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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT ADDENDUM AREA OF CONCERN 538 AND 539 (AOC 538) AND (AOC 539) ZONE E CNC CHARLESTON SC

4/30/2003

CH2M HILL

RFI REPORT ADDENDUM

AOCs 538 and 539. Zone E

Charleston Naval Complex
North Charleston, South Carolina

SUBMITTED TO
U.S. Navy Southern Division
Naval Facilities Engineering Command

CH2M-Jones

April 2003

Contract N62467-99-C-0960

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April 30, 2003

Mr. David Scaturo
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Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: RFI Report Addendum (Revision 1) – AOCs 538 and 539, Zone E

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum (Revision 1) for AOCs 538 and 539 in Zone E of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Sam Naik. Please do not hesitate to contact him at 770/604-9182, extension 255, should you have any questions or comments.

Sincerely,

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Dean Williamson, P.E.

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October 8, 2002

Mr. David Scaturo
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: RFI Report Addendum (Revision 0) – AOCs 538 and 539, Zone E

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum (Revision 0) for AOCs 538 and 539 in Zone E of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Sam Naik. Please do not hesitate to contact him at 770/604-9182, extension 255, should you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

THE ATTACHED PAGES SHOULD BE INSERTED AS REPLACEMENTS IN THE
RFI REPORT ADDENDUM, AOCS 538/539, ZONE E, REVISION 0 SUBMITTAL:

- REVISED TABLE OF CONTENTS PGS. IV - V
- REVISED PGS. 2-5, 2-6, AND 2-7
- REVISED APPENDIX C
- NEW APPENDIX D

RFI REPORT ADDENDUM

AOCs 538 and 539, Zone E

Charleston Naval Complex
North Charleston, South Carolina

SUBMITTED TO
U.S. Navy Southern Division
Naval Facilities Engineering Command

PREPARED BY
CH2M-Jones

April 2003

Revision 1
Contract N62467-99-C-0960
158814.ZE.PR.06

Certification Page for RFI Report Addendum (Revision 1) – AOCs 538 and 539, Zone E

I, Dean Williamson, certify that this report has been prepared under my direct supervision. The data and information are, to the best of my knowledge, accurate and correct, and the report has been prepared in accordance with current standards of practice for engineering.

South Carolina

P.E. No. 21428

Dean Williamson, P.E.

4/25/2003

Date

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C High Volume Air Sampling Results and Analytical Data for Air Samples - Metals Analysis
D CH2M-Jones Responses to SCDHEC Comments regarding the *RFI Report Addendum, AOCs 538 and 539, Zone E, Revision 0* (CH2M-Jones, 2002)

Acronyms and Abbreviations

AOC	Area of concern
ALM	Adult Lead Methodology
AST	Aboveground storage tank
BCT	BRAC Cleanup Team
BEQ	Benzo[a]pyrene equivalent
BRAC	Base Realignment and Closure Act
BRC	Background reference concentration
CA	Corrective action
CNC	Charleston Naval Complex
COC	Chemical of concern
COPC	Chemical of potential concern
CSI	Confirmatory sampling investigation
DAF	Dilution attenuation factor
DET	Environmental Detachment Charleston
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
FRE	Fixed-point risk evaluation
HHRA	Human health risk assessment
IM	Interim measure
HI	Hazard index
LUC	Land use control
MCL	Maximum contaminant level
µg/kg	Microgram per kilogram
µg/L	Microgram per liter
mg/kg	Milligram per kilogram
NAVBASE	Naval Base
OP	Organophosphorous
OWS	Oil/water separator

Acronyms and Abbreviations, Continued

RBC	Risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SSL	Soil screening level
SVOC	Semivolatile organic compound
TDS	Total dissolved solids
UST	Underground storage tank
VOC	Volatile organic compound

Section 1.0

1.0 Introduction

In 1993, Naval Base (NAVBASE) Charleston was added to the list of bases scheduled for closure as part of the Defense Base Realignment and Closure Act (BRAC), which regulates closure and transition of property to the community. The Charleston Naval Complex (CNC) was formed as a result of the dis-establishment of the Charleston Naval Shipyard and NAVBASE on April 1, 1996.

Corrective Action (CA) activities are being conducted under the Resource Conservation and Recovery Act (RCRA) with the South Carolina Department of Health and Environmental Control (SCDHEC) as the lead agency for CA activities at the CNC. All RCRA CA activities are performed in accordance with the Final Permit (Permit No. SC0 170 022 560).

In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to complete the RCRA Facility Investigation (RFI) for Areas of Concern (AOCs) 538 and 539 in Zone E of CNC. The location of this site in Zone E is shown in Figure 1-1. Figure 1-2 shows an aerial photograph of the site.

1.1 Background

AOC 538, a former forge shop constructed in 1906, is located in the eastern portion of Building 6. Various metal-working processes were conducted in the shop. The forge furnaces were oil-fired. Numerous quench oil tanks were also present as part of this operation.

AOC 539, a former propeller shop, is located in the western extension of Building 6, which was added in 1967. The Zyglo process was used here until it was replaced by the red dye process in 1979. Zyglo penetrant, which is 99-percent 1,1,1-trichloroethane, was reportedly rinsed from the propellers onto the floor and then washed outside into the storm sewer. Subsequent operations used a red dye magnaflux process, and the excess waste from this process was collected in a portable aboveground storage tank (AST). Building 6 has been subleased to Solution Technologies.

Materials of concern at AOC 538 identified in the *Final Zone E RFI Work Plan* (EnSafe Inc. [EnSafe], 1995), include waste oils, paints, heavy metals, ceramic refractory materials, galvanizing flux, coal and charcoal coke. The material of concern at AOC 539 is Zyglo

penetrant (99-percent 1,1,1-trichloroethane). This area of Zone E is zoned M-2 (industrial land use). The CNC RCRA Permit identified AOCs 538 and 539 as requiring a RFI.

The RFI was initially conducted by the Navy/EnSafe team and the RFI activities were documented in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). A regulatory review was conducted on this document and a draft response to the comments from SCDHEC was prepared by the Navy/EnSafe team. A copy of these responses is provided as Appendix A of this RFI Report Addendum.

1.2 Purpose of the RFI Report Addendum

The purpose of this RFI Report Addendum is to document the results of previous RFI investigations conducted by EnSafe at AOCs 538 and 539. This RFI Report Addendum also discusses various closeout issues and the findings of previous investigations, existing site conditions, and surrounding area land use.

Prior to changing the status of any site in the CNC RCRA CA permit, the BRAC Cleanup Team (BCT) agreed that the following issues should be considered:

- Status of the RFI
- Presence of metals (inorganics) in groundwater
- Potential linkage to SWMU 37, Investigated Sanitary Sewers at the CNC
- Potential linkage to Area of Concern (AOC) 699, Investigated Storm Sewers at the CNC
- Potential linkage of AOC 504, Investigated Railroad Lines at the CNC
- Potential linkage to surface water bodies (Zone J)
- Potential contamination associated with oil/water separators (OWSs)
- Relevance or need for land use controls (LUCs) at the site

Information regarding these issues is also provided in this RFI Report Addendum to expedite evaluation of closure of the site.

1.3 Report Organization

This RFI Report Addendum consists of the following sections, including this introductory section:

1.0 Introduction – Presents the purpose of the report and background information relating to the RFI Report Addendum.

2.0 Summary of RFI Conclusions for AOCs 538 and 539 – Summarizes the conclusions from the RFI investigations and risk evaluations for AOCs 538 and 539 as presented in the *Zone E RFI Report, Revision 0.*

3.0 Interim Measures and UST/AST Removals – Provides information regarding any interim measures (IMs) or underground storage tank (UST)/AST removal activities performed at the site.

4.0 Summary of Additional Investigations – Summarizes any information collected after completion of the *Zone E RFI Report, Revision 0.*

5.0 COPC/COC Refinement – Provides further evaluation of chemicals of potential concern (COPC) based on RFI and additional data to assess them as chemicals of concern (COCs).

6.0 Summary of Information Related to Site Closeout Issues – Discusses the various site closeout issues that the BRAC Cleanup Team (BCT) agreed to evaluate prior to site closeout.

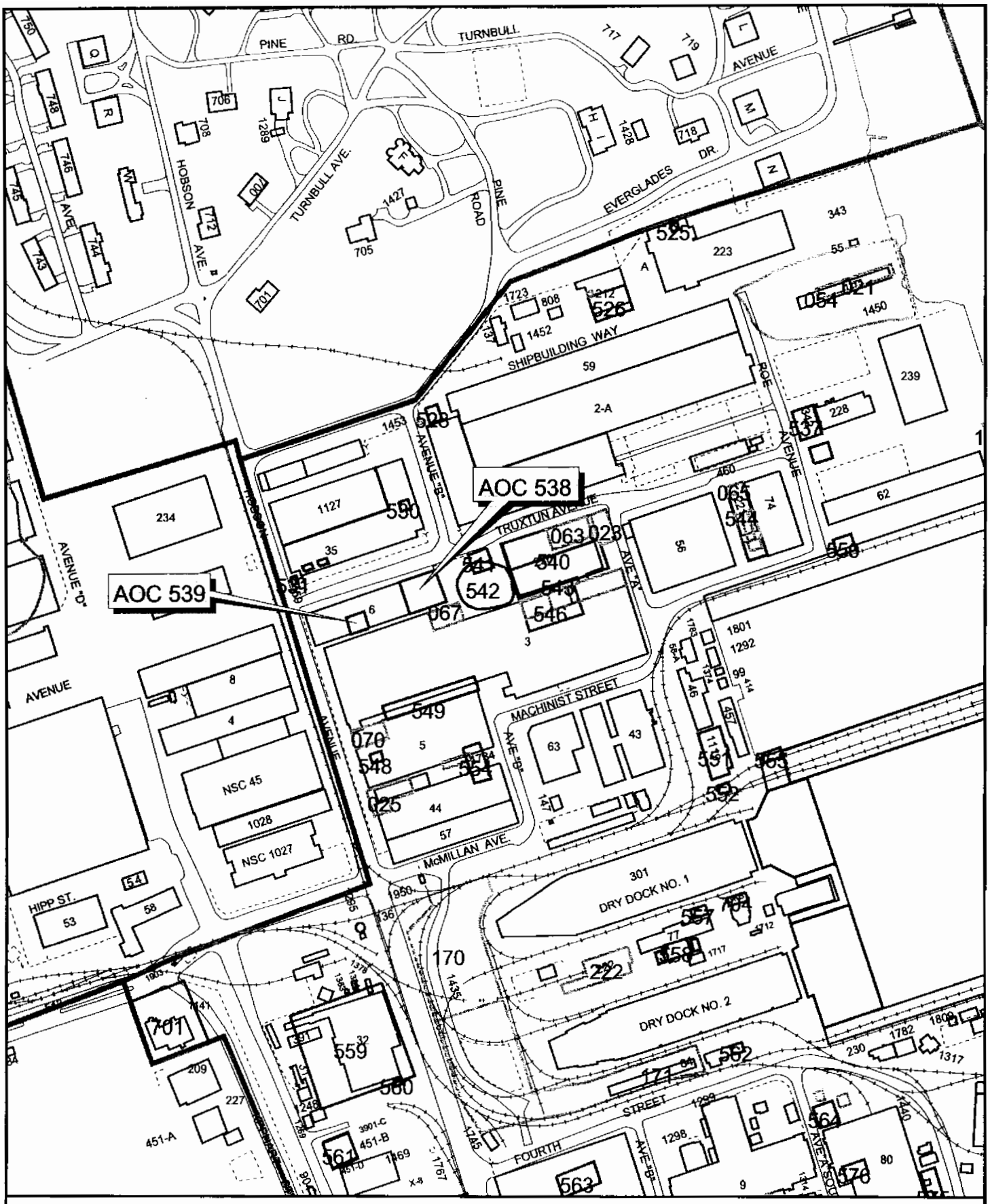
7.0 Recommendations – Provides recommendations for proceeding with site closure.

8.0 References – Lists the references used in this document.

Appendix A – Contains responses to SCDHEC comments for AOCs 538 and 539 from the *Zone E RFI Report, Revision 0.*

Appendix B – Includes excerpts from the *Zone E RFI Report, Revision 0,* including a summary of detections of chemicals and a groundwater flow map for the site vicinity.

Appendix C – Contains the high volume air sampling results and analytical data for air samples - metals analysis.



Railroads
Fence
Roads
AOC Boundary
SWMU Boundary
Shoreline
Buildings
Zone Boundary

N

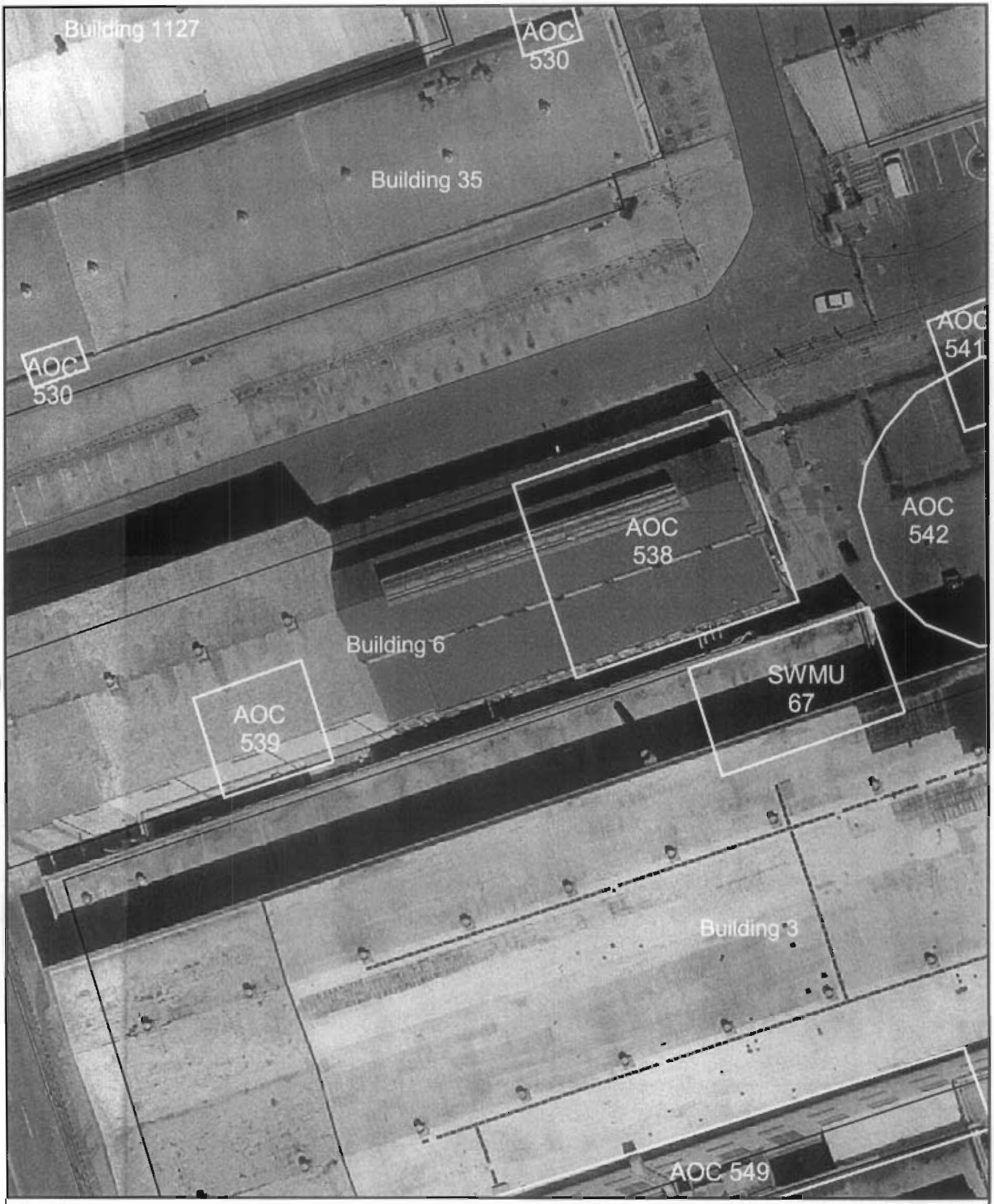
0 200 400 Feet

1 inch = 300 feet

Figure 1-1
Location of AOCs 538 and 539 in Zone E
Charleston Naval Complex

CH2MHILL

NOTE: Aerial Photo Date is 1997



Fence
Roads
AOC/SWMU Boundary
Buildings

N

0 40 80 Feet

1 inch = 50 feet

Figure 1-2
Site Map
AOCs 538 and 539, Zone E
Charleston Naval Complex

CH2MHILL

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Section 2.0

2.0 Summary of RFI Conclusions for AOCs 538 and 539

This section summarizes the results and conclusions from the soil, groundwater, sediment, wipe sampling, and air investigations conducted at AOCs 538 and 539, which were reported in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). Figure 2-1 shows soil, groundwater, and sediment sampling locations.

As part of the Zone E RFI, air, soil, wipe sampling, groundwater, and sediment investigations were conducted at AOCs 538 and 539 from 1995 to 1997. Appendix B contains a summary of these data. The RFI report presented the results of these investigations and conclusions concerning contamination and risk, as summarized in the following sections. A further evaluation of COCs at this combined site is provided in Section 5.0.

2.1 Soil Sampling and Analysis

RFI soil sampling at AOCs 538 and 539 involved the collection and analysis of 11 surface soil and 10 subsurface soil samples from locations under concrete and asphalt pavement. Figure 2-1 shows the RFI sampling locations.

Soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. Two duplicate samples were also analyzed for herbicides, hexavalent chromium, organophosphorus (OP) pesticides, and dioxins.

2.1.1 Surface Soil Results

During the RFI, surface soil detections of organic compounds were evaluated against the U.S. Environmental Protection Agency (EPA) Region III industrial risk-based concentrations (RBCs) (with a hazard index [HI]=0.1 for noncarcinogens). Surface soil detections of inorganic compounds were evaluated against the EPA Region III industrial RBCs (HI=0.1 for noncarcinogens) and the Zone E background reference concentrations (BRCs).

Detected concentrations of organic and inorganic analytes exceeding their respective criteria are as follows:

VOCs: No VOC detections exceeded the screening criteria in surface soils.

SVOCs: No SVOC detections exceeded the screening criteria in surface soils.

Inorganics: The RFI did not report any exceedances of inorganic chemicals above the screening criteria in surface soil.

2.1.2 Subsurface Soil Results

During the RFI, subsurface soil detections of organic compounds were compared with generic soil screening levels (SSLs) (using a dilution attenuation factor [DAF]=10). Subsurface soil detections of inorganic compounds were compared with generic SSLs (using a DAF=10) and the Zone E BRCs.

Detected concentrations of organic and inorganic compounds from subsurface soil samples are as follows:

VOCs: No VOC detections exceeded the screening criteria in subsurface soils.
SVOCs: No SVOC detections exceeded the screening criteria in subsurface soils.
Inorganics: No inorganic detections exceeded the screening criteria in subsurface soils.
Pesticides: There were no pesticide detections above laboratory detection limits in subsurface soil samples from AOCs 538 and 539.
Dioxins: No dioxin detections exceeded the screening criteria in subsurface soils.

2.2 Groundwater Sampling and Analysis

Two shallow monitoring wells, E538GW001 and E539GW001, and two deep monitoring wells, E538GW001D and E539GW001D, were installed during the RFI, as shown in Figure 2-1. Groundwater samples were analyzed for VOCs, SVOCs, metals, chlorides, sulfates, and total dissolved solids (TDS). One duplicate groundwater sample was analyzed for herbicides, OP pesticides, dioxins, and hexavalent chromium.

During the RFI, each well was sampled four times during the period from 1996 to 1997. The detections in groundwater samples were compared with the EPA Region III tap water RBCs, maximum contaminant levels (MCLs) and the Zone E BRCs for shallow and deep aquifers.

The results of the first two groundwater sampling events were presented in the RFI report.

2.2.1 Shallow Groundwater Results

Analyte concentrations in shallow groundwater samples were detected as follows at this site:

VOCs: No VOC detections exceeded the screening criteria in shallow groundwater samples from AOCs 538 and 539.

SVOCs: No SVOC detections exceeded the screening criteria in shallow groundwater samples from AOCs 538 and 539.

Inorganics: The *Zone E RFI Report, Revision 0* reported detections of arsenic or iron exceeding the screening criteria.

- Arsenic: One arsenic detection at a concentration of 60.1 micrograms per liter (µg/L), at E538GW001, exceeded both its tap water RBC of 0.0450 µg/L, and shallow groundwater BRC of 18.7 µg/L. This detection also exceeded the arsenic MCL of 50.0 µg/L.
- Iron: Detected at a concentration of 8,960 µg/L, at E566GW001, exceeded its tap water RBC of 1,100 µg/L (HI=0.1). No primary MCL exists for iron , and no shallow groundwater BRC was developed for iron in Zone E during the RFI.

2.2.2 Deep Groundwater Results

The following detections were found in the deep groundwater samples at the site:

VOCs: The *Zone E RFI Report, Revision 0* reported a detection of 1,2-dichloroethene (total), exceeding the screening criteria.

- The 1,2-dichloroethene (total) detection at a concentration of 12.0 µg/L, at E539GW01D, exceeded its tap water RBC of 5.50 µg/L, but was below its MCL of 70 µg/L.

SVOCs: There were no SVOC detections above laboratory detection limits in deep groundwater samples from AOCs 538 and 539.

Inorganics: The *Zone E RFI Report, Revision 0* reported detections of iron above the screening criteria.

Iron detections ranged from 1,860 µg/L to 3,860 µg/L, exceeding its tap water RBC of 1,100 µg/L. No primary MCL exists for iron, and no deep groundwater BRC was developed for iron in Zone E during the RFI.

2.3 Sediment Sampling and Analysis

The *Zone E RFI Work Plan, Revision 1* (EnSafe/Allen & Hoshall, 1995) for AOCs 538 and 539 proposed the collection of one sediment sample from the floor drain associated with AOC 539. The sample was analyzed for VOCs, SVOCs, and metals. No samples were selected as duplicates. Sediment detections of organic and inorganic compounds were evaluated against the EPA Region III industrial RBCs. Figure 2-1 shows the sediment sample location.

The following detections were found in the sediment samples at the site:

VOCs: No VOC detections exceeded the screening criteria in sediment samples from AOCs 538 and 539.

SVOCs: The *Zone E RFI Report, Revision 0* reported a detection of BEQs exceeding the screening criteria.

- Benzo[a]pyrene equivalents (BEQs) at a concentration of 2,280 micrograms per kilogram (μg/kg), exceeded the benzo[a]pyrene industrial soil RBC of 780 μg/kg at a single location (E539M0001).

Inorganics: The *Zone E RFI Report, Revision 0* reported detections of arsenic, copper, and nickel exceeding the screening criteria.

- Arsenic was detected at a concentration of 6.6 milligrams per kilogram (mg/kg) at E539M0001, exceeding its industrial RBC of 3.8 mg/kg.
- Copper was detected at a concentration of 134,000 mg/kg at E539M0001, exceeding its industrial RBC of 8,200 mg/kg.
- Nickel was detected at a concentration of 6,430 mg/kg at E539M0001, exceeding its industrial RBC of 4,100 mg/kg.

Pesticides/PCBs: The *Zone E RFI Report, Revision 0* reported a detection of dieldrin exceeding the screening criteria. No PCBs were detected above laboratory detection limits.

- Dieldrin was detected at a concentration of 370 μg/kg at E539M0001, exceeding its industrial RBC of 360 μg/kg.

Subsequent to the RFI field investigation, the sediments that were present in the floor drain at AOC 539 were removed during the IM for AOC 699, which was conducted by the Environmental Detachment Charleston (DET) in 1998. As a result, these sediments are no longer present at this site. The IM activities are documented in a report titled *Interim Measure Completion Report for AOC 699 Storm Drain Cleaning* (DET, 1999).

2.4 Wipe Samples

The RFI investigation for AOCs 538 and 539 consisted of 22 wipe samples collected from the floor, walls, beams, and other surfaces where metal dusts and fumes could have settled. Sample locations were selected in the field based on observed discoloration, proximity to emitting processes, and likelihood to collect dust and fumes. The wipe samples were analyzed for metals. Metals were detected in all the wipe samples. No residential or industrial RBCs exist for comparison to the wipe sampling results. Appendix B includes the individual wipe sampling results for AOCs 538 and 539.

2.5 Air Samples

Seventeen air samples were also collected during the RFI investigation for AOCs 538 and 539. Sample locations were determined in the field and were biased in an attempt to identify worst-case situations. Metals were detected in all of the air samples. The purpose of the air sampling effort was to characterize any air-borne dust or contamination released from the industrial activities occurring within Building 6 at the time of sampling. According to the *Zone E RFI Report, Revision 0*, three Hi Vol air samplers were used for assessment of air quality, with each Hi Vol sampler collecting a 24-hour composite for five consecutive days at each location.

The sample locations were reported to have been determined in the field, and were likely collected from inside Building 6, where both AOCs 538 and 539 are located. The specific location of these samples within the building are not reported in the RFI report. The range of inorganics detected in 17 samples was reported in the RFI report but not the individual sample results; CH2M-Jones obtained the individual sample results from EnSafe. Appendix C-1 includes the analytical data per sample, for each of the analyzed metals. Based on the sample identification numbers, 11 of the 17 samples were collected from AOC 538, and six of the 17 samples were collected from AOC 539. All of the samples were analyzed for metals, which were detected in several of the 17 samples.

There are no appropriate project-specific comparison criteria for these sample results, as there are COPC screening criteria for the other environmental media (e.g., soils or groundwater). The most pertinent criteria for comparison are likely to be occupational exposure-based criteria that are protective of industrial workers, given the location of the sites within industrial building, and the fact that the samples represent air-borne contaminants within the interior of the building, where workers may be present.

Since several of these metals are part of the background environmental media, they are likely to be present in ambient air. Background ambient air metals levels at the CNC were not previously established. Therefore, published sources of such information were used. The chemical-specific toxicity profiles from the Agency for Toxic Substances and Disease Registry (ATSDR) include the ambient air concentration levels for these metals in urban and rural areas across the U.S., which can be considered background levels. These chemical-specific background metals concentrations compiled from the individual toxicity profiles are provided in Appendix C-2, to provide comparison with sample-specific metals concentrations to determine if they are specific to AOCs 538 and 539.

Because this site is located within Zone E and is an aged industrial building, residential exposures are not feasibly going to occur. The only potential exposure scenario for AOCs 538/539 is for site worker exposure. No RBCs have been developed for the protection of industrial workers from exposures to air in the EPA Region III RBC tables. However, the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Health and Safety Administration (OSHA) both have occupational exposure limit values for the protection of workers' health. When multiple time-weighted average (TWA) values are available in the NIOSH handbook, the most conservative of these values were selected for comparison (see Appendix C-2).

The results of the comparison of metals detections in the air samples with the TWA values indicated that the concentrations of metals in all 17 samples were below the most conservative TWA levels that are protective of industrial workers. Therefore, detected inorganic chemical concentrations in air samples at AOCs 538 and 539 are not a worker exposure concern.

2.6 RFI Human Health Risk Assessment (HHRA)

The *Zone E RFI Report, Revision 0* used a fixed-point risk evaluation (FRE) approach at this site, which considered site resident and site worker scenarios. The detailed risk assessment for the AOCs 538 and 539 site are presented in Sections 10.23.12.2 and 10.23.12.3 of the *Zone E RFI Report, Revision 0.*

2.6.1 Soils

BEQs were retained as a COC for surface soil for the unrestricted (i.e., residential) future land use scenario. No COCs were identified for the industrial/commercial future land use scenario.

The FRE did not identify any COCs in subsurface soil for the unrestricted future land use scenario at AOCs 538 and 539.

2.6.2 Groundwater

Arsenic was retained as a COC for shallow groundwater for both the unrestricted and commercial/industrial future land use scenarios.

Thallium was retained as a COC for deep groundwater for both the unrestricted and commercial/industrial future land use scenarios.

2.6.3 Wipe Samples

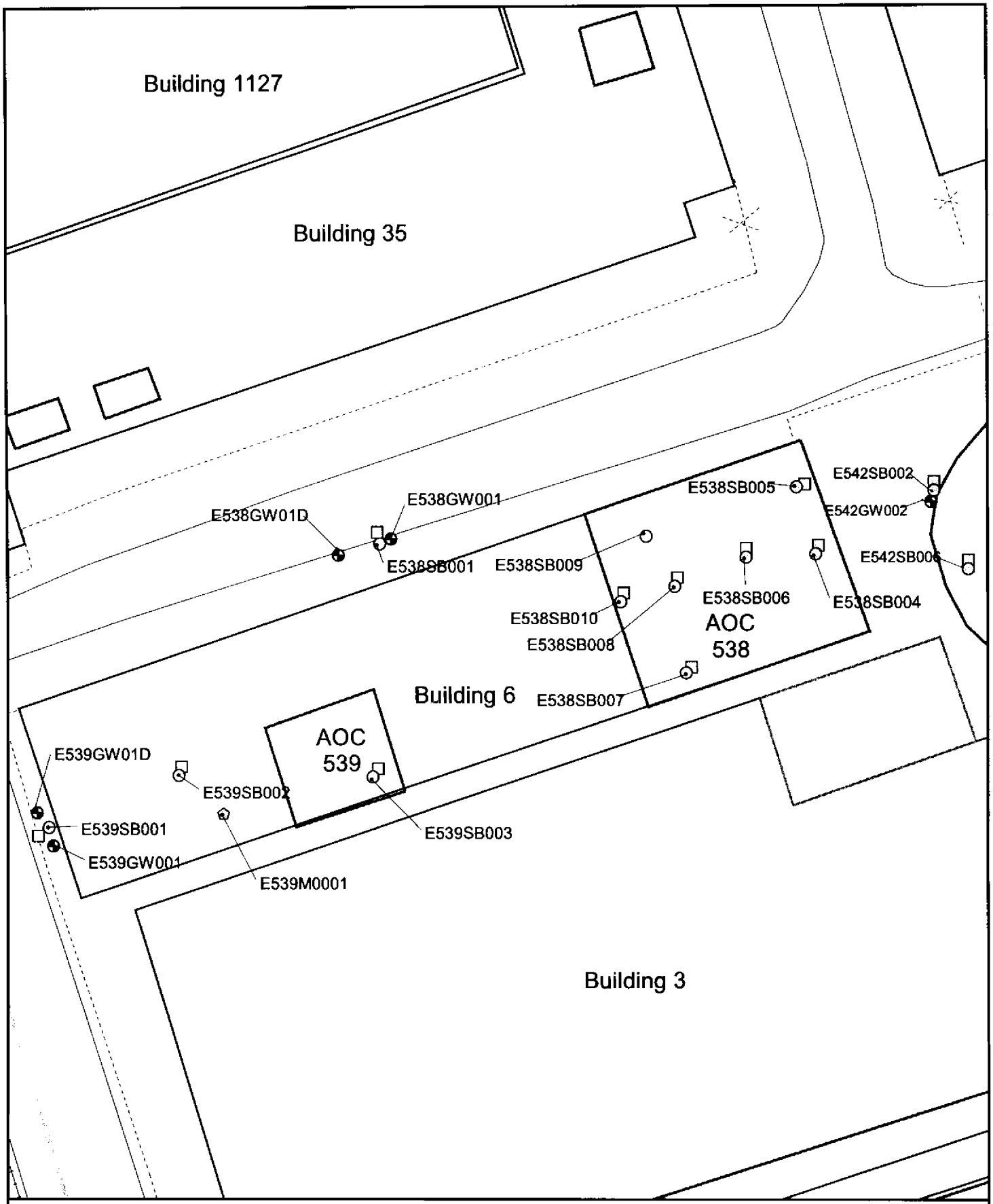
The FRE did not address wipe samples at AOCs 538 and 539.

2.6.4 Air Samples

The FRE did not address air samples at AOCs 538 and 539.

2.7 RFI Conclusions and Recommendations

The *Zone E RFI Report, Revision 0* recommended that a Corrective Measures Study (CMS) be conducted for the surface soil COC (BEQs), shallow groundwater COC (arsenic), and deep groundwater COC (thallium) at AOCs 538 and 539.



Surface Soil Sample
Subsurface Soil Sample
Groundwater Well
Sediment Sample
Railroads
Fence
SWMU Boundary
AOC Boundary
Zone Boundary
Roads
Buildings

N

0 40 80 Feet

1 inch = 50 feet

Figure 2-1
RFI Sample Locations
AOCs 538 and 539, Zone E
Charleston Naval Complex

CH2MHILL

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Section 3.0

3.0 Interim Measures and UST/AST Removals

3.1 UST/AST Removals

Two 2,500-gallon USTs, 6A and 6B, which supplied #2 fuel oil to Building 6 and Building 226 (which is associated with AOC 542), were removed in May 1996. On March 1, 2001, SCDHEC approved the CAP for remediation of soil and groundwater contaminated by the former USTs.

The UST removal effort will be described as part of the RFI Report Addendum for the Combined SWMU 23 site (SWMUs 23 and 63 and AOCs 540, 541, 542 and 543).

3.2 Interim Measures

In 1998 the DET conducted an IM to remove sediments present in the storm drains and associated piping at the CNC. As a result, the sediments that were present in the floor drain at AOC 539 are no longer present at this site.

The IM activities are documented in a report titled *Interim Measure Completion Report for AOC 699 Storm Drain Cleaning* (DET, 1999).

Section 4.0

4.0 Summary of Additional Investigations

No additional investigations have been conducted at AOCs 538 and 539 since the RFI field investigations conducted by EnSafe during the period of 1995-1997.

Section 5.0

5.0 COPC/COC Refinement

The *Zone E RFI Report, Revision 0* (EnSafe, 1997) did not identify any COCs for the industrial land use scenario. Therefore the site is suitable immediate for use under an industrial scenario. For the unrestricted (i.e., residential) future land use scenario, BEQs in surface soil, arsenic in shallow groundwater, and thallium in deep groundwater were identified as COCs for AOCs 538 and 539 during the RFI. Each of these chemicals is further discussed in this section to facilitate site closeout.

In addition, the BCT has agreed that soil VOC data will be re-screened against generic SSLs with a DAF of 1. This re-screening is also discussed in this section.

5.1 COCs in Soil

5.1.1 BEQs

It was reported in the *Zone E RFI Report, Revision 0* (EnSafe, 1997) that among detected SVOC compounds, elevated BEQ concentrations were detected at four surface soil sample locations. The calculated BEQ values for all site samples ranged from 280 µg/kg to 917 µg/kg, as shown in Table 5-1. While these detections exceeded the benzo[a]pyrene residential RBC of 88 µg/kg, they were below the industrial RBC of 780 µg/kg for benzo[a]pyrene and the CNC BEQ site-wide reference concentration of 1,304 µg/kg for surface soil. All the samples were collected from soil under concrete/asphalt pavement, which could be could be a source of the detected BEQs. Direct exposure to soils with these BEQ concentrations is not a concern in this highly industrialized area of Zone E. For these reasons, BEQs are not considered COCs for surface soil at this site.

5.1.2 Soil VOC Screening using SSL at DAF=1

Soil VOC detections were compared to SSLs at DAF=1, and only one chemical, methylene chloride, exceeded this screening criteria. Methylene chloride was detected in only one of ten surface soil samples and one of nine subsurface soil samples. These detections do not represent a widespread distribution of methylene chloride. There were no methylene chloride detections in groundwater samples collected from monitoring wells surrounding the perimeter of AOCs 538 and 539, indicating that methylene chloride in soil at this site does not pose a threat to groundwater via leaching.

Detections of methylene chloride were 2 µg/kg in surface soil at E538SB010, and 4 µg/kg in subsurface soil at E538SB010, above the SSL (DAF=1) of 1 µg/kg, as shown in Table 5-1 . However, methylene chloride is considered a common laboratory artifact or contaminant by the *EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February 1994). It is unlikely to be associated with site operations at AOCs 538 and 539.

Methylene chloride was detected in three of the laboratory blank samples associated with the AOCs 538 and 339 sample data group (SDG 23359) at concentrations ranging from 1 µg/kg to 4 µg/kg. Methylene chloride is a recognized common laboratory contaminant and has been widely detected previously in many blanks associated with CNC samples. Based on EPA's "ten times rule", methylene chloride at concentrations up to 40 parts per billion (ppb) may be considered as possible laboratory contamination. Because of its presence at relatively low concentrations in the laboratory blanks and two site samples, it is likely that methylene chloride is detected due to contamination as a laboratory contaminant and therefore is not considered a site COC.

For these reasons, methylene chloride is not considered a COC for surface or subsurface soil at this site.

5.2 COCs in Shallow Groundwater

5.2.1 Arsenic

The RFI report considered arsenic as a COC based on the detections of arsenic above the tap water RBC (0.045 µg/L) and Zone E BRC (18.7 µg/L) in shallow groundwater at AOCs 538 and 539. Arsenic was detected during four RFI sampling events at concentrations ranging from 53.1 µg/L to 67.0 µg/L at E538GW001, which exceeded its MCL of 50 µg/L. However, these detections are below the maximum Zone E background concentration in shallow groundwater for arsenic of 316 µg/L.

It should also be noted that the iron and manganese concentrations in this well are elevated, as shown in Figure 5-1 and Table 5-2. Iron concentrations range from 5,790 µg/L to 8,960 µg/L and manganese concentrations range from 50.8 µg/L to 75.5 µg/L. These data suggest that iron-reducing conditions are present at the site and influencing the arsenic concentrations. Elevated arsenic concentrations in groundwater at the CNC have previously been shown to be correlated with elevated iron concentrations at the CNC, as described in the document *Technical Memorandum, An Overview of Arsenic Geochemistry, Terminal Electron Accepting Processes in GW Systems, and Implications for the CNC Hydrogeologic Environment,*

(CH2M-Jones, 2001). As discussed in the referenced document, the elevated arsenic at this site is attributed to natural geochemical processes at this site.

For these reasons, arsenic is not considered a COC for shallow groundwater at AOCs 538 and 539.

5.3 COCs in Deep Groundwater

5.3.1 Thallium

The RFI report identified thallium as a COC for deep groundwater, based on detections ranging from 2.8 µg/L to 3.9 µg/L, at E539GW01D and E538GW01D respectively, that exceeded the thallium MCL of 2 µg/L during the third RFI sampling event. RFI groundwater sampling results for AOCs 538 and 539 are shown in Table 5-2. None of the thallium detections exceeded the maximum Zone E background concentration in deep groundwater for thallium of 163 µg/L. Intermittent detections of thallium at the site in groundwater do not point to a site-specific source, but can be attributed to natural occurrence. Thallium was also not present in site soils at elevated concentrations, indicating that no known source or significant release of thallium is present at the site. For these reasons, thallium is not considered a COC for deep groundwater at AOCs 538 and 539.

5.4 COC Summary

No COCs for the unrestricted or industrial land use scenario that require further action are identified at AOCs 538 and 539.

TABLE 5-1
Detected Concentrations of BEQs and Methylene Chloride in Surface and Subsurface Soil
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Result (µg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC	SSL (DAF=1)	Zone E Background Range of Conc.
BEQs [a]	**Surface Soil**					88	NA	1,304
	E538SB001	538SB00101	832	U	11/07/1995			
	E538SB004	538SB00401	844	U	08/28/1995			
	E538SB005	538SB00501	820	U	08/28/1995			
	E538SB006	538SB00601	1,271	U	08/28/1995			
	E538SB007	538SB00701	639	=	08/28/1995			
	E538SB008	538SB00801	917	=	08/28/1995			
	E538SB009	538SB00901	936	U	08/28/1995			
	E538SB010	538SB01001	797	U	08/28/1995			
	E539SB001	539SB00101	809	U	10/13/1995			
	E539SB002	539SB00201	280	=	08/29/1995			
	E539SB003	539SB00301	450	=	08/29/1995			
	Subsurface Soil					88	NA	1,400
	E538SB001	538SB00102	855	U	11/07/1995			
	E538SB004	538SB00402	832	U	08/28/1995			
	E538SB005	538SB00502	797	U	08/28/1995			
	E538SB006	538SB00602	820	U	08/28/1995			
	E538SB007	538SB00702	797	U	08/28/1995			
	E538SB008	538SB00802	787	=	08/28/1995			
	E538SB010	538SB01002	797	=	08/28/1995			
	E539SB001	539SB00102	832	U	10/13/1995			
	E539SB002	539SB00202	404	U	08/29/1995			
	E539SB003	539SB00302	261	=	08/29/1995			
	Avg. Subsurface Soil BEQ Conc.		**451**					
Methylene Chloride	**Surface Soil**					85	1	NA
	E539SB003	539SB00301	12	U	08/29/1995			
	E538SB009	538SB00901	26	U	08/28/1995			
	E539SB002	539SB00201	14	U	08/29/1995			
	E538SB004	538SB00401	26	U	08/28/1995			
	E538SB008	538SB00801	2	U	08/28/1995			
	E538SB010	538SB01001	**2**	J	08/28/1995			
	E538SB006	538SB00601	31	U	08/28/1995			
	E538SB007	538SB00701	32	U	08/28/1995			
	E538SB005	538SB00501	20	U	08/28/1995			
	E538SB001	538SB00101	51	U	11/07/1995			
	Subsurface Soil					85	1	NA
	E539SB002	539SB00202	12	U	08/29/1995			
	E538SB008	538SB00802	2	U	08/28/1995			
	E539SB003	539SB00302	18	U	08/29/1995			
	E538SB005	538SB00502	22	U	08/28/1995			
	E538SB007	538SB00702	5	U	08/28/1995			
	E538SB001	538SB00102	50	U	11/07/1995			

TABLE 5-1
Detected Concentrations of BEQs and Methylene Chloride in Surface and Subsurface Soil
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Result (µg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC	SSL (DAF=1)	Zone E Background Range of Conc.
Methylene Chloride	**Subsurface Soil**					85	1	NA
	E538SB006	538SB00602	17	U	08/28/1995			
	E538SB010	538SB01002	4	J	08/28/1995			
	E539SB001	539SB00102	5	U	10/13/1995			

Concentrations in bold text and outlined within the table exceed screening criteria.

[a] BEQ calculation method based on background PAHs study report, technical information for development of background BEQ values (Ch2m-Jones, February 2001).

Average concentrations were calculated by using the full value of the detected concentrations and half the detection limit for sample results with U or UJ qualifiers.

= Indicates that the analyte was detected at the concentration shown.

J Indicates an estimated value. One or more quality control (QC) parameters were outside control limits or the value was detected below the laboratory's quantification limit.

U Indicates that the concentration was not detected.

TABLE 5-2
Arsenic, Iron, Manganese, and Thallium in Groundwater
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

		Arsenic		Iron		Manganese		Thallium	
Location	Sample Collection Date	Concentration (µg/L)	Qualifier	Concentration (µg/L)	Qualifier	Concentration (µg/L)	Qualifier	Concentration (µg/L)	Qualifier
MCL		50		NA		NA		2	
EPA Region III Tap Water RBC (HI=0.1)		0.045		1,100		73		0.26	
E538GW001	04/29/1996	**60.10**	=	8,960	J	74.5	J	5.00	U
E538GW001	08/06/1996	**67.00**	=	7,200	=	75.5	J	**3.80**	J
E538GW001	12/09/1996	**53.10**	=	5,790	J	50.8	=	2.70	UJ
E538GW001	02/24/1997	**56.70**	=	7,690	=	62	=	5.00	U
E539GW001	04/29/1996	5.00	U	498	J	4.1	U	5.00	U
E539GW001	07/29/1996	2.50	U	2,010	=	7.6	J	3.90	UJ
E539GW001	12/13/1996	2.50	U	2,790	=	3.9	J	**3.50**	J
E539GW001	02/27/1997	2.10	UJ	861	=	2.3	J	5.00	U
E538GW001D	04/29/1996	6.80	U	3,860	J	110	J	5.00	U
E538GW001D	08/06/1996	3.80	J	3,270	=	103	J	2.70	U
E538GW001D	12/09/1996	3.20	J	3,300	J	132	=	**3.90**	J
E538GW001D	02/24/1997	4.20	J	3,200	=	124	=	5.00	U
E539GW001D	04/29/1996	5.00	U	1,860	J	189	J	5.00	U
E539GW001D	07/29/1996	2.50	U	1,770	=	192	=	2.90	UJ
E539GW001D	12/13/1996	2.50	U	1,770	=	215	J	**2.80**	J
E539GW001D	02/27/1997	2.10	UJ	2,290	=	189	=	5.00	U

TABLE 5-2
Arsenic, Iron, Manganese, and Thallium in Groundwater
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

		Arsenic		Iron		Manganese		Thallium	
Location	**Sample Collection Date**	**Concentration (µg/L)**	**Qualifier**	**Concentration (µg/L)**	**Qualifier**	**Concentration (µg/L)**	**Qualifier**	**Concentration (µg/L)**	**Qualifier**
MCL		50		NA		NA		2	
EPA Region III Tap Water RBC (HI=0.1)		0.045		1,100		73		0.26	

Concentrations in bold and outlined text exceed the appropriate screening criteria.

= Indicates that the analyte is detected at the concentration shown.

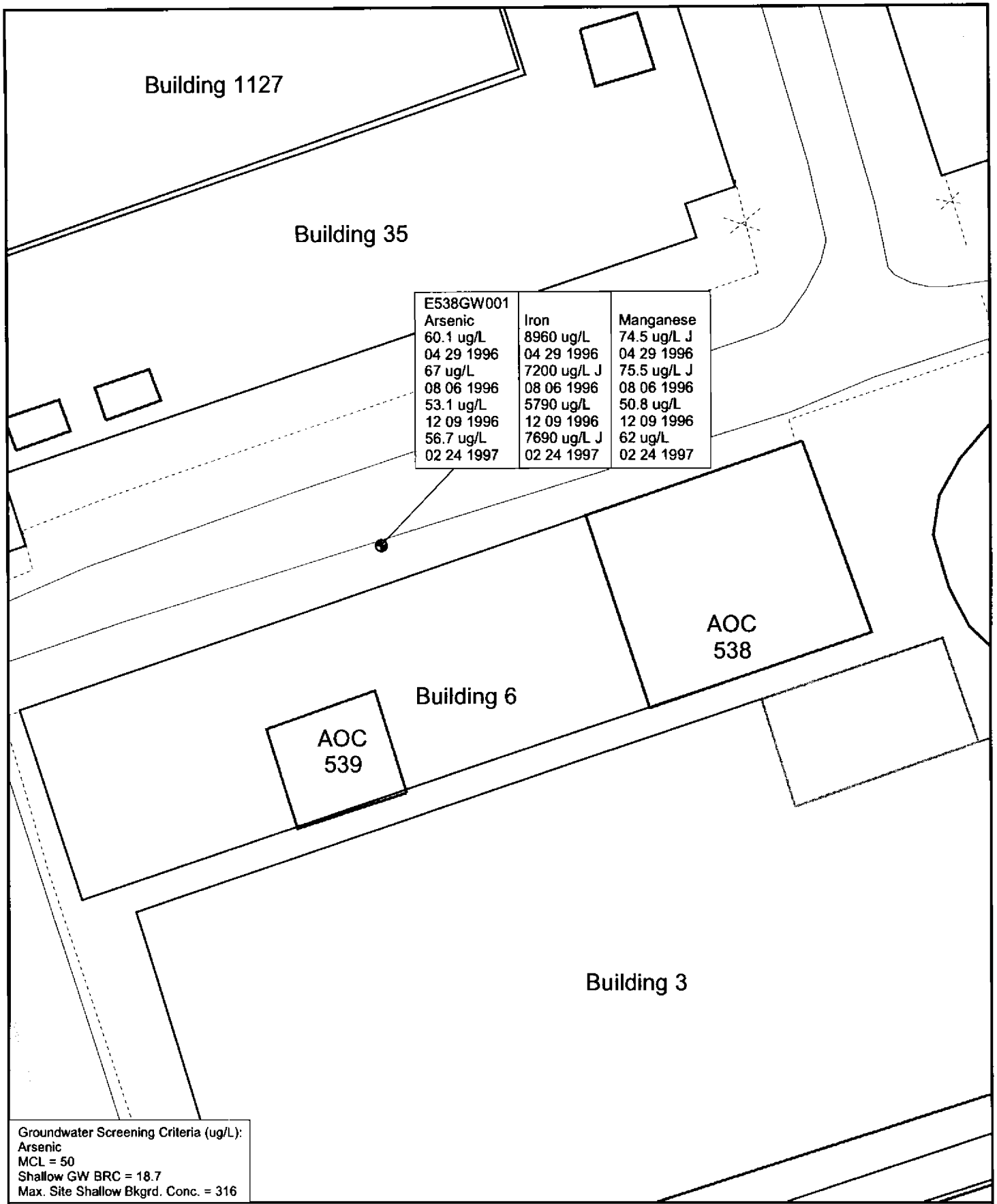
HI Hazard index

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

µg/L micrograms per liter

NA Screening criteria not available for the referenced compound.

U Indicates analyte not detected above laboratory detection limit.



Groundwater Monitoring Well
Railroads
Fence
Roads
AOC Boundary
Buildings
SWMU Boundary
Zone Boundary

N

0 40 80 Feet

1 inch = 50 feet

Figure 5-1
Arsenic, Iron, and Manganese
Detections in Groundwater
AOCs 538 and 539, Zone E
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_E\aocs-538-539-cnc-egis apr, Date: 10 Sep 2002 9:41, User: TWILEY

Section 6.0

6.0 Summary of Information Related to Site Closeout Issues

6.1 RFI Status

The *Zone E RFI Report, Revision 0* (EnSafe, 1997) addressed Solid Waste Management Units (SWMUs)/AOCs within Zone E of the CNC, including AOCs 538 and 539. With the completion of this RFI Report Addendum, the RFI is considered complete.

The remaining subsections address the issues that the BCT agreed to evaluate prior to site closeout.

6.2 Presence of Inorganics in Groundwater

For the purpose of site closeout documentation, the inorganics in groundwater issue refers to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and antimony) in groundwater at concentrations above the applicable MCL, preceded or followed by detections of these same metals below the MCL or below the practicable quantitation limit.

There were no detections of antimony in shallow or deep wells above the laboratory detection limits. Arsenic was not detected above its MCL deep wells. Arsenic detections in shallow groundwater wells exceeded the MCL during four RFI sampling events. However, these detections did not exceed the site background range of 0.8 µg/L to 316 µg/L for arsenic in shallow groundwater. Table 5-2 shows arsenic concentrations from the RFI groundwater sampling at AOCs 538 and 539.

During the RFI, two detections in shallow groundwater and two detections in deep groundwater exceeded the MCL for thallium. However, none of these detections exceeded their respective shallow and deep groundwater BRCs or site background concentrations. Intermittent detections of thallium at the site in shallow and deep groundwater do not point to a site-specific source, but can be attributed to natural occurrence. Table 5-2 shows thallium concentrations from the RFI groundwater sampling at AOCs 538 and 539. Further evaluation of this issue is not warranted.

6.3 Potential Linkage to SWMU 37, Investigated Storm Sewers at the CNC

Wastewater and sanitary wastes from this facility are discharged to the North Charleston Sewer District sanitary sewer system. There are no data suggesting that there was an impact to the sanitary sewers from this site. Therefore, further evaluation of this issue is not warranted.

6.4 Potential Linkage to AOC 699, Investigated Sanitary Sewers at the CNC

No COCs requiring further evaluation are present at this site and there are no data suggesting an impact to the investigated storm sewers at this site from site-related activities. Based on these findings, further evaluation of this issue is not warranted.

6.5 Potential Linkage to AOC 504, Investigated Railroad Lines at the CNC

The nearest existing railroad line to AOCs 538 and 539 is approximately 140 feet southwest of the site. There is no known linkage between AOCs 538 and 539 and the investigated railroad lines of AOC 504. Therefore, further evaluation of this issue is not warranted.

6.6 Potential Migration Pathways to Surface Water Bodies at the CNC

The nearest surface water body to AOCs 538 and 539 is the Cooper River, which lies approximately 600 feet southeast of the site. The only potential migration pathway from the site to surface water is via overland flow via stormwater runoff. The entire site is covered with buildings and pavement, which eliminates contact of surface soil with stormwater. Similarly, runoff directed to the storm sewer system, which discharges to the Cooper River, does not contact the surface soil. Since no COCs requiring further evaluation are present at this site, no further evaluation of a potential pathway for contaminant migration via stormwater runoff is warranted.

The potential for groundwater contamination associated with AOCs 538 and 539 to enter the Cooper River will be addressed when groundwater is addressed on an installation wide level in a later document.

6.7 Potential Contamination in Oil/Water Separators (OWSs)

There are no OWSs associated with AOCs 538 and 539. In addition, there is no reference to an OWS at the site in the *Oil Water Separator Data* report, Department of the Navy, September 2000. Therefore, further evaluation of this issue is not warranted.

6.8 Land Use Controls (LUCs)

The CNC BCT has agreed that all of Zone E will have at least some LUCs and restrictions. At a minimum, these LUCs are likely to include restrictions against residential land use. Screening conducted using current screening criteria adopted by the BCT did not identify any COCs in soil or groundwater at AOCs 538 and 539 for an unrestricted land use scenario. Therefore, LUCs are not necessary at this site.

Section 7.0

7.0 Recommendations

AOC 538, a former forge shop constructed in 1906, is located in the eastern portion of Building 6. Various metal-working processes were conducted in the shop. The most recent forge furnaces were oil-fired. Numerous quench oil tanks are present. AOC 539, a former propeller shop, is located in the western extension of Building 6, which was added in 1967. The Zyglo process was used here until it was replaced by the red dye process in 1979. Zyglo reportedly was rinsed from the propellers onto the floor and then washed outside into the storm sewer. Subsequent operations used a red dye magnaflux process, the excess waste of which was collected in a portable AST. Building 6 has been subleased to Solution Technologies.

The *Zone E RFI Report, Revision 0* (EnSafe, 1997) identified BEQs in surface soils, arsenic in shallow groundwater, and thallium in deep groundwater as COCs for the AOCs 538 and 539 site. However, further evaluation of COPCs as presented in this RFI Report Addendum, concludes that there are no soil or groundwater COCs at the site. Therefore, no corrective action is necessary, and this site is recommended for NFA.

Once the BCT concurs that NFA is appropriate for the site, a Statement of Basis will be prepared that will be made available for public comment in accordance with SCDHEC policy. This will allow for public participation in the final remedy selection.

Section 8.0

8.0 References

CH2M-Jones. *Technical Memorandum: A Summary of Inorganic Chemical Concentrations in Background Soil and Groundwater at the CNC*. 2001.

EnSafe Inc./Allen & Hoshall. *Final RCRA Facility Assessment, NAVBASE Charleston*. July 1995.

EnSafe Inc./Allen & Hoshall. *Final Zone E RFI Work Plan, Revision 1, NAVBASE Charleston*. June 1995.

EnSafe Inc. *Zone E RFI Report, Revision 0, NAVBASE Charleston*. 1997.

SCDHEC. *Underground Storage Tank Asessment Report, Site # 12094, Charleston Naval Base Complex, CNSY Building 6*. May 15, 1996.

South Carolina Department of Health and Environmental Control, Final RCRA Part B Permit No. SC0 170 022 560.

U.S. EPA. *Contract Laboratory Program National Functional Guidelines for Organic Data Review*. OSWER, EPA/540/R-94/012-013, February 1994.

U.S. Naval Detachment. *Interim Measure Completion Report for AOC 699 Storm Drain Cleaning*. March 1999.

Appendix A

Comment Prepared by Charles B. Watson

AOCs 538 and 539

SCDHEC Comment 16:
Line 12 on page 10.23-2 states "AOC 538 will not include soil samples from 538002 and 538003. The Department does not agree with this exclusion. Please include this information in the revision and also include their locations on the site map.

Navy/EnSafe Response:
Please refer to Section 10.4.1, Figure 10.4.1, page 10.4-3 in Volume III of this report. Sample locations 542SB002 and 542SB006 for AOC 542 are the same locations which were proposed for sample locations 538SB002 and 538SB003 for AOC 538. Therefore, due to the proximity of these 2 sites, these locations were designated with an AOC 542 identification. Analytical results from these 2 locations were taken into consideration during the interpretation of nature and extent of contamination at AOC 538. The Final Zone E RFI Report will be revised to clarify this statement.

CH2M-Jones Response:
Analytical results from soil sampling locations 542SB002 and 542SB006 were evaluated in Section 10.4 of the RFI report for SWMUs 23 and 63, and AOCs 540, 541, 542, and 543. Aroclor-1254, detected at a concentration of 1,200 µg/kg at surface soil boring 542SB006, was identified as a COPC for both residential and industrial/commercial future land use scenarios in the RFI report but it was not retained as a COC. Lead and BEQs were identified as surface soil COCs at this combined SWMU 23 site. Lead and BEQ concentrations detected at soil sampling locations 542SB002 and 542SB006 did not exceed the RFI screening criteria. See Appendix A of this RFIRA for the data summary table for 542SB002 and 542SB006 soil samples collected during the RFI. Sampling locations 542SB002 and 542SB006 are included in Fig 2-1 of this RFI Report Addendum.

Comments Prepared by Eric F. Cathcart

AOCs 538 and 539

SCDHEC Comment 43:
The first paragraph on page 10.23-1 makes note of a "quench oil tank". Please describe the tank and its' function (ie., size, capacity, leak detection system). The sampling parameters should be evaluated to determine if they can detect a release from the tank.

Navy/EnSafe Response:
The dimensions of the tank are not known but it was used a dip tank for cooling hot steel and it did not have a leak detection system. Sample locations were placed in areas surrounding the tank. The analytical parameters for samples at this site included VOCs and SVOCs, which

SCDHEC Comment 73:
Semi-volatiles were not sampled for rounds 2, 3 or 4 in AOC 538 (538GW001 and 538GW01D). Please explain.

Navy/EnSafe Response:
Groundwater samples were analyzed for SVOCs in the 1st and 2nd rounds but were not in the 3rd and 4th rounds of sampling. Additional samples will be collected and analyzed for SVOCs and these results will be included in the Final Zone E RFI Report.

CH2M-Jones Response:
Groundwater in the vicinity of this well pair will be sampled as part of the CAP, and will be addressed under the UST program.

Appendix B

Chemicals Detected in Zone E Soil Samples
AOC 538

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
Volatile Organic Compounds (ug/kg)						
Acetone	538SB004	38.00	34.00	780000	NA	NA
	538SB005	37.00	36.00			
	538SB006	44.00	37.00			
	538SB007	52.00	22.00			
	538SB008	20.00	17.00			
	538SB009	120.00	NS			
	538SB010	71.00	24.00			
Methylene chloride	538SB010	2.00	4.00	85000	NA	NA
Xylene (Total)	538SB004	ND	2.00	16000000	NA	NA
	538SB007	2.00	ND			
Semi-volatile Compounds (ug/kg)						
2-Methylnaphthalene	538SB004	ND	220.00	NA	NA	NA
	538SB007	450.00	ND			
Benzo(a)anthracene	538SB008	480.00	57.00	880	NA	NA
Benzo(a)pyrene	538SB007	150.00	ND	88	NA	NA
	538SB008	450.00	ND			
Benzo(b)fluoranthene	538SB008	ND	114.00	880	NA	NA
Benzo(g,h,i)perylene	538SB007	120.00	ND	310	NA	NA
	538SB008	400.00	44.00			
Benzo(k)fluoranthene	538SB007	140.00	ND	8800	NA	NA
	538SB008	740.00	127.00			
bis(2-Ethylhexyl)phthalate (BEHP)	538SB008	81.00	ND	4600	NA	NA
	538SB009	100.00	NS			
	538SB010	160.00	120.00			
Chrysene	538SB007	200.00	ND	88000	NA	NA
	538SB008	540.00	82.00			
	538SB010	ND	150.00			
Fluoranthene	538SB008	690.00	125.00	3100000	NA	NA
Indeno(1,2,3-cd)pyrene	538SB008	320.00	37.00	880	NA	NA
Naphthalene	538SB004	ND	260.00	310000	NA	NA
	538SB007	470.00	ND			
	538SB010	ND	130.00			
Phenanthrene	538SB007	210.00	ND	310000	NA	NA
	538SB008	220.00	ND			
Pyrene	538SB008	650.00	160.00	230000	NA	NA
Dioxin/Dibenzofuran (ng/kg)						
1234678-HpCDD	538CB008	NS	72.30	NA	NA	NA
1234678-HpCDF	538CB008	NS	7.34	NA	NA	NA
123678-HxCDD	538CB008	NS	0.88	NA	NA	NA
123789-HxCDD	538CB008	NS	0.96	NA	NA	NA
OCDD	538CB008	NS	807.31	NA	NA	NA
OCDF	538CB008	NS	38.48	NA	NA	NA
Total Hepta-Dioxins	538CB008	NS	583.67	NA	NA	NA
Total Hepta-Furans	538CB008	NS	28.57	NA	NA	NA
Total Hexa-Dioxins	538CB008	NS	22.91	NA	NA	NA
Total Hexa-Furans	538CB008	NS	4.26	NA	NA	NA

Chemicals Detected in Zone E Soil Samples
AOC 538

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
Inorganic Compounds (mg/kg)						
Aluminum (Al)	538SB001	2150.00	4030.00	7800	26000	41100
	538SB004	3750.00	4100.00			
	538SB005	4630.00	3150.00			
	538SB006	2940.00	3650.00			
	538SB007	4880.00	1850.00			
	538SB008	4450.00	3720.00			
	538SB009	7400.00	NS			
	538SB010	4430.00	2670.00			
Antimony (Sb)	538SB009	0.63	NS	3.1	1.77	1.6
Arsenic (As)	538SB001	1.70	0.91	0.43	23.9	19.9
	538SB004	2.00	1.80			
	538SB005	1.40	0.70			
	538SB006	0.99	1.20			
	538SB007	5.30	0.81			
	538SB008	1.20	1.04			
	538SB009	5.30	NS			
	538SB010	2.50	2.30			
Barium (Ba)	538SB001	8.90	18.80	550	130	94.1
	538SB004	13.20	13.50			
	538SB005	17.70	8.70			
	538SB006	5.40	6.00			
	538SB007	27.50	7.50			
	538SB008	17.50	12.60			
	538SB009	22.20	NS			
	538SB010	14.00	8.80			
Beryllium (Be)	538SB001	0.20	0.17	0.15	1.7	2.71
	538SB004	0.16	0.22			
	538SB005	0.14	0.18			
	538SB007	0.15	ND			
	538SB008	0.11	0.18			
	538SB009	0.20	NS			
	538SB010	0.15	0.13			
Cadmium (Cd)	538SB001	0.31	0.23	3.9	1.5	0.96
	538SB007	3.70	ND			
	538SB008	ND	1.38			
Calcium (Ca)	538SB001	146000.00	12800.00	NA	NA	NA
	538SB004	3050.00	622.00			
	538SB005	1360.00	255.00			
	538SB006	4460.00	1110.00			
	538SB007	1290.00	153.00			
	538SB008	882.00	921.00			
	538SB009	2560.00	NS			
	538SB010	4030.00	427.00			
Chromium (Cr)	538SB001	4.50	3.70	39	94.6	75.2
	538SB004	5.10	4.60			
	538SB005	4.70	1.80			
	538SB006	3.80	4.40			
	538SB007	12.10	2.30			
	538SB008	4.70	2.90			

Chemicals Detected in Zone E Soil Samples
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Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	538SB009	19.90	NS			
	538SB010	6.40	5.40			
Cobalt (Co)	538SB001	0.51	0.36	470	19	14.9
	538SB004	3.90	0.52			
	538SB005	1.80	ND			
	538SB006	0.22	0.49			
	538SB007	4.40	ND			
	538SB008	0.46	0.32			
	538SB009	4.70	NS			
	538SB010	1.90	ND			
Copper (Cu)	538SB001	15.10	14.20	310	66	152
	538SB004	3.90	10.80			
	538SB005	25.80	ND			
	538SB006	1.80	1.50			
	538SB007	103.00	1.10			
	538SB008	15.30	3.65			
	538SB009	1.60	NS			
	538SB010	4.00	ND			
Iron (Fe)	538SB001	1770.00	1210.00	2300	NA	NA
	538SB004	4360.00	5060.00			
	538SB005	2840.00	1580.00			
	538SB006	1690.00	2020.00			
	538SB007	14900.00	2190.00			
	538SB008	1930.00	2195.00			
	538SB009	17000.00	NS			
	538SB010	5430.00	6650.00			
Lead (Pb)	538SB001	19.00	8.30	400	265	173
	538SB004	8.80	15.80			
	538SB005	14.70	2.80			
	538SB006	2.30	2.40			
	538SB007	116.00	1.40			
	538SB008	10.00	8.40			
	538SB009	7.50	NS			
	538SB010	10.10	5.00			
Magnesium (Mg)	538SB001	1440.00	248.00	NA	NA	NA
	538SB004	195.00	149.00			
	538SB005	174.00	88.10			
	538SB006	145.00	143.00			
	538SB007	292.00	86.90			
	538SB008	134.00	139.00			
	538SB009	495.00	NS			
	538SB010	312.00	110.00			
Manganese (Mn)	538SB001	105.00	16.10	180	302	881
	538SB004	17.40	24.70			
	538SB005	18.20	15.40			
	538SB006	11.80	5.50			
	538SB007	104.00	10.40			
	538SB008	18.10	22.10			
	538SB009	36.00	NS			
	538SB010	21.30	12.40			

Chemicals Detected in Zone E Soil Samples
AOC 538

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
Mercury (Hg)	538SB001	0.09	0.02	2.3	2.6	1.59
Nickel (Ni)	538SB001	3.00	2.60	160	77.1	57
	538SB004	1.50	1.30			
	538SB005	4.60	ND			
	538SB006	2.10	1.70			
	538SB007	65.60	ND			
	538SB008	10.20	2.30			
	538SB009	4.90	NS			
	538SB010	3.90	ND			
Potassium (K)	538SB001	500.00	300.00	NA	NA	NA
	538SB004	456.00	112.00			
	538SB005	ND	63.20			
	538SB006	223.00	105.00			
	538SB007	653.00	28.90			
	538SB008	265.00	192.00			
	538SB009	933.00	NS			
	538SB010	524.00	54.20			
Selenium (Se)	538SB008	ND	0.53	39	1.7	2.4
Silver (Ag)	538SB008	ND	0.21	39	NA	NA
Sodium (Na)	538SB001	111.00	29.20	NA	NA	NA
	538SB004	111.00	ND			
	538SB005	114.00	ND			
	538SB008	141.00	ND			
	538SB009	165.00	NS			
	538SB010	218.00	ND			
Thallium (Tl)	538SB008	ND	0.53	0.29	2.8	NA
Tin (Sn)	538SB007	5.90	ND	4700	59.4	9.23
	538SB008	ND	2.10			
Vanadium (V)	538SB001	2.60	2.10	55	94.3	155
	538SB004	7.00	5.70			
	538SB005	3.60	1.80			
	538SB006	3.70	4.80			
	538SB007	17.80	2.40			
	538SB008	1.80	2.40			
	538SB009	29.20	NS			
	538SB010	7.60	10.60			
Zinc (Zn)	538SB001	24.10	96.30	2300	827	886
	538SB004	7.50	10.20			
	538SB005	42.30	2.50			
	538SB006	9.80	5.30			
	538SB007	1100.00	7.80			
	538SB008	19.60	314.50			
	538SB009	25.10	NS			
	538SB010	12.00	2.70			

Notes:
ND: Not Detected
NS: No Sample Taken/Sample Not Analyzed
NA: Not applicable
For compounds detected in both the primary and duplicate sample, the concentration for both

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *

detections are averaged and listed as one detection.

For compounds that were detected in only one of the primary or duplicate sample, the value of the detection was used.

* Surface soil samples will be used for human health risk assessment for the Zone E report.

Chemicals Detected in Zone E Soil Samples
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Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
Volatile Organic Compounds (ug/kg)						
Acetone	539SB003	ND	15.00	780000	NA	NA
Xylene (Total)	539SB002	ND	2.00	16000000	NA	NA
Semi-volatile Compounds (ug/kg)						
2-Methylnaphthalene	539SB003	44.00	73.00	NA	NA	NA
Acenaphthene	539SB003	160.00	ND	470000	NA	NA
Anthracene	539SB003	140.00	ND	23000000	NA	NA
Benzo(a)anthracene	539SB002	60.00	ND	880	NA	NA
	539SB003	220.00	45.00			
Benzo(a)pyrene	539SB002	71.00	ND	88	NA	NA
	539SB003	210.00	40.00			
Benzo(b)fluoranthene	539SB002	62.00	ND	880	NA	NA
Benzo(g,h,i)perylene	539SB002	71.00	ND	310000	NA	NA
	539SB003	140.00	37.00			
Benzo(k)fluoranthene	539SB002	50.00	ND	8800	NA	NA
	539SB003	220.00	49.00			
Chrysene	539SB002	88.00	ND	88000	NA	NA
	539SB003	230.00	61.00			
Dibenzofuran	539SB003	160.00	ND	31000	NA	NA
Fluoranthene	539SB001	ND	130.00	3100000	NA	NA
	539SB002	93.00	ND			
	539SB003	580.00	87.00			
Fluorene	539SB003	140.00	95.00	310000	NA	NA
Indeno(1,2,3-cd)pyrene	539SB002	58.00	ND	880	NA	NA
	539SB003	120.00	ND			
Phenanthrene	539SB002	64.00	ND	310000	NA	NA
	539SB003	830.00	190.00			
Pyrene	539SB001	ND	120.00	230000	NA	NA
	539SB002	150.00	ND			
	539SB003	490.00	95.00			
bis(2-Ethylhexyl)phthalate (BEHP)	539SB002	190.00	65.00	4600	NA	NA
	539SB003	80.00	150.00			
Inorganic Compounds (mg/kg)						
Aluminum (Al)	539SB001	2930.00	2690.00	7800	26000	41100
	539SB002	3260.00	2640.00			
	539SB003	3000.00	3030.00			
Arsenic (As)	539SB001	0.55	0.95	0.43	23.9	19.9
	539SB002	1.50	1.90			
	539SB003	1.20	1.70			
Barium (Ba)	539SB001	8.30	11.80	550	130	94.1
	539SB002	10.50	7.90			
	539SB003	9.60	17.60			
Beryllium (Be)	539SB002	0.12	0.13	0.15	1.7	2.71
Cadmium (Cd)	539SB003	0.22	0.27	3.9	1.5	0.96
Calcium (Ca)	539SB001	384.00	519.00	NA	NA	NA
	539SB002	3000.00	746.00			
	539SB003	1100.00	1940.00			
Chromium (Cr)	539SB001	45.40	4.50	39	94.6	75.2

Chemicals Detected in Zone E Soil Samples
AOC 539

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	539SB002	3.40	3.40			
	539SB003	3.50	4.00			
Cobalt (Co)	539SB001	0.56	0.40	470	19	14.9
	539SB002	0.52	0.27			
	539SB003	0.74	1.20			
Copper (Cu)	539SB001	1.50	1.30	310	66	152
	539SB002	108.00	2.40			
	539SB003	18.60	51.90			
Iron (Fe)	539SB001	1080.00	2260.00	2300	NA	NA
	539SB002	2770.00	2650.00			
	539SB003	1720.00	2180.00			
Lead (Pb)	539SB001	2.00	2.40	400	265	173
	539SB002	13.80	6.40			
	539SB003	19.70	53.70			
Magnesium (Mg)	539SB001	1170.00	170.00	NA	NA	NA
	539SB002	181.00	135.00			
	539SB003	141.00	194.00			
Manganese (Mn)	539SB001	5.30	22.90	180	302	881
	539SB002	19.80	8.30			
	539SB003	9.10	14.70			
Mercury (Hg)	539SB003	0.18	0.38	2.3	2.6	1.59
Nickel (Ni)	539SB001	1.30	1.00	160	77.1	57
	539SB002	5.20	ND			
	539SB003	2.10	3.20			
Sodium (Na)	539SB001	29.60	35.10	NA	NA	NA
	539SB002	ND	70.70			
Tin (Sn)	539SB003	ND	3.00	4700	59.4	9.23
Vanadium (V)	539SB001	4.10	3.60	55	94.3	155
	539SB002	4.10	5.10			
	539SB003	3.00	3.50			
Zinc (Zn)	539SB001	1.70	2.70	2300	827	886
	539SB002	33.00	2.80			
	539SB003	61.70	107.00			

Notes:
ND: Not Detected
NS: No Sample Taken/Sample Not Analyzed
NA: Not applicable
For compounds detected in both the primary and duplicate sample, the concentration for both detections are averaged and listed as one detection.
For compounds that were detected in only one of the primary or duplicate sample, the value of the detection was used.
* Surface soil samples will be used for human health risk assessment for the Zone E report.

Chemicals Detected in Zone E Groundwater Samples
AOC 538

Name	Location	Round 1 Conc.	Round 2 Conc.	Round 3 Conc.	Round 4 Conc.	RBC (THQ=.1)	UTL	MCL
Volatile Organic Compounds (ug/l)								
1,2-Dichloroethene (total)	538GW01D	3.00	6.00	6.00	6.00	5.5	NA	70
Toluene	538GW001	ND	2.00	ND	2.00	75	NA	1000
Semi-volatile Compounds (ug/l)								
2-Methylnaphthalene	538GW001	17.00	4.00	NS	NS	NA	NA	NA
Butylbenzylphthalate	538GW001	ND	2.00	NS	NS	730	NA	NA
	538GW01D	ND	2.00	NS	NS			
Fluorene	538GW001	1.00	ND	NS	NS	NA	NA	NA
Other Compounds (mg/l)								
Chloride	538GW001	ND	3.30	2.30	2.80	NA	NA	NA
	538GW01D	ND	66.80	65.90	62.80			
Sulfate	538GW001	ND	4.80	5.20	4.10	NA	NA	NA
	538GW01D	ND	21.50	23.20	21.70			
Total Dissolved Solids (TDS)	538GW001	ND	204.00	164.00	ND	NA	NA	NA
	538GW01D	ND	456.00	416.00	532.00			
Inorganic Compounds (ug/l)								
Aluminum (Al)	538GW001	ND	299.00	386.00	382.00	3700	2810	NA
	538GW01D	ND	83.10	ND	17.90		319	
Arsenic (As)	538GW001	60.10	67.00	53.10	56.70	0.05	18.7	50
	538GW01D	ND	3.80	3.20	4.20		16.4	
Barium (Ba)	538GW001	ND	4.70	3.50	5.10	260	211	2000
	538GW01D	ND	31.50	32.50	32.60		218	
Calcium (Ca)	538GW001	47900.00	49700.00	35000.00	41700.00	NA	NA	NA
	538GW01D	77400.00	75800.00	75100.00	71400.00		NA	
Copper (Cu)	538GW001	ND	ND	0.64	2.90	150	2.7	1300
	538GW01D	ND	ND	0.89	3.70		NA	
Iron (Fe)	538GW001	8960.00	7200.00	5790.00	7690.00	11000	NA	NA
	538GW01D	3860.00	3270.00	3300.00	3200.00		NA	
Magnesium (Mg)	538GW001	3970.00	3770.00	2490.00	2870.00	NA	NA	NA
	538GW01D	9830.00	9750.00	10000.00	9480.00		NA	
Manganese (Mn)	538GW001	74.50	75.50	50.80	62.00	84	2560	NA
	538GW01D	110.00	103.00	132.00	124.00		869	
Potassium (K)	538GW001	ND	8900.00	5200.00	5510.00	NA	NA	NA
	538GW01D	ND	3260.00	3650.00	3440.00		NA	
Silver (Ag)	538GW001	2.00	ND	ND	ND	18	NA	NA
	538GW01D	2.10	ND	ND	ND		NA	
Sodium (Na)	538GW001	ND	6980.00	7200.00	10100.00	NA	NA	NA
	538GW01D	ND	68300.00	71200.00	67500.00		NA	
Thallium (Tl)	538GW001	ND	3.80	ND	ND	0.29	5.4	2
Vanadium (V)	538GW001	ND	ND	1.50	2.20	26	11.4	NA
Zinc (Zn)	538GW001	ND	ND	ND	7.10	11000	27.3	NA

Notes:
ND: Not Detected
NS: No Sample Taken/Sample Not Analyzed
NA: Not applicable

Chemicals Detected in Zone E Groundwater Samples
AOC 538

Name	Location	Round 1 Conc.	Round 2 Conc.	Round 3 Conc.	Round 4 Conc.	RBC (THQ=.1)	UTL	MCL

For compounds detected in both the primary and duplicate sample, the concentration for both detections are averaged and listed as one detection.

For compounds that were detected in only one of the primary or duplicate sample, the value of the detection was used.

Chemicals Detected in Zone E Groundwater Samples
AOC 539

Name	Location	Round 1 Conc.	Round 2 Conc.	Round 3 Conc.	Round 4 Conc.	RBC (THQ=.1)	UTL	MCL
Volatile Organic Compounds (ug/l)								
1,2-Dichloroethene (total)	539GW01D	12.00	10.00	14.00	12.00	5.5	NA	70
Carbon disulfide	539GW001	2.00	ND	ND	ND	100	NA	NA
Chlorobenzene	539GW01D	ND	3.00	ND	ND	3.9	NA	NA
Trichloroethene	539GW01D	2.00	1.00	2.00	2.00	1.6	NA	5
Other Compounds (mg/l)								
Chloride	539GW001	ND	2.80	3.20	4.00	NA	NA	NA
	539GW01D	ND	63.00	59.70	58.10			
Sulfate	539GW00102		23.70	28.20	23.90	NA	NA	NA
	539GW01D	ND	28.20	29.90	28.30			
Total Dissolved Solids (TDS)	539GW001	ND	140.00	ND	192.00	NA	NA	NA
	539GW01D	ND	462.00	ND	448.00			
Inorganic Compounds (ug/l)								
Aluminum (Al)	539GW001	ND	2250.00	1160.00	501.00	3700	2810	NA
	539GW01D	ND	ND	ND	9.20		319	
Barium (Ba)	539GW001	ND	16.00	18.30	13.80	260	211	2000
	539GW01D	ND	27.30	25.60	24.90		218	
Beryllium (Be)	539GW001	ND	0.36	ND	ND	0.02	0.43	4
	539GW01D	ND	0.33	ND	ND		1.2	
Calcium (Ca)	539GW001	30700.00	19200.00	42300.00	30300.00	NA	NA	NA
	539GW01D	83400.00	76900.00	81400.00	75700.00		NA	
Chromium (Cr)	539GW001	ND	ND	ND	1.50	3700	12.3	100
Iron (Fe)	539GW001	498.00	2010.00	2790.00	861.00	1100	NA	NA
	539GW01D	1860.00	1770.00	1770.00	2290.00		NA	
Magnesium (Mg)	539GW001	3430.00	3190.00	3910.00	3320.00	NA	NA	NA
	539GW01D	9810.00	9600.00	10200.00	9660.00		NA	
Manganese (Mn)	539GW001	ND	7.60	3.90	2.30	84	2560	NA
	539GW01D	189.00	192.00	215.00	189.00		869	
Mercury (Hg)	539GW001	0.20	ND	ND	ND	1100	NA	0.002
	539GW01D	0.27	ND	ND	ND		0.2	
Potassium (K)	539GW001	ND	5360.00	7940.00	6700.00	NA	NA	NA
	539GW01D	ND	3860.00	3900.00	3980.00		NA	
Selenium (Se)	539GW001	5.90	ND	3.10	ND	18	NA	50
Sodium (Na)	539GW001	ND	6030.00	7130.00	6180.00	NA	NA	NA
	539GW01D	ND	69300.00	73300.00	66300.00		NA	
Thallium (Tl)	539GW001	ND	ND	3.50	ND	0.29	5.4	2
	539GW01D	ND	ND	2.80	ND		6.5	
Vanadium (V)	539GW001	ND	6.50	7.30	2.90	26	11.4	NA

Notes:
ND: Not Detected
NS: No Sample Taken/Sample Not Analyzed
NA: Not applicable
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NAVAL BASE CHARLESTON, SOUTH CAROLINA
CHARLESTON ZONE E
AOC 538, AOC 539

SW846-MET

SAMPLE ID ------->	538-J-F001-01		538-J-F002-01		538-J-F003-01		538-J-F004-01		538-J-F005-01		538-J-F006-01	
ORIGINAL ID ----->	538JF00101		538JF00201		538JF00301		538JF00401		538JF00501		538JF00601	
LAB SAMPLE ID --->	23346.02		23346.03		23346.04		23346.05		23346.06		23346.07	
ID FROM REPORT -->	538JF00101		538JF00201		538JF00301		538JF00401		538JF00501		538JF00601	
SAMPLE DATE ----->	08/25/95		08/25/95		08/25/95		08/25/95		08/25/95		08/25/95	
DATE EXTRACTED -->	09/11/95		09/11/95		09/11/95		09/11/95		09/11/95		09/11/95	
DATE ANALYZED --->	09/12/95		09/12/95		09/12/95		09/12/95		09/12/95		09/12/95	
MATRIX ---------->	Wipe		Wipe		Wipe		Wipe		Wipe		Wipe	
UNITS ---------->	UG/W		UG/W		UG/W		UG/W		UG/W		UG/W	
CAS # Parameter	23346	VAL	23346	VAL	23346	VAL	23346	VAL	23346	VAL	23346	VAL
7429-90-5 Aluminum (Al)	780.		600.		879.		1050.		559.		802.	
7440-36-0 Antimony (Sb)	1.2	J	0.8	U	0.88	J	0.8	U	0.8	U	0.8	U
7440-38-2 Arsenic (As)	1.5	J	1.4	J	1.8	J	2.4		2.	J	2.5	
7440-39-3 Barium (Ba)	206.		223.		288.		1180.		386.		309.	
7440-41-7 Beryllium (Be)	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
7440-43-9 Cadmium (Cd)	1.6		3.5		2.5		7.6		2.3		4.7	
7440-70-2 Calcium (Ca)	2030.	J	2340.		10000.	J	5010.	J	3330.	J	2850.	J
7440-47-3 Chromium (Cr)	25.4		19.9		29.1		64.1	J	25.8		52.7	
7440-48-4 Cobalt (Co)	1.6	J	1.3	J	3.9	J	3.2	J	2.2	J	4.	J
7440-50-8 Copper (Cu)	909.		1870.	J	813.		944.		861.		1390.	
7439-89-6 Iron (Fe)	4390.		4780.	J	4810.	J	6910.	J	7670.	J	9900.	J
7439-92-1 Lead (Pb)	117.	J	96.	J	133.	J	1050.	J	196.	J	235.	J
7439-95-4 Magnesium (Mg)	380.	J	328.	J	429.	J	512.	J	563.	J	441.	J
7439-96-5 Manganese (Mn)	62.5		114.		64.3		80.7		73.1		107.	
7440-02-0 Nickel (Ni)	228.		192.		176.	J	306.	J	204.	J	635.	
7440-09-7 Potassium (K)	357.	U	284.	U	654.	J	1080.	J	651.	J	463.	J
7782-49-2 Selenium (Se)	1.	U	1.	U	1.	U	1.	U	1.	U	1.	U
7440-22-4 Silver (Ag)	0.63	J	0.65	J	1.9	J	4.8		0.5	J	0.6	J
7440-23-5 Sodium (Na)	307.	U	384.	U	424.	U	846.	U	1010.	J	123.	U
7440-28-0 Thallium (Tl)	1.	U	1.	U	1.	U	1.	U	1.	U	1.	U
7440-62-2 Vanadium (V)	3.2	J	2.4	J	4.1	J	5.3	J	2.5	J	4.	J
7440-66-6 Zinc (Zn)	734.		497.		717.		1380.		881.		5150.	
7440-31-5 Tin (Sn)	19.4	U	18.8	U	24.9	U	27.3	U	20.7	U	26.7	U

*** Validation Complete ***

NAVAL BASE CHARLESTON, SOUTH CAROLINA
CHARLESTON ZONE E
AOC 538, AOC 539

SW846-MET

SAMPLE ID ------->		538-J-F007-01		538-J-F008-01		538-J-H001-01		538-J-H002-01		538-J-H003-01		538-J-H004-01	
ORIGINAL ID ------>		538JF00701		538JF00801		538JH00101		538JH00201		538JH00301		538JH00401	
LAB SAMPLE ID --->		23346.08		23346.09		23346.10		23346.11		23346.12		23346.13	
ID FROM REPORT -->		538JF00701		538JF00801		538JH00101		538JH00201		538JH00301		538JH00401	
SAMPLE DATE ----->		08/25/95		08/25/95		08/25/95		08/25/95		08/25/95		08/25/95	
DATE EXTRACTED -->		09/11/95		09/11/95		09/11/95		09/11/95		09/11/95		09/11/95	
DATE ANALYZED --->		09/12/95		09/12/95		09/12/95		09/12/95		09/12/95		09/12/95	
MATRIX ---------->		Wipe		Wipe		Wipe		Wipe		Wipe		Wipe	
UNITS ---------->		UG/W		UG/W		UG/W		UG/W		UG/W		UG/W	
CAS #	Parameter	23346	VAL	23346	VAL	23346	VAL	23346	VAL	23346	VAL	23346	VAL
7429-90-5	Aluminum (Al)	315.		366.		580.		1700.		753.		292.	
7440-36-0	Antimony (Sb)	1.2	J	0.8	U	0.8	U	0.8	U	4.5	J	0.8	U
7440-38-2	Arsenic (As)	1.6	J	1.	U	2.9		3.7		6.6		4.8	
7440-39-3	Barium (Ba)	136.		106.		323.		179.		769.		171.	
7440-41-7	Beryllium (Be)	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
7440-43-9	Cadmium (Cd)	3.		1.6		1.7		1.9		4.7		4.2	
7440-70-2	Calcium (Ca)	1630.	J	3990.	J	1790.	J	1570.	J	3860.	J	1780.	J
7440-47-3	Chromium (Cr)	28.		26.7		167.		49.3		86.2		16.2	
7440-48-4	Cobalt (Co)	3.9	J	4.9	J	3.7	J	6.3	J	9.7	J	0.98	J
7440-50-8	Copper (Cu)	281.	J	635.		436.		693.		3220.		427.	
7439-89-6	Iron (Fe)	1640.	J	2400.	J	7610.	J	15000.	J	20300.	J	4090.	J
7439-92-1	Lead (Pb)	203.	J	106.	J	595.	J	506.	J	223.	J	128.	J
7439-95-4	Magnesium (Mg)	148.	J	641.	J	259.	J	180.	J	273.	J	128.	J
7439-96-5	Manganese (Mn)	21.4		36.5		60.3		119.		189.		44.2	
7440-02-0	Nickel (Ni)	57.6		216.		263.		690.		1690.		105.	
7440-09-7	Potassium (K)	332.	U	641.	J	367.	U	472.	J	485.	J	759.	J
7782-49-2	Selenium (Se)	1.	U	1.	U	1.	U	1.	U	1.	U	1.	U
7440-22-4	Silver (Ag)	0.4	U	0.4	U	0.4	U	1.6	J	0.58	J	0.4	U
7440-23-5	Sodium (Na)	189.	J	773.	U	743.	U	566.	U	369.	U	766.	U
7440-28-0	Thallium (Tl)	1.	U	1.	U	1.	U	1.	U	1.	U	1.	U
7440-62-2	Vanadium (V)	1.6	J	2.2	J	4.8	J	7.5	J	5.2	J	1.7	J
7440-66-6	Zinc (Zn)	1830.		473.		1110.		1150.		6520.		466.	
7440-31-5	Tin (Sn)	19.9	J	13.9	U	16.9	U	19.7	U	34.6	U	11.1	U

*** Validation Complete ***

NAVAL BASE CHARLESTON, SOUTH CAROLINA
CHARLESTON ZONE E
AOC 538, AOC 539

SW846-MET

SAMPLE ID ------->	538-J-H005-01		538-J-H006-01		538-J-H007-01		538-J-H008-01		
ORIGINAL ID ----->	538JH00501		538JH00601		538JH00701		538JH00801		
LAB SAMPLE ID --->	23346.14		23346.15		23346.16		23346.17		
ID FROM REPORT -->	538JH00501		538JH00601		538JH00701		538JH00801		
SAMPLE DATE ----->	08/25/95		08/25/95		08/25/95		08/25/95		
DATE EXTRACTED -->	09/11/95		09/11/95		09/11/95		09/11/95		
DATE ANALYZED --->	09/12/95		09/12/95		09/12/95		09/12/95		
MATRIX ---------->	Wipe		Wipe		Wipe		Wipe		
UNITS ---------->	UG/W		UG/W		UG/W		UG/W		
CAS # Parameter	23346	VAL	23346	VAL	23346	VAL	23346	VAL	
7429-90-5 Aluminum (Al)	3430.		1540.		8360.		1890.		
7440-36-0 Antimony (Sb)	7.1	J	2.3	J	3.9	J	11.4	J	
7440-38-2 Arsenic (As)	15.2		10.3		16.6		3.6		
7440-39-3 Barium (Ba)	4740.		427.		5530.		1050.		
7440-41-7 Beryllium (Be)	0.2	U	0.2	U	0.4	J	0.2	U	
7440-43-9 Cadmium (Cd)	4.3		2.9		20.2		4.2		
7440-70-2 Calcium (Ca)	11400.	J	4590.	J	42100.	J	14100.	J	
7440-47-3 Chromium (Cr)	170.		52.4		330.		71.1		
7440-48-4 Cobalt (Co)	8.3	J	5.2	J	27.2		14.5		
7440-50-8 Copper (Cu)	3160.		1110.		20100.		963.		
7439-89-6 Iron (Fe)	40000.	J	15600.	J	32100.	J	7620.	J	
7439-92-1 Lead (Pb)	1080.	J	757.	J	1100.	J	245.	J	
7439-95-4 Magnesium (Mg)	1110.		619.	J	5510.	J	992.	J	
7439-96-5 Manganese (Mn)	307.		140.		847.		99.8		
7440-02-0 Nickel (Ni)	1440.		650.		6710.		516.		
7440-09-7 Potassium (K)	1470.	J	1430.	J	9120.	J	1510.	J	
7782-49-2 Selenium (Se)	1.	U	1.	U	1.1		1.	U	
7440-22-4 Silver (Ag)	7.2		0.87	J	12.1		2.3		
7440-23-5 Sodium (Na)	857.	U	1240.	J	8350.		1430.	J	
7440-28-0 Thallium (Tl)	1.	U	1.	U	1.	U	1.	U	
7440-62-2 Vanadium (V)	16.8		6.8	J	46.8		15.		
7440-66-6 Zinc (Zn)	1490.		1550.		5260.		1250.		
7440-31-5 Tin (Sn)	32.1	U	24.5	U	70.3	J	39.5	U	

*** Validation Complete ***

Analytical Data Summary

	StationID	LABQC		LABQC		LABQC		LABQC		LABQC		LABQC	
	SampleID	BLK0336042		BLK0336043		BLK0336044		BLK0336062		BLK0336063		BLK0336064	
	DateCollected												
	DateExtracted												
	DateAnalyzed	09/06/1995		09/06/1995		09/07/1995		08/31/1995		09/01/1995		09/06/1995	
	SDGNumber	23359		23359		23359		23359		23359		23359	
Parameter	**Units**												
1,1,1,2-Tetrachloroethane	ug/Kg			5	U	5	U						
1,1,1,2-Tetrachloroethane	ug/L	5	U										
1,2,3-Trichloropropane	ug/Kg			5	U	5	U						
1,2,3-Trichloropropane	ug/L	5	U										
1,2-Dibromo-3-chloropropane	ug/Kg			10	U	10	U						
1,2-Dibromo-3-chloropropane	ug/L	10	U										
1,4-Dioxane	ug/Kg			500	U	500	U						
1,4-Dioxane	ug/L	500	U										
3-Chloropropene	ug/Kg			5	U	5	U						
3-Chloropropene	ug/L	5	U										
Acetonitrile	ug/Kg			200	U	200	U						
Acetonitrile	ug/L	200	U										
Acrolein	ug/Kg			50	U	50	U						
Acrolein	ug/L	50	U										
Acrylonitrile	ug/Kg			50	U	50	U						
Acrylonitrile	ug/L	50	U										
Chloroprene	ug/Kg			5	U	5	U						
Chloroprene	ug/L	5	U										
Dichlorodifluoromethane	ug/Kg			5	U	5	U						
Dichlorodifluoromethane	ug/L	5	U										
Ethylene Dibromide (1,2-Dibromo	ug/Kg			5	U	5	U						
Ethylene Dibromide (1,2-Dibromo	ug/L	5	U										
Isobutyl alcohol	ug/Kg			200	U	200	U						
Isobutyl alcohol	ug/L	200	U										
Methacrylonitrile	ug/Kg			100	U	100	U						
Methacrylonitrile	ug/L	100	U										
Methyl iodide	ug/Kg			5	U	5	U						
Methyl iodide	ug/L	5	U										
Methylene bromide	ug/Kg			10	U	10	U						
Methylene bromide	ug/L	10	U										
Propionitrile	ug/Kg			100	U	100	U						
Propionitrile	ug/L	100	U										
trans-1,4-Dichloro-2-butene	ug/Kg			5	U	5	U						

Analytic Data Summary

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0336065		BLK0336066		BLK0336067	
	DateCollected						
	DateExtracted						
	DateAnalyzed	09/06/1995		09/07/1995		09/08/1995	
	SDGNumber	23359		23359		23359	
Parameter	Units						
1,1,1,2-Tetrachloroethane	ug/Kg						
1,1,1,2-Tetrachloroethane	ug/L						
1,2,3-Trichloropropane	ug/Kg						
1,2,3-Trichloropropane	ug/L						
1,2-Dibromo-3-chloropropane	ug/Kg						
1,2-Dibromo-3-chloropropane	ug/L						
1,4-Dioxane	ug/Kg						
1,4-Dioxane	ug/L						
3-Chloropropene	ug/Kg						
3-Chloropropene	ug/L						
Acetonitrile	ug/Kg						
Acetonitrile	ug/L						
Acrolein	ug/Kg						
Acrolein	ug/L						
Acrylonitrile	ug/Kg						
Acrylonitrile	ug/L						
Chloroprene	ug/Kg						
Chloroprene	ug/L						
Dichlorodifluoromethane	ug/Kg						
Dichlorodifluoromethane	ug/L						
Ethylene Dibromide (1,2-Dibromo	ug/Kg						
Ethylene Dibromide (1,2-Dibromo	ug/L						
Isobutyl alcohol	ug/Kg						
Isobutyl alcohol	ug/L						
Methacrylonitrile	ug/Kg						
Methacrylonitrile	ug/L						
Methyl iodide	ug/Kg						
Methyl iodide	ug/L						
Methylene bromide	ug/Kg						
Methylene bromide	ug/L						
Propionitrile	ug/Kg						
Propionitrile	ug/L						
trans-1,4-Dichloro-2-butene	ug/Kg						

	StationID	LABQC		LABQC		LABQC		LABQC		LABQC		LABQC	
	SampleID	BLK0336042		BLK0336043		BLK0336044		BLK0336062		BLK0336063		BLK0336064	
	DateCollected												
	DateExtracted												
	DateAnalyzed	09/06/1995		09/06/1995		09/07/1995		08/31/1995		09/01/1995		09/06/1995	
	SDGNumber	23359		23359		23359		23359		23359		23359	
Parameter	**Units**												
trans-1,4-Dichloro-2-butene	ug/L	5	U										
Trichlorofluoromethane	ug/Kg			5	U	5	U						
Trichlorofluoromethane	ug/L	5	U										
1,2,4-Trichlorobenzene	ug/Kg												
Chloromethane	ug/Kg			10	U	10	U	10	U	10	U		
Chloromethane	ug/L	10	U									10	U
Vinyl chloride	ug/Kg			10	U	10	U	10	U	10	U		
Vinyl chloride	ug/L	10	U									10	U
Bromomethane	ug/Kg			10	U	10	U	10	U	10	U		
Bromomethane	ug/L	10	U									10	U
Chloroethane	ug/Kg			10	U	10	U	10	U	10	U		
Chloroethane	ug/L	10	U									10	U
1,1-Dichloroethene	ug/Kg			5	U	5	U	5	U	5	U		
1,1-Dichloroethene	ug/L	5	U									5	U
Acetone	ug/Kg			10	U	10	U	10	U	10	U		
Acetone	ug/L	10	U									10	U
Carbon Disulfide	ug/Kg			5	U	5	U	5	U	5	U		
Carbon Disulfide	ug/L	5	U									5	U
Methylene Chloride	ug/Kg			5	U	4	J	1	J	5	U		
Methylene Chloride	ug/L	5	U									5	U
1,1-Dichloroethane	ug/Kg			5	U	5	U	5	U	5	U		
1,1-Dichloroethane	ug/L	5	U									5	U
Vinyl acetate	ug/Kg			10	U	10	U	10	U	10	U		
Vinyl acetate	ug/L	10	U									10	U
Methyl ethyl ketone (2-Butanone)	ug/Kg			10	U	10	U	10	U	10	U		
Methyl ethyl ketone (2-Butanone)	ug/L	10	U									10	U
1,2-Dichloroethene (total)	ug/Kg			5	U	5	U	5	U	5	U		
1,2-Dichloroethene (total)	ug/L	5	U									5	U
Chloroform	ug/Kg			5	U	5	U	5	U	5	U		
Chloroform	ug/L	5	U									5	U
1,1,1-Trichloroethane	ug/Kg			5	U	5	U	5	U	5	U		
1,1,1-Trichloroethane	ug/L	5	U									5	U
Carbon Tetrachloride	ug/Kg			5	U	5	U	5	U	5	U		

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0336065		BLK0336066		BLK0336067	
	DateCollected						
	DateExtracted						
	DateAnalyzed	09/06/1995		09/07/1995		09/08/1995	
	SDGNumber	23359		23359		23359	
Parameter	Units						
trans-1,4-Dichloro-2-butene	ug/L						
Trichlorofluoromethane	ug/Kg						
Trichlorofluoromethane	ug/L						
1,2,4-Trichlorobenzene	ug/Kg						
Chloromethane	ug/Kg	10	U	10	U	10	U
Chloromethane	ug/L						
Vinyl chloride	ug/Kg	10	U	10	U	10	U
Vinyl chloride	ug/L						
Bromomethane	ug/Kg	10	U	10	U	10	U
Bromomethane	ug/L						
Chloroethane	ug/Kg	10	U	10	U	10	U
Chloroethane	ug/L						
1,1-Dichloroethene	ug/Kg	5	U	5	U	5	U
1,1-Dichloroethene	ug/L						
Acetone	ug/Kg	10	U	10	U	10	U
Acetone	ug/L						
Carbon Disulfide	ug/Kg	5	U	5	U	5	U
Carbon Disulfide	ug/L						
Methylene Chloride	ug/Kg	5	U	4	J	5	U
Methylene Chloride	ug/L						
1,1-Dichloroethane	ug/Kg	5	U	5	U	5	U
1,1-Dichloroethane	ug/L						
Vinyl acetate	ug/Kg	10	U	10	U	10	U
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/Kg	10	U	10	U	10	U
Methyl ethyl ketone (2-Butanone)	ug/L						
1,2-Dichloroethene (total)	ug/Kg	5	U	5	U	5	U
1,2-Dichloroethene (total)	ug/L						
Chloroform	ug/Kg	5	U	5	U	5	U
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/Kg	5	U	5	U	5	U
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/Kg	5	U	5	U	5	U

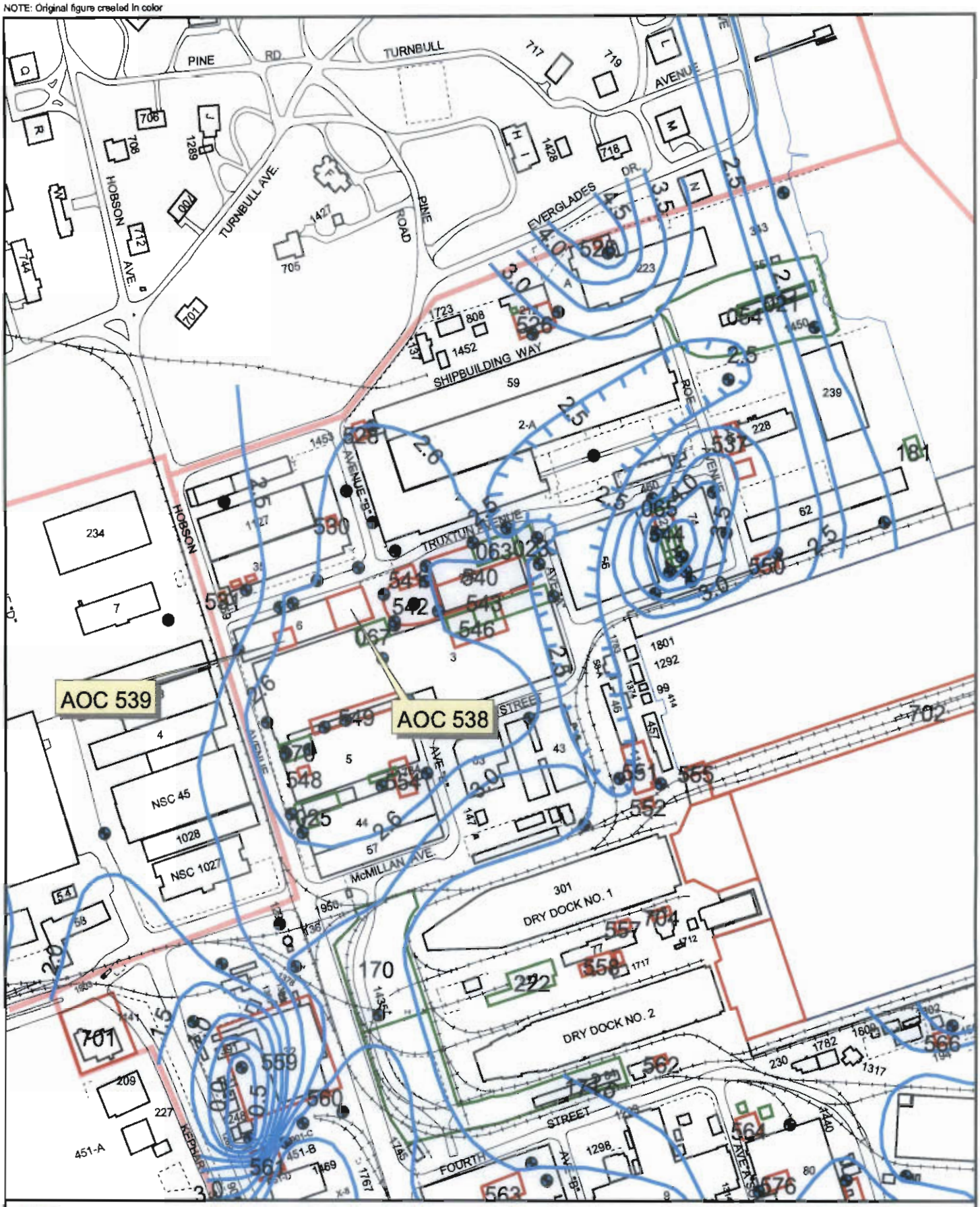
	StationID	LABQC		LABQC		LABQC		LABQC		LABQC		LABQC	
	SampleID	BLK0336042		BLK0336043		BLK0336044		BLK0336062		BLK0336063		BLK0336064	
	DateCollected												
	DateExtracted												
	DateAnalyzed	09/06/1995		09/06/1995		09/07/1995		08/31/1995		09/01/1995		09/06/1995	
	SDGNumber	23359		23359		23359		23359		23359		23359	
Parameter	**Units**												
Carbon Tetrachloride	ug/L	5	U									5	U
1,2-Dichloroethane	ug/Kg			5	U	5	U	5	U	5	U		
1,2-Dichloroethane	ug/L	5	U									5	U
Benzene	ug/Kg			5	U	5	U	5	U	5	U		
Benzene	ug/L	5	U									5	U
Trichloroethylene (TCE)	ug/Kg			5	U	5	U	5	U	5	U		
Trichloroethylene (TCE)	ug/L	5	U									5	U
1,2-Dichloropropane	ug/Kg			5	U	5	U	5	U	5	U		
1,2-Dichloropropane	ug/L	5	U									5	U
Bromodichloromethane	ug/Kg			5	U	5	U	5	U	5	U		
Bromodichloromethane	ug/L	5	U									5	U
2-Chloroethyl vinyl ether	ug/Kg			10	U	10	U	10	U	10	U		
2-Chloroethyl vinyl ether	ug/L	10	U									10	U
cis-1,3-Dichloropropene	ug/Kg			5	U	5	U	5	U	5	U		
cis-1,3-Dichloropropene	ug/L	5	U									5	U
Methyl isobutyl ketone (4-Methyl-2	ug/Kg			10	U	10	U	10	U	10	U		
Methyl isobutyl ketone (4-Methyl-2	ug/L	10	U									10	U
Toluene	ug/Kg			5	U	5	U	5	U	5	U		
Toluene	ug/L	5	U									5	U
trans-1,3-Dichloropropene	ug/Kg			5	U	5	U	5	U	5	U		
trans-1,3-Dichloropropene	ug/L	5	U									5	U
1,1,2-Trichloroethane	ug/Kg			5	U	5	U	5	U	5	U		
1,1,2-Trichloroethane	ug/L	5	U									5	U
2-Hexanone	ug/Kg			10	U	10	U	10	U	10	U		
2-Hexanone	ug/L	10	U									10	U
Tetrachloroethylene (PCE)	ug/Kg			5	U	5	U	5	U	5	U		
Tetrachloroethylene (PCE)	ug/L	5	U									5	U
Dibromochloromethane	ug/Kg			5	U	5	U	5	U	5	U		
Dibromochloromethane	ug/L	5	U									5	U
Chlorobenzene	ug/Kg			5	U	5	U	5	U	5	U		
Chlorobenzene	ug/L	5	U									5	U
Ethylbenzene	ug/Kg			5	U	5	U	5	U	5	U		
Ethylbenzene	ug/L	5	U									5	U

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0336065		BLK0336066		BLK0336067	
	DateCollected						
	DateExtracted						
	DateAnalyzed	09/06/1995		09/07/1995		09/08/1995	
	SDGNumber	23359		23359		23359	
Parameter	**Units**						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/Kg	5	U	5	U	5	U
1,2-Dichloroethane	ug/L						
Benzene	ug/Kg	5	U	5	U	5	U
Benzene	ug/L						
Trichloroethylene (TCE)	ug/Kg	5	U	5	U	5	U
Trichloroethylene (TCE)	ug/L						
1,2-Dichloropropane	ug/Kg	5	U	5	U	5	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/Kg	5	U	5	U	5	U
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/Kg	10	U	10	U	10	U
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/Kg	5	U	5	U	5	U
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2	ug/Kg	10	U	10	U	10	U
Methyl isobutyl ketone (4-Methyl-2	ug/L						
Toluene	ug/Kg	5	U	5	U	5	U
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/Kg	5	U	5	U	5	U
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/Kg	5	U	5	U	5	U
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/Kg	10	U	10	U	10	U
2-Hexanone	ug/L						
Tetrachloroethylene (PCE)	ug/Kg	5	U	5	U	5	U
Tetrachloroethylene (PCE)	ug/L						
Dibromochloromethane	ug/Kg	5	U	5	U	5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/Kg	5	U	5	U	5	U
Chlorobenzene	ug/L						
Ethylbenzene	ug/Kg	5	U	5	U	5	U
Ethylbenzene	ug/L						

	StationID	LABQC		LABQC		LABQC		LABQC		LABQC		LABQC	
	SampleID	BLK0336042		BLK0336043		BLK0336044		BLK0336062		BLK0336063		BLK0336064	
	DateCollected												
	DateExtracted												
	DateAnalyzed	09/06/1995		09/06/1995		09/07/1995		08/31/1995		09/01/1995		09/06/1995	
	SDGNumber	23359		23359		23359		23359		23359		23359	
Parameter	**Units**												
Xylenes, Total	ug/Kg			5	U	5	U	5	U	5	U		
Xylenes, Total	ug/L	5	U									5	U
Styrene	ug/Kg			5	U	5	U	5	U	5	U		
Styrene	ug/L	5	U									5	U
Bromoform	ug/Kg			5	U	5	U	5	U	5	U		
Bromoform	ug/L	5	U									5	U
1,1,2,2-Tetrachloroethane	ug/Kg			5	U	5	U	5	U	5	U		
1,1,2,2-Tetrachloroethane	ug/L	5	U									5	U

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0336065		BLK0336066		BLK0336067	
	DateCollected						
	DateExtracted						
	DateAnalyzed	09/06/1995		09/07/1995		09/08/1995	
	SDGNumber	23359		23359		23359	
Parameter	Units						
Xylenes, Total	ug/Kg	5	U	5	U	5	U
Xylenes, Total	ug/L						
Styrene	ug/Kg	5	U	5	U	5	U
Styrene	ug/L						
Bromoform	ug/Kg	5	U	5	U	5	U
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/Kg	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L						

NOTE: Original figure created in color



Groundwater Elevation
Shallow Groundwater Wells
Railroads
Fence
Roads
AOC Boundary
SWMU Boundary
Shoreline
Buildings
Zone Boundary

N

0 200 400 Feet

1 inch = 300 feet

Figure B-1
Shallow Groundwater Contour Map, May 2002
AOCs 538 and 539, Zone E
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_E\aocs-538-539-gw.apr, Date: 10 Jun 2002 8:40, User: TWILEY

Appendix C

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7429905	Aluminum (Al)	0.0309	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7439896	Iron (Fe)	0.0233	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7439921	Lead (Pb)	0.0023	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7439954	Magnesium (Mg)	0.0347		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7439965	Manganese (Mn)	0.0011	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440020	Nickel (Ni)	0.0034	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440097	Potassium (K)	0.1020		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440235	Sodium (Na)	0.3360		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440393	Barium (Ba)	0.0025	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440417	Beryllium (Be)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440439	Cadmium (Cd)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440473	Chromium (Cr)	0.0010	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440484	Cobalt (Co)	0.0002	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440508	Copper (Cu)	0.0776		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440622	Vanadium (V)	0.0052	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440666	Zinc (Zn)	0.0091	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7440702	Calcium (Ca)	0.0972		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP00101	A	09/20/1995	9999000555	Total Alkalinity	20.3000		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7429905	Aluminum (Al)	0.0364		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7439896	Iron (Fe)	0.0238	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7439921	Lead (Pb)	0.0014	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7439954	Magnesium (Mg)	0.0328		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7439965	Manganese (Mn)	0.0011	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440020	Nickel (Ni)	0.0041	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440097	Potassium (K)	0.0994		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440235	Sodium (Na)	0.3370		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440393	Barium (Ba)	0.0026	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440439	Cadmium (Cd)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440473	Chromium (Cr)	0.0013	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440484	Cobalt (Co)	0.0003	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440508	Copper (Cu)	0.0739		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440622	Vanadium (V)	0.0053	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440666	Zinc (Zn)	0.0090	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7440702	Calcium (Ca)	0.0918		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP00201	A	09/20/1995	9999000555	Total Alkalinity	19.2000		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7429905	Aluminum (Al)	0.0312	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7439896	Iron (Fe)	0.0127	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7439921	Lead (Pb)	0.0012	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7439954	Magnesium (Mg)	0.0357		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7439965	Manganese (Mn)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440020	Nickel (Ni)	0.0030	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440097	Potassium (K)	0.0910		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440235	Sodium (Na)	0.3530		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440280	Thallium (Tl)	0.0013	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440393	Barium (Ba)	0.0021	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440417	Beryllium (Be)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440439	Cadmium (Cd)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440473	Chromium (Cr)	0.0006	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440484	Cobalt (Co)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440508	Copper (Cu)	0.0393		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440622	Vanadium (V)	0.0044	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440666	Zinc (Zn)	0.0071	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7440702	Calcium (Ca)	0.0759		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP00402	A	09/21/1995	9999000555	Total Alkalinity	10.2000		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7429905	Aluminum (Al)	0.0330		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7439896	Iron (Fe)	0.0199	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7439921	Lead (Pb)	0.0014	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7439954	Magnesium (Mg)	0.0361		UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7439965	Manganese (Mn)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440020	Nickel (Ni)	0.0086		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440097	Potassium (K)	0.0903		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440235	Sodium (Na)	0.3530		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440280	Thallium (Tl)	0.0013	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440393	Barium (Ba)	0.0019	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440439	Cadmium (Cd)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440473	Chromium (Cr)	0.0006	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440484	Cobalt (Co)	0.0003	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440508	Copper (Cu)	0.0697		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440622	Vanadium (V)	0.0042	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440666	Zinc (Zn)	0.0075	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7440702	Calcium (Ca)	0.0768		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7782492	Selenium (Se)	0.0016	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	7439976	Mercury (Hg)	0.0003		UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP00502	A	09/21/1995	9999000555	Total Alkalinity	11.2000		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7429905	Aluminum (Al)	0.0416		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7439896	Iron (Fe)	0.0230	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7439921	Lead (Pb)	0.0019	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7439954	Magnesium (Mg)	0.0362		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7439965	Manganese (Mn)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440020	Nickel (Ni)	0.0022	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440097	Potassium (K)	0.0463	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440235	Sodium (Na)	0.3010		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440393	Barium (Ba)	0.0023	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440439	Cadmium (Cd)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440473	Chromium (Cr)	0.0009	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440484	Cobalt (Co)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440508	Copper (Cu)	0.0529		UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440622	Vanadium (V)	0.0010	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440666	Zinc (Zn)	0.0082	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7440702	Calcium (Ca)	0.0442	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP00703	A	09/22/1995	9999000555	Total Alkalinity	11.1000		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7429905	Aluminum (Al)	0.0593		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7439896	Iron (Fe)	0.0269	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7439921	Lead (Pb)	0.0020	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7439954	Magnesium (Mg)	0.0446		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7439965	Manganese (Mn)	0.0012	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440020	Nickel (Ni)	0.0023	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440097	Potassium (K)	0.0592	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440235	Sodium (Na)	0.3930		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440280	Thallium (Tl)	0.0013	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440393	Barium (Ba)	0.0028	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440439	Cadmium (Cd)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440473	Chromium (Cr)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440484	Cobalt (Co)	0.0002	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440508	Copper (Cu)	0.0641		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440622	Vanadium (V)	0.0014	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440666	Zinc (Zn)	0.0105	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7440702	Calcium (Ca)	0.0559	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP00803	A	09/22/1995	9999000555	Total Alkalinity	11.1000		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7429905	Aluminum (Al)	0.0304	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7439896	Iron (Fe)	0.0277	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7439921	Lead (Pb)	0.0010	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7439954	Magnesium (Mg)	0.0319		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7439965	Manganese (Mn)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440020	Nickel (Ni)	0.0013	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440097	Potassium (K)	0.0556	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440224	Silver (Ag)	0.0017	U	UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440235	Sodium (Na)	0.2990		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440360	Antimony (Sb)	0.0007	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440382	Arsenic (As)	0.0013	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440393	Barium (Ba)	0.0034	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440417	Beryllium (Be)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440439	Cadmium (Cd)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440473	Chromium (Cr)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440484	Cobalt (Co)	0.0002	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440508	Copper (Cu)	0.0236		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440622	Vanadium (V)	0.0021	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440666	Zinc (Zn)	0.0073	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7440702	Calcium (Ca)	0.0653	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7782492	Selenium (Se)	0.0010	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP01004	A	09/23/1995	9999000555	Total Alkalinity	23.3000		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7429905	Aluminum (Al)	0.0325	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7439896	Iron (Fe)	0.0355	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7439921	Lead (Pb)	0.0008	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7439954	Magnesium (Mg)	0.0293		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7439965	Manganese (Mn)	0.0027	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440020	Nickel (Ni)	0.0021	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440097	Potassium (K)	0.0545	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440224	Silver (Ag)	0.0019	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440235	Sodium (Na)	0.2860		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440280	Thallium (Tl)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440360	Antimony (Sb)	0.0007	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440382	Arsenic (As)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440393	Barium (Ba)	0.0030	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440439	Cadmium (Cd)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440473	Chromium (Cr)	0.0026	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440484	Cobalt (Co)	0.0003	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440508	Copper (Cu)	0.0380		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440622	Vanadium (V)	0.0019	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440666	Zinc (Zn)	0.0067	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7440702	Calcium (Ca)	0.0591	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7782492	Selenium (Se)	0.0011	U	UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP01104	A	09/23/1995	9999000555	Total Alkalinity	12.3000		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7429905	Aluminum (Al)	0.0243	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7439896	Iron (Fe)	0.0113	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7439921	Lead (Pb)	0.0012	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7439954	Magnesium (Mg)	0.0055	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7439965	Manganese (Mn)	0.0007	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440020	Nickel (Ni)	0.0029	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440097	Potassium (K)	0.0580	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440224	Silver (Ag)	0.0017	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440235	Sodium (Na)	0.1110		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440393	Barium (Ba)	0.0017	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440439	Cadmium (Cd)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440473	Chromium (Cr)	0.0006	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440484	Cobalt (Co)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440508	Copper (Cu)	0.0160		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440622	Vanadium (V)	0.0045	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440666	Zinc (Zn)	0.0071	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7440702	Calcium (Ca)	0.0291	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP01305	A	09/24/1995	9999000555	Total Alkalinity	1.0000	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7429905	Aluminum (Al)	0.0255	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7439896	Iron (Fe)	0.0156	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7439921	Lead (Pb)	0.0019	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7439954	Magnesium (Mg)	0.0102		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7439965	Manganese (Mn)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440020	Nickel (Ni)	0.0036	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440097	Potassium (K)	0.0701		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440235	Sodium (Na)	0.1320		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440382	Arsenic (As)	0.0012	U	UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440393	Barium (Ba)	0.0023	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440417	Beryllium (Be)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440439	Cadmium (Cd)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440473	Chromium (Cr)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440484	Cobalt (Co)	0.0003	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440508	Copper (Cu)	0.0131		UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440622	Vanadium (V)	0.0056	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440666	Zinc (Zn)	0.0090	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7440702	Calcium (Ca)	0.0353	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7782492	Selenium (Se)	0.0017	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	538AP01405	A	09/24/1995	9999000555	Total Alkalinity	5.6400		UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7429905	Aluminum (Al)	59.6000	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7439896	Iron (Fe)	15.7000	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7439921	Lead (Pb)	1.3600	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7439954	Magnesium (Mg)	2.8200	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7439965	Manganese (Mn)	0.6440	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440020	Nickel (Ni)	2.0800	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440097	Potassium (K)	30.4000	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440224	Silver (Ag)	2.9900	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440235	Sodium (Na)	105.0000	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440280	Thallium (Tl)	2.4800	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440360	Antimony (Sb)	1.6400	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440382	Arsenic (As)	2.2300	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440393	Barium (Ba)	2.2400	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440417	Beryllium (Be)	0.0137	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440439	Cadmium (Cd)	0.1510	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440473	Chromium (Cr)	2.2400	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440484	Cobalt (Co)	0.2600	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440508	Copper (Cu)	4.0000	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440622	Vanadium (V)	0.2810	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440666	Zinc (Zn)	5.3000	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7440702	Calcium (Ca)	24.8000	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7782492	Selenium (Se)	1.7200	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	7439976	Mercury (Hg)	0.0067	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	[redacted]	A	09/21/1995	9999000555	Total Alkalinity	37800.0000		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7429905	Aluminum (Al)	0.0387		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7439896	Iron (Fe)	0.0171	J	UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7439921	Lead (Pb)	0.0017	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7439954	Magnesium (Mg)	0.0321		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7439965	Manganese (Mn)	0.0010	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440020	Nickel (Ni)	0.0028	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440097	Potassium (K)	0.1090		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440224	Silver (Ag)	0.0017	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440235	Sodium (Na)	0.3310		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440393	Barium (Ba)	0.0017	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440417	Beryllium (Be)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440439	Cadmium (Cd)	0.0002	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440473	Chromium (Cr)	0.0006	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440484	Cobalt (Co)	0.0004	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440508	Copper (Cu)	0.0452		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440622	Vanadium (V)	0.0061	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440666	Zinc (Zn)	0.0079	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7440702	Calcium (Ca)	0.0786		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	539AP00301	A	09/20/1995	9999000555	Total Alkalinity	15.2000		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7429905	Aluminum (Al)	0.0353		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7439896	Iron (Fe)	0.0226	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7439921	Lead (Pb)	0.0020	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7439954	Magnesium (Mg)	0.0380		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7439965	Manganese (Mn)	0.0014	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440020	Nickel (Ni)	0.0034	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440097	Potassium (K)	0.1190		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440235	Sodium (Na)	0.4080		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440280	Thallium (Tl)	0.0013	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440393	Barium (Ba)	0.0021	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440439	Cadmium (Cd)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440473	Chromium (Cr)	0.0014	J	UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440484	Cobalt (Co)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440508	Copper (Cu)	0.0696		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440622	Vanadium (V)	0.0062	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440666	Zinc (Zn)	0.0096	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7440702	Calcium (Ca)	0.0889		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	7439976	Mercury (Hg)	0.0002		UG/M3
PARTICULAT	A	10/25/2001	TRUE	539AP00602	A	09/21/1995	9999000555	Total Alkalinity	14.0000		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7429905	Aluminum (Al)	0.0249	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7439896	Iron (Fe)	0.0174	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7439921	Lead (Pb)	0.0007	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7439954	Magnesium (Mg)	0.0224		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7439965	Manganese (Mn)	0.0007	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440020	Nickel (Ni)	0.0014	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440097	Potassium (K)	0.0374	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440224	Silver (Ag)	0.0016	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440235	Sodium (Na)	0.2090		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440393	Barium (Ba)	0.0019	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440439	Cadmium (Cd)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440473	Chromium (Cr)	0.0006	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440484	Cobalt (Co)	0.0004	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440508	Copper (Cu)	0.0352		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440622	Vanadium (V)	0.0009	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440666	Zinc (Zn)	0.0062	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7440702	Calcium (Ca)	0.0388	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7782492	Selenium (Se)	0.0009	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	7439976	Mercury (Hg)	0.0002		UG/M3
PARTICULAT	A	10/25/2001	TRUE	539AP00903	A	09/22/1995	9999000555	Total Alkalinity	11.9000		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7429905	Aluminum (Al)	0.0251	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7439896	Iron (Fe)	0.0191	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7439921	Lead (Pb)	0.0016	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7439954	Magnesium (Mg)	0.0207		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7439965	Manganese (Mn)	0.0008	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440020	Nickel (Ni)	0.0012	J	UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440097	Potassium (K)	0.0415	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440224	Silver (Ag)	0.0017	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440235	Sodium (Na)	0.2150		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440360	Antimony (Sb)	0.0007	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440382	Arsenic (As)	0.0013	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440393	Barium (Ba)	0.0020	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440417	Beryllium (Be)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440439	Cadmium (Cd)	0.0001	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440473	Chromium (Cr)	0.0007	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440484	Cobalt (Co)	0.0002	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440508	Copper (Cu)	0.0296		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440622	Vanadium (V)	0.0020	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440666	Zinc (Zn)	0.0068	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7440702	Calcium (Ca)	0.0441	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7782492	Selenium (Se)	0.0010	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	539AP01204	A	09/23/1995	9999000555	Total Alkalinity	19.1000		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7429905	Aluminum (Al)	0.0195	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7439896	Iron (Fe)	0.0126	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7439921	Lead (Pb)	0.0017	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7439954	Magnesium (Mg)	0.0055	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7439965	Manganese (Mn)	0.0007	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440020	Nickel (Ni)	0.0023	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440097	Potassium (K)	0.0555	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440224	Silver (Ag)	0.0017	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440235	Sodium (Na)	0.1130		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440280	Thallium (Tl)	0.0014	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440360	Antimony (Sb)	0.0006	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440382	Arsenic (As)	0.0012	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440393	Barium (Ba)	0.0016	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440417	Beryllium (Be)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440439	Cadmium (Cd)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440473	Chromium (Cr)	0.0010	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440484	Cobalt (Co)	0.0001	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440508	Copper (Cu)	0.0191		UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440622	Vanadium (V)	0.0052	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440666	Zinc (Zn)	0.0070	J	UG/M3

Appendix C-1
Analytical Data for Air Samples - Metals Analysis
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

METHOD	RPT_CODE	L_UPDATE	VALIDATED	SAMPLE_ID	SAMPL_TYPE	SAMPL_DATE	CAS_NO	PARAM	RESULT	VQUAL	CONC_UNITS
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7440702	Calcium (Ca)	0.0255	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7782492	Selenium (Se)	0.0010	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	7439976	Mercury (Hg)	0.0001	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	539AP01505	A	09/24/1995	9999000555	Total Alkalinity	1.0000	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7429905	Aluminum (Al)	61.7000		UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7439896	Iron (Fe)	12.1000	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7439921	Lead (Pb)	1.5300	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7439954	Magnesium (Mg)	2.8200	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7439965	Manganese (Mn)	0.2820	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440020	Nickel (Ni)	0.9680	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440097	Potassium (K)	25.2000	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440224	Silver (Ag)	2.9900	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440235	Sodium (Na)	117.0000	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440280	Thallium (Tl)	2.4800	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440360	Antimony (Sb)	1.1500	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440382	Arsenic (As)	2.2300	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440393	Barium (Ba)	1.7900	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440417	Beryllium (Be)	0.0184	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440439	Cadmium (Cd)	0.1160	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440473	Chromium (Cr)	0.8470	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440484	Cobalt (Co)	0.2110	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440508	Copper (Cu)	1.9700	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440622	Vanadium (V)	0.2810	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440666	Zinc (Zn)	6.6100	J	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7440702	Calcium (Ca)	24.8000	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7782492	Selenium (Se)	1.7200	U	UG/M3
EPA METAL	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	7439976	Mercury (Hg)	0.0053	J	UG/M3
PARTICULAT	A	10/25/2001	TRUE	[redacted]	A	09/23/1995	9999000555	Total Alkalinity	100.0000		UG/M3

Appendix C-2
High Volume Air Sampling Results
RFI Report Addendum, AOCs 538 and 539, Zone E, Charleston Naval Complex

Sample ID	Sample Date	Aluminum (Al)	Qualifier	Antimony (Sb)	Qualifier	Arsenic (As)	Qualifier	Barium (Ba)	Qualifier	Beryllium (Be)	Qualifier	Cadmium (Cd)	Qualifier
538AP00101	09/20/1995	0.0309	J	0.0006	U	0.0012	U	0.0025	J	0.0001	J	0.0001	J
538AP00201	09/20/1995	0.0364		0.0006	U	0.0012	U	0.0026	J	0.0001	U	0.0001	U
538AP00402	09/21/1995	0.0312	J	0.0006	U	0.0012	U	0.0021	J	0.0001	J	0.0001	U
538AP00502	09/21/1995	0.0330		0.0006	U	0.0012	U	0.0019	J	0.0001	U	0.0001	J
538AP00703	09/22/1995	0.0416		0.0006	U	0.0012	U	0.0023	J	0.0001	U	0.0001	J
538AP00803	09/22/1995	0.0593		0.0006	U	0.0012	U	0.0028	J	0.0001	U	0.0001	U
538AP01004	09/23/1995	0.0304	J	0.0007	U	0.0013	U	0.0034	J	0.0001	J	0.0001	U
538AP01104	09/23/1995	0.0325	J	0.0007	U	0.0014	U	0.0030	J	0.0001	U	0.0001	U
538AP01305	09/24/1995	0.0243	J	0.0006	U	0.0012	U	0.0017	J	0.0001	U	0.0001	J
538AP01405	09/24/1995	0.0255	J	0.0006	U	0.0012	U	0.0023	J	0.0001	J	0.0001	U
539AP00301	09/20/1995	0.0387		0.0006	U	0.0012	U	0.0017	J	0.0001	J	0.0002	J
539AP00602	09/21/1995	0.0353		0.0006	U	0.0012	U	0.0021	J	0.0001	U	0.0001	J
539AP00903	09/22/1995	0.0249	J	0.0006	U	0.0012	U	0.0019	J	0.0001	U	0.0001	J
539AP01204	09/23/1995	0.0251	J	0.0007	U	0.0013	U	0.0020	J	0.0001	J	0.0001	J
539AP01505	09/24/1995	0.0195	J	0.0006	U	0.0012	U	0.0016	J	0.0001	U	0.0001	U
Statistics	Minimum of detects	0.0195		1.6400		ND		0.0016		0.0001		0.0001	
	Maximum of detects	61.7000		1.6400		ND		2.2400		0.0184		0.1510	
	Maximum without Samples 1603 & 1705	0.0593		0.0000		ND		0.0034		0.0001		0.0002	
	Mean of detects	7.1640		1.6400		ND		0.2391		0.0027		0.0169	
	Mean without Samples 1603 & 1705	0.0326		ND		ND		0.0023		0.0001		0.0001	
	Mean without Samples 1603 & 1706 and U at 1/2 DL	0.0326		0.0003		0.0006		0.0023		0.0001		0.0001	
Screening Criterion	TWA (Exposure Limits)***	5000		500		NA		500		0.5 - 25		5	

Units are in $\mu g/m^3$
U indicates the the compound was not detected. The reported value is the detection limit.
J indicates that the compound was detected. The reported value is estimated.
ND - Not detected
* - Ambient values are the maximum value from chemical specific toxicological profiles from ATSDR, on CD version 3.1, 2000
** - The RBC values ar ethe ambient air levels from EPA Region III, (chromium value from EPA Region 9 PRG table for total chromium)
*** - The Time-weighted averages (TWA) from NIOSH Pocket Guide to Chemical Hazards, USDHHS, CDC, June 1994
NA - Not available

Appendix C-2
High Volume Air Sampling Results
RFI Report Addendum, AOCs 538 and 539, Zone E, Ch

Sample ID	Sample Date	Calcium (Ca)	Qualifier	Chromium (Cr)	Qualifier	Cobalt (Co)	Qualifier	Copper (Cu)	Qualifier	Iron (Fe)	Qualifier	Lead (Pb)	Qualifier
538AP00101	09/20/1995	0.0972		0.0010	J	0.0002	J	0.0776		0.0233	J	0.0023	J
538AP00201	09/20/1995	0.0918		0.0013	J	0.0003	J	0.0739		0.0238	J	0.0014	J
538AP00402	09/21/1995	0.0759		0.0006	J	0.0001	J	0.0393		0.0127	J	0.0012	J
538AP00502	09/21/1995	0.0768		0.0006	J	0.0003	J	0.0697		0.0199	J	0.0014	J
538AP00703	09/22/1995	0.0442	J	0.0009	J	0.0001	U	0.0529		0.0230	J	0.0019	J
538AP00803	09/22/1995	0.0559	J	0.0008	J	0.0002	J	0.0641		0.0269	J	0.0020	J
538AP01004	09/23/1995	0.0653	J	0.0008	J	0.0002	J	0.0236		0.0277	J	0.0010	J
538AP01104	09/23/1995	0.0591	J	0.0026	J	0.0003	J	0.0380		0.0355	J	0.0008	U
538AP01305	09/24/1995	0.0291	J	0.0006	J	0.0001	U	0.0160		0.0113	J	0.0012	J
538AP01405	09/24/1995	0.0353	J	0.0008	J	0.0003	J	0.0131		0.0156	J	0.0019	J
539AP00301	09/20/1995	0.0786		0.0006	J	0.0004	J	0.0452		0.0171	J	0.0017	J
539AP00602	09/21/1995	0.0889		0.0014	J	0.0001	J	0.0696		0.0226	J	0.0020	J
539AP00903	09/22/1995	0.0388	J	0.0006	J	0.0004	J	0.0352		0.0174	J	0.0007	U
539AP01204	09/23/1995	0.0441	J	0.0007	J	0.0002	J	0.0296		0.0191	J	0.0016	J
539AP01505	09/24/1995	0.0255	J	0.0010	J	0.0001	U	0.0191		0.0126	J	0.0017	J
Statistics	Minimum of detects	0.0255		0.0006		0.0001		0.0131		0.0113		0.0010	
	Maximum of detects	0.0972		2.2400		0.2600		4.0000		15.7000		1.5300	
	Maximum without Samples 1603 & 1705	0.0972		0.0026		0.0004		0.0776		0.0355		0.0023	
	Mean of detects	0.0604		0.1824		0.0202		0.3904		1.0005		0.1108	
	Mean without Samples 1603 & 1705	0.0604		0.0010		0.0003		0.0445		0.0206		0.0016	
	Mean without Samples 1603 & 1706 and U at 1/2 DL	0.0604		0.0010		0.0002		0.0445		0.0206		0.0015	
Screening Criterion	TWA (Exposure Limits)***	NA		500		NA		1000		>1000		50 - 100	

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ND - Not detected
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** - The RBC values ar ethe ambient air levels from EPA
*** - The Time-weighted averages (TWA) from NIOSH P
NA - Not available

Appendix C-2
High Volume Air Sampling Results
RFI Report Addendum, AOCs 538 and 539, Zone E, Ch

Sample ID	Sample Date	Magnesium (Mg)	Qualifier	Manganese (Mn)	Qualifier	Mercury (Hg)	Qualifier	Nickel (Ni)	Qualifier	Potassium (K)	Qualifier	Selenium (Se)	Qualifier
538AP00101	09/20/1995	0.0347		0.0011	J	0.0001	J	0.0034	J	0.1020		0.0009	U
538AP00201	09/20/1995	0.0328		0.0011	J	0.0001	J	0.0041	J	0.0994		0.0009	U
538AP00402	09/21/1995	0.0357		0.0008	J	0.0001	J	0.0030	J	0.0910		0.0009	U
538AP00502	09/21/1995	0.0361		0.0008	J	0.0003		0.0086		0.0903		0.0016	J
538AP00703	09/22/1995	0.0362		0.0008	J	0.0001	J	0.0022	J	0.0463	J	0.0009	U
538AP00803	09/22/1995	0.0446		0.0012	J	0.0001	J	0.0023	J	0.0592	J	0.0009	U
538AP01004	09/23/1995	0.0319		0.0008	J	0.0001	J	0.0013	J	0.0556	J	0.0010	U
538AP01104	09/23/1995	0.0293		0.0027	J	0.0001	J	0.0021	J	0.0545	J	0.0011	U
538AP01305	09/24/1995	0.0055	J	0.0007	J	0.0001	J	0.0029	J	0.0580	J	0.0009	U
538AP01405	09/24/1995	0.0102		0.0008	J	0.0001	J	0.0036	J	0.0701		0.0017	J
539AP00301	09/20/1995	0.0321		0.0010	J	0.0001	J	0.0028	J	0.1090		0.0009	U
539AP00602	09/21/1995	0.0380		0.0014	J	0.0002		0.0034	J	0.1190		0.0009	U
539AP00903	09/22/1995	0.0224		0.0007	J	0.0002		0.0014	J	0.0374	J	0.0009	U
539AP01204	09/23/1995	0.0207		0.0008	J	0.0001	J	0.0012	J	0.0415	J	0.0010	U
539AP01505	09/24/1995	0.0055	J	0.0007	J	0.0001	J	0.0023	J	0.0555	J	0.0010	U
Statistics	Minimum of detects	0.0055		0.0007		0.0001		0.0012		0.0374		0.0016	
	Maximum of detects	0.0446		0.6440		0.0067		2.0800		30.4000		0.0017	
	Maximum without Samples 1603 & 1705	0.0446		0.0027		0.0003		0.0086		0.1190		0.0017	
	Mean of detects	0.0277		0.0554		0.0008		0.1328		3.3346		0.0017	
	Mean without Samples 1603 & 1705	0.0277		0.0010		0.0001		0.0030		0.0726		0.0017	
	Mean without Samples 1603 & 1706 and U at 1/2 DL	0.0277		0.0010		0.0001		0.0030		0.0726		0.0006	
Screening Criterion	TWA (Exposure Limits)***	NA		1000 - 5000		50 - 100		15 - 1000		NA		200	

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*** - The Time-weighted averages (TWA) from NIOSH P
NA - Not available

Appendix C-2
High Volume Air Sampling Results
RFI Report Addendum, AOCs 538 and 539, Zone E, Ch

Sample ID	Sample Date	Silver (Ag)	Qualifier	Sodium (Na)	Qualifier	Thallium (Tl)	Qualifier	Vanadium (V)	Qualifier	Zinc (Zn)	Qualifier	Total Alkalinity	Qualifier
538AP00101	09/20/1995	0.0016	U	0.3360		0.0014	U	0.0052	J	0.0091	J	20.3000	
538AP00201	09/20/1995	0.0016	U	0.3370		0.0014	U	0.0053	J	0.0090	J	19.2000	
538AP00402	09/21/1995	0.0016	U	0.3530		0.0013	U	0.0044	J	0.0071	J	10.2000	
538AP00502	09/21/1995	0.0016	U	0.3530		0.0013	U	0.0042	J	0.0075	J	11.2000	
538AP00703	09/22/1995	0.0016	U	0.3010		0.0014	U	0.0010	J	0.0082	J	11.1000	
538AP00803	09/22/1995	0.0016	U	0.3930		0.0013	U	0.0014	J	0.0105	J	11.1000	
538AP01004	09/23/1995	0.0017	U	0.2990		0.0014	U	0.0021	J	0.0073	J	23.3000	
538AP01104	09/23/1995	0.0019	U	0.2860		0.0016	U	0.0019	J	0.0067	J	12.3000	
538AP01305	09/24/1995	0.0017	U	0.1110		0.0014	U	0.0045	J	0.0071	J	1.0000	U
538AP01405	09/24/1995	0.0016	U	0.1320		0.0014	U	0.0056	J	0.0090	J	5.6400	
539AP00301	09/20/1995	0.0017	U	0.3310		0.0014	U	0.0061	J	0.0079	J	15.2000	
539AP00602	09/21/1995	0.0016	U	0.4080		0.0013	U	0.0062	J	0.0096	J	14.0000	
539AP00903	09/22/1995	0.0016	U	0.2090		0.0014	U	0.0009	J	0.0062	J	11.9000	
539AP01204	09/23/1995	0.0017	U	0.2150		0.0014	U	0.0020	J	0.0068	J	19.1000	
539AP01505	09/24/1995	0.0017	U	0.1130		0.0014	U	0.0052	J	0.0070	J	1.0000	U
Statistics	Minimum of detects	ND		0.1110		ND		0.0009		0.0062		5.6400	
	Maximum of detects	ND		117.0000		ND		0.0062		6.6100		37800.0000	
	Maximum without Samples 1603 & 1705	ND		0.4080		ND		0.0062		0.0105		23.3000	
	Mean of detects	ND		13.3045		ND		0.0037		0.7076		2538.9693	
	Mean without Samples 1603 & 1705	ND		0.2785		ND		0.0037		0.0079		14.1954	
	Mean without Samples 1603 & 1706 and U at 1/2 DL	0.0008		0.2785		0.0007		0.0037		0.0079		12.3693	
Screening Criterion	TWA (Exposure Limits)***	NA		NA		NA		50 - 500		1000		NA	

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NA - Not available

Appendix D

CH2MHILL TRANSMITTAL

To: Jerry Stamps
South Carolina Department of Health
and Environmental Control
Bureau of Land and Waste
Management
2600 Bull Street
Columbia, SC 29201

From: Dean Williamson/CH2M-Jones

Date: March 13, 2003

Re: CH2M-Jones' Responses to Comments by SCDHEC regarding the *RFI Report Addendum, AOCs 538 and 539, Zone E, Revision 0*

Quantity	Description
4	CH2M-Jones' Responses to Comments by SCDHEC regarding the *RFI Report Addendum, AOCs 538 and 539, Zone E, Revision 0* – Originally Submitted on October 10, 2002

If material received is not as listed, please notify us at once.

Remarks:

Copy To:

Dann Spariosu/USEPA, w/att
Rob Harrell/Navy, w/att
Gary Foster/CH2M-Jones, w/att

Specific Comments

1. Section 2.5, Air Samples, Page 2-5 and 2-6 and Appendix C.

The text states that Appendix C-1 contains the analytical data per sample from the original Ensafe RFI, and Appendix C-2 contains the comparison tables to the ambient values, RBCs, and TWAs. After reading Appendix C, it appears that C-1 is the comparison table and C-2 is the sample specific table. Please revise the text accordingly.

CH2M-Jones Response:

The text will be changed accordingly.

2. Section 2.5, Air Samples, Page 2-6.

The text states that two of the fifteen air samples contained relatively high concentrations of most of the metals analyzed. The text goes on to state that these samples **may** have been collected from closer to the industrial activity, and the operations in this area **may** have changed with time. Since the Navy is recommending NFA for this site, the Department would like to see a more thorough explanation for excluding the air pathway. Please include a brief discussion of the contaminants that were detected above ambient concentrations / RBCs and that they were not considered COCs in other media. Also include a brief discussion of why the dust inside of the building is not a likely source of contamination at AOCs 538 and 539. The Department concurs with the recommendations in the RFI Addendum; however, additional information would make the conclusions more obvious to the reader.

CH2M-Jones Response:

We agree that a clearer discussion of this issue would be helpful to the reader. After reviewing the air data, in light of the reviewer's comment above, and considering the physical condition and age of Building 6 and its lack of suitability for residential use, we have concluded that it is not reasonable to assume that the Building 6 would ever be used for residential purposes. The residential exposure scenario that provides the basis for calculating the EPA Region III residential air RBCs is simply not going to occur at this site.

In preparing the Revision 0 RFI Report Addendum (RFIRA), the residential air RBC values were used as a relative point of reference, since the EPA Region III Risk Based tables do not provide air RBCs for the industrial use scenario. After reconsidering the information with regard to the reviewer's request to clarify the issue for the reader, we do not believe that comparison of the air data in Appendix C to residential air RBCs is required since the residential exposure scenario is not going to occur in Building 6. We suggest that the comparison of air data in table C-1 be made only to the OSHA time-weighted average (TWA) values, which are already provided in Table C-1, and that the residential air RBCs and "ambient" values be removed from Table C-1. Discussion can be added to Section 2.5 clarifying why the industrial exposure scenario is the only relevant exposure scenario to consider for the air pathway.

As stated on lines 21 and 22 of Page 2-6, none of the detected site inorganic concentrations exceeded the most conservative of the published TWA values which are protective of industrial workers. Since there is no exposure concern from these analytes in air to the industrial worker, and because a residential scenario air pathway will not occur in the building, the air exposure pathway is not of concern at this site.