date of Prep	Date of Analysis	Units	Concentration			Practical Quantitation Level**	LABORATORY CONTROL SAMPLE RESULTS					
				Measured in Blank	Acceptance Range	Acceptance Range		True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)	
Nitrate-Nitrogen	22-Jul-99	22-Jul-99	mg/L	< 0.050	< 0.050	< 0.050	0.050	mg/L	1.00	0.950	95	80-120	
	22-Jul-99	22-Jul-99	mg/L	< 0.050	< 0.050	< 0.050	0.050	mg/L	1.00	0.903	90	80-120	
Sulfate	13-Aug-99	13-Aug-99	mg/L	< 1.0	< 1.0	< 1.0	1.0	mg	250	256	102	83-112	@

** Practical quantitation level is the lowest concentration measurable for samples with normal chemical and physical composition during routine laboratory operations.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory and method specified acceptance range except as noted.

@ The laboratory uses the internally established statistical 99% confidence range as the acceptance range for this LCS.

Katahdin Analytical Services, Inc.
Quality Control Report

Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client: Tetra Tech NUS
Work Order: WP3350

DUPLICATE RESULTS

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Parameter	Katahdin Sample No	Sample Measurements		Mean Conc	RPD (%)	Acceptance Range for RPD (%)	Concentration or Quantity			Matrix Spike Recovery (%)		Acceptance Range (%)	RPD (%)	Acceptance Range (%)
		Units	Rep 1				Rep 2	Units	Sampl Only	Spike Added	Sample +Spike			
										Dup 1	Dup 2			
Nitrate - N	WP3350-1	mg/L	<0.050	<0.050	<0.050	0.0	0-20	mg/L	<0.050	0.50	0.459	91.8	75-125	0-20
Sulfate	WP3350-1	mg/L	160.49	149.42	154.96	7.1	0-20	mg	0.8	0.5	1.28	96.0	75-125	0-20

RPD = Relative percent difference, which is the absolute value of the difference between two replicate results divided by the mean concentration then multiplied by 100%.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory or contract specified acceptance range except as noted. The laboratory does not use the sample duplicate and matrix spike acceptance ranges as acceptance criteria for a specific analysis. Sample duplicate and matrix spike data are used to evaluate method performance in the environmental sample matrix only. Please refer to LCS data for assessment of quality control for each parameter.

4B
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;072699

Lab Name: Katahdin Analytical Services

SDG No.: WP3350

Lab File ID: Z1625

Lab Sample ID: SBLK;072699

Instrument ID: 5972-Z

Date Extracted: 7/26/99

GC Column: RTX-624 ID: 0.18 (mm)

Date Analyzed: 08/04/99

Matrix: (soil/water) WATER

Time Analyzed: 10:55

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;072699	LCS;072699	Z1626	8/4/99	11:41:00 AM
LCSD;072699	LCSD;072699	Z1627	8/4/99	12:27:00 PM
17GLM6D01	WP3350-4	Z1635	8/4/99	6:38:00 PM
17GLM6D01D	WP3350-5	Z1636	8/4/99	7:23:00 PM
16GLM0201	WP3350-6	Z1640	8/5/99	9:34:00 AM
16GLM0201D	WP3350-7	Z1641	8/5/99	10:20:00 AM
20GLM0101	WP3350-10	Z1644	8/5/99	12:41:00 PM
16GLM0401	WP3350-8	Z1673	8/9/99	11:37:00 AM
16GLM0501	WP3350-9	Z1674	8/9/99	12:23:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;072699
SDG: WP3350
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 8/4/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;072699	AQ	-	-	7/26/99	DAS	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	61	%	1.0		
2-FLUOROBIPHENYL	61	%	1.0		
TERPHENYL-D14	92	%	1.0		

Report Notes:

Katahdin Analytical Services
LCS/LCSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
LCS;072699	Z1626	8/4/99	11:41	KRT	AQ	8270
LCSD;072699	Z1627	8/4/99	12:27	KRT	AQ	8270

Compound Name	Spk Amt ug/L	LCS Result ug/L	LCSD Result ug/L	LCS Rec (%)	LCSD Rec (%)	Rec. Limits (%)	RPD (%)	RPD Limit (%)
2-METHYLNAPHTHALENE	50	27.6	35.1	*55	70	70-130	24	30
ACENAPHTHENE	50	32.2	35.9	*64	72	70-130	12	30
ACENAPHTHYLENE	50	32.3	35.9	*65	72	70-130	10	30
ANTHRACENE	50	41.5	42.0	83	84	70-130	1.2	30
BENZO[A]ANTHRACENE	50	37.7	37.4	75	75	70-130	0	30
BENZO[A]PYRENE	50	36.5	36.5	73	73	70-130	0	30
BENZO[B]FLUORANTHENE	50	34.3	34.1	*69	*68	70-130	1.4	30
BENZO[G,H,I]PERYLENE	50	37.7	36.9	75	74	70-130	1.3	30
BENZO[K]FLUORANTHENE	50	42.1	42.5	84	85	70-130	1.2	30
CHRYSENE	50	39.2	39.5	78	79	70-130	1.3	30
DIBENZ[A,H]ANTHRACENE	50	34.3	34.6	*69	*69	70-130	0	30
FLUORANTHENE	50	37.0	39.7	74	79	70-130	6.5	30
FLUORENE	50	33.6	35.2	*67	70	70-130	4.4	30
INDENO[1,2,3-CD]PYRENE	50	31.9	34.4	*64	*69	70-130	7.5	30
NAPHTHALENE	50	27.0	34.7	*54	*69	70-130	24	30
PHENANTHRENE	50	39.0	38.8	78	78	70-130	0	30
PYRENE	50	43.4	38.7	87	77	70-130	12	30

RPD = (lcs rec - lcsd rec) / [(lcsd rec + lcsd rec)/2] * 100

* Out of Limits

1

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKM28A

Lab Name: Katahdin Analytical Services

SDG No.: WP3350

Lab File ID: M1223

Lab Sample ID: VBLKM28A

Date Analyzed: 07/28/99

Time Analyzed: 9:44

GC Column: RTX-624 ID: 0.18 (mm)

Heated Purge: (Y/N) N

Instrument ID: 5972-M

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSM28A	LCSM28A	M1222	7/28/99	9:05:00 AM
16GLM0401	WP3350-8	M1235	7/28/99	5:57:00 PM
16GLM0501	WP3350-9	M1236	7/28/99	6:35:00 PM



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: VBLKM28A
SDG: WP3350
Report Date: 8/25/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKM28A	AQ	-	-	7/28/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample	Method
				PQL	PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	89	%	1.0		
1,2-DICHLOROETHANE-D4	89	%	1.0		
TOLUENE-D8	98	%	1.0		
P-BROMOFLUOROBENZENE	94	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: M1222

Sample ID: LCSM28A

Date Run: 7/28/99

Analyst: DJP

Time Injected 9:05:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	45.9	92	60-140
BENZENE	50	45.6	91	60-140
ETHYLBENZENE	50	52.0	104	60-140
MTBE	50	45.6	91	60-140
NAPHTHALENE	50	54.4	109	60-140
TOLUENE	50	48.2	96	60-140
TOTAL XYLENES	150	158	105	60-140

*** Out of Limits**

1

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKU30A

Lab Name: Katahdin Analytical Services

SDG No.: WP3350

Lab File ID: U0253

Lab Sample ID: VBLKU30A

Date Analyzed: 07/30/99

Time Analyzed: 8:52

GC Column: RTX-624 ID: 0.18 (mm)

Heated Purge: (Y/N) N

Instrument ID: 5973-U

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSU30A	LCSU30A	U0252	7/30/99	8:15:00 AM
17GLM6D01	WP3350-4	U0260	7/30/99	1:09:00 PM
17GLM6D01D	WP3350-5	U0261	7/30/99	1:44:00 PM
16GLM0201	WP3350-6	U0262	7/30/99	2:19:00 PM
16GLM0201D	WP3350-7	U0263	7/30/99	2:54:00 PM
20GLM0101	WP3350-10	U0264	7/30/99	3:30:00 PM
17TL00501	WP3350-11	U0265	7/30/99	4:05:00 PM
17GLM6D01MS	WP3350-4MS	U0266	7/30/99	4:41:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: VBLKU30A
SDG: WP3350
Report Date: 8/25/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU30A	AQ	-	-	7/30/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	95	%	1.0		
1,2-DICHLOROETHANE-D4	105	%	1.0		
TOLUENE-D8	103	%	1.0		
P-BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: U0252

Sample ID: LCSU30A

Date Run: 7/30/99

Analyst: JSS

Time Injected 8:15:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	49.4	99	60-140
BENZENE	50	50.6	101	60-140
ETHYLBENZENE	50	53.5	107	60-140
MTBE	50	47.0	94	60-140
NAPHTHALENE	50	40.4	81	60-140
TOLUENE	50	52.2	104	60-140
TOTAL XYLENES	150	151	100	60-140

*** Out of Limits**

1

0000032



**SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON**

Sample Receipt

The following samples were received on May 18, 1999 and were logged in under Katahdin Analytical Services work order number WP2490 for a hardcopy due date of June 17, 1999.

<u>KATAHDIN</u> <u>Sample No.</u>	<u>TTNUS</u> <u>Sample Identification</u>	<u>GEL</u> <u>Sample No.</u>
WP2490-1	16SLB01-0203	
WP2490-2	16SLB02-0203	
WP2490-3	16SLB02-0203D	
WP2490-4	16SLB05-0203	
WP2490-5	17SLB01-0708	
WP2490-6	17SLB07-0809	
WP2490-7	17SLB02-0809	
WP2490-8	17SLB09-0708	
WP2490-9	17SLB04-0304	
WP2490-11	17SLB05-0708D	
WP2490-12	17SLB05-0708	
WP2490-13	17SLB03-0506	9905606-01
WP2490-14	18SLB03-00506D	9905606-02
WP2490-15	17SLB03-0506A	
WP2490-16	17SLB03-0506B	
WP2490-17	18SLB03-0304	
WP2490-18	19SLB16-0203	9905606-03
WP2490-19	01TL00103	

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

One aqueous (trip blank) and thirteen soil/sediment samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on May 18, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this SDG were performed on instruments 5972-M (low level soil), 5972-Z (low level soil), and 5972-F (aqueous). A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ug/l.

Batch QC (VBLK, and LCS) was performed in each twelve hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. No matrix spike/matrix spike duplicate pair was analyzed on any of the samples in this workorder.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Method 8260B narrows this 20% maximum to 15%.

In the calibration curves analyzed in this SDG, several analytes had %RSD values exceeding the allowed 15%. Since the average %RSD for all analytes was 8.4%, 13.4%, and 14.1%, the curves were acceptable.

Initial analyses of samples WP2490-1, WP2490-3, WP2490-5, and WP2490-13 yielded internal standard area and/or surrogate recovery deviations. Reanalyses yielded similar results, confirming matrix interference. Both sets of data for each sample are included in this data package.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organic Analysis

Thirteen soil/sediment samples were received by the Katahdin GC/MS laboratory on May 18, 1999 for analysis in accordance with 8270C for the TCL/PAH list of analytes.

Extraction of all of the soil samples occurred following USEPA method 3550 on May 25, 1999. A laboratory control spike consisting of all TCL analytes spiked into organic free sand, was extracted in the batch along with a site specific MS/MSD pair on sample WP2490-9.

WP2490-9MS and 9MSD showed an elevated recovery for the surrogate terphenyl-d14, and low recovery of the internal standard Perylene-d12. No action was taken in accordance with the method.

Samples WP2490-8,12, and 13 yielded internal standard area recovery deviations. Reanalysis confirmed the internal standard deviations confirming matrix interference. Both sets of data for this sample are included in the data package.

The initial calibration curves analyzed in this SDG had some of the target analyte %RSD values exceeding 15 %.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Section 7.3.7.1 of method 8270C (revision 3, 12/96) narrows this 20% maximum to 15%.

In the calibration curves analyzed for this workorder, the average %RSD for all analytes were as follows:

5970-I 6/22/99	8.2%
5970-I 6/28/99	8.7%

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Wet Chemistry Analysis

For work order WP2490 the analyses for Total Combustible Organics (TCO) have been performed in accordance with the "Annual Book of ASTM Standards", 1987. Analyses for Solids-Total Residue (TS) for work order WP2490 samples have been performed in accordance with "Contract Laboratory Program Statement of Work for Inorganic Analysis".

All analyses were performed within analytical hold time. No protocol deviations were noted by the Wet Chemistry laboratory staff.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager and/or his designee, as verified by the following signature.

Authorized Signature

0000004

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # WP2490

PAGE: 1 OF 2

COOLER: 1 OF 2

COC#

SDG#

DATE / TIME RECEIVED: DS/18/99 ~1010

DELIVERED BY: FEDEX

RECEIVED BY: BKH

LIMS ENTRY BY: Saw

LIMS REVIEW BY / PM: AJC

CLIENT: Tetratedon - SC

PROJECT: CNC Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>1.1</u>	AJC notified Paul Calligan by fax 5/18/99
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT (Y or N)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
 Tel. (207) 874-2400
 Fax (207) 775-4029

LAB (WORK ORDER) # WP2490

PAGE: 2 OF 2

COOLER: 2 OF 2

CLIENT: Tetratedi-SC

COC# -

SDG# -

DATE / TIME RECEIVED: 05/18/99-1010

DELIVERED BY: FEDEx

RECEIVED BY: BKL

LIMS ENTRY BY: Sam

LIMS REVIEW BY / PM: AC

PROJECT: CNC Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>4.1</u>	
6. SAMPLES RECEIVED AT 4°C +/- 2° (ICE) ICE PACKS PRESENT (Y) or N?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if . If samples required pH adjustment, record volume and type of preservative and

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-2490

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

ORDER DATE: 05/18/99

PHONE: 850/385-9899

FAX: 850/385-9860

DUE: 17 JUN

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 661 ANDERSEN DRIVE, FOSTER PLAZA VII
 PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 17 JUN

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP2490-1	16SLB01-0203	17 MAY 0810	18 MAY	SL
	WP2490-2	16SLB02-0203	17 MAY 0825		
	WP2490-3	16SLB02-0203D	17 MAY 0825		
	WP2490-4	16SLB05-0203	17 MAY 0845		
	WP2490-5	17SLB01-0708	17 MAY 1050		
	WP2490-6	17SLB07-0809	17 MAY 1140		
	WP2490-7	17SLB02-0809	17 MAY 1105		
	WP2490-8	17SLB09-0708	17 MAY 1425		
	WP2490-9	17SLB04-0304	17 MAY 1115		
	WP2490-11	17SLB05-0708D	17 MAY 1200		
	WP2490-12	17SLB05-0708	17 MAY 1200		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	11	85.00	935.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	11	135.00	1485.00
Solids-Total Residue (TS)	CLP/CIP SO	11	0.00	0.00
TOTALS		11	220.00	2420.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2 WP2490-15	17SLB03-0506A	17 MAY 1210	18 MAY	SL
WP2490-16	17SLB03-0506B	17 MAY 1210		
WP2490-17	18SLB03-0304	17 MAY 1550		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Wet Lab Subcontract		3	110.00	330.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3 WP2490-19	01TL00103	03 MAY 1515	18 MAY	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00

0000009
Mr Calligan

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
 New England-ME Laboratory (207) 874-2400
 CONFIRMATION

ORDER NO WP-2490

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

ORDER DATE: 05/18/99
 PHONE: 850/385-9891
 FAX: 850/385-9860
 DUE: 17 JUN
 FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 661 ANDERSEN DRIVE, FOSTER PLAZA VII
 PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090
 PO: N7912-P99264
 PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 17 JUN

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4 WP2490-13	17SLB03-0506	17 MAY 1210	18 MAY	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Wet Lab Subcontract		1	135.00	135.00
Total Combustible Organics	ASTM D2974	1	30.00	30.00

TOTALS 1 385.00 385.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
5 WP2490-14	18SLB03-0506D	17 MAY 1550	18 MAY	S

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Wet Lab Subcontract		1	60.00	60.00
Total Combustible Organics	ASTM D2974	1	30.00	30.00

TOTALS 1 310.00 310.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6 WP2490-18	19SLB16-0203	17 MAY 1640	18 MAY	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Wet Lab Subcontract		1	170.00	170.00
Total Combustible Organics	ASTM D2974	1	30.00	30.00

TOTALS 1 200.00 200.00

0000010
 Al. Calligan

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

Page 3

ORDER NO WP-2490

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 05/18/99
PHONE: 850/385-9899
FAX: 850/385-9860
DUE: 17 JUN
FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
661 ANDERSEN DRIVE, FOSTER PLAZA VII
PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 17 JUN

ORDER NOTE: QC-IV NFESC-D
DD(KAS007QC-DB3)
CNC CHARLESTON
REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PALZA 7
661 ANDERSEN DR.
PITTSBURGH, PA 15220
REPORT & DISK

INVOICE: With Report

TOTAL ORDER AMOUNT \$3,730.00
This is NOT an Invoice

AJC/BKR/WEST.AJC(dw)

06-14Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

0000011
KATAHDIN



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
\$	'\$' flag denotes surrogate compound recovery is out of criteria. Re-extraction or re-analysis confirmed matrix interference.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmed matrix interference.



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note

Note Text

O-13

Internal standard area(s) are out of criteria. Reanalysis confirmed matrix interference.

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2490-1
Report Date: 07/09/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 1 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
16SLB01-0203	Solid	CLIENT		05/17/99	05/18/99		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	84.	wt %	1.0	0.10	CLP/CIP SOW	05/19/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 05/18/99 by JF

07/09/99

LJO/baeajc (dw) /msm
PE18TSS8
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PALZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2490-1
 SDG: WP2490
 Report Date: 7/8/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: 84
 Method: EPA 8270
 Date Analyzed: 6/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB01-0203	SL	5/17/99	5/18/99	5/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	<430	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	<430	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZO[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	75	%	1.3		
2-FLUOROBIPHENYL	91	%	1.3		
TERPHENYL-D14	88	%	1.3		

Port Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2490-1
SDG: WP2490
Report Date: 6/16/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: SW8260
Date Analyzed: 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB01-0203	SL	5/17/99	5/18/99	5/27/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	79	%	1.0		
1,2-DICHLOROETHANE-D4	84	%	1.0		
TOLUENE-D8	\$65	%	1.0		
P-BROMOFLUOROBENZENE	\$56	%	1.0		

Report Notes: \$



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Lab Number: WP2490-1RE
 SDG: WP2490
 Report Date: 6/16/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: 84
 Method: SW8260
 Date Analyzed: 5/28/99

Proj. ID: CNC CHARLESTON

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB01-0203	SL	5/17/99	5/18/99	5/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.1	6	5
TOLUENE	<6	ug/Kg	1.1	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.1	6	5
ETHYLBENZENE	<6	ug/Kg	1.1	6	5
NAPHTHALENE	<6	ug/Kg	1.1	6	5
MTBE	<6	ug/Kg	1.1	6	5
TOTAL XYLENES	<6	ug/Kg	1.1	6	5
DIBROMOFLUOROMETHANE	\$46	%	1.1		
1,2-DICHLOROETHANE-D4	\$45	%	1.1		
1,2-DICHLOROETHANE-D8	\$34	%	1.1		
1,2-DIBROMOETHANE	\$24	%	1.1		

Report Notes: \$



CLIENT: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

Lab Number : WP-2490-2
 Report Date: 07/09/99
 PO No. : N7912-P99264
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 2 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED				
16SLB02-0203	Solid	CLIENT	05/17/99	05/18/99			
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	84.	wt %	1.0	0.10	CLP/CIP SOW	05/19/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
 (1) Sample Preparation on 05/18/99 by JF

07/09/99

LJO/baeajc (dw) /msm
 PE18TSS8
 CC: MS. LEE LECK
 TETRA TECH NUS
 FOSTER PALZA 7
 661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2490-2
SDG: WP2490
Report Date: 7/8/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: EPA 8270
Date Analyzed: 6/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB02-0203	SL	5/17/99	5/18/99	5/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	J270	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	570	ug/Kg	1.3	430	330
PYRENE	490	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	J240	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	J220	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZ[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	75	%	1.3		
2-FLUOROBIPHENYL	80	%	1.3		
TERPHENYL-D14	88	%	1.3		

Port Notes: J



KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2490-2
SDG: WP2490
Report Date: 6/16/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 84
Method: SW8260
Date Analyzed: 5/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB02-0203	SL	5/17/99	5/18/99	5/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.2	6	5
TOLUENE	<6	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	<6	ug/Kg	1.2	6	5
NAPHTHALENE	J4	ug/Kg	1.2	6	5
MTBE	<6	ug/Kg	1.2	6	5
TOTAL XYLENES	<6	ug/Kg	1.2	6	5
DIBROMOFLUOROMETHANE	100	%	1.2		
1,2-DICHLOROETHANE-D4	95	%	1.2		
TOLUENE-D8	99	%	1.2		
P-BROMOFLUOROBENZENE	93	%	1.2		

Report Notes: J



CLIENT: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

Lab Number : WP-2490-3
 Report Date: 07/09/99
 PO No. : N7912-P99264
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 3 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
16SLB02-0203D	Solid	CLIENT		05/17/99	05/18/99		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	85.	wt %	1.0	0.10	CLP/CIP SOW	05/19/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

(1) Sample Preparation on 05/18/99 by JF

07/09/99

LJO/baeajc (dw) /mrc/msm
 PE18TSS8
 CC: MS. LEE LECK
 TETRA TECH NUS
 FOSTER PALZA 7
 661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2490-3
SDG: WP2490
Report Date: 7/8/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 85
Method: EPA 8270
Date Analyzed: 6/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB02-0203D	SL	5/17/99	5/18/99	5/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	<430	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	<430	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
CHRYSENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZO[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	77	%	1.3		
2-FLUOROBIPHENYL	86	%	1.3		
TERPHENYL-D14	85	%	1.3		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2490-3
 SDG: WP2490
 Report Date: 6/16/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: 85
 Method: SW8260
 Date Analyzed: 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB02-0203D	SL	5/17/99	5/18/99	5/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.2	6	5
TOLUENE	<6	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	<6	ug/Kg	1.2	6	5
NAPHTHALENE	J4	ug/Kg	1.2	6	5
MTBE	<6	ug/Kg	1.2	6	5
TOTAL XYLENES	<6	ug/Kg	1.2	6	5
DIBROMOFLUOROMETHANE	87	%	1.2		
1,2-DICHLOROETHANE-D4	108	%	1.2		
1,2-DICHLOROETHANE-D8	78	%	1.2		
P-BROMOFLUOROBENZENE	89	%	1.2		

Report Notes: J, O-13



KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2490-3RE
SDG: WP2490
Report Date: 6/16/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 85
Method: SW8260
Date Analyzed: 5/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB02-0203D	SL	5/17/99	5/18/99	5/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.3	6	5
TOLUENE	<6	ug/Kg	1.3	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.3	6	5
ETHYLBENZENE	<6	ug/Kg	1.3	6	5
NAPHTHALENE	<6	ug/Kg	1.3	6	5
MTBE	<6	ug/Kg	1.3	6	5
TOTAL XYLENES	<6	ug/Kg	1.3	6	5
DIBROMOFLUOROMETHANE	\$43	%	1.3		
1,2-DICHLOROETHANE-D4	\$46	%	1.3		
TOLUENE-D8	\$25	%	1.3		
P-BROMOFLUOROBENZENE	\$14	%	1.3		

Report Notes: \$



CLIENT: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

Lab Number : WP-2490-4
 Report Date: 07/09/99
 PO No. : N7912-P99264
 Project : CIO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 4 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
16SLB05-0203	Solid	CLIENT		05/17/99	05/18/99		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	86.	wt %	1.0	0.10	CLP/CIP SOW	05/19/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
 (1) Sample Preparation on 05/18/99 by JF

07/09/99

LJO/baeajc (dw) /mrc/msm
 PE18TSS8
 CC: MS. LEE LECK
 TETRA TECH NUS
 FOSTER PALZA 7
 661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2490-4
SDG: WP2490
Report Date: 7/8/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 86
Method: EPA 8270
Date Analyzed: 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB05-0203	SL	5/17/99	5/18/99	5/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	<430	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	<430	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
CHRYSENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZ[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	91	%	1.3		
2-FLUOROBIPHENYL	94	%	1.3		
TERPHENYL-D14	94	%	1.3		

Report Notes:



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308
 Proj. ID: CNC CHARLESTON

Lab Number: WP2490-4
 SDG: WP2490
 Report Date: 5/16/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: 86
 Method: SW8260
 Date Analyzed: 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB05-0203	SL	5/17/99	5/18/99	5/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.1	6	5
TOLUENE	<6	ug/Kg	1.1	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.1	6	5
ETHYLBENZENE	<6	ug/Kg	1.1	6	5
NAPHTHALENE	<6	ug/Kg	1.1	6	5
MTBE	<6	ug/Kg	1.1	6	5
TOTAL XYLENES	<6	ug/Kg	1.1	6	5
DIBROMOFLUOROMETHANE	106	%	1.1		
DICHLOROETHANE-D4	108	%	1.1		
UENE-D8	112	%	1.1		
P-BROMOFLUOROBENZENE	106	%	1.1		

Report Notes:



Method Blank and Laboratory Control Sample Results

Client:	Tetra Tech NUS
Work Order:	WP2490

METHOD BLANK RESULTS

LABORATORY CONTROL SAMPLE RESULTS

Parameter	Date of Prep	Date of Analysis	Units	Concentration			Practical Quantitation Level**	LABORATORY CONTROL SAMPLE RESULTS					
				Measured in Blank	Acceptance Range	Acceptance Range		True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)	
TCO-Total Combustible Organics	04-Jun-99	07-Jun-99	wt %	< 0.10	< 0.10	< 0.10	0.10						NA
	07-Jun-99	08-Jun-99	wt %	< 0.10	< 0.10	< 0.10	0.10						NA
TS -Total Residue	18-May-99	19-May-99	wt %	< 0.10	< 0.10	< 0.10	0.10	wt %	90	89.7	100	80-120	

** Practical quantitation level is the lowest concentration measurable for samples with normal chemical and physical composition during routine laboratory operations.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory and method specified acceptance range except as noted.



Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client:	Tetra Tech NUS
Work Order:	WP2490

DUPLICATE RESULTS

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Parameter	Sample No	<i>DUPLICATE RESULTS</i>						<i>MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS</i>							
		Sample Measurements		Mean	Acceptance Range		Concentration or Quantity			Matrix Spike Recovery (%)				Acceptance RPD (%)	Acceptance Range (%)
		Rep 1	Rep 2	Conc	RPD (%)	for RPD (%)	Units	Sampl Only	Spike Added	Sample +Spike	Sample +Spike	Sample +Spike	Sample +Spike		
TS	WP2490-4	wt%	86.8	86.0	86.4	0.9	0-20	MS/MSD Not Applicable for this Parameter							

RPD = Relative percent difference, which is the absolute value of the difference between two replicate results divided by the mean concentration then multiplied by 100%.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory or contract specified acceptance range except as noted. The laboratory does not use the sample duplicate and matrix spike acceptance ranges as acceptance criteria for a specific analysis. Sample duplicate and matrix spike data are used to evaluate method performance in the environmental sample matrix only. Please refer to LCS data for assessment of quality control for each parameter.

5000004

2A
SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Katahdin Analytical Services

SDG No.: WP2490

Matrix: SOIL

Client Sample ID	Lab Sample ID	SMC1 (NBZ) #	SMC2 (FBP) #	SMC3 (TPH) #	Total Out
SBLK;052599	SBLK;052599	91	87	98	0
16SLB05-0203	WP2490-4	91	94	94	0
17SLB07-0809	WP2490-6	93	88	100	0
17SLB02-0809	WP2490-7	94	88	94	0
17SLB09-0708	WP2490-8	84	84	113	1
17SLB04-0304	WP2490-9	66	69	97	0
17SLB04-0304MS	WP2490-9MS	99	97	117 *	1
17SLB04-0304MSD	WP2490-9MSD	91	89	144 *	1
17SLB05-0708D	WP2490-11	72	74	98	0
17SLB05-0708	WP2490-12	52	56	87	0
17SLB03-0506	WP2490-13	62	66	88	0
LCS;052599	LCS;052599	74	80	82	0
17SLB01-0708	WP2490-5	77	89	81	0
17SLB09-0706	WP2490-8RA	82	92	104	0
17SLB05-0708	WP2490-12RA	46	60	121 *	1
17SLB03-0506	WP2490-13RA	58	63	88	0
18SLB03-0506D	WP2490-14	30	33	33	0
16SLB01-0203	WP2490-1	75	91	88	0
16SLB02-0203	WP2490-2	75	80	88	0
16SLB02-0203D	WP2490-3	77	86	85	0

QC LIMITS

SMC1 (NBZ) = NITROBENZENE-D5 (14-107)
 SMC2 (FBP) = 2-FLUOROBIPHENYL (32-109)
 SMC3 (TPH) = TERPHENYL-D14 (26-116)

Column to be used to flag recovery value

* Values are outside of QC limits



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Owen Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;052599
 SDG: WP2490
 Report Date: 7/8/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: 100
 Method: EPA 8270
 Date Analyzed: 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;052599	SL	-	-	5/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample	Method
				PQL	PQL
NAPHTHALENE	<330	ug/Kg	1.0	330	330
2-METHYLNAPHTHALENE	<330	ug/Kg	1.0	330	330
ACENAPHTHYLENE	<330	ug/Kg	1.0	330	330
ACENAPHTHENE	<330	ug/Kg	1.0	330	330
FLUORENE	<330	ug/Kg	1.0	330	330
PHENANTHRENE	<330	ug/Kg	1.0	330	330
ANTHRACENE	<330	ug/Kg	1.0	330	330
FLUORANTHENE	<330	ug/Kg	1.0	330	330
TYRENE	<330	ug/Kg	1.0	330	330
BENZO[A]ANTHRACENE	<330	ug/Kg	1.0	330	330
CHRYSENE	<330	ug/Kg	1.0	330	330
BENZO[B]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[K]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[A]PYRENE	<330	ug/Kg	1.0	330	330
INDENO[1,2,3-CD]PYRENE	<330	ug/Kg	1.0	330	330
DIBENZ[A,H]ANTHRACENE	<330	ug/Kg	1.0	330	330
BENZO[G,H,I]PERYLENE	<330	ug/Kg	1.0	330	330
NITROBENZENE-D5	91	%	1.0		
2-FLUOROBIPHENYL	87	%	1.0		
TERPHENYL-D14	98	%	1.0		

Report Notes:

Katahdin Analytical Services
8270 LCS Recovery Sheet

Lab File: I3762

Sample ID: LCS;052599

Date Run: 6/28/99

Analyst: KRT

Time Injected 8:35:00 PM

Matrix: SL

Compound Name	Spike Amt (ng/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	1667	1290	77	60-140
ACENAPHTHENE	1667	1240	74	60-140
ACENAPHTHYLENE	1667	1270	76	60-140
ANTHRACENE	1667	1300	78	60-140
BENZO[A]ANTHRACENE	1667	1420	85	60-140
BENZO[A]PYRENE	1667	1240	75	60-140
BENZO[B]FLUORANTHENE	1667	1310	78	60-140
BENZO[G,H,I]PERYLENE	1667	1220	73	60-140
BENZO[K]FLUORANTHENE	1667	1350	81	60-140
CHRYSENE	1667	1430	86	60-140
DIBENZ[A,H]ANTHRACENE	1667	1170	70	60-140
FLUORANTHENE	1667	1310	79	60-140
FLUORENE	1667	1340	80	60-140
INDENO[1,2,3-CD]PYRENE	1667	1240	75	60-140
NAPHTHALENE	1667	1240	74	60-140
PHENANTHRENE	1667	1380	83	60-140
PYRENE	1667	1260	75	60-140

* Out of Limits

1

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP2490-9	I3746	6/27/99	7:03:00 PM	KRT	SL	8270_99
WP2490-9MS	I3747	6/27/99	7:44:00 PM	KRT	SL	8270_99
WP2490-9MSD	I3748	6/27/99	8:25:00 PM	KRT	SL	8270_99

Compound Name	Native (ug/Kg)	MS Spk Amount (ug/Kg)	MSD Spk Amount (ug/Kg)	MS Result (ug/Kg)	MSD Result (ug/Kg)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
CHRYSENE	0	2080	2080	2140	2490	103	120	60-140	15	50
ACENAPHTHENE	0	2080	2080	1890	1880	91	90	60-140	0.53	50
ACENAPHTHYLENE	0	2080	2080	1980	1930	95	93	60-140	2.6	50
ANTHRACENE	0	2080	2080	2170	2100	104	101	60-140	3.3	50
BENZO[A]ANTHRACENE	0	2080	2080	2170	2170	104	104	60-140	0	50
BENZO[A]PYRENE	0	2080	2080	3260	3260	*157	*157	60-140	0	50
BENZO[B]FLUORANTHENE	0	2080	2080	3160	3760	*152	*180	60-140	17	50
2-METHYLNAPHTHALENE	0	2080	2080	1820	1820	88	87	60-140	0	50
BENZO[K]FLUORANTHENE	0	2080	2080	2930	3360	*141	*161	60-140	14	50
PYRENE	0	2080	2080	2560	3090	123	*149	60-140	19	50
DIBENZ[A,H]ANTHRACENE	0	2080	2080	2940	3090	*141	*149	60-140	5.0	50
FLUORANTHENE	0	2080	2080	2000	1870	96	90	60-140	6.7	50
FLUORENE	0	2080	2080	2100	2000	101	96	60-140	4.9	50
INDENO[1,2,3-CD]PYRENE	0	2080	2080	2710	2750	130	132	60-140	1.5	50
NAPHTHALENE	0	2080	2080	1960	1880	94	90	60-140	4.2	50
PERYLENE	0	2080	2080	2270	2080	109	100	60-140	8.7	50
BENZO[G,H,I]PERYLENE	0	2080	2080	2810	2820	135	136	60-140	0.36	50

RPD = [(ms res - msd res) / (ms res + msd res) / 2] * 100

* Out of Limits

/

2A
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Katahdin Analytical Services

SDG No.: WP2490

Matrix: SOIL

Client Sample ID	Lab Sample ID	SMC1 (DFM) #	SMC2 (DCA) #	SMC3 (TOL) #	SMC4 (BFB) #	Total Out
LCSM27A	LCSM27A	107	110	106	107	0
VBLKM27A	VBLKM27A	125	123	123	121	0
16SLB01-0203	WP2490-1	79	84	65 *	56 *	2
LCSM27C	LCSM27C	121	126	120	119	0
VBLKM27C	VBLKM27C	122	122	122	120	0
16SLB02-0203D	WP2490-3	87	108	78	89	0
16SLB05-0203	WP2490-4	106	108	112	106	0
17SLB01-0708	WP2490-5	47 *	52 *	41 *	39 *	4
17SLB07-0809	WP2490-6	95	103	106	99	0
17SLB02-0809	WP2490-7	99	99	98	90	0
17SLB09-0708	WP2490-8	116	120	95	86	0
17SLB04-0304	WP2490-9	97	107	88	76	0
17SLB05-0708D	WP2490-11	111	118	123	118	0
LCSZ27B	LCSZ27B	94	92	96	81	0
VBLKZ27A	VBLKZ27A	105	104	105	83	0
17SLB05-0708	WP2490-12	117	112	99	79	0
17SLB03-0506	WP2490-13	109	102	103	134	0
18SLB03-0506D	WP2490-14	90	85	92	80	0
LCSZ28A	LCSZ28A	96	92	109	102	0
VBLKZ28A	VBLKZ28A	86	90	85	90	0
16SLB01-0203RE	WP2490-1RE	46 *	45 *	34 *	24 *	4
16SLB02-0203	WP2490-2	100	95	99	93	0
16SLB02-0203DRE	WP2490-3RE	43 *	46 *	25 *	14 *	4
17SLB01-0708RE	WP2490-5RE	47 *	45 *	47 *	48 *	4
17SLB03-0506RE	WP2490-13RE	52 *	49 *	30 *	16 *	4

QC LIMITS

SMC1 (DFM) = DIBROMOFLUOROMETHANE (69-148)
 SMC2 (DCA) = 1,2-DICHLOROETHANE-D4 (66-149)
 SMC3 (TOL) = TOLUENE-D8 (68-147)
 SMC4 (BFB) = P-BROMOFLUOROBENZENE (64-152)

Column to be used to flag recovery value

* Values are outside of QC limits



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Owen Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKM27A
SDG: WP2490
Report Date: 6/16/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKM27A	SL	-	-	5/27/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	125	%	1.0		
1,2-DICHLOROETHANE-D4	123	%	1.0		
1,2-DICHLOROETHANE-D8	123	%	1.0		
P-BROMOFLUOROBENZENE	121	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: M0470

Sample ID: LCSM27A

Date Run: 5/27/99

Analyst: KMC

Time Injected 6:26:00 AM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	56.6	113	60-140
BENZENE	50	50.8	102	60-140
ETHYLBENZENE	50	50.7	101	60-140
MTBE	50	55.7	111	60-140
NAPHTHALENE	50	73.8	*148	60-140
TOLUENE	50	52.2	104	60-140
TOTAL XYLENES	150	150	100	60-140

* Out of Limits

1

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: Z0870

Sample ID: LCSZ27B

Date Run: 5/27/99

Analyst: JSS

Time Injected 4:25:00 PM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	44.8	90	60-140
BENZENE	50	44.0	88	60-140
ETHYLBENZENE	50	51.3	102	60-140
MTBE	50	50.4	101	60-140
NAPHTHALENE	50	48.0	96	60-140
TOLUENE	50	43.4	87	60-140
TOTAL XYLENES	150	157	105	60-140

* Out of Limits

1

Katabdin Analytical Services
8260 LCS Recovery Sheet

Lab File: M0484

Sample ID: LCSM27C

Date Run: 5/27/99

Analyst: JSS

Time Injected 5:24:00 PM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ng/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	57.1	114	60-140
BENZENE	50	53.4	107	60-140
ETHYLBENZENE	50	52.0	104	60-140
MTBE	50	58.1	116	60-140
NAPHTHALENE	50	59.8	120	60-140
TOLUENE	50	54.3	108	60-140
TOTAL XYLENES	150	152	102	60-140

* Out of Limits

1



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: VBLKZ28A
SDG: WP2490
Report Date: 6/16/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8280
Date Analyzed: 5/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKZ28A	SL	-	-	5/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	86	%	1.0		
1,1-DICHLOROETHANE-D4	90	%	1.0		
M-TOLUENE-DB	85	%	1.0		
P-BROMOFLUOROBENZENE	90	%	1.0		

Report Notes:

**SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECHNUS
CASE CNC CHARLESTON**

Sample Receipt

The following samples were received on May 15, 1999 and were logged in under Katahdin Analytical Services work order number WP2474 for a hardcopy due date of June 14, 1999.

<u>KATAHDIN</u>	<u>TTNUS</u>	<u>GEL</u>
<u>Sample No.</u>	<u>Sample Identification</u>	<u>Sample No.</u>
WP2474-1	18SLB05-0406	9905519-03
WP2474-2	18SLB01-0203	9905519-02
WP2474-3	18SLB02-0405	9905519-01
WP2474-4	19SLB09-0405D	
WP2474-5	19SLB03-0506	
WP2474-6	19SLB09-0405	
WP2474-7	19SLB06-0506	
WP2474-8	19SLB08-0405	
WP2474-9	16SLB06-0304	9905519-05
WP2474-10	16SLB10-0304	
WP2474-11	16SLB03-0304	
WP2474-12	19SLB16-0203	
WP2474-13	16SLB04-0304	9905519-04
WP2474-14	02TL00201 TRIP BLANK	
WP2474-15	16SLB04-0304/2ND INT	
WP2474-16	16SLB04-0304/TPO INT	

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

One aqueous (trip blank) and thirteen soil/sediment samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on May 15, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this SDG were performed on instruments 5972-M (low level soil), 5972-F (aqueous/medium level soil), and 5970-Q (medium level soil). A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ug/l.

Batch QC (VBLK, and LCS) was performed in each twelve hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. No matrix spike/matrix spike duplicate pair was analyzed on any of the samples in this workorder.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Method 8260B narrows this 20% maximum to 15%.

In the calibration curves analyzed in this SDG, several analytes had %RSD values exceeding the allowed 15%. Since the average %RSD for all analytes was 11.5%, 8.4%, 8.3%, 10.4%, and 13.4%, the curves were acceptable.

Sample WP2474-4 was analyzed following medium level protocols only due to the matrix, resulting in elevated reporting limits.

Initial analysis of sample WP2474-6 yielded internal standard area and surrogate recovery deviations. Reanalysis yielded similar results, confirming matrix interference. Both sets of data for this sample are included in this data package.

Initial analyses of samples WP2474-8 and -13 yielded surrogate recovery deviations and target analyte concentrations over the upper limit of the calibration curve. Reanalysis occurred following medium level protocols successfully. Both sets of data for each sample are included in this data package.

Initial analysis of sample WP2474-11 yielded potential carryover. Analysis of sample WP2474-12 yielded internal standard area recoveries. Reanalysis of each occurred following medium level protocols since none of the low level ENCORE aliquots remained.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organic Analysis

Thirteen soil/sediment samples were received by the Katahdin GC/MS laboratory on May 15, 1999 for analysis in accordance with 8270C for the TCL/PAH list of analytes.

Extraction of all of the soil samples occurred following USEPA method 3550 on May 26, 1999. A laboratory control spike consisting of all TCL analytes spiked into organic free sand, was extracted in the batch along with a site specific MS/MSD pair on sample WP2474-9.

WP2474-9, 9MS and 9MSD showed an elevated recovery for the surrogate terphenyl-d14, and low recovery of the internal standard Perylene-d12 confirming matrix interference. No action was taken in accordance with the method.

Sample WP2474-2 was initially analyzed on 6/28/99 and displayed less than 50% recovery for the internal standard perylene-d12, and an elevated recovery for the surrogate terphenyl-d14. Reanalysis confirmed matrix interference as perylene-d12 recovered below 50% again, both sets of data are enclosed in the data package.

Sample WP2474-7 recovered the surrogate terphenyl-d14 above the limit, an elevated recovery would indicate a high bias and the sample showed no positive detects.

Sample WP2474-12 recovered the internal standards chrysene-d12, and perylene-d12 at less than 50%, reanalysis was not performed. The target analyte result for Benzo (ghi) Perylene may be biased high.

The initial calibration curves analyzed in this SDG had some of the target analyte %RSD values exceeding 15 %.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Section 7.3.7.1 of method 8270C (revision 3, 12/96) narrows this 20% maximum to 15%.

In the calibration curves analyzed for this workorder, the average %RSD for all analytes were as follows:

5970-X 6/27/99 9.4%

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Metals Analysis

The samples of Katahdin Work Order WP2474 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Waste", SW-846, November 1986, Third Edition.

Inductively-Coupled Plasma (ICP) Atomic Emission Spectroscopic Analysis

Solid-matrix Katahdin Sample Nos. WP2474-(1-3) were digested for ICP analysis on 06/14/99 (QC Batch PF14ICS0) in accordance with USEPA Method 3050B. The measured calcium concentration (0.111 mg/L, corresponding to a dry-weight concentration of 11.1 mg/kg) of the preparation blank (PBSPF14ICS0) that is associated with this digestion batch exceeds the laboratory's acceptance limit. However, because the measured calcium concentrations of all associated client samples are more than ten times that of the preparation blank, no corrective action is required.

ICP analyses of Katahdin Work Order WP2474 sample digestates were performed in accordance with USEPA Method 6010B, using a Thermo Jarrell Ash (TJA) Trace ICP spectrometer and a TJA 61 ICP spectrometer. All samples were analyzed within holding times and all QC criteria were met with the following comments or exceptions:

Some of the results for run QC samples (ICV, ICB, CCV, CCB, ICSA, and ICSAB) included in the accompanying data package may have exceeded acceptance limits for some elements. Please note that all client samples and batch QC samples associated with out-of-control results for run QC samples were subsequently reanalyzed for the analytes in question.

Analysis of Mercury by Cold Vapor Atomic Absorption (CVAA)

Solid-matrix Katahdin Sample Nos. WP2474-(1-3) were digested for mercury analysis on 06/09/99 (QC Batch PF09HGS2) in accordance with USEPA Method 7471A. Katahdin Sample No. WP2474-1 was prepared with duplicate matrix-spiked aliquots.

Mercury analyses of Katahdin Work Order WP2474 sample digestates were performed using a Leeman Labs PS200 automated mercury analyzer. All samples were analyzed within holding times and all run QC criteria were met.

Wet Chemistry Analysis

For work order WP2474 the analyses for Total Combustible Organics (TCO) have been performed in accordance with the "Annual Book of ASTM Standards", 1987. Analyses for Solids-Total Residue (TS) for work order WP2474 samples have been performed in accordance with "Contract Laboratory Program Statement of Work for Inorganic Analysis".

All analyses were performed within analytical hold time. No protocol deviations were noted by the Wet Chemistry laboratory staff.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager and/or his designee, as verified by the following signature.

Authorized Signature

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # WP 2774

PAGE: 1 OF 2

COOLER: 1 OF 2

CLIENT: Tetra Tech

COC# =

SDG# =

DATE / TIME RECEIVED: 051599 1100

DELIVERED BY: FEDEX

RECEIVED BY: SR

LIMS ENTRY BY: BKW

LIMS REVIEW BY / PM: ADC

PROJECT: CNC Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>2.9</u>	
6. SAMPLES RECEIVED AT 4°C +/- 2° ICE / ICE PACKS PRESENT <u>Y</u> OR N?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>VDA encloses inadvertently not extruded within 48 hours</u>	<u>hold extended on Monday 5/11 per Kelly Johnson-Campion & Dawn Collins</u>
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

0000007

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # WP 2474

PAGE: 2 OF 2

COOLER: 2 OF 2

CLIENT: Tetra Tech

COC# -

SDG# -

DATE / TIME RECEIVED: 05/5/99 1100

DELIVERED BY: FEDEX

RECEIVED BY: SR

LIMS ENTRY BY: BKA

LIMS REVIEW BY / PM: AC

PROJECT: CNC Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>3.5</u>	
6. SAMPLES RECEIVED AT 4°C ± .2? ICE / ICE PACKS PRESENT (Y or N)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>NA</u>	
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>↓</u>	
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

8000000

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

ORDER NO WP-2474

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

ORDER DATE: 05/17/99

PHONE: 850/385-989

FAX: 850/385-9860

DUE: 14 JUN

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 661 ANDERSEN DRIVE, FOSTER PLAZA VII
 PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 16 JUL

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP2474-1	18SLB05-0406	14 MAY 1122	15 MAY	SL
	WP2474-2	18SLB01-0203	14 MAY 0955		
	WP2474-3	18SLB02-0405	14 MAY 0945		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	135.00	405.00
Target Analyte List Metals, Total		3	100.00	300.00
Solids-Total Residue (TS)	CLP/CIP SO	3	0.00	0.00
Volatile Organics by 8260B	SW8260	3	85.00	255.00
Wet Lab Subcontract		3	75.00	225.00

TOTALS		3	395.00	1185.00
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	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2	WP2474-4	19SLB09-0405D	14 MAY 1140	15 MAY	SL
	WP2474-5	19SLB03-0506	14 MAY 0922		
	WP2474-6	19SLB09-0405	14 MAY 0835		
	WP2474-7	19SLB06-0506	14 MAY 0907		
	WP2474-8	19SLB08-0405	14 MAY 0850		
	WP2474-10	16SLB10-0304	14 MAY 1505		
	WP2474-11	16SLB03-0304	14 MAY 1545		
	WP2474-12	19SLB16-0203	14 MAY 1615		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Solids-Total Residue (TS)	CLP/CIP SO	8	0.00	0.00
Volatile Organics by 8260B	SW8260	8	85.00	680.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	8	135.00	1080.00

TOTALS		8	220.00	1760.00
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0000010
 12/16/99

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
 New England-ME Laboratory (207) 874-2400
 CONFIRMATION

ORDER NO WP-2474

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

ORDER DATE: 05/17/99

PHONE: 850/385-989

FAX: 850/385-9860

DUE: 14 JUN

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
 TETRA TECH NUS, INC.
 661 ANDERSEN DRIVE, FOSTER PLAZA VII
 PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 16 JUL

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6 WP2474-9	16SLB06-0304	14 MAY 1450	15 MAY	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Wet Lab Subcontract		1	60.00	60.00
Total Combustible Organics	ASTM D2974	1	30.00	30.00

TOTALS		1	310.00	310.00
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LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
7 WP2474-6	19SLB09-0405D	14 MAY 0922	15 MAY	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B RA	SW8260	1	0.00	0.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
8 WP2474-8	19SLB08-0405	14 MAY 0850	14 MAY	SL
WP2474-11	16SLB03-0304	14 MAY 1545		
WP2474-12	19SLB16-0203	14 MAY 1615		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B DL	SW8260	3	0.00	0.00

0000012
 05/11/99

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

Page 4

ORDER NO WP-2474

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 05/17/99
PHONE: 850/385-9899
FAX: 850/385-9860
DUE: 14 JUN
FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
661 ANDERSEN DRIVE, FOSTER PLAZA VII
PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 16 JUL

ORDER NOTE: QC-IV NFESC-D
DD(KAS007QC-DB3)
CNC CHARLESTON

REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.
PITTSBURGH, PA 15220
REPORT & DISK

INVOICE: With Report

TOTAL ORDER AMOUNT \$3,855.00
This is NOT an Invoice

AJC/BKR/DRT/WEST.AJC(dw)/WEST.DRT(dw)

06-14 Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

0000013
05/17/99



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
#	'#' flag denotes surrogate compound recovery is out of criteria.
\$	'\$' flag denotes surrogate compound recovery is out of criteria. Re-extraction or re-analysis confirmed matrix interference.
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-1	Sample dilution required due to matrix interference, sample viscosity or other matrix-related problem; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmed matrix interference.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
#	'#' flag denotes surrogate compound recovery is out of criteria.
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O-1	Sample dilution required due to matrix interference, sample viscosity or other matrix-related problem; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmed matrix interference.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.



CLIENT: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr., Suite 102
 Tallahassee, FL 32308

Lab Number : WP-2474-9
 Report Date: 07/13/99
 PO No. : N7912-P99264
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 13 of 13

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED	
16SLB06-0304	Solid	CLIENT	05/14/99	05/15/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	81.	wt %	1.0	0.10	CLP/CIP SOW	05/18/99	JF	1
Total Combustible Organics	1.8	wt %	1.0	0.1	ASTM D2974-8	06/07/99	JF	2

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

- (1) Sample Preparation on 05/17/99 by JF
- (2) Sample Preparation on 06/04/99 by JF

07/13/99

LJO/baeajc(dw)/msm

CC: MS. LEE LECK
 TETRA TECH NUS
 FOSTER PLAZA 7
 661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2474-9
SDG: WP2474
Report Date: 7/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 82
Method: EPA 8270
Date Analyzed: 6/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB06-0304	SL	5/14/99	5/15/99	5/26/99	DPD	EPA 3550	SW

Compound	Result	Units	DF	Sample	Method
				PQL	PQL
NAPHTHALENE	<460	ug/Kg	1.4	460	330
2-METHYLNAPHTHALENE	<460	ug/Kg	1.4	460	330
ACENAPHTHYLENE	<460	ug/Kg	1.4	460	330
ACENAPHTHENE	<460	ug/Kg	1.4	460	330
FLUORENE	<460	ug/Kg	1.4	460	330
PHENANTHRENE	<460	ug/Kg	1.4	460	330
ANTHRACENE	<460	ug/Kg	1.4	460	330
FLUORANTHENE	<460	ug/Kg	1.4	460	330
PYRENE	<460	ug/Kg	1.4	460	330
BENZO[A]ANTHRACENE	<460	ug/Kg	1.4	460	330
CHRYSENE	<460	ug/Kg	1.4	460	330
BENZO[B]FLUORANTHENE	<460	ug/Kg	1.4	460	330
BENZO[K]FLUORANTHENE	<460	ug/Kg	1.4	460	330
BENZO[A]PYRENE	<460	ug/Kg	1.4	460	330
INDENO[1,2,3-CD]PYRENE	<460	ug/Kg	1.4	460	330
DIBENZ[A,H]ANTHRACENE	<460	ug/Kg	1.4	460	330
BENZO[G,H,I]PERYLENE	<460	ug/Kg	1.4	460	330
NITROBENZENE-D5	99	%	1.4		
2-FLUOROBIPHENYL	93	%	1.4		
TERPHENYL-D14	\$170	%	1.4		

Report Notes: \$, 0-13



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Arnold Lamb
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2474-9
SDG: WP2474
Report Date: 6/14/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 82
Method: SW8260
Date Analyzed: 5/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB06-0304	SL	5/14/99	5/15/99	5/26/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	0.98	5	5
TOLUENE	<5	ug/Kg	0.98	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	0.98	5	5
ETHYLBENZENE	<5	ug/Kg	0.98	5	5
NAPHTHALENE	<5	ug/Kg	0.98	5	5
MTBE	<5	ug/Kg	0.98	5	5
TOTAL XYLENES	<5	ug/Kg	0.98	5	5
DIBROMOFLUOROMETHANE	100	%	0.98		
1,2-DICHLOROETHANE-D4	104	%	0.98		
TOLUENE-D8	84	%	0.98		
P-BROMOFLUOROBENZENE	75	%	0.98		

Report Notes:



CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2474-10
Report Date: 07/13/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 9 of 13

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED				
16SLB10-0304	Solid	CLIENT	05/14/99	05/15/99			
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	83.	wt %	1.0	0.10	CLP/CIP SOW	05/18/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 05/17/99 by JF

07/13/99

LJO/baeajc(dw)/msm

CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2474-10
SDG: WP2474
Report Date: 7/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 83
Method: EPA 8270
Date Analyzed: 6/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB10-0304	SL	5/14/99	5/15/99	5/26/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	<430	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	<430	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
CHRYSENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZ[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	70	%	1.3		
2-FLUOROBIPHENYL	78	%	1.3		
TERPHENYL-D14	88	%	1.3		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Arnold Lamb
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2474-10
SDG: WP2474
Report Date: 6/14/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 83
Method: SW8260
Date Analyzed: 5/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB10-0304	SL	5/14/99	5/15/99	5/26/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.3	6	5
TOLUENE	<6	ug/Kg	1.3	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.3	6	5
ETHYLBENZENE	<6	ug/Kg	1.3	6	5
NAPHTHALENE	<6	ug/Kg	1.3	6	5
MTBE	<6	ug/Kg	1.3	6	5
TOTAL XYLENES	<6	ug/Kg	1.3	6	5
DIBROMOFLUOROMETHANE	109	%	1.3		
1,2-DICHLOROETHANE-D4	108	%	1.3		
OLUENE-D8	110	%	1.3		
P-BROMOFLUOROBENZENE	102	%	1.3		

Report Notes:



CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2474-11
Report Date: 07/13/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 10 of 13

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED	
16SLB03-0304	Solid			CLIENT		05/14/99	05/15/99
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	81.	wt %	1.0	0.10	CLP/CIP SOW	05/18/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 05/17/99 by JF

07/13/99

LJO/baeajc(dw)/msm

CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2474-11
 SDG: WP2474
 Report Date: 7/12/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: 81
 Method: EPA 8270
 Date Analyzed: 6/29/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB03-0304	SL	5/14/99	5/15/99	5/26/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<460	ug/Kg	1.4	460	330
2-METHYLNAPHTHALENE	<460	ug/Kg	1.4	460	330
ACENAPHTHYLENE	<460	ug/Kg	1.4	460	330
ACENAPHTHENE	<460	ug/Kg	1.4	460	330
FLUORENE	<460	ug/Kg	1.4	460	330
PHENANTHRENE	J280	ug/Kg	1.4	460	330
ANTHRACENE	<460	ug/Kg	1.4	460	330
FLUORANTHENE	J260	ug/Kg	1.4	460	330
PYRENE	J260	ug/Kg	1.4	460	330
BENZO[A]ANTHRACENE	<460	ug/Kg	1.4	460	330
CHRYSENE	<460	ug/Kg	1.4	460	330
BENZO[B]FLUORANTHENE	<460	ug/Kg	1.4	460	330
BENZO[K]FLUORANTHENE	<460	ug/Kg	1.4	460	330
BENZO[A]PYRENE	<460	ug/Kg	1.4	460	330
INDENO[1,2,3-CD]PYRENE	<460	ug/Kg	1.4	460	330
DIBENZO[A,H]ANTHRACENE	<460	ug/Kg	1.4	460	330
BENZO[G,H,I]PERYLENE	<460	ug/Kg	1.4	460	330
NITROBENZENE-D5	107	%	1.4		
2-FLUOROBIPHENYL	101	%	1.4		
TERPHENYL-D14	113	%	1.4		

Report Notes: J



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Arnold Lamb
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2474-11
SDG: WP2474
Report Date: 6/14/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 5/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB03-0304	SL	5/14/99	5/15/99	5/26/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<7	ug/Kg	1.4	7	5
TOLUENE	<7	ug/Kg	1.4	7	5
1,2-DIBROMOETHANE	<7	ug/Kg	1.4	7	5
ETHYLBENZENE	<7	ug/Kg	1.4	7	5
NAPHTHALENE	14	ug/Kg	1.4	7	5
MTBE	<7	ug/Kg	1.4	7	5
TOTAL XYLENES	<7	ug/Kg	1.4	7	5
DIBROMOFLUOROMETHANE	107	%	1.4		
1,2-DICHLOROETHANE-D4	105	%	1.4		
TOLUENE-D8	113	%	1.4		
P-BROMOFLUOROBENZENE	100	%	1.4		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Arnold Lamb
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2474-11DL
SDG: WP2474
Report Date: 6/14/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB03-0304	SL	5/14/99	5/15/99	5/27/99	HMP	5035	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kgdrywt	1.0	5	5
TOLUENE	<5	ug/Kgdrywt	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kgdrywt	1.0	5	5
ETHYLBENZENE	<5	ug/Kgdrywt	1.0	5	5
NAPHTHALENE	<5	ug/Kgdrywt	1.0	5	5
MTBE	<5	ug/Kgdrywt	1.0	5	5
TOTAL XYLENES	<5	ug/Kgdrywt	1.0	5	5
DIBROMOFLUOROMETHANE	94	%	1.0		
1,2-DICHLOROETHANE-D4	91	%	1.0		
TOLUENE-D8	94	%	1.0		
P-BROMOFLUOROBENZENE	94	%	1.0		

Report Notes:



CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2474-13
Report Date: 07/13/99
PO No. : N7912-P99264
Project : CIO #68

WICH#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 12 of 13

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
16SLB04-0304	Solid	CLIENT		05/14/99	05/15/99		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	81.	wt %	1.0	0.10	CLP/CIP SCW	05/18/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 05/17/99 by JF

07/13/99

LJO/baeajc(dw)/msm

CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2474-13
 SDG: WP2474
 Report Date: 7/12/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: 81
 Method: EPA 8270
 Date Analyzed: 6/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB04-0304	SL	5/14/99	5/15/99	5/26/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	9300	ug/Kg	14	4600	330
2-METHYLNAPHTHALENE	44000	ug/Kg	14	4600	330
ACENAPHTHYLENE	<4600	ug/Kg	14	4600	330
ACENAPHTHENE	<4600	ug/Kg	14	4600	330
FLUORENE	6700	ug/Kg	14	4600	330
PHENANTHRENE	9100	ug/Kg	14	4600	330
ANTHRACENE	<4600	ug/Kg	14	4600	330
FLUORANTHENE	<4600	ug/Kg	14	4600	330
PYRENE	<4600	ug/Kg	14	4600	330
BENZO[A]ANTHRACENE	<4600	ug/Kg	14	4600	330
CHRYSENE	<4600	ug/Kg	14	4600	330
BENZO[B]FLUORANTHENE	<4600	ug/Kg	14	4600	330
BENZO[K]FLUORANTHENE	<4600	ug/Kg	14	4600	330
BENZO[A]PYRENE	<4600	ug/Kg	14	4600	330
INDENO[1,2,3-CD]PYRENE	<4600	ug/Kg	14	4600	330
DIBENZ[A,H]ANTHRACENE	<4600	ug/Kg	14	4600	330
BENZO[G,H,I]PERYLENE	<4600	ug/Kg	14	4600	330
NITROBENZENE-D5	84	%	14		
2-FLUOROBIPHENYL	74	%	14		
TERPHENYL-D14	74	%	14		

Report Notes: O-1, O-2



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Arnold Lamb
 Tetra Tech NUS
 1401 Owen Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2474-13
 SDG: WP2474
 Report Date: 6/14/99
 PO No. : N7912-P99264
 Project: CTO #68
 % Solids: 81
 Method: SW8260
 Date Analyzed: 5/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB04-0304	SL	5/14/99	5/15/99	5/26/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.2	6	5
TOLUENE	<6	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	7	ug/Kg	1.2	6	5
NAPHTHALENE	E970	ug/Kg	1.2	6	5
MTBE	<6	ug/Kg	1.2	6	5
TOTAL XYLENES	<6	ug/Kg	1.2	6	5
DIBROMOFLUOROMETHANE	#31	%	1.2		
1,2-DICHLOROETHANE-D4	#37	%	1.2		
TOLUENE-D8	#14	%	1.2		
P-BROMOFLUOROBENZENE	#27	%	1.2		

Report Notes: E, #



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Arnold Lamb
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2474-13DL
SDG: WP2474
Report Date: 6/14/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
16SLB04-0304	SL	5/14/99	5/15/99	5/27/99	HMP	5035	HMP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<650	ug/Kgdrywt	130	650	5
TOLUENE	<650	ug/Kgdrywt	130	650	5
1,2-DIBROMOETHANE	<650	ug/Kgdrywt	130	650	5
ETHYLBENZENE	<650	ug/Kgdrywt	130	650	5
NAPHTHALENE	8600	ug/Kgdrywt	130	650	5
MTBE	<650	ug/Kgdrywt	130	650	5
TOTAL XYLENES	<650	ug/Kgdrywt	130	650	5
DIBROMOFLUOROMETHANE	98	%	130		
1,2-DICHLOROETHANE-D4	93	%	130		
TOLUENE-D8	90	%	130		
P-BROMOFLUOROBENZENE	96	%	130		

Report Notes: O-1



Method Blank and Laboratory Control Sample Results

Client:	TETRA TECHNUS
Work Order:	WP2474

Parameter	Date of Prep	Date of Analysis	METHOD BLANK RESULTS				LABORATORY CONTROL SAMPLE RESULTS					
			Units	Concentration Measured in Blank	Acceptance Range	Practical Quantitation Level**	Units	True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)
TS -Total Residue	17-May-99	18-May-99	wt %	< 0.10	< 0.10	0.10	wt %	90	90	100	80-120	
	17-May-99	18-May-99	wt %	< 0.10	< 0.10	0.10	wt %	90	90	100	80-120	

** Practical quantitation level is the lowest concentration measurable for samples with normal chemical and physical composition during routine laboratory operations.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory and method specified acceptance range except as noted.

50000003

Environmental Analysis Services, Inc.
Environmental Laboratory

Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client:	TETRA TECH NUS
Work Order:	WP2474

*DUPLICATE RESULTS**MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS*

Parameter	Sample No	Sample Measurements						Acceptance	Concentration or Quantity				Matrix Spike Recovery (%)							
		Units	Rep 1	Rep 2	Mean Conc	RPD (%)	Range for RPD (%)	Units	Sampl Only	Spike Added	Sample +Spike Dup 1	Sample +Spike Dup 2	Sample +Spike Dup 1	Sample +Spike Dup 2	Acceptance Range (%)	RPD (%)	Acceptance Range (%)			
TS	WP2474-9	wt%	81.0	82.1	81.6	1.3	0-20	MS/MSD Not Applicable for this Parameter												

RPD = Relative percent difference, which is the absolute value of the difference between two replicate results divided by the mean concentration then multiplied by 100%.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory or contract specified acceptance range except as noted. The laboratory does not use the sample duplicate and matrix spike acceptance ranges as acceptance criteria for a specific analysis. Sample duplicate and matrix spike data are used to evaluate method performance in the environmental sample matrix only. Please refer to LCS data for assessment of quality control for each parameter.

2A
SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Katahdin Analytical Services

SDG No.: WP2474

Matrix: SOIL

Client Sample ID	Lab Sample ID	SMC1 (NBZ) #	SMC2 (FBP) #	SMC3 (TPH) #	Total Out
SBLK;052699	SBLK;052699	76	80	105	0
LCS;052699	LCS;052699	83	76	88	0
18SLB05-0406	WP2474-1	56	67	84	0
18SLB01-0203	WP2474-2	97	93	163 *	1
16SLB06-0304	WP2474-9	99	93	170 *	1
16SLB06-0304MS	WP2474-9MS	104	102	175 *	1
16SLB06-0304MSD	WP2474-9MSD	92	89	150 *	1
16SLB10-0304	WP2474-10	70	78	88	0
16SLB03-0304	WP2474-11	107	101	113	0
18SLB01-0203	WP2474-2RA	83	87	105	0
19SLB09-0405D	WP2474-4	77	84	85	0
19SLB08-0405	WP2474-8	82	79	78	0
16SLB04-0304	WP2474-13	84	74	74	0
18SLB02-0405	WP2474-3	72	71	82	0
19SLB03-0506	WP2474-5	96	97	114	0
19SLB09-0405	WP2474-6	73	76	85	0
19SLB06-0506	WP2474-7	102	103	138 *	1
19SLB16-0203	WP2474-12	52	55	50	0

QC LIMITS

SMC1 (NBZ) = NITROBENZENE-D5 (14-107)
 SMC2 (FBP) = 2-FLUOROBIPHENYL (32-109)
 SMC3 (TPH) = TERPHENYL-D14 (26-116)

Column to be used to flag recovery value

* Values are outside of QC limits



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
 Tetra Tech NUS
 1401 Oven Park Dr.
 Suite 102
 Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK052699
SDG: WP2474
Report Date: 7/12/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: EPA 8270
Date Analyzed: 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK052699	SL	-	-	5/26/99	DPD	EPA 3550	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<330	ug/Kg	1.0	330	330
2-METHYLNAPHTHALENE	<330	ug/Kg	1.0	330	330
ACENAPHTHYLENE	<330	ug/Kg	1.0	330	330
ACENAPHTHENE	<330	ug/Kg	1.0	330	330
FLUORENE	<330	ug/Kg	1.0	330	330
PHENANTHRENE	<330	ug/Kg	1.0	330	330
ANTHRACENE	<330	ug/Kg	1.0	330	330
FLUORANTHENE	<330	ug/Kg	1.0	330	330
PYRENE	<330	ug/Kg	1.0	330	330
BENZO[A]ANTHRACENE	<330	ug/Kg	1.0	330	330
CHRYSENE	<330	ug/Kg	1.0	330	330
BENZO[B]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[K]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[A]PYRENE	<330	ug/Kg	1.0	330	330
INDENO[1,2,3-CD]PYRENE	<330	ug/Kg	1.0	330	330
DIBENZ[A,H]ANTHRACENE	<330	ug/Kg	1.0	330	330
BENZO[G,H,I]PERYLENE	<330	ug/Kg	1.0	330	330
NITROBENZENE-D5	76	%	1.0		
2-FLUOROBIPHENYL	80	%	1.0		
TERPHENYL-D14	105	%	1.0		

Report Notes:

Katahdin Analytical Services
8270 LCS Recovery Sheet

Lab File: X1987

Sample ID: LCS;052699

Date Run: 6/28/99

Analyst: SW

Time Injected 12:42:00 PM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	1667	1330	80	60-140
ACENAPHTHENE	1667	1360	82	60-140
ACENAPHTHYLENE	1667	1360	81	60-140
ANTHRACENE	1667	1550	93	60-140
BENZO[A]ANTHRACENE	1667	1360	82	60-140
BENZO[A]PYRENE	1667	1480	89	60-140
BENZO[B]FLUORANTHENE	1667	1510	90	60-140
BENZO[G,H,I]PERYLENE	1667	1620	97	60-140
BENZO[K]FLUORANTHENE	1667	1620	98	60-140
CHRYSENE	1667	1430	86	60-140
DIBENZ[A,H]ANTHRACENE	1667	1480	88	60-140
FLUORANTHENE	1667	1460	88	60-140
FLUORENE	1667	1430	86	60-140
INDENO[1,2,3-CD]PYRENE	1667	1660	100	60-140
NAPHTHALENE	1667	1560	94	60-140
PHENANTHRENE	1667	1560	93	60-140
PYRENE	1667	1570	94	60-140

* Out of Limits

1

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP2474-9	X1997	6/28/99	8:10:00 PM	SW	SL	8270_99
WP2474-9MS	X1998	6/28/99	8:55:00 PM	SW	SL	8270_99
WP2474-9MSD	X1999	6/28/99	9:40:00 PM	SW	SL	8270_99

Compound Name	Native (ug/Kg)	MS Spk Amount (ug/Kg)	MSD Spk Amount (ug/Kg)	MS Result (ug/Kg)	MSD Result (ug/Kg)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
CHRYSENE	0	2250	2250	2060	1880	92	84	60-140	9.1	50
ACENAPHTHENE	0	2250	2250	2240	2040	99	91	60-140	9.3	50
ACENAPHTHYLENE	0	2250	2250	2380	2160	106	96	60-140	9.7	50
ANTHRACENE	0	2250	2250	2420	2090	108	93	60-140	15	50
BENZO[A]ANTHRACENE	0	2250	2250	2120	1830	94	82	60-140	15	50
BENZO[A]PYRENE	0	2250	2250	2250	1990	100	89	60-140	12	50
BENZO[B]FLUORANTHENE	0	2250	2250	2490	2100	111	93	60-140	17	50
2-METHYLNAPHTHALENE	0	2250	2250	2390	2030	106	90	60-140	16	50
BENZO[K]FLUORANTHENE	0	2250	2250	2560	2280	114	102	60-140	12	50
PYRENE	0	2250	2250	3160	2810	140	125	60-140	12	50
DIBENZ[A,H]ANTHRACENE	0	2250	2250	2140	1970	95	88	60-140	8.3	50
FLUORANTHENE	0	2250	2250	1870	1830	83	81	60-140	2.2	50
FLUORENE	0	2250	2250	2470	2260	110	100	60-140	8.9	50
INDENO[1,2,3-CD]PYRENE	0	2250	2250	1210	1080	*54	*48	60-140	11	50
NAPHTHALENE	0	2250	2250	2040	1810	91	80	60-140	12	50
PHENANTHRENE	0	2250	2250	2420	2160	108	96	60-140	11	50
BENZO[G,H,I]PERYLENE	0	2250	2250	2170	1960	96	87	60-140	10	50

2A
 WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Katahdin Analytical Services

SDG No.: WP2474

Matrix: WATER

Client Sample ID	Lab Sample ID	SMC1 (DFM) #	SMC2 (DCA) #	SMC3 (TOL) #	SMC4 (BFB) #	Total Out
LCSF24A	LCSF24A	104	95	98	97	0
VBLKF24A	VBLKF24A	104	96	100	96	0
LCSF26B	LCSF26B	85	83	86	90	0
VBLKF26B	VBLKF26B	84	84	87	82	0
LCSQ26A	LCSQ26A	102	100	98	100	0
VBLKQ26A	VBLKQ26A	96	92	97	94	0
LCSQ27A	LCSQ27A	98	100	98	95	0
VBLKQ27A	VBLKQ27A	94	91	96	94	0

QC LIMITS

SMC1 (DFM) = DIBROMOFLUOROMETHANE (75-129)
 SMC2 (DCA) = 1,2-DICHLOROETHANE-D4 (65-135)
 SMC3 (TOL) = TOLUENE-D8 (82-120)
 SMC4 (BFB) = P-BROMOFLUOROBENZENE (69-125)

Column to be used to flag recovery value

* Values are outside of QC limits

2A
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Katahdin Analytical Services

SDG No.: WP2474

Matrix: SOIL

Client Sample ID	Lab Sample ID	SMC1 (DFM) #	SMC2 (DCA) #	SMC3 (TOL) #	SMC4 (BFB) #	Total Out
19SLB09-0405D	WP2474-4	98	94	98	94	0
02TL00201 TRIP B	WP2474-14	81	81	87	81	0
VBLKM20B	VBLKM20B	110	124	108	119	0
LCS	LCS	112	126	104	115	0
LCSD	LCSD	105	114	99	107	0
18SLB05-0406	WP2474-1	90	98	81	78	0
18SLB01-0203	WP2474-2	89	93	81	71	0
LCSM24A	LCSM24A	122	126	118	112	0
VBLKM24A	VBLKM24A	114	116	114	116	0
18SLB02-0405	WP2474-3	95	95	87	77	0
LCSM25D	LCSM25D	116	113	117	115	0
VBLKM25D	VBLKM25D	108	108	111	108	0
19SLB09-0405	WP2474-6	24*	32*	8*	4*	4
19SLB06-0506	WP2474-7	102	105	97	91	0
16SLB06-0304	WP2474-9	100	104	84	75	0
16SLB10-0304	WP2474-10	109	108	110	102	0
LCSM26A	LCSM26A	125	122	126	130	0
VBLKM26A	VBLKM26A	117	121	122	136	0
SLB03-0506	WP2474-5	122	119	122	104	0
SLB09-0405RE	WP2474-6RE	62*	86	40*	52*	3
19SLB08-0405	WP2474-8	112	109	107	156*	1
16SLB03-0304	WP2474-11	107	105	113	100	0
19SLB16-0203	WP2474-12	119	116	110	77	0
16SLB04-0304	WP2474-13	31*	37*	14*	27*	4
19SLB08-0405DL	WP2474-8DL	96	94	97	96	0
16SLB03-0304DL	WP2474-11DL	94	91	94	94	0
19SLB16-0203DL	WP2474-12DL	93	88	92	98	0
16SLB04-0304DL	WP2474-13DL	98	93	90	96	0

QC LIMITS

SMC1 (DFM) = DIBROMOFLUOROMETHANE (69-148)
 SMC2 (DCA) = 1,2-DICHLOROETHANE-D4 (66-149)
 SMC3 (TOL) = TOLUENE-D8 (68-147)
 SMC4 (BFB) = P-BROMOFLUOROBENZENE (64-152)

Column to be used to flag recovery value

* Values are outside of QC limits



**KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS**

Client: Arnold Lamb
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKM25D
SDG: WP2474
Report Date: 6/14/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 5/25/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKM25D	SL	-	-	5/25/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	108	%	1.0		
1,2-DICHLOROETHANE-D4	108	%	1.0		
TOLUENE-D8	111	%	1.0		
P-BROMOFLUOROBENZENE	108	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: M0420

Sample ID: LCSM25D

Date Run: 5/25/99

Analyst: JSS

Time Injected 6:25:00 PM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	57.8	116	60-140
BENZENE	50	55.6	111	60-140
ETHYLBENZENE	50	54.7	109	60-140
MTBE	50	55.7	111	60-140
NAPHTHALENE	50	68.5	137	60-140
TOLUENE	50	56.3	113	60-140
TOTAL XYLENES	150	160	107	60-140

* Out of Limits

1



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Arnold Lamb
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKM26A
SDG: WP2474
Report Date: 6/14/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 5/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKM26A	SL	-	-	5/26/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	117	%	1.0		
1,2-DICHLOROETHANE-D4	121	%	1.0		
TOLUENE-D8	122	%	1.0		
P-BROMOFLUOROBENZENE	136	%	1.0		

Report Notes:

CASE NARRATIVE
for
Katahdin Analytical
Former Charleston Naval Complex Site
SDG #95519

June 2, 1999

Laboratory Identification:

General Engineering Laboratories, Inc. (GEL)

Mailing Address:

PO Box 30712
Charleston, SC 29417

Express Mail Delivery and Shipping Address:

2040 Savage Rd
Charleston, SC 29414

Telephone Number:

(843) 769-7391

Summary:

Sample receipt

The samples from the former Charleston Naval Complex site arrived at General Engineering Laboratories, Inc., Charleston, SC on May 14, 1999, for environmental analyses. The sample containers arrived without any visible signs of tampering or breakage. The samples were delivered with chain of custody documentation and signatures.

The following samples were received by the laboratory:

<u>Laboratory Identification</u>	<u>Sample Description</u>
9905519-01	18SLB02-0405
9905519-02	18SLB01-0203
9905519-03	18SLB05-0406
9905519-04	16SLB04-0304
9905519-05	16SLB06-0304

General Narrative:

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are listed in the analytical case narratives.

Internal Chain of Custody:

Custody was maintained for the samples.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, and General Chemistry.

The following are definitions of reporting limits used at General Engineering Laboratories:

DL Detection Limit: The minimum level of an analyte that can be determined (identified not quantified) with 99% confidence. The values are normally achieved by preparing and analyzing seven aliquots of laboratory water spiked 1 to 5 times the estimated MDL, taking the standard deviation and multiplying it against the one-tailed t-statistic at 99%. This computed value is then verified for reasonableness by repeating the study using the concentration found in the initial study, calculating an F-ratio, and computing the final limit. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The detection limit is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is above zero. It answers the question "Is It Present".

QL Quantitation Limit: The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The QL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the QL analyte concentration is selected as the lowest non-zero standard in the calibration curve.

Sample QL's are highly matrix-dependent. Sample specific preparation and dilution factors are applied to these limits when they are reported.

The QL is always \geq DL.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

*Melissa Davis
for Valerie Davis*
Valerie S. Davis
Project Manager

fc:9905519%

**Case Narrative for
KATA
SDG# 95519**

TOTAL PETROLEUM HYDROCARBONS

Analytical Batch Number: 150617

Analytical Method: SW846 9071A

<u>Laboratory Number</u>	<u>Sample Description</u>
9905519-01	18SLB02-0405
9905519-02	18SLB01-0203
9905519-03	18SLB05-0406
9905519-04	16SLB04-0304
QC617492	Blank
QC617493	Laboratory Control Sample
QC617494	Matrix Spike of 9905519-01
QC617495	Duplicate of 9905519-01

Instrument Calibration:

The balance was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spike was run on the following Sample Number.

9905519-01

All analyte recoveries in the matrix spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

TOTAL ORGANIC CARBON

Analytical Batch Number: 150121

Analytical Method: SW846 9060 Modified

<u>Laboratory Number</u>	<u>Sample Description</u>
9905519-05	16SLB06-0304
QC615647	Blank
QC615648	Duplicate of 9905519-05
QC615649	Post Spike of 9905519-05
QC615650	Laboratory Control Sample

Sample Preparation:

All samples were prepared in accordance with accepted procedures. The method quoted is only for liquid samples. It is modified to handle soils analysis.

Instrument Calibration:

The instrument used was a Dohrmann DC-190 high temperature combustion TOC analyzer with a Dohrmann solids boat sampler. The instrument was properly calibrated on the day of the analysis.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The post spike was run on the following Sample Number.

9905519-05

All analyte recoveries in the post spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

Additional Comments:

TOC solid samples are tested to determine if inorganic carbon such as carbonates and bicarbonates are present in the sample. If so, the sample is acidified to remove the inorganic carbon, then dried in a low temperature oven. Because the sample portion is dried before analysis, the percent moisture correction is not applied to the TOC solid result.

The preceding narratives have been reviewed by: J. A. S. Date: 06/09/99

FEDERAL SAMPLE RECEIPT REVIEW

Client KATA

Received by [Signature]

Date 5/14/99

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?	—		Soi2
9. Were samples preserved properly? If no, list samples & tests	—		Soi2
10. Shipping container temperature checked?	✓		
11. Was shipping container temperature within specifications (±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. ARCO# IF REQUIRED	—		
15. SDG# IF REQUIRED	✓		95319

REVIEW [Signature]

DATE 5/14/99

SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

Client: Katahdin Analytical
 340 County Road
 Westbrook, Maine 04092
 Contact: Ms. Andrea Colby
 Project Description: Former Naval Complex

cc: KATA00199

Report Date: June 04, 1999

Page 1 of 1

Sample ID : 16SLB04-0304
 Lab ID : 9905519-04
 Matrix : Soil
 Date Collected : 05/14/99
 Date Received : 05/14/99
 Priority : Routine
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		238	62.5	125	mg/kg	1.0	AAT	06/04/99	0830	150617	1
Evaporative Loss @ 105 C		20.0	1.00	1.00	wt%	1.0	GJ	05/18/99	1600	149376	2

M = Method	Method-Description
M 1	SW846 9071A
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.

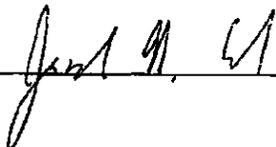
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

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.

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.

Reviewed By 

Client: Katahdin Analytical
 340 County Road
 Westbrook, Maine 04092
 Contact: Ms. Andrea Colby
 Project Description: Former Naval Complex

cc: KATA00199

Report Date: June 04, 1999

Page 1 of 1

Sample ID : 16SLB06-0304
 Lab ID : 9905519-05
 Matrix : Soil
 Date Collected : 05/14/99
 Date Received : 05/14/99
 Priority : Routine
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Evaporative Loss @ 105 C		18.0	1.00	1.00	wt%	1.0	GJ	05/18/99	1600	149376	1
Total Organic Carbon		1870	43.1	100	mg/kg	1.0	LS	05/28/99	1108	150121	2

M = Method	Method-Description
M 1	EPA 3550
M 2	SW846 9060 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).

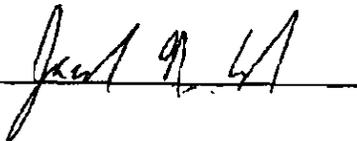
U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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

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



QC Summary Report

Project Description: Former Naval Complex

cc: KATA00199

Lab. Sample ID: 9905519%

Report Date: June 04, 1999

Page 1 of 1

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
General Chemistry													
QC617492	BLANK	150617											
Total Rec. Petro. Hydrocarbons						10.0	mg/kg				AAT	06/04/99	0830
QC617495	9905519-01DUP	150617											
Total Rec. Petro. Hydrocarbons				161		136	mg/kg	16.7					
QC617493	LCS	150617											
Total Rec. Petro. Hydrocarbons			20000			14000	mg/kg		70.0	(70.0 - 116.)			
QC617494	9905519-01MS	150617											
Total Rec. Petro. Hydrocarbons			25900	161		19400	mg/kg		74.3	(70.0 - 130.)			
QC612568	BLANK	149376											
Evaporative Loss @ 105 C						0.00	wt%				GJ	05/18/99	1600
QC612567	9905519-01DUP	149376											
Evaporative Loss @ 105 C				19.0		17.0	wt%	11.1					
QC615647	BLANK	150121											
Total Organic Carbon						1.62	mg/kg				LS	05/28/99	1055
QC615648	9905519-05DUP	150121											
Total Organic Carbon				1870		1890	mg/kg	0.905			LS	05/28/99	1120
QC615650	LCS	150121											
Total Organic Carbon			3750			4340	mg/kg		116	(88.0 - 130.)	LS	05/28/99	1051
QC615649	9905519-05PS	150121											
Total Organic Carbon			10000	1870		11700	mg/kg		98.0	(73.0 - 129.)	LS	05/28/99	1128

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

S. W. COLE ENGINEERING, INC.

R E P O R T O F G R A D A T I O N
ASTM C-117, C-136

Project No. 99008
Date 05/20/1999

Project MISCELLANEOUS
Client KATAHDIN ANALYTICAL
Sample No. 10, TILL, WP2474-15

<u>Sieve Size</u>	<u>Percent Passing</u>	<u>PROJECT Specifications %</u>
1/2 "	100.0	
1/4 "	98.8	
# 4	98.5	
# 10	98.0	
# 20	96.9	
# 40	94.5	
# 60	83.2	
# 100	38.9	
# 200	15.9	

S. W. COLE ENGINEERING, INC.

R E P O R T O F G R A D A T I O N
ASTM C-117, C-136

Project No. 99008
Date 05/20/1999

Project MISCELLANEOUS
Client KATAHDIN ANALYTICAL
Sample No. 11, TILL, WP2474-16

<u>Sieve Size</u>	<u>Percent Passing</u>	<u>PROJECT Specifications %</u>
1/2 "	100.0	
1/4 "	99.4	
# 4	99.4	
# 10	99.2	
# 20	98.6	
# 40	96.8	
# 60	92.0	
# 100	44.5	
# 200	7.5	

APPENDIX E

AQUIFER CHARACTERIZATION GRAPHS

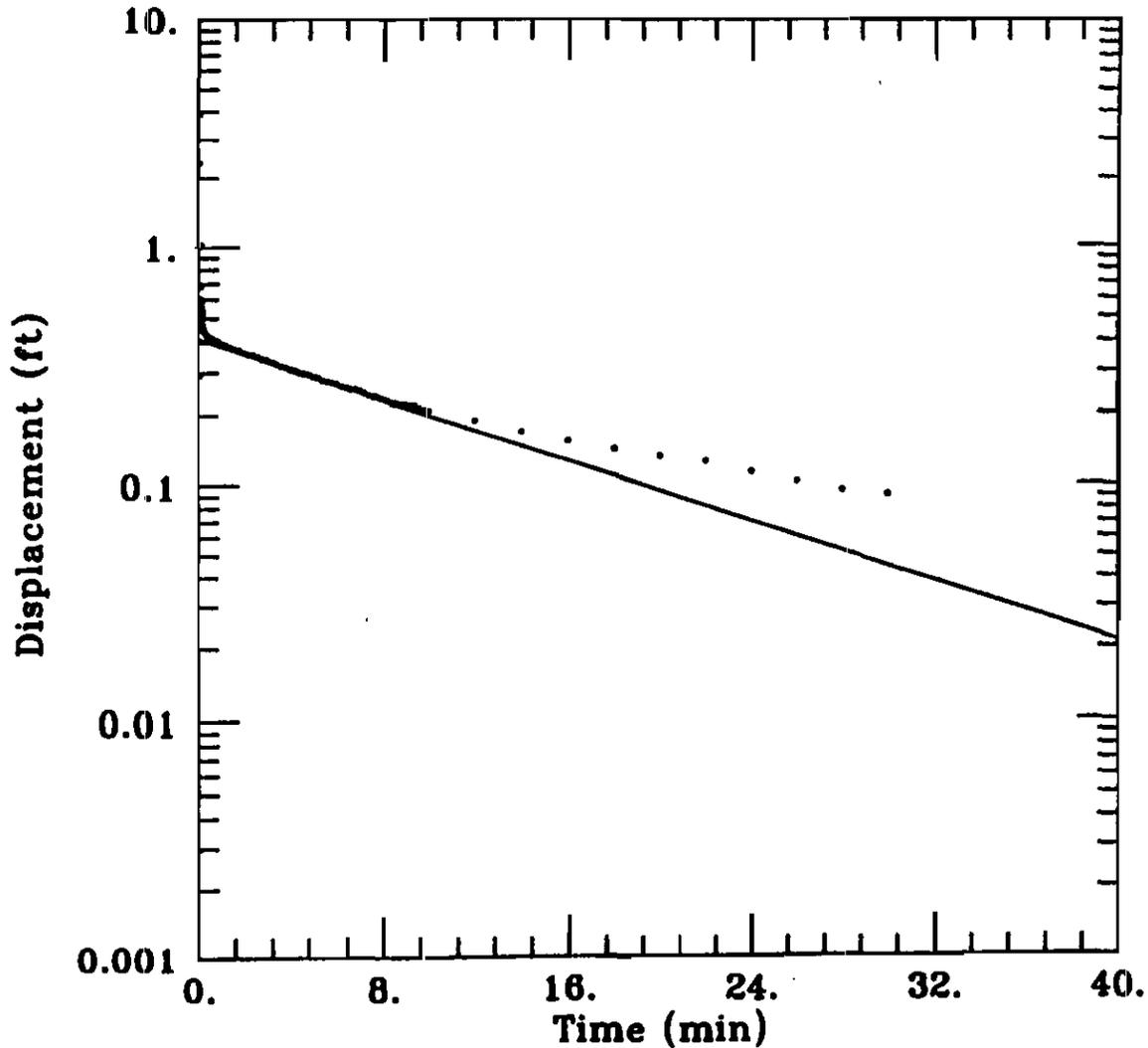
Client: CLEAN

Company: E/A&H

Location: NAVAL BASE CHARLESTON

Project: 2907-08450

FALLING HEAD SLUG TEST NBCG636001



DATA SET:
63601FAL.AQT
04/15/97

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

TEST DATA:
H0 = 1. ft
rc = 0.083 ft
rw = 0.3125 ft
L = 10. ft
b = 10. ft
H = 10. ft

PARAMETER ESTIMATES:
K = 0.0002885 ft/min
y0 = 0.4145 ft

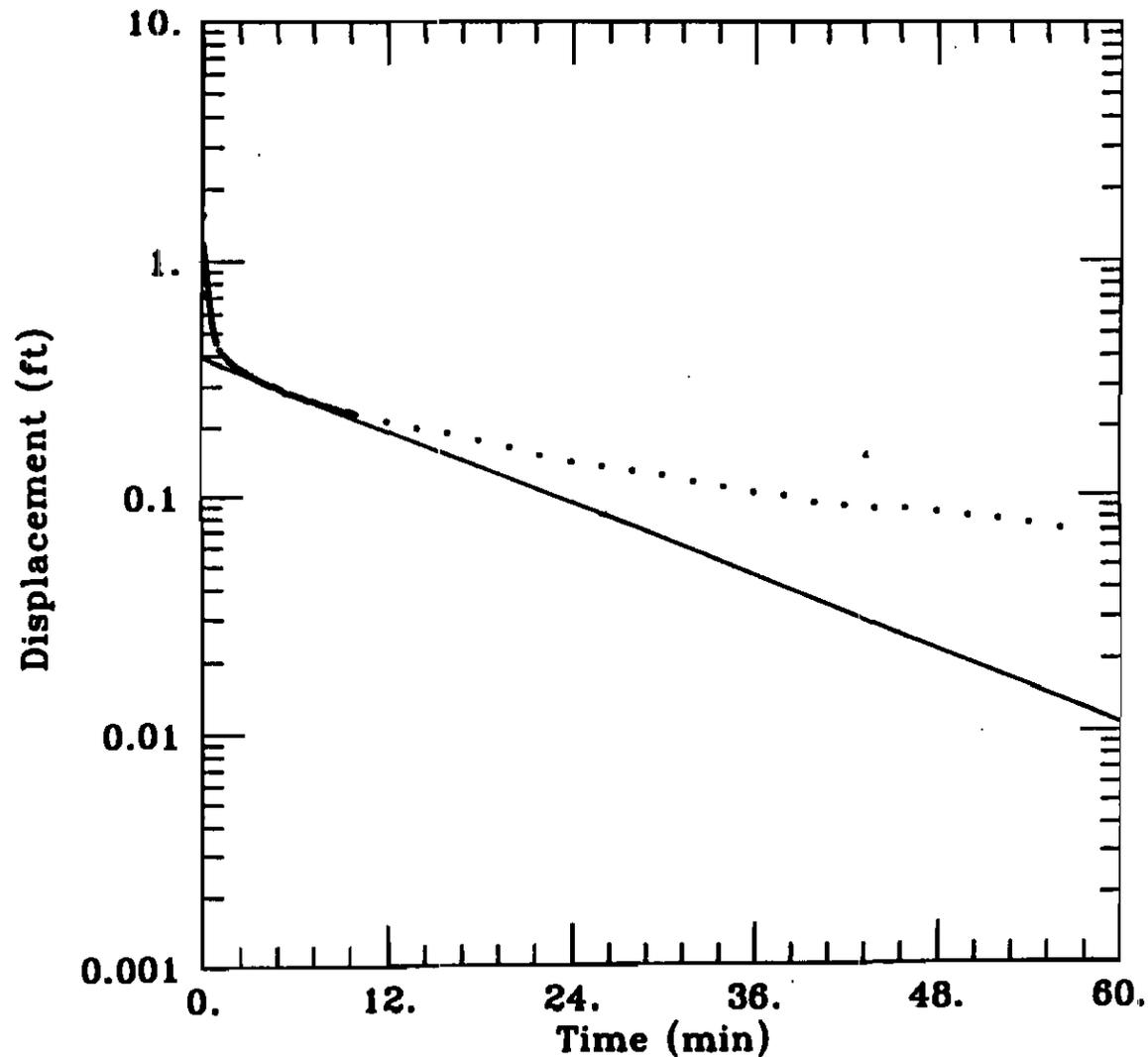
Client: **CLEAN**

Company: **E/A&H**

Location: **NAVAL BASE CHARLESTON**

Project: **2907-08450**

RISING HEAD SLUG TEST NBCG636001



DATA SET:
63601RIS.AQT
04/15/97

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 1997

TEST DATA:
H₀ = 1. ft
r_c = 0.083 ft
r_w = 0.3125 ft
L = 10. ft
b = 10. ft
H = 10. ft

PARAMETER ESTIMATES:
K = 0.0002338 ft/min
y₀ = 0.3951 ft

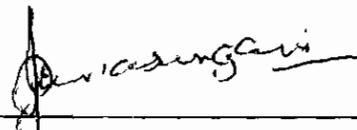
APPENDIX F

RBCA CALCULATIONS

Minimum Construction Worker RBSLs

	Dermal	Incidental Ingestion	Inhalation	Minimum
	RBSL	RBSL	RBSL	RBSL
	mg/L	mg/L	mg/L	mg/L
Benzene	0.85	68.52	0.15	0.15
Toluene	23.98	5677.78	5.19	5.19
Ethylbenzene	6.05	2838.89	14.70	6.05
Xylene	102.33	56777.78	102.12	102.12
Naphthalene	1.63	1135.56	2.63	1.63

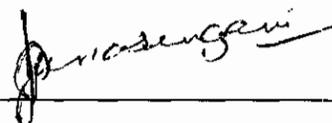
Prepared By: 

Reviewed By: 

Construction Worker Inhalation RBSLs

Chemical	TR (carc)	HI (nonc)	BWadult	AT	Sfi (carc)	RfD (nonc)	IR air	EF	ED	RBSLair	H	RBSLwater
			kg	yr	[mg/kg-day] ⁻¹	[mg/kg-day]	m ³ /day	day/yr	yr	mg/m ³	cm ³ /cm ³	mg/L
Benzene	1.00E-06	NA	70	70	2.90E-02	NA	20	90	1	3.43E-02	2.26E-01	0.152
Toluene	NA	1	70	1	NA	1.10E-01	20	90	1	1.56E+00	3.01E-01	5.187
Ethylbenzene	NA	1	70	1	NA	2.90E-01	20	90	1	4.12E+00	2.80E-01	14.701
Xylenes	NA	1	70	1	NA	2	20	90	1	2.84E+01	2.78E-01	102.118
Naphthalene	NA	1	70	1	NA	3.71E-04	20	90	1	5.27E-03	2.00E-03	2.633

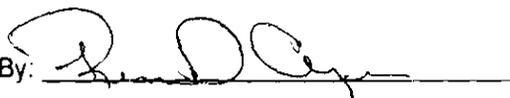
Prepared By: 

Reviewed By: 

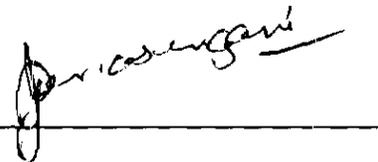
Construction Worker Incidental Ingestion RBSLs

	BW	AT	IR	ED	EF	Target	CSF oral	Rfd oral	RBSL
	kg	day	L/day	yrs	days/yr	Risk or HQ			mg/L
Benzene	70	25550	0.01	1	90	1.00E-06	2.90E-02		6.85E+01
Toluene	70	365	0.01	1	90	1.0	NA	2.00E-01	5677.778
Ethylbenzene	70	365	0.01	1	90	1.0	NA	1.00E-01	2838.889
Xylene	70	365	0.01	1	90	1.0	NA	2.00E+00	56777.78
Naphthalene	70	365	0.01	1	90	1.0	NA	4.00E-02	1135.556

Prepared By:



Reviewed By:



Construction Worker Dermal RBSLs

	Kow	MW	Kp	B	τ_{event}	c	b	t^*	t_{event}	DAevent
			cm/hr	unitless	hr/event			hr	hr/event	
Benzene	199.5262315	78.1	0.11551543	0.392637855	2.87E-01	6.32E-01	6.03E-01	6.90E-01	1	eq 3.3
Toluene	537.0317964	92.1	0.259561335	0.958068292	3.44E-01	1.13E+00	1.31E+00	1.33E+00	1	eq 3.2
Ethylbenzene	1412.537545	106.2	0.569219802	2.256154884	4.13E-01	2.36E+00	4.39E+00	1.70E+00	1	eq 3.2
Xylene*	1584.893192	106.2	0.638675123	2.531447415	4.13E-01	2.63E+00	5.31E+00	1.72E+00	1	eq 3.2
Naphthalene	1995.262315	128.2	0.605452393	2.636638957	5.48E-01	2.73E+00	5.69E+00	2.29E+00	1	eq 3.2

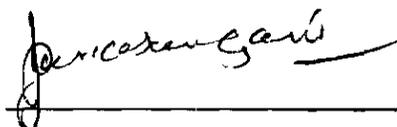
	BW	AT	EV	ED	EF	SA	CSF derm	Rfd derm	Target	RBSL	RBSL
	kg	day	events/day	yrs	days/yr	cm ²	(mg/kg-day) ⁻¹	mg/kg-day	Risk or HQ	mg/L	mg/L
Benzene	70	25550	1	1	90	4500	2.99E-02	NA	1.00E-06		8.52E-01
Toluene	70	365	1	1	90	4500	NA	1.60E-01	1.0	2.40E+01	
Ethylbenzene	70	365	1	1	90	4500	NA	9.70E-02	1.0	6.05E+00	
Xylene*	70	365	1	1	90	4500	NA	1.84E+00	1.0	1.02E+02	
Naphthalene	70	365	1	1	90	4500	NA	3.20E-02	1.0	1.63E+00	

* Kow and MW values for xylene, m-

Prepared By:



Reviewed By:



Construction Worker Inhalation RBSLs

Chemical	Dair cm ² /s	Dwater cm ² /s	H cm ³ /cm ³	θ_{acap} cm ³ /cm ³	θ_{wcap} cm ³ /cm ³	θ_{as} cm ³ /cm ³	θ_{ws} cm ³ /cm ³	θ_{T} cm ³ /cm ³	Deff-cap cm ² /s	Deff-s cm ² /s
Benzene	0.093	1.10E-05	2.20E-01	0.038	0.342	0.33	0.15	0.48	1.36E-05	1.01E-02
Toluene	0.085	9.40E-06	2.60E-01	0.038	0.342	0.33	0.15	0.48	1.13E-05	9.20E-03
Ethylbenzene	0.076	8.50E-06	3.20E-01	0.038	0.342	0.33	0.15	0.48	9.39E-06	8.22E-03
Xylenes	0.072	8.50E-06	2.90E-01	0.038	0.342	0.33	0.15	0.48	9.40E-06	7.79E-03
Naphthalene	0.072	9.40E-06	4.90E-02	0.038	0.342	0.33	0.15	0.48	2.92E-05	7.79E-03

Chemical	hcap cm	hv cm	Deff-ws cm ² /s	Uair cm/sec	δ_{air} cm	Lgw cm	W cm	VFWamb mg/m ³ /mg/L	TR (carc)	HI (nonc)
Benzene	5	117	3.22E-04	225	200	122	1500	1.94E-05	1.00E-06	NA
Toluene	5	117	2.68E-04	225	200	122	1500	1.90E-05	NA	1
Ethylbenzene	5	117	2.23E-04	225	200	122	1500	1.95E-05	NA	1
Xylenes	5	117	2.23E-04	225	200	122	1500	1.77E-05	NA	1
Naphthalene	5	117	6.55E-04	225	200	122	1500	8.77E-06	NA	1

Chemical	BWadult kg	AT yr	Sfi (carc) [mg/kg-day] ⁻¹	RfD (nonc) [mg/kg-day]	IR air m ³ /day	EF day/yr	ED yr	RBSLair mg/m ³	RBSLwater mg/L
Benzene	70	70	2.90E-02	NA	20	90	1	3.43E-02	1769.4
Toluene	70	1	NA	1.14E-01	20	90	1	1.62E+00	8.51E+04
Ethylbenzene	70	1	NA	2.86E-01	20	90	1	4.06E+00	2.08E+05
Xylenes	70	1	NA	NA*	20	90	1	NA*	NA*
Naphthalene	70	1	NA	3.71E-04	20	90	1	5.27E-03	6.00E+02

*No inhalation reference dose is available for xylenes; therefore, no RBSL can be calculated for xylene.

SITE 16, BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 10-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units	Parameter Descriptions:	Units
POE = Point of Exposure		ρ_s = Soil Bulk Density	g/cm ³
SSTL = Site-Specific Target Level	mg/L	f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
SSTL _{SOURCE} = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L	α_x = Longitudinal Dispersivity = $x/10$	m
SSTL _{COMP} = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L	α_y = Transverse Dispersivity = $\alpha_x/3$	m
$X_{POE} = x$ = Distance from Plume Source to POE (along Centerline)	m	α_z = Vertical Dispersivity = $\alpha_x/20$	m
$X_{COMP} = x$ = Distance from POE to Compliance Point (along Centerline)	m	k_{oc} = Organic Carbon Partition Coefficient	cm ³ -H ₂ O/g-C
Y = Source Width (Perpendicular to Flow Direction)	m	k_d = Soil-Water Sorption Coefficient	cm ³ -H ₂ D/g-soil
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m	V = Pore Water Velocity	m/sec
K_s = Saturated Hydraulic Conductivity	m/sec	R_c = Constituent Retardation Factor	
i = Groundwater Gradient	cm/cm	V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s i / R_c)$	m/sec
θ = Porosity in Saturated Zone	cm ³ /cm ³	RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm ³ /cm ³	ρ_s g/cm ³	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm ³ -H ₂ O/g-C	k_d cm ³ -H ₂ D/g-soil	V m/sec	R_c	C_{POE}/C_{SOURCE}
Benzene	5	1.52402	15	2	3.15E+08	1.31E-06	0.0033	0.53	1.25	0.15	0.05	0.01	1.87E-03	81	0.15147	8.13E-09	1.357	6.845E-01
Naphthalene	1.05	0.32004	15	2	3.15E+08	1.31E-06	0.0033	0.53	1.25	0.03	0.01	0.00	1.87E-03	1543	2.88541	8.13E-09	7.805	5.229E-01

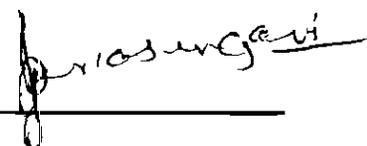
Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. Risk-Based Corrective Action for Petroleum Releases, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

Constituent	C_{SOURCE} mg/L	C_x mg/L
Benzene	0.008	0.005
Naphthalene	0.019	0.010

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

Prepared By: 

Reviewed By: 

SITE 16, BUILDING 224
 ZONE G, CHARLESTON NAVAL COMPLEX
 NORTH CHARLESTON, SOUTH CAROLINA

Predicted Migration 20

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 20-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units	Parameter Descriptions:	Units
POE = Point of Exposure		ρ_s = Soil Bulk Density	g/cm ³
SSTL = Site-Specific Target Level	mg/L	f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
SSTL _{SOURCE} = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L	α_x = Longitudinal Dispersivity = $x/10$	m
SSTL _{COMP} = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L	α_y = Transverse Dispersivity = $\alpha_x/3$	m
X _{POE} = x = Distance from Plume Source to POE (along Centerline)	m	α_z = Vertical Dispersivity = $\alpha_x/20$	m
X _{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m	k_{oc} = Organic Carbon Partition Coefficient	cm ³ -H ₂ O/g-C
Y = Source Width (Perpendicular to Flow Direction)	m	k_d = Soil-Water Sorption Coefficient	cm ³ -H ₂ O/g-soil
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m	V = Pore Water Velocity	m/sec
K _s = Saturated Hydraulic Conductivity	m/sec	R _c = Constituent Retardation Factor	
I = Groundwater Gradient	cm/cm	V/R _c = Maximum Transport Rate of Dissolved Constituent = (K _s I)/(θR _c)	m/sec
θ = Porosity in Saturated Zone	cm ³ /cm ³	RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X _{POE} ft	X _{POE} m	Y m	Z m	t sec	K _s m/sec	I m/m	θ m ³ /cm ³	ρ _s g/cm ³	α _x m	α _y m	α _z m	f _{oc} g-C/g-soil	k _{oc} cm ³ -H ₂ O/g-C	k _d cm ³ -H ₂ O/g-soil	V m/sec	R _c	C _{POE} /C _{SOURCE}
Benzene	10	3.04804	15	2	6.31E+08	1.31E-06	0.0033	0.53	1.25	0.30	0.10	0.02	1.87E-03	81	0.15147	8.13E-09	1.357	6.845E-01
Naphthalene	2.1	0.64009	15	2	6.31E+08	1.31E-06	0.0033	0.53	1.25	0.08	0.02	0.00	1.87E-03	1543	2.88541	8.13E-09	7.805	5.229E-01

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

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

Constituent	C _{SOURCE} mg/L	C _x mg/L
Benzene	0.008	0.005
Naphthalene	0.019	0.010

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

Prepared By: Ken D. [Signature]

Reviewed By: [Signature]

APPENDIX G

SOIL LEACHABILITY MODEL

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA

Department of Health and Environmental Control (DHEC)

Site Data

SITE ID #	1251	COUNTY	Charleston
FACILITY NAME	Site 16, Building 224		
STREET ADDRESS	Charleston Naval Complex, North Charleston, SC		

Soil Risk Evaluation Data

			<u>Figure</u>
TPH	238 mg/kg		
Soil % SAND (Estimated)	91.6 %		
Soil % CLAY (Estimated)	7.5 %		
Worst Case	Benzene	mg/kg	Cs
Soil Analyses	Toluene	mg/kg	Cs
	Ethylbenzene	mg/kg	Cs
	Xylenes	mg/kg	Cs
	Naphthalene	52.6 mg/kg	Cs
	MTBE	mg/kg	Cs
Natural Organic Carbon Content	1870 mg/kg		foc
Average Annual Recharge	25	cm	Hw
Distance from highest Soil Impact to water table	60	cm	L
Bulk Density of Soil	1.7	g/cc	Bd 1
Wetting Front Suction	-10	cm	Hf 2
Soil Hydraulic Conductivity	5.60E-03	cm/sec	Kf 3
Porosity	0.47	decimal %	Φ 4
Residual Water Content	0.04	decimal %	Wr 5

List possible human exposure pathways from surface soil.

Soil leaching to groundwater - utility trench

Bold indicates site specific data

IN-SITU SOIL RISK EVALUATION

SOIL LEACHABILITY MODEL FOR NAPHTHALENE
RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES

SITE INFORMATION:

Site: **Site 16, Building 224**
 Location: **Charleston Naval Complex, North Charleston, SC**

REFERENCES:

- (1) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure C3.
- (2) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 2.
- (3) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Input Parameters.
- (4) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 1.
- (5) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 2.
- (6) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 3.
- (7) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 4.
- (8) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 5.

INPUT:

	NAPHTHALENE
COC Chemical of Concern	
Bd Soil Bulk Density (1)	g/cm3 1.7
Crsbl Risk Based Screening Level	mg/L 1.63
Cs Concentration of COC in soil	mg/kg 52.6
DAF Dilution/Attenuation Factor (2)	unitless 8
foc Organic Carbon Content in Soil (3)	mg/kg 1870
H' Henry's Law Constant (4)	unitless 0.002
Hf Wetting front suction head (always negative) (5)	cm -10
Hw Average Annual Recharge (3)	cm 25
Kf Soil Hydraulic Conductivity (6)	cm/s 0.0056
Koc Soil/Water Partioning Coefficient (2)	ml/g 1543
L Depth between soil sample with greatest COC concentration to groundwater.	cm 60
ø Porosity (7)	unitless 0.47
t1/2 Biodegradation "half life" (2)	days 48
TPH Total Petroleum Hydrocarbons, EPA Method 3550	mg/kg 238
Wr Residual Water Content (8)	volume fraction 0.04

CALCULATIONS:

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

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

$$fcs = (foc + TPH/1.724) * 1E-6 = \underline{0.0020} \text{ decimal \%}$$

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

$$Cw = Cs * ((Wr * 1g/cc + Bd) / ((Bd * Koc * fcs) + Wr + ((\theta - Wr) * H))) = \underline{0.67} \text{ mg/l}$$

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

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

$$f = \theta - Wr = \underline{0.43} \text{ decimal \%}$$

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 et site).

$$t = (L/Kf) * (L - (Hw - Hf)) * (\ln(Hw + ((L - Hf) / (Hw - Hf)))) = \underline{1,924} \text{ seconds}$$

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

$$Vw = (L/30.48cm/ft) / (t/31,500,000sec/year) = \underline{32235} \text{ ft/year}$$

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.

$$Kd = Koc * foc * 1E-6 = \underline{2.88541} \text{ ml/g}$$

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

$$Vc = Vw * (1 + ((Bd * Kd) / \theta)) = \underline{2,819} \text{ ft/year}$$

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

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

$$T_c = 365 \text{ day/yr} * ((L/30.48 \text{ cm/ft})/V_c) = \underline{\underline{0.25}} \text{ days}$$

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

$$C_p = 10^{(\log(C_{rsbl}) + ((T_c/2.3) * (0.693/t_{1/2})))} = \underline{\underline{1.64}} \text{ mg/l}$$

COC concentration in soil pore water (Cp) is greater than Crsbl, therefore the SSTL must be calculated.

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

$$C_{astl} \text{ for APHTHALENE in soil} = C_p * DAF * (((8d * K_{oc} * f_{cs}) + W_r + (F * H''')) / (W_r * 1 \text{ g/cc} + B_d)) = \underline{\underline{39.927674}} \text{ mg/kg}$$

PREPARED BY: _____

Date

CHECKED BY: _____

Date

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 1251
FACILITY NAME Site 16, Building 224

Instructions

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

Data

List Constituent: <u>NAPHTHALENE</u> (BTEX, Napth.)				Table
Bioremediation "half-life"	<u>48</u>	days	t 1/2	1
Soil/water partitioning coefficient	<u>1543</u>	ml/g	K oc	1

Results

				Equation Set	Step
Total Organic Carbon Content	<u>0.0020</u>	decimal %	f cs	I	1
Leachate Concentration	<u>0.674</u>	mg/l	C w	I	2
Air Filled Porosity	<u>0.43</u>	decimal %	f	II	1
Infiltration Rate Time	<u>1,924</u>	seconds	t	II	2
Velocity of Water	<u>32,235</u>	ft/year	V w	II	3
Soil/Water Distribution Coefficient	<u>2.89</u>	ml/g	K d	III	1
Contaminant Percolation Rate	<u>2,819</u>	ft/year	V c	III	2
Time to Reach Groundwater	<u>0</u>	days	T c	IV	1
Concentration reaching Groundwater	<u>1.64</u>	mg/l	C p	IV	2
Site Specific Target Level	<u>40</u>	mg/kg	C ssti	V	

Conclusions

Does concentration of chemical of concern in soil exceed SSTL? YES

Risk of Human Exposure due to contaminated soil.

X YES NO

IN-SITU SOIL RISK EVALUATION

S. W. COLE ENGINEERING, INC.

R E P O R T O F G R A D A T I O N
ASTM C-117, C-136

Project No. 99008
Date 05/20/1999

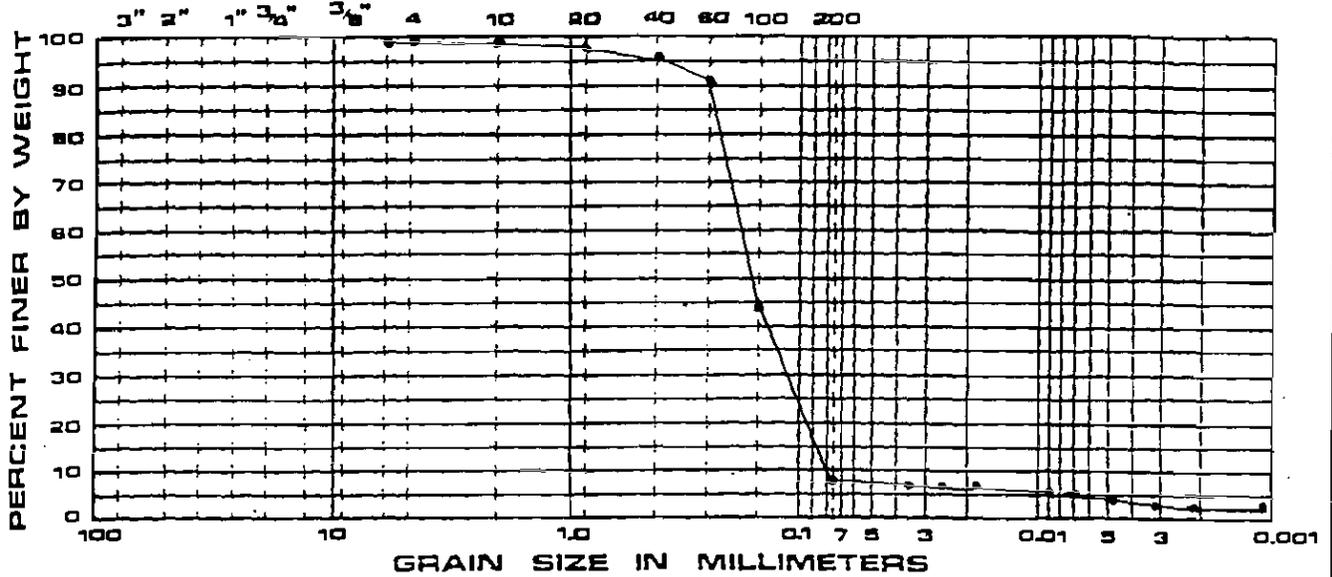
Project MISCELLANEOUS
Client KATAHDIN ANALYTICAL
Sample No. 11, TILL, WP2474-16

<u>Sieve Size</u>	<u>Percent Passing</u>	<u>PROJECT Specifications %</u>
1/2 "	100.0	
1/4 "	99.4	
# 4	99.4	
# 10	99.2	
# 20	98.6	
# 40	96.8	
# 60	92.0	
# 100	44.5	
# 200	7.5	

GRAIN SIZE ANALYSIS

COBBLE	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COA.	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE NO.

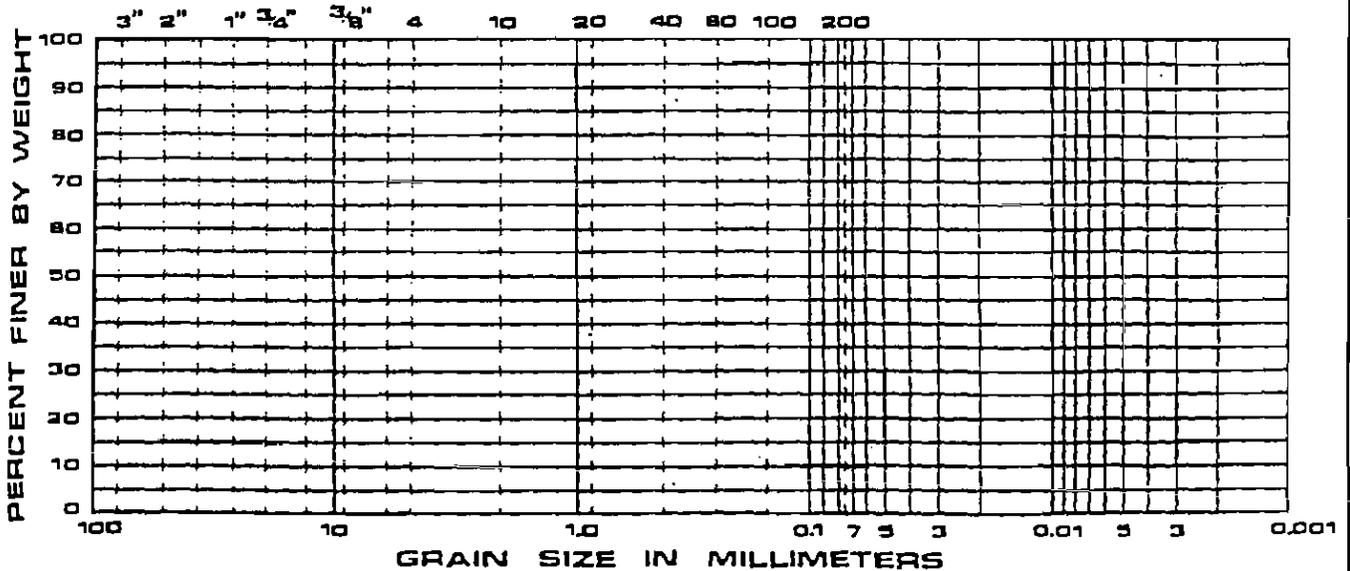


PLOT	SOURCE	SAMP.	DEPTH	CLASSIFICATION	W
•	WR 247416	11			

GRAIN SIZE ANALYSIS

COBBLE	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COA.	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE NO.



PLOT	SOURCE	SAMP.	DEPTH	CLASSIFICATION	W