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SAMPLING AND ANALYSIS PLAN (SAP) FOR ZONE K AT BUILDING 2508 CNC
CHARLESTON SC
02/01/2003
CH2M HILL

**SAMPLING AND ANALYSIS PLAN
FOR
ZONE K; BUILDING 2508
SCDHEC No: 00951**

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

**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND**

Contract Number N62467-99-C-0960

February 2003

Water Monitoring Assessment &
Investigation Division

**SAMPLING AND ANALYSIS PLAN
FOR
Zone K; Building 2508**

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

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

**Submitted by:
CH2M-JONES, LLC.
Charleston Naval Complex
1849 Avenue F
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J.A. JONES
ENVIRONMENTAL
SERVICES



CH2MHILL

Contract Number: N62467-99-C-0960

February 2003

ACRONYMS

bls	below land surface
BTEX	benzene, toluene, ethylbenzene and xylenes
BRAC	Defense Base Realignment and Closure Act
CAP	Corrective Action Plan
CNC	Charleston Naval Complex
COC	Chemical of Concern
DPT	Direct Push Technology
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
GEL	General Engineering Laboratories
$\mu\text{g}/\text{kg}$	microgram per kilogram
$\mu\text{g}/\text{L}$	microgram per liter
NAVFAC	Naval Facilities Engineering Command
OVA	Organic Vapor Analyzer
PAH	Polycyclic Aromatic Hydrocarbons
QA	Quality Assurance
QC	Quality Control
RA	Rapid Assessment
RAR	Rapid Assessment Report
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation Recovery Act
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SPORTENDETCHASN	Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston
SSTL	Site-Specific Target Level
US EPA	United States Environmental Protection Agency
UST	Underground Storage Tank

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1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by CH2M-JONES, LLC. The plan is designed for Building 2508, located at the Naval Station Annex in North Charleston, South Carolina.

The South Carolina Department of Health and Environmental Control (SCDHEC) has designated this site as Identification Number: 00951.

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, as shown on **Figure 1**. This installation consists of three major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkley County, a developed area on the west bank of the Cooper River, and a developed area to the north called the Naval Station Annex.

The site is located at the Naval Station Annex within the developed portion of the base. 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, and the Annex is located to the north of the base.

1.2 Site Background

The CNC began operations in 1901, when the Navy acquired the property. In 1993, the CNC was added to the list of bases schedule for closure under the Defense Base Realignment and Closure Act (BRAC). BRAC regulates the closure of the base and transition of the property back to the community. With the scheduled closure of the base, environmental cleanup has proceeded to make the property available for redevelopment after closure.

Building 2508 was formerly a boiler house. The building provided steam for heating other buildings in the complex. Above-ground Storage Tank (AST) 2508 was a 42,000 gallon steel tank used to supply the boilers inside of Building 2508 with fuel. The AST was located to the north of Building 2508 (**Figure 2**).

On 4 December 1996, AST 2508 was removed as a part of the closure for this site. The Assessment report completed by SPORTENVDETHASN in January 1997, states that "AST 2508 was in good condition" and that "Only minor patches of corrosion was found along the top and on the underside of the tank where it rested on the foundation" All piping associated with the AST were removed and disposed along with the tank.

On 22 October 1997 SCDHEC issued a No Further Action (NFA) for AST 2508. Building 2508 was designated an Area of Concern (AOC) 698 due to lead-based paint peeling from the interior and exterior surfaces/walls. Lead and petroleum hydrocarbons were identified in the *Final Zone K RFI Workplan* as constituents of concern for AOC 698.

In a memorandum letter dated 18 March 2002 (Overcash to Rennhack), AOC 698 was transferred to the Departments Underground Storage Tank (UST) Program for investigation of the hydrocarbon contamination (see attachment of letter).

2.0 PROPOSED SAMPLING PLAN

This SAP proposes additional assessment of the groundwater in the vicinity of the former AST 2508. Based upon previous data, the one existing well (698GW001) will be sampled and two DPTs will be collected.

Based on the historical analytical results CH2M-Jones, LLC recommends that a sampling plan be implemented to confirm that groundwater in this area have not been impacted by the former operations. If analytical results indicate that levels are below the RBSLs, a No Further Action may be recommended for this site.

2.1 Sampling and Analysis Plan

Groundwater will be collected from two existing wells and two DPTs. The samples collected will be analyzed for VOCs and SVOCs in accordance with the *South Carolina Risk-Based Corrective Action for Petroleum Releases*.

All sampling procedures will be conducted in accordance with EPA EISOPQAM and Ensaf/Allen & Hoshall, Comprehensive Sampling and Analysis Plan, 1996.

2.2 Groundwater Collection

A total of four groundwater samples will be collected at AST 2508. The one existing monitoring well (698GW001) will be sampled along with two new DPTs. (See **Figure 3** for locations).

2.3 Surveying

All new sampling locations will be surveyed after collection.

2.4 Reporting

A Groundwater Monitoring Report will be submitted to SCDHEC following the sampling event. The report will summarize and include copies of field and laboratory analytical data and COC distribution and trends.

2.5 Equipment Decontamination

If needed, 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 EPA EISOPQAM.

2.6 Sample Handling

Sample handling will be conducted in accordance to the following references: EPA EISOPQAM, Code of Federal Regulations 136, 1990, and EPA Users Guide to Contract Laboratory Program, 1988. The following forms will be completed for packing/shipping process: sample labels, chain-of-custody labels, appropriate labels applied to shipping coolers, and chain-of-custody forms.

2.7 Quality Control

In addition to periodic calibration of field equipment and the completions of the appropriate documentation, 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 EPA 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.

2.8 Field Quality Assurance / Quality Control (QA/QC)

All sampling procedures will be conducted in accordance with EPA EISOPQAM.

QA/QC specifications for selected field measurements are summarized below.

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.

2.9 Record Keeping

In addition to required sampling documentation, standardized forms, log sheets and logbooks will be completed during all field activities.

3.0 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
Rob Harrell
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) 898-4300

4.0 REFERENCES

South Carolina Department of Health and Environmental Control 2001, Risk-Based Corrective Action.

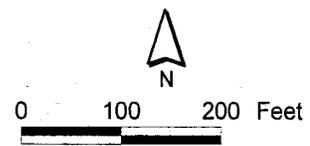
United States Environmental Protection Agency. 1996, EPA Environmental Investigations Standard Operating Procedures for Quality Assurance Manual.

SPORTENVDETHASN. 1997,. AST Assessment Report for 2508.

NOTE: Original figure created in color



- Fence
- Buildings

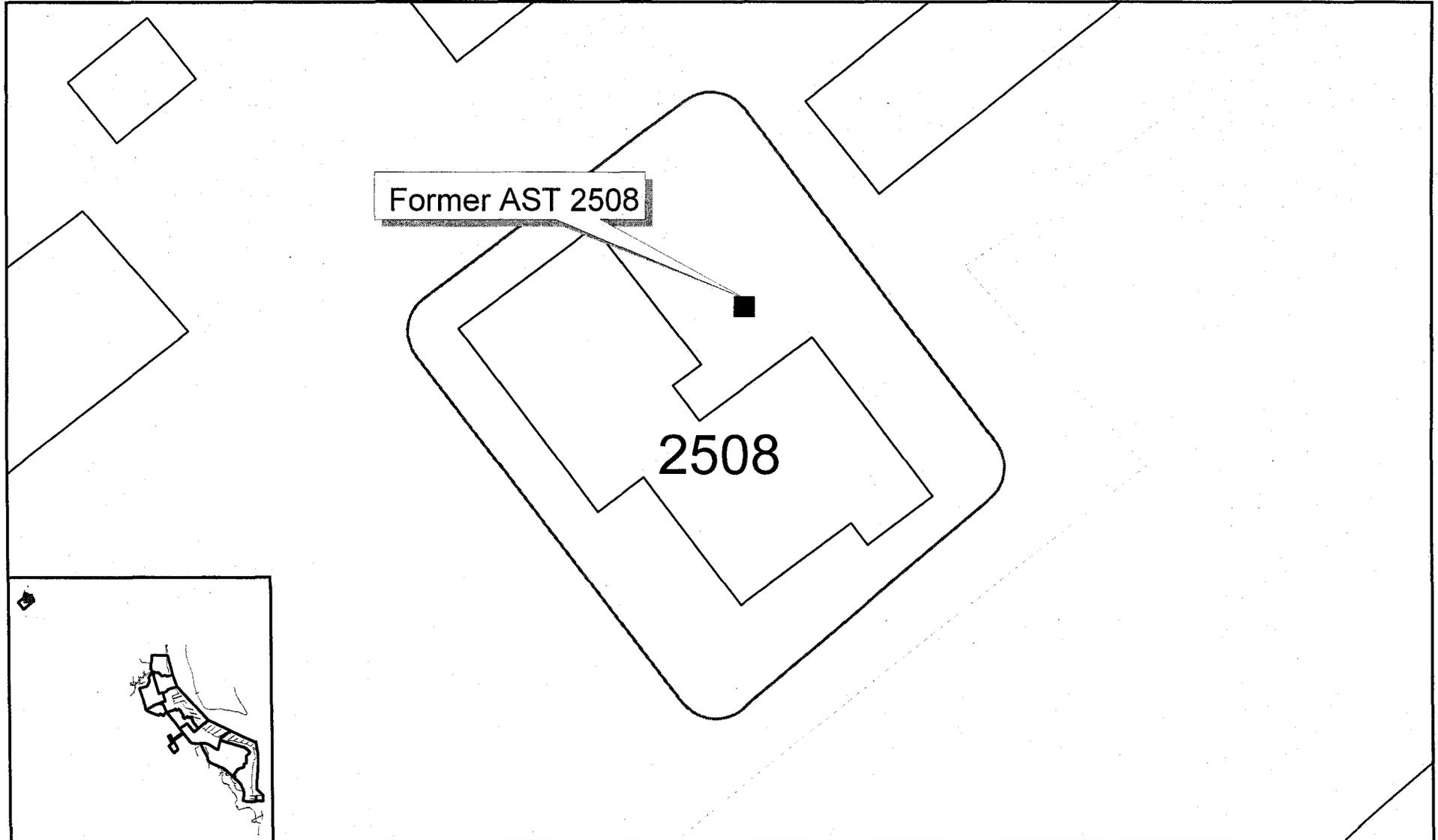


1 inch = 137.839 feet

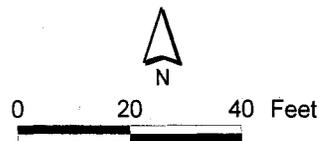
Figure 1
Site Layout Map
Zone K; Bldg 2508
Charleston Naval Complex

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NOTE: Original figure created in color



-  AOC Boundary
-  SWMU Boundary
-  Buildings

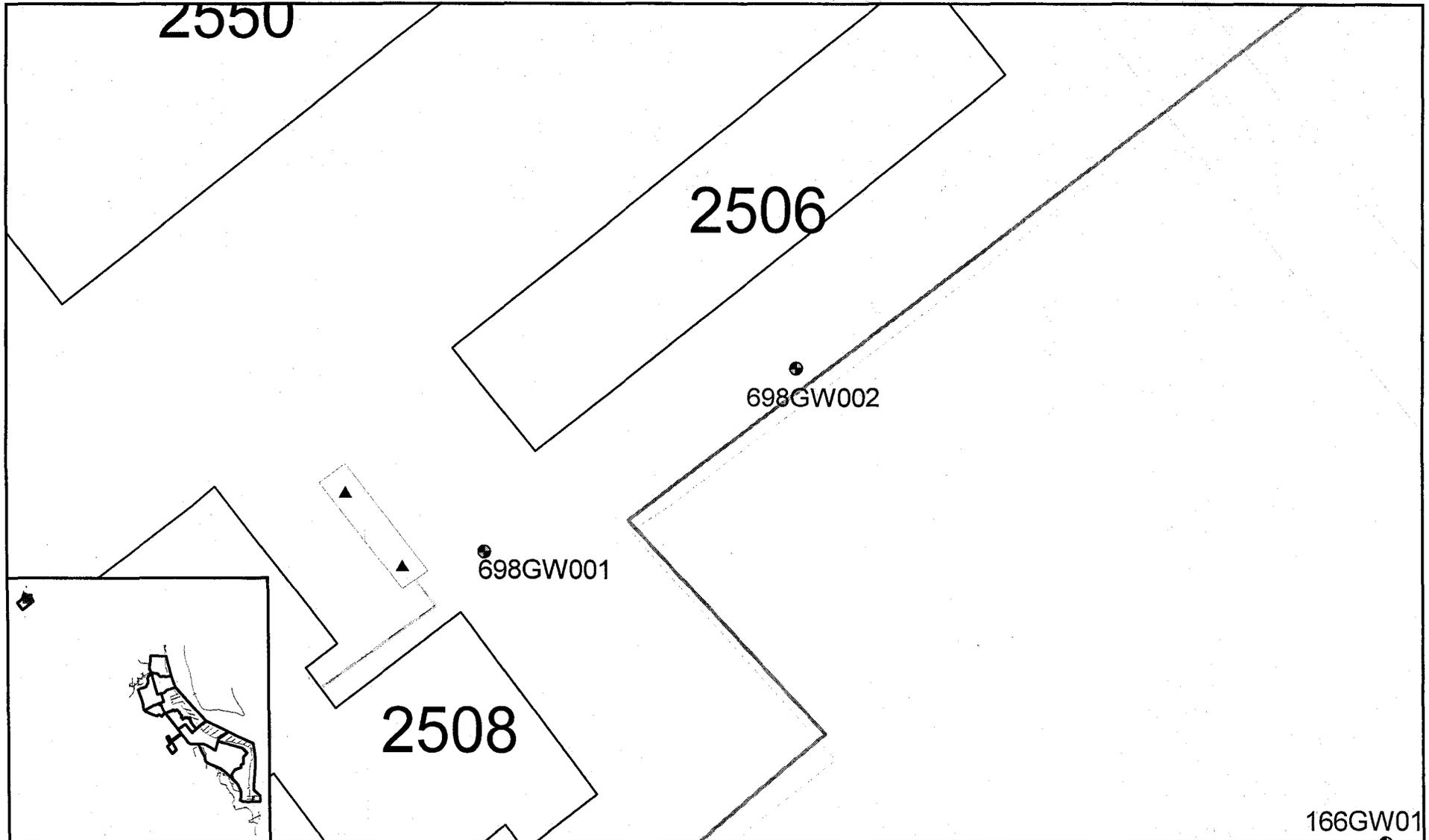


1 inch = 29.9465 feet

Figure 2
AST Location Map
ZOne K; Bldg 2508
Charleston Naval Complex

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NOTE: Original figure created in color



- ⊗ Abandoned
- Active
- ▲ Proposed DPT
- Buildings
- ▨ Not Restricted
- ▤ Restricted
- Former AST

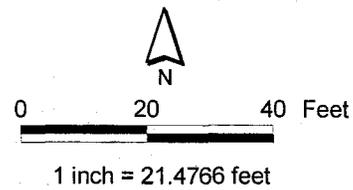


Figure 3
Existing and Proposed Sample Locations
Zone K; Bldg 2508
Charleston Naval Complex

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MEMORANDUM

TO: Gilbert Rennhack, Engineer Associate
Corrective Action Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: Jo Cherie Overcash, Hydrogeologist
RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management

DATE: 18 March 2002

RE: Charleston Naval Complex (Navy)
SC0 170 022 560
Charleston County

RFI Report Addendum Revision 1
Dated February 2002; Received February 11, 2002
AOC 698 Electrical Boiler House Building 2508, Naval Annex
Zone K

As requested, the document referenced above has been reviewed with respect to the requirements of R.61-79.264 Subpart F of the South Carolina Hazardous Waste Management Regulations (SCHWMRs), the Environmental Protection Agency's (EPA) RCRA Facility Assessment guidance document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, and CERCLA 120(h) as amended.

Area of concern (AOC) 698 consist of Building 2508 at the Naval Station Annex, which housed four boilers to supply steam to annex facilities. Building 2508 was designated an AOC due to lead-based paint peeling from the interior and exterior surfaces/walls. A 10,000 gallon fuel oil aboveground storage tank (AST) was located on the northeast side of Building 2508. Lead and petroleum hydrocarbons were identified in the *Final Zone K RFI Workplan* as constituents of concern for AOC 698.

Historical application of pesticides at AOC 698 have adversely impacted groundwater at this unit. Two isomers of lindane (pesticide, benzenehexachloride-BHC) have been sporadically detected in groundwater at AOC 698. While the concentration of alpha-BHC (0.15 µg/L)

exceeded the RBC of 0.011 µg/L during the October 1997 sampling event, this isomer was not detected during the December 1999 sampling event. Only gamma-BHC was detected during the December 1999 sampling event. However, the gamma-BHC concentration of 0.079(J) µg/L does not exceed the MCL of 0.20 µg/L for lindane. These low concentrations of pesticides as reported in this RFI Report Addendum, do not appear to pose a threat to human health at this time. Therefore, the Division of Hydrogeology agrees that there are no RCRA Subtitle C constituents of concern for groundwater at AOC 698 at this time. Moreover, it is recommended that AOC 698 be transferred to the Department's Underground Storage Tank (UST) program for investigation of the hydrocarbon contamination at this site.

The Navy provided a copy of the Department's approval letter for closure of AST 2508 (Bristol to Magwood, 10/22/97) in Appendix G of the referenced Report. The May 9, 1997, Aboveground Storage Tank Assessment Report was not provided. However, on March 6, 2002, Mr. Michael Bishop of the Department's Bureau of Water, informed the author that according to the referenced Assessment Report, no groundwater samples were collected during closure of AST 2508.

Benzene has been consistently detected (5 of 6 samples) in concentrations at or above the maximum contaminant level (MCL) of 5 micrograms per liter (µg/L). The highest concentration of benzene (31 µg/L) was reported in the last sampling event conducted on July 20, 2000. Moreover, naphthalene has been consistently detected in concentrations greater than the EPA Region III risk based concentration (RBC) of 6.5 µg/L. Therefore, the Division of Hydrogeology recommends that groundwater at AOC 698 be addressed under RCRA Subtitle I through transfer to the Department's UST program. Based upon available data, a "no further action" (NFA) decision for groundwater at AOC 698 would be appropriate upon receipt of satisfactory completion of RCRA Subtitle I requirements.

If you have any questions, please discuss them with me.

Attachments: Table 5-3 Groundwater Analytical Results for COPCs Exceeding Screening Criteria

Figure 4-1 Additional Soil Boring and Monitoring Well Locations

cc: Michael Bishop, BOW, SCDHEC

March 20, 2002

Ms. Amy Daniell
Charleston Naval Complex
Caretaker Site Office, 1895 Avenue F
North Charleston, SC 29405

RE: RFI Report Addendum (Revision 1), Dated February 2002
AOC 698, Zone K
SC0 170 022 560

Dear Ms. Daniell:

The Corrective Action Engineering and the Hydrogeology Sections of the South Carolina Department of Health and Environmental Control (Department) have completed the review of the above referenced document (received February 11, 2002) according to applicable State and Federal Regulations, and the CNC Hazardous Waste Permit (Permit) effective September 17, 1998. The Department hereby approves the referenced document, however, it is recommended that AOC 698 be transferred to the Department's Underground Storage Tank (UST) program for investigation of the hydrocarbon contamination at this site.

Based on details and analytical data presented in the RFI Report Addendum for AOC 698, the Department recommends that the groundwater at AOC 698 be addressed under RCRA Subtitle I via the transfer to the Department's UST program. A no further action (NFA) for the groundwater at AOC 698 will be appropriate upon receipt of satisfactory completion of the RCRA Subtitle I requirements.

Thank you for your cooperation in this matter. If you have any questions or concerns, please contact Gil Rennhack at (803) 896-4192

Sincerely,

David M. Scaturo, P.E., P.G., Manager
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

Attachment: Memorandum dated March 18, 2002, Jo Cherie Overcash to Gil Rennhack

cc: CNC reading file
Jo Cherie Overcash, SCDHEC-BLWM
Jerry Stamps, SCDHEC-BLWM
Michael Bishop, SCDHEC-UST
Dean Williamson and Gary Foster, CH2M-Hill

Dann Spariosu, EPA Region IV
Rob Harrell, SOUTHDIV
Tony Hunt, SOUTHDIV
Rick Richter, Trident EQC