

N61165.AR.005353  
CNC CHARLESTON  
5090.3a

FINAL ASSESSMENT REPORT DATED 9 MARCH 2000 FOR ZONE I SITE 35 BUILDING NS-  
28 WITH SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL  
REVIEW LETTER CNC CHARLESTON SC  
04/20/2000  
CH2M JONES LLC



20 April 2000

2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Clas E. Bryant

Department of the Navy  
Southern Division NFEC

BOARD:  
Bradford W. Wyche  
Chairman

P.O. Box 190010  
North Charleston, SC 29419-9010  
Attention: Mr. Gabriel Magwood

William M. Hull, Jr., MD  
Vice Chairman

Mark B. Kent  
Secretary

Re: Final Assessment Report dated 09 March 2000  
Zone I/Site 35-Building NS28 (Site Identification # 00964)  
Charleston Naval Complex/Charleston Naval Base  
Charleston, SC  
Charleston County

Howard L. Brilliant, MD

Brian K. Smith

Rodney L. Grandy

Larry R. Chewning, Jr., DMD

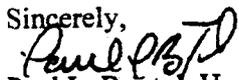
Dear Mr. Magwood:

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 compound(s) were reported in soil samples obtained at the subject site. Although reported concentrations do not exceed the RBSL (Risk-Based Screening Levels, SCDHEC *Risk-Based Corrective Action for Petroleum Releases*, 5 January 1998), the compounds benz(a)anthracene, benzo(b)fluoranthene and benzo(a)pyrene exceed proposed RBC (Risk-Based Concentrations for Residential Soils, EPA Region III Risk-Based Concentrations Table, 07 October 1999) and SSL's for groundwater migration (soil). Available analytical data and applied interpretations appear to indicate that a reasonable delineation and characterization of the extent and severity of soil contamination have been developed for the Building NS28 site. The available information and data were then utilized to propose "no further action" for the subject site.

With consideration to the above, the author does not concur with the conclusions and recommendations as presented. The facility must develop an appropriate monitoring plan sufficient to demonstrate a reasonable understanding of the environmental fate, relative potential current risk and relative potential future risk from the contaminants originating from the subject site. A schedule for development of the requested monitoring plan should be submitted to my attention by 31 May 2000. Should you have any questions please contact me at (803) 898-3559.

Charleston Naval Complex/Charleston Naval Base  
20 April 2000  
page 2

Sincerely,



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

cc: Trident District EQC

**RECEIVED**

DEC 19 2000

Bureau of Underground  
Storage Tank Management

**SAMPLING AND ANALYSIS PLAN  
FOR  
ZONE I/ SITE 35-BUILDING NS28**

**SITE IDENTIFICATION # 00964**

**Charleston Naval Complex  
Charleston, South Carolina**

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

**Submitted by:  
CH2M-JONES, LLC.  
115 Perimeter Center Place NE  
Suite 700  
Atlanta, Georgia 30346-1278**

**Contract Number: N62467-99-C-0960**

**December 2000**

**PREPARED BY:**

 12-11-00

**Brian R. Crawford  
Engineer II  
CH2M-JONES, LLC.**

**APPROVED BY:**



**Jed A. Heames  
Site Superintendent  
CH2M-JONES, LLC.**

# TABLE OF CONTENTS

Section	Page
<b>ACRONYMS.....</b>	<b>iii</b>
<b>1.0 INTRODUCTION.....</b>	<b>1-1</b>
1.1 GENRAL SITE DESCRIPTION.....	1-1
1.2 OBJECTIVE.....	1-1
<b>2.0 PROPOSED REMEDIATION TECHNOLOGY .....</b>	<b>2-1</b>
<b>3.0 MONITORING WELL INSTALLATON AND ABANDONMENT .....</b>	<b>3-1</b>
3-1 MONITORING WELL INSTALLATION .....	3-1
3-2 MONITORING WELL ABANDONMENT .....	3-1
3-3 SURVEYING.....	3-1
3-4 EQUIPMENT DECONTAMINATION.....	3-1
<b>4.0 PROPOSED MONITORING PROGRAM.....</b>	<b>4-1</b>
4-1 MONITORING FREQUENCY AND REPORTING.....	4-1
4-2 ANALYTICAL PARAMETERS .....	4-2
4-3 FIELD MEASUREMENTS .....	4-2
4-4 GROUNDWATER LEVEL MEASUREMENTS.....	4-2
4-5 SAMPLE HANDLING.....	4-3
4-6 SAMPLE PACKING AND SHIPPING .....	4-3
4-7 QUALITY CHECK.....	4-3
4-8 CONTROL LIMITS .....	4-4
4-9 RECORDKEEPING.....	4-4
4-10 SITE MANAGEMENT AND BASE SUPPORT .....	4-4
<b>REFERENCES.....</b>	<b>R-1</b>

**5.0**

**FIGURES**

FIG 1 .....SITE MAP

FIG 2 .....SITE VICINITY MAP

**6.0**

**ATTACHMENTS**

ATTACHMENT 1 .....INITIAL GROUNDWATER ASSESSMENT REPORT

## ACRONYMS AND ABBREVIATIONS

bls	below land surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene Isomers
CNC	Charleston Naval Complex
CSAP	Comprehensive Sampling and Analysis Plan
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
EPA	Environmental Protection Agency
ft	foot
IGWA	Initial Groundwater Assessment Report
mg/kg	microgram per kilogram
mg/L	microgram per liter
QA	Quality Assurance
QC	Quality Control
PAH	Polynuclear Aeromatic Hydrocarbon
RBSL	Risk-Based Screening Level
RDA	Redevelopment Authority
SAP	Sampling and Analysis Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
TTNUS	Tetra Tech NUS
UST	Underground Storage Tank

## 1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by CH2M-JONES, LLC. The plan is designed for Zone I/ Site 35-Building NS28; Underground Storage Tank (UST) NS28 located at the Charleston Naval Complex (CNC), Charleston, South Carolina.

The South Carolina Department of Health and Environmental Control (SCDHEC) has designated this site as Identification Number: 00964. This SAP provides methods to further evaluate the applicability of intrinsic remediation and monitoring well abandonment as a corrective action for UST NS28 in accordance with SCDHEC Corrective Action Guidance, June 1997.

### 1.1 General Site Description

The CNC is in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina. This installation consists of two major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkeley County, and a developed area on the west bank of the Cooper River. The developed portion of the base is on the peninsula bounded on the west by the Ashley River and on the east by the Cooper River. The site is located within the developed portion of the base as shown in Figure 2. (Tetra Tech, NUS [TTNUS], Initial Groundwater Assessment [IGWA] for UST NS28, March 2000).

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.

TTNUS completed a Rapid Assessment (RA) for Site 35 which includes one Underground Storage Tank (UST) system for Building NS28 at Charleston Naval Complex (CNC) Zone I, in North Charleston, South Carolina. The UST was used as fuel oil for Building 28, the former Bachelor Officer's Quarters. The 10,000 gallon steel UST was removed in March 1997. The assessment was performed under the direction of the South Carolina Department of Health and Environmental Control Rapid Assessment guidance dated June 20, 1997, and approval letter dated June 3, 1999. After determining all laboratory analytical results were below the risk-based screening levels (RBSLs), the reporting format was reduced from a RA to an Initial Groundwater Assessment report (IGWA) report format (TTNUS, March 2000).

### 1.2 Objective

In the IGWA completed by Tetra Tech NUS, two soil samples and one groundwater sample was collected at the site. Although benzo(a) anthracene, benzo(b) fluoranthene, benzo(k) fluoranthene, and chrysene were detected in the soil borings at 3-4 foot; no

chemicals of concern were found above the Risk Based Screening Levels (RBSLs). No chemicals of concern were detected in the groundwater sample.

The IGWA recommended a no further action for this site, however, SCDHEC requests that a monitoring plan be put in place in order to demonstrate a reasonable understanding of the environmental fate, relative potential current risk, and the relative potential future risk from the contaminants originating from this site.

This SAP presents a monitoring plan (see Section 4.0) to attempt to address and demonstrate the above concerns. If the areas sampled continue to be 'clean' (no detected COCs above the RBSLs), the site will be recommended to be a No Further Action (NFA) site.

## **2.0 PROPOSED REMEDIATION TECHNOLOGY**

Based on the results of the IGWA modeling, one additional round of sampling will be performed for the site. The monitoring program will consist of sampling one monitoring well and sampling three soil locations at 3-4 feet at the site. The proposed monitoring program is described in detail in Sections 3.0 and 4.0 of this plan.

After the sampling has been completed at the site, CH2M-Jones, LLC will determine if further sampling will be needed or if a request for No Further Action will be made. If the results are above the RBSLs an effort will be made to demonstrate a reasonable understanding of the environmental fate, relative potential current risk and relative potential future risk from the contaminants originating from this site. If the results are below RBSLs, CH2M-Jones, LLC will request NFA for the site on the basis that the site will have been sampled twice and no concentrations have been reported above the RBSLs.

### **3.0 MONITORING WELL INSTALLATION AND ABANDONMENT**

#### **3.1 Monitoring Well Installation**

Because no COCs were found above RBSLs in groundwater or soil at this site, no additional groundwater wells will be added.

#### **3.2 Monitoring Well Abandonment**

One monitoring well will be abandoned at Building NS28 following the South Carolina Well Standards and Regulations R.61-71. The well abandonment will include grouting wells, removing stick-ups and removing all guard posts.

#### **3.3 Surveying**

Because no monitoring wells will be installed at this site, a new survey will not be conducted.

A survey will be conducted in order to locate the soil boring locations.

#### **3.4 Equipment Decontamination**

All drilling equipment, augers, well casing and screens, and soil and groundwater sampling equipment involved in field sampling activities will be decontaminated according to the Environmental Protection Agencies (EPA) "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM).

## 4.0 PROPOSED MONITORING PROGRAM

### 4.1 Monitoring Frequency and Reporting

The monitoring program proposed at Building NS28 will be performed in accordance with SCDHEC Corrective Action Guidance, June 1997, and consist of the following:

Sampling date or (Quarter)	Sample Locations	Field Measures	Laboratory Analytical
First quarter <sup>1</sup> 2001	CNC-35-MW01 Soil Borings: SB01 and SB02	T°, pH, DO, Conductivity, Depth to water, Total depth, Turbidity.	BTEX 8260 including Naphthalene 8260 (15) PAHs 8270

1. First quarter is defined as January February and March.

- **Frequency:** Samples will be collected from monitoring well CNC 35-MW01, and soil borings SB-01 and SB-02.
- **Reporting:** Groundwater and soil monitoring reports will be submitted to SCDHEC.

At the end of the first quarter 2001 period, (or as necessary) a performance evaluation will be submitted to SCDHEC. It is possible that the COC levels are not above the RBSLs in the groundwater and soil, which will result in a request for NFA at this site.

- **Groundwater Sampling**

Prior to any groundwater sampling, each well will be measured for water levels and total depth and each well will be purged in accordance the EPA EISOPQAM.

## **4.2 Analytical Parameters**

The following constituents will be analyzed for each groundwater sample:

- BTEX including Naphthalene using method 8260
- Polynuclear Aeromatic Hydrocarbons (PAHs) using method 8270
- pH

The following constituents will be analyzed for each soil sample:

- BTEX including Naphthalene using method 8260
- PAH using method 8270

The following parameters will be analyzed in order to evaluate the effectiveness of intrinsic remediation:

- N/A

## **4.3 Field Measurements**

The following parameters will be sampled in the field for groundwater:

- Temperature
- pH
- Dissolved Oxygen
- Depth to water table
- Depth of well
- Turbidity
- Specific Conductance

Field measurements will be recorded in the field book and in field forms.

## **4.4 Groundwater Level Measurements**

Groundwater measurements will be taken from all monitoring wells at the site during each sampling event. All water level measurements will be taken on the same day as anticipated sampling.

Measurements will be taken with an electrical water level meter or interface probe if floating product is present using the highest part of the top of the casing as a reference point for determining depths to water and total depths. Water level measurements will be recorded to the nearest 0.01-foot in the field book.

#### 4.5 Sample Handling

Field procedures and groundwater analysis will follow standard procedures found in the approved Comprehensive Action Sampling and Analysis Plan (CSAP) portion of the RFI Work Plan (Ensafe, Inc./Allen & Hoshall, 1996). The CSAP outlines all monitoring procedures to be performed in during the investigation in order to characterize the environmental setting, source, and releases of hazardous constituents. In addition, the CSAP includes the Quality Assurance plan and Data Management Plan to verify that all information and data are valid and properly documented. Unless otherwise noted, the sampling strategy and procedures will be performed in accordance with the EPA Environmental Services Division

Sample Handling will be conducted in accordance with the following references:

EPA EISOPQAM (EPA May, 1996)  
Comprehensive Sampling and Analysis Plan (Ensafe/Allen & Hoshall July, 1996)

#### 4.6 Sample Packing and Shipping

The following forms will be compiled to complete the packing/shipping process:

- Sample labels
- Chain-of-custody labels
- Appropriate labels applied to shipping coolers
- Chain-of-custody forms
- Federal express air bills

#### 4.7 Quality Check

Quality Control (QC) samples will be collected during sampling events. QC samples may include field blanks, field duplicates, and trip blanks. Definitions of each can be found below as described by the EISOPQAM:

- **Field Blank:** a sample collected using organic-free water, which has been run over/through sample collection equipment. These samples are used to determine if contaminants have been introduced by contact of the sample medium with sampling equipment. Equipment field blanks are often associated with collecting rinse blanks of equipment that has been field cleaned.
- **Field Duplicates:** Two or more samples collected from a common source. The purpose of a duplicate sample is to estimate the variability of a given characteristic or contamination associated with a population.

- **Trip Blank:** A sample, which is prepared prior to the sampling event in the actual container and is stored with the investigative samples throughout the sampling event. They are often packaged for shipment with the other samples and submitted for analysis. At no time after their preparation are trip blanks to be opened before they reach the laboratory. Trip blanks are used to determine if samples were contaminated during storage and/or transportation back to the laboratory (a measure of sample handling variability resulting in positive bias in contaminant concentration). If samples are to be shipped, trip blanks are to be provided with each shipment but not for each cooler.

#### 4.8 Control Limits

Analysis	Control Parameter	Control Limit	Corrective Action
Air Monitoring	Check Calibration of OVA daily	Calibrate to manufactures specifications	Recalibrate. If unable to calibrate, replace.
pH of water	Continuing calibration check of pH 7.0 buffer	pH= 7.0	Recalibrate. If unable to calibrate, replace electrode.
Specific Conductance of water	Continuing calibration check of standard solution	> 1% of standard	Recalibrate.

#### 4.9 Record keeping

In addition to records kept in logbooks, forms will be kept on log sheets for soil and groundwater.

#### 4.10 Site Management and Base Support

Throughout the investigation activities, work on the CNC will be coordinated through SOUTHDIV and SCDHEC.

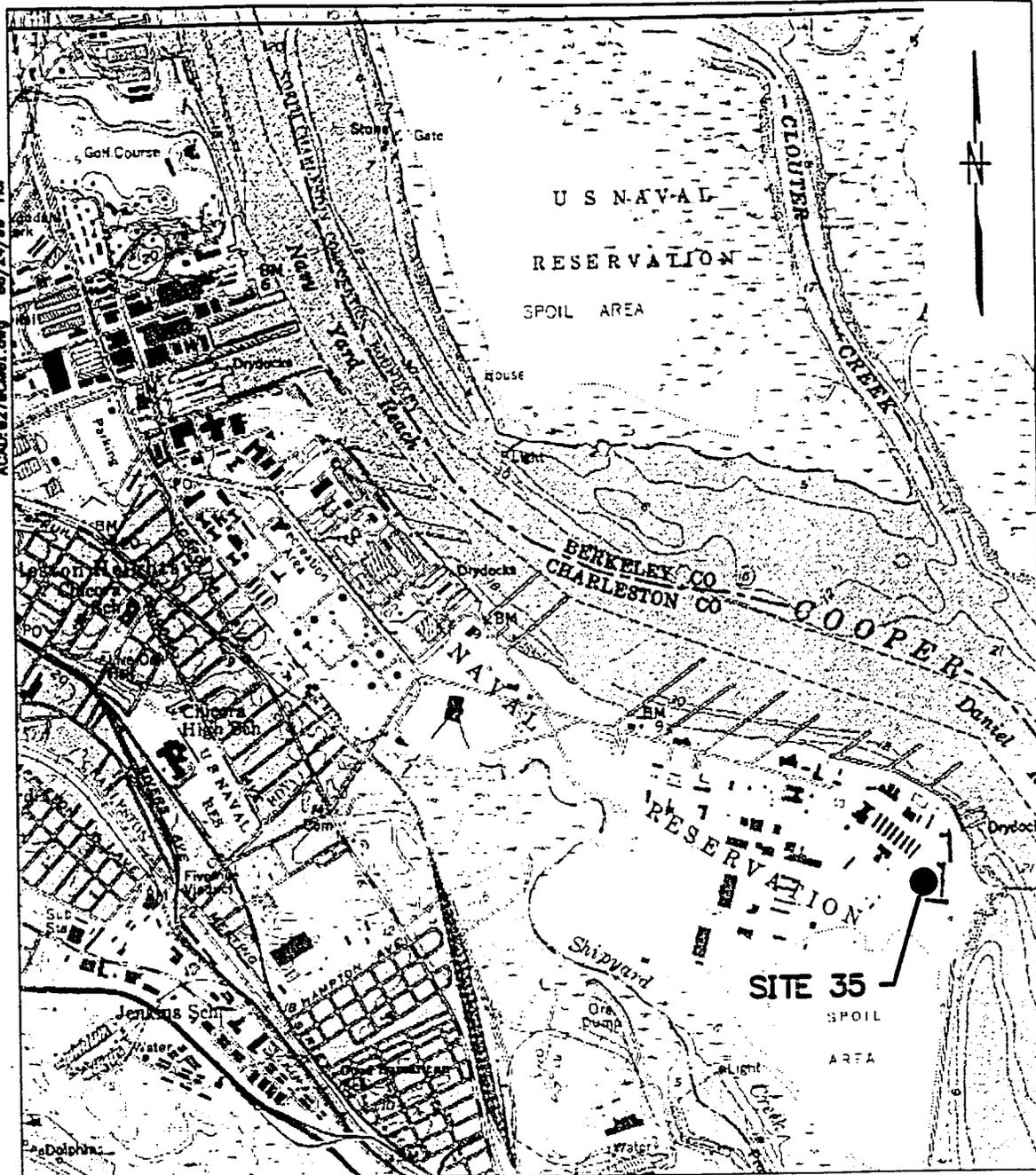
The primary contacts for each are as follows:

1. SOUTHDIV point of contact  
Gabe Magwood  
Southern Division Engineering Command  
2155 Eagle Drive  
North Charleston, SC 29406  
(843) 820-7307

2. SOUTHDIV point of contact  
Tony Hunt  
Southern Division Engineering Command  
2155 Eagle Drive  
North Charleston, SC 29406  
(843) 820-5525
  
3. SCDHEC point of contact  
Michael Bishop  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, SC 29201  
(843) 898-4339

## REFERENCES

- Ensafe/ Allen & Hoshall. July, 1996. Comprehensive Sampling and Analysis Plan.
- South Carolina Department of Health and Environmental Control. 1997. Corrective Action Guidance.
- Tetra Tech NUS, Inc.; March 2000 Initial Groundwater Assessment Site 35 (Building NS28), Charleston, South Carolina.
- United States Environmental Protection Agency. 1990. Code of Federal Regulations 136.
- United States Environmental Protection Agency. 1988. EPA Users Guide to Contract Laboratory Program.
- United States Environmental Protection Agency. 1996. EPA Environmental Investigations Standard Operating Procedures for Quality Assurance Manual.



ACAD: 8278CAM1.dwg 08/24/99 HJP

SOURCE: QUADRANGLE MAP SOUTH CAROLINA, REVISED 1879  
 QUADRANGLE MAP NORTH CHARLESTON, REVISED, 1879

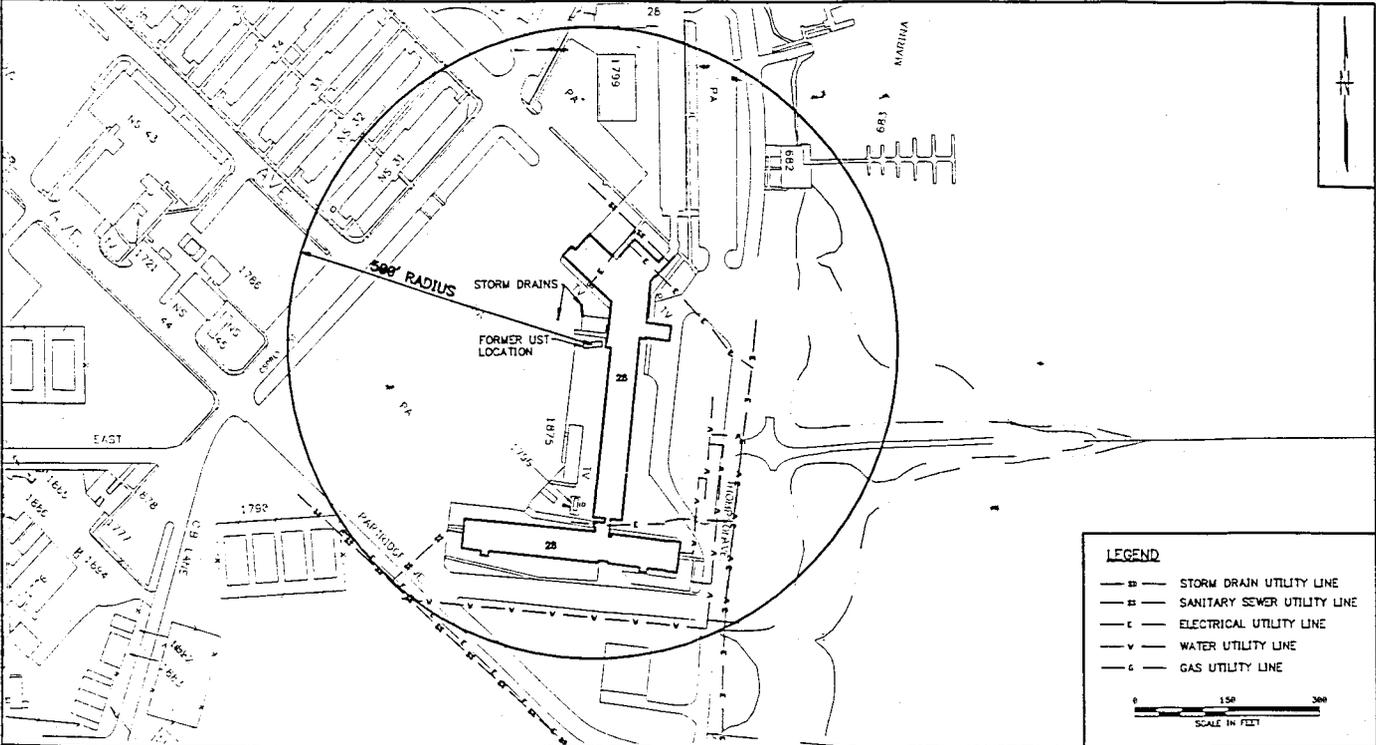


DRAWN BY	DATE
HJP	8/20/99
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE AS NOTED	



SITE LOCATION MAP  
 SITE 35, BUILDING NS28-A, ZONE I  
 CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SC

CONTRACT NO. N0270	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1	REV. 0



NO.	DATE	REVISIONS	BY	CHKD	APPR	REFERENCES

DRAWN BY: HJP DATE: 8/24/99  
 CHECKED BY: DATE: \_\_\_\_\_  
 COOT/SCHL-AREA: \_\_\_\_\_  
 SCALE: AS NOTED

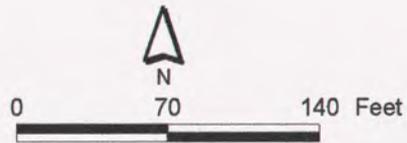


SITE VICINITY MAP  
 SITE 33, BUILDING NS 28  
 ZONE I, CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0270	
APPROVED BY:	DATE:
APPROVED BY:	DATE:
DRAWING NO. FIGURE 2	REV. P



● Proposed soil borings.



**Figure 3-1**  
Proposed Soil Borings  
Zone I/ Site 35, Building NS28  
Charleston Naval Complex

**CH2MHILL**

**Initial  
Ground-Water  
Assessment Report  
for  
Site 35, Building NS28**

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



**Southern Division  
Naval Facilities Engineering Command**

**Contract Number N62467-94-D-0888**

**Contract Task Order 0103**

**March 2000**

**INITIAL GROUND-WATER ASSESSMENT REPORT  
FOR  
SITE 35, BUILDING 28**

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

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

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

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

**CONTRACT NUMBER N62467-94-D-0888  
CONTRACT TASK ORDER 0103**

**MARCH 2000**

**PREPARED UNDER THE SUPERVISION OF:**

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

**APPROVED FOR SUBMITTAL BY:**

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

## EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment for Site 35 which includes one underground storage tank (UST) system for Building 28 at Charleston Naval Complex (CNC) Zone I, in North Charleston, South Carolina. The UST was used as fuel oil for Building 28, the former Bachelor Officer's Quarters. The 10,000-gallon steel UST was removed in March 1997. The assessment was performed under the direction of the South Carolina Department of Health and Environmental Control Rapid Assessment guidance dated June 20, 1997, and approval letter dated June 3, 1999. After determining all laboratory analytical results were below the risk-based screening levels (RBSLs), the reporting format was reduced from a Rapid Assessment Report to an Initial Ground-Water Assessment (IGWA) report format.

### **TtNUS performed the following actions during the Rapid Assessment:**

- 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 utility 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 NS 28A to determine boring locations and monitoring well placement.
- Conducted site survey to identify utilities and to construct a site plan.
- Installed three shallow soil borings (5, 8, and 12 feet below land surface [bls]) using direct push technology (DPT) and hand auger.
- Collected soil samples for field screening using an organic vapor analyzer.
- Collected soil and groundwater samples from DPT borings for on-site mobile laboratory screening analysis for benzene, toluene, ethylbenzene, and total xylenes (BTEX); naphthalene; and diesel range organics.
- Collected and analyzed two soil samples at a fixed-base analytical laboratory for BTEX and naphthalene using U.S. Environmental Protection Agency (USEPA) Method 8260 and polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270.
- Collected soil samples from one boring for grain size analysis, total organic carbon using USEPA Method 415.1, and total recoverable petroleum hydrocarbon using USEPA Method 9071.
- Installed one shallow permanent monitoring well to 11 feet bls using hollow stem auger.
- Collected groundwater samples from newly installed, permanent monitoring well for laboratory analysis at a fixed-base analytical laboratory.

- Analyzed groundwater samples for BTEX, methyl tert-butyl ether (MTBE), and naphthalene using USEPA Method 8260 and PAHs using USEPA Method 8270.
- Surveyed monitoring well and top of casing elevation and collected depth to groundwater measurement (to evaluate regional groundwater flow direction).

### Conclusions

On-site mobile laboratory screening results of soil and groundwater samples collected during the DPT investigation did not reveal the need for a full Rapid Assessment. Therefore, additional soil borings and monitoring wells were not installed. However, soil samples were collected from two confirmation soil borings on June 23, 1999, and analyzed for BTEX and PAHs by a fixed-base laboratory. Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene were detected in SB-02 from the west end of the UST pit at a depth of 3 to 4 feet. However, the chemicals of concern (CoCs) were not detected at concentrations exceeding the RBSLs for sandy soils (or clay-rich soils) where depth to groundwater is less than 5 feet bls.

A groundwater sample was collected from the newly installed monitoring well on July 14, 1999. No dissolved CoCs were detected in the well.

### Recommendation

Based upon the results of the Rapid Assessment performed in 1999 and reported in the following IGWA, no further action is requested for Site 35, UST 28A, Building 28, of Zone I, CNC. The CoCs that were detected in the fixed-base soil sample were well below their respective RBSLs. In addition, the monitoring well groundwater sample collected at the site did not contain any CoCs.

**INITIAL GROUND-WATER ASSESSMENT REPORT**

Facility Name: Charleston Naval Base, Zone I, Site 35, UST 28A, Building 28

Site ID Number: 00964

UST Owner or Operator's Name: U.S. Navy Southern Division (SouthDiv) Naval Facilities Engineering Command (NAVFAC)

Address: 2155 Eagle Drive, North Charleston, South Carolina 29406

Phone Number: 843-820-7307

Contractor: Tetra Tech NUS, Inc., Gregory D. Swanson, P.E. Cert. # 24

Address: 800 Oak Ridge Turnpike, Oak Ridge, TN 37830

Phone Number: (423) 483-9900

Well Driller: Rod Fuller, Custom Drilling – Hollow Stem Auger. Randolph Brand, Columbia Technologies- Direct Push. Cert. # 1240  
1485

**Receptor and Site Data**

Please place a check in the appropriate answer block for each question:

Receptor Survey Questions	No	Yes*
Is there a drinking water supply well (public or private) or surface water supply intake within 1,000 feet of the UST?	X	
Are irrigation or other non-drinking water wells located within 1,000 feet of the UST?		X
Are there other potential receptors (i.e., utilities, surface waters, wetlands) less than 500 feet from the UST?		X

\* If "yes" provide additional information:

There are monitoring wells within 1,000 feet of the site.

Water utility lines are located approximately 170 feet south, 200 feet east, and 260 feet east of the site.

A sanitary sewer service line from Building NS 28 is approximately 200 feet southwest of the site and connects to the sewer main which is approximately 300 feet southwest of the site.

The Cooper River is approximately 350 feet east from the site.

Were any water wells within 250-ft radius sampled?  Yes  No

Is the current use of the site and surrounding properties commercial, residential, agricultural, or industrial?

Site: Commercial & Industrial

Adjacent Properties: Commercial & Industrial

**Soil and Monitoring Well Data**

Primary Soil Type: Silty sand, sandy clay

Well Installation Method and Date: Hollow-stem auger; July 12, 1999

Development Method: Surge and purge using centrifugal pump

Soil Samples Obtained at 3 to 4 feet

**NOTE: Soil samples were collected from two soil borings. A duplicate sample was collected from one of the soil borings.**

**SOIL ANALYTICAL DATA**

Sample	Benzene (ug/kg)	Toluene (ug/kg)	Ethyl-benzene (ug/kg)	Xylenes (ug/kg)	Naphthalene (ug/kg)
CNC35-B01/ SLB010304	<6	<6	<6	<6	<6
CNC35-B02/ 35SLB020304	<6	<6	<6	<6	<6
CNC35-B02/ 35SLB020304D	<6	<6	<6	<6	<6

Sample	Benzo(a)-anthracene (ug/kg)	Benzo(b)-fluoranthene (ug/kg)	Benzo(k)-fluoranthene (ug/kg)	Chrysene (ug/kg)	Dibenz(a,h)-anthracene (ug/kg)
CNC35-B01/ 35SLB010304	<360	<360	<360	<360	<360
CNC35-B02/ 35SLB020304	580	590	<460	640	<460
CNC35-B02/ 35SLB020304D	1800	2000	780	1700	<400

**Ground-Water Data**

Depth to Ground Water: 4.29 feet

Well Purging/Sampling Method: Low flow using peristaltic pump

Date Sampled: 7/14/99

Free Product Thickness: None

Soil/Water Disposal Method: All soil cuttings and purge water were containerized, the containers labeled, and the containers moved to a staging area for final disposal by Charleston Naval Complex.

**GROUND-WATER ANALYTICAL DATA**

Sample	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	EDB (ug/L)	Naphthalene (ug/L)
CNC35M-01/ 35GLM0101	<5	<5	<5	<5	<5	<5

Sample	Benzo(a)-anthracene (ug/L)	Benzo(b)-fluoranthene (ug/L)	Benzo(k)-fluoranthene (ug/L)	Chrysene (ug/L)	Dibenz(a,h)-anthracene (ug/L)
CNC35M-01/ 35GLM0101	<10	<10	<10	<10	<10

**Appendices**

The appendices required for this report are as follows:

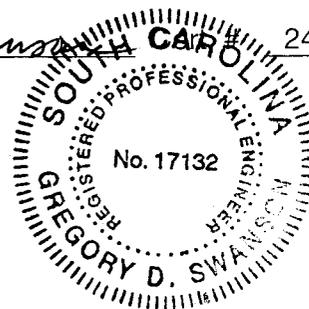
- Appendix A. Well Construction and Soil Boring Logs
- Appendix B. Laboratory Data
- Appendix C. Topographic Map With Site Location
- Appendix D. Site Base Maps

**NOTE: Appendices E, F, and G are not required.**

Report Completed By: \_\_\_\_\_

*Gregory D. Swanson*  
(signature)

Date: 1/26/00

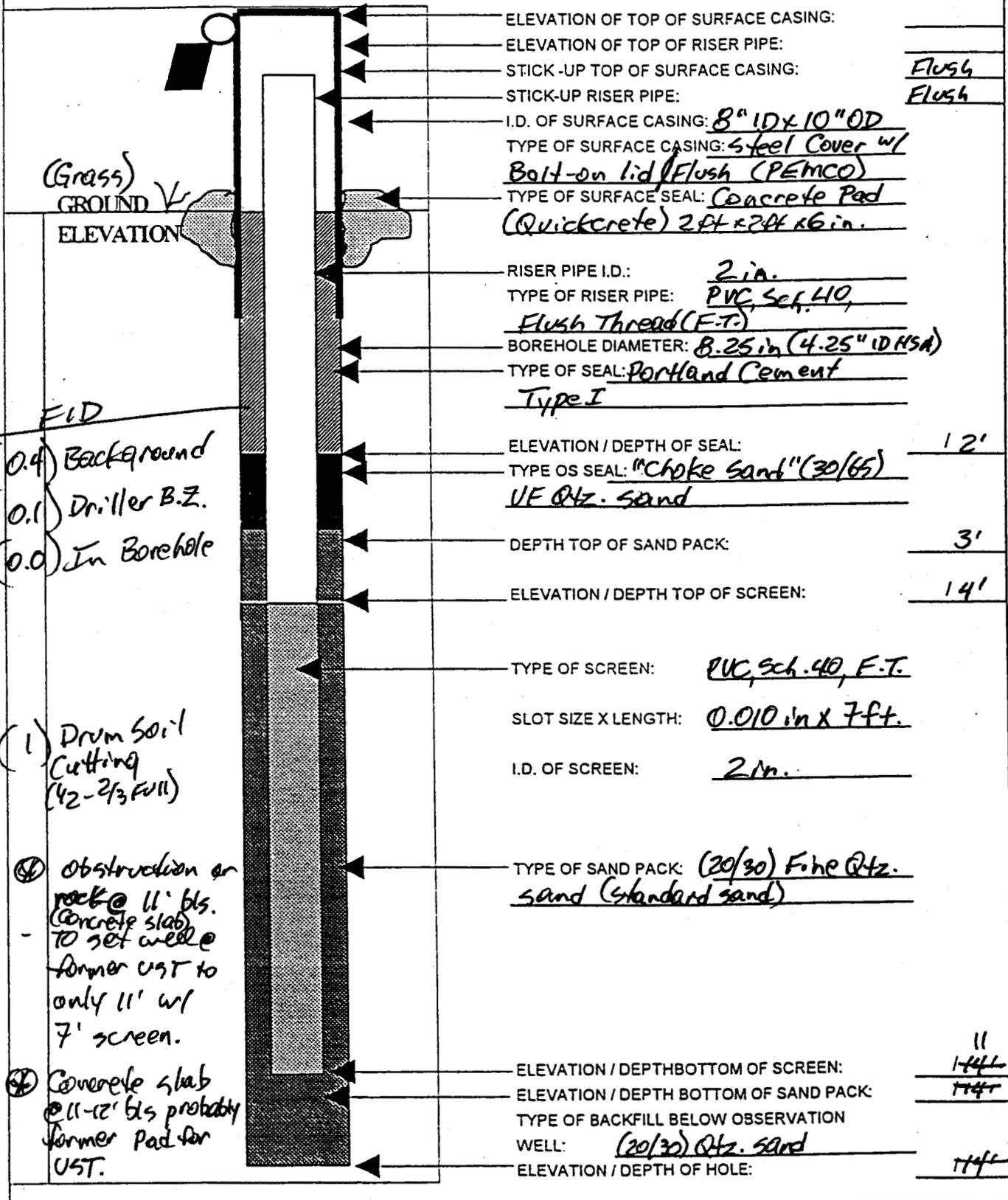


APPENDIX A

WELL CONSTRUCTION AND SOIL BORING LOGS

OVERBURDEN MONITORING WELL SHEET

PROJECT <u>CNC Site 35 Bldg. N528</u>	LOCATION: <u>Site 35/Zone I</u>	DRILLER <u>Custom Drilling</u>
PROJECT NO. <u>N 0270 Zone I</u>	BORING <u>CNC35-mw01</u>	METHOD: <u>DPT 4.25" ID HSA</u>
ELEVATION _____	DATE <u>7/12/99</u>	DRILLING <u>Rod Follower</u>
FIELD GEOLOGIST <u>Mark Dornigsten</u>		DEVELOPMENT: <u>NA</u>





# BORING LOG

PROJECT NAME: CTO 0103 C NE Zone 1  
 PROJECT NUMBER: N0270 Site 35 Bldg. N52B  
 DRILLING COMPANY: Columbia  
 DRILLING RIG: Stratoprobe

BORING NUMBER: 35 B 2  
 DATE: 6/17/99  
 GEOLOGIST: \_\_\_\_\_  
 DRILLER: R. Brand

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole	Driller BZ
	1	/				Tan	Silty Sand		Moist				
	2	/				Olive Grey	Sandy Clay		↓				
	3	/				↓	↓		↓				
X	4	/	3.4/4			↓	↓						
	5	/											
	6	/				Olive Grey	Sandy Clay		Moist				
	7	/				↓	↓		Saturated				
	8	/	2/4										
	9	/											
	10	/											
	11	/											
	12	/											

29 49  
651

\* 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 Temp No \_\_\_\_\_ Well I.D. #: \_\_\_\_\_



**APPENDIX B**  
**LABORATORY DATA**



August 23, 1999

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

RE: Katahdin Lab Number: WP-3277  
Project ID: CNC Charleston  
Project Manager: Ms. Andrea J. Colby  
Sample Receipt Date: July 15, 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

Maria Crouch  
Authorized Signature

08/23/99  
Date

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

**Sample Receipt**

The following samples were received on July 15, 1999 and were logged in under Katahdin Analytical Services work order number WP3277 for a hardcopy due date of August 14, 1999.

<u>KATAHDIN</u> <u>Sample No.</u>	<u>TTNUS</u> <u>Sample Identification</u>
WP3277-1	35GLM0101
WP3277-2	37GLM0201
WP3277-3	37GLM0101
WP3277-4	2IRL00101
WP3277-5	37TL00301

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**

Five aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on July 15, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

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

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

In the calibration curve analyzed in this SDG, the average %RSD for all analytes was 14.7%, 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

Four aqueous samples were received by Katahdin Analytical Services laboratory on July 15, 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 19, 1999. A laboratory control spike 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.

000003

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

LAB (WORK ORDER) # WP 3277

PAGE: 1 OF 1

COOLER: 1 OF 1

COC# -  
 SDG# -

DATE / TIME RECEIVED: 7-15-99 1000

DELIVERED BY: FedEx

RECEIVED BY: San

LIMS ENTRY BY: ASC

LIMS REVIEW BY / PM: ASC

CLIENT: Tetra Tech

PROJECT: CNC Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input type="checkbox"/>	<input checked="" 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>5.6</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 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>:  
 [Empty box for notes]

<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 required. If samples required pH adjustment, record volume and type of preservative used.



P.O. Box 720  
Westbrook, ME 04098  
Tel: (207) 874-2400  
Fax: (207) 775-4029

# CHAIN OF CUSTODY

PLEASE PRINT IN PEN

Page \_\_\_\_ of \_\_\_\_

Client: **Tetra Tech NUS** Contact: **Bryne Howze** Phone #: **(843) 814-9080** Fax #: **( )**  
 Address: **NH21 Ave. H** City: **N. Charleston** State: **SC** Zip Code: **29405**

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

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

Sampler (Print / Sign) **Emily Harrison E.J. Harrison** Copies To: \_\_\_\_\_

LAB USE ONLY WORK ORDER #: **WP 3277**  
 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. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| YO    |
|       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |

* Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	PAH	BTEX/naph/1,2,4-D									
35GLMD101	7/14/99/1420	GW	5	2	3									
37GLMD201	7/14/99/1135	GW	5	2	3									
37GLM0101	7/14/99/0930	GW	5	2	3									
37TL00301	7/14/99/ -	AQ	2		2									
IRL00101	7/14/99/1515	AQ	5	2	3									
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													
/	/													

COMMENTS \_\_\_\_\_

Relinquished By: (Signature) <b>J. Harrison</b>	Date / Time <b>7/14/99 1000</b>	Received By: (Signature) <b>B13402904613</b>	Relinquished By: (Signature) <b>SS</b>	Date / Time <b>7-15-99 1000</b>	Received By: (Signature) <b>Shelley Hillis</b>
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-3277

Project Manager: Andrea J. Colby

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

ORDER DATE: 07/15/99

PHONE: 850/385-9

FAX: 850/385-9

DUE: 14 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 13 SEP

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3277-1	35GLM0101	14 JUL 1420	15 JUL	AQ
	WP3277-2	37GLM0201	14 JUL 1135		
	WP3277-3	37GLM0101	14 JUL 0930		
	WP3277-4	2IRL00101	14 JUL 1515		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	4	75.00	300.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	4	125.00	500.00
TOTALS		4	200.00	800.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATP
2 WP3277-5	37TL00301	14 JUL	15 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 PLAZA 7  
661 ANDERSEN DR.  
PITTSBURGH, PA 15220  
REPORT & DISK

FINAL PAGE

INVOICE: With Report

TOTAL ORDER AMOUNT \$875.  
This is NOT an Invoice

AJC

07-15 Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

0000022

Aug 11 1999



# KATAHDIN ANALYTICAL SERVICES

## Summary of Report Notes

Report Note	Note Text
-------------	-----------

---

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

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: WP3277-1  
SDG: WP3277  
Report Date: 8/12/99  
PO No. : N7912-P99264  
Project: CTO #68  
% Solids: N/A  
Method: EPA 8270  
Date Analyzed: 8/2/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35GLM0101	AQ	7/14/99	7/15/99	7/19/99	DPD	SW3510	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	58	%	1.0				
2-FLUOROBIPHENYL	56	%	1.0				
TERPHENYL-D14	52	%	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: WP3277-1  
 SDG: WP3277  
 Report Date: 8/12/99  
 PO No. : N7912-P99264  
 Project: CTO #68  
 % Solids: N/A  
 Method: SW8260  
 Date Analyzed: 7/20/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35GLM0101	AQ	7/14/99	7/15/99	7/20/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	103	%	1.0		
1,2-DICHLOROETHANE-D4	105	%	1.0		
TOLUENE-D8	102	%	1.0		
P-BROMOFLUOROBENZENE	90	%	1.0		

Report Notes:

0000006

4B  
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;071999

Lab Name: Katahdin Analytical Services

SDG No.: WP3277

Lab File ID: Z1600

Lab Sample ID: SBLK;071999

Instrument ID: 5972-Z

Date Extracted: 7/19/99

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

Date Analyzed: 08/02/99

Matrix: (soil/water) WATER

Time Analyzed: 17:43

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;071999	LCS;071999	Z1601	8/2/99	6:31:00 PM
35GLM0101	WP3277-1	Z1602	8/2/99	7:18:00 PM
37GLM0201	WP3277-2	Z1603	8/2/99	8:06:00 PM
37GLM0101	WP3277-3	Z1604	8/2/99	8:52:00 PM
2IRL00101	WP3277-4	Z1608	8/3/99	11:27:00 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:** SBLK;071999  
**SDG:** WP3277  
**Report Date:** 8/12/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** N/A  
**Method:** EPA 8270  
**Date Analyzed:** 8/2/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;071999	AQ	-	-	7/19/99	DPD	SW3510	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	68	%	1.0		
2-FLUOROBIPHENYL	68	%	1.0		
TERPHENYL-D14	83	%	1.0		

Report Notes:

0000015

**Katahdin Analytical Services**  
**8270 LCS Recovery Sheet**

Lab File: Z1601

Sample ID: LCS;071999

Date Run: 8/2/99

Analyst: KRT

Time Injected 6:31:00 PM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	50	36.5	73	70-130
ACENAPHTHENE	50	37.7	75	70-130
ACENAPHTHYLENE	50	38.2	76	70-130
ANTHRACENE	50	45.1	90	70-130
BENZO[A]ANTHRACENE	50	41.5	83	70-130
BENZO[A]PYRENE	50	40.6	81	70-130
BENZO[B]FLUORANTHENE	50	38.8	78	70-130
BENZO[G,H,I]PERYLENE	50	39.4	79	70-130
BENZO[K]FLUORANTHENE	50	44.3	88	70-130
CHRYSENE	50	43.0	86	70-130
DIBENZ[A,H]ANTHRACENE	50	40.0	80	70-130
FLUORANTHENE	50	47.0	94	70-130
FLUORENE	50	39.4	79	70-130
INDENO[1,2,3-CD]PYRENE	50	42.3	84	70-130
NAPHTHALENE	50	34.6	*69	70-130
PHENANTHRENE	50	43.1	86	70-130
PYRENE	50	37.4	75	70-130

\* Out of Limits

1

0000016

4A  
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKM20B

Lab Name: Katahdin Analytical Services

SDG No.: WP3277

Lab File ID: M1061

Lab Sample ID: VBLKM20B

Date Analyzed: 07/20/99

Time Analyzed: 10:17

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

Heated Purge: (Y/N) N

Instrument ID: 5972-M

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

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSM20A	LCSM20A	M1059	7/20/99	8:58:00 AM
37TL00301	WP3277-5	M1063	7/20/99	11:37:00 AM
35GLM0101	WP3277-1	M1069	7/20/99	3:29:00 PM
37GLM0201	WP3277-2	M1070	7/20/99	4:07:00 PM
37GLM0101	WP3277-3	M1071	7/20/99	4:45:00 PM
2IRL00101	WP3277-4	M1072	7/20/99	5:22:00 PM

0000017



# 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: VBLKM20B  
SDG: WP3277  
Report Date: 8/12/99  
PO No. : N7912-P99264  
Project: CTO #68  
% Solids: N/A  
Method: SW8260  
Date Analyzed: 7/20/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKM20B	AQ	-	-	7/20/99	DJP	5030	DJP

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	101	%	1.0		
1,2-DICHLOROETHANE-D4	100	%	1.0		
TOLUENE-D8	99	%	1.0		
P-BROMOFLUOROBENZENE	90	%	1.0		

Report Notes:

0000018

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

Lab File: M1059

Sample ID: LCSM20A

Date Run: 7/20/99

Analyst: DJP

Time Injected 8:58:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	51.7	103	60-140
BENZENE	50	50.1	100	60-140
ETHYLBENZENE	50	55.0	110	60-140
MTBE	50	48.1	96	60-140
NAPHTHALENE	50	63.8	128	60-140
TOLUENE	50	54.2	108	60-140
TOTAL XYLENES	150	164	109	60-140

\* Out of Limits

1  
0000019



August 19, 1999

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

RE: Katahdin Lab Number: WP-3035  
Project ID: CNC Charleston  
Project Manager: Ms. Andrea J. Colby  
Sample Receipt Date: June 23 and 24, 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

Maria Crouch  
Authorized Signature

08/19/99  
Date



SDG NARRATIVE  
KATAHDIN ANALYTICAL SERVICES  
TETRA TECH NUS  
CASE CNC CHARLESTON

Sample Receipt

The following samples were received on June 24, 1999 and were logged in under Katahdin Analytical Services work order number WP3035 for a hardcopy due date of July 24, 1999.

<u>Sample No.</u>	<u>Sample Identification</u>	<u>Sample No.</u>
WP3035-1	35SLB020304	9906802-01
WP3035-2	35SLB020304D	9906802-02
WP3035-3	21SLB080607D	9906802-04
WP3035-4	35SLB010304	
WP3035-5	21SLB080607	9906802-03
WP3035-6	21SLB040405	9906802-05
WP3035-7	21SLB050506	
WP3035-8	21SLB090708	
WP3035-9	21TL00201	
WP3035-10	21SLB040405D	9906802-06

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 and eight soil samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on June 24, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5972-S (aqueous) and 5972-F (low level soil) instruments. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ppb.

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

Two initial calibration curves are reported in this workorder. Both calibrations had several analytes exceeding the maximum allowable 15% RSD. Since the average %RSD values were 8.5% and 11.2%, respectively, the curves were acceptable.

Initial analyses of samples WP3035-2 and -3 yielded surrogate recovery deviations and internal standard area recovery deviations. Reanalyses yielded similar results, confirming matrix interference. Both sets of data are included in the data package for each sample.

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

Eight soil/sediment samples were received by Katahdin Analytical Services laboratory on June 24, 1999 for analysis in accordance with 8270C for a client specified PAH list of analytes.

Extraction of the samples occurred following USEPA method 3550 on June 28, 1999. A laboratory control spike, consisting of all PAH analytes spiked into organic free sand, was extracted in the batch, along with a site specific MS/MSD pair on sample WP3035-7.

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.

Initial analysis of sample WP3035-6 yielded internal standard area recovery deviations and a concentration of the target analyte 2-methylnaphthalene over the upper limit of the calibration curve. Reanalysis occurred at a 1:4 dilution successfully. Both sets of data for this sample are included in this data package.

Sample WP3035-8 was analyzed at a 1:10 dilution only due to the matrix and target analyte concentrations, resulting in elevated reporting limits.

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 WP3035 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 WP3035 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.

#### Subcontracted Analysis

Analyses for Total Organic Carbon, Total Petroleum Hydrocarbons, and Grain size were subcontracted to outside laboratories.

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

LAB (WORK ORDER) # WP 3035

PAGE: 1 OF 1

COOLER: 1 OF 1

CLIENT: T-Tech-SC

COC# —

SDG# —

DATE / TIME RECEIVED: 06-24-99 ~ 0925

DELIVERED BY: FEDEx

RECEIVED BY: BKL

LIMS ENTRY BY: Sam

LIMS REVIEW BY / PM: APC

PROJECT: CNC Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>0.8</u>	APC notified Paul Calligan by fax 6/24/99.
6. SAMPLES RECEIVED AT 4°C +/- 2? (ICE / ICE PACKS PRESENT <input checked="" type="checkbox"/> or N?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED <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>:

0000053

<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 used.



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

ORDER NO WP-3035

Project Manager: Andrea J. Colby

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

ORDER DATE: 06/24/99

PHONE: 850/385-9811

FAX: 850/385-9811

DUE: 24 JUL

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: R. FRANKLIN

DELIVERED BY: FEDEX

DISPOSE: AFTER 24 JUL

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3035-1	35SLB020304	23 JUN 1030	24 JUN	SL
	WP3035-2	35SLB020304D	23 JUN 1030		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	2	85.00	170.00
Solids-Total Residue (TS)	CLP/CIP SO	2	0.00	0.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	2	135.00	270.00
Total Combustible Organics	ASTM D2974	2	30.00	60.00
Wet Lab Subcontract		2	135.00	270.00
TOTALS		2	385.00	770.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATR
2 WP3035-4	35SLB010304	23 JUN 1015	24 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Wet Lab Subcontract		1	110.00	110.00
TOTALS		1	330.00	330.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3 WP3035-5	21SLB080607	23 JUN 0850	24 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Total Combustible Organics	ASTM D2974	1	30.00	30.00
Wet Lab Subcontract		1	170.00	170.00
TOTALS		1	420.00	420.00

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

ORDER NO WP-3035

Project Manager: Andrea J. Colby

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

ORDER DATE: 06/24/99

PHONE: 850/385-9899

FAX: 850/385-9860

DUE: 24 JUL

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: R. FRANKLIN

DELIVERED BY: FEDEX

DISPOSE: AFTER 24 JUL

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4 WP3035-7	21SLB050506	23 JUN 0815	24 JUN	SL
WP3035-8	21SLB090708	23 JUN 0930		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	2	85.00	170.00
Solids-Total Residue (TS)	CLP/CIP SO	2	0.00	0.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	2	135.00	270.00
TOTALS		2	220.00	440.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
WP3035-9	21TL00201	23 JUN	24 JUN	SL

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

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6 WP3035-10	21SLB040405D	23 JUN 0755	23 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Wet Lab Subcontract		1	75.00	75.00

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

ORDER NO WP-3035

Project Manager: Andrea J. Colby

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

ORDER DATE: 06/24/99

PHONE: 850/385-986

FAX: 850/385-986

DUE: 24 JUL

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: R. FRANKLIN

DELIVERED BY: FEDEX

DISPOSE: AFTER 24 JUL

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
7 WP3035-3	21SLB080607D	23 JUN 0850	24 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Wet Lab Subcontract		1	60.00	60.00
Total Combustible Organics	ASTM D2974	1	30.00	30.00

TOTALS		1	310.00	310.00
--------	--	---	--------	--------

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
8 WP3035-6	21SLB040405	23 JUN 0755	23 JUN	

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Wet Lab Subcontract		1	75.00	75.00

TOTALS		1	295.00	295.00
--------	--	---	--------	--------

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

FINAL PAGE

INVOICE: With Report

TOTAL ORDER AMOUNT \$2,725.00

This is NOT an Invoice

AJC/BKR/WEST.AJC(dw)

06-28 Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questions



# KATAHDIN ANALYTICAL SERVICES

## Summary of Report Notes

Report Note	Note Text
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-1	Sample dilution required due to matrix interference, sample viscosity or other matrix-related problem; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmed matrix interference.



# KATAHDIN ANALYTICAL SERVICES

## Summary of Report Notes

Report Note	Note Text
\$	'\$' flag denotes surrogate compound recovery is out of criteria. Re-extraction or re-analysis confirmed matrix interference.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmed matrix interference.

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

 Lab Number : WP-3035-1  
 Report Date: 08/19/99  
 PO No. : N7912-P99264  
 Project : CTO #68

WIC#: CNC CHARLESTON

## REPORT OF ANALYTICAL RESULTS

Page 1 of 8

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED		
35SLB020304	Solid			R. FRANKLIN		06/23/99	06/24/99	
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	74.	wt %	1.0	0.10	CLP/CIP SOW	06/28/99	JF	1
Total Combustible Organics	7.7	wt %	1.0	0.1	ASTM D2974-8	06/28/99	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 06/25/99 by JF

08/19/99

 LJO/baeajc(dw)/msm  
 PF25VSS4  
 CC: MS. LEE LECK  
 TETRA TECH NUS  
 FOSTER PLAZA 7

661 ANDERSEN DR.



**KATAHDIN ANALYTICAL SERVICES**  
**REPORT OF ANALYTICAL RESULTS**

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

**Proj. ID:** CNC CHARLESTON

**Lab Number:** WP3035-1  
**SDG:** WP3035  
**Report Date:** 8/17/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 72  
**Method:** EPA 8270  
**Date Analyzed:** 7/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35SLB020304	SL	6/23/99	6/24/99	6/28/99	PMM	SW3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<460	ug/Kg	1.4	460	330
2-METHYLNAPHTHALENE	<460	ug/Kg	1.4	460	330
ACENAPHTHYLENE	<460	ug/Kg	1.4	460	330
ACENAPHTHENE	J420	ug/Kg	1.4	460	330
FLUORENE	<460	ug/Kg	1.4	460	330
PHENANTHRENE	860	ug/Kg	1.4	460	330
ANTHRACENE	J280	ug/Kg	1.4	460	330
FLUORANTHENE	1400	ug/Kg	1.4	460	330
PYRENE	1300	ug/Kg	1.4	460	330
BENZO[A]ANTHRACENE	580	ug/Kg	1.4	460	330
CHRYSENE	640	ug/Kg	1.4	460	330
BENZO[B]FLUORANTHENE	590	ug/Kg	1.4	460	330
BENZO[K]FLUORANTHENE	<460	ug/Kg	1.4	460	330
BENZO[A]PYRENE	J370	ug/Kg	1.4	460	330
INDENO[1,2,3-CD]PYRENE	<460	ug/Kg	1.4	460	330
DIBENZ[A,H]ANTHRACENE	<460	ug/Kg	1.4	460	330
BENZO[G,H,I]PERYLENE	<460	ug/Kg	1.4	460	330
NITROBENZENE-D5	53	%	1.4		
2-FLUOROBIPHENYL	57	%	1.4		
TERPHENYL-D14	76	%	1.4		

**Report Notes:** J



**KATAHDIN ANALYTICAL SERVICES**  
**REPORT OF ANALYTICAL RESULTS**

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

**Lab Number:** WP3035-1  
**SDG:** WP3035  
**Report Date:** 8/17/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 72  
**Method:** SW8260  
**Date Analyzed:** 6/24/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35SLB020304	SL	6/23/99	6/24/99	6/24/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.2	6	5
TOLUENE	<6	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	<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	86	%	1.2		
1,2-DICHLOROETHANE-D4	90	%	1.2		
1,2-DICHLOROETHANE-D8	86	%	1.2		
P-BROMOFLUOROBENZENE	70	%	1.2		

**Report Notes:**



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

Lab Number : WP-3035-2  
 Report Date: 08/19/99  
 PO No. : N7912-P99264  
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 2 of 8

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED	
35SLB020304D	Solid	R. FRANKLIN	06/23/99	06/24/99

PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	85.	wt %	1.0	0.10	CLP/CIP SOW	06/28/99 JF	1
Total Combustible Organics	6.8	wt %	1.0	0.1	ASTM D2974-8	06/28/99 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 '<' value  
 (1) Sample Preparation on 06/25/99 by JF

08/19/99

LJO/baeajc (dw) /mrc/msm  
 PF25VSS4  
 CC: MS. LEE LECK  
 TETRA TECH NUS  
 FOSTER PLAZA 7



# 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: WP3035-2  
SDG: WP3035  
Report Date: 8/17/99  
PO No. : N7912-P99264  
Project: CTO #68  
% Solids: 85  
Method: EPA 8270  
Date Analyzed: 7/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35SLB020304D	SL	6/23/99	6/24/99	6/28/99	PMM	SW3550	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	J320	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	1800	ug/Kg	1.2	400	330
ANTHRACENE	480	ug/Kg	1.2	400	330
FLUORANTHENE	3700	ug/Kg	1.2	400	330
PYRENE	3700	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	1800	ug/Kg	1.2	400	330
BENZO[B]ANTHRACENE	1700	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	2000	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	780	ug/Kg	1.2	400	330
BENZO[A]PYRENE	1200	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	J370	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	460	ug/Kg	1.2	400	330
NITROBENZENE-D5	55	%	1.2		
2-FLUOROBIPHENYL	60	%	1.2		
TERPHENYL-D14	77	%	1.2		

Report Notes: J



KATAHDIN ANALYTICAL SERVICES  
REPORT OF ANALYTICAL RESULTS

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

Proj. ID: CNC CHARLESTON

Lab Number: WP3035-2  
SDG: WP3035  
Report Date: 8/17/99  
PO No. : N7912-P99264  
Project: CTO #68  
% Solids: 85  
Method: SW8260  
Date Analyzed: 6/24/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35SLB020304D	SL	6/23/99	6/24/99	6/24/99	KMC	5030	KMC

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	89	%	1.1		
1,2-DICHLOROETHANE-D4	92	%	1.1		
TOLUENE-D8	77	%	1.1		
P-BROMOFLUOROBENZENE	\$52	%	1.1		

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: WP3035-2RE  
 SDG: WP3035  
 Report Date: 8/17/99  
 PO No. : N7912-P99264  
 Project: CTO #68  
 % Solids: 85  
 Method: SW8260  
 Date Analyzed: 6/25/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35SLB020304D	SL	6/23/99	6/24/99	6/25/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample	Method
				PQL	PQL
BENZENE	<6	ug/Kg	1.3	6	5
TOLUENE	<6	ug/Kg	1.3	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.3	6	5
ETHYLBENZENE	<6	ug/Kg	1.3	6	5
NAPHTHALENE	<6	ug/Kg	1.3	6	5
MTBE	<6	ug/Kg	1.3	6	5
TOTAL XYLENES	<6	ug/Kg	1.3	6	5
DIBROMOFLUOROMETHANE	96	%	1.3		
?-DICHLOROETHANE-D4	100	%	1.3		
LUENE-D8	84	%	1.3		
P-BROMOFLUOROBENZENE	\$55	%	1.3		

Report Notes: \$



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

Lab Number : WP-3035-4  
 Report Date: 08/19/99  
 PO No. : N7912-P99264  
 Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 3 of 8

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
35SLB010304	Solid	R. FRANKLIN		06/23/99	06/24/99		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	93.	wt %	1.0	0.10	CLP/CIP SOW	06/28/99 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 06/25/99 by JF

08/19/99

LJO/baeajc(dw)/msm  
 PF25TSS2  
 CC: MS. LEE LECK  
 TETRA TECH NUS  
 FOSTER PLAZA 7  
 661 ANDERSEN DR.



# KATAHDIN ANALYTICAL SERVICES

## REPORT OF ANALYTICAL RESULTS

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

Proj. ID: CNC CHARLESTON

Lab Number: WP3035-4  
 SDG: WP3035  
 Report Date: 8/17/99  
 PO No. : N7912-P99264  
 Project: CTO #68  
 % Solids: 93  
 Method: EPA 8270  
 Date Analyzed: 7/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35SLB010304	SL	6/23/99	6/24/99	6/28/99	PMM	SW3550	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<360	ug/Kg	1.1	360	330
2-METHYLNAPHTHALENE	<360	ug/Kg	1.1	360	330
ACENAPHTHYLENE	<360	ug/Kg	1.1	360	330
ACENAPHTHENE	<360	ug/Kg	1.1	360	330
FLUORENE	<360	ug/Kg	1.1	360	330
PHENANTHRENE	<360	ug/Kg	1.1	360	330
ANTHRACENE	<360	ug/Kg	1.1	360	330
FLUORANTHENE	<360	ug/Kg	1.1	360	330
PERYRENE	<360	ug/Kg	1.1	360	330
BENZO[A]ANTHRACENE	<360	ug/Kg	1.1	360	330
CHRYSENE	<360	ug/Kg	1.1	360	330
BENZO[B]FLUORANTHENE	<360	ug/Kg	1.1	360	330
BENZO[K]FLUORANTHENE	<360	ug/Kg	1.1	360	330
BENZO[A]PYRENE	<360	ug/Kg	1.1	360	330
INDENO[1,2,3-CD]PYRENE	<360	ug/Kg	1.1	360	330
DIBENZ[A,H]ANTHRACENE	<360	ug/Kg	1.1	360	330
BENZO[G,H,I]PERYLENE	<360	ug/Kg	1.1	360	330
NITROBENZENE-D5	40	%	1.1		
2-FLUOROBIPHENYL	44	%	1.1		
TERPHENYL-D14	85	%	1.1		

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: WP3035-4  
SDG: WP3035  
Report Date: 8/17/99  
PO No. : N7912-P99264  
Project: CTO #68  
% Solids: 93  
Method: SW8260  
Date Analyzed: 6/25/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
35SLB010304	SL	6/23/99	6/24/99	6/25/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.2	6	5
TOLUENE	<6	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	<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	101	%	1.2		
1,2-DICHLOROETHANE-D4	101	%	1.2		
TOLUENE-D8	101	%	1.2		
P-BROMOFLUOROBENZENE	93	%	1.2		

Report Notes:

Kubota Analytical Services, Inc.  
Quality Control Report

Method Blank and Laboratory Control Sample Results

Client:	Tetra Tech NUS
Work Order:	WP3035

*METHOD BLANK RESULTS*

*LABORATORY CONTROL SAMPLE RESULTS*

Parameter	Date of Prep	Date of Analysis	Concentration				Practical Quantitation Level**	LABORATORY CONTROL SAMPLE RESULTS				
			Units	Measured	Acceptance Range	in Blank		True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)
TS - Total Residue	25-Jun-99	28-Jun-99	wt %	< 0.10	< 0.10	0.10	wt %	90	90	100.0	60-140	
	25-Jun-99	28-Jun-99	wt %	< 0.10	< 0.10	0.10						
TCO - Total Combustible	25-Jun-99	28-Jun-99	wt %	< 0.10	< 0.10	0.10						

\*\* 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.

**Katalin Analytical Services, Inc.**  
**Quality Control Report**

Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client:	Tetra Tech NUS
Work Order:	WP3035

*DUPLICATE RESULTS*

*MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS*

Parameter	Sample No	Sample Measurements		Mean Conc	RPD (%)	Acceptance Range for RPD (%)	Concentration or Quantity		Matrix Spike Recovery (%)		Acceptance Range (%)	RPD (%)	Acceptance Range (%)
		Rep 1	Rep 2				Units Only	Spike Added	Sample +Spike Dup 1	Sample +Spike Dup 2			
TS	WP3035-1	wt%	94.9	95.3	95.1	0.4	0-20	MS/MSD Not Applicable for this Parameter					
	WP3035-8	wt%	73.6	72.6	73.1	1.4	0-20	MS/MSD Not Applicable for this Parameter					
TCO	WP3035-1	wt%	7.7	7.9	7.8	2.4	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%.

Because of the large uncertainty (i.e., 33% or greater) associated with measurements made near the detection level, the acceptance range for relative percent difference for duplicate measurements at such low concentrations is 0-100%.

**DATA QUALITY COMMENTS:**

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

4B  
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

**SBLK;062899**

Lab Name: Katahdin Analytical Services

SDG No.: WP3035

Lab File ID: Z1515

Lab Sample ID: SBLK;062899

Instrument ID: 5972-Z

Date Extracted: 6/29/99

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

Date Analyzed: 07/26/99

Matrix: (soil/water) SOIL

Time Analyzed: 12:27

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;062899	LCS;062899	Z1516	7/26/99	1:14:00 PM
35SLB020304	WP3035-1	Z1523	7/26/99	6:43:00 PM
35SLB020304D	WP3035-2	Z1524	7/26/99	7:29:00 PM
21SLB080607D	WP3035-3	Z1525	7/26/99	8:16:00 PM
35SLB010304	WP3035-4	Z1526	7/26/99	9:02:00 PM
21SLB080607	WP3035-5	Z1544	7/28/99	12:59:00 PM
21SLB040405	WP3035-6	Z1545	7/28/99	1:44:00 PM
21SLB050506	WP3035-7	Z1546	7/28/99	2:30:00 PM
21SLB050506MS	WP3035-7MS	Z1547	7/28/99	3:15:00 PM
21SLB050506MSD	WP3035-7MSD	Z1548	7/28/99	4:00:00 PM
21SLB090708	WP3035-8	Z1549	7/28/99	4:46:00 PM
21SLB040405	WP3035-6DL	Z1561	7/29/99	8:42:00 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: SBLK;062899  
SDG: WP3035  
Report Date: 8/17/99  
PO No. : N7912-P99264  
Project: CTO #68  
% Solids: 100  
Method: EPA 8270  
Date Analyzed: 7/26/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;062899	SL	-	-	6/29/99	PMM	SW3550	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	69	%	1.0		
2-FLUOROBIPHENYL	69	%	1.0		
TERPHENYL-D14	75	%	1.0		

Report Notes:

**Katahdin Analytical Services**  
**8270 LCS Recovery Sheet**

Lab File: Z1516

Sample ID: LCS;062899

Date Run: 7/26/99

Analyst: KRT

Time Injected 1:14:00 PM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	1667	1180	71	60-140
ACENAPHTHENE	1667	1180	71	60-140
ACENAPHTHYLENE	1667	1140	68	60-140
ANTHRACENE	1667	1380	83	60-140
BENZO[A]ANTHRACENE	1667	1310	79	60-140
BENZO[A]PYRENE	1667	1220	73	60-140
BENZO[B]FLUORANTHENE	1667	1260	76	60-140
BENZO[G,H,I]PERYLENE	1667	1080	65	60-140
BENZO[K]FLUORANTHENE	1667	1380	83	60-140
CHRYSENE	1667	1360	81	60-140
DIBENZ[A,H]ANTHRACENE	1667	1100	66	60-140
FLUORANTHENE	1667	1440	86	60-140
FLUORENE	1667	1240	74	60-140
INDENO[1,2,3-CD]PYRENE	1667	1080	65	60-140
NAPHTHALENE	1667	1140	68	60-140
PHENANTHRENE	1667	1310	78	60-140
PYRENE	1667	1240	74	60-140

\* Out of Limits

1

0000039

# Katahdin Analytical Services

## MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP3035-7	Z1546	7/28/99	2:30:00 PM	KRT	SL	8270_99
WP3035-7MS	Z1547	7/28/99	3:15:00 PM	KRT	SL	8270_99
WP3035-7MSD	Z1548	7/28/99	4:00:00 PM	KRT	SL	8270_99

Compound Name	Native (ug/Kg)	MS Spk Amount (ug/Kg)	MSD Spk Amount (ug/Kg)	MS Result (ug/Kg)	MSD Result (ug/Kg)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
CHRYSENE	0	1700	1700	1230	1190	72	70	60-140	3.3	50
ACENAPHTHENE	0	1700	1700	1010	1060	*59	62	60-140	4.8	50
ACENAPHTHYLENE	0	1700	1700	979	1010	*58	*59	60-140	3.1	50
ANTHRACENE	0	1700	1700	1250	1220	73	72	60-140	2.4	50
BENZO[A]ANTHRACENE	0	1700	1700	1140	1140	67	67	60-140	0	50
BENZO[A]PYRENE	0	1700	1700	1110	1080	65	64	60-140	2.7	50
BENZO[B]FLUORANTHENE	0	1700	1700	1060	1010	62	60	60-140	4.8	50
2-METHYLNAPHTHALENE	0	1700	1700	966	1020	*57	60	60-140	5.4	50
BENZO[K]FLUORANTHENE	0	1700	1700	1240	1230	73	72	60-140	0.81	50
PYRENE	0	1700	1700	1200	1170	71	69	60-140	2.5	50
DIBENZ[A,H]ANTHRACENE	0	1700	1700	1030	1050	60	62	60-140	1.9	50
FLUORANTHENE	0	1700	1700	1190	1180	70	70	60-140	0.84	50
FLUORENE	0	1700	1700	1070	1100	63	64	60-140	2.8	50
INDENO[1,2,3-CD]PYRENE	0	1700	1700	1050	1100	62	65	60-140	4.6	50
NAPHTHALENE	0	1700	1700	945	984	*56	*58	60-140	4.0	50
PHENANTHRENE	0	1700	1700	1190	1180	70	69	60-140	0.84	50
BENZO[G,H,I]PERYLENE	0	1700	1700	1120	1160	66	68	60-140	3.5	50

4A  
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

**VBLKF24A**

Lab Name: Katahdin Analytical Services

SDG No.: WP3035

Lab File ID: F1086

Lab Sample ID: VBLKF24A

Date Analyzed: 06/24/99

Time Analyzed: 10:27

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

Heated Purge: (Y/N) Y

Instrument ID: 5972-F

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
LCSF24A	LCSF24A	F1085	6/24/99	9:42:00 AM
35SLB020304	WP3035-1	F1097	6/24/99	5:26:00 PM
35SLB020304D	WP3035-2	F1098	6/24/99	6:03:00 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: VBLKF24A  
SDG: WP3035  
Report Date: 8/17/99  
PO No. : N7912-P99264  
Project: CTO #68  
% Solids: 100  
Method: SW8260  
Date Analyzed: 6/24/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKF24A	SL	-	-	6/24/99	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	111	%	1.0		
1,2-DICHLOROETHANE-D4	123	%	1.0		
TOLUENE-D8	98	%	1.0		
P-BROMOFLUOROBENZENE	104	%	1.0		

Report Notes:

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

Lab File: F1085

Sample ID: LCSF24A

Date Run: 6/24/99

Analyst: KMC

Time Injected 9:42:00 AM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	50.1	100	60-140
BENZENE	50	40.9	82	60-140
ETHYLBENZENE	50	48.3	96	60-140
MTBE	50	48.8	98	60-140
NAPHTHALENE	50	63.8	128	60-140
TOLUENE	50	43.3	86	60-140
TOTAL XYLENES	150	146	98	60-140

\* Out of Limits

1

0000048

4A  
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKF25A

Lab Name: Katahdin Analytical Services

SDG No.: WP3035

Lab File ID: F1101

Lab Sample ID: VBLKF25A

Date Analyzed: 06/25/99

Time Analyzed: 9:33

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

Heated Purge: (Y/N) Y

Instrument ID: 5972-F

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
LCSF25A	LCSF25A	F1100	6/25/99	8:42:00 AM
21SLB080607D	WP3035-3	F1102	6/25/99	10:33:00 AM
35SLB010304	WP3035-4	F1103	6/25/99	11:10:00 AM
21SLB080607	WP3035-5	F1104	6/25/99	11:46:00 AM
21SLB040405	WP3035-6	F1105	6/25/99	12:23:00 PM
21SLB050506	WP3035-7	F1106	6/25/99	1:00:00 PM
35SLB020304D	WP3035-2RE	F1107	6/25/99	1:36:00 PM
21SLB080607D	WP3035-3RE	F1113	6/25/99	5:15:00 PM
21SLB090708	WP3035-8	F1114	6/25/99	5:52:00 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:** VBLKF25A  
**SDG:** WP3035  
**Report Date:** 8/17/99  
**PO No. :** N7912-P99264  
**Project:** CTO #68  
**% Solids:** 100  
**Method:** SW8260  
**Date Analyzed:** 6/25/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKF25A	SL	-	-	6/25/99	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	107	%	1.0		
1,2-DICHLOROETHANE-D4	112	%	1.0		
TOLUENE-D8	105	%	1.0		
p-BROMOFLUOROBENZENE	102	%	1.0		

Report Notes:

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

Lab File: F1100

Sample ID: LCSF25A

Date Run: 6/25/99

Analyst: KMC

Time Injected 8:42:00 AM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	51.8	104	60-140
BENZENE	50	45.9	92	60-140
ETHYLBENZENE	50	49.6	99	60-140
MTBE	50	49.1	98	60-140
NAPHTHALENE	50	52.8	106	60-140
TOLUENE	50	45.6	91	60-140
TOTAL XYLENES	150	149	99	60-140

\* Out of Limits

1

0000049

**CASE NARRATIVE  
for  
Katahdin Analytical  
Westbrook, ME  
Former Charleston Naval Complex Site  
SDG #96802**

**July 20, 1999**

**Laboratory Identification:**

General Engineering Laboratories, Inc. (GEL)

**Mailing Address:**

P.O. Box 30712  
Charleston, SC 29417

**Express Mail Delivery and Shipping Address:**

2040 Savage Rd  
Charleston, SC 29414

**Telephone Number:**

(843) 556-8171

**Summary:**

**Sample receipt**

The samples from the former Charleston Naval Complex site arrived at General Engineering Laboratories, Inc., Charleston, SC on June 23, 1999, for environmental analyses. All 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>
9906802-01	35SLB020304
9906802-02	35SLB020304D
9906802-03	21SLB080607
9906802-04	21SLB080607D
9906802-05	21SLB040405

### Case 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 below by analytical parameter.

### Internal Chain of Custody:

Custody was maintained for all 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:saic9906802%

# CHAIN OF CUSTODY RECORD

9906802/1

Page 1 of 1

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								
Collected by/Company																									
SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	TPH	Remarks	
21	355L13φ2φ3φ4	6/23	1630				Y	Z	X														X		
22	355L13φ2φ3φ4D	6/23	1030				Y	Z	X														X		
23	215L13φ4φ6φ7	6/23	0850				X	1	X																
24	215L13φ4φ6φ7D	6/23	0850				X	1	X																
25	215L13φ4φ4φ5	6/23	0755				X	1															X		
26	215L13φ4φ4φ5D	6/23	0755				Y	1															X		
Relinquished by:			Date:	Time:	Received by:										Date:	Time:	Received by:								
Relinquished by:			Date:	Time:	Received by lab by:										Date:	Time:	Remarks:								

4/011  
 .1  
 .1  
 .2  
 .2  
 .3  
 .3

White = sample collector    Yellow = file    Pink = with report

# FEDERAL SAMPLE RECEIPT REVIEW

Client KATA

Received by [Signature]

Date 6/23/99

GEL COOLER \_\_\_\_\_ GEL POLY COOLER \_\_\_\_\_ CLIENT COOLER \_\_\_\_\_ OTHER \_\_\_\_\_

SAMPLE REVIEW CRITERIA	YES	NO	COMMENTS/QUALIFIERS
1. Were shipping containers received intact and sealed? If no, notify Project Manager	✓		
2. Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	✓		
Were the survey results negative? If no, notify Project Manager	✓		
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 correctly? (Ink, signed, match containers)	✓		
5. Were all sample containers properly labeled?	✓		
6. Were proper sample containers received?	✓		
7. Preserved samples checked for pH?	—		
8. Were samples preserved correctly? If no, list samples & tests	—		SOIL
9. Shipping container temperature checked?	✓		
10. Was shipping container temperature within specifications ( $4^{\circ} \pm 2^{\circ} \text{C}$ )? If no, notify Project Manager	✓		4°C
11. Is temperature documented on the Chain of Custody?	—		
12. Were samples received within holding time? if No, notify Project Manager	✓		
13. Were VOA vials free of headspace?	✓		
14. ARCO# IF REQUIRED	—		
15. SDG# IF REQUIRED	—		

REVIEW [Signature]

DATE 6/23/99

SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

**Case Narrative for  
KATA  
SDG# 96802**

**TOTAL ORGANIC CARBON**

**Analytical Batch Number:** 152320

**Analytical Method:** SW846 9060 Modified

<u>Laboratory Number</u>	<u>Sample Description</u>
9906802-01	35SLB020304
9906802-02	35SLB020304D
9906802-03	21SLB080607
9906802-04	21SLB080607D
QC624116	Blank
QC624117	Duplicate of 9906802-01
QC624118	Post Spike of 9906802-01
QC624119	Laboratory Control Sample

**Sample Preparation:**

All samples were prepared in accordance with accepted procedures. The method quoted is only for liquid samples. It is modified to handle soils analysis.

**Instrument Calibration:**

The instrument used was a Dohrmann DC-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.

9906802-01

All analyte recoveries in the post spike were within the required acceptance limits.

**Laboratory Control Samples:**

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

**Sample Duplicates:**

All sample duplicate results were within the required acceptance limits.

**Dilutions:**

None of the samples were diluted.

**Non Conformance Reports:**

There were no Nonconformance Reports associated with this batch.

**Additional Comments:**

TOC solid samples are tested to determine if inorganic carbon such as carbonates and bicarbonates are present in the sample. If so, the sample is acidified to remove the inorganic carbon, then dried in a low temperature oven. Because the sample portion is dried before analysis, the percent moisture correction is not applied to the TOC solid result.

## TOTAL PETROLEUM HYDROCARBONS

Analytical Batch Number: 152814

Analytical Method: SW846 9071A

<u>Laboratory Number</u>	<u>Sample Description</u>
9906802-01	35SLB020304
9906802-02	35SLB020304D
9906802-05	21SLB040405
9906802-06	21SLB040405D
QC625958	Blank
QC625959	Laboratory Control Sample
QC625960	Matrix Spike of 9906759-04
QC625961	Duplicate of 9906759-04

### 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.

9906759-04

All analyte recoveries in the matrix spike were within the required acceptance limits.

### Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

### Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

**Dilutions:**

None of the samples were diluted.

**Non Conformance Reports:**

There were no Nonconformance Reports associated with this batch.

The preceding narratives have been reviewed by: J. A. U Date: 07/11/19

Client: Katahdin Analytical  
 340 County Road  
 Westbrook, Maine 04092  
 Contact: Ms. Andrea Colby  
 Project Description: Former Naval Complex

cc: KATA00199

Report Date: July 19, 1999

Page 1 of 2

Sample ID : 35SLB020304  
 Lab ID : 9906802-01  
 Matrix : Soil  
 Date Collected : 06/23/99  
 Date Received : 06/23/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>General Chemistry</b>											
Total Rec. Petro. Hydrocarbons		410	139	278	mg/kg	1.0	AAT	07/13/99	1300	152814	1
Evaporative Loss @ 105 C		28.0	1.00	1.00	wt%	1.0	TSM2	07/19/99	0920	153640	2
Total Organic Carbon		13600	0.110	0.500	mg/l	1.0	LIB	07/02/99	1328	152320	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'.



\*\*\*006802 01\*\*\*

Client: Katahdin Analytical  
 340 County Road  
 Westbrook, Maine 04092  
 Contact: Ms. Andrea Colby  
 Project Description: Former Naval Complex

cc: KATA00199

Report Date: July 19, 1999

Page 1 of 2

Sample ID : 35SLB020304D  
 Lab ID : 9906802-02  
 Matrix : Soil  
 Date Collected : 06/23/99  
 Date Received : 06/23/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>General Chemistry</b>											
Total Rec. Petro. Hydrocarbons		286	130	260	mg/kg	1.0	AAT	07/13/99	1300	152814	1
Evaporative Loss @ 105 C		23.0	1.00	1.00	wt%	1.0	TSM2	07/19/99	0920	153640	2
Total Organic Carbon		13200	0.110	0.500	mg/l	1.0	LIB	07/02/99	1418	152320	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'.



\*0006202 07\*

QC Summary Report

Project Description: Former Naval Complex

cc: KATA00199

Lab. Sample ID: 9906802%

Report Date: July 19, 1999

Page 1 of 1

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
<b>General Chemistry</b>													
QC625958	BLANK	152814											
Total Rec. Petro. Hydrocarbons							145 mg/kg				AAT	07/13/99	1300
QC625959	LCS	152814											
Total Rec. Petro. Hydrocarbons			10800				10900 mg/kg		101	(70.0 - 116.)			
QC629172	BLANK	153640											
Evaporative Loss @ 105 C							0.00 wt%				TSM	07/19/99	0920
QC629171	9906802-04DUP	153640											
Evaporative Loss @ 105 C				43.0			39.0 wt%	9.76					
QC624116	BLANK	152320											
Total Organic Carbon							3.35 mg/l				LIB	07/02/99	1307
QC624117	9906802-01DUP	152320											
Total Organic Carbon				13600			14000 mg/l	2.39			LIB	07/02/99	1341
QC624119	LCS	152320											
Total Organic Carbon			3750				4160 mg/l		111	(85.0 - 115.)	LIB	07/02/99	1314
QC624118	9906802-01PS	152320											
Total Organic Carbon			9410	13600			24200 mg/l		112	(77.0 - 127.)	LIB	07/02/99	1402

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

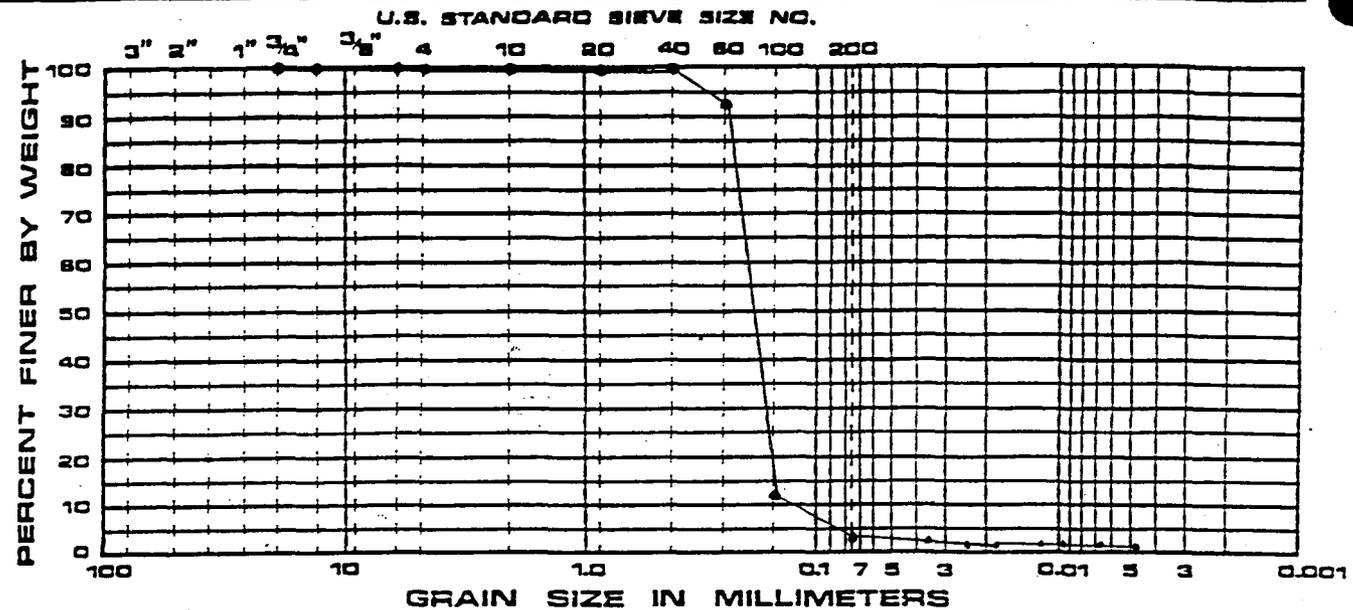
Project No.      99008  
Date              06/30/1999

Project            MISCELLANEOUS  
Client            KATAHDIN ANALYTICAL  
Sample No.       30, SILTY SAND, WP3035-4

<u>Sieve Size</u>	<u>Percent Passing</u>	<u>PROJECT Specifications %</u>
3/4 "	100.0	
1/2 "	99.9	
1/4 "	99.9	
# 4	99.9	
# 10	99.8	
# 20	99.6	
# 40	99.5	
# 60	93.3	
# 100	12.5	
# 200	3.1	

### GRAIN SIZE ANALYSIS

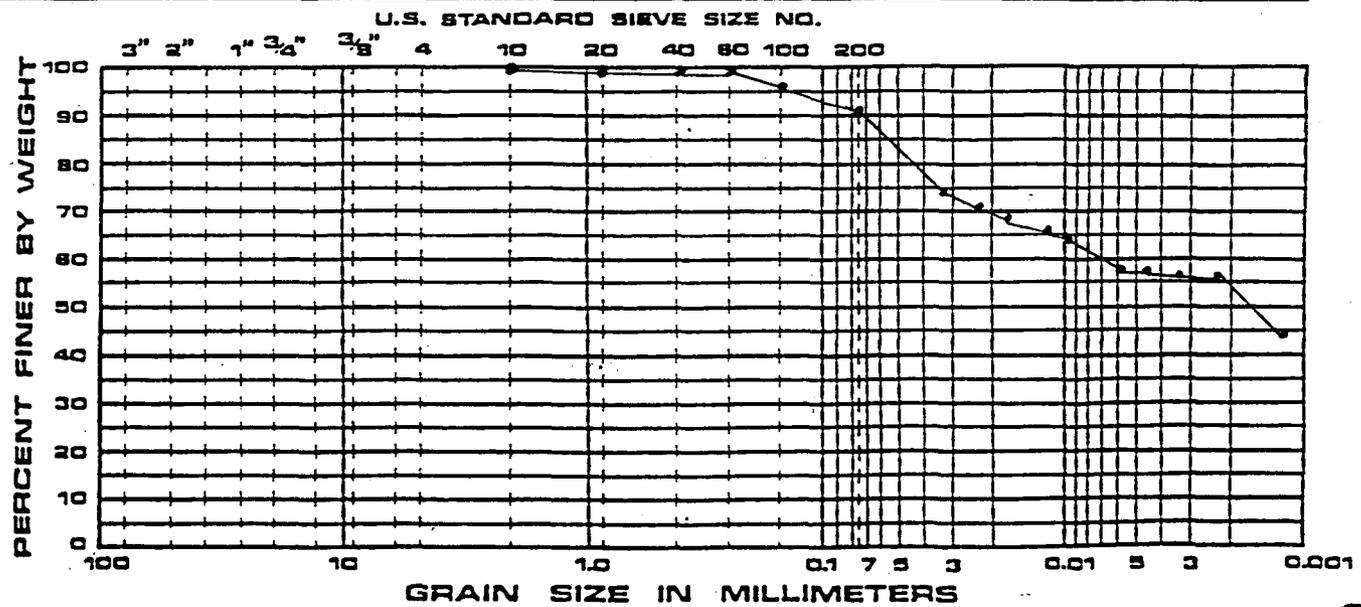
COBBLE	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COA.	MEDIUM	FINE	



PLOT	SOURCE	SAMP.	DEPTH	CLASSIFICATION	W
•	WR9035-4	490			

### GRAIN SIZE ANALYSIS

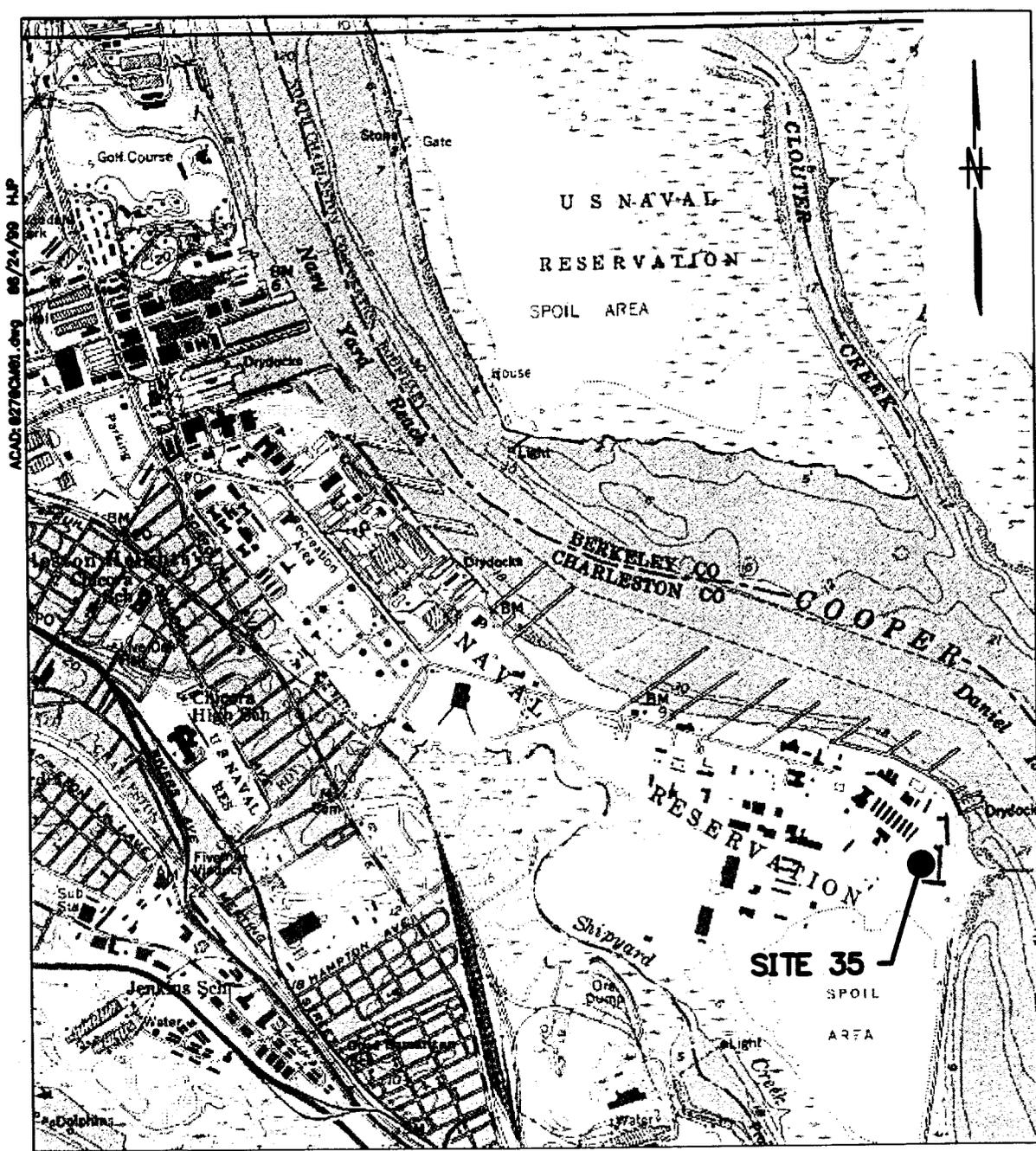
COBBLE	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COA.	MEDIUM	FINE	



PLOT	SOURCE	SAMP.	DEPTH	CLASSIFICATION	W
•	WR9035-5	31			

**APPENDIX C**

**TOPOGRAPHIC MAP WITH SITE LOCATION**



SC

SOURCE: QUADRANGLE MAP SOUTH CAROLINA, REVISED 1879  
 QUADRANGLE MAP NORTH CHARLESTON REVISED, 1979

0 2000 4000  
 SCALE IN FEET

DRAWN BY DATE  
 HJP 8/20/99

CHECKED BY DATE

COST/SCHED-AREA

SCALE  
 AS NOTED



SITE LOCATION MAP  
 SITE 35, BUILDING NS28-A, ZONE I  
 CHARLESTON NAVAL COMPLEX  
 NORTH CHARLESTON, SC

CONTRACT NO.  
 N0270

APPROVED BY DATE

APPROVED BY DATE

DRAWING NO.  
 FIGURE 1

REV.  
 0

