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SITE ASSESSMENT PLAN DATED 09 FEBRUARY 1999 FOR ZONE G SITE 17 BUILDING  
B42 WITH SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL  
CONTROL REVIEW LETTER CNC CHARLESTON SC  
02/24/1999  
TETRA TECH INC



24 February 1999

2600 Bull Street  
Columbia, SC 29201-1708

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Rodney L. Grandy

Department of the Navy  
Southern Division NFEC  
P.O. Box 190010  
North Charleston, SC 29419-9010  
Attention: Mr. Gabriel Magwood

Re: Site Assessment Plan dated 9 February 1999  
Zone G/Site 17-Building B42 (Site Identification # 17780)  
Charleston Naval Complex/Charleston Naval Base  
Charleston, SC  
Charleston County

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the SAP (site assessment plan) provides for additional investigative endeavors to determine the extent and severity of soil and groundwater contamination, if any, associated with a suspected release at the subject site. It is recognized that the initial tasks (i.e., soil borings, piezometers, etc.) are generically designed to allow for field modifications/adjustments, as necessary. Based on the foregoing review, the proposal to perform soil borings, piezometer installation (Phase I) and monitoring well installation (Phase II) and appropriate sampling is approved for implementation. Permanent monitoring well installation (Phase II), with the exception(s) noted below, will be conducted after appropriate consultation with the Department concerning Phase I analytical results.

The facility may use best professional judgement to install additional temporary monitoring points to define the extent and severity of free phase petroleum product and/or significant dissolved phase contamination if identified during Phase I field activities. Temporary monitoring wells may be converted to permanent wells at the time of installation in the presence of free phase petroleum product, as appropriate.

Please find enclosed monitoring well approval # 0391 for the proposed piezometers, soil borings and monitoring wells. Abandonment of all intrusive sampling points will be in accordance with the technical specifications and descriptions provided and/or referenced in the SAP or as approved by the Department.

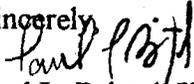
Please be reminded that the Department retains the authority to request additional assessments and/or remedial endeavors, as appropriate, if future conditions or information warrant and are

Charleston Naval Complex/Charleston Naval Base  
24 February 1999  
page 2

deemed necessary.

Should you have any questions please contact me at (803) 898-3559.

Sincerely,



Paul L. Bristol, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water

enc.: Monitoring Well Approval # 0391  
cc: Trident District EQC



Date of Issue: 24 February 1999  
Approval No: 0391

2600 Bull Street  
Columbia, SC 29201-1708

### Monitoring Well Installation Approval

COMMISSIONER:  
Douglas E. Bryant

Approval is hereby granted to: Charleston Naval Complex/Charleston Naval Base  
(on behalf of): Zone G/Site 17-Building B42  
Site ID#: 17780  
County: Charleston

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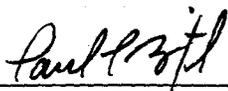
Rodney L. Grandy

This approval is for the construction of DPT (direct push technology) piezometers and monitoring wells (number to be field determined) in accordance with the construction plans and technical specifications submitted to the Department on 9 February 1999. The piezometers and monitoring wells are to be constructed within the surficial aquifer for the intended purpose of monitoring groundwater quality and/or water level(s) at the referenced facility. Approval is provided with the following conditions:

1. The surveyed elevations, boring and/or geologist logs and actual (as built) construction details for each well be submitted to within thirty (30) days of completion (of last well(s) installed).  
(to be submitted with Assessment Report)
2. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.
3. A minimum of forty-eight (48) hours prior to initiation of drilling activities, please provide notice to Trident District EQC Office (843-740-1590).
4. Please provide groundwater quality analytical data (chemical analyses and/or water level(s)) and associated measurements (i.e., field measurements) to Paul L. Bristol within thirty (30) days of receipt from laboratory.  
(to be submitted with Assessment Report)
5. Monitoring wells shall be installed by a well driller certified by the State of South Carolina.
6. Each well shall be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well I.D.#, date of construction, static water level, and driller name and state certification number.  
(for permanent wells, only)

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Regulations R.61-71.

Approved by:

  
\_\_\_\_\_  
Paul L. Bristol, P.G.  
Groundwater Quality Section  
Bureau of Water

cc: Trident District EQC



**TETRA TECH NUS, INC.**

1311 Executive Center Drive, Ellis Building, Suite 220 Tallahassee, FL 32031  
(850) 656-5458 ■ FAX (850) 656-7403 ■ www.tetrattech.com

Li 2.24.99  
Lo 2.24.99

TTNUS/TAL-99-008/0124/3.2

9 February, 1999

Project Number 0124

Mr. Paul Bristol  
South Carolina Department of Health and Environmental Control  
Groundwater Quality Section  
Bureau of Water  
2600 Bull Street  
Columbia, South Carolina 29201-1708

Reference: Clean Contract No. N62467-94-D0888  
Contract Task Order No. 0088

Subject: Site Assessment Plan for  
Charleston Naval Complex - Zone G  
Charleston, South Carolina

Dear Mr. Bristol:

On behalf of the Department of the Navy, Southern Division, Naval Facilities Engineering Command, Tetra Tech NUS, Inc. is pleased to submit for your review and approval, the Site Assessment Plan for the referenced zone at the Charleston Naval Complex.

If you have any questions regarding this plan or require further information, please contact me at (850) 656-5458.

Very truly yours,

Paul E. Calligan, P.G.  
Task Order Manager

/pc

Enclosures (1)

- c: Ms. D. Evans-Ripley, SOUTHDIV (w/o enclosure)
- Mr. Gabriel Magwood, SOUTHDIV
- Ms. D Wroblewski, TtNUS (w/o enclosure)
- Mr. A. Kendrick, TtNUS
- file



3 April 2000

2600 Bull Street  
Columbia, SC 29201-1708

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Larry R. Chewning, Jr., DMD

Department of the Navy  
Southern Division NFEC  
P.O. Box 190010  
North Charleston, SC 29419-9010  
Attention: Mr. Gabriel Magwood

Re: Final Assessment Report dated 03 March 2000  
Zone G/Site 17-Building B42 (Site Identification # 17780)  
Charleston Naval Complex/Charleston Naval Base  
Charleston, SC  
Charleston County

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides a narrative and summary of previous assessment activities and analytical results from additional sampling conducted to establish the environmental fate of suspected contamination at the subject property. Analytical results provided indicate that concentrations of PAH and VOC compound(s) were not detected above reported method detection limits in soil and groundwater samples (fixed base laboratory analysis) obtained at the subject site. This information and data were then utilized in evidential discussion(s) for consideration of "no further action" for Building B42 at this time.

With consideration to the above, the author does not concur with the recommendation as presented. Although soil analytical data from chosen sampling depths do not indicate CoC's (constituents of concern), narrative notes on soil boring logs clearly indicate the probable presence of fuel petroleum hydrocarbon compounds in the subsurface at depths which were not sampled. Further, although CNC17-B03 detected naphthalene (mobile laboratory-groundwater) no monitoring well was installed at this location. The author recommends another sampling event encompassing monitor wells CNC17-MW06D, CNC17-MW01, CNC17-MW02, CNC17-MW05. Comments and recommendations concerning need for additional assessments/corrective actions this site will be forwarded for your review upon submittal of the requested data. Please submit a schedule for completion of the requested sampling event to my attention at your earliest convenience. Should you have any questions please contact me at (803) 898-3559.

Charleston Naval Complex/Charleston Naval Base

3 April 2000

page 2

Sincerely,



Paul L. Bristol, Hydrogeologist

Groundwater Quality Section

Bureau of Water

cc: Trident District EQC

Li 3-20-00  
Lo 4.3-00  
Rev.1  
03/02/00

**RAPID ASSESSMENT REPORT  
FOR  
SITE 17, BUILDING B42**

**ZONE G, CHARLESTON NAVAL COMPLEX  
NORTH CHARLESTON, SOUTH CAROLINA**

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

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

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

**RECEIVED**

MAR 6 2000

Water Monitoring, Assessment &  
Protection Division

**CONTRACT NUMBER N62467-94-D-0888  
CONTRACT TASK ORDER 0088**

**MARCH 2000**

PREPARED UNDER THE SUPERVISION OF:

*Gerald Walker for*

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

APPROVED FOR SUBMITTAL BY:

*Debra Wroblewski*

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

### 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* 1/27/00

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

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## EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment (RA) for Site 17 which includes an underground storage tank (UST) system for Building B42 at Charleston Naval Complex (CNC) Zone G, in North Charleston, South Carolina. The UST heating fuel oil for the building's boiler. The RA was performed under the direction of the South Carolina Department of Health and Environmental Control's (SCDHEC's) Rapid Assessment Plan and approval letter dated November 4, 1998.

### **TtNUS performed the following actions during the RA:**

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate public and private potable wells, to locate utilities line areas, to locate nearby surface water bodies, and to determine surface hydrology and drainage;
- Reviewed the previously prepared Underground Storage Tank Assessment Report for UST B42 to determine boring locations and monitoring well placements;
- Conducted site survey to identify utilities and to construct a site plan;
- Performed direct push investigation, collected soil and groundwater samples for field screening of total petroleum hydrocarbons using an organic vapor analyzer;
- Collected groundwater samples from direct push borings for mobile lab screening analysis for benzene, toluene, ethyl benzene, total xylenes (BTEX), and diesel range organics;
- Installed two temporary piezometers;
- Installed five shallow permanent monitoring wells to approximately 15 feet below land surface (bls) and one vertical delineation well to approximately 27 feet bls;
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis of analyzed for BTEX, methyl tert-butyl ether (MTBE), and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260 and 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 20, 1999. Free product was not detected in any of the site piezometers or monitoring wells. One groundwater sampling event was conducted on July 20 to 21, 1999. No dissolved chemicals of concern (CoCs) were detected in any well sampled.

Seven soil samples were collected on May 17, 1999, and analyzed for BTEX and PAHs by a fix-based laboratory. Soil concentrations were reported below SCDHEC's Risk Based Screening Levels for clay-rich soils.

Free product was not present in any piezometers or monitoring wells and no CoCs were detected in groundwater samples. A Tier 2 Risk Evaluation was not required according to SCDHEC guidelines.

**Recommendation**

No dissolved hydrocarbon concentrations were detected at the site and soil concentrations were reported below SCDHEC's Risk Based Screening Levels for clay-rich soils. Therefore, no corrective actions are required according to SCDHEC guidelines.

## 1.0 INTRODUCTION

Site 17 is a closed underground storage tank (UST) system which provided heating fuel to Building 42 at the Charleston Naval Complex (CNC), Zone G, in North Charleston, South Carolina. This Rapid Assessment (RA) was performed by Tetra Tech NUS, Inc.'s (TtNUS's) Tallahassee, Florida, office, located at 1401 Oven Park Drive, Suite 102, Tallahassee, Florida 32312 (telephone number 850-385-9899) on behalf of the U.S. Navy Southern Division (SOUTHDIV) Naval Facilities Engineering Command (NAVFAC), 2155 Eagle Drive, North Charleston, South Carolina 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 November 4, 1998. Fieldwork necessary to complete the RA was performed May 2 and May 3, 1999; May 17 and May 27, 1999; June 16 and June 17, 1999; June 21 and June 22, 1999; and July 9, July 20, and July 21, 1999, by TtNUS.

### 1.1 SITE DESCRIPTION

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

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

Building 42 was used as a store room/boiler house for the former Green House. It was constructed over 20 years ago on previously undeveloped land. UST B42 was a 560-gallon steel tank which supplied heating fuel oil for the building's boiler. The UST was installed over 20 years ago and was an underground tank placed directly into the soil. The UST was located on the southwest corner of Building 42 (Figure 3).

It is unknown when the UST system was last in operation [Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth, Virginia, Environmental Detachment Charleston (SPORTENDECHASN), 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 combatant ships and submarines of the U.S. Atlantic Fleet [Ensafe/Allan & Hoshall, Inc. (E/A&H), 1996].

In 1993, major cuts in defense spending, as a result in part to the end of the Cold War, caused CNC to be added to the list of bases scheduled for closure under the Defense Base Realignment and Closure Act (BRAC). BRAC regulates the closure and transition of property back to the community (E/A&H, 1996). With the scheduled closure of the base, operations were scaled back and environmental cleanup proceeded to make the property available for redevelopment after closure. As part of the environmental cleanup process, the UST at Building 42 was removed and the tank closure completed on August 15, 1996.

On August 15, 1996, UST B42 was removed, cleaned, and recycled as scrap metal. At the time of the UST removal, no corrosion or pitting were found in the tank. After steam cleaning, one 0.25-inch diameter hole was discovered in the end of the tank. The UST system piping was constructed of steel and copper and ran from the vault to the building, located approximately 6 feet east of the UST. The piping from the UST to the building was removed during the closure (SPORTENDECHASN, 1998).

During the removal of the tank, strong petroleum contamination or odors were identified in excavated soils and in soil samples collected during the tank removal. The Underground Storage Tank Assessment Report for UST B42 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 B42 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) (SPORTENVDETHASN, 1999). The following utility receptors were located:

- Sanitary sewer, water utility: Sanitary sewer lines originate on the south side of Building 42 and extend toward the southwest connecting to a sanitary sewer line which runs northwest to southeast approximately 120 feet southwest of Building 42. A sanitary sewer branches from Building 42 to Building 249 on the western side of Building 42. A third sewer line runs from the south corner of Building 232 extending easterly toward Hobson Avenue. Water mains run northwest to southeast along the east and west sides of Building 42 and along the northwest side of Building 42. These mains are located between 50 and 100 feet from Building 42. The nearest downgradient water main to UST B42 is over 250 feet from Building 42.
- Electrical utility, gas utility: A primary subsurface electrical line is located approximately 70 feet south of UST B42. The subsurface electrical line connects to overhead utility line located south of Building 42. A gas main runs northwest to southeast, approximately 100 feet southwest of Building 42.
- Storm drain utility: A storm drain system is located approximately 70 feet northwest of Building B42. The storm drain system runs from the southwest to the northeast.

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 B42 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 (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

Nine direct push soil borings (CNC17-B01 through CNC17-B09) were advanced at Site 17 under the supervision of a TtNUS geologist between May 2 and May 3, 1999 (Figure 3). These borings ranged in depth from 16 to 28 feet bls and provided soil samples to characterize the subsurface lithology. On June 15, 1999, five shallow monitoring wells (CNC17-MW01 through CNC17-MW05) were installed to a depth of 15 feet bls. Grab soil samples were collected during installation to describe the subsurface lithology. On June 21 and June 22, 1999, a vertical delineation monitoring well (CNC17-MW-6D) was installed to 27 feet bls. During the drilling process, lithologic samples were collected using split-spoon samplers to characterize the subsurface lithology from 15 to 27 feet bls.

Based on lithologic descriptions from the soil borings and monitoring wells, the subsurface soil generally consist of interlayers of brown to gray sandy silt and silty sand near the surface to approximately 6 feet bls. Gray silty sand and clay were encountered in most samples from approximately 6 to 20 feet bls. Interbedded light gray sand, fine to coarse grained with clay stringers was encountered from approximately 21 to 27 feet bls (Figures 4 and 5). Boring logs are presented in Appendix B.

#### 2.1.2 Site Hydrogeology

Five shallow water table monitoring wells, CNC17-M01, CNC17-M02, CNC17-M03, CNC17-M04, and CNC17-M05, and one deep vertical delineation monitoring well, CNC17-M06, were installed as part of this RA investigation (see Figure 3). The shallow monitoring wells were completed to a depth of 15 feet bls. Each shallow monitoring well was completed using 10 feet of 0.01-inch machine-slotted Schedule 40 polyvinyl chloride (PVC) screen that bracketed the water table. Monitoring well CNC16-M06 was completed as a Type III monitoring well with 6-inch-diameter PVC surface casing grouted to a depth of 20 feet bls. After the grout for the surface casing cured for 24 hours, the borehole was advanced to a depth of 27 feet and a 2-inch-diameter PVC monitoring well was installed with a 10-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.

Two temporary, small diameter, PVC piezometers, CNC17-P01 and CNC17-P02, were installed. The piezometers were 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 with a 10-foot screen section installed from 2 to 12 feet bls. The piezometers were used to inspect the groundwater for the presence of free product.

Groundwater in shallow wells at Site 17 was encountered at depths ranging from approximately 8.4 to 9.5 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 20 and July 21, 1999. Figure 6 presents the groundwater potentiometric surface recorded during the field event on July 20, 1999. The potentiometric surface maps depict a groundwater flow direction toward the south-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 and one low tide.

Results of the tidal survey identified the maximum fluctuation in shallow monitoring wells to be 2.46 feet (this was an anomalous reading). The general fluctuation was less than 0.5 foot. The proximity of the wells to the tidal source did not appear to influence tidal changes within Zone G. The heterogeneity of the aquifer material appears to 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 natural groundwater gradient (E/A&H, 1996).

## 2.2 ASSESSMENT RESULTS

Nine soil borings were completed as part of the screening portion of the soil investigation at Site 17. 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, ethyl benzene, and xylenes (BTEX), methyl tert-butyl ether (MTBE), ethylene di-bromide (EDB), and diesel range organics.

Soil samples for CoC evaluation were collected on 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 and 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 20 and July 21, 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, EDB using USEPA Method 8260 and PAHs using USEPA Method 8270. Three of the groundwater samples were also analyzed for the following natural attenuation parameters: dissolved oxygen, alkalinity, carbon dioxide, sulfide, ferrous iron, nitrite, manganese, nitrogen/nitrate, and sulfate. Groundwater natural attenuation data are summarized on Table 3.

## 2.3 FIELD SCREENING ASSESSMENT

### 2.3.1 Soil Vapor Assessment

Nine soil borings were completed to evaluate for soil vapors as part of the soil screening assessment at Site 17. Organic vapor analyzer (OVA) headspace measurements were recorded at 1-foot intervals from ground surface to the top of the water table. Table 4 summarizes the soil vapor screening results. Figure 3 presents the soil boring locations.

Soil vapor concentrations ranged from not detected to 100 parts per million (ppm). Soil samples from six soil boring locations contained vapor concentrations ranging from not detected to 5 ppm. Vapor concentrations of 100 to 100 ppm were detected from three soil boring locations. The highest soil vapor concentrations were detected 1 foot above the water table at a sample depth of 7 feet pls.

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 criteria that the samples originate in the vadose zone above the water table. Table 5 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 5, BTEX constituents were not detected in any of the mobile laboratory soil samples except CNC17-B03, which contained total ethylbenzene at 34 parts per billion (ppb) and total xylenes at 16 ppb. Diesel range organics were detected in three samples at concentrations ranging from 57 to 1200 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**

A groundwater sample was collected from seven soil boring locations near UST B42. Each groundwater sample was analyzed by a mobile laboratory for BTEX and diesel range organics using USEPA Method 8260. Table 6 presents a summary of the analytical data from the mobile laboratory.

As indicated in Table 6, BTEX constituents were reported below detection limits in all samples except CNC17-B03, where ethylbenzene was detected at 9.8 ppb, total xylenes were reported at 3.1 ppb, and naphthalene at 540 ppb. Diesel range organics were detected in five samples at concentrations of 0.1 ppb to 1.4 ppb.

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 17 area for determination of CoCs. The soil boring locations are shown on Figure 3, and Table 7 summarizes the CoCs detected in the soil samples. No CoCs were detected in soil samples collected at the site. Soil analytical data sheets and grain size analysis reports are provided in Appendix D.

### **2.4.2 Chemicals of Concern in Groundwater**

Table 8 presents the analytical results for CoCs detected in the groundwater samples. Groundwater analytical data sheets for the July 20 and July 25, 1999, field event are presented in Appendix D. No petroleum constituents were detected above method detection limits in the groundwater samples.

## **2.5 ANALYTICAL DATA**

All analytical data from the September 1996 Underground Storage Tank Assessment Report are presented in Appendix A. Soil analytical data generated during this RA are summarized in Table 7. Groundwater analytical data generated during this RA are summarized in Table 8. The soil and groundwater 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 20 and July 21, 1999. The groundwater flow direction across the site is toward the south-southeast as illustrated on Figure 6. The hydraulic gradient between monitoring wells CNC17-M05 and CNC17-M01 on July 20, 1999, was 0.0013 feet per foot ( ft/ft), respectively.

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 and two deep 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 17. To make this determination, the screened interval and proximity to the site were evaluated. Based on this evaluation, monitoring well GDG002 was selected as the most representative well. GDG002 is located approximately 500 feet south of the site and is completed to a depth of approximately 13 feet with a 10-foot screened interval. The geometric mean of the rising and falling head conductivities for GDG002 was 0.32 feet per day.

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

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

where:

- V = average velocity
- K = hydraulic conductivity = 0.32 ft/day
- n = effective porosity = 0.41  
(from Shelby tube analysis of lowest porosity soils)
- i = most recent hydraulic gradient measurement = 0.0063 ft/ft

therefore:

$$V = \left( \frac{0.32 \text{ ft/day}}{0.41} \right) \times 0.0063 \text{ ft/ft}$$

$$V = 0.005 \text{ ft/day}$$

In summary, the seepage velocity of the surficial aquifer was calculated to be approximately 1.8 feet per year based on a hydraulic conductivity of 0.32 feet per day, a hydraulic gradient of 0.0063 feet per foot, and a porosity of 41% for silty sandy soil. Aquifer characterization graphs are provided in Appendix E.

## 2.7 FATE AND TRANSPORT MODEL DESCRIPTION

No soil or groundwater concentrations exceeded the SCDHEC risk-based screening levels (RBSLs); therefore, evaluation of Site 17 will stop at Tier 1. Fate and transport modeling is not required for Tier 1 evaluation.

## 2.8 PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN

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

### **3.0 TIER 1 EVALUATION**

#### **3.1 COMPARISON OF ANALYTICAL RESULTS WITH RBSLs**

Soil samples collected on May 17, 1999, were analyzed for BTEX and PAH constituents. No BTEX or PAH constituents were detected in the samples.

Groundwater samples collected on July 21 and July 22, 1999, were analyzed for BTEX, MTBE, and PAH. No BTEX or PAH constituents were detected in the samples. A comparison of soil and groundwater concentrations to RBSLs is summarized in Tables 7 and 8.

#### **3.2 EXPOSURE SETTING CHARACTERIZATION**

This section focuses on the current and future land use issues concerning the site. Figure 1 shows that the site is surrounded by the City of North Charleston and therefore is in an urban setting. The site housed former offices and classrooms for the Fleet Mine Warfare Training Center for CNC. The facility is included in the BRAC activities; therefore, the future use of the facility is unknown.

The City of Charleston provides drinking water for CNC. A water well survey conducted as part of the Final RCRA Facility Investigation for Zone G did not reveal the presence of any shallow water supply wells within 1,000 feet of the site (E/A&H, 1996).

The CNC is located on the Cooper River with the site located approximately 1,100 feet from the river. Groundwater at Site 17 appears to flow to the south-southeast.

#### **3.3 EXPOSURE PATHWAY ANALYSIS**

This section identifies potentially complete exposure pathways. Since there were no COC concentrations exceeding the RBSLs, an exposure pathway analysis is not required.

#### **3.4 IDENTIFICATION OF DATA REQUIREMENTS**

No additional data are required.

### 3.5 SITE-SPECIFIC TARGET LEVELS

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

### 3.6 RECOMMENDATIONS

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

TABLE 1

GROUNDWATER ELEVATIONS  
SITE 17, BUILDING B42  
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)
CNC17-M01	12	12.54	7/20/1999	8.85	ND	ND	3.69
CNC17-M02	12	12.42	7/20/1999	8.73	ND	ND	3.69
CNC17-M03	12	12.36	7/20/1999	8.66	ND	ND	3.70
CNC17-M04	12	12.09	7/20/1999	8.41	ND	ND	3.68
CNC17-M05	12	12.42	7/20/1999	8.68	ND	ND	3.74
CNC17-M06D	12	12.57	7/21/1999	9.50	ND	ND	3.07

TABLE 2

GROUNDWATER FIELD MEASUREMENTS  
 SITE 17, BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

Well ID	Date Sampled	Purge method	Volume (gallons)	Temp. (°C)	pH	Conductivity (uMHOS/cm)
CNC17-M01	7/20/1999	PP	3.1	28.4	5.68	0.39
CNC17-M02	7/20/1999	PP	2.9	28.6	5.34	0.48
CNC17-M03	7/20/1999	PP	3.1	28.8	5.81	0.34
CNC17-M04	7/20/1999	PP	3.0	28.9	5.12	0.52
CNC17-M05	7/20/1999	PP	3.2	26.9	4.57	0.19
CNC17-M06D	7/21/1999	PP	8.2	27.2	7.06	1.71

Notes:

(°C) - Degrees Celsius

PP - Peristaltic pump, low flow technique

uMHOS/cm - Micro HOS per centimeter

TABLE 3

GROUNDWATER NATURAL ATTENUATION FIELD MEASUREMENTS  
 SITE 17, BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

Well I.D.	Date Sampled	Dissolved Oxygen (mg/l)	Alkalinity (mg/l)	Carbon Dioxide (mg/l)	Sulfide (mg/l)	Ferrous Iron (mg/l)	Nitrite (mg/l)	Manganese (mg/l)	Nitrogen/Nitrate (mg/l)*	Sulfate (mg/l)*	Methane (ug/l)*
CNC17-M01	7/20/1999	2.60	100	301	0.02	0.07	NA	0.1	0.040	NA	NA
CNC17-M02	7/20/1999	2.26	275	220	0.01	0.11	NA	1.2	NA	NA	NA
CNC17-M03	7/20/1999	3.60	200	195	0.03	0.00	NA	1.1	0.090	NA	NA

Notes:

mg/l - Milligrams per liter

ug/l - Micrograms per liter

E- Estimated Concentration

\* Fixed base laboratory analysis

NA = Not analyzed

TABLE 4

SUMMARY OF OVA SOIL SCREENING RESULTS  
 SITE 17, BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA  
 PAGE 1 OF 2

Sample Location	Sample Identification	Sample Depth (feet)	Total Organic Vapor Headspace Concentration (ppm)	
CNC17-B01	17SSB0103	3	2	
	17SSB0104	4	2	
	17SSB0105	5	2	
	17SSB0106	6	2	
	17SSB0107	7	2	
	17SSB0108	8	2	
	17SSB0109	9	2	
	17SSB0110	10	2	
	17SSB0111	11	2	
	CNC17-B02	17SSB0203	3	2
		17SSB0204	4	2
17SSB0205		5	2	
17SSB0206		6	2	
17SSB0207		7	2	
17SSB0208		8	2	
17SSB0209		9	2	
17SSB0210		10	5	
CNC17-B03		17SSB0303	3	2
	17SSB0304	4	2	
	17SSB0305	5	2	
	17SSB0306	6	50	
	17SSB0307	7	100	
	17SSB0308	8	10	
	17SSB0309	9	20	
	17SSB0310	10	20	
CNC17-B04	17SSB0403	3	3	
	17SSB0404	4	3	
CNC17-B05	17SSB0503	3	3	
	17SSB0506	6	3	
	17SSB0507	7	70	
	17SSB0508	8	70	
	17SSB0510	10	20	
	17SSB0511	11	60	

Notes:

OVA - organic vapor analyzer equipped with a flame ionization detector

PPM - parts per million

**TABLE 4**

**SUMMARY OF OVA SOIL SCREENING RESULTS  
 SITE 17, BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA  
 PAGE 2 OF 2**

<b>Sample Location</b>	<b>Sample Identification</b>	<b>Sample Depth (feet)</b>	<b>Total Organic Vapor Headspace Concentration (ppm)</b>	
CNC17-B06	17SSB0602	2	2	
	17SSB0603	3	2	
	17SSB0604	4	2	
	17SSB0605	5	2	
	17SSB0606	6	50	
	17SSB0607	7	100	
	17SSB0608	8	10	
	17SSB0609	9	20	
	17SSB0610	10	20	
	CNC17-B07	17SSB0703	3	2
17SSB0704		4	2	
17SSB0705		5	2	
17SSB0706		6	2	
17SSB0707		7	2	
17SSB0708		8	2	
17SSB0709		9	2	
17SSB0710		10	3	
CNC17-B08		17SSB0803	3	3
		17SSB0804	4	3
	17SSB0805	5	3	
	17SSB0806	6	3	
	17SSB0807	7	3	
	17SSB0808	8	3	
	17SSB0809	9	3	
	17SSB0810	10	3	
	CNC17-B09	17SSB0903	3	3
		17SSB0904	4	3
17SSB0905		5	3	
17SSB0906		6	3	
17SSB0907		7	3	
17SSB0908		8	3	
17SSB0909		9	5	
17SSB0910		10	10	

**Notes:**

OVA - organic vapor analyzer equipped with a flame ionization detector

PPM - parts per million

TABLE 5

SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR SOIL  
 SITE 17, BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Sample Depth (feet)	Laboratory Screening Data (PPB) <sup>(1)</sup>					
			Benzene	Toluene	Ethyl-benzene	Total Xylenes	Naphthalene	Diesel Range Organics
CNC17-B01	17SFB01-0708	7-8	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC17-B02	17SFB02-0809	8-9	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC17-B03	17SFB03-0506	5-6	<5.0	<5.0	34	16	17000	1200
CNC17-B04	17SFB04-0304	3-4	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC17-B05	17SFB05-0708	7-8	<5.0	<5.0	<5.0	<5.0	330	57
CNC17-B06	17SFB06-0910	7-8	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC17-B07	17SFB07-0910	8-9	<5.0	<5.0	<5.0	<5.0	140	<10
CNC17-B08	17SFB08-1011	2-3	<5.0	<5.0	<5.0	<5.0	170	<10
CNC17-B08	17SFB08-1011	2-3	<5.0	<5.0	<5.0	<5.0	<5.0	<10
CNC17-B09	17SFB09-1011	7-8	<5.0	<5.0	<5.0	<5.0	1100	130

NOTES:

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

PPB - parts per billion

TABLE 6

SUMMARY OF MOBILE LABORATORY SCREENING RESULTS FOR GROUNDWATER  
 SITE 17, BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Identification	Laboratory Screening Date (PPB) <sup>1</sup>					
		Benzene	Toluene	Ethyl-benzene	Total Xylenes	Naphthalene	Diesel Range Organics
CNC17-B01	17GFB01-16	<1.0	<1.0	<1.0	<1.0	<1.0	0.1
CNC17-B02	17GFB02-16	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
CNC17-B03	17GFB03-16	<1.0	<1.0	9.8	3.1	540	1.4
CNC17-B04	17GFB04-16	<1.0	<1.0	<1.0	<1.0	8	0.1
CNC17-B05	17GFB05-16	<1.0	<1.0	<1.0	<1.0	21	0.2
CNC17-B06	17GFB06-16	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
CNC17-B07	17GFB07-16	<1.0	<1.0	<1.0	<1.0	<1.0	0.1
CNC17-B08	17GFB08-16	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
CNC17-B09	17GFB09-16	<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.

PPB - parts per billion

NA = Not analyzed

TABLE 7

**SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL  
SITE 17, BUILDING B42  
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 <sup>(1)</sup>		5	1622	1260	42471	73084	29097	231109	12998	87866	210
CNC17-B01 / 17SLB010708	17-May-99	< 6	< 6	< 6	< 6	< 430	< 430	< 430	< 430	< 430	< 6
CNC17-B02 / 17SLB020809	17-May-99	< 5	< 5	< 5	< 5	< 430	< 430	< 430	< 430	< 430	< 5
CNC17-B03 / 17SLB030506	17-May-99	< 5	< 5	< 5	< 5	< 430	< 430	< 430	< 430	< 430	22.00
CNC17-B04 / 17SLB040304	17-May-99	< 5	< 5	< 5	< 5	< 400	< 400	< 400	< 400	< 400	< 5
CNC17-B05 / 17SLB050708	17-May-99	< 6	< 6	< 6	< 6	< 430	< 430	< 430	< 430	< 430	< 6
CNC17-B05 / 17SLB050708D	17-May-99	< 6	< 6	< 6	< 6	< 430	< 430	< 430	< 430	< 430	< 6
CNC17-B07 / 17SLB070809	17-May-99	< 5	< 5	< 5	< 5	< 430	< 430	< 430	< 430	< 430	< 5
CNC17-B09 / 17SLB090708	17-May-99	< 5	< 5	< 5	< 5	< 430	< 430	< 430	< 430	< 430	< 5
CNC17-TL <sup>(2)</sup> / 01TL00103	17-May-99	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	< 5

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

NA - Not analyzed

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

<sup>(2)</sup> Trip blank

TABLE 8

**SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER  
SITE 17, BUILDING B42  
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 <sup>(1)</sup>		5	700	1000	10000	10 <sup>(2)</sup>	10 <sup>(2)</sup>	10 <sup>(2)</sup>	10 <sup>(2)</sup>	10 <sup>(2)</sup>	10 <sup>(2)</sup>	40
CNC17M-01 / 17GLM0101	20-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC17M-02 / 17GLM0201	20-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC17M-03 / 17GLM0301	20-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC17M-04 / 17GLM0401	20-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC17M-05 / 17GLM0501	20-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC17M-06 / 17GLM0601	21-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC17M-06 / 17GLM0601D	21-Jul-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC17TL <sup>(3)</sup> / 17TL00401	20-Jul-99	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	< 5
CNC17TL <sup>(3)</sup> / 17TL00501	21-Jul-99	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	< 5

All concentrations are in ug/L.

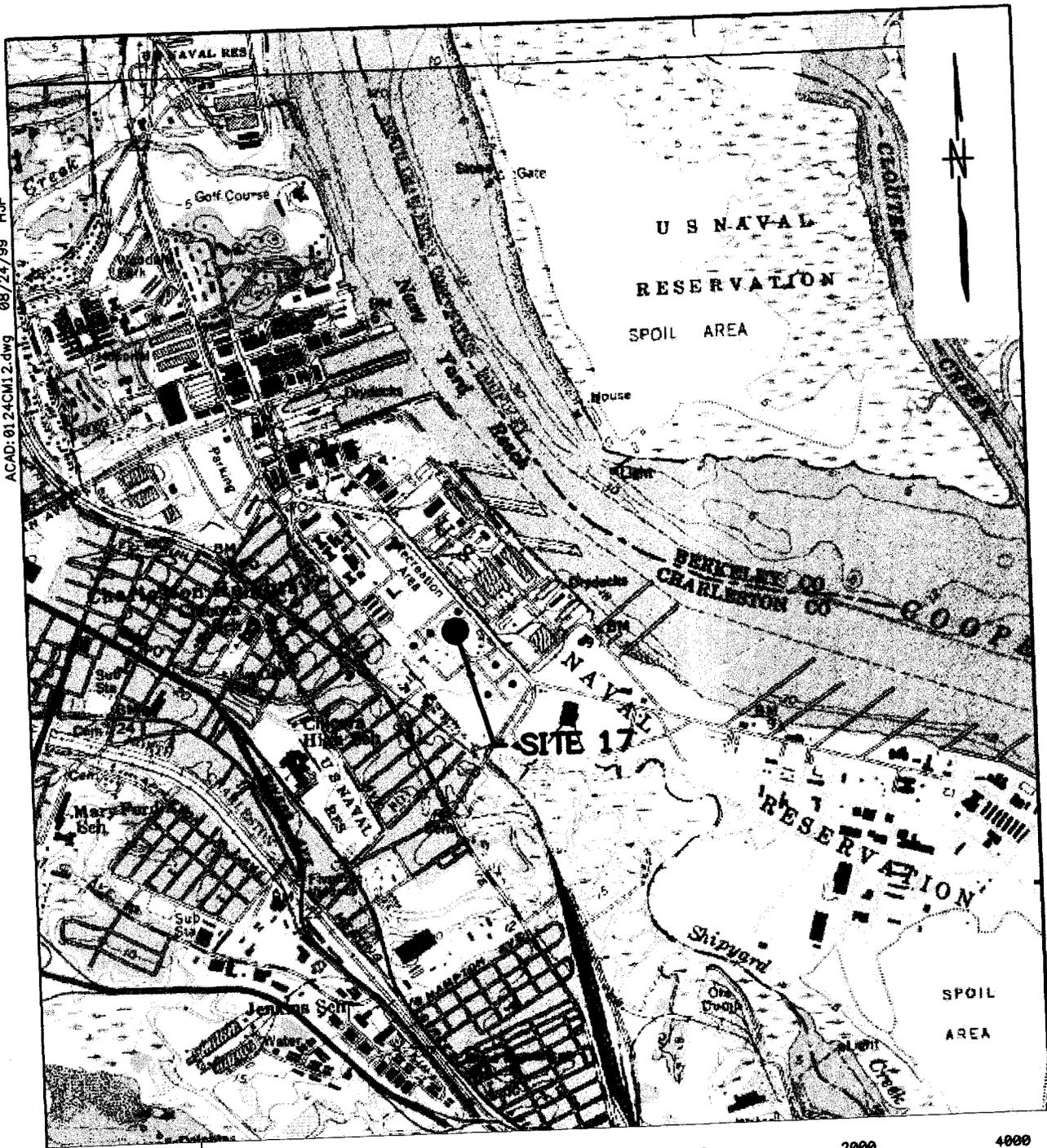
NA - Not analyzed

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

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

<sup>(3)</sup> Trip blank

ACAD: 0124CM12.dwg 08/24/99 HJP



SOURCE: QUADRANGLE MAP SOUTH CAROLINA, REVISED 1970  
 QUADRANGLE MAP NORTH CHARLESTON REVISED, 1979



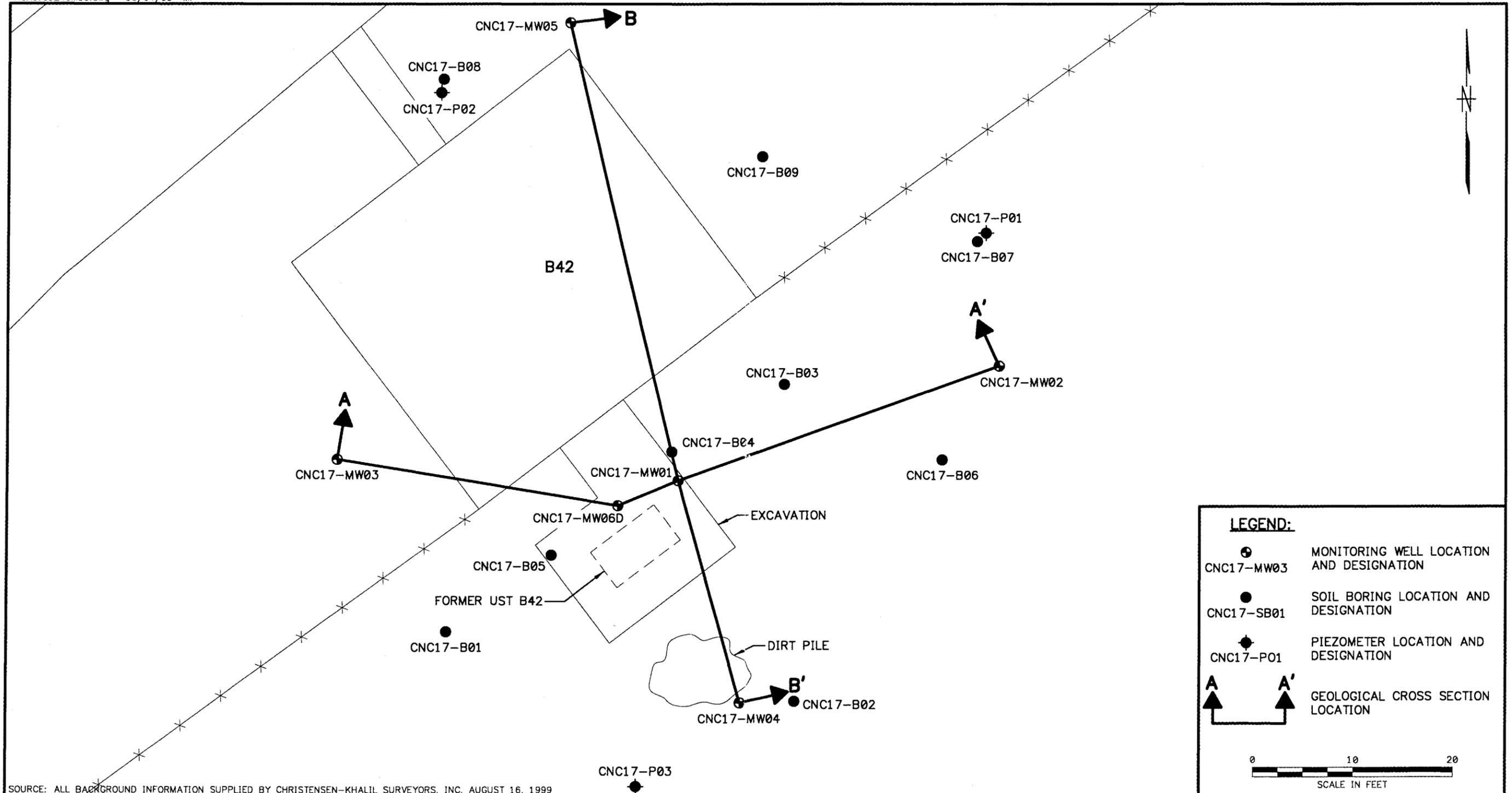
DRAWN BY HJP	DATE 8/20/99
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE AS NOTED	



**SITE LOCATION MAP**  
 SITE 17, BUILDING B42, ZONE G  
 CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SC

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





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

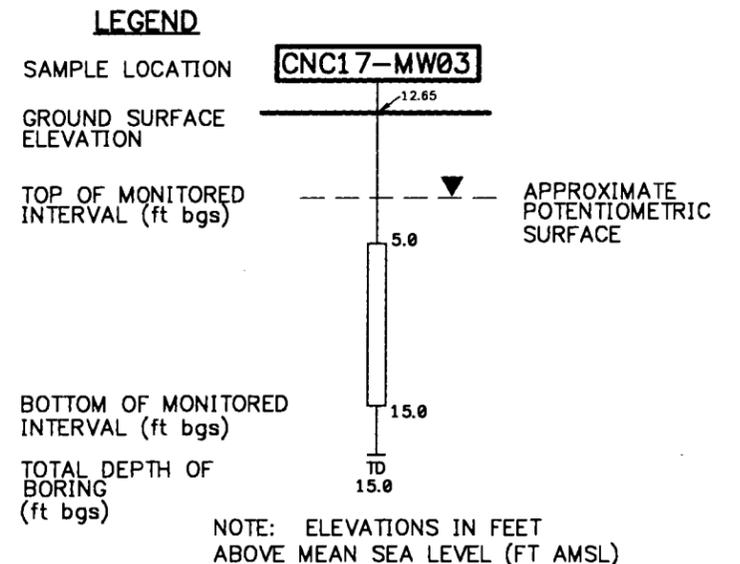
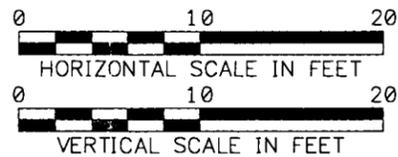
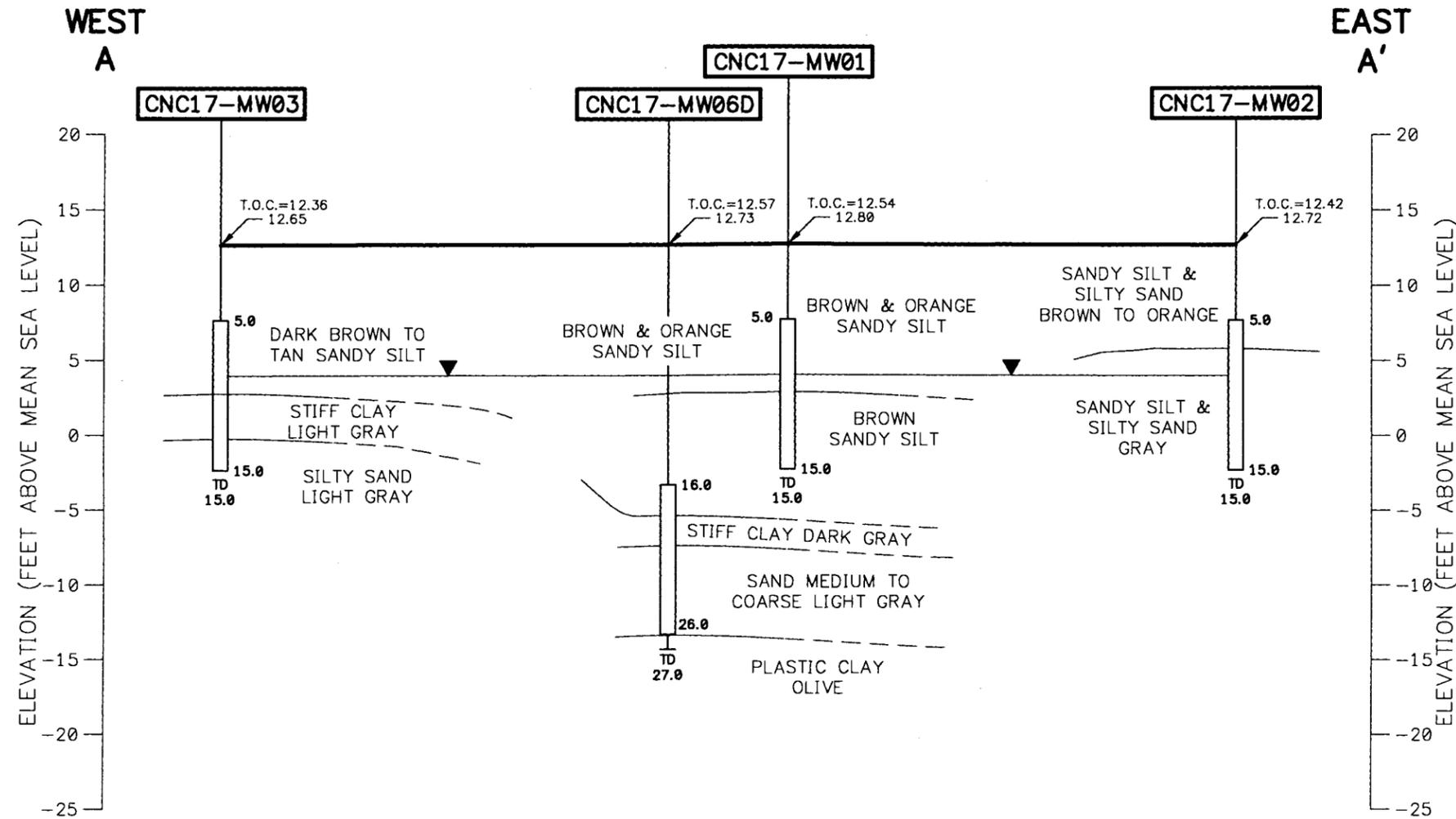
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE  
MF 10/4/99  
CHECKED BY DATE  
COST/SCHED-AREA  
SCALE AS NOTED



SITE AREA AND SAMPLING LOCATIONS  
SITE 17 BUILDING B42  
ZONE G, CHARLESTON NAVAL COMPLEX  
NORTH CHARLESTON, SOUTH CAROLINA

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



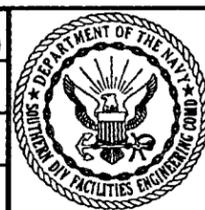
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY MF DATE 10/5/99

CHECKED BY DATE

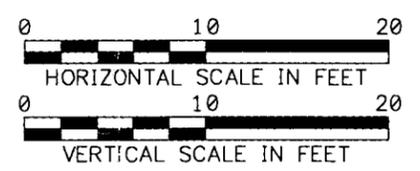
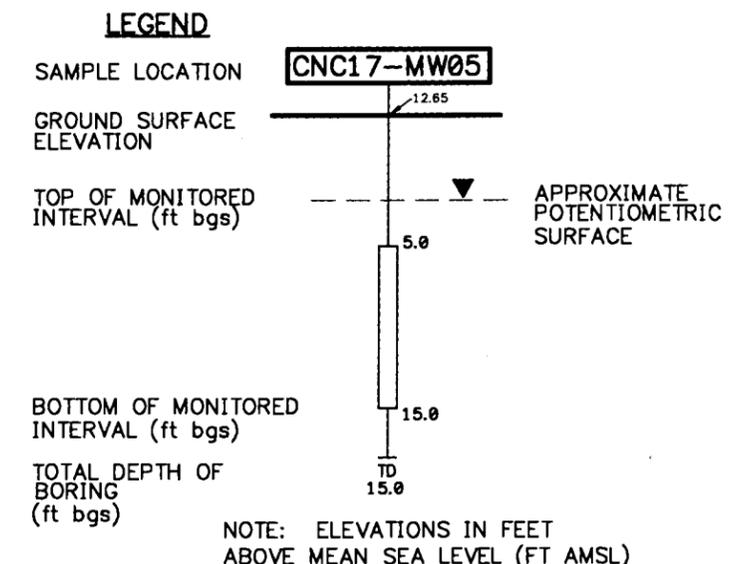
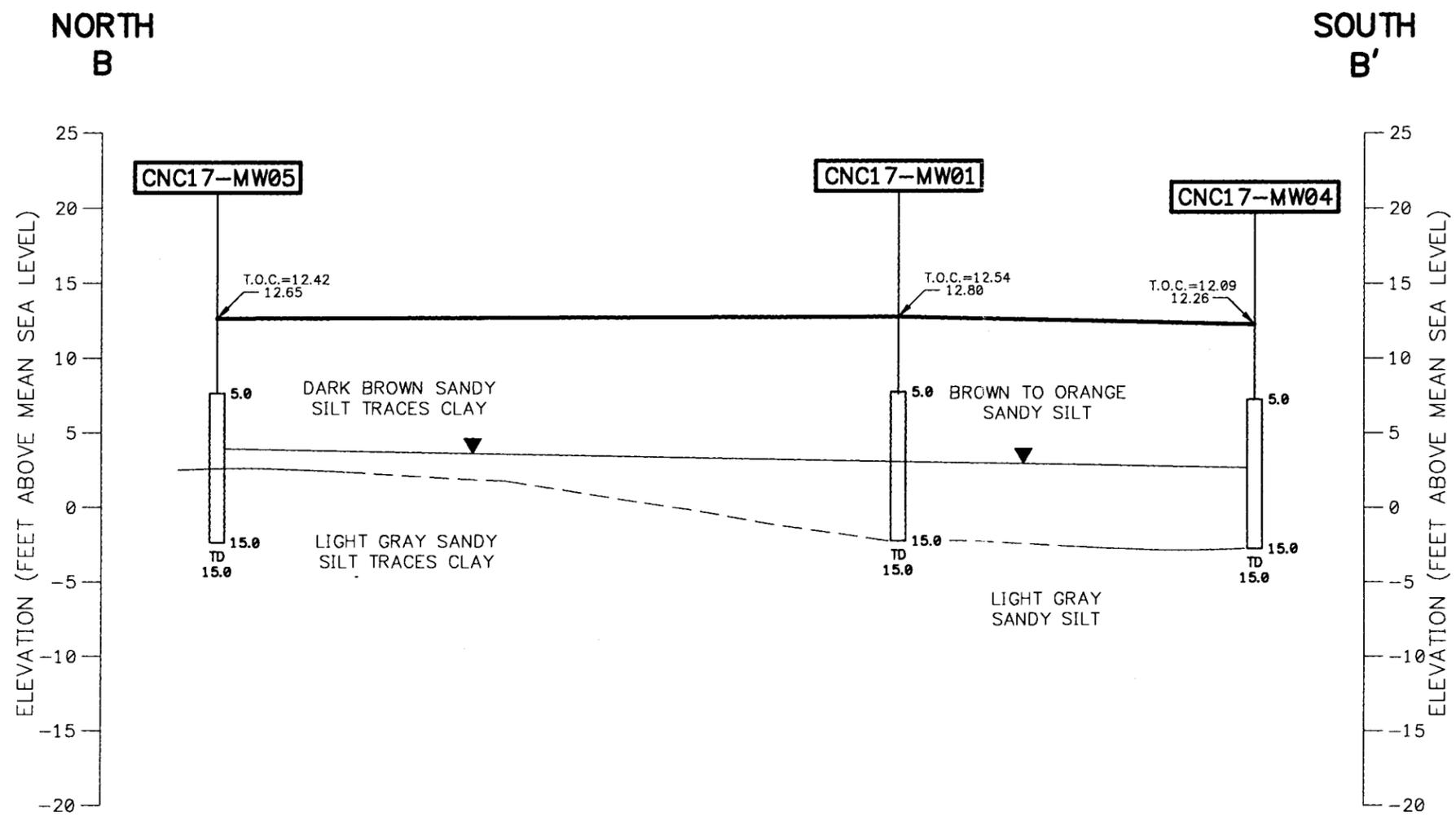
COST/SCHED-AREA

SCALE AS NOTED



**GEOLOGIC CROSS SECTION A-A'**  
 SITE 17, BUILDING B42  
 ZONE G CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 4	REV. 0



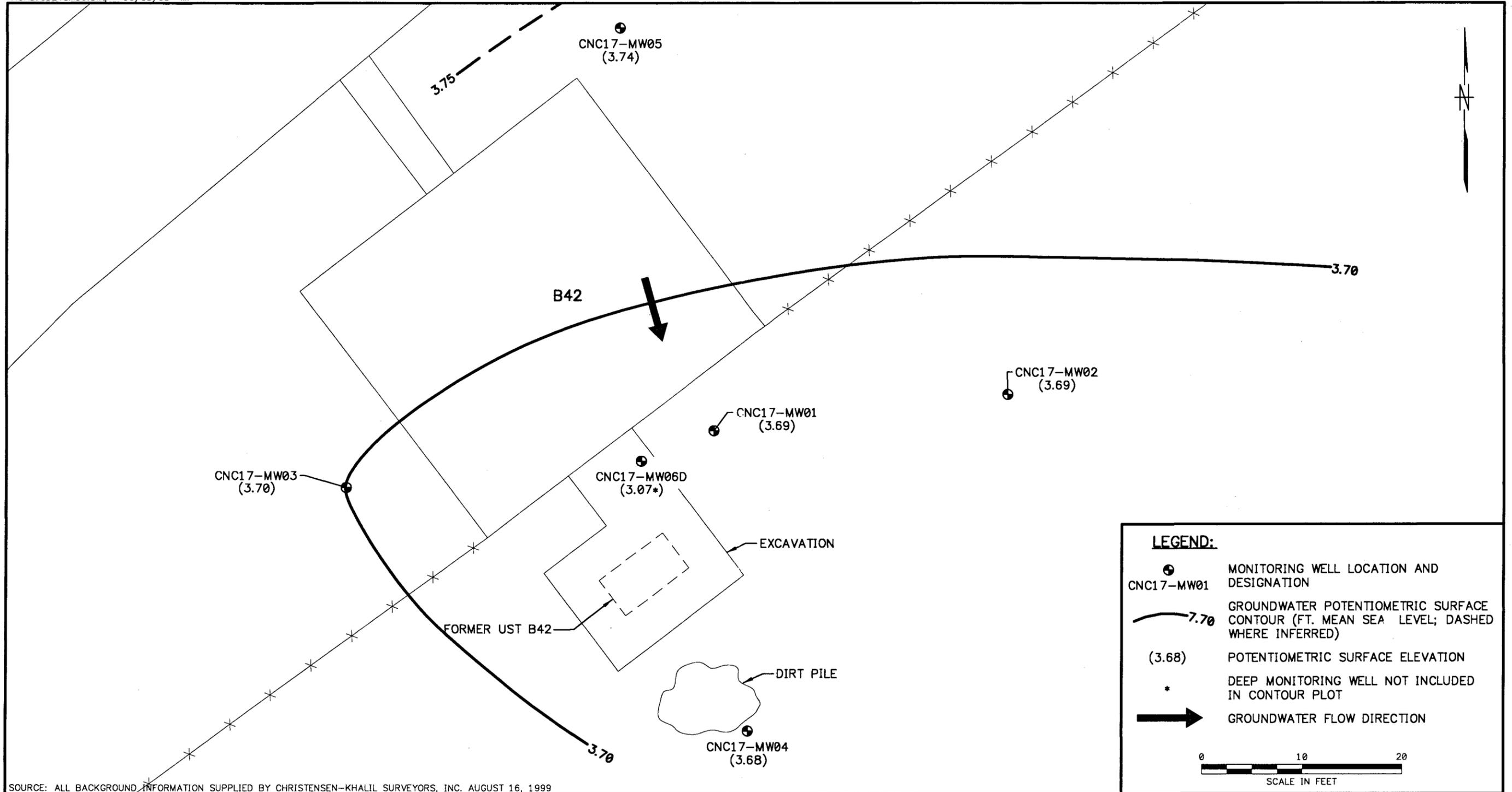
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY: MF  
 DATE: 10/5/99  
 CHECKED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 COST/SCHED-AREA: \_\_\_\_\_  
 SCALE: AS NOTED



**GEOLOGIC CROSS SECTION B-B'**  
 SITE 17, BUILDING B42  
 ZONE G CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 5	REV. 0



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

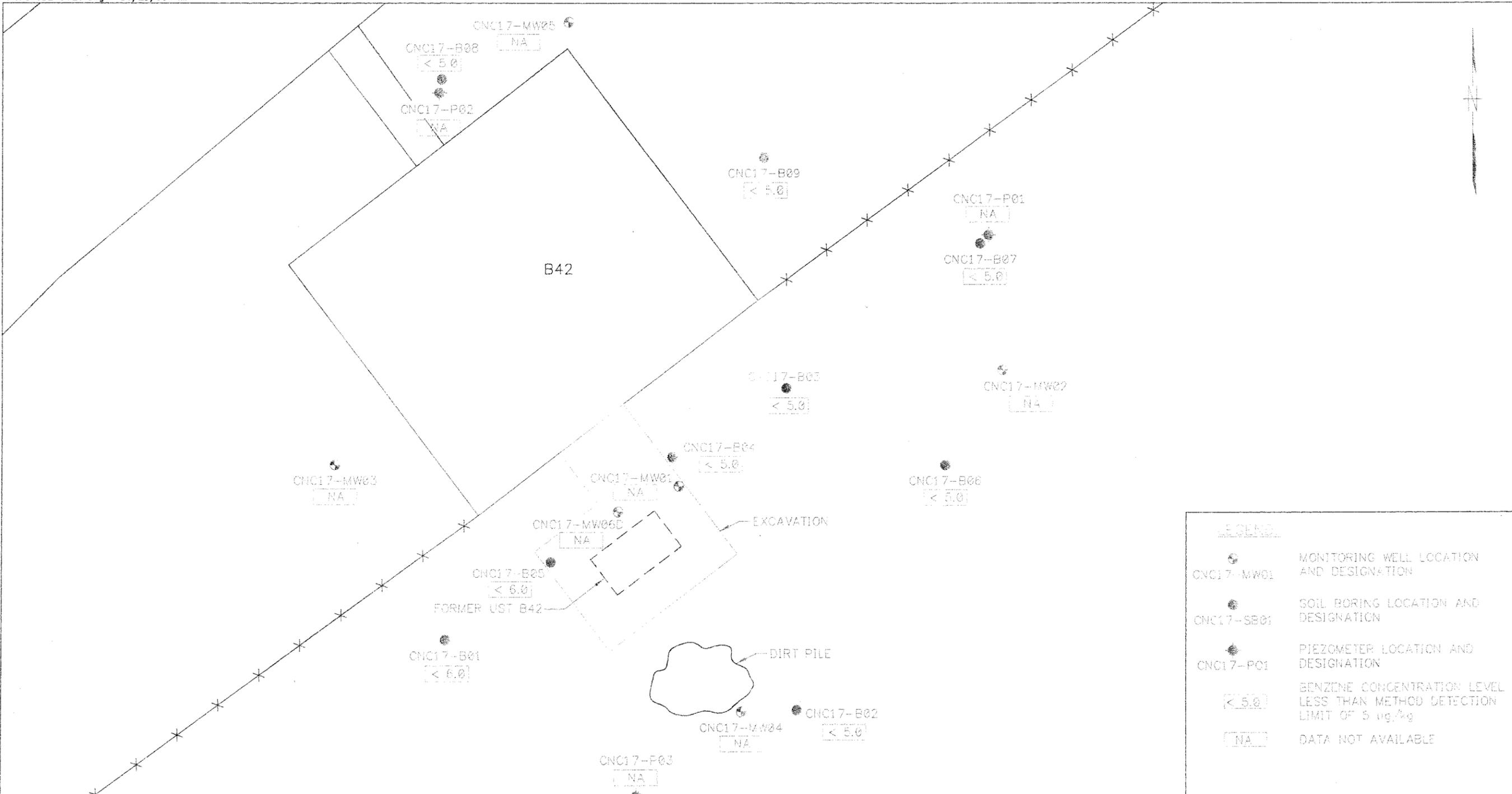
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY	DATE
MF	10/5/99
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
AS NOTED	



**GROUNDWATER POTENTIOMETRIC MAP**  
 (JULY 20, 1999)  
 SITE 17 BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

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



LEGEND	
	MONITORING WELL LOCATION AND DESIGNATION
	SOIL BORING LOCATION AND DESIGNATION
	PIEZOMETER LOCATION AND DESIGNATION
	BENZENE CONCENTRATION LEVEL LESS THAN METHOD DETECTION LIMIT OF 5 ug/kg
	DATA NOT AVAILABLE

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

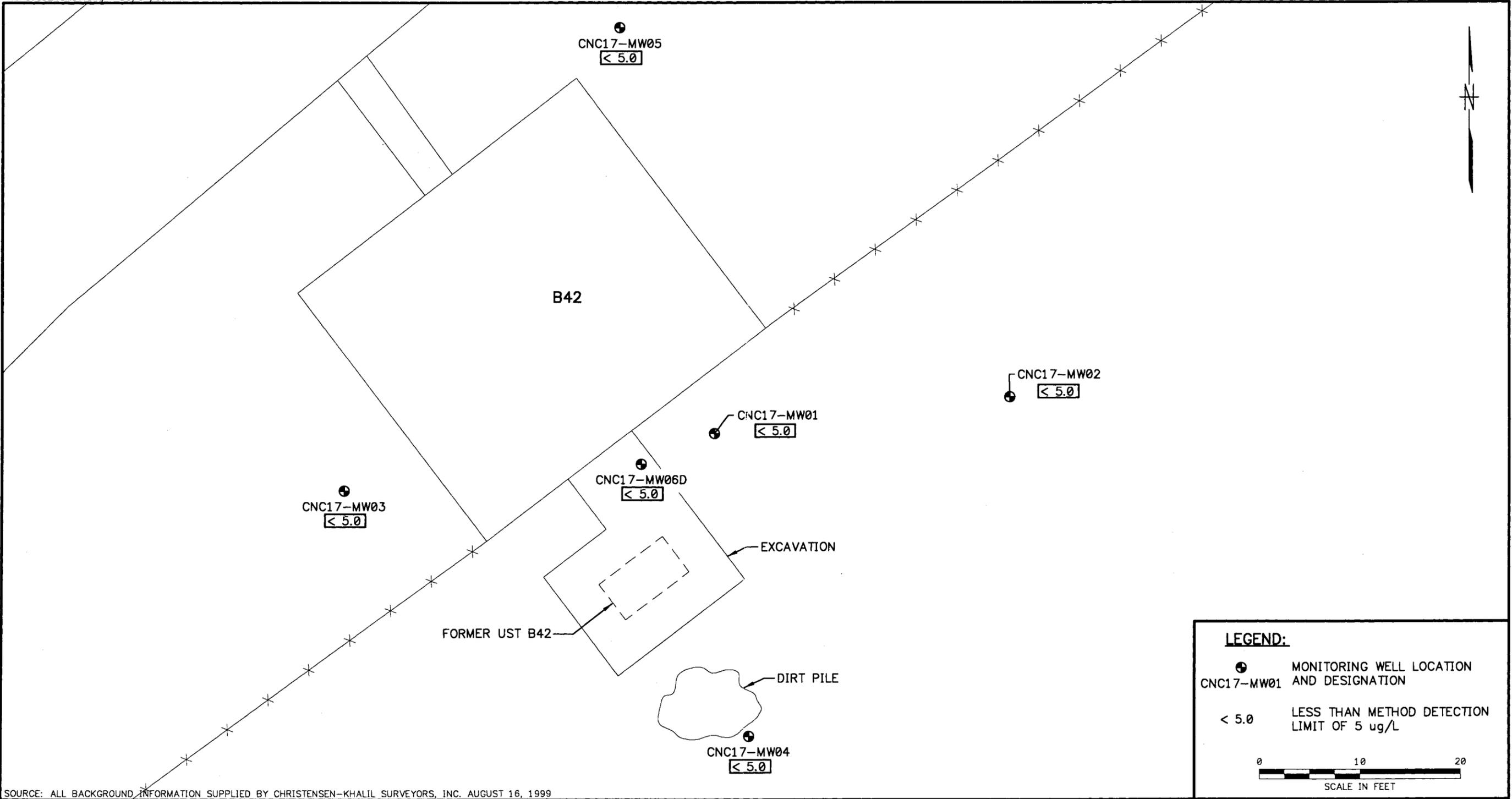
NO.	DATE	REVISIONS	BY	CHKD	APPR	REFERENCES

DRAWN BY: MF  
 DATE: 10/5/99  
 CHECKED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 COST/SCHED-AREA: \_\_\_\_\_  
 SCALE: AS NOTED



SOIL BENZENE CONCENTRATION MAP  
 (NOV. 1999)  
 SITE 17 BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0124	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 7	REV. 0



**LEGEND:**

- ⊕ MONITORING WELL LOCATION AND DESIGNATION
- < 5.0 LESS THAN METHOD DETECTION LIMIT OF 5 ug/L

0 10 20  
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 DATE  
MF 10/4/99

CHECKED BY DATE

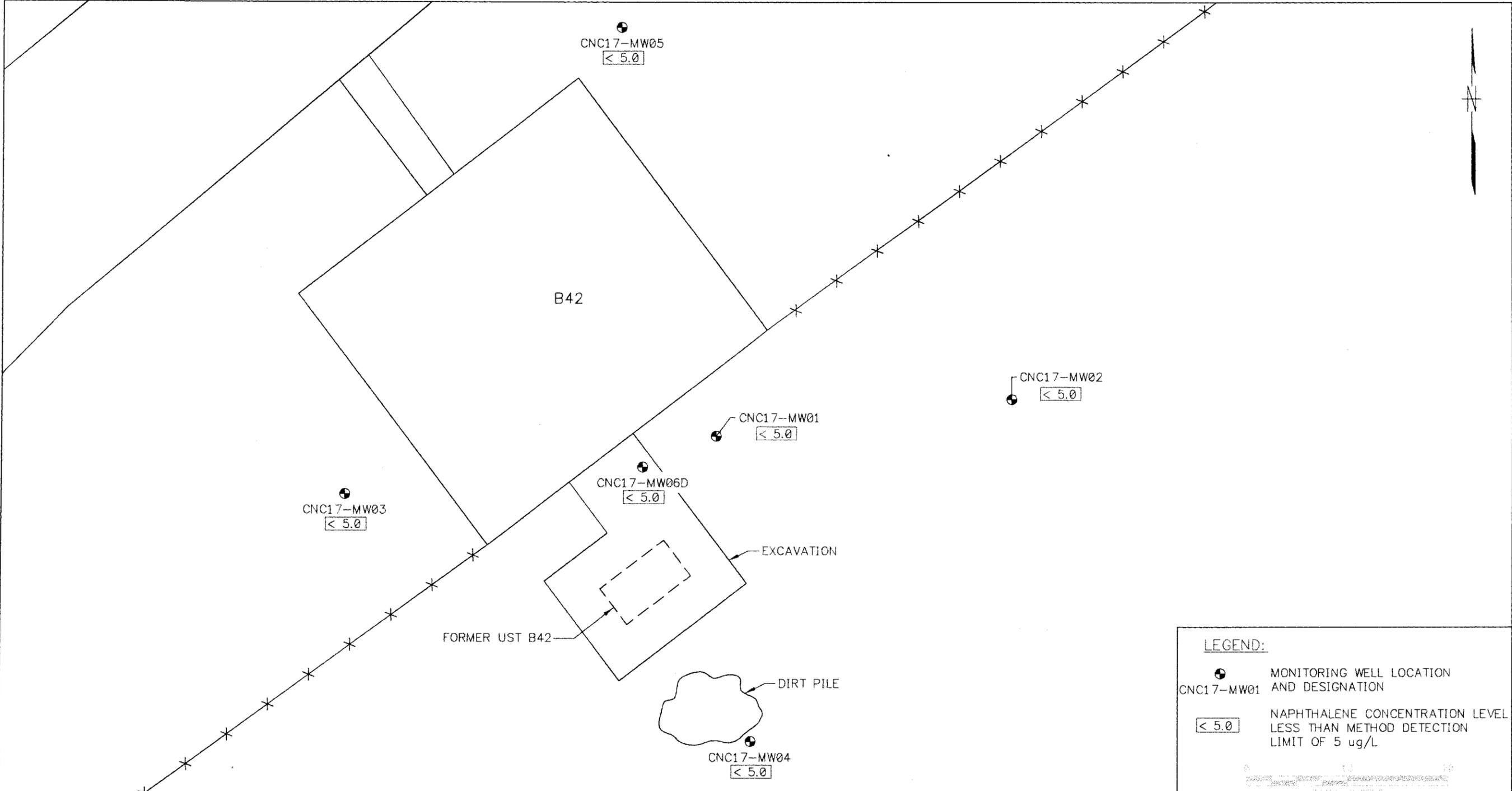
COST/SCHED-AREA

SCALE AS NOTED



**GROUNDWATER BENZENE CONCENTRATION MAP**  
(JULY 20, 1999)  
SITE 17 BUILDING B42  
ZONE G, CHARLESTON NAVAL COMPLEX  
NORTH CHARLESTON, SOUTH CAROLINA

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



**LEGEND:**

- MONITORING WELL LOCATION AND DESIGNATION
- NAPHTHALENE CONCENTRATION LEVEL LESS THAN METHOD DETECTION LIMIT OF 5 ug/L

SCALE: AS NOTED

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

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY MF DATE 10/4/99  
 CHECKED BY DATE  
 COST/SCHED-AREA  
 SCALE AS NOTED



GROUNDWATER NAPHTHALENE CONCENTRATION MAP (JULY 20, 1999)  
 SITE 17 BUILDING B42  
 ZONE G, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

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

**APPENDIX A**

**UNDERGROUND STORAGE TANK ASSESSMENT REPORT - UST B42**

# South Carolina DHEC

Department of Health and Environmental Control  
2600 Bull Street, Columbia, SC 29201

Commissioner: Douglas E. Bryant

Board: John H. Burriss, Chairman  
William M. Hull, Jr., MD, Vice Chairman  
Roger Leaks, Jr., Secretary

Richard E. Jabbour, DDS  
Cyndi C. Moeltner  
Brian K. Smith  
Rodney L. Grandy

Promoting Health, Protecting the Environment

Mr. Gabriel L. Magwood  
Southern Division NFEC  
P.O. Box 190010  
2155 Eagle Drive  
North Charleston, South Carolina 29419-9010

Re: Underground Storage Tank Assessment Report dated February 5, 1997  
Building B42 (DHEC Site Identification # 17780) (Zone C)  
Charleston Naval Complex/Charleston Naval Base  
Charleston, SC  
Charleston County

Date: March 21, 1997

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides analytical results of environmental sampling conducted to determine if releases have occurred from operation of the referenced underground storage tanks and/or associated piping system. The results presented indicate elevated levels of polynuclear aromatic hydrocarbons (PAH) were detected in soils grab samples obtained from the tank excavation. These results appear to indicate that additional endeavors for remedial actions (soils removal) and contamination characterization are warranted at the referenced site. As provided in the Tank Management Plan dated October 1996, a reasonable sampling and analysis plan for additional assessment activities should be provided to my attention for review and approval, as appropriate, on or before June 30, 1997. Please be reminded that groundwater sampling (if necessary) will require construction of sampling points and will need to be submitted for prior review and approval, as above.

Should you have any questions, please contact me at (803) 734-5328.

Sincerely,  
  
Paul L. Bristol, Hydrogeologist  
Groundwater Assessment and Development Section  
Bureau of Water

cc: Trident District EQC

**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	Tank 6
fuel oil						
560 gal.						
> 20 years						
steel						
Unk.						
5'						
N						
N						
R						
N						
Y						

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

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

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

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

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

No corrosion or pitting were found. One 1/4" hole was discovered in the end during steam cleaning. See Attachment I, photograph 2.

## 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? [*under piping]</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.) [*excavation, strong]</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>_____</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: See Note 2.</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 on the site map.</p>		X	

Note 2: The stockpiled soil has been transported to building 1601 as part of a future bioremediation pilot project. Per conversation with DHEC, Mr. Tim Mettlen, and SouthDiv, Mr. Gabriel Magwood, petroleum contaminated soil may be removed from the excavation and stockpiled for disposal or remediation.

## X. SAMPLING METHODOLOGY

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

After the removal of UST B42 soil samples were taken. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

The samples are identified as follows:

	Detachment Charleston		General Engineering Labs
Soil Sample	UST42-1	=	SPORT -0138-1
Soil Sample	UST42-2	=	SPORT -0138-2
Soil Sample	UST42-3	=	SPORT -0138-3
Soil Sample	UST42-4	=	SPORT -0138-4
Soil Sample	UST42-5	=	SPORT -0138-5

Sample jars were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Soil samples were extracted at the tank ends. UST piping soil samples were taken under the piping below their open ends.

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.

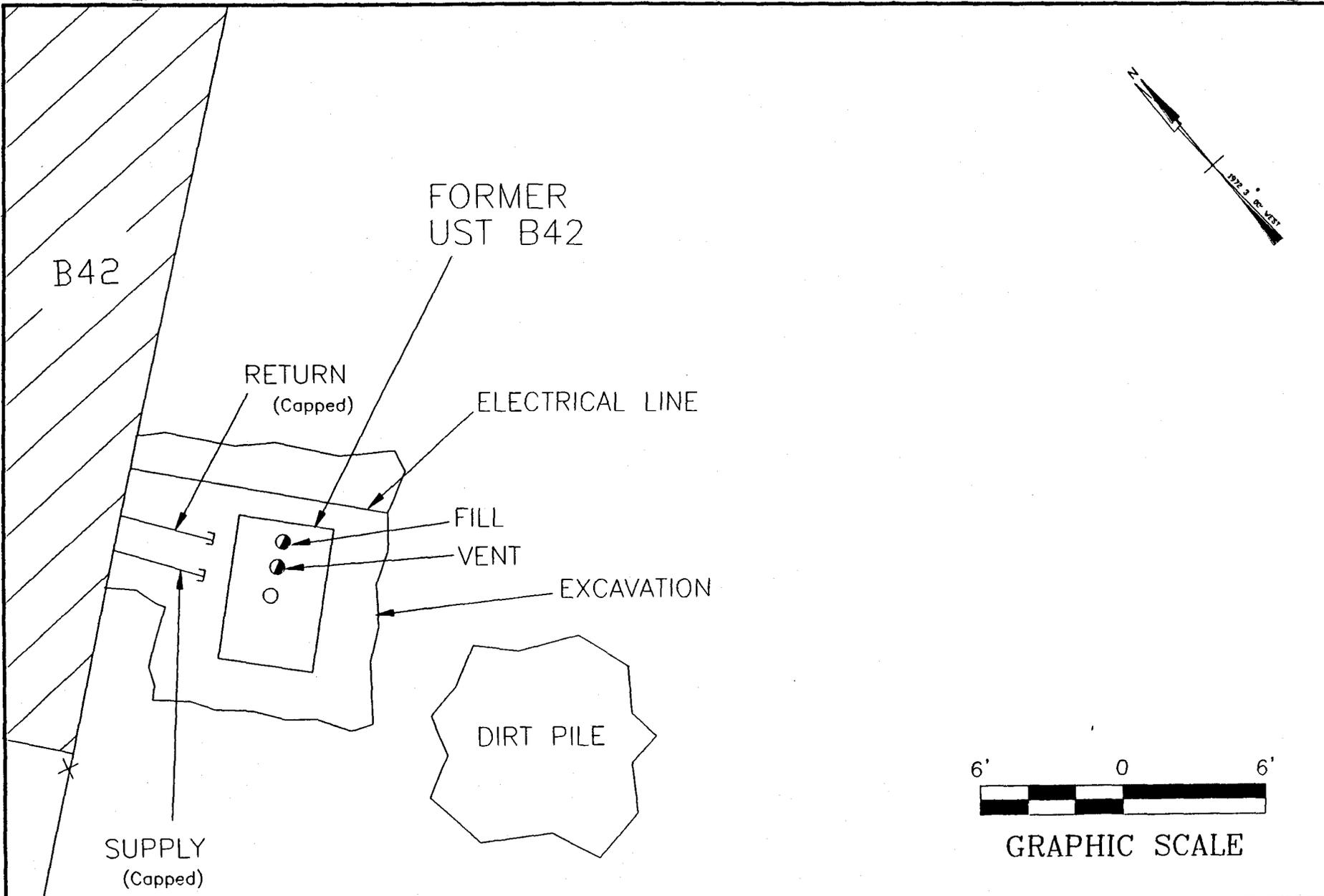
The samples remained in the custody of SPORTENVDETHASN until they were transferred to General Engineering Laboratories for analysis as documented in the attached Chain-of-Custody Record.

**Attachment I**

**SITE MAP**

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

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

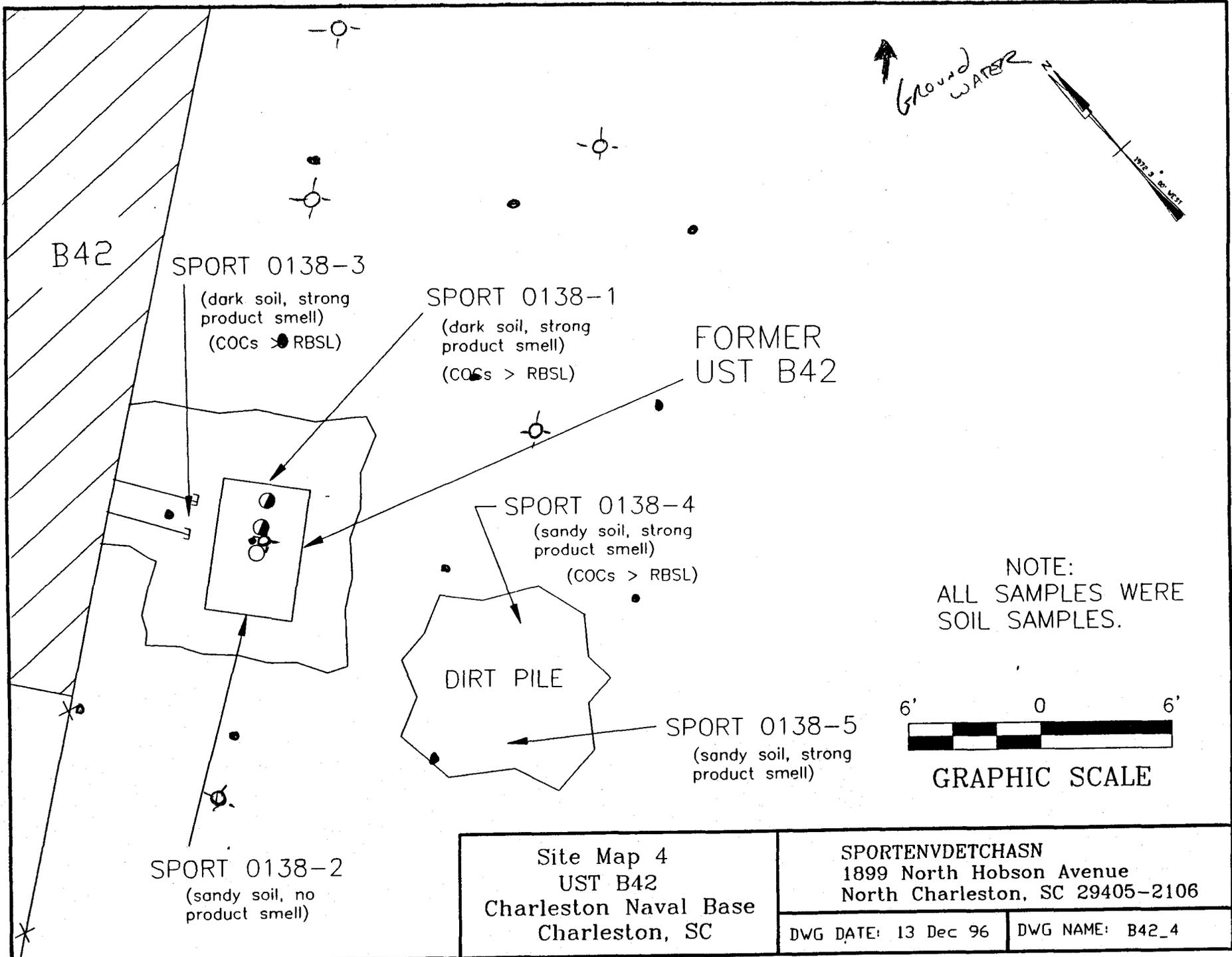


Site Map 2  
 UST B42  
 Charleston Naval Base  
 Charleston, SC

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

DWG DATE: 11 Dec 96

DWG NAME: B42\_2



Site Map 4  
UST B42  
Charleston Naval Base  
Charleston, SC

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

DWG DATE: 13 Dec 96    DWG NAME: B42\_4

# South Carolina DHEC

Department of Health and Environmental Control  
2600 Bull Street, Columbia, SC 29201

Commissioner: Douglas E. Bryant

Board: John H. Burriss, Chairman  
William M. Huff Jr., MD, Vice Chairman  
Roger Leaks, Jr., Secretary

Richard E. Jabbour, DDS  
Cyndi C. Moetter  
Brian K. Smith  
Rodney L. Grandy

Promoting Health, Protecting the Environment

Mr. Gabriel L. Magwood  
Southern Division NFEC  
P.O. Box 190010  
2155 Eagle Drive  
North Charleston, South Carolina 29419-9010

Re: Underground Storage Tank Assessment Report dated February 5, 1997  
Building B42 (DHEC Site Identification # 17780) (Zone 4)  
Charleston Naval Complex/Charleston Naval Base  
Charleston, SC  
Charleston County

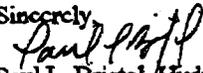
Date: March 21, 1997

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides analytical results of environmental sampling conducted to determine if releases have occurred from operation of the referenced underground storage tanks and/or associated piping system. The results presented indicate elevated levels of polynuclear aromatic hydrocarbons (PAH) were detected in soils grab samples obtained from the tank excavation. These results appear to indicate that additional endeavors for remedial actions (soils removal) and contamination characterization are warranted at the referenced site. As provided in the Tank Management Plan dated October 1996, a reasonable sampling and analysis plan for additional assessment activities should be provided to my attention for review and approval, as appropriate, on or before June 30, 1997. Please be reminded that groundwater sampling (if necessary) will require construction of sampling points and will need to be submitted for prior review and approval, as above.

Should you have any questions, please contact me at (803) 734-5328.

Sincerely,



Paul L. Bristol, Hydrogeologist  
Groundwater Assessment and Development Section  
Bureau of Water

cc: Trident District EQC

- 560 gal fuel oil > 20 yrs old
- Pet stained soils
- strong prod odor
- COCS > RBSL

Naph 5830 ug/kg in soil

ACAP ?

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

Date Received
State Use Only

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

**I OWNERSHIP OF UST(S)**

Agency/Owner:	Southern Division, Naval Facilities Engineering Command, Caretaker Site Office		
Mailing Address:	P.O. Box 190010		
City:	N. Charleston	State:	SC
		Zip Code:	29419-9010
Area Code:	803	Telephone Number:	743-9985
		Contact Person:	LCDR Paul Rose

**II SITE IDENTIFICATION AND LOCATION**

Site I.D. #:	Unregulated		
Facility Name:	Charleston Naval Base Complex, B42		
Street Address:	South Hobson Avenue		
City:	North Charleston, 29405-2413	County:	Charleston

**III CLOSURE INFORMATION**

Closure Started:	9 Aug 1996	Closure Completed:	18 Sept 1996
	Number of USTs Closed:		1
N/A		SPORTENVDETCASN	
Consultant		UST Removal Contractor	

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

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

LCDR Paul Rose

Name (Type or Print)



Signature

**V. UST INFORMATION**

- A. Product.....
- B. Capacity.....
- C. Age.....
- D. Construction Material.....
- E. Month/Year of Last Use.....
- F. Depth (ft.) To Base of Tank.....
- G. Spill Prevention Equipment Y/N.....
- H. Overfill Prevention Equipment Y/N.....
- I. Method of Closure Removed/Filled.....
- J. Visible Corrosion or Pitting Y/N.....
- K. Visible Holes Y/N.....

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
fuel oil						
560 gal.						
> 20 years						
steel						
Unk.						
5'						
N						
N						
R						
N						
Y						

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

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

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

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

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

No corrosion or pitting were found. One 1/4" hole was discovered in the end during steam cleaning. See Attachment I, photograph 2.

## 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.....

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Copper						
6'						
1 see note 1						
S						
N						
N						
N						
> 20 years						

Note 1: UST B42 provided fuel oil to building 42's boiler.

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

The piping contained no corrosion, pitting, or holes; however, during excavation, the supply and return lines were found unattached to the tank. The lines were capped by Detachment Charleston technicians.

## VII. BRIEF SITE DESCRIPTION AND HISTORY

Building 42 is a store room/boiler house for the former green house on the Naval base. UST B42 supplied fuel oil for the boiler.

On 2 Aug 90 approximately 10 gallons of kerosene overflowed from the uncapped fill pipe of the abandoned UST B42 onto the asphalt parking lot during a rainstorm. Charleston Naval Base Public Works personnel cleaned up the spill and pumped the tank dry.

### 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? [*under piping]</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.) [*excavation, strong]</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>_____</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: See Note 2.</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 on the site map.</p>		X	

Note 2: The stockpiled soil has been transported to building 1601 as part of a future bioremediation pilot project. Per conversation with DHEC, Mr. Tim Mettlen, and SouthDiv, Mr. Gabriel Magwood, petroleum contaminated soil may be removed from the excavation and stockpiled for disposal or remediation.



## X. SAMPLING METHODOLOGY

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

After the removal of UST B42 soil samples were taken. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

The samples are identified as follows:

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Soil Sample	UST42-4	=	SPORT -0138-4
Soil Sample	UST42-5	=	SPORT -0138-5

Sample jars were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Soil samples were extracted at the tank ends. UST piping soil samples were taken under the piping below their open ends.

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

## XI. RECEPTORS

Yes    No

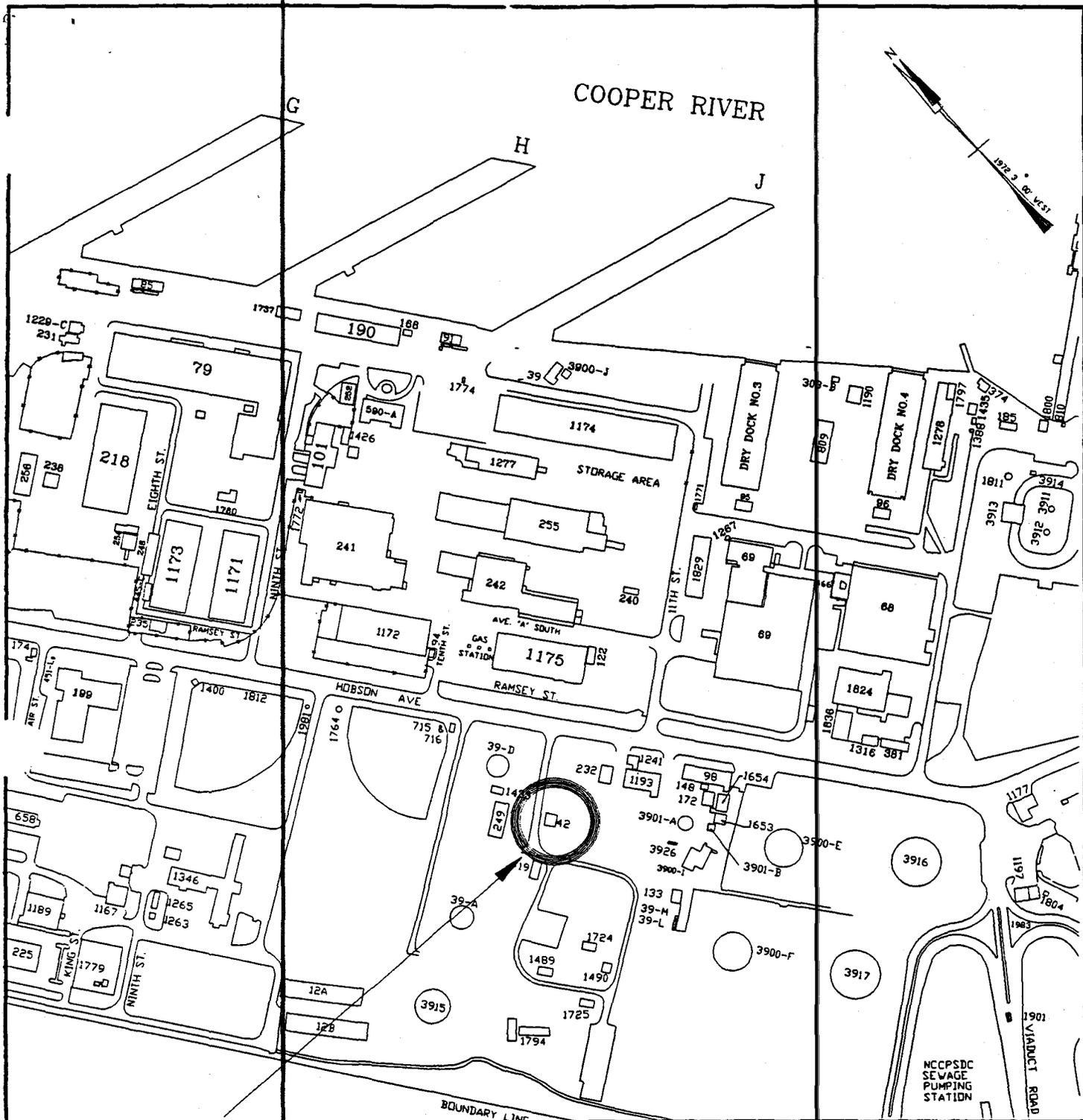
<p>A.    Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system?</p> <p>      If yes, indicate type of receptor, distance, and direction on site map.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>B.    Are there any public, private, or irrigation 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>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>C.    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>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>D.    Are there any underground utilities (e.g., telephone, electricity, gas, water, sewer, storm drain) located within 100 feet of the UST system that could potentially come in contact with the contamination?</p> <p style="text-align: right; margin-right: 20px;">[*Storm drain]</p> <p>      If yes, indicate the type of utility, distance, and direction on the site map.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>E.    Has contaminated soil been identified at a depth of less than 3 feet below land surface in an area that is not capped by asphalt or concrete?</p> <p>      If yes, indicate the area of contaminated soil on the site map.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Attachment I**

**SITE MAP**

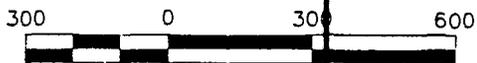
You must supply a scaled site map. It should include all buildings, road names, utilities, tank and pump island locations, sample locations, extent of excavation, and any other pertinent information.

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



Building 42

CHARLESTON NAVAL BASE  
CHARLESTON, SC



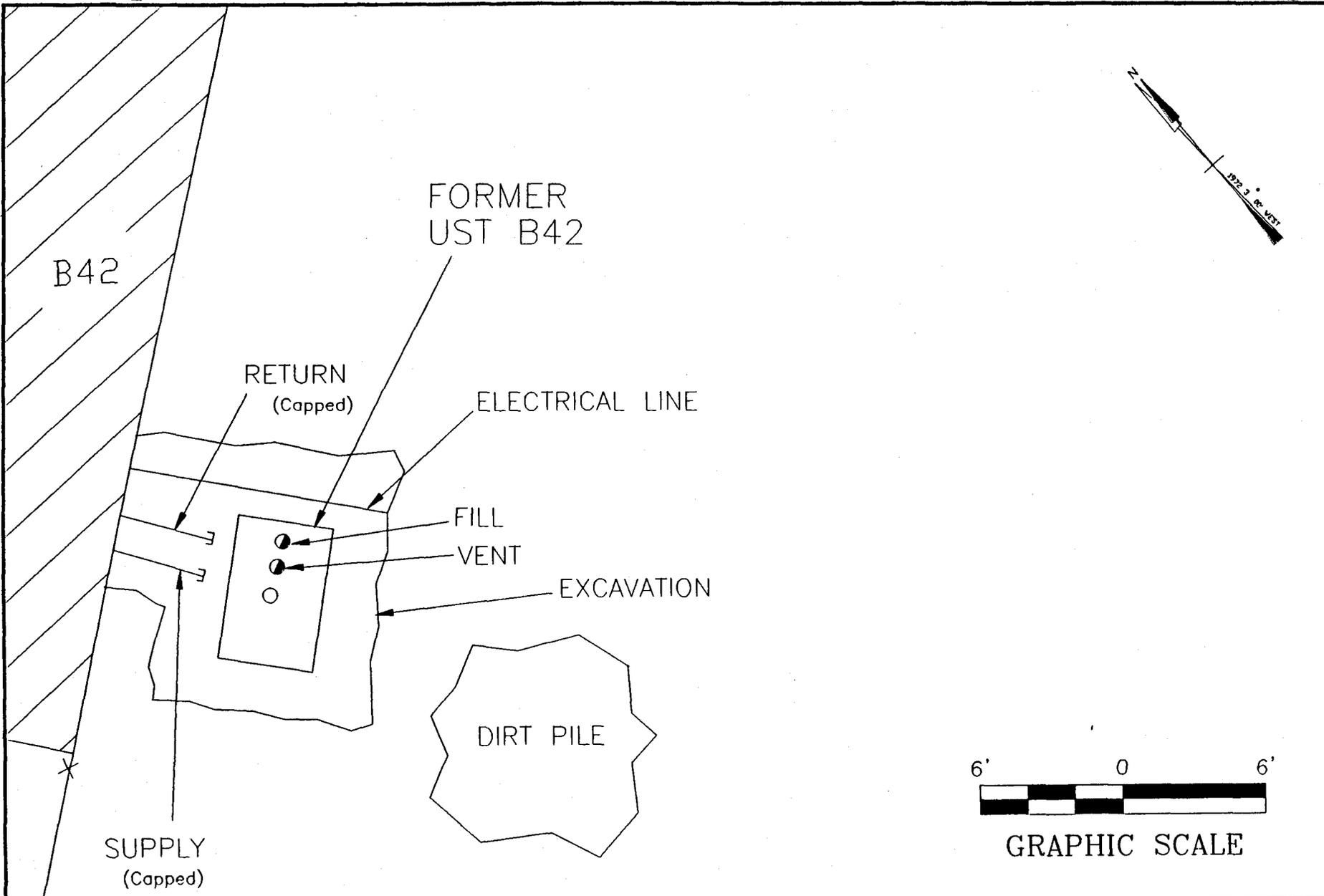
GRAPHIC SCALE

Site Map 1  
UST B42  
Charleston Naval Base  
Charleston, SC

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

DWG NAME: B42\_1

DWG DATE: 11 Dec 96

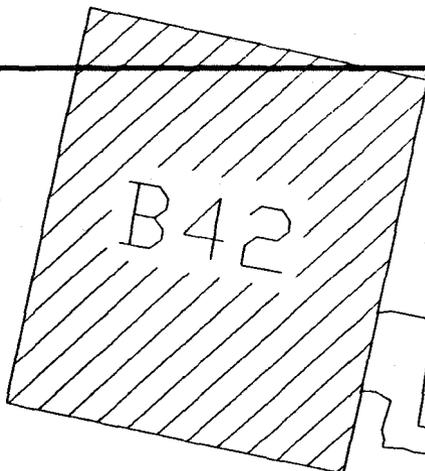
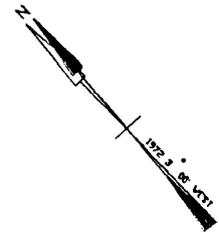


Site Map 2  
 UST B42  
 Charleston Naval Base  
 Charleston, SC

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

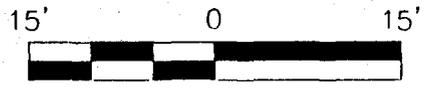
DWG DATE: 11 Dec 96

DWG NAME: B42\_2



EXCAVATION

FORMER UST B42



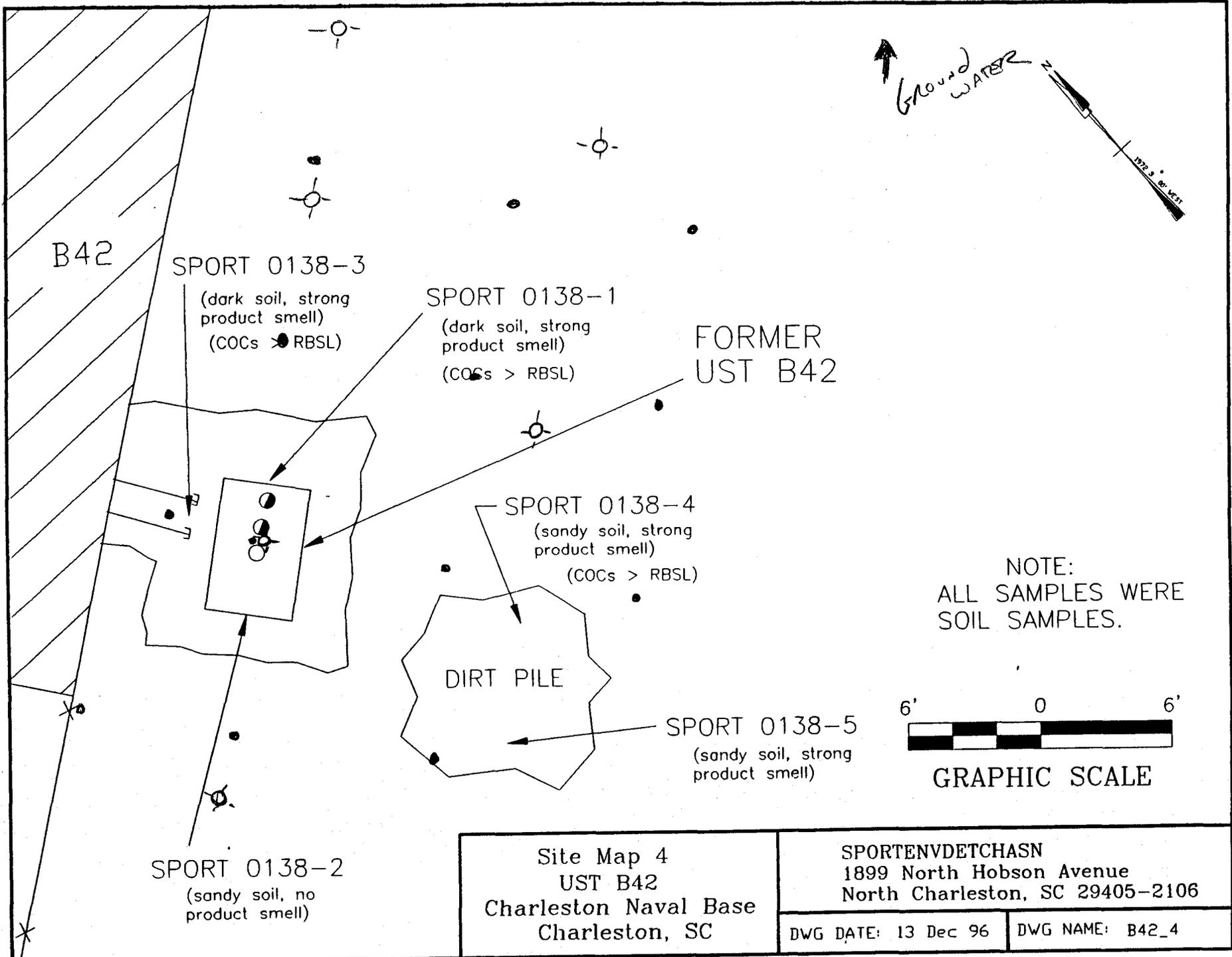
GRAPHIC SCALE

Site Map 3  
UST B42  
Charleston Naval Base  
Charleston, SC

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

DWG DATE: 11 Dec 96

DWG NAME: B42\_3



Site Map 4  
UST B42  
Charleston Naval Base  
Charleston, SC

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

DWG DATE: 13 Dec 96    DWG NAME: B42\_4

UST B42



Photo 1: UST B42 during removal. The 12" hole in the side of the tank was caused by the backhoe during excavation. No product release occurred.

UST B42

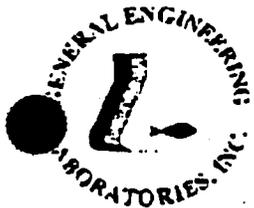


Photo 2: UST B42 during cleaning and dissection. Note the  $\frac{1}{4}$ " hole circled in chalk.

**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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## CERTIFICATE OF ANALYSIS

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 25, 1996

Page 1 of 3

Sample ID : SPORT0138-1  
 Lab ID : 9608328-01  
 Matrix : Soil  
 Date Collected : 08/15/96  
 Date Received : 08/15/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>TEX - 4 items</i>											
Benzene	U	0.00	50.0	100	ug/kg	50.	THL	08/20/96	2124	89190	1
Ethylbenzene	U	41.5	50.0	100	ug/kg	50.					
Toluene		217	50.0	100	ug/kg	50.					
Xylenes (TOTAL)		196	50.0	100	ug/kg	50.					
Naphthalene		5830	100	200	ug/kg	100	THL	08/21/96	1332	89190	1
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	6620	13200	ug/kg	40.	RLC	08/20/96	1450	89027	2
Acenaphthylene	U	0.00	6620	13200	ug/kg	40.					
Anthracene	U	0.00	6620	13200	ug/kg	40.					
Benzo(a)anthracene	U	0.00	6620	13200	ug/kg	40.					
Benzo(a)pyrene	U	0.00	6620	13200	ug/kg	40.					
Benzo(b)fluoranthene	U	0.00	6620	13200	ug/kg	40.					
Benzo(ghi)perylene	U	0.00	6620	13200	ug/kg	40.					
Benzo(k)fluoranthene	U	0.00	6620	13200	ug/kg	40.					
Chrysene	U	0.00	6620	13200	ug/kg	40.					
Dibenzo(a,h)anthracene	U	0.00	6620	13200	ug/kg	40.					
Fluoranthene	U	0.00	6620	13200	ug/kg	40.					
Fluorene	U	0.00	6620	13200	ug/kg	40.					
Indeno(1,2,3-c,d)pyrene	U	0.00	6620	13200	ug/kg	40.					
Naphthalene	J	11000	6620	13200	ug/kg	40.					
Phenanthrene	U	0.00	6620	13200	ug/kg	40.					
Pyrene	U	0.00	6620	13200	ug/kg	40.					

The following prep procedures were performed:  
 CMS Base/Neutral Compounds

TNF 08/17/96 0930 89027 3



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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: NPWCD00196

Report Date: August 26, 1996

Page 3 of 3

Sample ID : SPORT0138-1

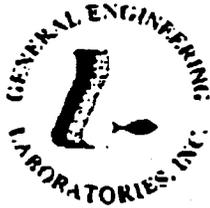
### GEL Laboratory Certifications

### EPI Laboratory Certifications

AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790	WV - 236		

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 Blakney at (803) 769-7386.

  
 Analytical Report Specialist



# GENERAL ENGINEERING LABORATORIES

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## CERTIFICATE OF ANALYSIS

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

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 26, 1996

Page 1 of 3

Sample ID : SPORT0138-2  
 Lab ID : 9608328-02  
 Matrix : Soil  
 Date Collected : 08/15/96  
 Date Received : 08/15/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	5.00	10.0	ug/kg	5.0	THL	08/21/96	1401	89190	1
Ethylbenzene	U	0.00	5.00	10.0	ug/kg	5.0					
Toluene	U	1.40	5.00	10.0	ug/kg	5.0					
Xylenes (TOTAL)	U	0.00	5.00	10.0	ug/kg	5.0					
Naphthalene		11.7	5.00	10.0	ug/kg	5.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	167	333	ug/kg	1.0	RLC	08/20/96	1237	89027	2
Acenaphthylene	U	0.00	167	333	ug/kg	1.0					
Anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	167	333	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	167	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Chrysene	U	0.00	167	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	167	333	ug/kg	1.0					
Fluoranthene	U	0.00	167	333	ug/kg	1.0					
Fluorene	U	0.00	167	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	167	333	ug/kg	1.0					
Naphthalene	U	0.00	167	333	ug/kg	1.0					
Phenanthrene	U	93.2	167	333	ug/kg	1.0					
Pyrene	U	0.00	167	333	ug/kg	1.0					

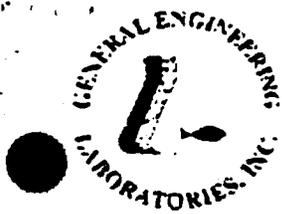
The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 08/17/96 0930 89027 3



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 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 26, 1996

Page 2 of 3

Sample ID : SPORT0138-2

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

**Comments:**

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

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	72.4	(30.0 - 115.)
Nitrobenzene-d5	M610	59.6	(23.0 - 120.)
p-Terphenyl-d14	M610	102.	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	77.8	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	107.	(74.0 - 128.)
Toluene-d8	BTEX-8260	99.9	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	77.8	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	107.	(74.0 - 128.)
Toluene-d8	NAP-8260	99.9	(53.4 - 163.)

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

**Notes:**

The qualifiers in this report are defined as follows:

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

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

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

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

GEL Laboratory Certifications

EPI Laboratory Certifications

\*9608328-02\*

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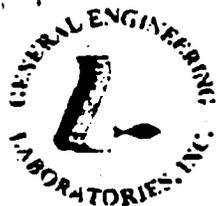


P. 028

TEL: 803-852-5812

GEN. ENGINEERING

13:58 (MON) 96-26 AUG.



# GENERAL ENGINEERING LABORATORIES

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

**Contact:** Mr. Bill Hiers  
**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 26, 1996

Page 3 of 3

Sample ID : SPORT0138-2

### GEL Laboratory Certifications

### EPI Laboratory Certifications

AL - 41040  
CA - 2089  
DE - SC012  
ME - SC012  
NC - 233  
RI - 135  
TN - 02934  
VA - 00151  
WI - 999887790

AZ - AZ0514  
CT - PH-0169  
FL - E8756/87294  
MS - 10120  
NY - 11501  
SC - 10120  
UT - E-251  
WA - C223  
WV - 235

AL - 41050  
CA - I-1023/2056  
FL - E87472/87458  
NY - 11502  
SC - 10582  
UT - E-227  
WA - C225  
PA - 68-485

AZ - AZ0514  
CT - PH-0175  
MS - 79417  
RI - 138  
TN - 02934  
VA - 00111  
NJ - 79002  
WV - 235

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.

  
Analytical Report Specialist

# UST Certificate of Disposal

## CONTRACTOR

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

Telephone (803) 743-6482

## TANK ID & LOCATION

UST B42, Charleston Naval Base, Bldg 42, Hobson Ave., N. Charleston, SC

## DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning  
& Disposal Area  
Charleston Naval Complex

## TYPE OF TANK

Fuel oil

## SIZE (GAL)

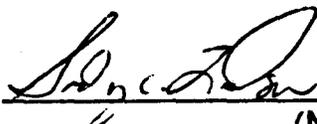
560 gal.

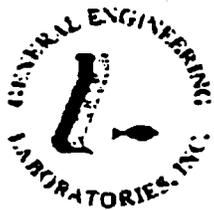
## CLEANING/DISPOSAL METHOD

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

## DISPOSAL CERTIFICATION

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

  
\_\_\_\_\_  
Sidney C. Ladson (Name) 1/2/9/96 (Date)



# GENERAL ENGINEERING LABORATORIES

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## CERTIFICATE OF ANALYSIS

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

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 26, 1996

Page 1 of 3

**Sample ID:** SPORT0138-3  
**Lab ID:** 9608328-03  
**Matrix:** Soil  
**Date Collected:** 08/15/96  
**Date Received:** 08/15/96  
**Priority:** Routine  
**Collector:** Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	50.0	100	ug/kg	50.	THL	08/20/96	2221	89190	1
Ethylbenzene	U	0.00	50.0	100	ug/kg	50.					
Toluene	U	0.00	50.0	100	ug/kg	50.					
Xylenes (TOTAL)	U	0.00	50.0	100	ug/kg	50.					
Naphthalene		3650	50.0	100	ug/kg	50.					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	664	1330	ug/kg	4.0	RLC	08/20/96	1526	89027	2
Acenaphthylene	U	0.00	664	1330	ng/kg	4.0					
Anthracene	U	0.00	664	1330	ng/kg	4.0					
Benzo(a)anthracene	U	0.00	664	1330	ng/kg	4.0					
Benzo(a)pyrene	U	0.00	664	1330	ug/kg	4.0					
Benzo(b)fluoranthene	U	0.00	664	1330	ug/kg	4.0					
Benzo(ghi)perylene	U	0.00	664	1330	ug/kg	4.0					
Benzo(k)fluoranthene	U	0.00	664	1330	ug/kg	4.0					
Chrysene	U	0.00	664	1330	ug/kg	4.0					
Dibenzo(a,h)anthracene	U	0.00	664	1330	ug/kg	4.0					
Fluoranthene	U	0.00	664	1330	ug/kg	4.0					
Fluorene	U	0.00	664	1330	ug/kg	4.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	664	1330	ug/kg	4.0					
Naphthalene	J	1120	664	1330	ng/kg	4.0					
Phenanthrene	U	0.00	664	1330	ug/kg	4.0					
Pyrene	U	0.00	664	1330	ug/kg	4.0					

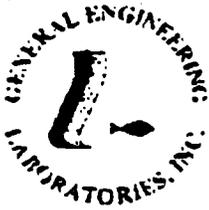
The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 08/17/96 0930 89027 3



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

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 26, 1996

Page 2 of 3

Sample ID : SPORT0138-3

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

A dilution was required for Volatile Organics due to a high concentration of hydrocarbons. A dilution was required for Extractable Organics due to matrix interference.

As a result, the detection limits are elevated.

Surrogate	Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	88.8	(30.0 - 115.)	
Nitrobenzene-d5	M610	67.2	(23.0 - 120.)	
p-Terphenyl-d14	M610	100.	(37.3 - 128.)	
Bromofluorobenzene	BTEX-8260	104.	(59.7 - 159.)	
Dibromofluoromethane	BTEX-8260	105.	(74.0 - 128.)	
Toluene-d8	BTEX-8260	102.	(53.4 - 163.)	
Bromofluorobenzene	NAP-8260	104.	(59.7 - 159.)	
Dibromofluoromethane	NAP-8260	105.	(74.0 - 128.)	
Toluene-d8	NAP-8260	102.	(53.4 - 163.)	

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

### Notes:

The qualifiers in this report are defined as follows:

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

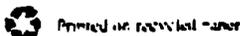
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

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

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

\*9608328-03\*

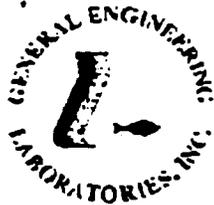
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050 J

2185-758-508-731

GENERAL ENGINEERING LABORATORIES, INC. 10:39 AM 08/26/96



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

**Contact:** Mr. Bill Hiem

**Project Description:** SUPSHIP-Portsmouth Detachment

or: NPWC00196

Report Date: August 26, 1996

Page 3 of 3

Sample ID : SPORT0138-3

### GEL Laboratory Certifications

### EPI Laboratory Certifications

AL - 41040  
 CA - 2089  
 DE - SC012  
 ME - SC012  
 NC - 233  
 RI - 133  
 TN - 02934  
 VA - 00151  
 WI - 999887790

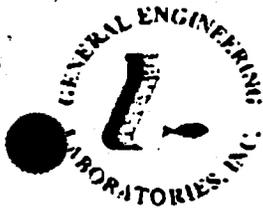
AZ - AZ0514  
 CT - PH-0169  
 FL - E87156/R7294  
 MS - 10120  
 NY - 11501  
 SC - 10120  
 UT - E-251  
 WA - C223  
 WV - 236

AL - 41050  
 CA - I-1023/2056  
 FL - E87472/87458  
 NY - 11502  
 SC - 10582  
 UT - E-227  
 WA - C225  
 PA - 68-485

AZ - AZ0514  
 CT - PH-0175  
 MS - 29417  
 RI - 138  
 TN - 02934  
 VA - 00111  
 NJ - 79002  
 WV - 235

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 Blenkinsy at (803) 769-7386.

Karen Blenkinsy  
 Analytical Report Specialist



# GENERAL ENGINEERING LABORATORIES

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## CERTIFICATE OF ANALYSIS

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

Contact: Mr. Bill Hiem

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWCD00196

Report Date: August 26, 1996

Page 1 of 3

Sample ID : SPORT0138-4  
 Lab ID : 9608328-04  
 Matrix : Soil  
 Date Collected : 08/15/96  
 Date Received : 08/15/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	50.0	100	ug/kg	50.	THL	08/20/96	2250	89190	1
Ethylbenzene	U	0.00	50.0	100	ug/kg	50.					
Toluene	U	0.00	50.0	100	ug/kg	50.					
Xylenes (TOTAL)	U	0.00	50.0	100	ug/kg	50.					
Naphthalene		1370	50.0	100	ug/kg	50.					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	662	1320	ug/kg	4.0	RLC	08/20/96	1559	89027	2
Acenaphthylene	U	0.00	662	1320	ug/kg	4.0					
Anthracene	U	0.00	662	1320	ug/kg	4.0					
Benzo(a)anthracene	U	0.00	662	1320	ug/kg	4.0					
Benzo(a)pyrene	U	0.00	662	1320	ug/kg	4.0					
Benzo(b)fluoranthene	U	0.00	662	1320	ug/kg	4.0					
Benzo(ghi)perylene	U	0.00	662	1320	ug/kg	4.0					
Benzo(k)fluoranthene	U	0.00	662	1320	ug/kg	4.0					
Chrysene	U	0.00	662	1320	ug/kg	4.0					
Dibenzo(a,h)anthracene	U	0.00	662	1320	ug/kg	4.0					
Fluoranthene	U	0.00	662	1320	ug/kg	4.0					
Fluorene	U	0.00	662	1320	ug/kg	4.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	662	1320	ug/kg	4.0					
Naphthalene	U	0.00	662	1320	ug/kg	4.0					
Phenanthrene	U	0.00	662	1320	ug/kg	4.0					
Pyrene	U	0.00	662	1320	ug/kg	4.0					

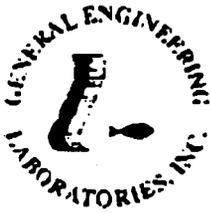
The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 08/17/96 0930 89027 3



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# GENERAL ENGINEERING LABORATORIES

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## CERTIFICATE OF ANALYSIS

<b>Client:</b>	Supervisor of Ship Building & Conversion SUPSHIP-Portsmouth Detachment-Eav. 1899 North Hobson Ave. North Charleston, South Carolina 29405-2106
<b>Contact:</b>	Mr. Bill Hiers
<b>Project Description:</b>	SUPSHIP-Portsmouth Detachment
<b>cc:</b> NPWC00196	<b>Report Date:</b> August 26, 1996
<b>Page 2 of 3</b>	

Sample ID : SPORT0138-4

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

**Comments:**

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

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	89.8	(30.0 - 115.)
Nitrobenzene-d5	M610	75.4	(23.0 - 120.)
p-Terphenyl-d14	M610	98.6	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	76.8	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	106.	(74.0 - 128.)
Toluene-d8	BTEX-8260	101.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	76.8	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	106.	(74.0 - 128.)
Toluene-d8	NAP-8260	101.	(53.4 - 163.)

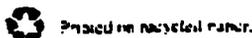
M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

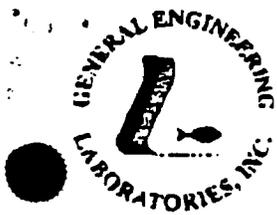
**Notes:**

The qualifiers in this report are defined as follows:

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

GEL Laboratory Certifications	EPI Laboratory Certifications
-------------------------------	-------------------------------





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

**Contact:** Mr. Bill Hiess

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 26, 1996

Page 3 of 3

Sample ID : SPORT0138-4

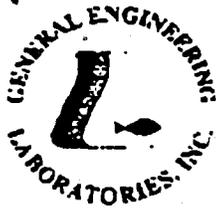
### GEL Laboratory Certifications

### EPI Laboratory Certifications

AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790	WV - 236		

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.

  
Analytical Report Specialist



# GENERAL ENGINEERING LABORATORIES

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## CERTIFICATE OF ANALYSIS

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

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

ac: NPWC00196

Report Date: August 26, 1996

Page 1 of 3

Sample ID : SPORT0138-5  
 Lab ID : 9608328-05  
 Matrix : Soil  
 Date Collected : 08/15/96  
 Date Received : 08/15/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	5.00	10.0	ug/kg	5.0	THL	08/21/96	1430	89190	1
Ethylbenzene	U	0.00	5.00	10.0	ug/kg	5.0					
Toluene	U	0.00	5.00	10.0	ug/kg	5.0					
Xylenes (TOTAL)	U	0.00	5.00	10.0	ug/kg	5.0					
Naphthalene		38.5	5.00	10.0	ug/kg	5.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	167	333	ug/kg	1.0	RLC	08/20/96	1417	89027	2
Acenaphthylene	U	0.00	167	333	ug/kg	1.0					
Anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	167	333	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	167	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Chrysene	U	0.00	167	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	167	333	ug/kg	1.0					
Fluoranthene	U	0.00	167	333	ug/kg	1.0					
Fluorene	U	0.00	167	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	167	333	ug/kg	1.0					
Naphthalene	U	0.00	167	333	ug/kg	1.0					
Phenanthrene	U	153	167	333	ug/kg	1.0					
Pyrene	U	59.9	167	333	ug/kg	1.0					

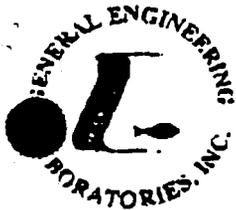
The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNP 08/17/96 0930 89027 3



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# GENERAL ENGINEERING LABORATORIES

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## CERTIFICATE OF ANALYSIS

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 26, 1996

Page 2 of 3

Sample ID : SPORT0138-5

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

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

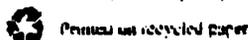
Surrogate Recovery	Test	Percent%	Acceptable Limits
Monobiphenyl	M610	78.8	(30.0 - 115.)
Chlorobenzene-d5	M610	66.4	(23.0 - 120.)
p-Terphenyl-d14	M610	99.4	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	101.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	108.	(74.0 - 128.)
Toluene-d8	BTEX-8260	104.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	101.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	108.	(74.0 - 128.)
Toluene-d8	NAP-8260	104.	(53.4 - 163.)

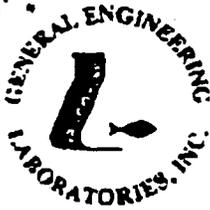
M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

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

GEL Laboratory Certifications

EPI Laboratory Certifications





# GENERAL ENGINEERING LABORATORIES

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 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hies

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: August 26, 1996

Page 3 of 3

Sample ID : SPORT0138-5

### GEL Laboratory Certifications

### EPI Laboratory Certifications

AL - 41040  
 CA - 2089  
 DE - SC012  
 ME - SC012  
 NC - 233  
 RI - 135  
 TN - 02934  
 VA - 00151  
 VI - 999887790

AZ - AZ0514  
 CT - BH-0169  
 FL - B87156/87294  
 MS - 10120  
 NY - 11501  
 SC - 10120  
 UT - E-251  
 WA - C223  
 WV - 136

AL - 41050  
 CA - I-1023/2056  
 FL - E87472/87458  
 NY - 11502  
 SC - 10582  
 UT - E-227  
 WA - C225  
 PA - 68-485

AZ - AZ0514  
 CT - PH-0175  
 MS - 29417  
 RI - 138  
 TN - 02934  
 VA - 00111  
 NJ - 79002  
 WV - 235

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*  
 Analytical Report Specialist

# CHAIN OF CUSTODY RECORD

Page 1 of 1 9608328

Client Name/Facility Name				SAMPLE ANALYSIS REQUIRED (X) - use remarks area to specify specific compounds or methods														Use F or P in the boxes to indicate whether sample was filtered and/or preserved					
SPORTENY DET CHASN				# OF CONTAINERS	pH. conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	CYANIDE	Coliform - specify type	BTEX PLUS NAPHTHALENE	PAH	Remarks		
SAMPLE ID	DATE	TIME	WELL SOIL																			CONP	GRAB
-01	SPORT0138-1	8/15/96	0830	X	X	2														X	X	UST 42-1 soil	.1
-02	SPORT0138-2	8/15/96	0830	X	X	2														X	X	UST 42-2 soil	.1
-03	SPORT0138-3	8/15/96	0830	X	X	2														X	X	UST 42-3 soil	.1
-04	SPORT0138-4	8/15/96	0830	X	X	2														X	X	UST 42-4 soil	.1
-05	SPORT0138-5	8/15/96	0830	X	X	2														X	X	UST 42-5 soil	.1
-06	SPORT0138-6	8/15/96	0830		X	3									X							UST 42 VOA Trip Blank	.2

Relinquished by: <i>[Signature]</i>	Date: 8/15/96	Time: 0930	Received by: W.K. Hiers, Jr.	Relinquished by: W.K. Hiers, Jr.	Date: 8/15/96	Time: 1440	Received by: Kelly M. Bono
Relinquished by: Kelly M. Bono	Date: 8/15/96	Time: 1555	Received by lab by: B. Desormeaux	Date: 8-15-96	Time: 1555	Remarks:	

White = sample collector    Yellow = file    Pink = with report

**Attachment III**

**Certificate of Disposal (tank)**

**APPENDIX B**

**GEOLOGIC BORING LOGS**

# BORING LOG

PROJECT NAME: Site 17 Bldg. B42 BORING NUMBER: CNC-17-B01  
 PROJECT NUMBER: ND124 Zone G DATE: 5-2  
 DRILLING COMPANY: \_\_\_\_\_ GEOLOGIST: S1500  
 DRILLING RIG: 250 / 5000 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									
2							fill		DRY									
3							dk brown sandy silt, some clay		DRY		2							
4			4				lt brown " " some clay		Moist		2							
5							Brown sandy silt		Moist		3							
6							Yellow-Brown " "		"		3							
7							Tan " "		"		2							
X 8			4				Tan-ht. gray " " trace clay		Moist		2							
9							Sandy silt		Wet		2							
10							Med stiff " " with clay		Moist		2							
11							Med. stiff " " with clay		Moist		2							
12			4				" " "		Wet		2							
13							lt gray Silty sand		Saturated		-							
14							lt gray Silty sand		Saturated		-							
15											-							
16			2								-							
							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): 2

Converted to Well: Yes \_\_\_\_\_ No X Well I.D. #: \_\_\_\_\_

# BORING LOG

PROJECT NAME: Site 7 Bldg. B42 BORING NUMBER: CNC 17-B02  
 PROJECT NUMBER: ND124 Zone G DATE: 5-2  
 DRILLING COMPANY: \_\_\_\_\_ GEOLOGIST: SUSCO  
 DRILLING RIG: 250 / 5200 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**
1	/	/	/				Asphalt fill		DRY	/			
2	/	/	/				fill		DRY	/			
3	/	/	/				Sandy silt, trace fill		Moist	2			
4	/	/	4				" " " " fill		Moist	2			
5	/	/	/						Moist	3			
6	/	/	/				Yellow " "		Moist	2			
7	/	/	/				Sandy silt, trace clay		Moist	2			
X 8	/	/	4				Gray " sand clay		Moist	2			
9	/	/	/				Sandy silt, some clay		Moist	2			
10	/	/	/				Silty sand		Wet	5			
11	/	/	/				" " sand clay		Moist	5			
12	/	/	4				Gray Silty sand		Wet	5			
13	/	/	/				" Silty sand		Saturated	/			
14	/	/	/				lt Gray " "		"	/			
15	/	/	/				" "		"	/			
16	/	/	4				" "		"	/			
				EOB									

\* When rock coring, enter rock brokenness.

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

Remarks: \_\_\_\_\_

Drilling Area Background (ppm): 2

Converted to Well: Yes \_\_\_\_\_ No X

Well I.D. #: \_\_\_\_\_

# BORING LOG

PROJECT NAME: Site 17 Bldg. B42  
 PROJECT NUMBER: NO124 Zone G  
 DRILLING COMPANY: \_\_\_\_\_  
 DRILLING RIG: 250/5400

BORING NUMBER: CNC17-B03  
 DATE: 5-2  
 GEOLOGIST: SISCO  
 DRILLER: COLEMAN

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																		
1							Asphalt		Dry									
2							Fill		Dry									
3							dk brown sandy silt		Moist			2						
4			3.5				lt brown " " , fine clay		Moist			2						
5							" " " " " "		moist			2						
6				mottled orange			lt. brown " " , some clay		moist			2						
7							lt gray silty organic clay		moist			50						
8			4				lt. gray silty organic clay		moist			100						
9							lt. gray silty organic clay		wet			10						
10							lt gray " "		moist			20						
11							mottled " "		moist			20						
12			4				olive " silty sand		wet			20						
13									SATURATED									
14									" "									
15									" "									
16			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): 2

Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_



# BORING LOG

PROJECT NAME: Site 17 Bldg. B42 BORING NUMBER: CNC17-B05  
 PROJECT NUMBER: NO124 Zone G DATE: 5-2  
 DRILLING COMPANY: \_\_\_\_\_ GEOLOGIST: S1500  
 DRILLING RIG: 250 / 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							asphalt										
1							asphalt/fill		dry								
2							fill		dry								
3							brown sandy silt		dry		~3						
4			3'				gravel										
5							gravel and asphalt										
6						lt brown	sandy silt		moist		~3						
7						dk gray	" " "		moist		~70						
8			4'			dk gray	sandy silt		petroleum odor		~70						
9							gravel and rock		dry								
10							fill/gravel		dry		20						
11						dk gray	sandy silt		moist		60						
12			4'			olive	sandy silt		moist		60						
13							<del>sandy silt</del>		<del>saturated</del>								
14							<del>sandy silt</del>		<del>saturated</del>								
15							<del>gravel fill</del>		<del>saturated</del>								
16			4'				<del>sandy silt</del>		<del>saturated</del>								
13							gravel		diesel odor								
14						lt gray	sandy silt		saturated								
15						and olive	sandy silt		saturated/odor?								
16			4'			" "	sandy silt		saturated/odor?								
17									saturated								
18									"								
19									"								
20			0.5			lt gray	sandy silt		"								
21																	

0.075

\* 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 17 Bldg. B42 BORING NUMBER: CNC17-B05  
 PROJECT NUMBER: ND124 Zone G DATE: 5-2  
 DRILLING COMPANY: \_\_\_\_\_ GEOLOGIST: SISCO  
 DRILLING RIG: 250 / 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**					
22	<del>26</del>	/																
23	<del>27</del>	/																
24	<del>28</del>	/	○							Saturated								
25	<del>29</del>	/																
26	<del>30</del>	/																
27		/																
28		/	○							11								
		/		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: Site 17 Bldg. B42 BORING NUMBER: CNC 17-BP6  
 PROJECT NUMBER: NO124 Zone G DATE: 5-3  
 DRILLING COMPANY: \_\_\_\_\_ GEOLOGIST: S/Sgt  
 DRILLING RIG: 250/5400 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**	Drillet BZ**					
	0																	
	1						asphalt (3")		dry									
	2				dk brown		sandy silt		dry		2							
	3				orange		silty sand		dry		2							
	4		3.5'		orange		" "		moist		2							
	5			med. stiff	orange		silty clay trace sand		moist		3							
	6				orange		sand silt some clay		moist		3							
	7				orange		silty sand		moist		3							
	8		4'		orange/brown		silty clayey sand		moist		3							
X	9				mottled		silty clay		moist		3							
	10				orange w/ olive		silty sand trace clay		moist		3							
	11						silty sand		wet		3							
	12		4'				" " tr. clay		wet		3							
	13				lt. brown		silty sand		saturated		-							
	14				lt. brown		" "		saturated		-							
	15						" "		saturated		-							
	16		3'		lt. brown		" "		saturated		-							
				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): 2

Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_

# BORING LOG

PROJECT NAME: Site 17 Bldg. B42 BORING NUMBER: CNC17- B07  
 PROJECT NUMBER: ND24 Zone G DATE: 5-3  
 DRILLING COMPANY: \_\_\_\_\_ GEOLOGIST: SISEO  
 DRILLING RIG: 250 / 5400 DRILLER: COL-EMAN

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		DRY								
2						Brown	Gill		DRY								
3						Overexposed	Silty sand		DRY			2					
4			4			" "	Sandy silt		Moist			2					
5						" "	Silty sand tr. clay		"			2					
6						" "	" "		"			2					
7						H. gray	Silty sand tr. clay		"			3					
8			4			H. gray	Sandy silt		"			2					
X 9							Silty sand		Moist			2					
X 10							Silty clay		Wet			3					
11							" "		Moist			5					
12			4				Silty sand		Wet			3					
13							Silty sand		Saturated								
14							" "		"								
15							" "		"								
16			3.5				" "		Wet								
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	

\* When rock coring, enter rock brokenness.

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

Remarks: EOB at 28 ft

Drilling Area Background (ppm): 2

Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_



# BORING LOG

PROJECT NAME: Site 17 Bldg. B4Z BORING NUMBER: 17-B09  
 PROJECT NUMBER: ND124 DATE: 5-3  
 DRILLING COMPANY: \_\_\_\_\_ GEOLOGIST: SISEO  
 DRILLING RIG: 250/5400 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		Dry								
	2	/					fill, sandy silt		Dry								
	3	/					Sandy silt		Moist								
	4	/	3.5				" "		Moist								
	5	/					Sandy silt		"								
	6	/					" " some clay		"								
	7	/					Silty sand some clay		"								
	8	/	4				Silty sand		Moist								
	9	/					" " fr. clay		"								
X	10	/					Silty clay		"								
X	11	/					" "		"								
	12	/	4				Silty sand		Wet								
	13	/					Silty sand		Saturated								
	14	/					" "		"								
	15	/					" "		"								
	16	/	4				" " fr. clay		Wet								

SYZON  
ODOR

\* 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  Well I.D. #: \_\_\_\_\_

Drilling Area Background (ppm): 3

# BORING LOG

PROJECT NAME: Chas. Naval Complex BORING NUMBER: CNC17-mw06D  
 PROJECT NUMBER: 02A / site 17 / Zone # 9 DATE: 6/21/99  
 DRILLING COMPANY: Coastal Drilling Co. GEOLOGIST: Mark Darrington  
 DRILLING RIG: B-61 Mobile DRILLER: Darnell Martin

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	0																	
	↓																	
1	15	4/2	0"	15														
	↓	2/2																
2	17	3/6	18"	17.5	dk br or													
	↓	7/10																
	19				dk grey													
3	19	3/3	3"		dk grey													
	↓	5/6																
	21																	
					<p>19-20' interval -- Upon returning the S.S. sampler, it was noted that the formation @ 19-20' was so tight or created such a suction that the 3" stainless tip to the S.S. sampler was pulled off.</p> <p>⊕ TO set surface casing, 6" Ø PVC, (S.C.) to 20 ft. bl. - TO create pilot hole to 20 ft.</p>													

When rock coring, enter rock brokenness.  
 Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.  
 marks: \_\_\_\_\_  
 Drilling Area Background (ppm): 0.0  
 Inverted to Well: Yes  No \_\_\_\_\_ Well I.D. #: CNC17-mw06D

# BORING LOG

PROJECT NAME: CNC Site 17 BORING NUMBER: CNC17-MU06 D  
 PROJECT NUMBER: ND124 Bldg: B42 DATE: 4/22/78  
 DRILLING COMPANY: Custom GEOLOGIST: Marty Ray  
 DRILLING RIG: \_\_\_\_\_ DRILLER: Rod

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/F) 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**		
1	21'	10 6"			Soft	light grey	sand medium to fine poorly sorted wet								
		10 6"													
		10 6"	15 1/2					some shell hash.							
	23'	7 6"						last 2" fine silty sand poorly sorted of grain to coarse grain wet							
2	23'	4 6"			Soft	light grey	course sand poorly sorted wet, some shell hash phosphate flecks throughout								
		7 6"	15 1/2												
		7 6"				Firm		sandy silt. olive in color wet to moist.							
	25'	4 6"													
3	25'	7 6"			Soft	grey	course sand (very course) trace silt well sorted								
		4 6"													
		7 6"				Firm									
	27'	7 6"				dry		Clay plastic with phosphate flakes throughout							
4	27'	6"													
		6"													
	29'	6"													
5	29'	6"													
		6"													
		6"													
	31'	6"													

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

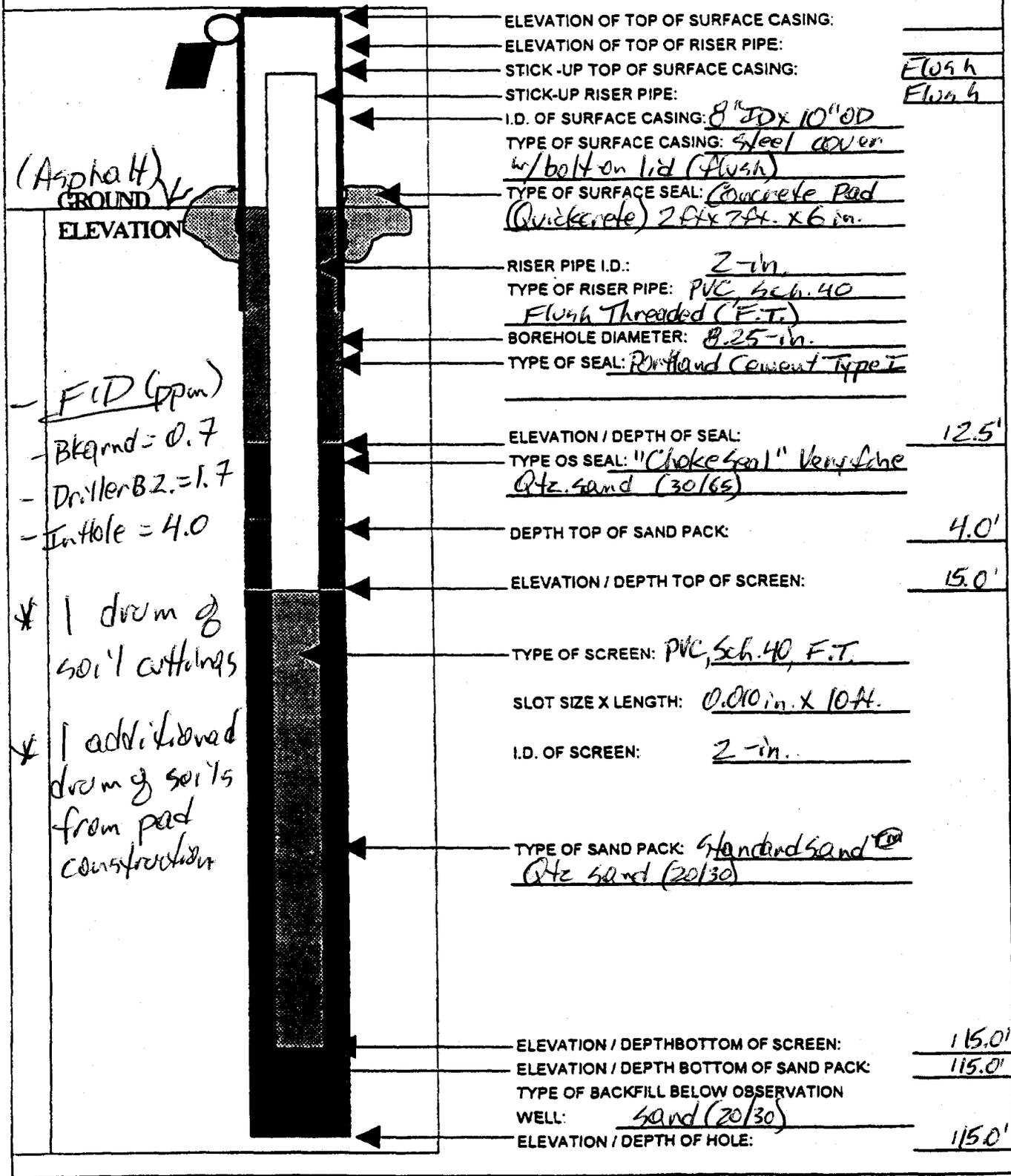
Remarks: \_\_\_\_\_ Drilling Area Background (ppm):

Converted to Well: Yes \_\_\_\_\_ No \_\_\_\_\_ Well I.D. #: \_\_\_\_\_

OVERBURDEN MONITORING WELL SHEET

Zone F Zone G

PROJECT <u>Chas. Naval Complex</u>	LOCATION: <u>Site 17 / Zone G</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>0127-0219</u>	BORING <u>CNK17-MW01</u>	METHOD: <u>DPT 4.25-in. HSA</u>
ELEVATION <u>062194</u> <u>SIX 17</u> <u>NO 124</u>	DATE <u>6/16/99</u>	DRILLING <u>Darrell Martin</u>
FIELD GEOLOGIST <u>Mark Dancino</u>		DEVELOPMENT: <u>NA</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" JD x 10" OD

TYPE OF SURFACE CASING: Steel cover w/ bolt on lid (Flush)

TYPE OF SURFACE SEAL: Concrete Pad (Quikrete) 2 ft x 7 ft x 6 in.

RISER PIPE I.D.: 2-in.

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

BOREHOLE DIAMETER: 8.25-in.

TYPE OF SEAL: Portland Cement Type I

ELEVATION / DEPTH OF SEAL: 12.5'

TYPE OF SEAL: "Choke Seal" Very fine Qtz. sand (30/65)

DEPTH TOP OF SAND PACK: 4.0'

ELEVATION / DEPTH TOP OF SCREEN: 15.0'

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

SLOT SIZE X LENGTH: 0.010 in. x 10 ft.

I.D. OF SCREEN: 2-in.

TYPE OF SAND PACK: Standard sand (20/30) Qtz sand (20/30)

ELEVATION / DEPTH BOTTOM OF SCREEN: 115.0'

ELEVATION / DEPTH BOTTOM OF SAND PACK: 115.0'

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

ELEVATION / DEPTH OF HOLE: 115.0'

(Asphalt)  
GROUND  
ELEVATION

- FID (ppm)  
- Background = 0.7  
- Driller B.2. = 1.7  
- In hole = 4.0

\* 1 drum of soil cuttings

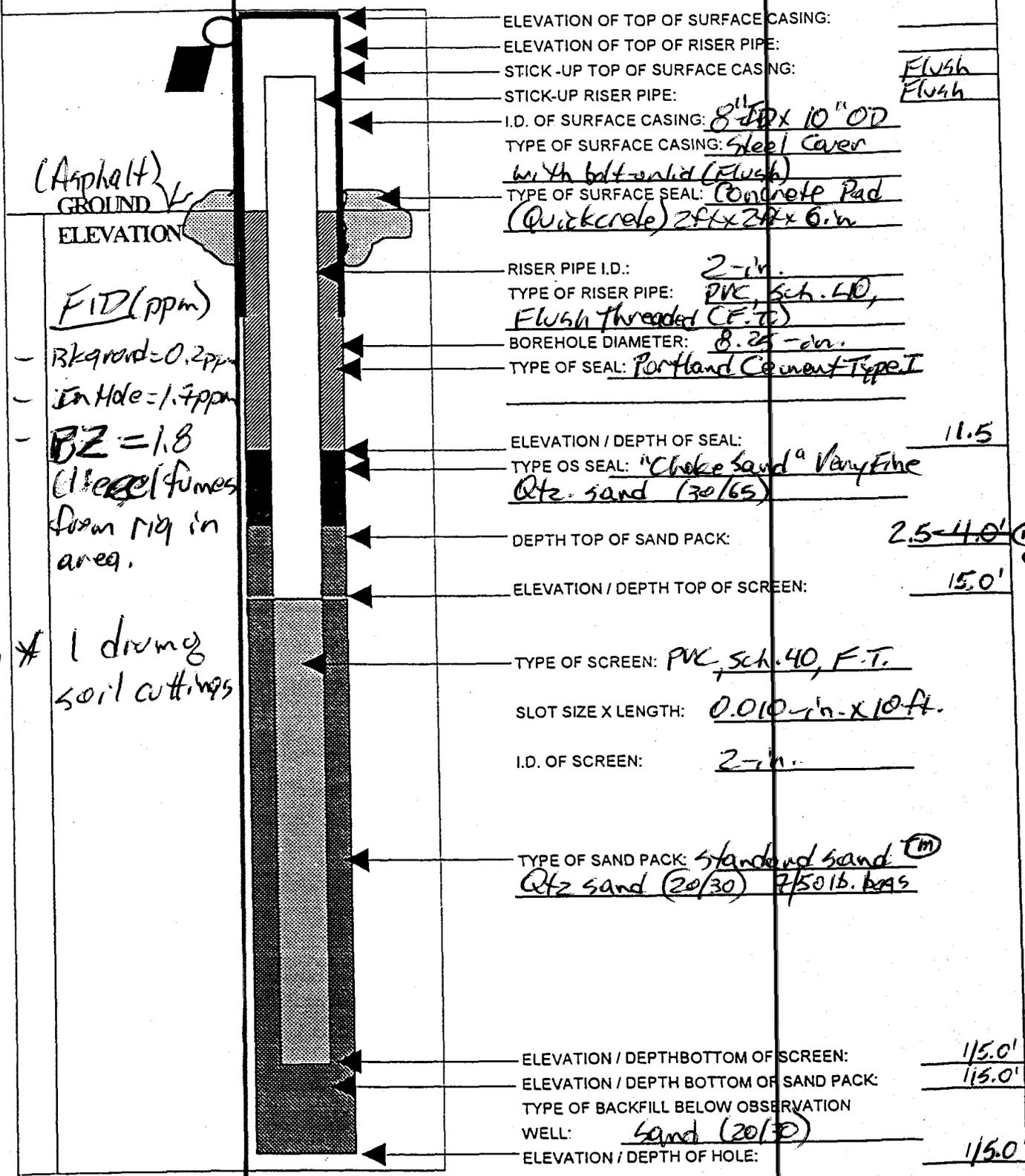
\* 1 additional drum of soils from pad construction

BORING N°

# OVERBURDEN MONITORING WELL SHEET

Zone F Zone G

PROJECT <u>Chas. Naval Complex</u>	LOCATION: <u>Site 17/B42</u>	DRILLER <u>Custom L</u>
PROJECT NO. <u>024-0124</u>	BORING <u>CNC17-mw02</u>	METHOD: <u>DPT 4.25-...</u>
ELEVATION <u>Site 17</u>	DATE <u>6/16/99</u>	DRILLING <u>Darrell Martin</u>
FIELD GEOLOGIST <u>Mark Darrington</u>		DEVELOPMENT: <u>NA</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" ID x 10" OD

TYPE OF SURFACE CASING: Steel Cover with bolt-on lid (Flush)

TYPE OF SURFACE SEAL: Concrete Pad (Quickcrete) 2ft x 2ft x 6 in.

RISER PIPE I.D.: 2-in.

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

BOREHOLE DIAMETER: 8.25-in.

TYPE OF SEAL: Portland Cement Type I

ELEVATION / DEPTH OF SEAL: 11.5

TYPE OF SEAL: "Choke sand" Very Fine Qtz. sand (30/65)

DEPTH TOP OF SAND PACK: 2.5-4.0' (mm) 6/16/99

ELEVATION / DEPTH TOP OF SCREEN: 15.0'

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

SLOT SIZE X LENGTH: 0.010-in. x 10 ft.

I.D. OF SCREEN: 2-in.

TYPE OF SAND PACK: Standard sand (m) Qtz sand (20/30) 7/50 lb. bags

ELEVATION / DEPTH BOTTOM OF SCREEN: 115.0'

ELEVATION / DEPTH BOTTOM OF SAND PACK: 115.0'

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

ELEVATION / DEPTH OF HOLE: 115.0

(Asphalt) GROUND

ELEVATION

FID (ppm)

- Background = 0.2 ppm
- In Hole = 1.7 ppm
- BZ = 1.8

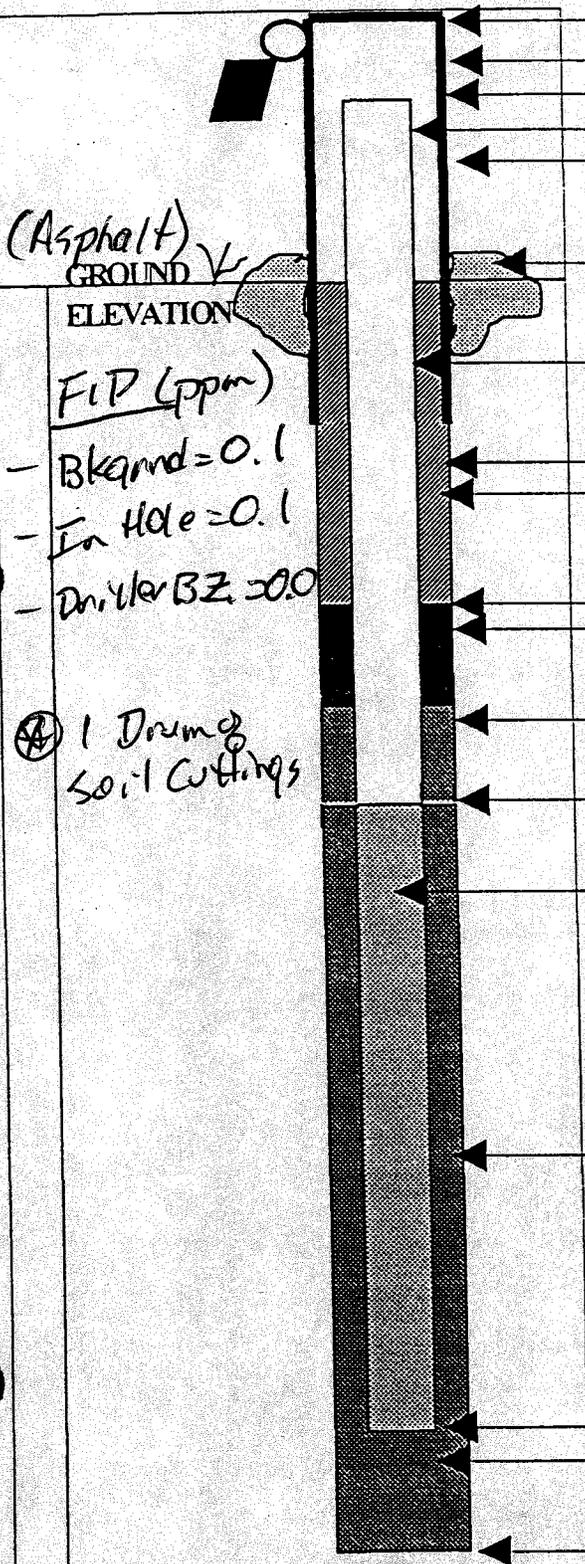
(Clear fumes from 10' in area.)

\* 1 drawing soil cuttings

# OVERBURDEN MONITORING WELL SHEET

Zone F Zone G

PROJECT <u>Chas Naval Complex</u>	LOCATION: <u>S, Ye 17 (B42)</u>	DRILLER <u>Cosmos Dr</u>
PROJECT NO. <u>062104-0124-0219NO124</u>	BORING <u>CUC017-MW03</u>	METHOD: <u>DPT 4.25" H</u>
ELEVATION <u>Site 17</u>	DATE <u>6/16/99</u>	DRILLING <u>Daved Martin</u>
FIELD GEOLOGIST <u>Mark Darrington</u>		DEVELOPMENT: <u>NA</u>

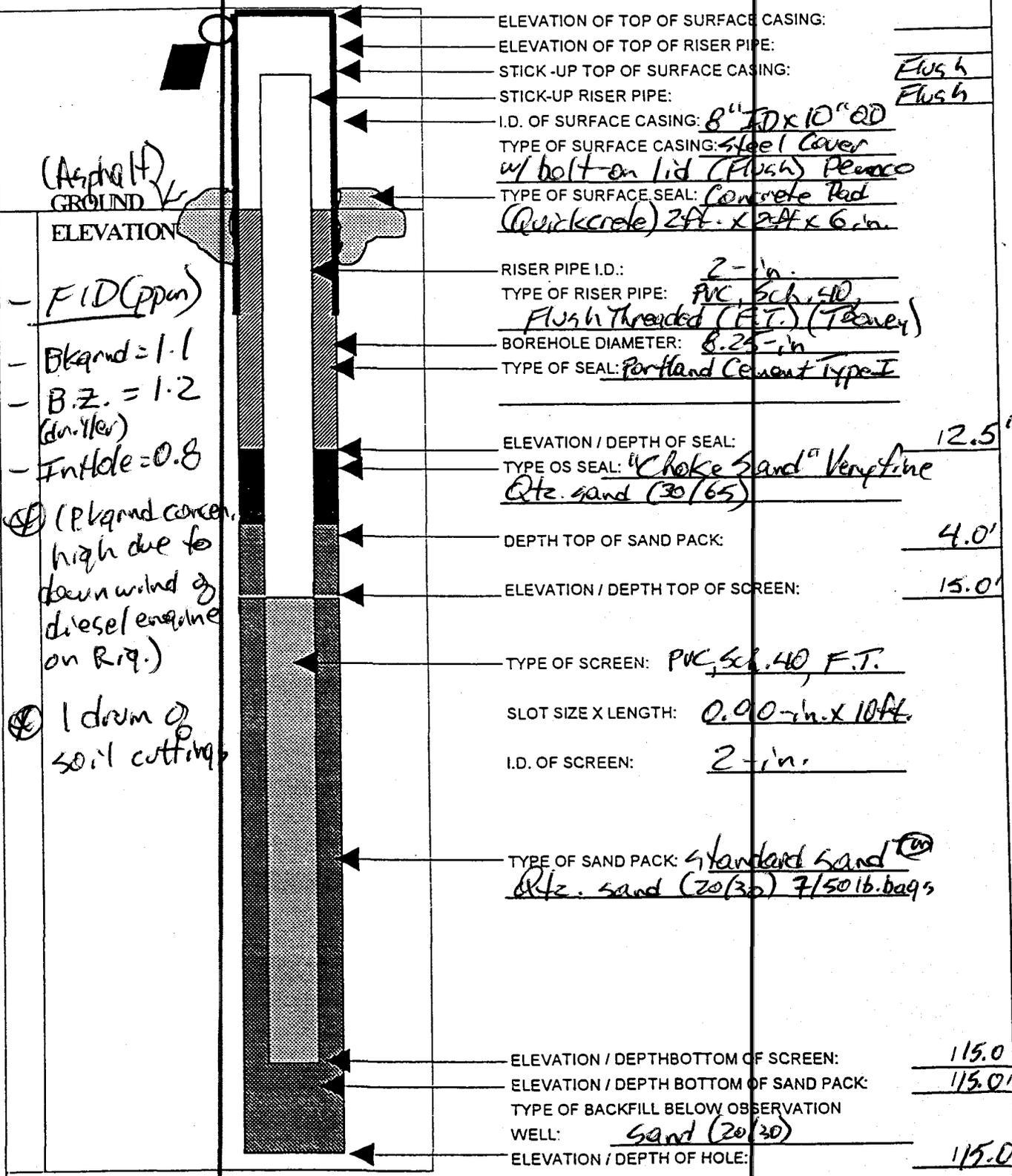


ELEVATION OF TOP OF SURFACE CASING:	
ELEVATION OF TOP OF RISER PIPE:	
STICK-UP TOP OF SURFACE CASING:	<u>Flush</u>
STICK-UP RISER PIPE:	<u>Flush</u>
I.D. OF SURFACE CASING:	<u>8" ID x 10" OD</u>
TYPE OF SURFACE CASING:	<u>Steel Cover with bolt-on lid (Flush) pemco</u>
TYPE OF SURFACE SEAL:	<u>Concrete Pad (Quickcrete) 2 ft x 2 ft x 6 inch</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>12.5'</u>
TYPE OF SEAL:	<u>"Choke Sand" Very Fine Sand (30/60)</u>
DEPTH TOP OF SAND PACK:	<u>4.0'</u>
ELEVATION / DEPTH TOP OF SCREEN:	<u>5.0'</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) 7/50 lb. bags</u>
ELEVATION / DEPTH BOTTOM OF SCREEN:	<u>115.0'</u>
ELEVATION / DEPTH BOTTOM OF SAND PACK:	<u>115.0'</u>
TYPE OF BACKFILL BELOW OBSERVATION WELL:	<u>sand (20/30)</u>
ELEVATION / DEPTH OF HOLE:	<u>115.0'</u>

OVERBURDEN MONITORING WELL SHEET

Zone F Zone G

PROJECT <u>Chas. Nodal Complex</u>	LOCATION: <u>Site 17/842</u>	DRILLER <u>Custon Dr</u>
PROJECT NO. <u>062199-024-0219</u>	BORING <u>CNC17-MW01</u>	METHOD: <u>DPT 4.25-in H</u>
ELEVATION <u>ND124</u>	DATE <u>6/16/99</u>	DRILLING <u>Darrell Martin</u>
FIELD GEOLOGIST <u>Mark Darrington</u>		DEVELOPMENT: <u>NA</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" ID x 10" OD

TYPE OF SURFACE CASING: Steel Cover w/ bolt-on lid (Flush) Permaco

TYPE OF SURFACE SEAL: Concrete Pad (Quickcrete) 2ft. x 2ft x 6 in.

RISER PIPE I.D.: 2-in.

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

BOREHOLE DIAMETER: 8.25-in

TYPE OF SEAL: Portland Cement Type I

ELEVATION / DEPTH OF SEAL: 12.5'

TYPE OF SEAL: "Choke Sand" Very fine Qtz. sand (30/65)

DEPTH TOP OF SAND PACK: 4.0'

ELEVATION / DEPTH TOP OF SCREEN: 15.0'

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

SLOT SIZE X LENGTH: 0.90-in. x 10ft.

I.D. OF SCREEN: 2-in.

TYPE OF SAND PACK: Standard Sand (R) Qtz. sand (20/30) 7/50 lb. bags

ELEVATION / DEPTH BOTTOM OF SCREEN: 115.0'

ELEVATION / DEPTH BOTTOM OF SAND PACK: 115.0'

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

ELEVATION / DEPTH OF HOLE: 115.0'

(Asphalt) GROUND ELEVATION

- FID (ppm)
- Bk and = 1:1
- B.Z. = 1:2 (du. Ylev)
- Int Hole = 0.8

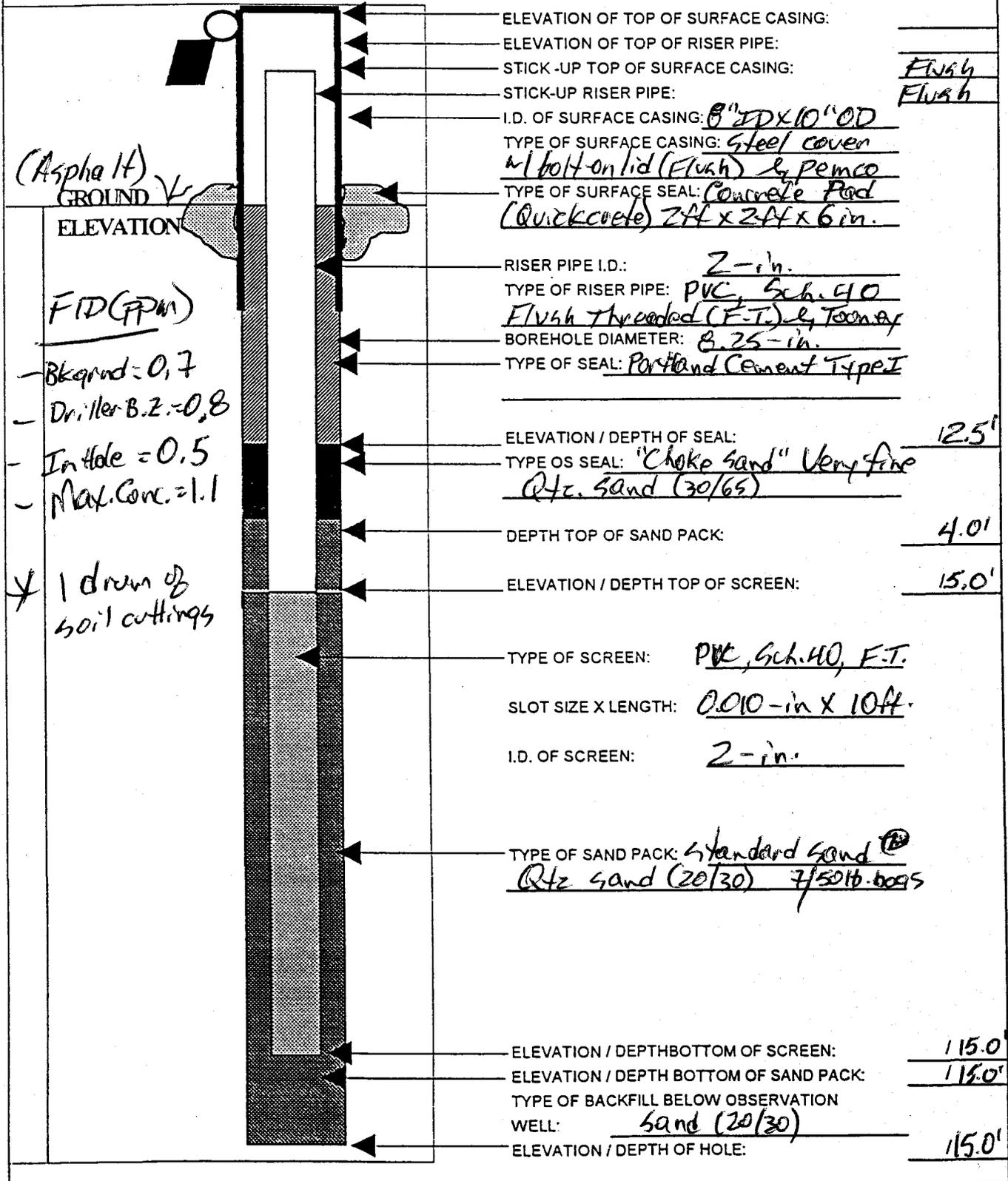
⊕ (Pbk and concn. high due to down wind of diesel engine on Riq.)

⊕ 1 drum of soil cuttings

OVERBURDEN MONITORING WELL SHEET

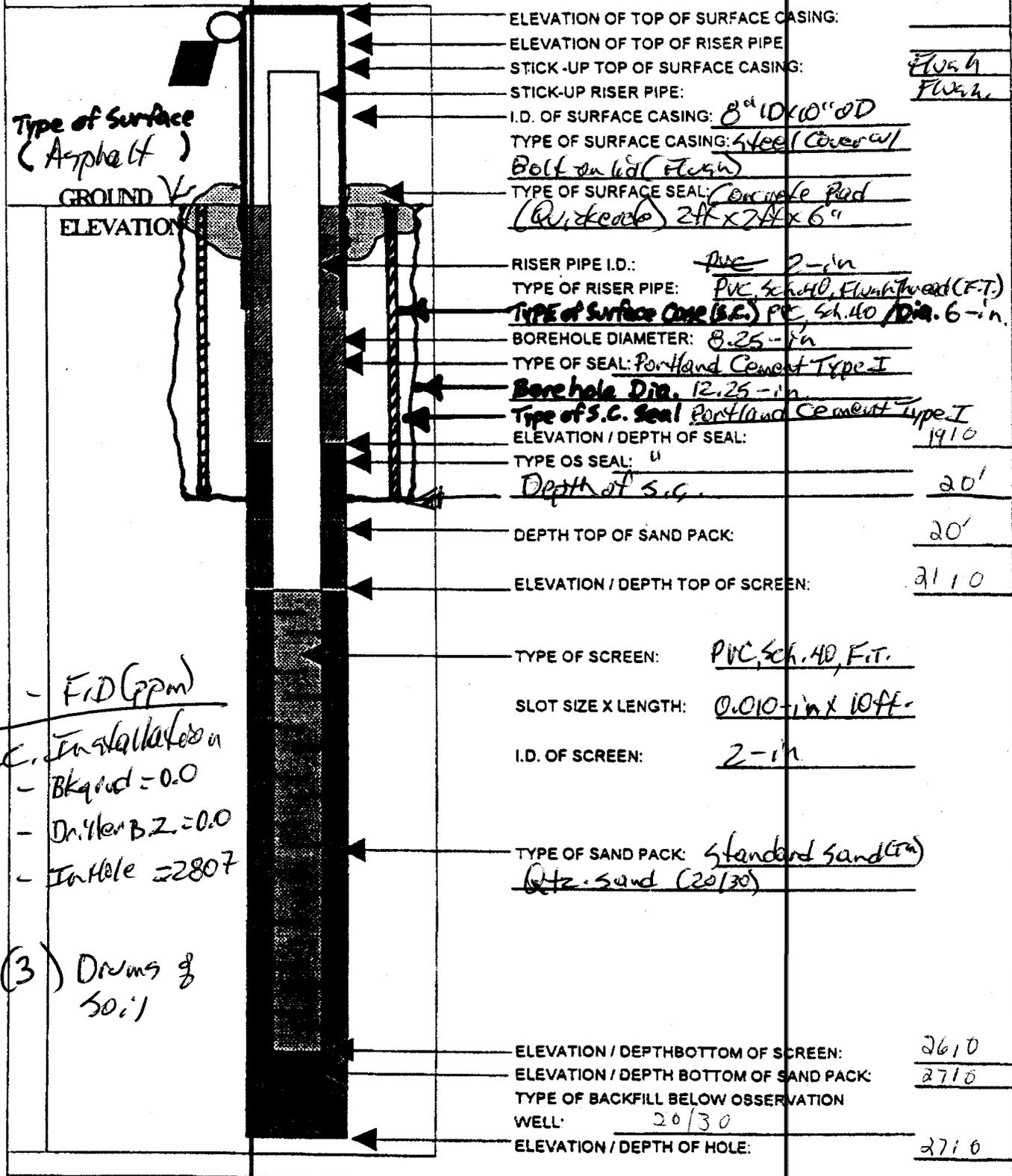
Zone F Zone G

PROJECT <u>Chas. Naval Complex</u>	LOCATION: <u>Site 17 / B42</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>0124</u> <del>0124</del> <u>0124</u>	BORING <u>CNC17-MW05</u>	METHOD: <u>DPT 4.25" HSA</u>
ELEVATION <u>062199</u>	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

PROJECT <u>Chas. Naval Complex</u>	LOCATION: <u>Site 17/Zone F G</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>0219 0124</u>	BORING <u>CNC17-MW06D</u>	METHOD: <u>8.25 HSA /</u>
ELEVATION _____	DATE <u>6/21/99</u>	DRILLING <u>Darrell Martin</u>
FIELD GEOLOGIST <u>Mark Damington</u>		DEVELOPMENT: _____
<b>Boring Methods: <u>Surface Casing; 8.25 HSA / Finer Casing</u></b>		



- FrD (ppm)  
 S.C. Installed on  
 - Bk aquid = 0.0  
 - Driller B.Z. = 0.0  
 - In Hole = 2807

(3) Drawings of 50:1

**APPENDIX C**

**FIELD SAMPLING DATA SHEETS**

# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name:	<u>Site 17 Bldg. B42</u>	Sample ID No.:	<u>17SLB01-0708</u>
Project No.:	<u>N0124 Zone G</u>	Sample Location:	_____
<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>5/17/99</u>	<u>7-8'</u>	<u>orange</u>	<u>clay sand</u>
Time: <u>1050</u>			
Method: _____			
Monitor Reading (ppm): <u>1</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 40oz jar</u>	<u>/</u>	
<u>BTEX</u>	<u>4 encore</u>	<u>/</u>	

OBSERVATIONS / NOTES:	MAP:

Circle if Applicable:	Signature(s):		
<table style="width: 100%;"> <tr> <td style="width: 50%;"><input type="checkbox"/> MS/MSD</td> <td style="width: 50%;">Duplicate ID No.:</td> </tr> </table>	<input type="checkbox"/> MS/MSD	Duplicate ID No.:	<u>Janet Banknight</u>
<input type="checkbox"/> MS/MSD	Duplicate ID No.:		

# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Project 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:	Site 17 Bldg. B42 NO 124 Zone G	Sample ID No.: 17SLB01-0809 Sample Location: Sampled By: JA/JB C.O.C. No.:  Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
--	------------------------------------	---

GRAB SAMPLE DATA:				
Date:	Time:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
5/17/99	1105	8-9'	orangish brown	sandy clay
Method:				
Monitor Reading (ppm): 5				

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

SAMPLE COLLECTION INFORMATION:				
Analysis	Container Requirements	Collected	Other	
PAH	1 4oz jar	✓		
BTEX	4 Encores	✓		

OBSERVATIONS / NOTES:	MAP:

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

# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name:	<u>Site 17 Bldg. B4Z</u>	Sample ID No.:	<u>17SLB03-0506</u>
Project No.:	<u>N0124 Zone G</u>	Sample Location:	
<input type="checkbox"/> Surface Soil		Sampled By:	<u>JA/JB</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>5/17/99</u>	<u>5-6'</u>	<u>Orange mottled</u>	<u>Sandy clay</u>
Time: <u>1210</u>			
Method:			
Monitor Reading (ppm): <u>1</u>			

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

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>TOC - FOC</u>	<u>1 4oz jar</u>	<u>✓</u>	
<u>TPH</u>	<u>1 4oz jar</u>	<u>✓</u>	
<u>PAH</u>	<u>1 4oz jar</u>	<u>✓</u>	
<u>BTEX</u>	<u>4 EnCore</u>	<u>✓</u>	
<u>Grain Size Hydrometer</u>	<u>2 32oz jars</u>	<u>✓</u>	

OBSERVATIONS / NOTES:	MAP:
<u>Bored twice to get enough sample</u>	

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

# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Project 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:	Site 17 Bldg. B42 NC124 Zone G	Sample ID No.: <u>17SLB04-0304</u> Sample Location: Sampled By: <u>JA/JB</u> C.O.C. No.:  Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
--	-----------------------------------	---

GRAB SAMPLE DATA:				
Date:	5/17/99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	1115	3-4'	orangish brown	sandy & clay
Method:				
Monitor Reading (ppm):	0			

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	
PAH	1 4oz jar	✓		
BTEX	4 Encore	✓		

OBSERVATIONS / NOTES:	MAP:

Circle if Applicable: MS/MSD <u>17SLB04-0304M</u>	Duplicate ID No.:  Signature(s): <i>Janet Bonknight</i>
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*Richard ...*

# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: <u>Site 17 Bldg. B42</u>	Sample ID No.: <u>17SLB05-0708</u>
Project No.: <u>N0124 Zone G</u>	Sample Location: _____
<input type="checkbox"/> Surface Soil	Sampled By: <u>JA/JB</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>5/17/99</u>	<u>7-8'</u>	<u>orange grey mud</u>	<u>sandy clay</u>
Time: <u>1200</u>			
Method: _____			
Monitor Reading (ppm): <u>3</u>			

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

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 EnCores</u>	<input checked="" type="checkbox"/>	

OBSERVATIONS / NOTES:	MAP:

Circle if Applicable:	Duplicate ID No.:	Signature(s):
<input type="checkbox"/> MS/MSD	<u>17SLB05-0708D</u>	<u>Janet Bokenight</u>

# SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: Project 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	<u>Site 17 Bldg. B42</u> <u>N0124 Zone 9</u>	Sample ID No.: <u>17SLB07-0809</u> Sample Location: Sampled By: <u>JA/JTB</u> C.O.C. No.:  Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
---	---	--

**GRAB SAMPLE DATA:**

Date: <u>5/17/99</u>	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1140</u>	<u>8-9'</u>	<u>orange? yellow</u> <del>red mottled</del>	<u>sandy clay</u>
Method:			
Monitor Reading (ppm): <u>0</u>			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other
<u>PAH</u>	<u>1 4oz jar</u>	<u>✓</u>	
<u>BTEX</u>	<u>4 En Core</u>	<u>✓</u>	

**OBSERVATIONS / NOTES:**

**MAP:**

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**Circle if Applicable:**

**Signature(s):**

MS/MSD	Duplicate ID No.:	<u>Janet Banknight</u>
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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name:	<u>Site 17 Bldg. B4Z</u>	Sample ID No.:	<u>17SLB09-0708</u>
Project No.:	<u>NO124 Zone G</u>	Sample Location:	
<input type="checkbox"/> Surface Soil		Sampled By:	<u>JA/JB</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>5/17/99</u>	<u>7-8'</u>	<u>orange &amp; grey mottled</u>	<u>clay sand moist</u>
<u>1425</u>			
Method:			
Monitor Reading (ppm): <u>3</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:**

Drilled to 11ft

**MAP:**

**Circle if Applicable:**

<b>MS/MSD</b>	<b>Duplicate ID No.:</b>
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Signature(s): Janet Banknight













# GROUNDWATER SAMPLE LOG SHEET

Page      of     

Project Site Name: <u>CNG17 Bldg. B42</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>17GLM0191</u> Sample Location: <u>MW-1</u> Sampled By: <u>JA/RW</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>7-20-99</u>									
<u>1446</u>									
Method:									

PURGE DATA:									
Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	
<u>7-20-99</u>									
Method: <u>Slow Purge</u>	Initial	<u>5.95</u>	<u>625</u>	<u>28.8</u>	<u>27</u>	<u>2.45</u>			
Monitor Reading (ppm):	1	<u>5.63</u>	<u>408</u>	<u>28.7</u>	<u>15</u>	<u>2.00</u>			
Well Casing Diameter & Material	2	<u>5.67</u>	<u>393</u>	<u>28.4</u>	<u>8</u>	<u>2.60</u>			
Type: <u>P.V.C. 2"</u>	3	<u>5.68</u>	<u>388</u>	<u>28.4</u>	<u>8</u>	<u>2.60</u>			
Total Well Depth (TD):	<u>15.04</u>								
Static Water Level (WL):	<u>2.25</u>								
One Casing Volume(gal/L):	<u>1.04</u>								
Start Purge (hrs):	<u>1340</u>								
End Purge (hrs):	<u>1444</u>								
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

SAMPLE COLLECTION INFORMATION:				
Analysis	Preservative	Container Requirements	Collected	
<u>BTEX, naph, EDB, MTBE</u>	<u>HCl</u>	<u>3X4 ml vials</u>	<u>7-20-99</u>	
<u>PAH</u>	<u>-</u>	<u>2X 2 L amber</u>	<u>7-20-99</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.

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Project Site Name: CNC Zone G Sample ID No.: 17GLMΦ1Φ1  
 Project No.: ND124 site 17 Bldg. B42 Sample Location: nwi  
 Sampled By: JA/RH 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
<u>7 20 99</u>	(Visual)	(+/- mv)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	(SU)
Time:								
Method:								

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Dissolved Oxygen:**  
 Equipment: HACH Digital Titrator OX-DT CHEMetrics (Range: 0-1 ppm) Analysis Time: 1645  
~~1555~~

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 mg/L ppm

**Alkalinity:**

Equipment: HACH Digital Titrator AL-DT CHEMetrics (Range: \_\_\_\_\_ mg/L) Analysis Time: 1620  
 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 checked="" type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	<del>164</del> & <u>144</u>	x 1.0	= <u>144</u> 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:	<u>0</u>	<u>0</u>	<u>144</u>

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: 1632

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>301</u>	x 1.0	= <u>301</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.

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Project Site Name: <u>Site 17 Bldg. 1342</u>	Sample ID No.: <u>17GLMΦ1Φ1</u>
Project No.: <u>NO124 Zone G</u>	Sample Location: _____
Sampled By: _____	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <span style="border: 1px solid black; display: inline-block; width: 40px; height: 20px; vertical-align: middle;"></span>	

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Sulfide (S<sup>2-</sup>):**

Equipment: <u>DR-700</u>	DR-8 <u>  </u>	HS-C Color Chart	HS-WR Color Wheel	Analysis Time: <u>171Φ</u>
Program/Module: <u>610nm</u>	93		Other: _____	
Concentration: <u>0.02</u> mg/L				Filtered: <input type="checkbox"/>
Notes: _____				

**Sulfate (SO<sub>4</sub><sup>2-</sup>):**

Equipment: <u>DR-700</u>	DR-8 <u>  </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 (NO<sub>2</sub><sup>-</sup>-N):**

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

**Nitrate (NO<sub>3</sub><sup>-</sup>-N):**

Equipment: <u>DR-700</u>	DR-8 <u>  </u>	Other: _____	Analysis Time: <u>1755</u>
Program/Module: _____	55		
Concentration: <u>0.04</u> mg/L			Filtered: <input type="checkbox"/>
Standard Solution: <input type="checkbox"/>	Results: _____		Nitrite Interference Treatment: <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.

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Project Site Name: <u>Site 17 Bldg. B42</u>	Sample ID No.: <u>17GL-<del>17201</del> <sup>MCP1</sup></u>
Project No.: <u>NO124 Zone G</u>	Sample Location: _____
Sampled By: _____	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <span style="border: 1px solid black; display: inline-block; width: 40px; height: 20px; vertical-align: middle;"></span>	

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Manganese (Mn<sup>2+</sup>):**

Equipment: <u>DR-700</u>	DR-8 <u>  </u>	HACH MN-5	Other: _____	Analysis Time: <u>1821</u>
Program/Module: <u>525nm</u>	<u>41</u>			
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"/>	Digits Required: 0.1ml: _____	0.2ml: _____	0.3ml: _____	Reagent Blank Correction: <input type="checkbox"/>

Notes: \_\_\_\_\_

**Ferrous Iron (Fe<sup>2+</sup>):**

Equipment: <u>DR-700</u>	DR-8 <u>  </u>	IR-18C Color Wheel	Other: _____	Analysis Time: _____
Program/Module: <u>500nm</u>	<u>33</u>			
Concentration: <u>0.02</u> mg/L				Filtered: <input type="checkbox"/>

Notes: \_\_\_\_\_

**Hydrogen Sulfide (H<sub>2</sub>S):**

Equipment: <u>HS-C</u>	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.

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Project Site Name: Site 17 Bldg. B42      Sample ID No.: 17GLMφ2φ1  
 Project No.: NO124 Zone G      Sample Location: \_\_\_\_\_  
 Sampled By: \_\_\_\_\_      Duplicate:   
 Field Analyst: \_\_\_\_\_      Blank:   
 Field Form Checked as per QA/QC Checklist (initials): \_\_\_\_\_

**SAMPLING DATA:**

Date: <u>7 20 95</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: \_\_\_\_\_ mg/L)      Analysis Time: 1648

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

Titration Count	Multiplier	Concentration
_____	x 0.01	= _____ mg/L
_____	x 0.02	= _____ mg/L

CHEMetrics: .6 mg/L

Notes: \_\_\_\_\_

**Alkalinity:**

Analysis Time: 1623

Equipment: HACH Digital Titrator AL-DT      CHEMetrics (Range: \_\_\_\_\_ mg/L)      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 checked="" type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	<u>275</u> & <u>275</u>	x 1.0	= <u>275</u> 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:	<u>U</u>	<u>φ</u>	<u>1φφ</u>

CHEMetrics: \_\_\_\_\_ mg/L

Notes: \_\_\_\_\_

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

**Carbon Dioxide:**

Analysis Time: 1645

Equipment: HACH Digital Titrator CA-DT      CHEMetrics (Range: \_\_\_\_\_ mg/L)

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

Titration Count	Multiplier	Concentration
_____	x 0.1	= _____ mg/L
_____	x 0.2	= _____ mg/L
<u>22φ</u>	x 1.0	= <u>22φ</u> mg/L
_____	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.

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Project Site Name: <u>Site 17 Bldg. B42</u>	Sample ID No.: _____
Project No.: <u>NO124 Zone G</u>	Sample Location: <u>Trmw 2</u>
Sampled By: _____	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <span style="border: 1px solid black; display: inline-block; width: 50px; height: 20px; vertical-align: middle;"></span>	

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Sulfide (S<sup>2-</sup>):**

Equipment: DR-700	DR-8 __	HS-C Color Chart	HS-WR Color Wheel	Analysis Time: <u>1711</u>
Program/Module: 610nm	93		Other: _____	
Concentration: <u>0.01</u> mg/L				Filtered: <input type="checkbox"/>
Notes: _____				

**Sulfate (SO<sub>4</sub><sup>2-</sup>):**

Equipment: DR-700	DR-8 __	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 (NO<sub>2</sub><sup>-</sup>-N):**

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

**Nitrate (NO<sub>3</sub><sup>-</sup>-N):**

Equipment: DR-700	DR-8 __	Other: _____	Analysis Time: <u>1813</u>
Program/Module: _____	55		
Concentration: <u>0.05</u> 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>Site 17 Bldg. B42</u>	Sample ID No.: _____
Project No.: <u>NO124 Zone G</u>	Sample Location: <u>Fmw 2</u>
Sampled By: _____	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <span style="border: 1px solid black; display: inline-block; width: 40px; height: 20px; vertical-align: middle;"></span>	

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Manganese (Mn<sup>2+</sup>):**

Equipment: DR-700      DR-8 \_\_      HACH MN-5      Other: \_\_\_\_\_      Analysis Time: 1823

Program/Module: 525nm      41

Concentration: 1.2 mg/L      Filtered:

Digestion:

Standard Solution:       Results: \_\_\_\_\_      Reagent Blank Correction:

Standard Additions:       Digits Required: 0.1ml: \_\_\_\_\_ 0.2ml: \_\_\_\_\_ 0.3ml: \_\_\_\_\_

Notes: \_\_\_\_\_

**Ferrous Iron (Fe<sup>2+</sup>):**

Equipment: DR-700      DR-8 \_\_      IR-18C Color Wheel      Other: \_\_\_\_\_      Analysis Time: \_\_\_\_\_

Program/Module: 500nm      33

Concentration: 0.11 mg/L      Filtered:

Notes: \_\_\_\_\_

**Hydrogen Sulfide (H<sub>2</sub>S):**

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:





# FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page      of     

Project Site Name: Site 17 Bldg. B42 Sample ID No.: 17GLMΦ3Φ1  
 Project No.: ND124 Zone G Sample Location: \_\_\_\_\_  
 Sampled By: \_\_\_\_\_ Duplicate:   
 Field Analyst: \_\_\_\_\_ Blank:   
 Field Form Checked as per QA/QC Checklist (initials):

SAMPLING DATA:								
Date: <u>7 2Φ 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: \_\_\_\_\_ mg/L) Analysis Time: 16 1Φ  
 Notes: \_\_\_\_\_

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: .9 mg/L ppm

Notes: \_\_\_\_\_

**Alkalinity:**  
 Equipment: HACH Digital Titrator AL-DT CHEMetrics (Range: \_\_\_\_\_ mg/L) Analysis Time: 16 2 3 6  
 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 checked="" type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	_____ & <u>2ΦΦ</u>	x 1.0	= <u>2ΦΦ</u> 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:	<u>Φ</u>	<u>Φ</u>	<u>2ΦΦ</u>

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: 16 5 3

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>105</u>	x 1.0	= <u>195</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>Site 17 Bldg. B42</u>	Sample ID No.: _____
Project No.: <u>ND124 Zone G</u>	Sample Location: <u>17 mw 3</u>
Sampled By: _____	Duplicate: <input type="checkbox"/>
Field Analyst: _____	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <span style="border: 1px solid black; display: inline-block; width: 50px; height: 20px; vertical-align: middle;"></span>	

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Sulfide (S<sup>2-</sup>):**

Equipment: DR-700	DR-8 __	HS-C Color Chart	HS-WR Color Wheel	Analysis Time: <u>1712</u>
Program/Module: 610nm	93		Other: _____	
Concentration: <u>0.03</u> mg/L				Filtered: <input type="checkbox"/>
Notes: _____				

**Sulfate (SO<sub>4</sub><sup>2-</sup>):**

Equipment: DR-700	DR-8 __	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 (NO<sub>2</sub><sup>-</sup>-N):**

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

**Nitrate (NO<sub>3</sub><sup>-</sup>-N):**

Equipment: DR-700	DR-8 __	Other: _____	Analysis Time: <u>1814</u>
Program/Module: _____	55		
Concentration: <u>0.09</u> 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: _____		
			Nitrite Interference Treatment: <input type="checkbox"/>
			Reagent Blank Correction: <input type="checkbox"/>
Notes: _____			



# FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page    of   

Project Site Name: Site 17 Bldg. B42

Sample ID No.: \_\_\_\_\_

Project No.: NO124 Zone G

Sample Location: IFmw3

Sampled By: \_\_\_\_\_

Duplicate:

Field Analyst: \_\_\_\_\_

Blank:

Field Form Checked as per QA/QC Checklist (initials):

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Manganese (Mn<sup>2+</sup>):**

Equipment: DR-700      DR-8 \_\_      HACH MN-5      Other: \_\_\_\_\_      Analysis Time: 1823

Program/Module: 525nm      41

Concentration: 1.1 mg/L

Filtered:

Digestion:

Standard Solution:

Results: \_\_\_\_\_

Reagent Blank Correction:

Standard Additions:

Digits Required: 0.1ml: \_\_\_\_\_ 0.2ml: \_\_\_\_\_ 0.3ml: \_\_\_\_\_

Notes: \_\_\_\_\_

**Ferrous Iron (Fe<sup>2+</sup>):**

Equipment: DR-700      DR-8 \_\_      IR-18C Color Wheel      Other: \_\_\_\_\_      Analysis Time: \_\_\_\_\_

Program/Module: 500nm      33

Concentration: φ.φφ mg/L

Filtered:

Notes: \_\_\_\_\_

**Hydrogen Sulfide (H<sub>2</sub>S):**

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:

# GROUNDWATER SAMPLE LOG SHEET

Page      of     

Project Site Name: Project No.:  <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:	<p style="text-align: center;"><u>CNO 17 Bldg. B42</u></p> <p style="text-align: center;"><u>NO124 Zone G</u></p>	Sample ID No.: <u>17G6MCH/01</u> Sample Location: <u>MW 4</u> Sampled By: <u>JA/RM</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>7-20-99</u>	<u>Clear</u>	<u>5.12</u>	<u>2519</u>	<u>28.9</u>	<u>13</u>	<u>2.20</u>			

PURGE DATA:									
Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	
Method:	Initial								
<u>7-20-99</u>									
<u>Slow Purge</u>									
Monitor Reading (ppm):	1	<u>5.17</u>	<u>.659</u>	<u>28.6</u>	<u>3</u>	<u>1.86</u>			
Well Casing Diameter & Material	2	<u>5.15</u>	<u>.593</u>	<u>28.8</u>	<u>14</u>	<u>2.16</u>			
Type: <u>PVC 2"</u>	3	<u>5.12</u>	<u>.519</u>	<u>28.9</u>	<u>13</u>	<u>2.20</u>			
Total Well Depth (TD):	<u>14.91</u>								
Static Water Level (WL):	<u>3.41</u>								
One Casing Volume (gal/L):	<u>1.06</u>								
Start Purge (hrs):	<u>1005</u>								
End Purge (hrs):	<u>1117</u>								
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

SAMPLE COLLECTION INFORMATION:				
Analysis	Preservative	Container Requirements	Collected	
<u>BTEX, Naph, EOB, MTBE</u>	<u>HCl</u>	<u>3x 40ml vials</u>	<u>7-20-99</u>	
<u>PAH</u>	<u>None</u>	<u>2x 1 L amber</u>	<u>7-20-99</u>	

**OBSERVATIONS / NOTES:**

Circle if Applicable:	Signature(s): <u>    </u>
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# GROUNDWATER SAMPLE LOG SHEET

Page      of     

Project Site Name: CNS17 Bldg. B42  
 Project No.: ND124 Zone G

Sample ID No.: 17GLM0501  
 Sample Location: MW-5  
 Sampled By: JA/RH  
 C.O.C. No.:                     

- Domestic Well Data
- Monitoring Well Data
- Other Well Type:
- QA Sample Type:

- Type of Sample:
- Low Concentration
  - High Concentration

**SAMPLING DATA:**

Date: <u>7-20-99</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>1510</u>	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: <u>GLDAS</u>	<u>437</u>	<u>4.37</u>						

**PURGE DATA:**

Date: <u>7-20-99</u>	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: <u>Slow Purge</u>	Initial	<u>4.37</u>	<u>.230</u>	<u>26.2</u>	<u>19</u>	<u>3.51</u>		
Monitor Reading (ppm):	1	<u>4.62</u>	<u>.189</u>	<u>26.3</u>	<u>5</u>	<u>3.79</u>		
Well Casing Diameter & Material	2	<u>4.76</u>	<u>.189</u>	<u>26.9</u>	<u>21</u>	<u>3.92</u>		
Type: <u>PVC 2"</u>	3	<u>4.57</u>	<u>.192</u>	<u>26.9</u>	<u>15</u>	<u>3.25</u>		
Total Well Depth (TD):	<u>1498</u>							
Static Water Level (WL):	<u>8.68</u>							
One Casing Volume(gal/L):	<u>105</u>	<u>1008</u>						
Start Purge (hrs):	<u>1008</u>							
End Purge (hrs):	<u>1100</u>							
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>BTEX, Naph., MTBE, EDB</u>	<u>HCl</u>	<u>3 x 40 ml vials</u>	<u>7-20-99</u>
<u>PAH</u>	<u>—</u>	<u>2 x 1 L amber</u>	<u>7-20-99</u>

**OBSERVATIONS / NOTES:**

Circle if Applicable:

MS/MSD  Duplicate ID No.:                     

Signature(s):

*[Handwritten Signature]*

# GROUNDWATER SAMPLE LOG SHEET

Page      of     

Project Site Name: <u>CNC 17 Bldg. B42</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>17GLM0601</u> Sample Location: <u>MW-6D</u> Sampled By: <u>R.H</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>7-21-99</u>	<u>Clear</u>	<u>7.06</u>	<u>1.71</u>	<u>27.2</u>	<u>φ</u>	<u>2.00</u>			

PURGE DATA:								
Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
<u>7-21-99</u>	<u>Slow Purge</u>	<u>7.18</u>	<u>1.63</u>	<u>25.1</u>	<u>405</u>	<u>1.96</u>		
Monitor Reading (ppm):	1	<u>7.15</u>	<u>1.66</u>	<u>25.8</u>	<u>21</u>	<u>2.40</u>		
Well Casing Diameter & Material	2	<u>7.10</u>	<u>1.71</u>	<u>26.1</u>	<u>72</u>	<u>2.30</u>		
Type: <u>P.V.C. 2"</u>	3	<u>7.06</u>	<u>1.71</u>	<u>27.2</u>	<u>φ</u>	<u>2.00</u>		
Total Well Depth (TD):	<u>26.24</u>							
Static Water Level (WL):	<u>9.50</u>							
One Casing Volume(gal/L):	<u>2.72</u>							
Start Purge (hrs):	<u>0840</u>							
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
<u>BTEX, Naph., MTBE, EDB</u>	<u>HCl</u>	<u>3 X 40 ml Vials</u>	<u>7-21-99</u>
<u>PAH</u>	<u>—</u>	<u>2 X 1L amber</u>	<u>7-21-99</u>

**OBSERVATIONS / NOTES:**

Circle if Applicable: <input checked="" type="checkbox"/> MS/MSD    Duplicate ID No.: <u>17GLM0601D / 17GLM0601M</u>	Signature(s): <u>[Signature]</u>
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**APPENDIX D**

**SOIL AND GROUNDWATER LABORATORY ANALYTICAL DATA**

# TIDEWATER, Inc

## Zone G Master Report

Client Name: Tetra Tech NUS

Analysis: EPA Method 8021B: BTEX, Napthalene  
EPA Method 8015M: TPH-DRO

Matrix: Soil

### Analytical Services for Charleston Naval Complex Project

Quantitation Limit		Benzene 5.0 µg/kg	Toluene 5.0 µg/kg	Ethylbenzene 5.0 µg/kg	m,p-Xylene 5.0 µg/kg	o-Xylene 5.0 µg/kg	Napthalene 5.0 µg/kg	DRO 10 mg/kg
Sample ID	Date/Time	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(mg/kg)
16SFB01-0304	4-30/0840	<5.0	<5.0	17	<5.0	53	510	33
16SFB01-0304*	4-30/0840	<5.0	<5.0	6.3	8.0	35	480	NA
16SFB02-0304	4-30/1000	<5.0	<5.0	<5.0	15	<5.0	19000	270
16SFB03-0304	4-30/1050	<5.0	<5.0	<5.0	<5.0	<5.0	64	44
16SFB04-0304	4-30/1130	34	20	320	410	1700	39000	360
16SFB05-0203	4-30/1215	<5.0	<5.0	<5.0	<5.0	<5.0	3800	<10
16SFB06-0304	5-01/1215	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
16SFB07-0304	5-01/1300	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	19
16SFB08-0304	5-01/1330	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
16SFB09-0304	5-01/1400	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
16SFB10-0304	5-01/1430	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
16SFB11-0304	5-02/0910	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
16SFB14-0304	5-03/0840	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
16SFB14-0304*	5-03/0840	NA	NA	NA	NA	NA	NA	<10
17SFB01-0708	5-02/1300	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
17SFB02-0809	5-02/1450	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
17SFB03-0506	5-02/1515	<5.0	<5.0	34	<5.0	16	17000	1200
17SFB04-0304	5-02/1550	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
17SFB05-0708	5-02/1635	<5.0	<5.0	<5.0	<5.0	<5.0	330	57
17SFB06-0910	5-03/1110	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
17SFB07-0910	5-03/1155	<5.0	<5.0	<5.0	<5.0	<5.0	140	<10
17SFB07-0910*	5-03/1155	<5.0	<5.0	<5.0	<5.0	<5.0	170	NA
17SFB08-1011	5-03/1345	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
17SFB09-1011	5-03/1440	<5.0	<5.0	<5.0	<5.0	<5.0	1100	130
18SFB01-03	4-27/1010	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
18SFB02-0405	4-29/0845	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10
18SFB03-0405	4-29/1430	<5.0	<5.0	<5.0	<5.0	<5.0	29	<10
18SFB04-0405	4-29/1345	<5.0	<5.0	<5.0	<5.0	9.6	13	<10
18SFB05-0405	4-29/1420	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10

# TIDEWATER, Inc

## Zone G Master Report

Client Name: Tetra Tech NUS

Analysis: EPA Method 8021B: BTEX, Napthalene  
EPA Method 8015M: TPH-DRO

Matrix: Water

### Analytical Services for Charleston Naval Complex Project

Quantitation Limit		Benzene 1.0 µg/L	Toluene 1.0 µg/L	Ethylbenzene 1.0 µg/L	m,p-Xylene 1.0 µg/L	o-Xylene 1.0 µg/L	Napthalene 1.0 µg/L	DRO 0.1 mg/L
Sample ID	Date/Time	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(mg/L)
16GFB01-10	4-30/0900	<1.0	<1.0	<1.0	1.1	<1.0	290	6.5
16GFB02-09	4-30/1015	10	<1.0	<1.0	<1.0	<1.0	690	1.2
16GFB03-12	4-30/1100	<5.0	<5.0	<5.0	<5.0	<5.0	64	15
16GFB03-12*	4-30/1100	NA	NA	NA	NA	NA	NA	16
16GFB04-12	4-30/1200	27	2.3	<1.0	<1.0	1.1	280	0.7
16GFB04-12*	4-30/1200	6.4	<1.0	<1.0	<1.0	<1.0	170	NA
16GFB05-12	4-30/1230	89	1.8	2.5	6.9	3.5	84	0.3
16GFB06-12	5-01/1230	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.2
16GFB07-08	5-01/1315	<1.0	<1.0	<1.0	<1.0	<1.0	22	12
16GFB07-08*	5-01/1315	<1.0	<1.0	<1.0	<1.0	<1.0	44	NA
16GFB08-08	5-01/1340	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.8
16GFB09-08	5-01/1400	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.2
16GFB10-08	5-01/1440	3	1.3	6.3	12	70	1800	14
16GFB11-08	5-02/0945	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.3
16GFB12-08	5-02/1010	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.2
16GFB13-07	5-02/1040	<1.0	<1.0	<1.0	<1.0	<1.0	29	0.1
16GFB14-08	5-03/0850	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
17GFB01-16	5-02/1415	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.1
17GFB02-16	5-02/1500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
17GFB03-16	5-02/1530	<1.0	<1.0	9.8	1.2	1.9	540	1.4
17GFB04-16	5-02/1615	<1.0	<1.0	<1.0	<1.0	<1.0	8.0	0.1
17GFB05-16	5-02/1700	<1.0	<1.0	<1.0	<1.0	<1.0	21	0.2
17GFB06-16	5-03/1130	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
17GFB07-16	5-03/1210	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.1
17GFB08-16	5-03/1400	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
17GFB09-16	5-03/1450	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
18GFB01-06	4-28/0900	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.1

8950 Route 108, Suite 100  
Columbia, MD 21045

Mobile and Fixed  
Laboratory Services

Phone: (410) 997-4458  
Fax: (410) 997-8713

**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



LAB (WORK ORDER) # WP2490

PAGE: 2 OF 2

COOLER: 2 OF 2

CLIENT: Tetratedi-SC

COC# -  
 SDG# -

PROJECT: CNC Charleston

DATE / TIME RECEIVED: 05/18/99-1010

DELIVERED BY: FEBEY

RECEIVED BY: BKR

LIMS ENTRY BY: scw

LIMS REVIEW BY / PM: ASC

	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 <sup>(1)</sup> ?	<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<sup>(1)</sup>:

000000

<sup>(1)</sup> 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.



340 County Road No. 5  
P.O. Box 720  
Westbrook, ME 04098  
Tel: (207) 74-2400  
Fax: (207) 75-4029

# CHAIN of CUSTODY

PLEASE PRINT IN PEN

Client: Tetra Tech NUS Contact: Bryn Howze Phone #: (423) 483-9900 Fax #: ( )  
 Address: NH-21 Ave. H City: North Charleston State: SC Zip Code: 29405

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

Bill (if different than above): \_\_\_\_\_ Address: \_\_\_\_\_

Sampler (Print / Sign): \_\_\_\_\_ Copies To: \_\_\_\_\_

LAB USE ONLY WORK ORDER #: WP2490  
 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  |
|       |       |       |       |       |       |       |       |       |       |       |

* Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	PATHs + Nephth	TAL metals	BTEX, EDB	Grain Size	Hydrometer	FID headspace
16SLB01-0203	5/17/0810	S	5	X		X			80
16SLB02-0203	5/17/0825	S	5	X		X			20
16SLB02-0203D	5/17/0825	S	5	X		X			20
16SLB05-0203	5/17/0845	S	5	X		X			20
17SLB01-0708	5/17/1050	S	5	X		X			0
17SLB07-0809	5/17/1140	S	5	X		X			0
17SLB02-0809	5/17/1105	S	5	X		X			5
17SLB09-0708	5/17/1425	S	5	X		X			3
17SLB04-0304	5/17/1115	S	5	X		X			0
17SLB04-0304MS	5/17/1115	S	5	X		X			0
17SLB05-0708D	5/17/1200	S	5	X		X			3
17SLB05-0708	5/17/1200	S	5	X		X			3
17SLB03-0506	5/17/1210	S	7	X		X	X		1
18SLB03-0506D	5/17/1550	S	5	X		X			1
18SLB03-0304	5/17/1550	S	1				X		
OITL00103	5/3/1515	W	2			X			

COMMENTS: Grain Size for 17SLB03-0506 are labeled with A & B at the end of the sample ID

Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>5/17/08 1752</u>	Received By: (Signature) <u>[Signature]</u>	Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>5/18/99 1010</u>	Received By: (Signature) <u>[Signature]</u>
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-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: 850/385-9890  
 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	16SLE01-0203	17 MAY 0810	18 MAY	SL
	WP2490-2	16SLE02-0203	17 MAY 0825		
	WP2490-3	16SLE02-0203D	17 MAY 0825		
	WP2490-4	16SLE05-0203	17 MAY 0845		
	WP2490-5	17SLE01-0708	17 MAY 1050		
	WP2490-6	17SLE07-0809	17 MAY 1140		
	WP2490-7	17SLE02-0809	17 MAY 1105		
	WP2490-8	17SLE09-0708	17 MAY 1425		
	WP2490-9	17SLE04-0304	17 MAY 1115		
	WP2490-11	17SLE05-0708D	17 MAY 1200		
	WP2490-12	17SLE05-0708	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	17SLE03-0506A	17 MAY 1210	18 MAY	SL
WP2490-16	17SLE03-0506B	17 MAY 1210		
WP2490-17	18SLE03-0304	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	01TLC0103	03 MAY 1515	18 MAY	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00

LABORATORY ORDER CONTINUED ON PAGE 2

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: 850/385-9899

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

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
WP2490-14	18SLB03-0506D	17 MAY 1550	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	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

LABORATORY ORDER CONTINUED ON PAGE 3

0000010  
 At 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: 850/385-9890  
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 PLAZA 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)

06-14 Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questions

0000011  
KATAHDIN

# KATAHDIN ANALYTICAL SERVICES

## Summary of Report Notes

**Report Note****Note Text**

---

\$ 'S' 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-2490-5  
 Report Date: 07/09/99  
 PO No. : N7912-P99264  
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 5 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
17SLB01-0708	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) /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:** WP2490-5  
**SDG:** WP2490  
**Report Date:** 7/8/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 84  
**Method:** EPA 8270  
**Date Analyzed:** 6/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB01-0708	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	77	%	1.3		
2-FLUOROBIPHENYL	89	%	1.3		
TERPHENYL-D14	81	%	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:** WP2490-5  
**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
17SLB01-0708	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	<6	ug/Kg	1.2	6	5
MTBE	<6	ug/Kg	1.2	6	5
TOTAL XYLENES	<6	ug/Kg	1.2	6	5
DIBROMOFLUOROMETHANE	\$47	%	1.2		
1,1-DICHLOROETHANE-D4	\$52	%	1.2		
1,1-DICHLOROETHANE-D8	\$41	%	1.2		
P-BROMOFLUOROBENZENE	\$39	%	1.2		

**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:** WP2490-5RE  
**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
17SLB01-0708	SL	5/17/99	5/18/99	5/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample	Method
				PQL	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	\$47	%	1.1		
1,2-DICHLOROETHANE-D4	\$45	%	1.1		
TOLUENE-D8	\$47	%	1.1		
P-BROMOFLUOROBENZENE	\$48	%	1.1		

**Report Notes:** \$

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

Lab Number : WP-2490-6  
Report Date: 07/09/99  
PO No. : N7912-P99264  
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 6 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED					
17SLB07-0809	Solid	CLIENT	05/17/99	05/18/99				
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	82.	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:** WP2490-6  
**SDG:** WP2490  
**Report Date:** 7/8/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 82  
**Method:** EPA 8270  
**Date Analyzed:** 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB07-0809	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	93	%	1.3		
2-FLUOROBIPHENYL	88	%	1.3		
TERPHENYL-D14	100	%	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: WP2490-6  
SDG: WP2490  
Report Date: 6/16/99  
PO No. : N7912-P99264  
Project: CTO #68  
% Solids: 82  
Method: SW8260  
Date Analyzed: 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB07-0809	SL	5/17/99	5/18/99	5/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample	Method
				PQL	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	95	%	1.0		
DICHLOROETHANE-D4	103	%	1.0		
LUENE-D8	106	%	1.0		
P-BROMOFLUOROBENZENE	99	%	1.0		

Report Notes:

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

Lab Number : WP-2490-7  
Report Date: 07/09/99  
PO No. : N7912-P99264  
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 7 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
17SLB02-0809	Solid	CLIENT		05/17/99	05/18/99		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	82.	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/msn  
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: WP2490-7  
 SDG: WP2490  
 Report Date: 7/8/99  
 PO No. : N7912-P99264  
 Project: CTO #68  
 % Solids: 82  
 Method: EPA 8270  
 Date Analyzed: 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB02-0809	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
INDENOPYRENE	<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	94	%	1.3		
2-FLUOROBIPHENYL	88	%	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:** WP2490-7  
**SDG:** WP2490  
**Report Date:** 6/16/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 82  
  
**Method:** SW8260  
**Date Analyzed:** 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB02-0809	SL	5/17/99	5/18/99	5/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample	Method
				PQL	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	99	%	1.0		
1,2-DICHLOROETHANE-D4	99	%	1.0		
TOLUENE-D8	98	%	1.0		
P-BROMOFLUOROBENZENE	90	%	1.0		

**Report Notes:**



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

Lab Number : WP-2490-8  
 Report Date: 07/09/99  
 PO No. : N7912-P99264  
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 8 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED	
17SLB09-0708	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)/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:** WP2490-8  
**SDG:** WP2490  
**Report Date:** 7/8/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 84  
**Method:** EPA 8270  
**Date Analyzed:** 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB09-0708	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	84	%	1.3		
2-FLUOROBIPHENYL	84	%	1.3		
TERPHENYL-D14	113	%	1.3		

**Report Notes:** 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: WP2490-8RA  
 SDG: WP2490  
 Report Date: 7/8/99  
 PO No. : N7912-P99264  
 Project: CTO #68  
 % Solids: 84  
 Method: EPA 8270  
 Date Analyzed: 6/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB09-0708	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	82	%	1.3		
2-FLUOROBIPHENYL	92	%	1.3		
TERPHENYL-D14	104	%	1.3		

Report Notes: 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:** WP2490-8  
**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
17SLB09-0708	SL	5/17/99	5/18/99	5/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	Δ	ug/Kg	1.0	5	5
TOLUENE	Δ	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	Δ	ug/Kg	1.0	5	5
ETHYLBENZENE	Δ	ug/Kg	1.0	5	5
NAPHTHALENE	Δ	ug/Kg	1.0	5	5
MTBE	Δ	ug/Kg	1.0	5	5
TOTAL XYLENES	Δ	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	116	%	1.0		
1,2-DICHLOROETHANE-D4	120	%	1.0		
TOLUENE-D8	95	%	1.0		
P-BROMOFLUOROBENZENE	86	%	1.0		

**Report Notes:**

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

Lab Number : WP-2490-9  
Report Date: 07/09/99  
PO No. : N7912-P99264  
Project : CTO #68

WICH#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 9 of 14

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
17SLB04-0304	Solid	CLIENT		05/17/99	05/18/99		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	89.	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:** WP2490-9  
**SDG:** WP2490  
**Report Date:** 7/8/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 89  
**Method:** EPA 8270  
**Date Analyzed:** 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB04-0304	SL	5/17/99	5/18/99	5/25/99	DPD	EPA 3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<400	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	<400	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	66	%	1.2		
2-FLUOROBIPHENYL	69	%	1.2		
TERPHENYL-D14	97	%	1.2		

**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:** WP2490-9  
**SDG:** WP2490  
**Report Date:** 6/16/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 89  
**Method:** SW8260  
**Date Analyzed:** 5/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB04-0304	SL	5/17/99	5/18/99	5/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	0.99	5	5
TOLUENE	<5	ug/Kg	0.99	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	0.99	5	5
ETHYLBENZENE	<5	ug/Kg	0.99	5	5
NAPHTHALENE	<5	ug/Kg	0.99	5	5
MTBE	<5	ug/Kg	0.99	5	5
TOTAL XYLENES	<5	ug/Kg	0.99	5	5
DIBROMOFLUOROMETHANE	97	%	0.99		
DICHLOROETHANE-D4	107	%	0.99		
UENE-D8	88	%	0.99		
P-BROMOFLUOROBENZENE	76	%	0.99		

**Report Notes:**

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

Lab Number : WP-2490-11  
Report Date: 07/09/99  
PO No. : N7912-P99264  
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

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SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED				
17SLB05-0708D	Solid	CLIENT	05/17/99	05/18/99			
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	87.	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: WP2490-11  
 SDG: WP2490  
 Report Date: 7/8/99  
 PO No. : N7912-P99264  
 Project: CTO #68  
 % Solids: 87  
 Method: EPA 8270  
 Date Analyzed: 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB05-0708D	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
PERYSENE	<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	72	%	1.3		
2-FLUOROBIPHENYL	74	%	1.3		
TERPHENYL-D14	98	%	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:** WP2490-11  
**SDG:** WP2490  
**Report Date:** 6/16/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 87  
**Method:** SW8260  
**Date Analyzed:** 5/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB05-0708D	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	111	%	1.1		
1,2-DICHLOROETHANE-D4	118	%	1.1		
TOLUENE-D8	123	%	1.1		
P-BROMOFLUOROBENZENE	118	%	1.1		

**Report Notes:**

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

Lab Number : WP-2490-12  
Report Date: 07/09/99  
PO No. : N7912-P99264  
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

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SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
17SLB05-0708	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) /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:** WP2490-12  
**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
17SLB05-0708	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	52	%	1.3		
2-FLUOROBIPHENYL	56	%	1.3		
TERPHENYL-D14	87	%	1.3		

**Report Notes:** 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: WP2490-12RA  
 SDG: WP2490  
 Report Date: 7/8/99  
 PO No. : N7912-P99264  
 Project: CTO #68  
 % Solids: 86  
 Method: EPA 8270  
 Date Analyzed: 6/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB05-0708	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	46	%	1.3		
2-FLUOROBIPHENYL	60	%	1.3		
TERPHENYL-D14	#121	%	1.3		

Report Notes: #, 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:** WP2490-12  
**SDG:** WP2490  
**Report Date:** 6/16/99  
**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
17SLB05-0708	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	117	%	1.1		
1,2-DICHLOROETHANE-D4	112	%	1.1		
TOLUENE-D8	99	%	1.1		
P-BROMOFLUOROBENZENE	79	%	1.1		

**Report Notes:**



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

Lab Number : WP-2490-13  
 Report Date: 07/09/99  
 PO No. : N7912-P99264  
 Project : CTO #68

WICH#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

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SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED				
17SLB03-0506	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
Total Combustible Organics	2.5	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 05/18/99 by JF  
 (2) Sample Preparation on 06/04/99 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:** WP2490-13  
**SDG:** WP2490  
**Report Date:** 7/8/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 84  
**Method:** EPA 8270  
**Date Analyzed:** 6/27/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB03-0506	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	62	%	1.3		
2-FLUOROBIPHENYL	66	%	1.3		
TERPHENYL-D14	88	%	1.3		

**Report Notes:** 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: WP2490-13RA  
 SDG: WP2490  
 Report Date: 7/8/99  
 PO No. : N7912-P99264  
 Project: CTO #68  
 % Solids: 84  
 Method: EPA 8270  
 Date Analyzed: 6/28/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
17SLB03-0506	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
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	58	%	1.3		
2-FLUOROBIPHENYL	63	%	1.3		
TERPHENYL-D14	88	%	1.3		

Port Notes: 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:** WP2490-13  
**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
17SLB03-0506	SL	5/17/99	5/18/99	5/27/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample	Method
				PQL	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	22	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	109	%	1.0		
1,2-DICHLOROETHANE-D4	102	%	1.0		
TOLUENE-D8	103	%	1.0		
P-BROMOFLUOROBENZENE	134	%	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: WP2490-13RE  
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
17SLB03-0506	SL	5/17/99	5/18/99	5/28/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample	Method
				PQL	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	\$52	%	1.0		
1,2-DICHLOROETHANE-D4	\$49	%	1.0		
1,2-DICHLOROETHANE-D8	\$30	%	1.0		
P-BROMOFLUOROBENZENE	\$16	%	1.0		

Report Notes: \$

Barrington Analytical Services, Inc.  
Quality Control Report

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	Concentration			Practical Quantitation Level**	LABORATORY CONTROL SAMPLE RESULTS					
			Units	Measured in Blank	Acceptance Range		Units	True 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					NA	
	07-Jun-99	08-Jun-99	wt %	< 0.10	< 0.10	0.10					NA	
TS -Total Residue	18-May-99	19-May-99	wt %	< 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.

Analytical Services, Inc.  
 Quality Control Report

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	Sample Measurements						Acceptance Range for RPD (%)	Concentration or Quantity				Matrix Spike Recovery (%)					
		Units	Rep 1	Rep 2	Mean Conc	RPD (%)	Units		Sampl Only	Spike Added	Sample +Spike	Sample +Spike	Sample +Spike	Sample +Spike	Acceptance Range (%)	RPD (%)	Acceptance Range (%)	
																		Dup 1
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.

## SOIL SEMI-VOLATILE 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
17SLB09-0708	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 Oven 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 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	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 (ug/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	MSD Spk	MS	MSD	MS	MSD	Recovery Limits (%)	RPD (%)	RPD Limit (%)
		Amount (ug/Kg)	Amount (ug/Kg)	Result (ug/Kg)	Result (ug/Kg)	REC (%)	REC (%)			
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 Oven 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		
1,1-DICHLOROETHANE-D4	123	%	1.0		
1,1-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 (%)
I,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

**Katahdin 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 (ug/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 Oven 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:** SW8260  
**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		
1,1-DICHLOROETHANE-D2	85	%	1.0		
P-BROMOFLUOROBENZENE	90	%	1.0		

Report Notes:



## GENERAL ENGINEERING LABORATORIES

*Meeting today's needs with a vision for tomorrow.*

June 2, 1999

Ms. Andrea Colby  
Katahdin Analytical  
340 County Rd  
Westbrook, ME 04092

Dear Ms. Colby:

Enclosed is a data package for samples from the former Charleston Naval Complex site. The samples were analyzed for general chemistry.

General Engineering Laboratories appreciates this opportunity to provide you with analytical results, and trusts that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171.

Yours very truly,

Valerie S. Davis  
Project Manager

enclosure



**CASE NARRATIVE**  
for  
**Katahdin Analytical**  
**Former Charleston Naval Complex Site**  
**SDG #95606**

**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 18, 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:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
9905606-01	17SLB03-0506
9905606-02	18SLB03-0506
9905606-03	19SLB16-0203
9905606-04	32SLB03-0506
9905606-05	34SLB03-0304
9905606-06	33SLB05-0304

**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.



Valerie S. Davis  
Project Manager

fc:9905606%



Case Narrative for  
KATA  
SDG# 95606

**TOTAL ORGANIC CARBON**

**Analytical Batch Number:** 150121

**Analytical Method:** SW846 9060 Modified

<u>Laboratory Number</u>	<u>Sample Description</u>
9905606-01	17SLB03-0506
9905606-02	18SLB03-0506
9905606-03	19SLB16-0203
9905606-04	32SLB03-0506
9905606-05	34SLB03-0304
9905606-06	33SLB05-0304
QC615649	Duplicate of 9905519-05
QC615649	Post Spike of 9905519-05
QC615647	Blank
QC615650	Laboratory Control Sample

**Sample Preparation:**

The method quoted is for aqueous samples only. It is modified to accommodate soils analysis.

**Instrument Calibration:**

The instrument used was a Dohrmann DC-80 TOC analyzer. The instrument 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 post spike was run on the following Sample Number.

9905519-05

The analyte recovery in the post spike was 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 PETROLEUM HYDROCARBONS**

**Analytical Batch Number:** 150797

**Analytical Method:** SW846 9071A

<u>Laboratory Number</u>	<u>Sample Description</u>
9905606-01	17SLB03-0506
9905606-04	32SLB03-0506
9905606-05	34SLB03-0304
9905606-06	33SLB05-0304
QC618246	Blank
QC618247	Laboratory Control Sample
QC618248	Matrix Spike of 9905606-06
QC618249	Duplicate of 9905606-06

**Instrument Calibration:**

The instrument 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.

9905606-06

The analyte recovery in the matrix spike was 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.

9905606-06

**Dilutions:**

None of the samples were diluted.

**Non Conformance Reports:**

There were no Nonconformance Reports associated with this batch.

The above narrative has been reviewed by: J. A. A Date: 05/13/99

# CHAIN OF CUSTODY RECORD

9905606 1/2

Client Name/Facility Name			SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods													Remarks				
Katahdin Analytical (TetraTech NUS)			pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's		Cyanide	Coliform - specify type	TPH	
Collected by/Company																# OF CONTAINERS				
SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	CRAB														
D1 17SLB03-0506	5/17	1210	X	X	2		X												X	
D2 18SLB03-0506	5/17	1550	X	X	1		X													
D3 19SLB16-0203	5/17	1640	X	X	1		X													
D4 32SLB03-0506	5/18	0850	X	X	2		X												X	
D5 34SLB03-0304	5/18	1025	X	X	2		X												X	
D6 33SLB05-0304	5/18	1235	X	X	2		X												X	
Relinquished by:			Date:	Time:	Received by:			Relinquished by:			Date:	Time:	Received by:							
[Signature]			5/18/99	3:55	[Signature]			[Signature]			5/18/99	1555	Remarks:							

4326  
 .1  
 .2  
 .2  
 .1  
 .1  
 .1

# FEDERAL SAMPLE RECEIPT REVIEW

Client KATIA

Received by [Signature]

Date 5/18/99

GEL COOLER  GEL POLY COOLER  CLIENT COOLER  OTHER

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? Call Project Manager if No	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)? Were the survey results negative? Call Project Manager if No		✓	
Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?	+		
3. Were chain of custody documents included?	✓		
4. Were chain of custody documents completed properly? (Ink, signed, match containers)	✓		
5. Did all samples container arrive intact? (sealed, unbroken)? Call Project Manager if No	✓		
6. Were all sample containers properly labeled?	✓		
7. Were proper sample containers received?	✓		
8. Preserved samples checked for proper pH?	+		
9. Were samples preserved properly? If no, list samples & tests	+		3012
10. Shipping container temperature checked?	✓		
11. Was shipping container temperature within specifications (4±2C)? If no, Call Project Manager	✓		4°C
12. Were samples received within holding time? if No, Call Project Manager	✓		
13. Were VOA vials free of headspace?	+		
14. ARCO# IF REQUIRED	+		
15. SDG# IF REQUIRED	✓		

REVIEW [Signature]

DATE 5/18/99

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 13, 1999

Page 1 of 2

Sample ID : 17SLB03-0506  
 Lab ID : 9905606-01  
 Matrix : Soil  
 Date Collected : 05/17/99  
 Date Received : 05/18/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>General Chemistry</b>											
Total Rec. Petro. Hydrocarbons		362	115	230	mg/kg	1.0	AAT	06/11/99	1030	150797	1
Evaporative Loss @ 105 C		13.0	1.00	1.00	wt%	1.0	GJ	05/19/99	1540	149550	2
Total Organic Carbon		681	43.1	100	mg/kg	1.0	LS	05/28/99	1139	150121	3

M = Method	Method-Description
M 1	SW846 9071A
M 2	EPA 3550
M 3	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'.



QC Summary Report

Project Description: Former Naval Complex

cc: KATA00199

Lab. Sample ID: 9905606-06

Report Date: June 11, 1999

Page 1 of 1

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
<b>General Chemistry</b>													
QC618246	BLANK	150797											
Total Rec. Petro. Hydrocarbons							150 mg/kg				AAT	06/11/99	1030
QC618249	9905606-06DUP	150797											
Total Rec. Petro. Hydrocarbons				233			267 mg/kg	13.3					
QC618247	LCS	150797											
Total Rec. Petro. Hydrocarbons			11200				10700 mg/kg		95.3	(70.0 - 116.)			
QC618248	9905606-06MS	150797											
Total Rec. Petro. Hydrocarbons			13400	233			11500 mg/kg		84.2	(70.0 - 130.)			
QC613273	BLANK	149550											
Evaporative Loss @ 105 C							0.00 wt%				GJ	05/19/99	1540
QC613272	9905606-06DUP	149550											
Evaporative Loss @ 105 C				10.0			9.00 wt%	10.5					
QC615647	BLANK	150121											
Total Organic Carbon							1.62 mg/kg				LS	05/28/99	1055
QC615650	LCS	150121											
Total Organic Carbon			3750				4340 mg/kg		116	(88.0 - 130.)	LS	05/28/99	1051

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.    12, SILTY SAND, WP2490-15

Sieve Size

Percent Passing

PROJECT  
Specifications %

# 4	100.0
# 10	99.7
# 20	99.1
# 40	90.0
# 60	67.0
# 100	37.0
# 200	19.2

S. W. COLE ENGINEERING, INC.

REPORT OF GRADATION  
ASTM C-117, C-136

Project No. 99008  
Date 05/20/1999

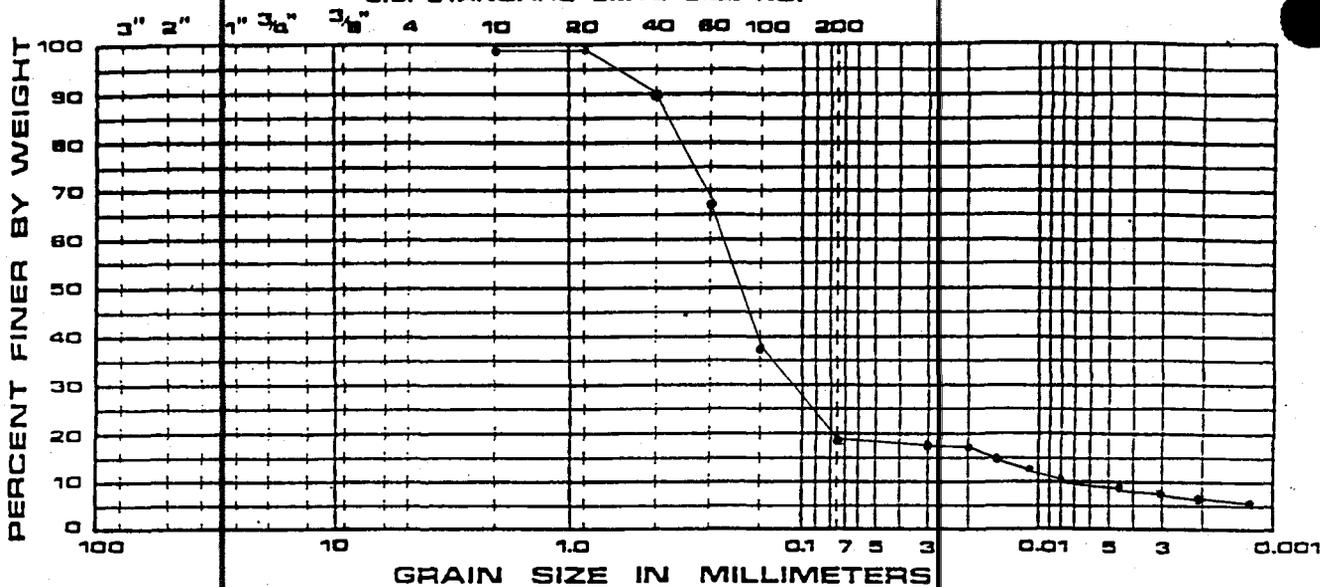
Project MISCELLANEOUS  
Client KATAHDIN ANALYTICAL  
Sample No. 13, SILTY CLAY, WP2490-16

<u>Sieve Size</u>	<u>Percent Passing</u>	<u>PROJECT Specifications %</u>
# 4	100.0	
# 10	99.9	
# 20	99.6	
# 40	96.4	
# 60	86.6	
# 100	58.7	
# 200	41.4	

# GRAIN SIZE ANALYSIS

COBBLE	GRAVEL				SAND			SILT OR CLAY
	COARSE	FINE		COA.	MEDIUM	FINE		

U.S. STANDARD SIEVE SIZE NO.

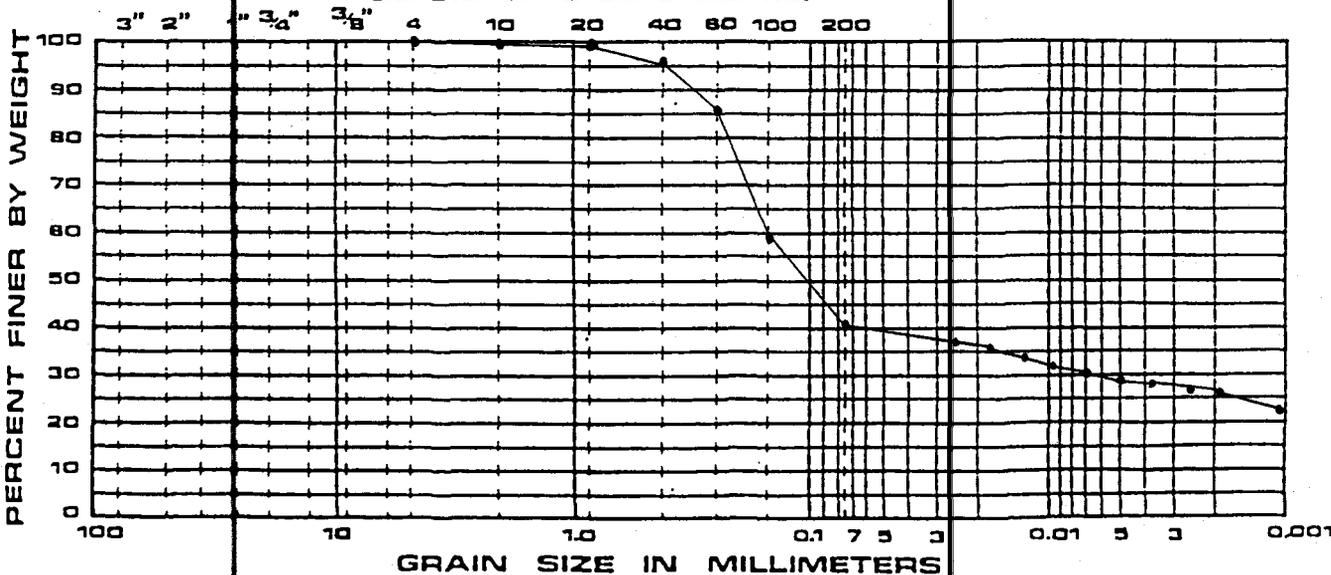


PLOT	SOURCE	SAMP.	DEPTH	CLASSIFICATION	W
•	WB249D-15	12			

# 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
•	WB249D-16	13			



August 25, 1999

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

RE: Katahdin Lab Number: WP-3338  
Project ID: CNC Charleston  
Project Manager: Ms. Andrea J. Colby  
Sample Receipt Date: July 21, 1999

Dear Mr. Calligan:

Please find enclosed the following information:

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

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

Mary S. Morill  
Authorized Signature

8.25.99  
Date

0000001

**SDG NARRATIVE  
KATAHDIN ANALYTICAL SERVICES  
TETRA TECHNUS  
CASE CNC CHARLESTON**

**Sample Receipt**

The following samples were received on July 21, 1999 and were logged in under Katahdin Analytical Services work order number WP3338 for a hardcopy due date of August 20, 1999.

<u>Sample No.</u>	<u>Sample Identification</u>
WP3338-1	17GLM0401
WP3338-2	17GLM0201
WP3338-3	17GLM0101
WP3338-4	17GLM0301
WP3338-5	17GLM0501
WP3338-6	17TL00401

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**

Six aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on July 21, 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 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 sample 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%.

0000002

In the calibration curve analyzed in this SDG, the average %RSD for all analytes was 10.4%, making the curve 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

Five aqueous samples were received by Katahdin Analytical Services laboratory on July 21, 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.

**KATAHDIN ANALYTICAL SERVICES, INC.**  
**SAMPLE RECEIPT CONDITION REPORT**  
 Tel. (207) 874-2400  
 Fax (207) 775-4029

LAB (WORK ORDER) # WP 3338

PAGE: 1 OF 2

COOLER: 1 OF 2

COC# —

SDG# —

DATE / TIME RECEIVED: 7-21-99 0855

DELIVERED BY: FedEx

RECEIVED BY: Saw

LIMS ENTRY BY: Saw

LIMS REVIEW BY / PM: ACC

CLIENT: Tetra Tech

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 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>2.7</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 <sup>(1)</sup> ?	<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 NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES<sup>(1)</sup>: \*COC has 17GLMØ2Ø, containers have for 17GLMØ2Ø1 (time matches)

<sup>(1)</sup> Use this space (and additional sheets if necessary) to document samples that are received broken, compromised, C-O-C discrepancies, radiation checks, residual chlorine check, residual 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 3338

PAGE: 2 OF 2

COOLER: 2 OF 2

COC# -

SDG# \_\_\_\_\_

DATE / TIME RECEIVED: 7-21-99 0855

DELIVERED BY: Fed Ex

RECEIVED BY: Sam

LIMS ENTRY BY: Sam

LIMS REVIEW BY / PM: ALC

CLIENT: Tetra Tech

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 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 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>7.3</u>	<u>ALC notified and called by fax 7/21/99</u>
6. SAMPLES RECEIVED AT 4°C +/- 2? <u>ICE</u> / ICE PACKS PRESENT <u>Y</u> or N?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
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 <sup>(1)</sup> ?	<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<sup>(1)</sup>:  
000000

<sup>(1)</sup> 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-3338

Project Manager: Andrea J. Colby

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

ORDER DATE: 07/21/99

PHONE: 850/385-9899

FAX: 850/385-9860

DUE: 20 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: J. HILL, J. ALEXANDER DELIVERED BY: FEDEX DISPOSE: AFTER 19 SEP

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3338-1	17GLM0401	20 JUL 1353	21 JUL	AQ
	WP3338-2	17GLM0201	20 JUL 1425		
	WP3338-3	17GLM0101	20 JUL 1446		
	WP3338-4	17GLM0301	20 JUL 1455		
	WP3338-5	17GLM0501	20 JUL 1510		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	5	75.00	375.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	5	125.00	625.00
TOTALS		5	200.00	1000.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
WP3338-6	17TL00401	20 JUL	21 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 PLAZA 7  
 661 ANDERSEN DR.  
 PITTSBURGH, PA 15220

**FINAL PAGE**

INVOICE: With Report

TOTAL ORDER AMOUNT \$1,075.00  
 This is NOT an Invoice

AJC/BKR  
 07-21 Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

0000024

ur 7/21/99



# 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:** WP3338-1  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0401	AQ	7/20/99	7/21/99	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	49	%	1.0		
2-FLUOROBIPHENYL	50	%	1.0		
TERPHENYL-D14	85	%	1.0		

Report Notes:

0000005



# 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:** WP3338-1  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0401	AQ	7/20/99	7/21/99	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	<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	106	%	1.0		
TOLUENE-D8	101	%	1.0		
BROMOFLUOROBENZENE	102	%	1.0		

Report Notes:

0000004



# 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:** WP3338-2  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0201	AQ	7/20/99	7/21/99	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	45	%	1.0		
2-FLUOROBIPHENYL	47	%	1.0		
TERPHENYL-D14	73	%	1.0		

**Report Notes:**

*0000007*



# 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:** WP3338-2  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0201	AQ	7/20/99	7/21/99	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	<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	111	%	1.0		
TOLUENE-D8	103	%	1.0		
1-BROMOFLUOROBENZENE	106	%	1.0		

Report Notes:

0000006



# 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:** WP3338-3  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0101	AQ	7/20/99	7/21/99	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	40	%	1.0		
2-FLUOROBIPHENYL	47	%	1.0		
TERPHENYL-D14	68	%	1.0		

Report Notes:

*0000008*



# 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:** WP3338-3  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0101	AQ	7/20/99	7/21/99	7/30/99	JSS	5030	JSS

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	95	%	1.0		
1,2-DICHLOROETHANE-D4	106	%	1.0		
TOLUENE-D8	102	%	1.0		
P-BROMOFLUOROBENZENE	102	%	1.0		

Report Notes:

0000009



# 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:** WP3338-4  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0301	AQ	7/20/99	7/21/99	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	<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	66	%	1.0		
2-FLUOROBIPHENYL	65	%	1.0		
TERPHENYL-D14	68	%	1.0		

Report Notes:

0000010



**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:** WP3338-4  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0301	AQ	7/20/99	7/21/99	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	<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	96	%	1.0		
1,2-DICHLOROETHANE-D4	106	%	1.0		
TOLUENE-D8	101	%	1.0		
p-BROMOFLUOROBENZENE	100	%	1.0		

Report Notes:

0000011



# 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:** WP3338-5  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0501	AQ	7/20/99	7/21/99	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	47	%	1.0		
2-FLUOROBIPHENYL	52	%	1.0		
TERPHENYL-D14	68	%	1.0		

**Report Notes:**

0000012



# 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:** WP3338-5  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17GLM0501	AQ	7/20/99	7/21/99	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	<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	96	%	1.0		
1,2-DICHLOROETHANE-D4	109	%	1.0		
LUENE-D8	102	%	1.0		
BROMOFLUOROBENZENE	103	%	1.0		

**Port Notes:**

0000013



# 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:** WP3338-6  
**SDG:** WP3338  
**Report Date:** 8/24/99  
**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
17TL00401	AQ	7/20/99	7/21/99	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	<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	96	%	1.0		
1,2-DICHLOROETHANE-D4	106	%	1.0		
TOLUENE-D8	102	%	1.0		
P-BROMOFLUOROBENZENE	101	%	1.0		

**Report Notes:**

0000014

4B  
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

**SBLK;072699**

Lab Name: Katahdin Analytical Services

SDG No.: WP3338

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
17GLM0401	WP3338-1	Z1629	8/4/99	2:00:00 PM
17GLM0201	WP3338-2	Z1630	8/4/99	2:46:00 PM
17GLM0101	WP3338-3	Z1631	8/4/99	3:32:00 PM
17GLM0301	WP3338-4	Z1632	8/4/99	4:19:00 PM
17GLM0501	WP3338-5	Z1633	8/4/99	5:06:00 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:** WP3338  
**Report Date:** 8/24/99  
**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	51	%	1.0		
2-FLUOROBIPHENYL	51	%	1.0		
TERPHENYL-D14	92	%	1.0		

Report Notes:

0000019

# 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
BENZO[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 + lcs rec) / 2] \* 100

\* Out of Limits

0000020

4A  
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKU30A

Lab Name: Katahdin Analytical Services

SDG No.: WP3338

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
17TL00401	WP3338-6	U0254	7/30/99	9:37:00 AM
17GLM0401	WP3338-1	U0255	7/30/99	10:12:00 AM
17GLM0201	WP3338-2	U0256	7/30/99	10:47:00 AM
17GLM0101	WP3338-3	U0257	7/30/99	11:23:00 AM
17GLM0301	WP3338-4	U0258	7/30/99	11:58:00 AM
17GLM0501	WP3338-5	U0259	7/30/99	12:33:00 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:** WP3338  
**Report Date:** 8/24/99  
**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		
BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

0000016

**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

0000017

August 25, 1999

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

RE: Katahdin Lab Number: WP-3350  
Project ID: CNC Charleston  
Project Manager: Ms. Andrea J. Colby  
Sample Receipt Date: July 22, 1999

Dear Mr. Calligan:

Please find enclosed the following information:

- \* Report of Analysis
- \* Confirmation
- \* Chain of Custody

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 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 PG27ICW1) 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.



**KATAHDIN ANALYTICAL SERVICES, INC.**

**SAMPLE RECEIPT CONDITION REPORT**

Tel. (207) 874-2400

Fax (207) 775-4029

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>	<u>AJC notified Paul Calligan by phone 7/22/99 &amp; was told to proceed.</u>
6. SAMPLES RECEIVED AT 4°C +/- 2?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
(CE) 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 <sup>(1)</sup> ?	<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<sup>(1)</sup>: Added HNO<sub>3</sub> to Metals bottle, sample 20G2M0104 to ↓ pH to < 2

0000047

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

NEW ENGLAND 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

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

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
WP3350-4	17GLM6D01	21 JUL 1115	22 JUL	AQ
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

LABORATORY ORDER CONTINUED ON PAGE 2

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

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

ORDER DATE: 07/22/98  
 PHONE: 850/385-9860  
 FAX: 850/385-9860  
 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

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	17TLO0501	21 JUL 0730	22 JUL	

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

**Report Note****Note Text**

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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.



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

Lab Number : WP-3350-1  
 Report Date: 08/26/99  
 PO No. : N7912-P99264  
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 1 of 3

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
17GLM0101	Aqueous	CLIENT	07/21/99 07/22/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Nitrate as N	<0.050	mg/L	1.0	0.050	353.2	07/22/99 BD	
Sulfate	160.	mg/L	20	1.0	375.4	08/13/99 VN	

\* 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  
 PG22NOW2

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

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

Lab Number : WP-3350-2  
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			
17GLM0201	Aqueous	CLIENT		07/21/99	07/22/99		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Nitrate as N	<0.050	mg/L	1.0	0.050	353.2	07/22/99	BD
Sulfate	110.	mg/L	20	1.0	375.4	08/13/99	VN

\* 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  
PG22NOW2  
CC: MS. LEE LECK  
TETRA TECH NUS  
FOSTER PALZA 7  
661 ANDERSEN DR.

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

Lab Number : WP-3350-3  
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
17GLM0301	Aqueous	CLIENT	07/21/99 07/22/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Nitrate as N	0.42	mg/L	1.0	0.050	358.2	07/22/99	BD
Sulfate	110.	mg/L	6.7	1.0	375.4	08/13/99	VN

\* 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  
PG22NOW2

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: WP3350-4  
 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
17GLM6D01	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	1.1	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.1	10	10
ACENAPHTHYLENE	<10	ug/L	1.1	10	10
ACENAPHTHENE	<10	ug/L	1.1	10	10
FLUORENE	<10	ug/L	1.1	10	10
PHENANTHRENE	<10	ug/L	1.1	10	10
ANTHRACENE	<10	ug/L	1.1	10	10
FLUORANTHENE	<10	ug/L	1.1	10	10
PYRENE	<10	ug/L	1.1	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.1	10	10
INDENOPYRENE	<10	ug/L	1.1	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.1	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.1	10	10
BENZO[A]PYRENE	<10	ug/L	1.1	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.1	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.1	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.1	10	10
NITROBENZENE-D5	48	%	1.1		
2-FLUOROBIPHENYL	50	%	1.1		
TERPHENYL-D14	59	%	1.1		

Port Notes: A-1



# 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:** WP3350-4  
**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
17GLM6D01	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	<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	97	%	1.0		
1,2-DICHLOROETHANE-D4	108	%	1.0		
TOLUENE-D8	102	%	1.0		
P-BROMOFLUOROBENZENE	102	%	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:** WP3350-5  
**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
17GLM6D01D	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	48	%	1.0		
2-FLUOROBIPHENYL	51	%	1.0		
TERPHENYL-D14	63	%	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:** WP3350-5  
**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
17GLM6D01D	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	<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	101	%	1.0		
P-BROMOFLUOROBENZENE	102	%	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:** WP3350-11  
**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
17TL00501	AQ	7/21/99	7/22/99	7/30/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	Δ	ug/L	1.0	5	5
TOLUENE	Δ	ug/L	1.0	5	5
1,2-DIBROMOETHANE	Δ	ug/L	1.0	5	5
ETHYLBENZENE	Δ	ug/L	1.0	5	5
NAPHTHALENE	Δ	ug/L	1.0	5	5
MTBE	Δ	ug/L	1.0	5	5
TOTAL XYLENES	Δ	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	94	%	1.0		
1,2-DICHLOROETHANE-D4	100	%	1.0		
LUENE-D8	100	%	1.0		
BROMOFLUOROBENZENE	99	%	1.0		

Port Notes:

Kendall Analytical Services Inc.  
Quality Control Report

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	Concentration				Practical Quantitation Level**	LABORATORY CONTROL SAMPLE RESULTS				
			Units	Measured in Blank	Acceptance Range	Measured Value		True 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	mg/L	1.00	0.950	95	80-120	
	22-Jul-99	22-Jul-99	mg/L	< 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	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 Water 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			Acceptance			Concentration or Quantity				Matrix Spike Recovery (%)			RPD (%)	Acceptance Range (%)
		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		
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.

**SELK;072699**

Lab Name: Katahdin Analytical Services

SDG No.: WP3350

Lab File ID: Z1625

Lab Sample ID: SELK;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		

Port 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

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

4A  
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKU31A

Lab Name: Katahdin Analytical Services

SDG No.: WP3350

Lab File ID: U0270

Lab Sample ID: VBLKU31A

Date Analyzed: 07/31/99

Time Analyzed: 9:57

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
LCSU31A	LCSU31A	U0269	7/31/99	9:21:00 AM
17GLM6D01MSD	WP3350-4MSD	U0271	7/31/99	10:45:00 AM



# 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:** VBLKU31A  
**SDG:** WP3350  
**Report Date:** 8/25/99  
**PO No.:** N7912-P99264  
**Project:** CTO #68  
**% Solids:** N/A  
**Method:** SW8260  
**Date Analyzed:** 7/31/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKU31A	AQ	-	-	7/31/99	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	98	%	1.0		
1,2-DICHLOROETHANE-D4	100	%	1.0		
TOLUENE-D8	101	%	1.0		
BROMOFLUOROBENZENE	99	%	1.0		

Report Notes:

**Katahdin Analytical Services**  
**8260 LCS Recovery Sheet**

Lab File: U0269

Sample ID: LCSU31A

Date Run: 7/31/99

Analyst: JSS

Time Injected 9:21:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	47.1	94	60-140
BENZENE	50	50.1	100	60-140
ETHYLBENZENE	50	50.6	101	60-140
MTBE	50	45.5	91	60-140
NAPHTHALENE	50	40.3	80	60-140
TOLUENE	50	48.8	98	60-140
TOTAL XYLENES	150	143	95	60-140

\* Out of Limits

1

0000035

# Katahdin Analytical Services

## MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP3350-4	U0260	7/30/99	1:09:00 PM	JSS	AQ	8260_99
WP3350-4MS	U0266	7/30/99	4:41:00 PM	JSS	AQ	8260_99
WP3350-4MSD	U0271	7/31/99	10:45:00 AM	JSS	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	125	123	83	82	60-140	1.6	20
TOLUENE	0	50	50	42.8	41.4	86	83	60-140	3.3	20
NAPHTHALENE	0	50	50	38.2	37.1	76	74	60-140	2.9	20
MTBE	0	50	50	43.7	42.2	87	84	60-140	3.5	20
ETHYLBENZENE	0	50	50	44.0	42.6	88	85	60-140	3.2	20
BENZENE	0	50	50	43.9	43.0	88	86	60-140	2.1	20
1,2-DIBROMOETHANE	0	50	50	45.6	44.3	91	88	60-140	2.9	20

RPD = [(ms res - msd res) / (ms res + msd res) / 2] \* 100

\* Out of Limits

1

0000036

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 #: 990119

**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.



## SAMPLE LOG-IN & RECEIPT CHECKLIST

Client/Proj #: KATAHDIN

Proj Mgr: ANDREA COLBY

Lab Pool #: 990119

Inspected & Logged in by: A. REZNES

Date Time: 7/27/99 @ 1645

Sample Matrix	Number of Samples	Analysis Requested	Analyze by (date)	Storage Location
<u>AQUEOUS (VIALS)</u>	<u>3</u>	<u>Me</u>	<u>8/20/99</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 4°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:

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:  
WP3350-3(C)

All recoveries were within QC limits.

Date Samples Received by the Laboratory: 7/23/99

Date Analysis Started: 8/4/99

C:\My Documents\katrpt7.doc

1  
ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. \_\_\_\_\_

Lab Name: ENSR Contract: WP3350-1(C)

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

Matrix: (soil/water) water Lab Sample ID: 990119-1

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KTH\_009

Level: (low/med) low Date Received: 7/23/99

% 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) <u>µg/L</u>	<u>Q</u>
74-82-8	Methane	9.8	

1  
ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: \_\_\_\_\_

**WP3350-2(A)**

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

Matrix: (soil/water) \_\_\_\_\_ water \_\_\_\_\_

Lab Sample ID: 990119-2

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

Lab File ID: KTH\_010

Level: (low/med) \_\_\_\_\_ low \_\_\_\_\_

Date Received: 7/23/99

% Moisture: NA

Date Analyzed: 8/4/99

GC Column: Carboxen 1004 OD: 1/16"

Dilution Factor: 1

Soil Extract Volume: NA ( $\mu$ l)

Soil Aliquot Volume: NA ( $\mu$ l)

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
( $\mu$ g/L or PPMv)  $\mu$ g/L

Q

74-82-8

Methane

5.2

U

1  
ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ENSR Contract: \_\_\_\_\_

WP3350-3(B)

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

Matrix: (soil/water) \_\_\_\_\_ water \_\_\_\_\_ Lab Sample ID: 990119-3

Sample wt / vol: 32.5 ml (g/ml) Lab File ID: KTH\_011

Level: (low/med) low Date Received: 7/23/99

% 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) <u>µg/L</u>	Q
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74-82-8	Methane	5.2	U
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1  
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 \_\_\_\_\_ (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	2.7	J

1  
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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ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name:        ENSR        Contract:       

WP3350-3(C)MS

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

Matrix: (soil/water)        water       

Lab Sample ID: 990119-3 MS

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

Lab File ID:        KTH\_012       

Level: (low/med)        low       

Date Received:        7/23/99       

% 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) <u>      </u> µg/L <u>      </u>	Q
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74-82-8	Methane	24	
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## 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.: WP3350-3(C)

COMPOUND	SPIKE ADDED ( $\mu\text{g/L}$ )	SAMPLE CONCENTRATION ( $\mu\text{g/L}$ )	MS CONCENTRATION ( $\mu\text{g/L}$ )	MS % REC #	QC LIMITS REC.
Methane	41.03	0	24.1	59%	50-150

Spike recovery: 0 out of 1 outside limits.Comments:  
\_\_\_\_\_  
\_\_\_\_\_

4  
METHOD BLANK SUMMARY

EPA SAMPLE NO.

Lab Name: ENSR Contract: VBLK01

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

Lab File ID: KTH\_006 Lab Sample I MB990119

Instrument ID: HPGC#3 Date Analyzed: 8/4/99

Matrix: (soil/water) water Level: (low/med) low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES; MS AND MSD

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	LCS01	LCS990119	KTH_008	08/04/99
02	WP3350-1(C)	990119-1	KTH_009	08/04/99
03	WP3350-2(A)	990119-2	KTH_010	08/04/99
04	WP3350-3(B)	990119-3	KTH_011	08/04/99
05	WP3350-3(C) MS	990119-3 MS	KTH_012	08/04/99
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
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23				
24				
25				
26				

COMMENTS:

**APPENDIX E**

**AQUIFER CHARACTERIZATION GRAPHS**

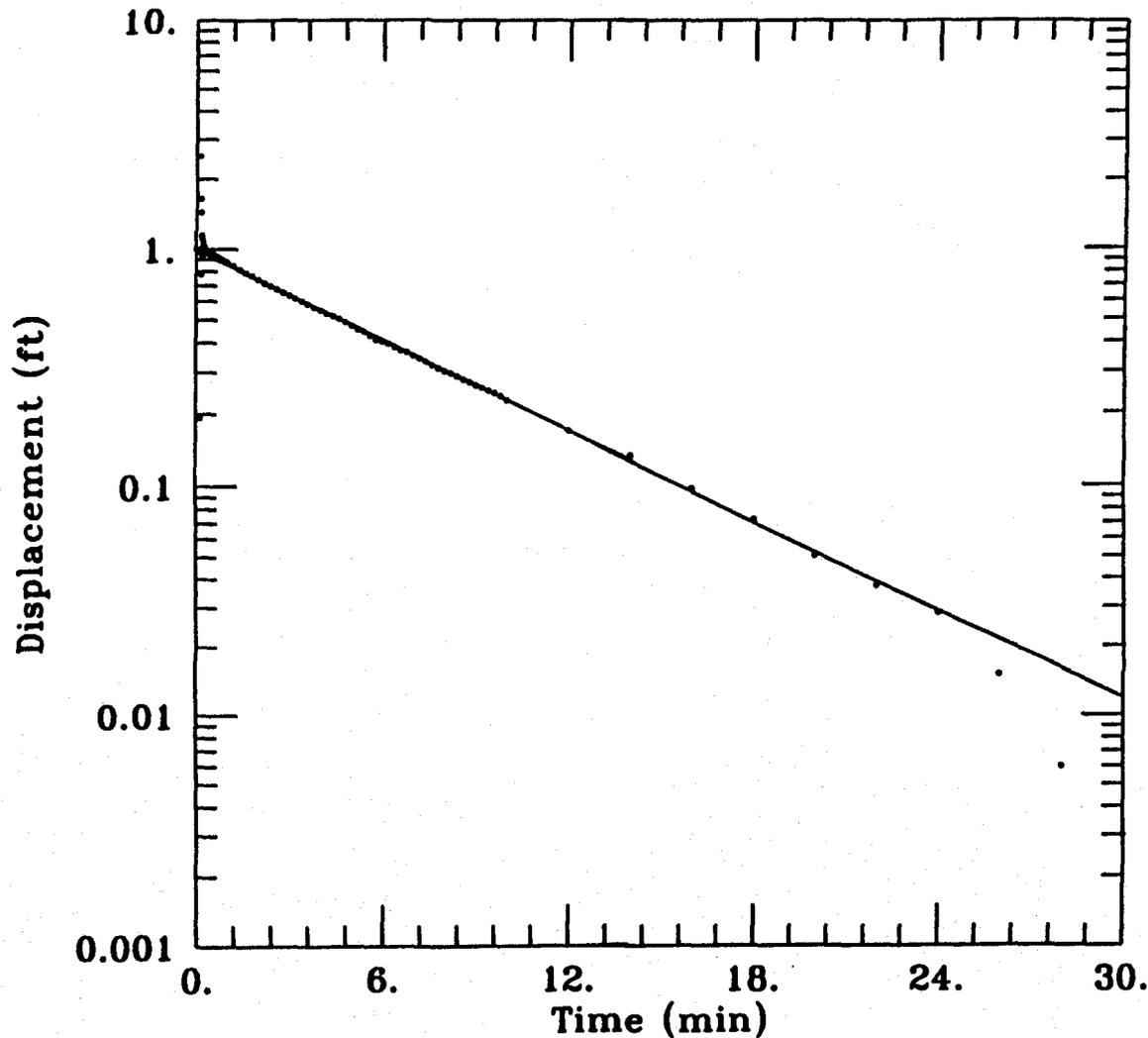
Client: CLEAN

Company: E/A&H

Location: NAVAL BASE CHARLESTON

Project: 2907-08450

## FALLING HEAD SLUG TEST NBCGGDG002



DATA SET:  
G002FAL.AQT  
04/09/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bower-Rice

PROJECT DATA:  
test date: January 1997

TEST DATA:  
H0 = 1. ft  
rc = 0.083 ft  
rw = 0.3125 ft  
L = 5. ft  
b = 5. ft  
H = 5. ft

PARAMETER ESTIMATES:  
K = 0.0002064 ft/min  
y0 = 0.9928 ft

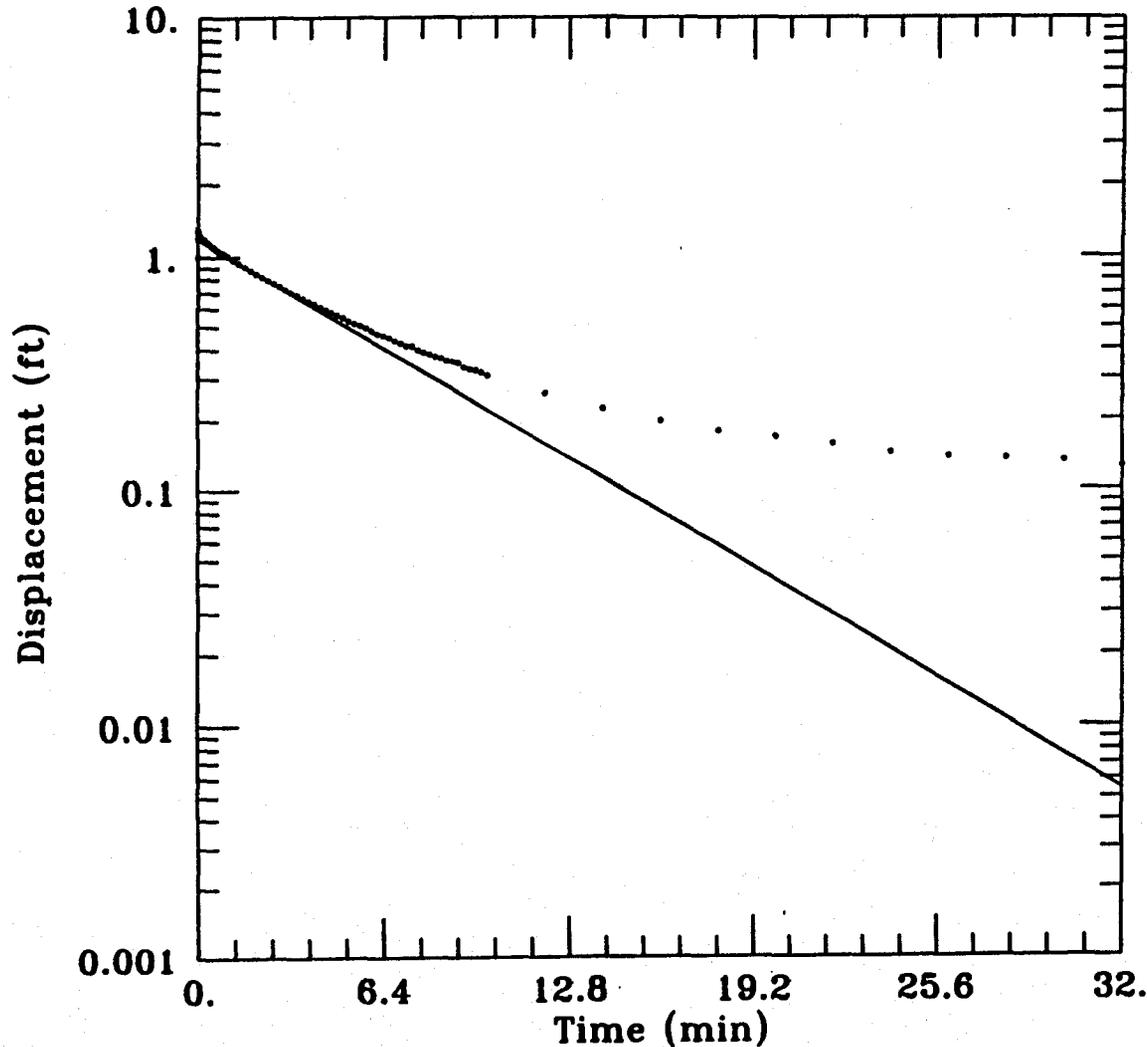
Client: CLEAN

Company: E/A&H

Location: NAVAL BASE CHARLESTON

Project: 2907-08450

## RISING HEAD SLUG TEST NBCGGDG002



DATA SET:  
G002RIS.AGT  
04/09/97

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 = 5. ft  
b = 5. ft  
H = 5. ft

PARAMETER ESTIMATES:  
K = 0.0002353 ft/min  
y0 = 1.184 ft