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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT ADDENDUM CORRECTIVE MEASURES STUDY WORK PLAN COMBINED SOLID WASTE MANAGEMENT UNIT 65 (SWMU 65) ZONE E CNC CHARLESTON SC

6/17/2003

CH2M HILL

RFI REPORT ADDENDUM

RFI Report Addendum and CMS Work Plan
Combined SWMU 65, Zone E

Charleston Naval Complex
North Charleston, South Carolina

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

CH2M-Jones

June 2003

Revision 1
Contract N62467-99-C-0960

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June 17, 2003

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 and CMS Work Plan (Revision 1) – Combined SWMU 65, Zone E

Dear Mr. Scaturo:

Enclosed please find two copies of the RFI Report Addendum and CMS Work Plan (Revision 1) for Combined SWMU 65 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: Tim Frederick/Gannett Fleming, Inc., w/att
Dann Spariosu/EPA, w/att
Rob Harrell/Navy, w/att
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April 14, 2003

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Gary Foster/CH2M HILL, w/att

RFI REPORT ADDENDUM

RFI Report Addendum and CMS Work Plan Combined SWMU 65, Zone E

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

June 2003

Revision 1
Contract N62467-99-C-0960
158814.ZE.PR.01

Certification Page for RFI Report Addendum and CMS Work Plan (Revision 1) – Combined SWMU 65, 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.

6/13/2003

Date

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B Excerpts from the *Zone E RFI Report, Revision 0*, including a summary of chemical detections and a groundwater flow map for the site vicinity

C Copy of Figure 2 from the *Interim Measure Completion Report, AOC 699, Storm Draining Cleaning* (DET, 1999)

D Copy of the Underground Storage Tank 221-1 Closure Report (DET, 1996)

E Analytical Results Summary for Additional Sampling (2002)

F Data Validation Summary Report for Additional Sampling (2002)

G Copy of Figure 6-1, Groundwater Sampling Form (*Final Comprehensive Sampling and Analysis Plan* [August 30, 1994])

H CH2M-Jones' Responses to EPA Comments on the *RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Revision 0* (CH2M-Jones, 2003)

Acronyms and Abbreviations

AOC	Area of concern
BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure Act
BRC	Background reference concentration
BTEX	Benzene, ethyl benzene, toluene, and xylene
CA	Corrective action
CMS	Corrective measures study
CNC	Charleston Naval Complex
COC	Chemical of concern
COPC	Chemical of potential concern
CSI	Confirmatory Sampling Investigation
DAF	Dilution attenuation factor
DCE	Dichloroethene
DET	Environmental Detachment Charleston
DPT	Direct-push technology
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
FRE	Fixed-point risk evaluation
ft bls	Feet below land surface
HHRA	Human health risk assessment
HI	Hazard index
ILCR	Incremental lifetime cancer risk
IM	Interim measure
LUC	Land use control
µg/L	Micrograms per liter
µg/kg	Micrograms per kilogram
mg/kg	Milligram per kilogram

Acronyms and Abbreviations, Continued

MCL	Maximum contaminant level
MCS	Media cleanup standard
ng/kg	Manograms per kilograms
NAVBASE	Naval Base
NTU	Nephelometric turbidity unit
OP	Organophosphorous
OWS	Oil/water separator
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
Pg/L	Picograms per liter
RAO	Remedial action objectives
RBC	Risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RFIRA/CMSWP	RFI Report Addendum/CMS Work Plan
RGO	Remedial goal options
RI	Remedial investigation
SAP	Sampling and analysis plan
SCDHEC	South Carolina Department of Health and Environmental Control
SDG	Sample data group
SSL	Soil screening level
SVOC	Semivolatile organic compound
SWMU	Solid waste management unit
TCDD	Tetrachlorodibenzodioxin
TCE	Trichloroethene
TDS	Total dissolved solids

Acronyms and Abbreviations

TEQ	TCDD-equivalent
TPH-GRO	Total Petroleum Hydrocarbons – Gasoline Range Organics
TPH-DRO	Total Petroleum Hydrocarbons – Diesel Range Organics
TTAL	Treatment Technique Action Level
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 Solid Waste Management Unit (SWMU) 65 and Areas of Concern (AOCs) 544 and 546 in Zone E of CNC. These units were investigated together during the RFI due to their proximity, and will be referred to as Combined SWMU 65 in this report. The location of Combined SWMU 65 in Zone E is shown in Figure 1-1. Figure 1-2 shows an aerial photograph of the site.

1.1 Background

1.1.1 SWMU 65 – Lead Storage Area, Building 221, and South of the Building

SWMU 65 consists of a former lead storage area in which lead blankets and shielding materials were stored on pallets and shelves inside Building 221 and on a paved area south of the building. The majority of the lead was encased in rubber, but some exposed lead was stored beneath a tarp inside the building. This site was also a staging area for scrap lead awaiting disposal. Building 221 was built in 1970, and was used for lead storage and pickling operations until 1985. Building 221 is currently a heavy equipment repair and maintenance shop being used by Metal Trades, Inc., and the area south of the building is used for storage of old metal parts and machinery.

As identified in the RCRA Facility Assessment (RFA) documentation (EnSafe Inc. [EnSafe]/Allen & Hoshall, 1995), the materials of concern for SWMU 65 include lead, other

heavy metals, and acids. The SWMU 65 area is zoned M-2 (for marine industrial land use). The CNC RCRA Permit identified SWMU 65 as requiring an RFI.

1.1.2 AOC 544 – Former Pickling Plant, Building 221

AOC 544 is the site of a former pickling plant at Building 221. From 1940 to 1970, the pickling plant consisted of an open-air facility with only the pickling tanks covered by a roof. In 1970, a single-story structure was built to house the pickling operations. The process used a series of chemical baths and water rinses. Until 1974, spent pickling bath solutions were discharged via the storm drainage system into the Cooper River. After 1974, a private contractor disposed of the wastes. Operations were discontinued in 1984 and the process equipment was removed.

As identified in the RFA documentation, the materials of concern for AOC 544 include acids, caustics, volatile organic compounds (VOCs), petroleum products, and heavy metals. The AOC 544 area is zoned for future land use as M-2. The CNC RCRA Permit identified AOC 544 as requiring an RFI.

1.1.3 AOC 546 – Former Galvanizing/Pickling Shop, South of Building 221

AOC 546 consists of a former galvanizing/pickling shop that operated within Building 1025 from the early 1920s until 1967. Building 1025 was located at two separate areas during its existence. Originally, it was situated adjacent to the southwest corner of Building 6 (at the current location of Building 3) and approximately co-located with SWMU 67 until 1942. During this time, historic engineering drawings referred to it is as a galvanizing shed. After it was relocated to south of Building 221, it was referred to as a pipe shop/pickling plant. No information was found during the RFA or RFI regarding its operational processes. Currently, both the former and present locations of AOC 546 are covered with pavement or structures. This area of Zone E is zoned M-2 (marine industrial land use). At this time only a concrete slab exists at the location of Building 1025 south of Building 221, and is being used as a storage area. This RFI Report Addendum/Corrective Measures Study (CMS) Work Plan (RFIRA/CMSWP) addresses only the portion of AOC 546 that is located next to SWMU 65 and AOC 544. The portion of AOC 546 that is co-located with SWMU 67 is addressed in this RFIRA/CMSWP for Combined SWMU 65.

As identified in the RFA documentation (EnSafe/Allen & Hoshall, 1995), the materials of concern for AOC 546 include VOCs, inorganic acids, and heavy metals. The AOC 546 area is zoned M-2 (marine industrial land use). The CNC RCRA Permit identified AOC 546 as requiring a Confirmatory Sampling Investigation (CSI).

prepared by the Navy/EnSafe team. These comments and responses are included in Appendix A of this report.

1.2 Purpose of the RFI Report Addendum/CMS Work Plan

The purpose of this RFIRA/CMSWP is to document the results of previous RFI investigations conducted by the Navy/EnSafe team at Combined SWMU 65. This RFIRA/CMSWP also includes results and conclusions from the additional investigations conducted at the site by CH2M-Jones during 2002. In addition, this document 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 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 RFIRA/CMSWP to expedite evaluation of closure of the site.

1.3 Report Organization

This RFIRA/CMSWP consists of the following sections, including this introductory section:

1.0 Introduction – Presents the purpose of the report and background information relating to the RFIRA/CMSWP.

2.0 Summary of RFI Conclusions for Combined SWMU 65 – Summarizes the conclusions from the RFI investigations and risk evaluations for Combined SWMU 65 as presented in the *Zone E RFI Report, Revision 0*.

3.0 Summary of Interim Measures and UST/AST Removals at Combined SWMU 65 – Provides information regarding any interim measures (IMs) or tank removal activities performed at the site.

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

5.0 COPC/COC Refinement – Provides further evaluation of chemicals of potential concern (COPCs) 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 BCT agreed to evaluate prior to site closeout.

7.0 Recommendations – Provides recommendations for proceeding with site closure.

8.0 CMS Work Plan for Combined SWMU 65 – Presents a focused CMSWP to address the COCs that have been identified in groundwater at Combined SWMU 65.

9.0 References – Lists the references used in this document.

Appendix A – Contains responses to SCDHEC comments for Combined SWMU 65 from the *Zone E RFI Report, Revision 0* (EnSafe, 1997).

Appendix B – Contains excerpts from the *Zone E RFI Report, Revision 0*, including a summary of detections of chemicals and Figure B-1, which is a groundwater flow map for the site vicinity.

Appendix C – Contains a copy of Figure 2 from the *Interim Measure Completion Report, AOC 699, Storm Drain Cleaning* (Environmental Detachment Charleston [DET], 1999).

Appendix D - Contains a copy of the Underground Storage Tank (UST) Removal Report for UST 221-1, which is associated with Building 221.

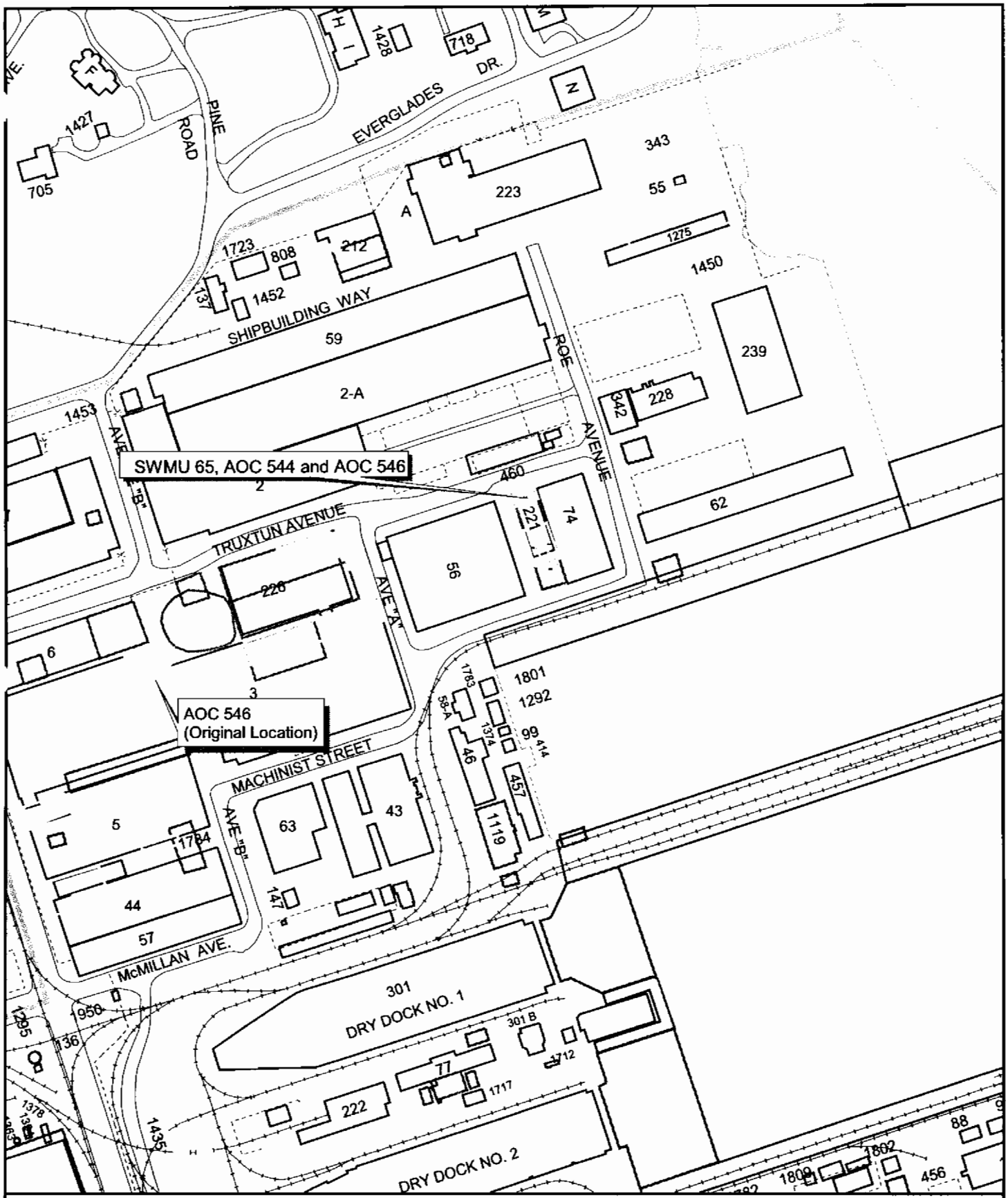
Appendix E – Contains summaries of the analytical results for the additional soil and groundwater samples that were collected at the site by CH2M-Jones during 2002.

Appendix F – Contains the data validation report for the additional 2002 sampling event.

Appendix G - Contains a copy of Figure 6-1, Groundwater Sampling Form from the *Final Comprehensive Sampling and Analysis Plan* (EnSafe, 1994).

Appendix H - Contains CH2M-Jones' responses to EPA comments regarding the *RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Revision 0* (CH2M-Jones, 2003).

All figures and tables appear at the end of their respective sections.



Railroads
Roads - Lines
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary

N

0 200 400 Feet

1 inch = 233 feet

Figure 1-1
Location of Combined SWMU 65 in Zone E
Charleston Naval Complex

CH2MHILL

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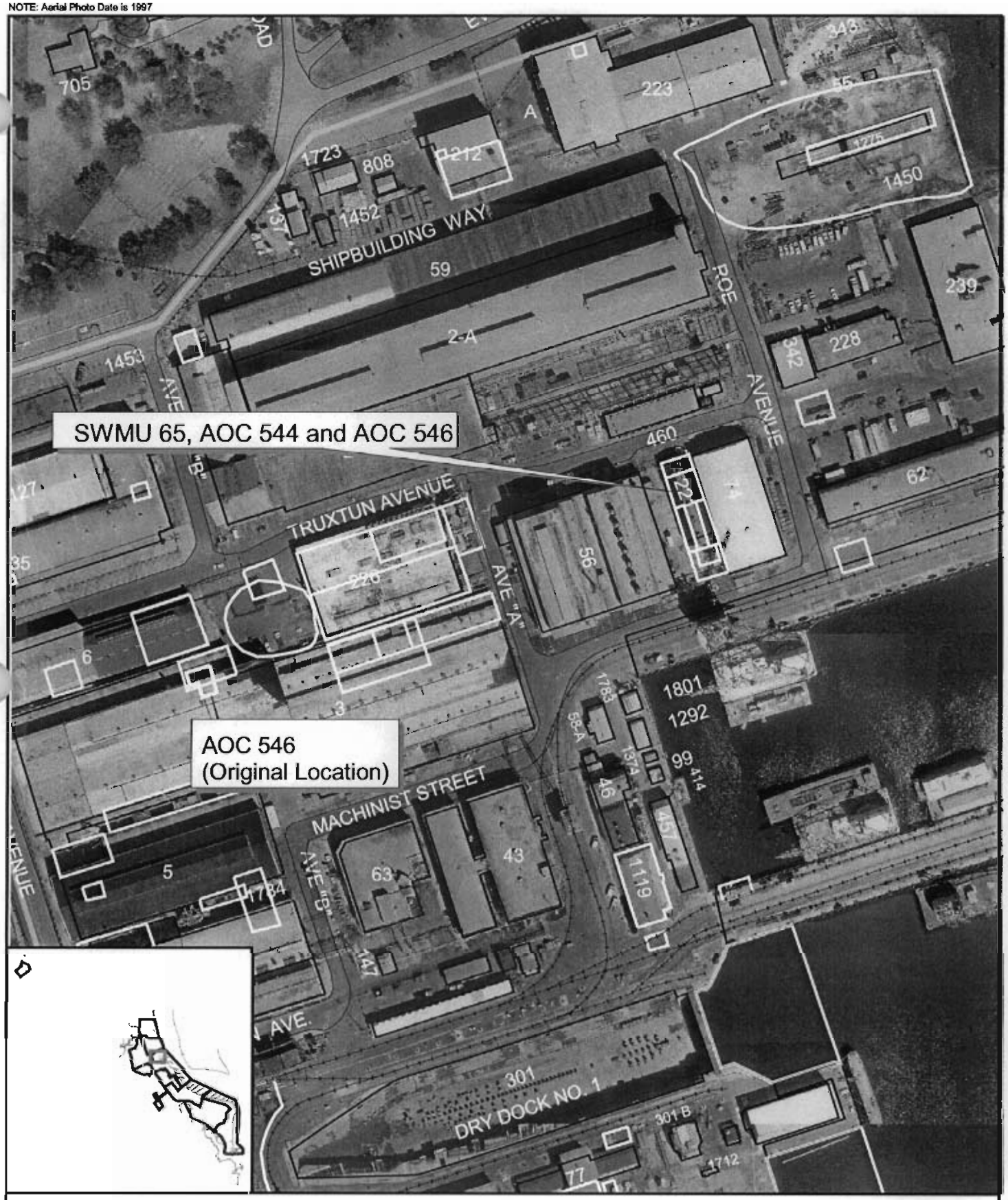
NOTE: Aerial Photo Date is 1997



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0 100 200 Feet

1 inch = 186 feet

Figure 1-2
Site Location
Combined SWMU 65, Zone E
Charleston Naval Complex

CH2MHILL

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Section 2.0

2.0 Summary of RFI Conclusions for Combined SWMU 65

This section summarizes the results and conclusions from the soil and groundwater investigations conducted at Combined SWMU 65, which were reported in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). Appendix B of this RFIRA/CMSWP contains relevant excerpts from the RFI report, including a groundwater flow map for the site vicinity.

As part of the Zone E RFI, soil, groundwater, and sediment investigations were conducted at Combined SWMU 65 during 1995 through 1997. 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 COPCs at this site is provided in Section 5.0. Figure 2-1 shows the RFI soil, groundwater, and sediment sampling locations.

2.1 Soil Sampling and Analysis

The RFI at Combined SWMU 65 included the collection and analysis of 12 surface soil and 11 subsurface soil samples from locations under concrete and asphalt pavement during two sampling events. Samples from the first sampling event were analyzed for VOCs, semivolatile organic compounds (SVOCs), metals, pesticides/polychlorinated biphenyls (PCBs), cyanide, organotins, and pH. Four samples (two surface soil and two subsurface soil) were selected as duplicates and were analyzed for VOCs and SVOCs, as well as herbicides, organophosphorous (OP) pesticides, hexavalent chromium, and dioxins. Samples from the second sampling event were analyzed for SVOCs and metals.

During drilling of the groundwater monitoring well E065GW006, petroleum product was noted in the boring, and an additional soil sample (identified as E065SB00603), was collected from this area and analyzed for VOCs, PCBs, total petroleum hydrocarbons -diesel range organics (TPH-DROs), metals, and cyanide.

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).

The detected concentrations of organic and inorganic analytes exceeding their respective criteria were as follows:

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

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

Inorganics: No inorganic detections exceeded the screening criteria in surface soils.

PCBs/ Pesticides: No PCBs were detected above laboratory detection limits in the soil samples collected from Combined SWMU 65. Among detected pesticides, two exceeded their respective screening criteria:

- Aldrin, at a concentration of 349 micrograms per kilogram (μg/kg) at soil boring location E544SB001, exceeded its industrial RBC of 340 μg/kg.
- Dieldrin, at a concentration of 586 μg/kg at soil boring location E544SB001, exceeded its industrial RBC of 357 μg/kg.

Dioxins: Calculated TCDD-Equivalents (TEQs) did not exceed the screening criteria of 1,000 nanograms per kilogram (ng/kg) used during the RFI. A comparison against the industrial RBC was not performed during the RFI, however the detections are below the industrial RBC for 2,3,7,8-Tetrachlorodibenzodioxin (2,3,7,8-TCDD) of 38 ng/kg.

pH: The pH of surface soil samples collected at the site ranged from 7.62 to 11.3.

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.

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

VOCs: No VOCs exceeded the screening criteria in subsurface soil.

SVOCs: Among detected SVOC compounds, two analytes exceeded their respective screening criteria:

- Benzo[a]anthracene, at a concentration of 2,900 μg/kg at soil boring location E065SB007, exceeded its SSL of 700 μg/kg.
- Chrysene, at a concentration of 2,900 μg/kg at location E065SB007, exceeded its SSL of 1,000 μg/kg.

Inorganics: One inorganic detection exceeded the screening criteria:

- Arsenic, at a concentration of 21 milligrams per kilogram (mg/kg) at soil boring E065SB001, exceeded both its SSL of 14.5 mg/kg and its Zone E subsurface soil BRC of 19.9 mg/kg.

PCBs/Pesticides: No PCBs were detected in any of the soil samples collected from Combined SWMU 65. Among detected pesticides, two exceeded their respective screening criteria:

- Beta-BHC, at a concentration of 2.8 μg/kg at location E544SB001, exceeded its SSL of 2 μg/kg.
- Dieldrin, at concentrations of 29 μg/kg, 14.4 μg/kg, and 33.2 μg/kg at locations E544SB001, E544SB002, and E544SB003, respectively, exceeded its SSL of 1 μg/kg.

Dioxins: No dioxins exceeded the screening criteria in subsurface soils. The RFI report did not compare the dioxin results to an SSL value. However, the maximum TEQ concentration of 0.404 ng/kg did not exceed the EPA Region III SSL (with a DAF=10) of 4.3 ng/kg.

TPH-DRO: No TPH-DROs were detected at concentrations above laboratory detection limits.

TPH-Gasoline Range Organics (GRO): TPH-GRO detections did not exceed the screening criteria for subsurface soils.

pH: The pH of subsurface soil samples collected at the site ranged from 7.21 to 8.99.

In the subsurface soil sample E065SB00603, which was collected from the well boring E065GW006 where petroleum product was observed, two VOCs, TPH-GRO, and 15 metals were detected in the sample. None of the detected concentrations of any chemical exceeded its respective SSL.

2.2 Groundwater Sampling and Analysis

The RFI for Combined SWMU 65 included the installation and sampling of nine monitoring wells (eight shallow and one deep), as shown in Figure 2-1. Four initial RFI sampling events and two post-RFI sampling events were conducted. During the first sampling event,

groundwater samples were analyzed for VOCs, SVOCs, pesticides/PCBs, metals, cyanide, organotins, chlorides, sulfates, total dissolved solids (TDS), and pH. One duplicate sample from a shallow monitoring well was collected and analyzed for the previously listed parameters plus herbicides, hexavalent chromium, OP pesticides, and dioxins. During the second sampling event, groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, dioxins, and metals. During the third and fourth sampling events, samples were analyzed for VOCs, SVOCs, metals, pesticides, and PCBs.

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 aquifers.

2.2.1 Shallow Groundwater Results

The following analyte concentrations in shallow groundwater samples were detected:

VOCs: Among detected analytes, acetone, 1,2-dichloroethene (1,2-DCE), and vinyl chloride exceeded their respective screening criteria:

- Acetone, at a concentration of 380 micrograms per liter (μg/L) at E065GW002, exceeded its tap water RBC of 370 μg/L. No MCL was published for acetone.
- 1,2-DCE, at a concentration of 7 μg/L at E569GW003, exceeded its tap water RBC (HI=0.1) of 5.5 μg/L. The detection did not exceed the 1,2-DCE MCL of 70 μg/L.
- Vinyl chloride, at a concentration of 6 μg/L at E569GW002, exceeded its tap water RBC of 0.019 μg/L. The detection also exceeded the vinyl chloride MCL of 2 μg/L.

SVOCs: There were no detections of SVOC concentrations above screening criteria.

Pesticides/PCBs: No PCBs were detected. Two pesticides exceeded their respective screening criteria in shallow groundwater samples:

- Alpha-BHC, at a concentration of 0.13 μg/L at location E65GW004, exceeded its tap water RBC of 0.011 μg/L. No MCL was available for alpha-BHC.
- Beta-BHC, at a concentration of 0.048 μg/L at location E065GW004, exceeded its tap water RBC of 0.037 μg/L. No MCL was available for beta-BHC.

Inorganics: Among detected inorganic analytes, 12 metals (aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, iron, lead, mercury, vanadium, and zinc) exceeded both their respective tap water RBCs and shallow groundwater BRCs.

Dioxins: The calculated TEQ (dioxin equivalent) in the single duplicate groundwater sample was 2.42 picograms per liter (pg/L), which exceeded the tap water RBC of 0.4 pg/L for 2,3,7,8-TCDD. No MCL was available for dioxin during the RFI. The detected concentration is below the current MCL for 2,3,7,8-TCDD of 30 pg/L.

2.2.2 Deep Groundwater Results

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

VOCs: Among detected analytes, three VOCs exceeded the screening criteria:

- 1,2-DCE (total), at a concentration of 10 μg/L at monitoring well E065GW04D, exceeded its tap water RBC of 5.5 μg/L (with a HI=0.1). The detection did not exceed the 1,2-DCE (total) MCL of 70 μg/L.
- Trichloroethene (TCE), at a concentration of 8 μg/L at E065GW04D, exceeded its tap water RBC of 5.5 μg/L. The detection also exceeded the TCE MCL of 5 μg/L.
- Vinyl chloride, at a concentration of 6 μg/L at E065GW04D, exceeded its tap water RBC of 0.019 μg/L. The detection also exceeded the vinyl chloride MCL of 2 μg/L.

SVOCs: There were no detections of SVOC concentrations above screening criteria.

Inorganics: Among detected inorganic analytes, two metals exceeded the screening criteria:

- Arsenic, at a concentration of 22.8 μg/L at E065GW04D, exceeded both its tap water RBC of 0.045 μg/L and the deep groundwater BRC of 16.4 μg/L. The detection did not exceed the arsenic MCL of 50 μg/L.
- Iron was detected at 2,790 μg/L at E065GW04D, exceeding its tap water RBC of 1,100 μg/L. No deep groundwater BRC has been established for iron in Zone E, and no primary MCL exists for iron.

2.3 Sediment Sampling and Analysis

The RFI for Combined SWMU 65 included one sediment sample collected from a storm drain catch basin at the location shown in Figure 2-1. The sediment sample, taken from the grit from the bottom of the catch basin, was analyzed for VOCs, SVOCs, pesticides/PCBs, cyanide, metals, organotins, and pH.

Detections in sediment samples during the RFI were evaluated against the EPA Region III industrial RBCs for soil (with a HI=0.1 for noncarcinogens).

Detected concentrations of organic and inorganic compounds from the sediment sample were as follows:

VOCs: No VOC detections exceeded the screening criteria in the sediment sample.

SVOCs: The RFI reported that among detected SVOC compounds, the calculated BEQ concentration of 17,000 μg /kg at E546M0001 exceeded the industrial RBC of 780 μg/kg for benzo[a]pyrene. BEQ calculations were performed using the method adopted by the BCT at the time of the writing of the *Zone E RFI Report, Revision 0* (EnSafe, 1997).

Pesticides/PCBs: No pesticide detections exceeded the screening criteria in the sediment sample. No PCBs were detected above laboratory detection limits in the sediment sample.

Inorganics: Among detected inorganic analytes, two metals exceeded their respective screening criteria:

- Arsenic was detected at a concentration of 9.9 mg/kg at E546M0001, which exceeded the industrial soil RBC of 3.8 mg/kg.
- Lead was detected at a concentration of 3,130 mg/kg at E546M0001, which exceeded the industrial soil RBC of 400 mg/kg.

Organotins: No organotins were detected above laboratory detection limits in the sediment sample.

pH: The pH of the sediment sample collected at Combined SWMU 65 was 6.99.

Subsequent to the RFI, the sediments that were present in the storm drain at Combined SWMU 65 were removed as part of the IM for AOC 699, which was conducted by the DET in 1999. As a result, these sediments are no longer present at this site. Figure 2 from the *Interim Measure Closure Report, AOC 699 Storm Drain Cleaning* (DET, 1999) is included in Appendix C and shows the sediment sampling location.

2.4 Wipe Sampling

The *Zone E RFI Work Plan, Revision 1* (EnSafe/Allen & Hoshall, 1995) did not propose the collection of wipe samples, however four wipe samples were collected and analyzed for lead during the RFI. Sample locations were determined in the field and targeted at areas where the heaviest concentrations of lead could be expected - areas where lead ingots and weights were formerly stored at SWMU 65. Appendix B contains a copy of Figure 10.6.4 from the RFI report that shows the wipe sampling locations. Based on the figure, it appears

that the three northernmost samples were collected within the footprint of Bulding 221, and the southermost sample may have been collected outside the southern side of Building 221.

Lead was detected in three of the four wipe samples collected at Combined SWMU 65, with a range of 60.6 to 210 mg/wipe and a mean of 140 mg/wipe. No residential or industrial RBCs were developed for wipe samples during the RFI.

No COCs were identified for the site based on wipe samples.

2.5 RFI Human Health Risk Assessment (HHRA)

The *Zone E RFI Report, Revision 0* used a fixed-point risk evaluation (FRE) approach at this site. The FRE included site resident and site worker exposure scenarios. The detailed risk assessment for the Combined SWMU 65 site is presented in Section 10.6.10 of the *Zone E RFI Report, Revision 0*.

2.5.1 Soils

No COCs were identified for surface or subsurface soils at the Combined SWMU 65 site.

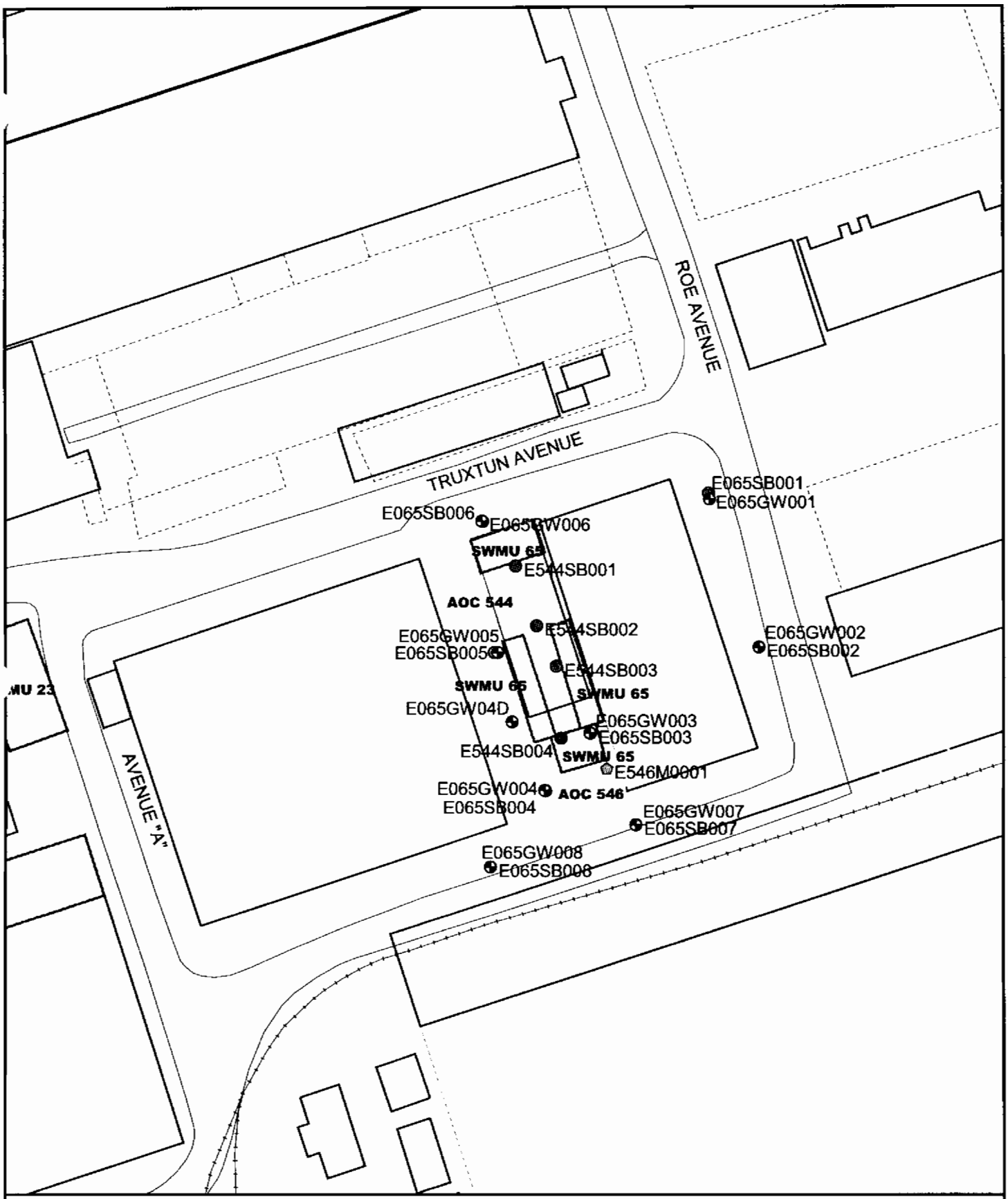
2.5.2 Groundwater

Arsenic, 1,2-DCE (total), TCE, and vinyl chloride were retained as shallow groundwater COCs.

Acetone, aluminum, antimony, arsenic, beryllium, alpha-BHC, beta-BHC, cadmium, chromium, copper, 1,2-DCE (total), dioxin equivalents, lead, mercury, vanadium, and vinyl chloride were retained as deep groundwater COCs.

2.6 RFI Conclusions and Recommendations

The *Zone E RFI Report, Revision 0* recommended that a CMS be conducted at Combined SWMU 65 for shallow and deep groundwater to address the analytes that were identified as COCs.



Groundwater Monitoring Well
Soil Boring Location
Sediment Sampling Location
Railroads
Roads
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary

N

0 40 80 Feet

1 inch = 82 feet

Figure 2-1
RFI Sampling Locations
Combined SWMU 65, Zone E
Charleston Naval Complex

CH2MHILL

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Section 3.0

3.0 Summary of Interim Measures and UST/AST Removals at Combined SWMU 65

3.1 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 storm drain catch basin at Combined SWMU 65 are no longer present at this site.

These IM activities are documented in a report titled *Interim Measure Completion Report for AOC 699 Storm Drain Cleaning* (DET, 1999). Appendix C includes a copy of Figure 2 from this IM Completion Report, which shows the location of the storm drain cleaned during this IM.

3.2 UST/AST Removals

One UST (UST No. 56) that was used to store fuel oil was removed before construction of Building 221. Another UST, identified as UST 221-1, was located at the southeast end of Building 221. This UST was linked to an OWS and tank system at Building 221 that was part of a steam cleaning pad. The pad was used for cleaning oily/greasy parts and components, and drained to the OWS. In 1983-1984 the operation was shut down. During 1996, the UST was removed by the DET. During the tank closure activities, the UST was removed, drained, and cleaned. It was then cut up and recycled as scrap metal. Contaminated soil was excavated and confirmatory soil samples were collected from the tank excavation area. The pipes were mildly corroded, but generally in good condition. The site was then backfilled with soil and resurfaced with asphalt. These activities are documented in the UST closure report, which is included in this RFIRA/CMSWP as Appendix D.

Section 4.0

4.0 Summary of Additional Investigations

This section summarizes the results and conclusions from the soil and groundwater investigations conducted at Combined SWMU 65 by CH2M-Jones during July and September 2002 to assess the presence of mercury in subsurface soil at one RFI location (E065SB003), and to evaluate current organic and inorganic chemical concentrations in groundwater.

A sampling and analysis plan (SAP) for this verification sampling at Combined SWMU 65 was prepared by CH2M-Jones and submitted to SCDHEC. The soil sampling was conducted during July 2002. Groundwater sampling was conducted during July and September 2002.

During the preparation of this RFIRA/CMSWP, verification of the former location of Building 1025 (prior to its relocation next to Building 221) indicated that the RFA and the RFI report showed an incorrect former location for Building 1025 (AOC 546). A review of the historic Public Works Map, Charleston Naval Base, dated June 30, 1937, showed the correct former location of Building 1025 to be approximately 160 feet northwest of the location shown in the RFI. Figure B-2 included in Appendix B of this report shows the actual location of Building 1025 in relation to the location shown in the RFI. A copy of an excerpt from this map is included as Figure B-3, including the legend confirming the operation at Building 1025 as a galvanizing shop. Both the location shown in the RFI report, and the location shown in this Public Works Map, are currently under Building 3.

The actual former location of Building 1025 overlaps one part of SWMU 67, as shown in Figure B-2. Although soil samples were collected as part of SWMU 67 within the footprint of the former Building 1025, they had been sampled only for mercury, the material of concern identified in the RFA for SMWU 67. Therefore, additional sampling for organics and inorganics (as part of AOC 546) was warranted at this correct location of Building 1025. A SAP Addendum was prepared by CH2M-Jones in November 2002 to outline this additional soil sampling, and was approved by SCDHEC. This soil sampling was conducted during December 2002, and the surface and subsurface soil samples were analyzed for VOCs, SVOCs, and metals. Since this area overlaps the location of SWMU 67, the analytical results from this soil sampling will be evaluated as part of the SMWU 67 RFIRA/CMSWP, to be submitted at a later date.

4.1 Soil Sampling and Analysis

4.1.1 July 2002 Sampling at AOC 544

One RFI subsurface soil sample (at boring location E544SB003; see Figure 2-1) showed an elevated mercury concentration. This location was resampled during July 2002 to verify this elevated concentration, and the new boring was identified as E544SB005. At this new resampling location, a subsurface sample was collected from the 3 to 5 feet below land surface (ft bls) depth interval and analyzed for mercury only. Copies of analytical results and data validation summaries are presented in Appendices E and F, respectively.

The subsurface soil concentration for mercury for this sample was compared with its generic SSL using a DAF=10 and the maximum Zone E background subsurface soil mercury concentration of 0.9 mg/kg.

The mercury concentration in this sample was 1.27 mg/kg, which is greater than the generic SSL (with a DAF=10) for mercury of 1 mg/kg and the maximum Zone E background subsurface soil mercury concentration of 0.9 mg/kg.

4.2 Groundwater Sampling and Analysis

During July 2002, groundwater was sampled at the site to verify current concentrations of organics. The eight existing shallow wells and one existing deep well at the site were sampled for VOCs. The locations of these wells are shown in Figure 2-1. Additionally, wells E065GW004 and E065GW009 were sampled for SVOCs, and well E065GW004 was sampled for pesticides.

Well E065GW009 is a replacement for well E065GW007 (installed and sampled during the RFI) which was abandoned.

In response to a request from SCDHEC, the eight shallow wells and one deep monitoring well at the site were sampled for metals during September 2002. During this sampling event, at each well, groundwater samples were split, and one of the two split samples was field-filtered before being sent for analyses to the offsite analytical laboratory. Samples were filtered using a 0.45-micron filter and field filtration procedures were followed per the EPA guidance document *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers* (EPA, 2002). Detections in groundwater samples were compared with the MCLs for organics and inorganics. Additionally, the detections of inorganic chemicals were compared with the maximum Zone E background concentrations from shallow and deep grid wells.

Detected concentrations of organic and inorganic chemicals from groundwater samples are shown in Table 4-1, and those chemicals exceeding their respective screening criteria are as follows:

VOCs: Vinyl chloride at E065GW003 and E065GW04D exceeded its MCL of 2 $\mu g/L$ at concentrations of 3.3 $\mu g/L$ and 3.2 $\mu g/L$, respectively.

SVOCs: No SVOC detections exceeded the screening criteria.

Pesticides: No pesticide detections exceeded the screening criteria.

Inorganics: Two inorganic chemicals exceeded their respective screening criteria:

- Antimony (dissolved) at E065GW003 exceeded its MCL of 6 $\mu g/L$ at a concentration of 28.2 $\mu g/L$. The total antimony concentration of 30.7 $\mu g/L$ in this well also exceeded the antimony MCL.
- Lead (dissolved) at E065GW003 and E065GW004 exceeded its treatment technique action level (TTAL) of 15 $\mu g/L$ at concentrations of 227 $\mu g/L$ and 19.9 $\mu g/L$, respectively. Total lead concentrations at E065GW003 and E065GW004 also exceeded the lead TTAL, at concentrations of 683 $\mu g/L$ and 25.6 $\mu g/L$, respectively.

4.3 COPC Summary

Based on a comparison of detected concentrations of chemicals in soil and groundwater from the 2002 sampling at Combined SWMU 65, the following chemicals were identified as COPCs:

4.3.1 Surface Soils

No COPCs have been identified in surface soils from the 2002 soil sampling.

4.3.2 Subsurface Soils

Based on the 2002 soil sampling, mercury was identified as a COPC in subsurface soil at Combined SWMU 65.

4.3.3 Shallow Groundwater

Based on the screening results for shallow groundwater detections at Combined SWMU 65, antimony, lead, and vinyl chloride are retained as COPCs.

4.3.4 Deep Groundwater

Vinyl chloride was identified as a COPC in deep groundwater at Combined SWMU 65.

TABLE 4-1
Detections in Groundwater; 2002 Sampling
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Sample ID	Station ID	Concentration (µg/L)	Qualifier	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
VOCs							
Shallow Groundwater							
1,1-DCA	065GW002M1	065GW002	1.1	J	80	NA	NA
1,2-DCE (total)	065GW003M1	065GW003	2.7	J	5.5	70	NA
	065GW004M1	065GW004	2.2	J			
	065GW006M1	065GW006	0.74	J			
Acetone	065GW002M1	065GW002	2.5	J	61	NA	NA
	065GW006M1	065GW006	3.3	J			
cis-1,2-DCE	065GW003M1	065GW003	2.7	J	6.1	70	NA
	065GW004M1	065GW004	2.2	J			
	065GW006M1	065GW006	0.74	J			
TCE	065GW003M1	065GW003	1.9	J	1.6	5	NA
	065GW004M1	065GW004	0.87	J			
Vinyl chloride	065GW003M1	065GW003	**3.3**	J	0.08	2	NA
VOCs							
Deep Groundwater							
Vinyl chloride	065GW04DM1	065GW04D	**3.2**	J	0.08	2	NA
1,2-DCE (total)	065GW04DM1	065GW04D	6.8	=	5.5	70	NA
1,4-DCB	065GW04DM1	065GW04D	0.6	J	0.47	75	NA
cis-1,2-DCE	065GW04DM1	065GW04D	5.9	=	6.1	70	NA
trans-1,2-DCE	065GW04DM1	065GW04D	0.92	J	12	100	NA
TCE	065GW04DM1	065GW04D	4.3	J	1.6	5	NA
SVOCs							
Shallow Groundwater							
Acenaphthene	065GW004M1	065GW004	0.65	J	37	NA	NA
	065GW009M1	065GW009	4	J			

TABLE 4-1
Detections in Groundwater; 2002 Sampling
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Sample ID	Station ID	Concentration (µg/L)	Qualifier	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
SVOCs							
Shallow Groundwater							
Dibenzofuran	065GW009M1	065GW009	0.46	J	2.4	NA	NA
Fluorene	065GW009M1	065GW009	1.3	J	24	NA	NA
Pesticides							
Shallow Groundwater							
p,p'-DDT	065GW004M1	065GW004	0.0073	J	0.2	NA	NA
Inorganics							
Shallow Groundwater							
Antimony (Total)	065GW003M2	065GW003	**30.7**	J	1.5	6	2.1 - 4.9
Antimony, Dissolved	065GW003M2	065GW003	**28.2**	J			
Arsenic (Total)	065GW003M2	065GW003	11.5	=	0.045	50	2.6 - 316
Arsenic, Dissolved	065GW003M2	065GW003	11	=			
Arsenic (Total)	065GW004M2	065GW004	11.9	=			
Arsenic, Dissolved	065GW004M2	065GW004	13.1	=			
Arsenic (Total)	065GW006M2	065GW006	10.9	=			
Arsenic (Total)	065GW008M2	065GW008	13.9	=			
Arsenic, Dissolved	065GW008M2	065GW008	5.02	J			
Barium (Total)	065GW001M2	065GW001	17.4	J	255	2,000	5.9 - 398
Barium, Dissolved	065GW001M2	065GW001	3.24	J			
Barium (Total)	065GW002M2	065GW002	159	J			
Barium, Dissolved	065GW002M2	065GW002	137	J			
Barium (Total)	065GW003M2	065GW003	22.7	J			
Barium, Dissolved	065GW003M2	065GW003	9.14	J			
Barium (Total)	065GW004M2	065GW004	27.4	J			

TABLE 4-1
Detections in Groundwater; 2002 Sampling
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

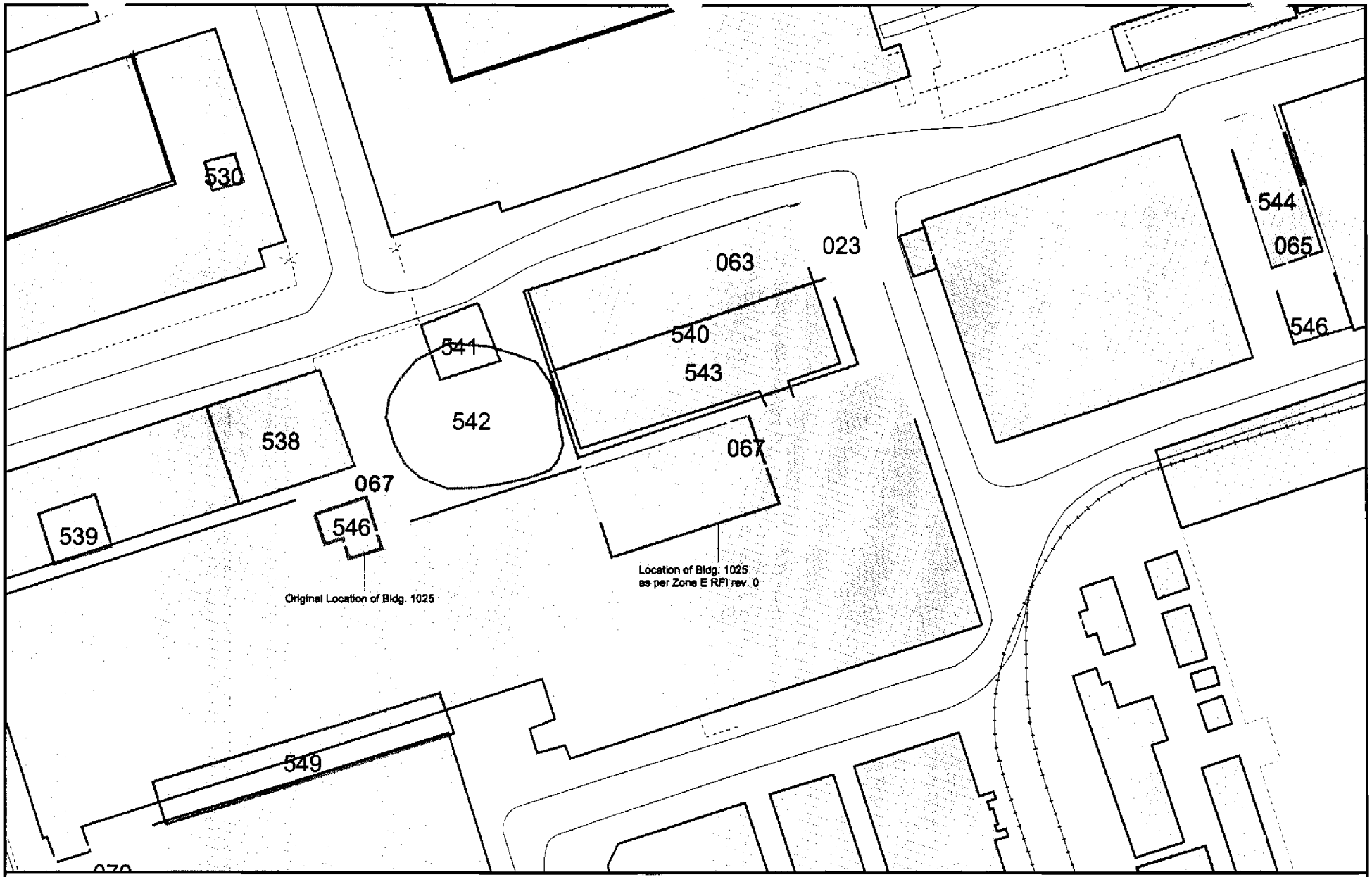
Parameter	Sample ID	Station ID	Concentration (µg/L)	Qualifier	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Inorganics							
Shallow Groundwater							
Barium, Dissolved	065GW004M2	065GW004	25.7	J	255	2,000	5.9 - 398
Barium (Total)	065GW005M2	065GW005	10.8	J			
Barium, Dissolved	065GW005M2	065GW005	4.93	J			
Barium (Total)	065GW006M2	065GW006	12.6	J			
Barium, Dissolved	065GW006M2	065GW006	6.5	J			
Barium (Total)	065GW008M2	065GW008	59.6	J			
Barium, Dissolved	065GW008M2	065GW008	34.3	J			
Barium (Total)	065GW009M2	065GW009	34	J			
Barium, Dissolved	065GW009M2	065GW009	14.9	J			
Cadmium (Total)	065GW003M2	065GW003	2.95	J	1.8	5	1.4
Chromium, Total	065GW003M2	065GW003	69.6	=	5,475	100	0.84 - 31.4
Chromium, Dissolved	065GW003M2	065GW003	31.5	=			
Chromium, Total	065GW004M2	065GW004	12.9	=			
Chromium, Dissolved	065GW004M2	065GW004	8.31	J			
Chromium (Hexavalent), Dissolved	065GW001M2	065GW001	11	J	11	NA	
	065GW002M2	065GW002	6	J			
	065GW009M2	065GW009	6	J			
Lead (Total)	065GW003M2	065GW003	**683**	=	NA	15 (TTAL)	1.5 - 46.7
Lead, Dissolved	065GW003M2	065GW003	**227**	=			

TABLE 4-1
Detections in Groundwater; 2002 Sampling
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Sample ID	Station ID	Concentration (µg/L)	Qualifier	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Inorganics							
Shallow Groundwater							
Lead (Total)	065GW004M2	065GW004	**25.6**	=	NA	15 (TTAL)	1.5 - 46.7
Lead, Dissolved	065GW004M2	065GW004	**19.9**	=			
Mercury (Total)	065GW003M2	065GW003	0.35	=	1.1	2	0.14 - 0.61
Mercury, Dissolved	065GW003M2	065GW003	0.041	J			
Mercury (Total)	065GW004M2	065GW004	0.086	J			
Zinc (Total)	065GW003M2	065GW003	762	=	1,095	NA	4.6 - 141
Zinc, Dissolved	065GW003M2	065GW003	234	=			
Zinc (Total)	065GW004M2	065GW004	45.3	=			
Zinc, Dissolved	065GW004M2	065GW004	36.7	=			
Inorganics							
Deep Groundwater							
Arsenic (Total)	065GW04DM2	065GW04D	19.1	=	0.045	50	2.6 - 132
Arsenic, Dissolved	065GW04DM2	065GW04D	16.2	=			
Barium (Total)	065GW04DM2	065GW04D	37.3	J	255	2,000	11.8 - 322
Barium, Dissolved	065GW04DM2	065GW04D	7.28	J			

Concentrations in bold and outlined within the table indicate exceedances of the screening criteria.

µg/L Micrograms per liter
HI Hazard index
MCL Maximum contaminant level
NA Not available/not applicable
TTAL Treatment technique action level
= Indicates that the analyte is detected at the concentration shown.
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.
U Indicates analyte not detected above laboratory detection limit.



Fence
Railroads
Roads
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary

N

0 70 140 Feet

1 inch = 100 feet

Figure 4-1
Previous Location of Building 1025, Zone E
Charleston Naval Complex

CH2MHILL

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Section 5.0

5.0 COPC/COC Refinement

The *Zone E RFI Report, Revision 0* (EnSafe, 1997) identified arsenic, 1,2-DCE (total), TCE, and vinyl chloride as shallow groundwater COCs. Acetone, aluminum, antimony, arsenic, beryllium, alpha-BHC, beta-BHC, cadmium, chromium, copper, 1,2-DCE (total), dioxin equivalents, lead, mercury, vanadium, and vinyl chloride were identifed as deep groundwater COCs for Combined SWMU 65. The RFI did not identify any COCs in soil.

Based on the additional soil sampling as described in Section 4.0, mercury in subsurface soil was identified as a COPC. Based on the additional groundwater sampling, antimony, lead, and vinyl chloride were identified as COPCs in shallow groundwater; vinyl chloride was identified as a COPC in deep groundwater.

The BCT has agreed to rescreen soil VOC data using generic SSLs based on a DAF=1. The results of this rescreening are presented below. The nature of occurrence and the relevance of COPCs at the site are also discussed below.

5.1 Soil VOC Rescreening using SSL at DAF=1

During the RFI, acetone, carbon disulfide, carbon tetrachloride, 1,2-DCE (total), ethylbenzene, methyl ethyl ketone, methylene chloride, vinyl chloride, and xylenes (total) were detected in soil samples at SWMU 65 and AOCs 544 and 546. Carbon tetrachloride, methylene chloride, and vinyl chloride were detected above their respective generic SSLs (based on a DAF=1). These three chemicals are further discussed below.

5.1.1 Carbon tetrachloride

Carbon tetrachloride was detected in one of ten surface soil samples and in one of nine subsurface soil samples. Both surface and subsurface detections were found in the soil boring location E544SB003 at 0.005 mg/kg and 0.004 mg/kg, respectively, which is above the generic SSL (with a DAF=1) of 0.003 mg/kg. Table 5-1 lists the carbon tetrachloride detections in surface and subsurface soils.

Site-specific SSLs were calculated for carbon tetrachloride. The SSL for carbon tetrachloride for the unpaved scenario is 0.13 mg/kg. For the paved scenario, the SSL is 1.3 mg/kg. The calculations for these SSLs are presented in Table 5-2. The detected concentrations of carbon tetrachloride at the site do not exceed either the paved or unpaved site-specific SSL, indicating that these concentrations do not pose a leaching concern.

Carbon tetrachloride was not detected in site groundwater samples, indicating that it is not migrating into groundwater. Based on these observations, carbon tetrachloride is not considered a soil COC at this site.

5.1.2 Methylene chloride

Methylene chloride was detected in three of 14 surface soil samples and in three of 12 subsurface soil samples. Table 5-1 lists the methylene chloride detections in surface and subsurface soils. Detections of methylene chloride above the SSL (DAF = 1) of 0.001 mg/kg, ranged from 0.019 mg/kg to 0.06 mg/kg in surface soil, and from 0.019 mg/kg to 0.035 mg/kg in subsurface soil.

Site-specific SSLs were calculated for methylene chloride. The SSL for methylene chloride under the unpaved scenario is 0.013 mg/kg. For the paved scenario, the SSL is 0.12 mg/kg. The site average concentration of methylene chloride was calculated to be 0.009 mg/kg for surface soil and 0.013 mg/kg for subsurface soil, as shown in Table 5-2. These detections are below the site-specific SSL for the unpaved scenario, indicating that methylene chloride detections in soil are not a leaching concern at this site.

Methylene chloride is a recognized common laboratory contaminant and has been widely detected previously in many blanks associated with CNC samples. Methylene chloride was detected in five of the laboratory blank samples associated with the Combined SWMU 65 sample data group (SDGs 23663 and 23704) at concentrations ranging from 3 μg/kg to 300 μg/kg, as shown in Appendix E. Based on EPA's "ten times rule," methylene chloride at concentrations up to 3,000 μg/kg may be considered as possible laboratory contamination. Methylene chloride detections at the site are below this value, indicating the possibility of these detections being due to laboratory contamination.

Methylene chloride was not detected in any of the groundwater sampling events, indicating that methylene chloride in soil does not pose a threat to groundwater via leaching. Based on these observations, methylene chloride is not considered a COC in soil at this site.

5.1.3 Vinyl Chloride

During the RFI, vinyl chloride was detected in one of 14 subsurface soil samples, and in none of the ten surface soil samples. The surface soil detection, at a concentration of 0.007 mg/kg at location E544SB004, exceeded the generic SSL (DAF=1) of 0.0007 mg/kg.

Site-specific SSLs were calculated for Combined SWMU 65 and are 0.0087 mg/kg for the unpaved scenario, and 0.085 mg/kg for the paved scenario, as shown in Table 5-2. The single detection of vinyl chloride at 0.007 mg/kg in the subsurface soil sample is below the

site-specific SSL for the unpaved scenario, indicating that it does not pose a leaching concern. There were no other detections in the surface or subsurface soil samples from the RFI sampling events at the site. Based on these observations, vinyl chloride is not considered a COC for soil at Combined SWMU 65.

5.2 COCs in Soil

5.2.1 Mercury

Mercury was not identified as a COC in the RFI report. In surface soil samples from the RFI and 2002 sampling at Combined SWMU 65, mercury was detected in 14 out of 16 samples, with concentrations ranging from 0.006 mg/kg to 0.220 mg/kg. Table 5-1 lists detected mercury concentrations in surface and subsurface soils. No surface soil samples had mercury concentrations that exceeded the EPA Region III residential RBC (HI=0.1) of 2.3 mg/kg. Therefore, mercury is not a surface soil COC for the direct exposure pathway for either the unrestricted or the industrial land use scenario.

In subsurface soil samples from the RFI and 2002 sampling, mercury was detected in 12 out of 15 subsurface soil samples, with concentrations ranging from 0.015 mg/kg to 8.2 mg/kg. One RFI subsurface soil sample (from E544SB003) showed a detection of 8.2 mg/kg, which is above the SSL of 1 mg/kg. This location (E544SB003) was resampled during the July 2002 sampling event and identified as E544SB005. The sample from this location showed a mercury concentration of 1.27 mg/kg, which slightly exceeds the generic SSL (with a DAF=10) of 1 mg/kg.

The subsurface soil site average for mercury was calculated to be 0.75 mg/kg, as shown in Table 5-1. This average value is below the generic SSL (with a DAF=10) for mercury of 1 mg/kg. Based on this evaluation, mercury is not considered a leaching hazard at the site.

Mercury was detected in groundwater above its MCL of 2 μg/L in two different shallow wells E065GW001 (at 2.3 μg/L) and E065GW004 (at 5.7 μg/L), during four RFI sampling events. These detections were preceded and followed by non-detects, except for an estimated value of 0.09 J μg/L in one sample (see Table 5-3). During the September 2002 sampling event, mercury was detected at 0.35 μg/L in the sample from E065GW003 and at 0.086 μg/L in the sample from E065GW004. Both of these detections are below the MCL of 2 μg/L, indicating that soil concentrations of mercury at the site are not a threat to groundwater.

Based on these observations, mercury is not considered a soil COC at this site.

5.3 COCs in Groundwater

5.3.1 Acetone

The RFI report considered acetone as a shallow groundwater COC based on a detection of acetone above the EPA Region III tap water RBC at SWMU 65 and AOCs 544 and 546. This detection, at a concentration of 380 $\mu g/L$ at well E065GW002, exceeded the tap water RBC of 370 $\mu g/L$ for acetone in use during the RFI. There is no MCL for acetone.

Acetone was not detected above laboratory detection limits in this well during three subsequent groundwater sampling events, or in any other site wells during any RFI sampling event. During the 2002 sampling event, acetone was detected at 2.5 $\mu g/L$ in the sample from E065GW002 and at 3.3 $\mu g/L$ in the sample from E065GW006, below its current tap water RBC of 61 $\mu g/L$.

Acetone was detected in two of the laboratory blank samples and a field blank sample associated with the Combined SWMU 65 sample data group (SDG 25330) at concentrations of 2 $\mu g/L$, 6 $\mu g/L$, and 16 $\mu g/L$, respectively, as shown in Appendix E. Based on the "ten times" rule for common laboratory contaminants (per EPA guidance), concentrations in samples up to 160 $\mu g/L$ could be considered as likely present from laboratory contamination. Acetone is a recognized common laboratory contaminant and has been widely detected previously in many blanks associated with CNC samples. Because of its presence in the field and laboratory blanks and infrequently in site samples, it is likely that the acetone detections are not due to site-related activities, but due to field and laboratory contamination.

Based on these observations, acetone is not considered a COC in groundwater at the site.

5.3.2 Aluminum

The RFI report considered aluminum as a shallow groundwater COC based on a single detection of aluminum above the EPA Region III tap water RBC and shallow groundwater BRC in shallow groundwater at SWMU 65 and AOCs 544 and 546. The detection, at a concentration of 21,500 $\mu g/L$ at well E065GW003, exceeded the maximum Zone E background aluminum concentration in shallow groundwater of 16,100 $\mu g/L$. The sampling event during which this value of 21,500 $\mu g/L$ was recorded was the first time the well was sampled, on April 18, 1996. There is no primary MCL for aluminum. The aluminum detections in well E570GW002 in the subsequent three groundwater sampling events were well below the maximum Zone E background aluminum concentration in shallow groundwater, as shown in Table 5-3. All aluminum detections in the other wells associated

with Combined SWMU 65 were the maximum Zone E background aluminum concentration in shallow groundwater of 16,100 μg/L. Also, inspection of the field data form during the sampling of this well when the value of 21,500 μg/L was recorded indicates that turbidity values during well purging ranged from 142 to 288 nephelometric turbidity units (NTUs). Thus, it is highly likely that turbidity in the groundwater samples during this sampling event impacted the results. EPA recommends turbidities of less than 10 NTUs as most representative of groundwater concentrations. Copies of these field data forms are presented in Appendix G. Based on these observations, aluminum is not considered a groundwater COC for this site.

5.3.3 Antimony

The RFI report considered antimony as a shallow groundwater COC at Combined SWMU 65 based on its detection in three shallow groundwater samples, at E065GW003, E065GW004, and E065GW005, at concentrations of 42 μg/L, 5.1 μg/L, and 4.5 μg/L respectively, that exceeded the tap water RBC (HI=0.1) of 1.5 μg/L. The 5.1 μg/L concentration, as presented in the RFI report, comes from a duplicate sample, E065HW00401, which was collected from the groundwater sample E065GW00401. The native sample at E065GW004 did not show a detection above laboratory detection limit.

The antimony detection of 42 μg/L in the sample from well E065GW003 exceeded the antimony MCL of 6 μg/L and the maximum Zone E background antimony concentration of 5 μg/L for shallow groundwater. Antimony concentrations in groundwater samples from this well during the subsequent two RFI sampling events were below laboratory detection limits. In the fourth RFI sampling event, the antimony detection in this well was 17.9 μg/L, above its MCL. Antimony detections in groundwater are shown in Table 5-3.

Antimony detections in well E065GW003 from the September 2002 sampling event were 30.7 μg/L (for total antimony) and 28.2 μg/L (for dissolved antimony), which is above its MCL. Due to these exceedances of the MCL, antimony will be retained as a COC in shallow groundwater and will be addressed as part of a CMS as outlined in the CMSWP in Section 8.0 of this document.

5.3.4 Arsenic

Shallow Groundwater

The RFI report considered arsenic as a COC in shallow groundwater at Combined SWMU 65 based on its detection in two shallow groundwater samples from E065GW003 and E065GW004, at concentrations of 22.6 μg/L and 58.8 μg/L respectively, that exceeded both

the EPA Region III tap water RBC of 0.045 μg/L and the shallow groundwater BRC for arsenic. The detection of 58.8 μg/L at E065GW004 is above the South Carolina MCL for arsenic of 50 μg/L. Arsenic detections during the subsequent groundwater sampling events in these wells and in all other wells were below the South Carolina MCL for arsenic of 50 μg/L, as shown in Table 5-3. Arsenic detections in these and other site wells during the September 2002 sampling were also below the South Carolina MCL.

Based on similar observances of elevated arsenic at other locations at the CNC, and a relationship between arsenic above its MCL and iron concentrations greater than 1,000 μg/L, which is indicative of natural iron-reducing conditions in the aquifer, a summary of the arsenic and iron concentrations in groundwater samples from well E065GW004 was created, and is presented in Table 5-4. This table indicates that on the single occasion that arsenic exceeded its MCL in well E065GW004, the iron concentration was 11,300 μg/L, which is well above the 1,000 μg/L value used by EPA as an indicator of iron-reducing conditions. Thus, the occurrence of arsenic in the well above its MCL is likely related to natural geochemical conditions at the CNC. These geochemical conditions and the relationship between elevated arsenic and iron have been previously summarized in a Technical Memorandum, *A Discussion on the Occurrence of Arsenic in Background Groundwater at the CNC*, dated November 25, 2002 and submitted by CH2M Jones to SCDHEC.

Based on these observations, arsenic is believed to be present due to natural geochemical conditions and is not considered a shallow groundwater COC for this site.

Deep Groundwater

The RFI report considered arsenic as a deep groundwater COC at Combined SWMU 65 based on its detection in the sample from E065GW04D, at a concentration of 22.8 μg/L, that exceeded both the tap water RBC of 0.045 μg/L and the maximum Zone E BRC of 16.4 μg/L. However, the detection did not exceed the South Carolina MCL for arsenic of 50 μg/L, as shown in Table 5-3. Arsenic detections during the subsequent groundwater sampling events were also below the MCL. Based on these observations, arsenic is not a deep groundwater COC for this site.

5.3.5 Beryllium

The RFI report considered beryllium as a shallow groundwater COC at Combined SWMU 65 based on its detection in two shallow groundwater samples from E065GW003 and E065GW004, at concentrations of 1.2 μg/L and 2 μg/L respectively, that exceeded both the tap water RBC of 0.016 μg/L used during the RFI, and Zone E shallow groundwater BRC of 0.43 μg/L for beryllium. However, the detections did not exceed the current beryllium MCL

of 4 μg/L or the current EPA Region III tapwater RBC (HI=0.1) of 7.3 μg/L, as shown in Table 5-3. Beryllium detections during the subsequent groundwater sampling events were also below the MCL. Based on these observations, beryllium is not a groundwater COC at this site.

5.3.6 Alpha-BHC

Alpha-BHC was retained in the RFI as a shallow groundwater COC, based on a detection of 0.13 μg/L in the sample from E065GW004, which exceeded the tap water RBC of 0.011 μg/L. No MCL for alpha-BHC has been established by the EPA. During the subsequent three groundwater sampling events, alpha-BHC was not detected above laboratory detection limits in any of the wells associated with SWMU 65 and AOCs 544 and 546, as shown in Table 5-3. Well E065GW004 was sampled again during July 2002, and alpha-BHC was not detected above laboratory detection limits. Based on these observations, alpha-BHC is not a groundwater COC at this site.

5.3.7 Beta-BHC

The RFI considered beta-BHC as a shallow groundwater COC based on a detection of 0.048 μg/L in one sample from the well E065GW004 , which exceeded the tap water RBC of 0.037 μg/L. No MCL for beta-BHC has been established by the EPA. During the subsequent three groundwater sampling events, beta-BHC was not detected above laboratory detection limits in any of the wells associated with SWMU 65 and AOCs 544 and 546, as shown in Table 5-3. Well E065GW004 was sampled again during July 2002, and beta-BHC was not detected above laboratory detection limits. Based on these observations, beta-BHC is not a groundwater COC at this site.

5.3.8 Cadmium

The RFI report considered cadmium as a shallow groundwater COC at Combined SWMU 65, based on one detection in the sample from E065GW003 at a concentration of 6.9 μg/L, that exceeded the tap water RBC (HI=0.1) of 1.8 μg/L. The sampling event during which this value of 6.9 μg/L was recorded was the first time the well was sampled, on April 18, 1996. No shallow groundwater BRC was developed for cadmium in Zone E, during the RFI. The detection also exceeded the cadmium MCL of 5 μg/L, as shown in Table 5-3. However, cadmium detections in samples from E065GW003 and other wells at Combined SWMU 65 during three subsequent RFI groundwater sampling events and the September 2002 sampling event were either below laboratory detection limits or below the MCL. Also, inspection of the field data form during the sampling of this well when the value of 6.9 μg/L was recorded, indicates that turbidity values during well purging ranged from 142 to

288 NTUs. Appendix G presents a copy of this field sampling report. Thus, it is highly likely that turbidity in the groundwater samples during this sampling event impacted the results. EPA recommends turbidities of less than 10 NTUs as most representative of groundwater concentrations. Based on these observations, cadmium is not considered a groundwater COC at this site.

5.3.9 Chromium

The RFI report considered chromium as a shallow groundwater COC at Combined SWMU 65 based on its detection in samples from wells E065GW003 and 065GW004, at concentrations of 245 μg/L and 159 μg/L, respectively, that exceeded both the tap water RBC of 12.3 μg/L and the shallow groundwater BRC of 12.3 μg/L for chromium. The detections also exceeded the chromium MCL of 100 μg/L, as shown in Table 5-3. The sampling event during which the value of 245 μg/L was recorded in well E065GW003 was the first time the well was sampled, on April 18, 1996. The sampling event during which the value of 159 μg/L was recorded in well E065GW004 was also the first sampling event for that well, on April 17, 1996. Inspection of the field data form during the sampling of well E065GW003 when the value of 245 μg/L was recorded, indicates that turbidity values during well purging ranged from 142 to 288 NTUs (see Appendix G). Thus, it is highly likely that turbidity in the groundwater samples during this sampling event impacted the results. The turbidity in well E065GW004 ranged from 3 to 29 NTUs. These data suggest that it is possible, although not as conclusive as the turbidity data for well E065GW003, that turbidity was a factor in the elevated detection of chromium in well E065GW004 during this one sampling event in 1996. Chromium detections during all three subsequent RFI groundwater sampling events and the September 2002 sampling event were all below the MCL. Based on these observations, chromium does not appear to be present in groundwater at the site and is not considered a groundwater COC at this site.

5.3.10 Copper

The RFI report considered copper as a shallow groundwater COC at Combined SWMU 65 based on its detection in samples from E065GW003 and E065GW004, at concentrations of 536 μg/L and 178 μg/L, respectively, that exceeded both the tap water RBC of 150 μg/L and shallow groundwater BRC of 2.7 μg/L for copper. There is no primary MCL for copper. The screening criterion presribed by EPA is the treatment technique action level (TTAL) for copper, which is 1,300 μg/L (*National Primary Drinking Water Standards,* EPA 2001). None of the detections exceed the TTAL, as shown in Table 5-3. As per the previous discussions of inorganic chemical exceedances during the first sampling events above, these elevated detections of copper also occurred during the first sampling events for these two wells. As stated above, turbidity is a very likely cause for the elevated detections for well E065GW003, and a potential reason for the single elevated detection in well E065GW004.

Copper detections during the subsequent RFI groundwater sampling events were also below the MCL. There were no copper detections above laboratory detection limits in any wells during the September 2002 sampling event.

Based on these observations, copper does not appear to be present in the groundwater at the site, and copper is not considered a groundwater COC for this site.

5.3.11 1,2-DCE (Total)

Shallow Groundwater

The RFI report considered 1,2-DCE (total) as a shallow groundwater COC at Combined SWMU 65 based on one detection from E065GW003, at a concentration of 7 μg/L, that exceeded the tap water RBC (HI=0.1) for 1,2-DCE (total) of 5.5 μg/L. However, the detection did not exceed the MCL for 1,2-DCE (total) of 70 μg/L, as shown in Table 5-3. 1,2-DCE (total) detections during the subsequent RFI groundwater sampling events were all below the MCL. Based on these observations, 1,2-DCE (total) is not considered a shallow groundwater COC for this site.

Deep Groundwater

The RFI report considered 1,2-DCE (total) as a deep groundwater COC at Combined SWMU 65 based on its detection at location, E569GW04D, at a concentration of 10 μg/L, that exceeded the tap water RBC for 1,2-DCE (total) of 5.5 μg/L. However, the detection did not exceed the 1,2-DCE (total) MCL of 70 μg/L, as shown in Table 5-3. 1,2-DCE (total) concentrations during subsequent groundwater sampling events were also below the MCL. For this reason, 1,2-DCE (total) is not a deep groundwater COC for this site.

5.3.12 TCDD-Equivalents (TEQs)

The RFI report considered dioxin as a shallow groundwater COC at Combined SWMU 65 based on one detection of 2.42 pg/L of TEQs (dioxin equivalents) in the duplicate sample from shallow groundwater monitoring well E065GW004, exceeding the 2,3,7,8-TCDD tap water RBC of 0.4 pg/L. All calculated TEQ values from detections of dioxin compounds at the site range from 1.45 pg/L to 5.8 pg/L , and are below the MCL for dioxin of 30 pg/L (see Table 5-3). Based on these observations, TEQs are not considered COCs at this site.

5.3.13 Lead

The RFI report considered lead as a shallow groundwater COC at Combined SWMU 65 based on its detection in samples from E065GW003 and E065GW004 at concentrations of 1,690 μg/L and 315 μg/L respectively, that exceeded both the TTAL for lead of 15 μg/L and the BRC of 4.8 μg/L for lead. During the subsequent four sampling events, all of the

detections of lead at E065GW004 were below the shallow groundwater maximum background concentration of 47 μg/L, and all but one of the detections was below the TTAL of 15 μg/L for lead. The lead detections in well E065GW003 in the subsequent four groundwater sampling events ranged from 207 μg/L to 349 μg/L, and exceeded both the TTAL of 15 μg/L and maximum shallow groundwater background concentration of 47 μg/L, as shown in Table 5-3.

During the September 2002 sampling, lead was detected in samples from E065GW003 at 683 μg/L (for total lead) and 227 μg/L (dissolved lead); and in samples from E065GW004 at 25.6 μg/L (for total lead) and 19.9 μg/L (for dissolved lead). These detections are above the TTAL of 15 μg/L.

Based on these exceedances, lead is retained as a COC in shallow groundwater and will be addressed in the CMS for Combined SWMU 65.

5.3.14 Mercury

The RFI report considered mercury as a shallow groundwater COC at Combined SWMU 65 based on its detection in a sample from E065GW004 at a concentration of 5.9 μg/L, that exceeded the tap water RBC (HI=0.1) of 1.1 μg/L. As with a number of other solitary elevated inorganic detections,this detection occurred during the first sampling event of April 1996 when high turbidity was noted during sample collection in this well. The detection also exceeded the mercury MCL of 2 μg/L. No BRC was developed for mercury in shallow groundwater for Zone E, during the RFI. Mercury concentrations at E065GW004 during three subsequent RFI sampling events were below laboratory detection limits. One mercury detection of 2.3 μg/L at E065GW001 during the third sampling event exceeded the MCL for mercury of 2 μg/L, but was preceded and succeeded by mercury detections below laboratory detection limits, as shown in Table 5-3. Based on these observations, mercury is not considered a groundwater COC for this site.

5.3.15 TCE

Shallow Groundwater

The RFI report did not consider TCE as a shallow groundwater COC at Combined SWMU. However the RFI considered the results from only the first groundwater sampling event. During the subsequent three RFI sampling, TCE was detected at location E065GW003, at concentrations ranging from 15 μg/L to 16 μg/L, exceeding its MCL of 5 μg/L, as shown in Table 5-3. During the July 2002 groundwater sampling, TCE was detected at a concentration

of 1.9 μg/L, which is below the MCL of 5 μg/L. Due to historical exceedance of the MCL in samples from this well, TCE will be retained as a shallow groundwater COC at this site.

Deep Groundwater

The RFI report considered TCE as a deep groundwater COC at Combined SWMU 65 based on its detection in the sample from E065GW04D at a concentration of 8 μg/L, that exceeded both the tap water RBC for TCE of 1.6 μg/L and the MCL for TCE of 5 μg/L, as shown in Table 5-3. During the second sampling event TCE was detected at E065GW04D at a concentration of 6 μg/L, which also exceeded the MCL. However, during the subsequent two sampling events, TCE was detected at this location at concentrations below the MCL. During the July 2002 sampling event, TCE was detected in this well at 4.3 μg/L, which is below the MCL. The TCE concentrations in the last three sampling events have been below the MCL. TCE is retained a COC for deep groundwater at this time.

5.3.16 Vanadium

The RFI report considered vanadium as a COC at Combined SWMU 65 based on its detection in shallow groundwater locations, E065GW003 and E065GW004, at concentrations of 62.5 μg/L and 167 μg/L, that exceeded both the EPA Region III tap water RBC (HI=0.1) for vanadium of 26 μg/L, and the Zone E shallow groundwater BRC of 11.4 μg/L for vanadium. As with other solitary elevated inorganic detections, both of these occurred during the first sampling event of April 1996 when high turbidity was noted during sample collection in this well. No primary MCL exists for vanadium. The vanadium detections in wells E065GW003 and EO65GW004 in the subsequent three groundwater sampling events did not exceed its tap water RBC of 26 μg/L, or the maximum shallow groundwater background concentration of 26 μg/L, as shown in Table 5-3. It is likely that turbidity caused the elevated detections in this initial sampling event. Based on these observations, vanadium is not considered a groundwater COC for this site.

5.3.17 Vinyl Chloride

Shallow Groundwater

The RFI report considered vinyl chloride as a shallow groundwater COC at Combined SWMU 65 based on its in the sample from E065GW003 at a concentration of 6 μg/L, that exceeds both the tap water RBC for vinyl chloride of 0.019 μg/L and the vinyl chloride MCL of 2 μg/L, as shown in Table 5-3. This detection was followed by a detection of 2 μg/L equal to the MCL in the second RFI sampling event, and two detections in the third and fourth RFI sampling events below the laboratory detection limit. During the September 2002 sampling event, vinyl chloride was detected in the sample from this well at 3.3 μg/L, above

the MCL of 2 $\mu g/L$. Based on these exceedances of the MCL, vinyl chloride will be retained as a COC in shallow groundwater at Combined SWMU 65 and addressed as part of a focused CMS.

Deep Groundwater

The RFI report considered vinyl chloride as a deep groundwater COC at Combined SWMU 65 based on a detection of 6 $\mu g/L$ in the sample from E065GW04D, that exceeded both the tap water RBC for vinyl chloride of 0.019 $\mu g/L$ and the MCL for vinyl chloride of 2 $\mu g/L$, as shown in Table 5-3. This detection was followed by a detection of 6 $\mu g/L$ in the second RFI sampling event, and detections below the MCL in the third and fourth RFI sampling events. During the July 2002 sampling event, vinyl chloride was detected in this well at 3.2 $\mu g/L$, which is above its MCL. Based on these exceedances of the MCL, vinyl chloride will be retained as a COC in deep groundwater and addressed as part of a focused CMS for Combined SWMU 65.

5.4 COC Summary

No COCs have been identified in soil at this combined site. Antimony, lead, TCE, and vinyl chloride are identified as COCs in shallow groundwater; and TCE and vinyl chloride are identified as COCs in deep groundwater. These COCs in groundwater at Combined SWMU 65 will be addressed in a CMS. A CMSWP is provided in Section 8.0 of this report.

TABLE 5-1
Surface and Subsurface Soil Detections of Carbon Tetrachloride, Mercury, Methylene Chloride, and Vinyl Chloride
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL (DAF=1)	Site-specific SSL (unpaved)	Site-specific SSL (paved)
Carbon Tetrachloride	E065SB00101	E065SB001	0.006	U	12/04/1995	4.9	0.003	0.13	1.3
Surface Soil	E065SB00201	E065SB002	0.006	U	10/30/1995				
	E065SB00301	E065SB003	0.006	U	09/27/1995				
	E065SB00401	E065SB004	0.007	U	09/27/1995				
	E065SB00501	E065SB005	0.006	U	09/27/1995				
	E065SB00601	E065SB006	0.006	U	09/28/1995				
	E544SB00101	E544SB001	0.006	U	09/28/1995				
	E544SB00201	E544SB002	0.006	U	09/28/1995				
	E544SB00301	E544SB003	**0.005**	J	09/29/1995				
	E544SB00401	E544SB004	0.006	U	09/27/1995				
	E546SB00101	E546SB001	0.005	U	12/12/2002				
	E546SB00201	E546SB002	0.006	U	12/12/2002				
	E546SB00301	E546SB003	0.005	U	12/12/2002				
	E546SB00401	E546SB004	0.006	U	12/12/2002				
Carbon Tetrachloride	E544SB00102	E544SB001	0.006	U	09/28/1995	NA	0.003	0.13	1.3
Subsurface Soil	E544SB00202	E544SB002	0.006	U	09/28/1995				
	E544SB00302	E544SB003	0.004	J	09/29/1995				
	E544SB00402	E544SB004	0.006	U	09/27/1995				

TABLE 5-1
Surface and Subsurface Soil Detections of Carbon Tetrachloride, Mercury, Methylene Chloride, and Vinyl Chloride
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL (DAF=1)	Site-specific SSL (unpaved)	Site-specific SSL (paved)
Carbon Tetrachloride	E065SB00102	E065SB001	0.009	U	12/04/1995	NA	0.003	0.13	1.3
Subsurface Soil	E065SB00302	E065SB003	0.006	U	09/27/1995				
	E065SB00502	E065SB005	0.034	U	09/27/1995				
	E065SB00602	E065SB006	0.006	U	09/28/1995				
	E065SB00603	E065SB006	0.006	U	11/07/1995				
	E546SB00102	E546SB001	0.005	U	12/12/2002				
	E546SB00202	E546SB002	0.005	U	12/12/2002				
	E546SB00302	E546SB003	0.005	U	12/12/2002				
Mercury	E544SB00301	E544SB003	0.03	=	09/29/1995	2.3	1	0.455	4.45
Surface Soil	E544SB00101	E544SB001	0.03	=	09/28/1995		(DAF=10)		
	E544SB00401	E544SB004	0.06	=	09/27/1995				
	E544SB00201	E544SB002	0.03	=	09/28/1995				
	E065SB00201	E065SB002	0.02	U	10/30/1995				
	E065SB00301	E065SB003	0.22	=	09/27/1995				
	E065SB00401	E065SB004	0.06	=	09/27/1995				
	E065SB00501	E065SB005	0.03	=	09/27/1995				
	E065SB00601	E065SB006	0.06	=	09/28/1995				
	E065SB00701	E065SB007	0.04	U	09/10/1996				

TABLE 5-1
Surface and Subsurface Soil Detections of Carbon Tetrachloride, Mercury, Methylene Chloride, and Vinyl Chloride
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL (DAF=1)	Site-specific SSL (unpaved)	Site-specific SSL (paved)
Mercury	E065SB00801	E065SB008	0.21	=	09/10/1996	2.3	1	0.455	4.45
Surface Soil	E065SB00101	E065SB001	0.15	=	12/04/1995		(DAF=10)		
	E546SB00101	E546SB001	0.158	=	12/12/2002				
	E546SB00201	E546SB002	0.066	J	12/12/2002				
	E546SB00301	E546SB003	0.103	J	12/12/2002				
	E546SB00401	E546SB004	0.006	J	12/12/2002				
Mercury	E544SB00102	E544SB001	0.1	=	09/28/1995	NA	1	0.455	4.45
Subsurface Soil	E544SB00202	E544SB002	0.02	U	09/28/1995		(DAF=10)		
	E544SB00302	E544SB003	**8.2**	=	09/29/1995				
	E544SB00402	E544SB004	0.36	=	09/27/1995				
	E065SB00702	E065SB007	0.2	=	09/10/1996				
	E065SB00102	E065SB001	0.28	=	12/04/1995				
	E065SB00302	E065SB003	0.25	=	09/27/1995				
	E065SB00502	E065SB005	0.12	=	09/27/1995				
	E065SB00602	E065SB006	0.02	U	09/28/1995				
	E065SB00802	E065SB008	0.33	=	09/10/1996				
	E065SB00603	E065SB006	0.03	U	11/07/1995				
	E546SB00102	E546SB001	0.022	J	12/12/2002				

TABLE 5-1
Surface and Subsurface Soil Detections of Carbon Tetrachloride, Mercury, Methylene Chloride, and Vinyl Chloride
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL (DAF=1)	Site-specific SSL (unpaved)	Site-specific SSL (paved)
Mercury	E546SB00202	E546SB002	0.015	J	12/12/2002	NA	1	0.455	4.45
Subsurface Soil	E546SB00302	E546SB003	0.094	J	12/12/2002		(DAF=10)		
	E546SB00502	E546SB005	**1.27**	J	07/22/2002				
		Average	0.75						
Methylene Chloride									
Surface Soil	E544SB00301	E544SB003	0.006	U	09/29/1995	85	0.001	0.013	0.12
	E544SB00101	E544SB001	0.006	U	09/28/1995				
	E544SB00401	E544SB004	0.007	U	09/27/1995				
	E544SB00201	E544SB002	**0.024**	=	09/28/1995				
	E065SB00201	E065SB002	0.006	U	10/30/1995				
	E065SB00301	E065SB003	**0.06**	J	09/27/1995				
	E065SB00401	E065SB004	0.007	U	09/27/1995				
	E065SB00501	E065SB005	0.006	U	09/27/1995				
	E065SB00601	E065SB006	**0.019**	J	09/28/1995				
	E065SB00101	E065SB001	0.006	U	12/04/1995				
	E546SB00101	E546SB001	0.005	U	12/12/2002				
	E546SB00201	E546SB002	0.006	U	12/12/2002				

TABLE 5-1
Surface and Subsurface Soil Detections of Carbon Tetrachloride, Mercury, Methylene Chloride, and Vinyl Chloride
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL (DAF=1)	Site-specific SSL (unpaved)	Site-specific SSL (paved)
Methylene Chloride	E546SB00301	E546SB003	0.005	U	12/12/2002	85	0.001	0.013	0.12
Surface Soil	E546SB00401	E546SB004	0.006	U	12/12/2002				
		Average	0.009						
Methylene Chloride	E544SB00102	E544SB001	0.034	=	09/28/1995	NA	0.001	0.013	0.12
Subsurface Soil	E544SB00202	E544SB002	**0.028**	J	09/28/1995				
	E544SB00302	E544SB003	0.006	U	09/29/1995				
	E544SB00402	E544SB004	0.007	U	09/27/1995				
	E065SB00102	E065SB001	0.009	U	12/04/1995				
	E065SB00302	E065SB003	0.006	U	09/27/1995				
	E065SB00502	E065SB005	0.034	U	09/27/1995				
	E065SB00602	E065SB006	**0.035**	J	09/28/1995				
	E065SB00603	E065SB006	**0.019**	=	11/07/1995				
	E546SB00102	E546SB001	0.005	U	12/12/2002				
	E546SB00202	E546SB002	0.005	U	12/12/2002				
	E546SB00302	E546SB003	0.005	U	12/12/2002				
		Average	0.013						

TABLE 5-1
Surface and Subsurface Soil Detections of Carbon Tetrachloride, Mercury, Methylene Chloride, and Vinyl Chloride
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL (DAF=1)	Site-specific SSL (unpaved)	Site-specific SSL (paved)
Vinyl Chloride	E544SB00301	E544SB003	0.011	U	09/29/1995	0.85	0.0007	0.0087	0.085
Surface Soil	E544SB00101	E544SB001	0.011	U	09/28/1995				
	E544SB00401	E544SB004	0.013	U	09/27/1995				
	E544SB00201	E544SB002	0.012	U	09/28/1995				
	E065SB00201	E065SB002	0.012	U	10/30/1995				
	E065SB00301	E065SB003	0.012	U	09/27/1995				
	E065SB00401	E065SB004	0.014	U	09/27/1995				
	E065SB00501	E065SB005	0.012	U	09/27/1995				
	E065SB00601	E065SB006	0.011	U	09/28/1995				
	E065SB00101	E065SB001	0.012	U	12/04/1995				
	E546SB00101	546SB001	0.0103	U	12/12/2002				
	E546SB00201	546SB002	0.0129	U	12/12/2002				
	E546SB00301	546SB003	0.0106	U	12/12/2002				
	E546SB00401	546SB004	0.0115	U	12/12/2002				
Vinyl Chloride	E544SB00102	E544SB001	0.012	U	09/28/1995	NA	0.0007	0.0087	0.085
Subsurface Soil	E544SB00202	E544SB002	0.011	U	09/28/1995				
	E544SB00302	E544SB003	0.012	U	09/29/1995				
	E544SB00402	E544SB004	**0.007**	J	09/27/1995				

TABLE 5-1
Surface and Subsurface Soil Detections of Carbon Tetrachloride, Mercury, Methylene Chloride, and Vinyl Chloride
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL (DAF=1)	Site-specific SSL (unpaved)	Site-specific SSL (paved)
Vinyl Chloride	E065SB00102	E065SB001	0.018	U	12/04/1995	NA	0.0007	0.0087	0.085
Subsurface Soil	E065SB00302	E065SB003	0.012	U	09/27/1995				
	E065SB00502	E065SB005	0.068	U	09/27/1995				
	E065SB00602	E065SB006	0.013	U	09/28/1995				
	E065SB00603	E065SB006	0.013	U	11/07/1995				
	E546SB00102	546SB001	0.0109	U	12/12/2002				
	E546SB00202	546SB002	0.0106	U	12/12/2002				
	E546SB00302	546SB003	0.0105	U	12/12/2002				
		Average	0.009						

Concentrations in bold and outlined within the table represent exceedances of the appropriate screening criteria.

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

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

NA Not applicable/not available

U Indicates analyte not detected above laboratory detection limit.

Table 5-2
Leachate Transport Analysis Model
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

						Parameter	Vinyl chloride	Carbon Tetrachloride	Methylene chloride
Chemical Specific Input Parameters									
Cw	=	Target groundwater concentration MCL (mg/L)					2.00E-03	5.00E-03	5.00E-03
H	=	Henry's Law Constant, dimensionless					1.11E+00	1.25E+00	8.98E-02
Kd	=	Soil-water sorption coefficient (cm3 water / g soil = L/kg) = Koc x foc where					6.88E-01	5.62E+00	3.70E-01
		koc = organic carbon-water sorption coefficient, (cm3 (ml) water) / (g soluble organic carbon)					1.86E+01	1.52E+02	1.00E+01
		foc = Fraction of organic content, dimensionless				0.037			
Site Specific Input Parameters									
Sw =		Width of Source Parallel to Groundwater Flow Direction	(impacted soil zone)	52.7 m	173 ft				
da =		Aquifer Thickness		7.3 m	24 ft				
d =		Groundwater Mixing Zone thickness	(paved)	5.72 m	18.8 ft				
			(unpaved)	7.31 m	24.0 ft				
I =		Groundwater Gradient		4.3E-03	(unitless)				
Ks =		Saturated Hydraulic Conductivity		778.7 m/yr	2555.0 ft/yr				
θw =		Volumetric Water Content of Soil Pore Space		0.3 cm^3_{vapor}/cm^3_{soil}	0.3 in^3_{vapor}/in^3_{soil}				
θv =		Volumetric Vapor Content of Soil Pore Space		0.15 cm^3_{vapor}/cm^3_{soil}	0.15 in^3_{vapor}/in^3_{soil}				
ρs =		Soil Bulk Density		1.5 g/cm^3	93.64 lb_m/ft^3				
qi =		Water Infiltration Rate	(paved)	0.0086 m/yr	0.0283 ft/yr				
			(unpaved)	0.1372 m/yr	0.4500 ft/yr				
Partition Term, Cw/Csoil, (L/kg)							9.99E-01	5.95E+00	5.79E-01
Dilution Term, dimensionless			(paved)				4.26E+01	4.26E+01	4.26E+01
			(unpaved)				4.35E+00	4.35E+00	4.35E+00
Csoil/Cw =Partition term * Dilution term (mg/kg / mg/L) = L/kg			(paved)				4.26E+01	2.53E+02	2.47E+01
			(unpaved)				4.35E+00	2.59E+01	2.52E+00
Calculated Site Specific Target Level for Soil									
C_{soil} calculated source soil concentration (SSL, mg/kg) Cw*(partion term)*(dilution term)						(paved)	0.085	1.3	0.12
						(unpaved)	0.0087	0.13	0.013

$$\frac{C_{soil}}{C_w} = \left(\frac{\theta_w + K_d\rho_s + H\theta_v}{\rho_s}\right)\left(\frac{K_s i d + q_i S_w}{q_i S_w}\right)$$

Cwt is the MCL from EPA National Drinking Water Standards (March 2001)or US EPA Region III RBCs (October, 2000).
H from Table 36 of the Soil Screening Guidance; Technical Background Document (EPA, 1996).
Kd = koc x foc.
koc from Table 39 of the Soil Screening Guidance; Technical Background Document (EPA, 1996).
foc calculated as the mean foc from TOC measurements from Zone E.
Sw Estimated as the distance along gw flow path (length, NW-SE) of AOC 544 (173 ft).
d is calculated as $M = (0.0112\ L^2)^{0.5} + da\{1 - e^{[-L\ qi/Ks\ da]}\}$ or da, whichever is less.
da is based on top of Ashley (-20 ft, GIS) and nearest isocontour line for groundwater level (4 ft msl, GIS).
i Calculated from isocontour groundwater map for Zone E in GIS ([4-3]/235 ~ 0.0043, CH2MHill, 2002).
Ks Based on CH2MHill's hydraulic conductivity theme in the GIS (7 ft/d).
θw is the default value presented in the Soil Screening Guidance: User's Guide (EPA, 1996)
θv is calculated as total porosity (0.45, assumed) - θw (0.3) = 0.15.
ρs is the default value presented in the Soil Screening Guidance: User's Guide (EPA, 1996)
qi is a derived value (unpaved, 5.4 in/yr or paved, 0.34 in/yr) based on annual precipitation, evapo-transportation, and runoff coefficient values for the Charleston area.

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
1,2-DCE (total)	E065GW001	065GW00101	5	U	04/17/1996	5.5	70	NA
		065GW00102	5	U	08/14/1996			
		065GW00103	5	U	12/11/1996			
		065GW00104	5	U	02/26/1997			
		E065GW001M1	5	U	09/15/2002			
	E065GW002	065GW00201a	5	U	04/19/1996			
		065GW00202	5	U	08/13/1996			
		065GW00203	5	U	12/11/1996			
		065GW00204	5	U	02/25/1997			
		E065GW002M1	5	U	09/15/2002			
	E065GW003	065GW00301a	7	=	04/19/1996			
		065GW00302	16	=	08/14/1996			
		065GW00303	11	=	12/10/1996			
		065GW00304	8	=	02/26/1997			
		E065GW003M1	2.7	J	09/15/2002			
	E065GW004	065GW00401	5	U	04/17/1996			
		065GW00402	2	J	08/15/1996			
		065GW00403	2	J	12/09/1996			
		065GW00404	1	J	02/25/1997			
	E065GW004	E065GW004M1	2.2	J	09/15/2002			
	E065GW005	065GW00501	5	U	04/17/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
1,2-DCE (total)		065GW00502	5	U	08/15/1996	5.5	70	NA
		065GW00503	5	U	12/10/1996			
		065GW00504	5	U	02/25/1997			
		E065GW005M1	5	U	09/15/2002			
	E065GW006	065GW00601	5	U	04/19/1996			
		065GW00602	2	J	08/14/1996			
		065GW00603	5	U	12/12/1996			
		065GW00604	5	U	02/26/1997			
		E065GW006M1	0.74	J	09/15/2002			
	E065GW007	065GW00701	5	U	10/30/1996			
		065GW00704	5	U	10/09/1997			
		065GW007A2	5	U	03/06/1997			
		065GW007A3	5	U	06/27/1997			
	E065GW008	065GW00801	5	U	10/30/1996			
		065GW00804	5	U	10/09/1997			
		065GW008A2	5	U	03/06/1997			
		065GW008A3	5	U	06/27/1997			
	E065GW008	E065GW008M1	5	U	09/15/2002			
	E065GW009	E065GW009M1	5	U	09/15/2002			
	E065GW04D	065GW04D01b	10	=	04/19/1996			
		065GW04D02	14	=	08/15/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
1,2-DCE (total)		065GW04D03	13	=	12/09/1996	5.5	70	NA
		065GW04D04	14	=	02/26/1997			
		E065GW04DM1	6.8	=	09/15/2002			
Alpha-BHC	E065GW001	065GW00101	0.04	U	04/17/1996	0.01	NA	NA
		065GW00102	0.04	U	08/14/1996			
		065GW00103	0.04	U	12/11/1996			
		065GW00104	0.04	U	02/26/1997			
	E065GW002	065GW00201b	0.04	U	04/18/1996			
		065GW00202	0.04	U	08/13/1996			
		065GW00203	0.04	U	12/11/1996			
		065GW00204	0.04	U	02/25/1997			
	E065GW003	065GW00301b	0.04	U	04/18/1996			
		065GW00302	0.04	U	08/14/1996			
		065GW00303	0.04	U	12/10/1996			
		065GW00304	0.04	UJ	02/26/1997			
	E065GW004	065GW00401	**0.1**	J	04/17/1996			
		065GW00402	0.04	U	08/15/1996			
		065GW00403	0.04	U	12/09/1996			
		065GW00404	0.04	U	02/25/1997			
	E065GW005	065GW00501	0.04	U	04/17/1996			
		065GW00502	0.04	U	08/15/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Alpha-BHC		065GW00503	0.04	U	12/10/1996	0.01	NA	NA
		065GW00504	0.04	U	02/25/1997			
	E065GW006	065GW00601	0.04	U	04/19/1996			
		065GW00602	0.04	U	08/14/1996			
		065GW00603	0.04	U	12/12/1996			
		065GW00604	0.04	U	02/26/1997			
	E065GW007	065GW00701	0.04	U	10/30/1996			
		065GW007A2	0.04	U	03/06/1997			
	E065GW008	065GW00801	0.04	U	10/30/1996			
	E065GW008	065GW008A2	0.04	U	03/06/1997			
	E065GW04D	065GW04D01a	0.04	U	04/18/1996			
		065GW04D02	0.04	U	08/15/1996			
		065GW04D03	0.04	U	12/09/1996			
	E065GW04D	065GW04D04	0.04	U	02/26/1997			
Aluminum, Total	E065GW001	065GW00101	88	U	04/17/1996	3.7	NA	19 - 16,100
Aluminum, Total		065GW00102	30.3	U	08/14/1996			
Aluminum, Total		065GW00103	350	=	12/11/1996			
Aluminum, Total		065GW00104	70	J	02/26/1997			
Aluminum, Total	E065GW002	065GW00201b	25	UJ	04/18/1996			
Aluminum, Total		065GW00202	23	U	08/13/1996			
Aluminum, Total		065GW00203	18	U	12/11/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Aluminum, Total		065GW00204	41.2	J	02/25/1997	3.7	NA	19 - 16,100
Aluminum, Total	E065GW003	065GW00301b	**21,500**	=	04/18/1996			
Aluminum, Total		065GW00302	4,590	=	08/14/1996			
Aluminum, Total		065GW00303	2,550	=	12/10/1996			
Aluminum, Total		065GW00304	2,290	=	02/26/1997			
Aluminum, Total	E065GW004	065GW00401	4,510	=	04/17/1996			
Aluminum, Total	E065GW004	065GW00402	133	=	08/15/1996			
Aluminum, Total		065GW00403	81.1	J	12/09/1996			
Aluminum, Total		065GW00404	44.3	J	02/25/1997			
Aluminum, Total	E065GW005	065GW00501	337	=	04/17/1996			
Aluminum, Total		065GW00502	128	=	08/15/1996			
Aluminum, Total	E065GW005	065GW00503	173	J	12/10/1996			
Aluminum, Total		065GW00504	170	J	02/25/1997			
Aluminum, Total	E065GW006	065GW00601	56.5	UJ	04/19/1996			
Aluminum, Total		065GW00602	67.1	U	08/14/1996			
Aluminum, Total		065GW00603	60.5	J	12/12/1996			
Aluminum, Total		065GW00604	73.9	J	02/26/1997			
Aluminum, Total	E065GW007	065GW00701	101	J	10/30/1996			
Aluminum, Total		065GW00704	55.1	U	10/09/1997			
Aluminum, Total		065GW007A2	183	J	03/06/1997			
Aluminum, Total		065GW007A3	60.8	J	06/27/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Aluminum, Total	E065GW008	065GW00801	113	J	10/30/1996	3.7	NA	19 - 16,100
Aluminum, Total		065GW00804	81	U	10/09/1997			
Aluminum, Total		065GW008A2	94.5	J	03/06/1997			
Aluminum, Total		065GW008A3	263	=	06/27/1997			
Aluminum, Total	E065GW04D	065GW04D01a	25	UJ	04/18/1996	3.7	NA	19 - 461
Aluminum, Total		065GW04D02	23	U	08/15/1996			
Aluminum, Total		065GW04D03	21	J	12/09/1996			
Aluminum, Total		065GW04D04	36.1	J	02/26/1997			
Antimony, Total	E065GW001	065GW00101	4	U	04/17/1996	1.5	6	2 - 5
Antimony, Total		065GW00102	2.1	U	08/14/1996			
Antimony, Total	E065GW001	065GW00103	2.5	U	12/11/1996			
Antimony, Total		065GW00104	2.3	U	02/26/1997			
Antimony, Total		E065GW001M2	4.79	U	02/26/1997			
Antimony, Dissolved		E065GW001M2	4.79	U	02/26/1997			
Antimony, Total	E065GW002	065GW00201b	4	U	04/18/1996			
Antimony, Total		065GW00202	2.1	U	08/13/1996			
Antimony, Total		065GW00203	2.8	U	12/11/1996			
Antimony, Total		065GW00204	2.6	U	02/25/1997			
Antimony, Total		E065GW002M2	4.79	U	02/25/1997			
Antimony, Dissolved		E065GW002M2	4.79	U	09/15/2002			
Antimony, Total	E065GW003	065GW00301b	**42**	J	04/18/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Antimony, Total		065GW00302	**24.2**	U	08/14/1996	1.5	6	2 - 5
Antimony, Total		065GW00303	**13.9**	U	12/10/1996			
Antimony, Total		065GW00304	**17.9**	J	02/26/1997			
Antimony, Total		E065GW003M2	**30.7**	J	09/15/2002			
Antimony, Dissolved		E065GW003M2	**28.2**	J	09/15/2002			
Antimony, Total	E065GW004	065GW00401	4	U	04/17/1996			
Antimony, Total		065GW00402	4.2	U	08/15/1996			
Antimony, Total	E065GW004	065GW00403	2.9	U	12/09/1996			
Antimony, Total		065GW00404	3.1	U	02/25/1997			
Antimony, Total		E065GW004M2	4.79	U	02/25/1997			
Antimony, Dissolved		E065GW004M2	4.79	U	09/15/2002			
Antimony, Total	E065GW005	065GW00501	4.5	J	04/17/1996			
Antimony, Total		065GW00502	2.1	U	08/15/1996			
Antimony, Total		065GW00503	2.1	U	12/10/1996			
Antimony, Total		065GW00504	3.2	U	02/25/1997			
Antimony, Total		E065GW005M2	4.79	U	02/25/1997			
Antimony, Dissolved		E065GW005M2	4.79	U	09/15/2002			
Antimony, Total	E065GW006	065GW00601	4	U	04/19/1996			
Antimony, Total		065GW00602	2.1	U	08/14/1996			
Antimony, Total		065GW00603	2.9	U	12/12/1996			
Antimony, Total		065GW00604	1.6	U	02/26/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Antimony, Total		E065GW006M2	4.79	U	02/26/1997	1.5	6	2 - 5
Antimony, Dissolved		E065GW006M2	4.79	U	09/15/2002			
Antimony, Total	E065GW007	065GW00701	2.1	U	10/30/1996			
Antimony, Total		065GW00704	1.6	U	10/09/1997			
Antimony, Total		065GW007A2	1.7	U	03/06/1997			
Antimony, Total		065GW007A3	2.1	U	06/27/1997			
Antimony, Total	E065GW008	065GW00801	2.1	U	10/30/1996			
Antimony, Total		065GW00804	1.6	U	10/09/1997			
Antimony, Total		065GW008A2	1.6	U	03/06/1997			
Antimony, Total		065GW008A3	1.6	UJ	06/27/1997			
Antimony, Total		E065GW008M2	4.79	U				
Antimony, Dissolved		E065GW008M2	4.79	U	09/15/2002			
Antimony, Total	E065GW009	E065GW009M2	4.79	U	09/15/2002			
Antimony, Dissolved		E065GW009M2	4.79	U	09/15/2002			
Antimony, Total	E065GW04D	065GW04D01a	4	U	04/18/1996			
Antimony, Total		065GW04D02	2.1	U	08/15/1996			
Antimony, Total	E065GW04D	065GW04D03	2.1	U	12/09/1996			
Antimony, Total		065GW04D04	1.6	U	02/26/1997			
Antimony, Total		E065GW04DM2	4.79	U				
Antimony, Dissolved		E065GW04DM2	4.79	U	09/15/2002			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Arsenic, Total	E065GW001	E065GW00101	5	U	04/17/1996	0.045	50	2.6 - 316
Arsenic, Total		E065GW00102	4.6	U	08/14/1996			
Arsenic, Total		E065GW00103	6.4	J	12/11/1996			
Arsenic, Total		E065GW00104	5.7	J	02/26/1997			
Arsenic, Total	E065GW001	E065GW001M2	3.97	U	09/15/2002			
Arsenic, Dissolved		E065GW001M2	3.97	U	09/15/2002			
Arsenic, Total	E065GW002	E065GW00201b	5	U	04/18/1996			
Arsenic, Total		E065GW00202	12.4	U	08/13/1996			
Arsenic, Total		E065GW00203	8.1	J	12/11/1996			
Arsenic, Total		E065GW00204	4.8	J	02/25/1997			
Arsenic, Total		E065GW002M2	3.97	U	09/15/2002			
Arsenic, Dissolved		E065GW002M2	3.97	U	09/15/2002			
Arsenic, Total	E065GW003	E065GW00301b	22.6	=	04/18/1996			
Arsenic, Total		E065GW00302	10.7	U	08/14/1996			
Arsenic, Total		E065GW00303	3.5	J	12/10/1996			
Arsenic, Total		E065GW00304	7.3	J	02/26/1997			
Arsenic, Total		E065GW003M2	11.5	=	09/15/2002			
Arsenic, Dissolved		E065GW003M2	11	=	09/15/2002			
Arsenic, Total	E065GW004	E065GW00401	58.8	=	04/17/1996			
Arsenic, Total		E065GW00402	6.4	J	08/15/1996			
Arsenic, Total		E065GW00403	2.5	U	12/09/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Arsenic, Total		E065GW00404	2.1	U	02/25/1997	0.045	50	2.6 - 316
Arsenic, Total		E065GW004M2	11.9	=	09/15/2002			
Arsenic, Dissolved	E065GW004	E065GW004M2	13.1	=	09/15/2002			
Arsenic, Total	E065GW005	E065GW00501	12.7	=	04/17/1996			
Arsenic, Total		E065GW00502	23.3	J	08/15/1996			
Arsenic, Total		E065GW00503	18.5	=	12/10/1996			
Arsenic, Total		E065GW00504	12.8	=	02/25/1997			
Arsenic, Total		E065GW005M2	3.97	U	09/15/2002			
Arsenic, Dissolved		E065GW005M2	3.97	U	09/15/2002			
Arsenic, Total	E065GW006	E065GW00601	5	U	04/19/1996			
Arsenic, Total		E065GW00602	2.6	U	08/14/1996			
Arsenic, Total		E065GW00603	2.8	J	12/12/1996			
Arsenic, Total		E065GW00604	2.2	J	02/26/1997			
Arsenic, Total		E065GW006M2	10.9	=	09/15/2002			
Arsenic, Dissolved		E065GW006M2	3.97	U	09/15/2002			
Arsenic, Total	E065GW007	E065GW00701	7.8	J	10/30/1996			
Arsenic, Total		E065GW007A2	2.1	U	03/06/1997			
Arsenic, Total		E065GW007A3	6.8	J	06/27/1997			
Arsenic, Total		E065GW00704	4	J	10/09/1997			
Arsenic, Total	E065GW008	E065GW00801	16.2	=	10/30/1996			
Arsenic, Total		E065GW008A2	15.1	=	03/06/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Arsenic, Total	E065GW008	E065GW008A3	30.7	=	06/27/1997	0.045	50	2.6 - 316
Arsenic, Total		E065GW00804	25.5	=	10/09/1997			
Arsenic, Total		E065GW008M2	13.9	=	09/15/2002			
Arsenic, Dissolved		E065GW008M2	5.02	J	09/15/2002			
Arsenic, Total	E065GW009	E065GW009M2	3.97	U	09/15/2002			
Arsenic, Dissolved		E065GW009M2	3.97	U	09/15/2002			
Arsenic, Total	E065GW04D	E065GW04D01a	22.8	=	04/18/1996	0.045	50	3 - 132
Arsenic, Total		E065GW04D02	19	J	08/15/1996			
Arsenic, Total		E065GW04D03	17.7	=	12/09/1996			
Arsenic, Total		E065GW04D04	44	=	02/26/1997			
Arsenic, Total		E065GW04DM2	19.1	=	09/15/2002			
Arsenic, Total		E065GW04DM2	16.2	=	09/15/2002			
Beryllium, Total	E065GW001	065GW00101	1.	U	04/17/1996	7.3	4	0.3 - 0.9
Beryllium, Total		065GW00102	0.36	U	08/14/1996			
Beryllium, Total		065GW00103	0.39	U	12/11/1996			
Beryllium, Total		065GW00104	0.2	U	02/26/1997			
Beryllium, Total	E065GW002	065GW00201b	1	U	04/18/1996			
Beryllium, Total		065GW00202	0.3	U	08/13/1996			
Beryllium, Total		065GW00203	0.3	U	12/11/1996			
Beryllium, Total		065GW00204	0.24	J	02/25/1997			
Beryllium, Total	E065GW003	065GW00301b	1.2	J	04/18/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Beryllium, Total		065GW00302	0.44	U	08/14/1996	7.3	4	0.3 - 0.9
Beryllium, Total		065GW00303	0.3	U	12/10/1996			
Beryllium, Total		065GW00304	0.2	U	02/26/1997			
Beryllium, Total	E065GW004	065GW00401	2	J	04/17/1996			
Beryllium, Total		065GW00402	0.4	J	08/15/1996			
Beryllium, Total		065GW00403	0.3	U	12/09/1996			
Beryllium, Total		065GW00404	0.2	U	02/25/1997			
Beryllium, Total	E065GW005	065GW00501	1	U	04/17/1996			
Beryllium, Total		065GW00502	0.37	J	08/15/1996			
Beryllium, Total		065GW00503	0.3	U	12/10/1996			
Beryllium, Total		065GW00504	0.27	J	02/25/1997			
Beryllium, Total	E065GW006	065GW00601	1	U	04/19/1996			
Beryllium, Total		065GW00602	0.34	U	08/14/1996			
Beryllium, Total		065GW00603	0.44	U	12/12/1996			
Beryllium, Total		065GW00604	0.2	U	02/26/1997			
Beryllium, Total	E065GW007	065GW00701	0.39	U	10/30/1996			
Beryllium, Total		065GW00704	0.2	U	10/09/1997			
Beryllium, Total		065GW007A2	0.2	UJ	03/06/1997			
Beryllium, Total	E065GW007	065GW007A3	0.2	UJ	06/27/1997			
Beryllium, Total	E065GW008	065GW00801	0.39	U	10/30/1996			
Beryllium, Total		065GW00804	0.2	U	10/09/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Beryllium, Total		065GW008A2	0.2	UJ	03/06/1997	7.3	4	0.3 - 0.9
Beryllium, Total		065GW008A3	0.23	UJ	06/27/1997			
Beryllium, Total	E065GW04D	065GW04D01a	1	U	04/18/1996	7.3	4	0.2 - 1.3
Beryllium, Total		065GW04D02	0.35	J	08/15/1996			
Beryllium, Total		065GW04D03	0.3	U	12/09/1996			
Beryllium, Total		065GW04D04	0.2	U	02/26/1997			
Beta-BHC	E065GW001	065GW00101	0.04	U	04/17/1996	0.037	NA	NA
		065GW00102	0.04	U	08/14/1996			
		065GW00103	0.04	U	12/11/1996			
		065GW00104	0.04	U	02/26/1997			
	E065GW002	065GW00201b	0.04	U	04/18/1996			
		065GW00202	0.04	U	08/13/1996			
		065GW00203	0.04	U	12/11/1996			
		065GW00204	0.04	U	02/25/1997			
	E065GW003	065GW00301b	0.04	U	04/18/1996			
		065GW00302	0.04	U	08/14/1996			
		065GW00303	0.04	U	12/10/1996			
		065GW00304	0.04	UJ	02/26/1997			
		065GW00401	**0.05**	J	04/17/1996			
		065GW00402	0.04	U	08/15/1996			
		065GW00403	0.04	U	12/09/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Beta-BHC	E065GW004	065GW00404	0.04	U	02/25/1997	0.037	NA	NA
	E065GW005	065GW00501	0.04	U	04/17/1996			
		065GW00502	0.04	U	08/15/1996			
		065GW00503	0.04	U	12/10/1996			
		065GW00504	0.04	U	02/25/1997			
	E065GW006	065GW00601	0.04	U	04/19/1996			
		065GW00602	0.04	U	08/14/1996			
		065GW00603	0.04	U	12/12/1996			
		065GW00604	0.04	U	02/26/1997			
	E065GW007	065GW00701	0.04	U	10/30/1996			
		065GW007A2	0.04	U	03/06/1997			
	E065GW008	065GW00801	0.04	U	10/30/1996			
		065GW008A2	0.04	U	03/06/1997			
	E065GW04D	065GW04D01a	0.04	U	04/18/1996			
	E065GW04D	065GW04D02	0.04	U	08/15/1996			
		065GW04D03	0.04	U	12/09/1996			
		065GW04D04	0.04	U	02/26/1997			
Cadmium, Total	E065GW001	065GW00101	1	U	04/17/1996	1.8	5	1.4
Cadmium, Total		065GW00102	0.5	U	08/14/1996			
Cadmium, Total		065GW00103	0.5	U	12/11/1996			
Cadmium, Total		065GW00104	0.3	U	02/26/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Cadmium, Total		E065GW001M2	0.21	U	09/15/2002	1.8	5	1.4
Cadmium, Dissolved		E065GW001M2	0.21	U	09/15/2002			
Cadmium, Total	E065GW002	065GW00201b	1	U	04/18/1996			
Cadmium, Total		065GW00202	0.5	U	08/13/1996			
Cadmium, Total		065GW00203	0.5	U	12/11/1996			
Cadmium, Total		065GW00204	0.3	U	02/25/1997			
Cadmium, Total		E065GW002M2	0.21	U	09/15/2002			
Cadmium, Dissolved		E065GW002M2	0.21	U	09/15/2002			
Cadmium, Total	E065GW003	065GW00301b	6.9	=	04/18/1996			
Cadmium, Total		065GW00302	0.87	J	08/14/1996			
Cadmium, Total		065GW00303	0.5	U	12/10/1996			
Cadmium, Total		065GW00304	0.44	J	02/26/1997			
Cadmium, Total	E065GW003	E065GW003M2	2.95	J	09/15/2002			
Cadmium, Dissolved		E065GW003M2	0.89	U	09/15/2002			
Cadmium, Total	E065GW004	065GW00401	1	J	04/17/1996			
Cadmium, Total		065GW00402	0.5	U	08/15/1996			
Cadmium, Total		065GW00403	0.5	U	12/09/1996			
Cadmium, Total		065GW00404	0.3	U	02/25/1997			
Cadmium, Total		E065GW004M2	0.21	U	09/15/2002			
Cadmium, Dissolved		E065GW004M2	0.25	U	09/15/2002			
Cadmium, Total	E065GW005	065GW00501	1	U	04/17/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Cadmium, Total		065GW00502	0.	U	08/15/1996	1.8	5	1.4
Cadmium, Total		065GW00503	0.50	U	12/10/1996			
Cadmium, Total		065GW00504	0.3	U	02/25/1997			
Cadmium, Total		E065GW005M2	0.21	U	09/15/2002			
Cadmium, Dissolved		E065GW005M2	0.21	U	09/15/2002			
Cadmium, Total	E065GW006	065GW00601	1	U	04/19/1996			
Cadmium, Total		065GW00602	0.5	U	08/14/1996			
Cadmium, Total		065GW00603	0.5	U	12/12/1996			
Cadmium, Total		065GW00604	0.3	U	02/26/1997			
Cadmium, Total		E065GW006M2	0.21	U	09/15/2002			
Cadmium, Dissolved		E065GW006M2	0.21	U	09/15/2002			
Cadmium, Total	E065GW007	065GW00701	0.5	U	10/30/1996			
Cadmium, Total		065GW00704	0.3	U	10/09/1997			
Cadmium, Total		065GW007A2	0.3	U	03/06/1997			
Cadmium, Total		065GW007A3	0.3	UJ	06/27/1997			
Cadmium, Total	E065GW007	065GW00801	0.5	U	10/30/1996			
Cadmium, Total		065GW00804	0.37	U	10/09/1997			
Cadmium, Total		065GW008A2	0.37	U	03/06/1997			
Cadmium, Total		065GW008A3	0.3	UJ	06/27/1997			
Cadmium, Total		E065GW008M2	0.21	U	09/15/2002			
Cadmium, Dissolved		E065GW008M2	0.21	U	09/15/2002			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Cadmium, Total	E065GW009	E065GW009M2	0.21	U	09/15/2002	1.8	5	1.4
Cadmium, Dissolved		E065GW009M2	0.21	U	09/15/2002			
Cadmium, Total	E065GW04D	065GW04D01a	1	U	04/18/1996	1.8	5	0.61
Cadmium, Total		065GW04D02	0.5	U	08/15/1996			
Cadmium, Total		065GW04D03	0.5	U	12/09/1996			
Cadmium, Total		065GW04D04	0.3	U	02/26/1997			
Cadmium, Total		E065GW04DM2	0.21	U	09/15/2002			
Cadmium, Dissolved		E065GW04DM2	0.21	U	09/15/2002			
Chromium, Total	E065GW001	065GW00101	1	U	04/17/1996	5,475	100	0.84 - 31.4
Chromium, Total		065GW00102	1.2	U	08/14/1996			
Chromium, Total		065GW00103	1	U	12/11/1996			
Chromium, Total		065GW00104	2.1	J	02/26/1997			
Chromium, Total		E065GW001M2	0.62	U	09/15/2002			
Chromium, Dissolved		E065GW001M2	0.74	U	09/15/2002			
Chromium, Total	E065GW002	065GW00201b	1	U	04/18/1996			
Chromium, Total		065GW00202	0.8	U	08/13/1996			
Chromium, Total		065GW00203	0.8	U	12/11/1996			
Chromium, Total		065GW00204	1	U	02/25/1997			
Chromium, Total		E065GW002M2	0.53	U	09/15/2002			
Chromium, Dissolved		E065GW002M2	0.53	U	09/15/2002			
Chromium, Total	E065GW003	065GW00301b	**245**	=	04/18/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Chromium, Total		065GW00302	93.5	=	08/14/1996	5,475	100	0.84 - 31.4
Chromium, Total		065GW00303	61.9	=	12/10/1996			
Chromium, Total		065GW00304	49.7	J	02/26/1997			
Chromium, Total		E065GW003M2	69.6	=	09/15/2002			
Chromium, Dissolved		E065GW003M2	31.5	=	09/15/2002			
Chromium, Total	E065GW004	065GW00401	**159**	=	04/17/1996			
Chromium, Total	E065GW004	065GW00402	0.8	U	08/15/1996			
Chromium, Total		065GW00403	1.8	U	12/09/1996			
Chromium, Total		065GW00404	1	U	02/25/1997			
Chromium, Total		E065GW004M2	12.9	=	09/15/2002			
Chromium, Dissolved		E065GW004M2	8.31	J	09/15/2002			
Chromium, Total	E065GW005	065GW00501	1	U	04/17/1996			
Chromium, Total		065GW00502	1.5	J	08/15/1996			
Chromium, Total		065GW00503	1.1	U	12/10/1996			
Chromium, Total		065GW00504	1.5	U	02/25/1997			
Chromium, Total		E065GW005M2	0.53	U	09/15/2002			
Chromium, Dissolved		E065GW005M2	0.53	U	09/15/2002			
Chromium, Total	E065GW006	065GW00601	1	U	04/19/1996			
Chromium, Total		065GW00602	0.85	U	08/14/1996			
Chromium, Total		065GW00603	0.8	U	12/12/1996			
Chromium, Total		065GW00604	1.3	J	02/26/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Chromium, Total		E065GW006M2	0.71	U	09/15/2002	5,475	100	0.84 - 31.4
Chromium, Dissolved		E065GW006M2	0.53	U	09/15/2002			
Chromium, Total	E065GW007	065GW00701	1.2	J	10/30/1996			
Chromium, Total		065GW007A2	1.7	U	03/06/1997			
Chromium, Total		065GW007A3	1	U	06/27/1997			
Chromium, Total		065GW00704	1	U	10/09/1997			
Chromium, Total	E065GW008	065GW00801	0.96	J	10/30/1996			
Chromium, Total		065GW008A2	2.8	U	03/06/1997			
Chromium, Total		065GW008A3	1.6	J	06/27/1997			
Chromium, Total		065GW00804	1	U	10/09/1997			
Chromium, Total		E065GW008M2	0.53	U	09/15/2002			
Chromium, Dissolved		E065GW008M2	0.53	U	09/15/2002			
Chromium, Total	E065GW009	E065GW009M2	0.67	U	09/15/2002			
Chromium, Dissolved		E065GW009M2	0.53	U	09/15/2002			
Chromium, Total	E065GW04D	065GW04D01a	1	U	04/18/1996	5,475	100	0.84 - 27.1
Chromium, Total		065GW04D02	0.8	U	08/15/1996			
Chromium, Total		065GW04D03	0.8	U	12/09/1996			
Chromium, Total		065GW04D04	1.2	J	02/26/1997			
Chromium, Total		E065GW04DM2	0.59	U	09/15/2002			
Chromium, Dissolved		E065GW04DM2	0.53	U	09/15/2002			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Copper, Total	E065GW001	065GW00101	10	U	04/17/1996	146	1,300[a]	0.87 - 8.1
Copper, Total		065GW00102	3.8	U	08/14/1996			
Copper, Total		065GW00103	0.6	U	12/11/1996			
Copper, Total		065GW00104	1.6	J	02/26/1997			
Copper, Total	E065GW002	065GW00201b	2	U	04/18/1996			
Copper, Total		065GW00202	1.7	U	08/13/1996			
Copper, Total		065GW00203	0.6	U	12/11/1996			
Copper, Total		065GW00204	3	J	02/25/1997			
Copper, Total	E065GW003	065GW00301b	536	=	04/18/1996			
Copper, Total		065GW00302	119	=	08/14/1996			
Copper, Total		065GW00303	71	=	12/10/1996			
Copper, Total		065GW00304	65.3	=	02/26/1997			
Copper, Total	E065GW004	065GW00401	178	=	04/17/1996			
Copper, Total		065GW00402	1.7	U	08/15/1996			
Copper, Total		065GW00403	1.6	J	12/09/1996			
Copper, Total		065GW00404	1.4	U	02/25/1997			
Copper, Total	E065GW005	065GW00501	10	U	04/17/1996			
Copper, Total		065GW00502	3.1	U	08/15/1996			
Copper, Total		065GW00503	0.71	J	12/10/1996			
Copper, Total		065GW00504	4.1	J	02/25/1997			
Copper, Total	E065GW006	065GW00601	2	U	04/19/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Copper, Total		065GW00602	2.7	U	08/14/1996	146	1,300[a]	0.87 - 8.1
Copper, Total	E065GW006	065GW00603	0.6	U	12/12/1996			
Copper, Total		065GW00604	4.4	U	02/26/1997			
Copper, Total	E065GW007	065GW00701	1.7	U	10/30/1996			
Copper, Total		065GW00704	1.4	U	10/09/1997			
Copper, Total		065GW007A2	1.8	J	03/06/1997			
Copper, Total		065GW007A3	2.5	J	06/27/1997			
Copper, Total	E065GW008	065GW00801	0.6	UJ	10/30/1996			
Copper, Total		065GW00804	1.4	U	10/09/1997			
Copper, Total		065GW008A2	1.4	UJ	03/06/1997			
Copper, Total		065GW008A3	4.2	J	06/27/1997			
Copper, Total	E065GW04D	065GW04D01a	2	U	04/18/1996	146	1,300[a]	0.6 - 5.7
Copper, Total		065GW04D02	0.85	U	08/15/1996			
Copper, Total		065GW04D03	0.78	J	12/09/1996			
Copper, Total		065GW04D04	3	U	02/26/1997			
Lead, Total	E065GW001	065GW00101	3	U	04/17/1996	NA	15	1.5 - 46.7
Lead, Total		065GW00102	1.7	U	08/14/1996			
Lead, Total		065GW00103	1.7	U	12/11/1996			
Lead, Total		065GW00104	0.9	U	02/26/1997			
Lead, Total		E065GW001M2	1.24	U	09/15/2002			
Lead, Dissolved		E065GW001M2	2.53	U	09/15/2002			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Lead, Total	E065GW002	065GW00201b	3	U	04/18/1996	NA	15	1.5 - 46.7
Lead, Total		065GW00202	1.7	U	08/13/1996			
Lead, Total		065GW00203	1.7	U	12/11/1996			
Lead, Total		065GW00204	0.9	U	02/25/1997			
Lead, Total		E065GW002M2	1.57	U	09/15/2002			
Lead, Dissolved		E065GW002M2	1.36	U	09/15/2002			
Lead, Total	E065GW003	065GW00301b	**1,690**	=	04/18/1996			
Lead, Total		065GW00302	**349**	=	08/14/1996			
Lead, Total		065GW00303	**224**	=	12/10/1996			
Lead, Total		065GW00304	**207**	=	02/26/1997			
Lead, Total		E065GW003M2	**683**	=	09/15/2002			
Lead, Dissolved		E065GW003M2	**227**	=	09/15/2002			
Lead, Total	E065GW004	065GW00401	**315**	=	04/17/1996			
Lead, Total		065GW00402	2.9	J	08/15/1996			
Lead, Total		065GW00403	1.7	U	12/09/1996			
Lead, Total		065GW00404	1.3	J	09/15/2002			
Lead, Total		E065GW004M2	25.6	=	09/15/2002			
Lead, Dissolved		E065GW004M2	19.9	=	07/12/2002			
Lead, Total	E065GW005	065GW00501	3.6	=	04/17/1996			
Lead, Total		065GW00502	1.7	U	08/15/1996			
Lead, Total		065GW00503	1.7	U	12/10/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Lead, Total		065GW00504	1.7	J	02/25/1997	NA	15	1.5 - 46.7
Lead, Total		E065GW005M2	1.77	U	09/15/2002			
Lead, Dissolved		E065GW005M2	1.85	U	09/15/2002			
Lead, Total	E065GW006	065GW00601	8.9	=	04/19/1996			
Lead, Total		065GW00602	5.1	=	08/14/1996			
Lead, Total		065GW00603	4.5	=	12/12/1996			
Lead, Total		065GW00604	7.6	=	02/26/1997			
Lead, Total		E065GW006M2	2.1	U	09/15/2002			
Lead, Dissolved		E065GW006M2	1.24	U	09/15/2002			
Lead, Total	E065GW007	065GW00701	1.7	J	10/30/1996			
Lead, Total		065GW007A2	1.5	U	03/06/1997			
Lead, Total		065GW007A3	0.9	U	06/27/1997			
Lead, Total		065GW00704	0.9	U	10/09/1997			
Lead, Total	E065GW008	065GW00801	1.7	U	10/30/1996			
Lead, Total		065GW008A2	0.9	U	03/06/1997			
Lead, Total		065GW008A3	2.1	U	06/27/1997			
Lead, Total		065GW00804	0.9	U	10/09/1997			
Lead, Total		E065GW008M2	1.24	U	09/15/2002			
Lead, Dissolved		E065GW008M2	1.24	U	09/15/2002			
Lead, Total	E065GW009	E065GW009M2	1.24	U	09/15/2002			
Lead, Dissolved		E065GW009M2	1.24	U	07/12/2002			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Lead, Total	E065GW04D	065GW04D01a	3	U	04/18/1996	NA	15	1.5 - 46.7
Lead, Total		065GW04D02	1.7	U	08/15/1996			
Lead, Total		065GW04D03	1.7	U	12/09/1996			
Lead, Total		065GW04D04	0.9	U	02/26/1997			
Lead, Total		E065GW04DM2	1.24	U	09/15/2002			
Lead, Dissolved		E065GW04DM2	1.24	U	09/15/2002			
Mercury, Total	E065GW001	065GW00101	0.2	U	04/17/1996	1.1	2	0.14 - 0.61
Mercury, Total		065GW00102	0.1	U	08/14/1996			
Mercury, Total		065GW00103	**2.3**	=	12/11/1996			
Mercury, Total		065GW00104	0.1	U	02/26/1997			
Mercury, Total		E065GW001M2	0.04	U	09/15/2002			
Mercury, Dissolved		E065GW001M2	0.04	U	09/15/2002			
Mercury, Total	E065GW002	065GW00201b	0.2	U	04/18/1996			
Mercury, Total		065GW00202	0.1	U	08/13/1996			
Mercury, Total		065GW00203	0.18	U	12/11/1996			
Mercury, Total		065GW00204	0.12	U	02/25/1997			
Mercury, Total		E065GW002M2	0.04	U	09/15/2002			
Mercury, Dissolved		E065GW002M2	0.04	U	09/15/2002			
Mercury, Total	E065GW003	065GW00301b	0.81	=	04/18/1996			
Mercury, Total		065GW00302	0.31	=	08/14/1996			
Mercury, Total		065GW00303	0.2	U	12/10/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Mercury, Total		065GW00304	0.23	=	02/26/1997	1.1	2	0.14 - 0.61
Mercury, Total		E065GW003M2	0.35	=	09/15/2002			
Mercury, Dissolved		E065GW003M2	0.04	J	09/15/2002			
Mercury, Total	E065GW004	065GW00401	5.7	=	04/17/1996			
Mercury, Total		065GW00402	0.1	U	08/15/1996			
Mercury, Total		065GW00403	0.2	U	12/09/1996			
Mercury, Total		065GW00404	0.12	U	02/25/1997			
Mercury, Total		E065GW004M2	0.09	J	09/15/2002			
Mercury, Dissolved		E065GW004M2	0.04	U	09/15/2002			
Mercury, Total	E065GW005	065GW00501	0.2	U	04/17/1996			
Mercury, Total		065GW00502	0.1	U	08/15/1996			
Mercury, Total		065GW00503	0.2	U	12/10/1996			
Mercury, Total		065GW00504	0.12	U	02/25/1997			
Mercury, Total		E065GW005M2	0.04	U	09/15/2002			
Mercury, Dissolved		E065GW005M2	0.04	U	09/15/2002			
Mercury, Total	E065GW006	065GW00601	0.2	U	04/19/1996			
Mercury, Total		065GW00602	0.1	U	08/14/1996			
Mercury, Total		065GW00603	0.13	U	12/12/1996			
Mercury, Total		065GW00604	0.1	U	02/26/1997			
Mercury, Total		E065GW006M2	0.04	U	09/15/2002			
Mercury, Dissolved		E065GW006M2	0.04	U	09/15/2002			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Mercury, Total	E065GW007	065GW00701	0.1	U	10/30/1996	1.1	2	0.14 - 0.61
Mercury, Total		065GW007A2	0.1	U	03/06/1997			
Mercury, Total		065GW007A3	0.1	U	06/27/1997			
Mercury, Total		065GW00704	0.77	=	10/09/1997			
Mercury, Total	E065GW008	065GW00801	0.1	U	10/30/1996			
Mercury, Total		065GW008A2	0.1	U	03/06/1997			
Mercury, Total		065GW008A3	0.1	U	06/27/1997			
Mercury, Total		065GW00804	0.11	J	10/09/1997			
Mercury, Total		E065GW008M2	0.04	U	09/15/2002			
Mercury, Dissolved		E065GW008M2	0.04	U	09/15/2002			
Mercury, Total	E065GW009	E065GW009M2	0.04	U	09/15/2002			
Mercury, Dissolved		E065GW009M2	0.04	U	09/15/2002			
Mercury, Total	E065GW04D	065GW04D01a	0.2	U	04/18/1996			
Mercury, Total		065GW04D02	0.1	U	08/15/1996			
Mercury, Total		065GW04D03	0.2	U	12/09/1996			
Mercury, Total		065GW04D04	0.1	U	02/26/1997			
Mercury, Total		E065GW04DM2	0.04	U	09/15/2002			
Mercury, Dissolved		E065GW04DM2	0.04	U	09/15/2002			
TEQs	E065GW001	065GW00102	2.09 (pg/L)	=	14-Aug-96	0.4 (pg/L)	30 (pg/L)	NA (pg/L)
	E065GW002	065GW00202	2.71	U	13-Aug-96			
	E065GW003	065GW00302	5.8	=	14-Aug-96			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
TEQs	E065GW004	065GW00402	1.45	=	15-Aug-96	0.4 (pg/L)	30 (pg/L)	NA (pg/L)
	E065GW004	065HW00401	7.29	=	17-Apr-96			
	E065GW004	065HW00402	2.84	=	15-Aug-96			
	E065GW005	065GW00502	1.23	=	15-Aug-96			
	E065GW006	065GW00602	2.53	=	14-Aug-96			
	E065GW04D	065GW04D02	1.61	=	15-Aug-96			
TCE	E065GW001	065GW00102	5	U	08/14/1996	1.6	5	NA
	E065GW001	065GW00101	5	U	04/17/1996			
		065GW00103	5	U	12/11/1996			
		065GW00104	5	U	02/26/1997			
		E065GW001M1	5	U	09/15/2002			
	E065GW002	065GW00201a	5	U	04/19/1996			
		065GW00202	5	U	08/13/1996			
		065GW00203	5	U	12/11/1996			
		065GW00204	5	U	02/25/1997			
		E065GW002M1	5	U	09/15/2002			
	E065GW003	065GW00301a	5	U	04/19/1996			
		065GW00302	**16**	=	08/14/1996			
		065GW00303	**15**	=	12/10/1996			
		065GW00304	**15**	=	02/26/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
TCE		E065GW003M1	1.9	J	09/15/2002	1.6	5	NA
	E065GW004	065GW00401	5	U	04/17/1996			
		065GW00402	5	U	08/15/1996			
		065GW00403	1	J	12/09/1996			
		065GW00404	5	U	02/25/1997			
		E065GW004M1	0.87	J	09/15/2002			
	E065GW005	065GW00501	5	U	04/17/1996			
		065GW00502	5	U	08/15/1996			
		065GW00503	5	U	12/10/1996			
		065GW00504	5	U	02/25/1997			
		E065GW005M1	5	U	09/15/2002			
	E065GW006	065GW00601	5	U	04/19/1996			
		065GW00602	5	U	08/14/1996			
		065GW00603	5	U	12/12/1996			
		065GW00604	5	U	02/26/1997			
		E065GW006M1	5	U	09/15/2002			
	E065GW007	065GW00701	5	U	10/30/1996			
		065GW00704	5	U	10/09/1997			
		065GW007A2	5	U	03/06/1997			
		065GW007A3	5	U	06/27/1997			
	E065GW008	065GW00801	5	U	10/30/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
TCE		065GW00804	5	U	10/09/1997	1.6	5	NA
		065GW008A2	5	U	03/06/1997			
		065GW008A3	5	U	06/27/1997			
		E065GW008M1	5	U	09/15/2002			
	E065GW009	E065GW009M1	5	U	09/15/2002			
	E065GW04D	065GW04D01b	**8**	=	04/19/1996			
		065GW04D02	**6**	=	08/15/1996			
		065GW04D03	4	J	12/09/1996			
		065GW04D04	4	J	02/26/1997			
		E065GW04DM1	4.3	J	09/15/2002			
Vanadium	E065GW001	065GW00101	4.7	U	04/17/1996	25.6	NA	0.63 - 26
		065GW00102	8.5	J	08/14/1996			
		065GW00103	1.7	J	12/11/1996			
	E065GW001	065GW00104	2.9	J	02/26/1997			
	E065GW002	065GW00201b	1	U	04/18/1996			
		065GW00202	0.5	UJ	08/13/1996			
		065GW00203	0.5	U	12/11/1996			
		065GW00204	1.1	U	02/25/1997			
	E065GW003	065GW00301b	**62.5**	=	04/18/1996			
		065GW00302	18	J	08/14/1996			
		065GW00303	6.7	J	12/10/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Vanadium		065GW00304	12	J	02/26/1997	25.6	NA	0.63 - 26
	E065GW004	065GW00401	**167**	=	04/17/1996			
		065GW00402	3.4	U	08/15/1996			
		065GW00403	1.1	J	12/09/1996			
		065GW00404	1.1	U	02/25/1997			
	E065GW005	065GW00501	2.7	U	04/17/1996			
		065GW00502	2.6	U	08/15/1996			
		065GW00503	0.83	J	12/10/1996			
		065GW00504	1.6	J	02/25/1997			
	E065GW006	065GW00601	1	U	04/19/1996			
		065GW00602	0.92	UJ	08/14/1996			
		065GW00603	0.99	J	12/12/1996			
		065GW00604	1.1	U	02/26/1997			
	E065GW007	065GW00701	1	U	10/30/1996			
		065GW00704	1.1	U	10/09/1997			
		065GW007A2	1.1	U	03/06/1997			
		065GW007A3	1.1	U	06/27/1997			
	E065GW008	065GW00801	4.3	J	10/30/1996			
		065GW00804	1.1	U	10/09/1997			
		065GW008A2	1.1	U	03/06/1997			
		065GW008A3	2.5	J	06/27/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Vanadium	E065GW04D	065GW04D01a	1	U	04/18/1996	25.6	NA	0.52 - 7.7
		065GW04D02	0.9	U	08/15/1996			
		065GW04D03	0.5	UJ	12/09/1996			
		065GW04D04	1.1	U	02/26/1997			
Vinyl Chloride	E065GW001	065GW00101	10	U	04/17/1996	0.019	2	NA
		065GW00102	10	U	08/14/1996			
		065GW00103	10	U	12/11/1996			
		065GW00104	10	U	02/26/1997			
		E065GW001M1	10	U	07/12/2002			
	E065GW002	065GW00201a	10	U	04/19/1996			
		065GW00202	10	U	08/13/1996			
		065GW00203	10	U	12/11/1996			
		065GW00204	10	U	02/25/1997			
		E065GW002M1	10	U	07/12/2002			
	E065GW003	065GW00301a	**6**	J	04/19/1996			
		065GW00302	2	J	08/14/1996			
		065GW00303	10	U	12/10/1996			
		065GW00304	10	U	02/26/1997			
	E065GW003	E065GW003M1	**3.3**	J	09/15/2002			
	E065GW004	065GW00401	10	U	04/17/1996			
		065GW00402	10	U	08/15/1996			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Vinyl Chloride		065GW00403	10	U	12/09/1996	0.019	2	NA
		065GW00404	10	U	02/25/1997			
		E065GW004M1	10	U	09/15/2002			
	E065GW005	065GW00501	10	U	04/17/1996			
		065GW00502	10	U	08/15/1996			
		065GW00503	10	U	12/10/1996			
		065GW00504	10	U	02/25/1997			
		E065GW005M1	10	U	09/15/2002			
	E065GW006	065GW00601	10	U	04/19/1996			
		065GW00602	10	U	08/14/1996			
		065GW00603	10	U	12/12/1996			
		065GW00604	10	U	02/26/1997			
		E065GW006M1	10	U	09/15/2002			
	E065GW007	065GW00701	10	U	10/30/1996			
		065GW00704	10	U	10/09/1997			
		065GW007A2	10	U	03/06/1997			
		065GW007A3	10	U	06/27/1997	0.081	2	NA
	E065GW008	065GW00801	10	U	10/30/1996			
		065GW00804	10	U	10/09/1997			
		065GW008A2	10	U	03/06/1997			
		065GW008A3	10	U	06/27/1997			

TABLE 5-3
COPCs Detected in Groundwater Samples
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)	MCL	Zone E Range of Background Concentrations
Vinyl Chloride		E065GW008M1	10	U	09/15/2002	0.081	2	NA
	E065GW009	E065GW009M1	10	U	09/15/2002			
	E065GW04D	065GW04D01b	**6**	J	04/19/1996			
		065GW04D02	**6**	J	08/15/1996			
		065GW04D03	**4**	J	12/09/1996			
	E065GW04D	065GW04D04	**3**	J	02/26/1997			
		E065GW04DM1	**3.2**	J	09/15/2002			

Concentrations in bold and outlined within the table represent exceedances of the appropriate screening criteria.

[a] No primary MCL has been published for copper, instead the TTAL of 1,300 ug/L is used (USEPA, 2001).

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

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

NA Not applicable/not available

U Indicates analyte not detected above laboratory detection limit.

TABLE 5-4
Detections of Arsenic and Iron in Groundwater Samples from Well E065GW004
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (µg/L)	Qualifier	Date Sampled	EPA Region III Tap water RBC (HI=0.1)	MCL
Arsenic	E065GW004	065GW00401	58.8	=	04/17/1996	0.45	50
	E065GW004	065GW00402	6.4	J	08/15/1996		
	E065GW004	065GW00403	2.5	U	12/09/1996		
	E065GW004	065GW00404	2.1	U	02/25/1997		
Iron	E065GW004	065GW00401	11,300	=	04/17/1996	1,100	NA
	E065GW004	065GW00402	559	=	08/15/1996		
	E065GW004	065GW00403	210	J	12/09/1996		
	E065GW004	065GW00404	151	J	02/25/1997		

Concentrations in bold and outlined within the table represent exceedances of the appropriate screening criteria.

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

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

NA Not applicable/not available

U Indicates analyte not detected above laboratory detection limit.

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 SWMUs/AOCs within Zone E of the CNC, including SWMU 65 and AOCs 544 and 546. With the subsequent sampling and analysis conducted by CH2M-Jones as described in Section 4.0, 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 was only one detection of thallium during the RFI, which was in one shallow well E065GW002 at 2.8 μg/L above its MCL of 2 μg/L, but below the maximum Zone E thallium background concentration of 5.8 μg/L. This detection was preceded and followed by detections below laboratory detection limits. Intermittent detections of thallium in deep groundwater at the site above the MCL do not point to a site-specific source, but can be attributed to natural occurrence. Antimony was discussed in Section 5.0 and determined to be a COC for shallow groundwater. Arsenic was also discussed in Section 5.0 and determined to not be a COC for this site.

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

One direct-push technology (DPT) boring, LE037GP066, was installed near the Combined SWMU 65 site, as shown in Figure 6-1. The groundwater sample from this DPT boring showed detections of various metals. Metals data from DPT borings have not been used for decision-making at CNC due to the high turbidity associated with these samples. There are no other 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 Storm Sewers at the CNC

Two DPT borings, LE699GP080 and LE699GP106, were installed near the Combined SWMU 65 site, as shown in Figure 6-1. A few polycyclic aromatic hydrocarbons (PAHs) were detected in the sample from LE699GP106, as shown in Table 6-1, and some metals were detected in the sample from boring LE699GP080. As previously discussed with the BCT, the presence of turbidity in unfiltered direct-push samples renders them unsuitable for evaluating metals in groundwater.

The PAH detections do not appear to indicate a connection with operations at the site since they were detected away from the UST and OWS that were previously in operation at the site, which were located on the southern side. The detection of these PAHs may be related to the previous observance of a small amount of LNAPL during installation of well E065W006, but which did not subsequently reappear in the well. Monitoring well E065W006 is located approximately 17 feet from boring LE699GP106. It is important to note that no VOCs, such as benzene, ethyl benzene, toluene, or xylene (BTEX), which commonly occur with significant fuel releases, were detected at LE699GP106. BTEX compounds are typically key indicators of the presence of a hydrocarbon release that is capable of creating a mobile dissolved plume. The lack of BTEX indicates that a hydrocarbon release capable of creating a significant mobile plume is not likely present. No CVOCs were detected in the groundwater sample from LE699GP106.

Also, groundwater samples from monitoring well E065W006, which is located close to LE699GP106, did not indicate the presence of any SVOCs or VOCs, even though a small amount of LNAPL was observed during its installation. Consequently, it does not appear that a significant release of hydrocarbons has occurred at the site.

There is no information to indicate any details about the source of this PAH contamination, other than the presence of an AST formerly located at the site to store diesel. There were also historic railroad tracks in this area during the 1930s and later. There has also been extensive building demolition and reconstruction in this area, and it is likely that a minor petroleum spill may have occurred during these activities.

The storm sewer does not appear to have been impacted by operations at SWMU 65.

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

There are no railroad lines in the vicinity of the Combined SWMU 65 site that were investigated as part of AOC 504. Therefore, no linkage is established between the site and the investigated railroad lines.

6.6 Potential Migration Pathways to Surface Water Bodies at the CNC

The nearest surface water body to Combined SWMU 65 is the Cooper River, which lies approximately 100 feet southeast of the site. The only potential migration pathway from the site to surface water is via overland flow as stormwater runoff. The entire site is covered with 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 soil. Therefore, further evaluation of this issue is not warranted.

6.7 Potential Contamination in Oil/Water Separators (OWSs)

As discussed in Section 3.2, there was an OWS associated with a UST at Building 221. This UST was removed in 1996 and connecting lines to the OWS were capped. These activities are documented in the UST closure report included as Appendix D. The OWS is not currently in operation. There are no data suggesting an impact from the OWS at the site. Therefore, further evaluation of this issue is not warranted.

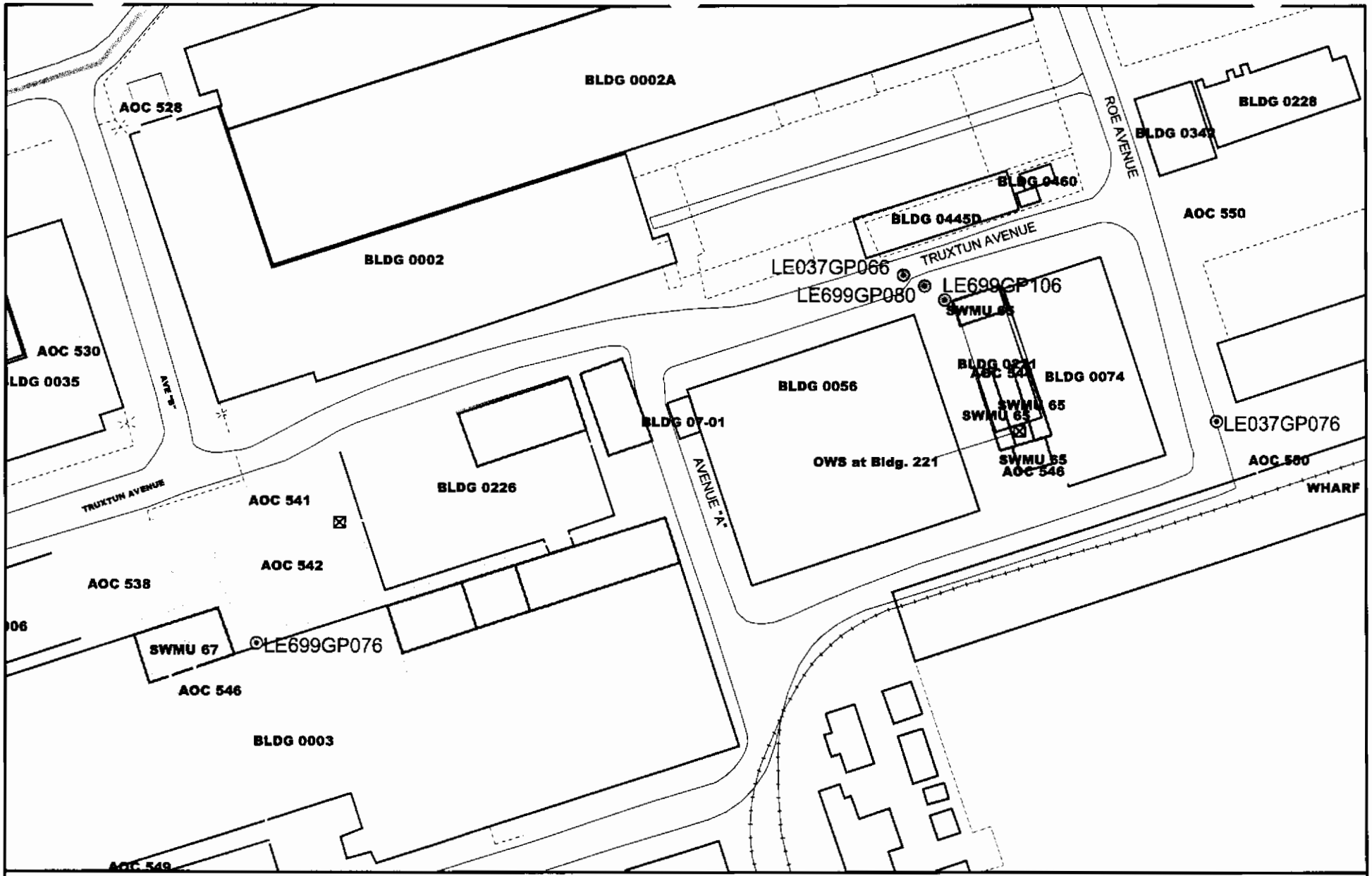
6.8 Land Use Controls (LUCs)

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 unrestricted (i.e., residential) land use.

TABLE 6-1
PAHs Detected in Groundwater
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	EPA Region III Tap Water RBC (HI=0.1)
Acenaphthene	LE699GP106	**64**	J	01/08/98	37
Chrysene		**11**	J		9.2
Fluorene		**140**	=		24
2-Methylnaphthalene		**520**	=		12
Phenanthrene		280	=		NL
Pyrene		**37**	J		18

Concentrations in bold and outlined within the table represent an exceedance of the screening criterion.
µg/L Micrograms per liter
J indicates that the analyte was detected, concentration is estimated value.
= indicates that the analyte was detected at the concentration shown.
NL Not listed



Zone L DPT Sampling Location
OWS
Railroads
Roads
AOC Boundary
SWMU Boundary
Buildings

N

0 80 160 Feet

1 inch = 113 feet

Figure 6-1
Zone L DPT Sampling Locations
Combined SWMU 65, Zone E
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\cnc\2003proj.apr, Date: 11 Feb 2003 10:22, User: SNAIK1

Section 7.0

7.0 Recommendations

SWMU 65 consists of a former lead storage area in which lead blankets and shielding materials were stored on pallets and shelves inside Building 221 and on a paved area south of the building. The majority of the lead was encased in rubber, but some exposed lead was stored beneath a tarp inside the building. This site was also a staging area for scrap lead awaiting disposal. Building 221 is currently a heavy equipment repair and maintenance shop, and the area south of the building is used for storage of old metal parts and machinery.

AOC 544 is the site of a former pickling plant at Building 221. From 1940 to 1970, the pickling plant consisted of an open-air facility with only the pickling tanks covered by a roof. In 1970, a single-story structure was built to house the pickling operations. The process used a series of chemical baths and water rinses. Until 1974, spent pickling bath solutions were discharged via the storm drainage system into the Cooper River. After 1974, a private contractor disposed of the wastes. Operations were discontinued in 1984 and the process equipment was removed.

AOC 546 consists of a former galvanizing/pickling shop that operated within Building 1025 from the early 1920s until 1967. Building 1025 was at the current location of Building 3 until 1942, when it was relocated south of Building 221. No information was found regarding its operational processes. Currently both locations are covered with pavement or structures.

The *Zone E RFI Report, Revision 0* (EnSafe, 1997) identified arsenic, 1,2-DCE (total), TCE, and vinyl chloride as shallow groundwater COCs, and acetone, aluminum, antimony, arsenic, beryllium, alpha-BHC, beta-BHC, cadmium, chromium, copper, 1,2-DCE (total), dioxin equivalents, lead, mercury, vanadium, and vinyl chloride as deep groundwater COCs for Combined SWMU 65. The RFI report did not identify COCs in soil.

Based on an evaluation of the RFI data, additional data collected in 2002, and site conditions as discussed herein, this RFIRA/CMSWP recommends that a focused CMS be undertaken to address antimony, lead, TCE, and vinyl chloride in shallow groundwater; and TCE and vinyl chloride in deep groundwater at Combined SWMU 65. No other COCs were identified for any other media at this site. A work plan for conducting a focused CMS is provided in Section 8.0 of this report.

Section 8.0

8.0 CMS Work Plan for Combined SWMU 65

Antimony, lead, TCE, and vinyl chloride were identified as COCs in shallow groundwater at Combined SWMU 65. TCE and vinyl chloride were identifed as COCs in deep groundwater. Currently there is no unacceptable exposure or risk from these COCs; however, it is feasible that in the future, should land use and/or site conditions change, some exposure could occur. Therefore, a CMS should be conducted to evaluate potential corrective measures and identify an appropriate remedy for the site.

This section presents a focused CMSWP. In the following subsections, media cleanup standards (MCSs) are identified for the COCs and potential remedies that will be evaluated to address site contamination are presented.

8.1 Remedial Action Objectives

Remedial action objectives (RAOs) are medium-specific goals that the remedial actions are designed to accomplish in order to protect human health and the environment by preventing or reducing exposures under current and future land use conditions. The RAOs identified for groundwater at Combined SWMU 65 are 1) to prevent ingestion and direct/dermal contact with groundwater having unacceptable carcinogenic or noncarcinogenic risk, and 2) to restore the aquifer to beneficial use. No remedial actions are required for soil at Combined SWMU 65.

8.2 Remedial Goal Options and Media Cleanup Standards

Throughout the process of remediating a hazardous waste site, a risk manager uses a progression of increasingly acceptable site-specific media levels in considering remedial alternatives. Under the RCRA program, remedial goal options (RGOs) and MCSs are developed at the end of the risk assessment in the RFI/Remedial Investigation (RI) programs, before completion of the CMS.

RGOs can be based on a variety of criteria, such as specific incremental lifetime cancer risk (ILCR) levels (e.g., 1E-04, 1E-05, or 1E-06), HI levels (e.g., 0.1, 1.0, 3.0), or site background concentrations. For a particular RGO, specific MCSs can be determined as target concentration values. Achieving these MCSs is accepted as demonstrating that RGOs and RAOs have been achieved. Achieving these goals should promote the protection of human

health and the environment, while achieving compliance with applicable state and federal standards.

The exposure media of concern for Combined SWMU 65 are shallow groundwater contaminated with antimony, lead, TCE, and vinyl chloride, and deep groundwater contaminated with TCE and vinyl chloride. Because Combined SWMU 65 is located within a highly developed area of the CNC and there are no surface water bodies in the immediate vicinity of the site, ecological exposures were not considered applicable for evaluation. In shallow groundwater, all COCs were found in one well E065GW003. The deep groundwater COCs were found in the deep well E065GW04D.

In shallow groundwater, antimony was detected in well E065GW003 at concentrations above its MCL of 6 μg/L, ranging from 17.9 μg/L to 42 μg/L. Lead was detected in shallow groundwater in well E065GW003 at concentrations above its TTAL of 15 μg/L, ranging from 25.6 μg/L to 1,690 μg/L. TCE was detected in shallow groundwater in well E065GW003 at concentrations above its MCL of 5 μg/L, ranging from 15 μg/L to 16 μg/L.

TCE was detected in deep groundwater in well E065GW04D at concentrations above its MCL of 5 μg/L, ranging from 6 μg/L to 8 μg/L. Vinyl chloride was detected in shallow groundwater in well E065GW003 at concentrations above its MCL of 2 μg/L, ranging from 3.3 μg/L to 6 μg/L. Vinyl chloride was detected in deep groundwater in well E065GW04D at concentrations above its MCL of 2 μg/L, ranging from 3.2 μg/L to 6 μg/L.

The MCSs for the groundwater COCs identified at Combined SWMU 65 are the MCLs of antimony (6 μg/L), TCE (5 μg/L), and vinyl chloride (2 μg/L). The MCS for lead is its TTAL of 15 μg/L.

8.3 Potential Remedies to Evaluate

The presumptive remedies that will be evaluated as part of the CMS include:

- Natural attenuation with LUCs
- In situ treatment

8.4 Focused CMS Approach

The focused CMS will consist of the following tasks that will be performed in the order presented below:

1. The corrective measure alternatives described above will be screened using several criteria and decision factors.

2. A preferred corrective measure alternative will be selected.
3. The CMS and preferred corrective measure alternative will be documented in the CMS report.

8.5 Approach to Evaluating Corrective Measure Alternatives

According to the RCRA permit issued by SCDHEC (SCDHEC, 1998), the alternatives will be evaluated with the following five standards:

1. Protecting human health and the environment.
2. Attaining media cleanup standards (RGOs).
3. Controlling the source of releases to minimize future releases that may pose a threat to human health and the environment.
4. Complying with applicable standards for the management of wastes generated by remedial activities.
5. Other factors include (a) long-term reliability and effectiveness; (b) reduction in toxicity, mobility, or volume of wastes; (c) short-term effectiveness; (d) implementability; and (e) cost.

Each of the five standards is defined in more detail below:

1. **Protecting human health and the environment.** The alternatives will be evaluated on the basis of their ability to protect human health and the environment. The ability of an alternative to achieve this standard may or may not be independent of its ability to achieve the other four standards. For example, an alternative may be protective of human health, but may not be able to attain the MCSs if the MCSs are not directly tied to protecting human health.

2. **Attaining media cleanup standards (RGOs).** The alternatives will be evaluated on the basis of their ability to achieve the RGOs defined in this CMS Work Plan. Another aspect of this standard is the timeframe to achieve the RGOs. Estimates of the timeframe for the alternatives to achieve RGOs will be provided.

3. **Controlling the source of releases.** This standard deals with the control of releases of contamination from the source (the area in which the contamination originated).

4. **Complying with applicable standards for management of wastes.** This standard deals with the management of wastes derived from implementing the alternatives, for example, treatment or disposal of excavated material. The soil removal alternative will

be designed to comply with all applicable standards for management of remediation wastes. Consequently, this standard will not be explicitly included in the detailed evaluation presented in the CMS but will be part of a work plan specific to the removal action should a removal action become the chosen alternative.

5. **Other factors.** Five other factors are to be considered if an alternative is found to meet the four standards described above. These other factors are as follows:

   a. Long-term reliability and effectiveness

   The two alternatives will be evaluated on the basis of their reliability, and the potential impact should the chosen alternative fail. In other words, a qualitative assessment will be made as to the chance of the alternative's failure and the consequences of that failure.

   b. Reduction in the toxicity, mobility, or volume of wastes

   Alternatives with technologies that reduce the toxicity, mobility, or volume of the contamination will be generally favored over those that do not. Consequently, a qualitative assessment of this factor will be performed for each alternative.

   c. Short-term effectiveness

   Alternatives will be evaluated on the basis of the risk they create during the implementation of the remedy. Factors that may be considered include fire, explosion, and exposure of workers to hazardous substances.

   d. Implementability

   The alternatives will be evaluated for their implementability by considering any difficulties associated with conducting the alternatives (such as the construction disturbances they may create), operation of the alternatives, and the availability of equipment and resources to implement the technologies comprising the alternatives.

   e. Cost

   A net present value of each alternative will be developed. These cost estimates will be used for the relative evaluation of the alternatives, not to bid or budget the work. The estimates will be based on information available at the time of the CMS and on a conceptual design of the alternative. They will be "order-of-magnitude" estimates with a generally expected accuracy of -50 percent to +50 percent for the scope of action described for each alternative. The estimates will be categorized into capital costs and operations and maintenance costs for each alternative.

In addition to the criteria described above, the alternatives will be evaluated for their ability to achieve all contractual obligations of CH2M-Jones and the Navy.

8.6 Focused CMS Report

A focused CMS Report will be prepared to present the identification, development, and evaluation of potential corrective measures for Combined SWMU 65. A proposed outline of the report, as shown in Table 8-1, provides an example of the report format and content.

TABLE 8-1
Outline of Focused CMS Report for Combined SWMU 65
RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Charleston Naval Complex

Section No.	Section Title
1.0	**Introduction**
1.1	Corrective Measures Study Purpose and Scope
1.2	Report Organization
1.3	Background Information
1.3.1	Facility Description
1.3.2	Site History and Background
1.3.2.1	Nature and Extent of Contamination
1.3.2.2	Summary of Risk Assessment
2.0	**Remedial Goal Objectives**
3.0	**Detailed Analysis of Focused Alternatives**
3.1	Approach
3.2	Evaluation Criteria
3.3	Description of Alternatives
3.3.1	Groundwater Alternative 1: Natural Attenuation with LUCs
3.3.2	Groundwater Alternative 2: In situ treatment
3.4	Detailed Analysis of Alternatives
3.4.1	Analysis of Alternative 1
3.4.2	Analysis of Alternative 2
3.5	Comparative Analysis of Alternatives
4.0	**Recommended Remedial Alternative**
5.0	**References**
Appendix A	**Corrective Measure Alternative Cost Estimates**[b]
List of Tables	
List of Figures	

[a] Additional alternatives will be analyzed as found necessary.

[b] Additional appendices will be added, if necessary.

Section 9.0

9.0 References

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

EnSafe Inc. *Final Comprehensive Sampling and Analysis Plan, Naval Base Charleston*. August 30, 1994.

EnSafe Inc./Allen & Hoshall. *Final RCRA Facility Assessment, Naval Base Charleston*. June 1995.

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

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

U.S. Environmental Protection Agency. *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers*. 2002.

U.S. Naval Detachment. *Underground Storage Tank (UST) Removal Report, UST 221-1, Charleston Naval Base Complex*. June 1996.

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

Appendix A

Comments Prepared by Charles B. Watson

SCDHEC Comment 2:
Page 10.6-33 (Table 10.6.6.2). Lead exceeded industrial soil RBC (1,300 mg/kg) with 3,130 mg/kg. More sampling is required for this area.

Navy/EnSafe Response:
The sample referred to is a sediment sample collected from a catch basin (storm drain) at AOC 546. The catch basin was cleaned during interim measures conducted by the Environmental Detachment Charleston. Details of the cleaning can be found in the Closure Report for AOC 699 Storm Drain Cleaning prepared on March 8, 1999.

CH2M-Jones Response:
These sediments were removed from the catch basin during the IM mentioned above, and no longer existed after the IM. No additional sampling is necessary.

SCDHEC Comment 3:
Page 10.6-4, states that since free product was discovered in 065SB006, an additional soil boring (065SB00603) was installed. The location of this boring has not been included on location maps. In soil boring 065SB0063, the soil was described as "fine sand with oily stains in laminations". Analyses were performed but data was not presented. The RFI states that two VOCs, TPH-GRO, and fifteen metals were detected. The data should be presented and a determination made as to the full extent of the impact.

Navy/EnSafe Response:
The text states "During drilling, free product was noted in soil boring 065SB006, prompting the collection of an additional soil sample (065SB00603)." An additional soil boring was not installed. The last 2 digits of the sample identification refer to the interval at which the sample was collected. The location of soil boring 065SB006 is shown on Figure 10.6.1, the same location from which sample 065SB00603 was collected. Refer to Section 3 of this report for the sample identification system. None of the detected concentrations exceeded their respective SSLs. Analytical results are included in Appendix H of this report. The source of the free product has been identified as a UST, which has been removed and is now part of the UST program. The responsibility of delineating the extent of contamination has fallen under the jurisdiction of the UST program. SCDHEC may want to discuss this site with Mr. Paul Bristol of the Departments UST program.

CH2M-Jones Response:
The subsurface soil sample (from the 3 to 5 ft depth interval) collected below sample E065GWSB00603 did not show detections of petroleum-related VOCs, indicating no impact to the soils in this depth interval. Additionally, the groundwater samples collected from the monitoring well E065GW006 installed in this boring have not shown the presence of petroleum-related products in five sampling events. Therefore, further investigation of this issue is not warranted.

Comments Prepared by Eric F. Cathcart

SCDHEC Comment 9:
Free product was reported in 065SB006. The Navy needs to locate the source of the free product. The utility map seems to identify a likely pathway for free product to travel very near the soil boring. Page 10.6.1, states that "until 1974, spent pickling bath solution was discharged via the storm drain into the Cooper River." More assessment should be performed around storm drain system.

Navy/EnSafe Response:
The source of the free product has been identified as a UST, which has been removed and is now part of the UST program. The responsibility of delineating the extent of contamination has fallen under the jurisdiction of the UST program. SCDHEC may want to discuss this site with Mr. Paul Bristol of the Departments UST program.

CH2M-Jones Response:
The RFI Report indicates that the two VOCs and metals detected in the subsurface soil sample collected to verify the contamination from the "free product" did not exceed SSLs. VOC detections from the RFI were compared with SSLs (with a DAF=1) and no COCs were identified at this site.

Additionally, there is no information from the groundwater samples collected during five sampling events from the monitoring well E065GW006, which was installed in this boring, that shows the presence of petroleum-related products. It does not appear that there is a petroleum plume at this location. Therefore, further investigation of this issue is not warranted.

SCDHEC Comment 10:
Deep well (NBCE06504D) reported a TCE value of 8.00 ug/L (MCL=5 ug/L) and vinyl chloride value of 6.00 ug/L (MCL=2.0 ug/L). DCE was also detected, but below the MCL. The horizontal and vertical extent of organics in the lower aquifer should be determined.

Navy/EnSafe Response:
Organics were also detected in elevated concentrations in shallow groundwater. Prior to the installation of additional shallow wells, the UST program will be consulted to determine if they have already installed additional shallow wells in response to the previous comment #9. Additional deep monitoring wells will be installed in the area around SWMU 65 for further delineation of these contaminants.

CH2M-Jones Response:
None of the other shallow wells installed as part of the RFI at this site have indicated the presence of chlorinated VOCs above screening criteria in the shallow aquifer. The installation of additional deep wells is not warranted at this site.

SCDHEC Comment 11:
Shallow wells have exceedances for MCL of metals. Additional deep wells should be installed to adequately delineate the vertical extent of contamination in the deep aquifer. In addition to the installation of additional deep wells, both shallow wells and existing deep wells should be resampled to monitor the concentrations of metals.

Navy/EnSafe Response:
Discussions are ongoing pertaining to the widespread presence of inorganics in groundwater and how to interpret the significance of that data. A technical memo was submitted to the Project Team to review several months ago and it was briefly discussed at a meeting with SCDHEC in June. At that meeting SCDHEC indicated their review of the memo was not complete and that further discussion should be deferred until that review was complete. Deep and shallow groundwater at this site have been recommended for CMS and long-term monitoring.

CH2M-Jones Response:
Exceedances of inorganics above the screening criteria at this site are localized to one well, E065GW003, where antimony and lead have been identified as shallow groundwater COCs. No groundwater inorganic COCs have been identified at any of the other shallow wells at this site. Therefore, additional deep wells are not warranted at this site.

Additional sampling of existing shallow and deep wells at the site was conducted by CH2M-Jones during September 2002. Details of this sampling are found in Section 4.0 of the RFI Report Addendum.

SCDHEC Comment 21:
Page 10.6-42 States that "PAHs are not of concern because most chemicals from group are not particularly mobile in soil or groundwater." The Department does not agree with this comment and recommends delineating the horizontal and vertical extent of PAHs in the area.

Navy/EnSafe Response:
In accordance with carcinogenic polynuclear aromatic hydrocarbon (cPAH) guidance, BEQs were calculated for cPAHs at this site. At issue seems to be whether or not it would be feasible to continue sampling when constituents are so wide-spread and samples have already been collected from all across the zone. Due to the high number of potential point sources close to one another and the shallow depth of groundwater, contribution of contaminants may or may not be attributable to any one site or source. The majority of second round soil sampling was conducted on the basis of arsenic and BEQs detected in the initial round of sampling and for the purpose of determining whether or not these constituents were wide-spread across Zone E. Results of second round sampling indicate that BEQ is wide-spread across Zone E, as well as NAVBASE Charleston in general, and the feasibility of additional sampling is questionable.

CH2M-Jones Response:
There were no exceedances of PAHs in soil above the COPC screening criteria adopted by the CNC BCT. No further investigation of this issue is warranted.

SCDHEC Comment 22:
Figure 10.6.7, Well #6 is listed as No COPCs detected, yet free product has been reported for this well. The figure should be revised.

Navy/EnSafe Response:
The figure will be revised to include the SVOCs detected in the free product sample collected at NBCE065006. The figure will be included in the Final Zone E RFI Report after the risk has been re-calculated.

CH2M-Jones Response:
No organic COPCs have been identified at well E065GW006, as indicated in the RFI Report Addendum.

Comments Prepared by Susan K. Byrd

SCDHEC Comment 14:
Section 10.24.5.2, Page 10.24-14, Lines 19 and 20: The text states that relatively high arsenic concentrations were detected in groundwater samples at SWMU 65, but were determined not to be a threat to surface water in the Cooper River. Justification should be given as to why the contamination is not impacting the Cooper River.

Navy/EnSafe Response:
The text will be revised to read "relatively high arsenic concentrations were also detected in groundwater samples at nearby SWMU 65, but were determined not to significantly impact surface water in the Cooper River." Please refer to Section 10.6.9.6, Table 10.6.9.2; maximum groundwater concentration does not exceed the Adjusted Eco/HH Groundwater RBC for arsenic.

CH2M-Jones Response:
With the exception of one detection of 58.5 mg/L at well E065GW004, which was followed by three detections below the South Carolina MCL of 50 mg/L and two detections below laboratory detection limits in this well, none of the other site wells showed arsenic detections in groundwater at the above the South Carolina MCL of 50 mg/L. Therefore, arsenic concentrations in groundwater at Combined SWMU 65 are not of concern.

Appendix B

Chemicals Detected in Zone E Soil Samples
AOC 544

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
Volatile Organic Compounds (ug/kg)						
1,2-Dichloroethene (total)	544SB004	ND	4.00	700.00	NA	NA
2-Butanone (MEK)	544SB001	ND	21.00	4700000.00	NA	NA
Acetone	544SB001	120.00	ND	780000.00	NA	NA
	544SB001	ND	57.00			
	544SB002	ND	150.00			
	544SB004	14.00	43.00			
Carbon disulfide	544SB001	ND	2.00	780000.00	NA	NA
	544SB002	ND	2.00			
	544SB004	2.00	2.00			
Carbon tetrachloride	544SB003	5.00	4.00	44000.00	NA	NA
Ethylbenzene	544SB001	ND	2.00	780000.00	NA	NA
Methylene chloride	544SB001	ND	34.00	85000.00	NA	NA
	544SB002	24.00	28.00			
Vinyl chloride	544SB004	ND	7.00	340.00	NA	NA
Xylene (Total)	544SB001	ND	5.00	16000000.00	NA	NA
Semi-volatile Compounds (ug/kg)						
2-Chlorophenol	544SB003	96.00	ND	39000.00	NA	NA
2-Methylnaphthalene	544SB001	130.00	990.00	NA	NA	NA
	544SB002	ND	140.00			
4-Chloro-3-methylphenol	544SB003	120.00	90.00	NA	NA	NA
Acenaphthene	544SB001	120.00	440.00	470000.00	NA	NA
	544SB003	77.00	ND			
Anthracene	544SB001	ND	46.00	23000000.00	NA	NA
Benzo(a)anthracene	544SB003	ND	88.00	880.00	NA	NA
	544SB004	ND	200.00			
Benzo(a)pyrene	544SB003	ND	120.00	88.00	NA	NA
	544SB004	ND	220.00			
Benzo(g,h,i)perylene	544SB003	ND	93.00	310000.00	NA	NA
Benzo(k)fluoranthene	544SB001	ND	48.00	8800.00	NA	NA
	544SB002	ND	53.00			
	544SB003	ND	190.00			
	544SB004	ND	430.00			
Chrysene	544SB003	ND	150.00	88000.00	NA	NA
	544SB004	ND	310.00			
Di-n-butylphthalate	544SB002	220.00	ND	7800000.00	NA	NA
Dibenzofuran	544SB001	75.00	310.00	31000.00	NA	NA
Fluoranthene	544SB001	ND	57.00	3100000.00	NA	NA
	544SB002	ND	46.00			
	544SB003	ND	120.00			
	544SB004	ND	510.00			
Fluorene	544SB001	61.00	300.00	310000.00	NA	NA
Naphthalene	544SB001	360.00	2000.00	310000.00	NA	NA
	544SB003	ND	210.00			
Phenanthrene	544SB001	76.00	340.00	310000.00	NA	NA
	544SB002	ND	64.00			

Chemicals Detected in Zone E Soil Samples
AOC 544

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	544SB003	ND	86.00			
	544SB004	ND	190.00			
Phenol	544SB003	110.00	ND	4700000.00	NA	NA
Pyrene	544SB001	ND	86.00	230000.00	NA	NA
	544SB002	ND	48.00			
	544SB003	ND	220.00			
	544SB004	ND	570.00			
Chlorinated Pesticides (ug/kg)						
4,4'-DDE	544SB001	ND	5.10	19000.00	NA	NA
	544SB002	10.50	10.30			
	544SB003	2.97	ND			
Aldrin	544SB001	349.00	ND	0.04	NA	NA
	544SB002	2.38	2.38			
	544SB003	1.61	1.61			
Dieldrin	544SB001	586.00	29.00	40.00	NA	NA
	544SB002	260.00	14.40			
	544SB003	15.10	33.20			
Endosulfan I	544SB001	ND	5.20	47000.00	NA	NA
Endosulfan II	544SB001	9.01	ND	47000.00	NA	NA
Endrin	544SB001	ND	5.20	2300.00	NA	NA
	544SB002	4.91	ND			
Endrin aldehyde	544SB001	4.73	1.70	2300.00	NA	NA
Heptachlor epoxide	544SB001	19.00	5.30	70.00	NA	NA
	544SB002	2.86	ND			
	544SB003	ND	2.03			
beta-BHC	544SB001	ND	2.80	350.00	NA	NA
	544SB002	11.70	ND			
delta-BHC	544SB001	96.00	5.30	350.00	NA	NA
	544SB002	2.41	8.64			
	544SB003	ND	2.52			
gamma-BHC (Lindane)	544SB001	9.54	ND	350.00	NA	NA
Inorganic Compounds (mg/kg)						
Cyanide (CN)	544SB002	ND	0.71	73.00	0.5	NA
Aluminum (Al)	544SB001	2500.00	1880.00	7800.00	26000	41100
	544SB002	2700.00	2290.00			
	544SB003	2150.00	4630.00			
	544SB004	4220.00	2320.00			
Antimony (Sb)	544SB001	0.61	ND	3.10	1.77	1.6
	544SB004	1.50	1.20			
Arsenic (As)	544SB001	2.20	2.50	3.10	1.77	1.6
	544SB002	1.30	0.87			
	544SB003	0.70	6.40			
	544SB004	1.10	2.30			
Barium (Ba)	544SB001	8.50	10.40	550.00	130	94.1
	544SB002	5.40	6.90			

Chemicals Detected in Zone E Soil Samples
AOC 544

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	544SB003	5.40	31.10			
	544SB004	25.10	17.50			
Beryllium (Be)	544SB001	0.13	0.19	0.15	1.7	2.71
	544SB003	ND	0.27			
	544SB004	ND	0.17			
Cadmium (Cd)	544SB001	0.24	0.30	3.90	1.5	0.96
	544SB002	0.14	ND			
	544SB003	ND	0.17			
	544SB004	ND	2.20			
Calcium (Ca)	544SB001	12200.00	5060.00	NA	NA	NA
	544SB002	381.00	803.00			
	544SB003	467.00	1660.00			
	544SB004	5980.00	2640.00			
Chromium (Cr)	544SB001	10.70	11.70	39.00	94.6	75.2
	544SB002	5.00	4.70			
	544SB003	3.80	10.00			
	544SB004	36.10	11.70	470.00	19	14.9
Cobalt (Co)	544SB001	1.30	3.90			
	544SB002	24.70	1.20			
	544SB003	34.50	3.90			
	544SB004	505.00	1.20			
Copper (Cu)	544SB001	35.10	26.00	310.00	66	152
	544SB002	6.80	7.00			
	544SB003	10.40	221.00			
	544SB004	21.90	111.00			
Iron (Fe)	544SB001	2690.00	3550.00	2300.00	NA	NA
	544SB002	3770.00	1850.00			
	544SB003	1740.00	6460.00			
	544SB004	3430.00	3700.00			
Lead (Pb)	544SB001	32.60	36.70	400.00	265	173
	544SB002	6.60	11.30			
	544SB003	8.30	112.00			
	544SB004	17.90	272.00			
Magnesium (Mg)	544SB001	412.00	399.00	NA	NA	NA
	544SB002	82.00	115.00			
	544SB003	80.40	534.00			
	544SB004	152.00	176.00			
Manganese (Mn)	544SB001	24.10	47.00	180.00	302	881
	544SB002	19.10	16.60			
	544SB003	10.00	38.10			
	544SB004	17.10	28.90			
Mercury (Hg)	544SB001	0.03	0.10	2.30	2.6	1.59
	544SB002	0.03	ND			
	544SB003	0.03	8.20			
	544SB004	0.06	0.36			
Nickel (Ni)	544SB001	3.30	4.10	160.00	77.1	57
	544SB002	3.80	1.40			

Chemicals Detected in Zone E Soil Samples
AOC 544

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	544SB003	5.80	6.50			
	544SB004	19.20	16.00			
Potassium (K)	544SB001	508.00	548.00	NA	NA	NA
	544SB003	179.00	680.00			
	544SB004	ND	469.00			
Sodium (Na)	544SB001	99.10	116.00	NA	NA	NA
	544SB002	71.50	69.80			
	544SB003	ND	137.00			
	544SB004	242.00	545.00			
Tin (Sn)	544SB003	2.60	4.80	4700.00	59.4	9.23
	544SB004	10.40	16.50			
Vanadium (V)	544SB001	5.40	5.80	55.00	94.3	155
	544SB002	4.50	3.70			
	544SB003	3.50	14.90			
	544SB004	3.20	6.40			
Zinc (Zn)	544SB001	39.50	51.40	2300.00	827	886
	544SB002	6.40	13.00			
	544SB003	13.60	225.00			
	544SB004	24.30	363.00			

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 Soil Samples
SWMU 65

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
Volatile Organic Compounds (ug/kg)						
1,2-Dichloroethene (total)	065SB003	2.00	2.00	700000	NA	NA
2-Butanone (MEK)	065SB003	ND	17.00	4700000	NA	NA
	065SB005	ND	53.00			
Acetone	065SB001	195.00	ND	780000	NA	NA
	065SB003	ND	69.00			
	065SB004	34.00	NS			
	065SB005	158.50	330.00			
	065SB006	44.00	18.00			
Methylene chloride	065SB003	60.00	ND	85000	NA	NA
	065SB006	19.00	35.00			
Semi-volatile Compounds (ug/kg)						
2-Methylnaphthalene	065SB007	ND	370.00	NA	NA	NA
4-Chloroaniline	065SB003	100.00	ND	310000	NA	NA
Acenaphthene	065SB003	ND	120.00	470000	NA	NA
	065SB006	ND	72.00			
	065SB007	ND	15000.00			
	065SB008	170.00	55.00			
Acenaphthylene	065SB007	ND	530.00	310000	NA	NA
	065SB008	ND	46.00			
Anthracene	065SB007	ND	5200.00	23000000	NA	NA
	065SB008	540.00	120.00			
Benzo(a)anthracene	065SB001	112.50	540.00	880	NA	NA
	065SB003	ND	180.00			
	065SB005	ND	149.00			
	065SB006	200.00	ND			
	065SB007	ND	2900.00			
	065SB008	230.00	290.00			
Benzo(a)pyrene	065SB001	100.00	440.00	88	NA	NA
	065SB003	ND	200.00			
	065SB005	ND	160.00			
	065SB006	160.00	ND			
	065SB007	ND	1200.00			
	065SB008	210.00	370.00			
Benzo(b)fluoranthene	065SB001	93.50	590.00	880	NA	NA
	065SB006	240.00	ND			
	065SB007	ND	1600.00			
	065SB008	220.00	290.00			
Benzo(g,h,i)perylene	065SB001	ND	360.00	310000	NA	NA
	065SB005	ND	120.00			
	065SB006	74.00	ND			
	065SB007	ND	250.00			
	065SB008	70.00	210.00			
Benzo(k)fluoranthene	065SB001	110.00	350.00	8800	NA	NA
	065SB003	ND	290.00			
	065SB005	ND	310.00			
	065SB006	270.00	ND			
	065SB007	ND	1600.00			
	065SB008	220.00	410.00			

Chemicals Detected in Zone E Soil Samples
SWMU 65

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
bis(2-Ethylhexyl)phthalate (BEHP)	065SB001	290.00	ND	4600	NA	NA
	065SB002	1300.00	NS			
Chrysene	065SB001	125.00	790.00	88000	NA	NA
	065SB003	ND	350.00			
	065SB005	ND	240.00			
	065SB006	420.00	ND			
	065SB007	ND	2900.00			
	065SB008	280.00	400.00			
Dibenz(a,h)anthracene	065SB001	ND	120.00	88000	NA	NA
	065SB007	ND	170.00			
	065SB008	ND	85.00			
Dibenzofuran	065SB007	ND	4000.00	31000	NA	NA
	065SB008	74.00	ND			
Fluoranthene	065SB001	170.00	550.00	3100000		
	065SB003	ND	440.00			
	065SB005	ND	315.00			
	065SB006	740.00	ND			
	065SB007	75.00	15000.00			
	065SB008	840.00	690.00			
Fluorene	065SB003	ND	150.00	310000	NA	NA
	065SB005	ND	320.00			
	065SB007	ND	12000.00			
	065SB008	190.00	52.00			
Indeno(1,2,3-cd)pyrene	065SB001	ND	390.00	880	NA	NA
	065SB003	ND	140.00			
	065SB006	72.00	ND			
	065SB007	ND	280.00			
	065SB008	72.00	170.00			
Naphthalene	065SB003	390.00	150.00	310000	NA	NA
	065SB007	ND	1600.00			
	065SB008	42.00	56.00			
Phenanthrene	065SB001	95.00	ND	310000	NA	NA
	065SB003	ND	260.00			
	065SB006	38.00	ND			
	065SB007	51.00	20000.00			
	065SB008	800.00	530.00			
Pyrene	065SB001	205.00	700.00	230000	NA	NA
	065SB003	ND	470.00			
	065SB005	ND	295.00			
	065SB006	540.00	ND			
	065SB007	58.00	17000.00			
	065SB008	730.00	730.00			
Chlorinated Pesticides (ug/kg)						
4,4'-DDT	065SB005	3.20	ND	1900	NA	NA
alpha-Chlordane	065SB001	ND	2.60	490	NA	NA
	065SB005	11.30	ND			
Dieldrin	065SB005	25.50	ND	40	NA	NA
	065SB006	ND	6.17			
gamma-Chlordane	065SB005	13.50	ND	490	NA	NA

Chemicals Detected in Zone E Soil Samples
SWMU 65

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
Heptachlor	065SB001	1.80	ND	140	NA	NA
Dioxin/Dibenzofuran (ng/kg)						
1234678-HpCDD	065CB001	1.77	2.06	NA	NA	NA
	065CB005	36.05	2.51			
1234678-HpCDF	065CB001	0.72	0.52	NA	NA	NA
	065CB005	15.70	7.02			
123478-HxCDF	065CB005	1.55	0.74	NA	NA	NA
12378-PeCDD	065CB005	ND	0.42	NA	NA	NA
OCDD	065CB001	21.20	23.60	NA	NA	NA
	065CB005	236.86	17.15			
OCDF	065CB005	53.90	9.69	NA	NA	NA
Total Hepta-Dioxins	065CB001	4.04	6.36	NA	NA	NA
	065CB005	277.81	8.63			
Total Hepta-Furans	065CB001	0.72	0.52	NA	NA	NA
	065CB005	23.88	7.95			
Total Hexa-Dioxins	065CB001	3.00	3.22	NA	NA	NA
	065CB005	11.57	2.55			
Total Hexa-Furans	065CB005	6.55	1.93	NA	NA	NA
Total Penta-Dioxins	065CB005	ND	0.42	NA	NA	NA
Total Penta-Furans	065CB005	0.61	ND	NA	NA	NA
Hexachromes (mg/kg)						
Chromium (Hexavalent)	065CB001	0.17	ND	390	NA	NA
Inorganic Compounds (mg/kg)						
Cyanide (CN)	065SB003	ND	3.40	73	0.5	NA
Aluminum (Al)	065SB001	2905.00	12290.00	7800	26000	41100
	065SB002	4080.00	NS			
	065SB003	2750.00	3580.00			
	065SB004	6490.00	NS			
	065SB005	1895.00	5735.00			
	065SB006	1230.00	1360.00			
Antimony (Sb)	065SB003	2.90	1.80	3.1	1.77	1.6
	065SB004	0.79	NS			
	065SB007	ND	3.60			
Arsenic (As)	065SB001	5.45	18.20	0.43	23.9	13.9
	065SB002	2.80	NS			
	065SB003	0.79	2.40			
	065SB004	4.10	NS			
	065SB005	0.97	5.10			
	065SB006	2.00	2.30			
Barium (Ba)	065SB001	15.00	25.95	550	130	94.1
	065SB002	13.10	NS			
	065SB003	22.80	14.00			
	065SB004	14.00	NS			
	065SB005	7.70	16.55			
	065SB006	7.40	6.60			
Beryllium (Be)	065SB001	0.29	0.86	0.15	1.7	2.71
	065SB002	0.44	NS			

Chemicals Detected in Zone E Soil Samples
SWMU 65

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	065SB003	ND	0.14			
	065SB004	0.40	NS			
	065SB005	ND	0.33			
	065SB006	0.15	ND			
Cadmium (Cd)	065SB001	0.97	ND	3.9	1.5	0.96
	065SB002	0.16	NS			
	065SB003	0.20	0.88			
	065SB004	0.53	NS			
	065SB005	1.45	ND			
Calcium (Ca)	065SB001	14750.00	15170.00	NA	NA	NA
	065SB002	15000.00	NS			
	065SB003	3040.00	2470.00			
	065SB004	94800.00	NS			
	065SB005	3930.00	3560.00			
	065SB006	2830.00	554.00			
	065SB007	56400.00	ND			
	065SB008	49500.00	ND			
Chromium (Cr)	065SB001	6.85	24.90	39	94.6	75.2
	065SB002	11.80	NS			
	065SB003	23.70	18.00			
	065SB004	36.50	NS			
	065SB005	9.25	11.85			
	065SB006	4.90	4.60			
	065SB007	6.80	20.50			
	065SB008	19.50	8.80			
Cobalt (Co)	065SB001	2.75	5.10	470	19	14.9
	065SB002	7.30	NS			
	065SB003	4.00	1.20			
	065SB004	15.90	NS			
	065SB005	8.70	5.95			
	065SB006	0.60	0.41			
Copper (Cu)	065SB001	26.35	22.30	310	66	152
	065SB002	4.90	NS			
	065SB003	60.90	71.20			
	065SB004	25.10	NS			
	065SB005	87.25	22.70			
	065SB006	9.10	6.40			
	065SB007	ND	70.30			
	065SB008	51.50	42.50			
Iron (Fe)	065SB001	5740.00	22800.00	2300	NA	NA
	065SB002	6160.00	NS			
	065SB003	1450.00	2810.00			
	065SB004	5400.00	NS			
	065SB005	2350.00	7460.00			
	065SB006	2150.00	1540.00			
Lead (Pb)	065SB001	48.45	96.70	400	265	173
	065SB002	6.60	NS			
	065SB003	165.00	196.00			
	065SB004	56.20	NS			
	065SB005	59.10	42.05			

Chemicals Detected in Zone E Soil Samples
SWMU 65

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	065SB006	21.10	10.80			
Magnesium (Mg)	065SB001	732.00	3070.00	NA	NA	NA
	065SB002	1010.00	NS			
	065SB003	188.00	259.00			
	065SB004	2570.00	NS			
	065SB005	117.75	652.50			
	065SB006	211.00	152.00			
Manganese (Mn)	065SB001	84.40	378.50	180	302	881
	065SB002	65.80	NS			
	065SB003	8.90	18.50			
	065SB004	49.10	NS			
	065SB005	13.90	59.65			
	065SB006	19.30	10.70			
Mercury (Hg)	065SB001	0.16	0.38	2.3	2.6	1.59
	065SB003	0.22	0.25			
	065SB004	0.06	NS			
	065SB005	0.04	0.12			
	065SB006	0.06	ND			
	065SB007	ND	0.20			
	065SB008	0.21	0.33			
Nickel (Ni)	065SB001	5.25	8.70	160	77.1	57
	065SB002	4.10	NS			
	065SB003	3.10	7.50			
	065SB004	13.10	NS			
	065SB005	49.05	9.75			
	065SB006	1.90	NS			
Potassium (K)	065SB001	709.00	2285.00	NA	NA	NA
	065SB002	969.00	NS			
	065SB003	461.00	560.00			
	065SB004	1150.00	NS			
	065SB005	214.00	740.50			
	065SB006	455.00	442.00			
Selenium (Se)	065SB002	0.77	NS	39	1.7	2.4
	065SB004	1.40	NS			
	065SB008	0.45	0.66			
Silver (Ag)	065SB005	0.38	ND	39	NA	NA
Sodium (Na)	065SB001	171.50	529.00	NA	NA	NA
	065SB002	297.00	NS			
	065SB003	441.00	507.00			
	065SB004	383.00	NS			
	065SB005	ND	73.10			
	065SB006	89.40	210.00			
Tin (Sn)	065SB003	34.60	22.70	4700	59.4	9.23
	065SB005	3.50	3.70			
	065SB006	ND	13.00			
	065SB007	ND	33.20			
Vanadium (V)	065SB001	10.15	52.05	55	94.3	155
	065SB002	12.40	NS			
	065SB003	2.20	4.90			
	065SB004	18.80	NS			

Chemicals Detected in Zone E Soil Samples
SWMU 65

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	065SB005	3.60	15.55			
	065SB006	3.70	4.00			
	065SB008	13.90	ND			
Zinc (Zn)	065SB001	242.50	84.05	2300	827	886
	065SB002	19.10	NS			
	065SB003	83.70	297.00			
	065SB004	109.00	NS			
	065SB005	127.50	67.65			
	065SB006	69.20	9.60			

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
SWMU 065

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)	065GW004	ND	2.00	2.00	ND	5.50	NA	70
Trichloroethene	065GW004	ND	ND	2.00	1.00	1.60	NA	5
Semi-volatile Compounds (ug/l)								
2-Methylnaphthalene	065GW003	ND	2.00	NS	NS	NA	NA	NA
	065GW007	2.00	1.00	8.00	NS			
Acenaphthene	065GW002	2.00	2.00	NS	NS	220.00	NA	NA
	065GW002	ND	ND	NS	NS			
	065GW003	ND	2.00	NS	NS			
	065GW004	ND	3.50	NS	NS			
	065GW04D	2.00	3.00	NS	NS			
	065GW007	41.00	38.00	56.00	NS			
Acenaphthylene	065GW007	1.00	1.00	NS	NS	NA	NA	NA
Anthracene	065GW007	2.00	1.00	2.00	NS	NA	NA	NA
Benzoic acid	065GW001	2.00	ND	NS	NS	15000.00	NA	NA
	065GW004	2.00	ND	NS	NS			
	065GW005	1.00	ND	NS	NS			
Dibenzofuran	065GW004	ND	1.50	NS	NS	15	NA	NA
	065GW04D	1.00	1.00	NS	NS			
	065GW007	12.00	11.00	17.00	NS			
Diethylphthalate	065GW007	ND	ND	2.00	NS	2900	NA	NA
Fluoranthene	065GW002	1.00	6.00	NS	NS	NA	NA	NA
	065GW007	4.00	3.00	6.00	NS			
Fluorene	065GW004	ND	2.00	NS	NS	NA	NA	NA
	065GW04D	1.00	2.00	NS	NS			
	065GW007	20.00	17.00	31.00	NS			
Naphthalene	065GW003	ND	60.00	NS	NS	150.00	NA	NA
	065GW004	ND	17.50	NS	NS			
Phenanthrene	065GW007	12.00	10.00	12.00	NS	NA	NA	NA
Pyrene	065GW002	1.00	4.00	NS	NS	110.00	NA	NA
	065GW007	2.00	2.00	3.00	NS			
Chlorinated Pesticides (ug/l)								
alpha-BHC	065GW004	0.12	ND	ND	ND	NA	NA	NA
beta-BHC	065GW004	0.05	ND	ND	ND	NA	NA	NA
Dioxin/Dibenzofuran (pg/l)								
1234678-HpCDD	065GW003	ND	106.00	NS	NS	NA	NA	NA
	065GW004	115.00	ND	NS	NS			
1234678-HpCDF	065GW005	ND	5.83	NS	NS	NA	NA	NA
	065GW006	ND	7.57	NS	NS			
	065GW04D	ND	6.15	NS	NS			
234678-HxCDF	065GW004	ND	2.26	NS	NS	NA	NA	NA
OCDD	065GW001	ND	10.90	NS	NS	NA	NA	NA
	065GW003	ND	375.00	NS	NS			
	065GW004	1270.00	9.41	NS	NS			
	065GW005	ND	7.50	NS	NS			
	065GW006	ND	14.80	NS	NS			

Chemicals Detected in Zone E Groundwater Samples
SWMU 065

Name	Location	Round 1 Conc.	Round 2 Conc.	Round 3 Conc.	Round 4 Conc.	RBC (THQ=.1)	UTL	MCL
	065GW04D	ND	6.54	NS	NS			
OCDF	065GW005	ND	7.74	NS	NS	NA	NA	NA
	065GW006	ND	8.27	NS	NS			
	065GW04D	ND	5.89	NS	NS			
	065GW004	ND	4.67	NS	NS			
Total Hepta-Dioxins	065GW003	ND	266.00	NS	NS	NA	NA	NA
	065GW004	439.00	ND	NS	NS			
Total Hepta-Furans	065GW04D	ND	6.15	NS	NS	NA	NA	NA
Total Hexa-Dioxins	065GW003	ND	14.60	NS	NS	NA	NA	NA
	065GW004	313.00	ND	NS	NS			
Total Hexa-Furans	065GW004	ND	2.26	NS	NS	NA	NA	NA
Total Tetra-Dioxins	065GW004	17.10	ND	NS	NS	NA	NA	NA
Other Compounds (mg/l)								
Chloride	065GW001	274.00	171.00	461.00	247.00	NA	NA	NA
	065GW002	718.00	444.00	414.00	291.00			
	065GW003	ND	10.60	14.00	13.40			
	065GW004	30.60	4.20	3.80	1.90			
	065GW005	24.80	4.30	23.30	31.30			
	065GW006	ND	15.70	ND	7.60			
	065GW007	27.50	21.60	ND	ND			
	065GW008	128.00	16.00	ND	ND			
	065GW04D	663.00	149.00	432.00	399.00			
	065HW004	34.10	4.10	3.40	1.70			
Sulfate	065GW001	ND	3.50	ND	ND	NA	NA	NA
	065GW002	ND	23.60	44.30	104.00			
	065GW003	ND	24.40	22.30	28.10			
	065GW004	ND	76.40	15.15	9.10			
	065GW005	ND	77.20	34.60	65.70			
	065GW006	ND	4.60	ND	3.10			
	065GW007	4.90	17.60	ND	ND			
	065GW008	0.43	0.57	ND	ND			
	065GW04D	126.00	75.90	58.70	45.40			
Total Dissolved Solids (TDS)	065GW007	ND	312.00	ND	NS	NA	NA	NA
	065GW008	ND	188.00	ND	NS			
Inorganic Compounds (ug/l)								
Cyanide (CN)	065GW001	ND	2.10	NS	NS	73	7.9	200
	065GW003	13.40	4.60	NS	NS			
	065GW004	9.80	ND	NS	NS			
Aluminum (Al)	065GW001	ND	ND	350.00	70.00	3700	2810	NA
	065GW002	ND	ND	ND	41.20			
	065GW003	21500.00	4590.00	2550.00	2290.00			
	065GW004	4425.00	126.00	85.75	44.90			
	065GW005	337.00	128.00	173.00	170.00			
	065GW006	ND	ND	60.50	73.90			
	065GW007	101.00	183.00	60.80	NS			
	065GW008	113.00	94.50	263.00	NS			
	065GW04D	ND	ND	21.00	36.10		319	

Chemicals Detected in Zone E Groundwater Samples
SWMU 065

Name	Location	Round 1 Conc.	Round 2 Conc.	Round 3 Conc.	Round 4 Conc.	RBC (THQ=.1)	UTL	MCL
Antimony (Sb)	065GW003	42.00	ND	ND	17.90	1.5	NA	6
	065GW004	5.10	ND	ND	ND			
	065GW005	4.50	ND	ND	ND			
Arsenic (As)	065GW001	ND	ND	6.40	5.70	0.05	18.7	50
	065GW002	ND	ND	8.10	4.80			
	065GW003	22.60	ND	3.50	7.30			
	065GW004	56.25	6.40	ND	ND			
	065GW005	12.70	23.30	18.50	12.80			
	065GW006	ND	ND	2.80	2.20			
	065GW007	7.80	ND	6.80	NS			
	065GW008	16.20	15.10	30.70	NS			
	065GW04D	22.80	19.00	17.70	44.00		16.4	
Barium (Ba)	065GW001	ND	15.60	14.80	15.40	260	211	2000
	065GW002	ND	36.00	44.70	44.30			
	065GW003	ND	12.50	8.20	7.70			
	065GW004	ND	23.35	10.20	6.25			
	065GW005	ND	17.30	17.00	16.30			
	065GW006	ND	30.30	22.40	28.60			
	065GW007	54.90	48.00	50.90	NS			
	065GW008	31.70	38.00	35.60	NS			
	065GW04D	ND	44.70	48.40	56.30		218	
Beryllium (Be)	065GW002	ND	ND	ND	0.24	0.02	0.43	4
	065GW003	1.20	ND	ND	ND			
	065GW004	2.00	0.40	ND	0.24			
	065GW005	ND	0.37	ND	0.27			
	065GW04D	ND	0.35	ND	ND		1.2	
Cadmium (Cd)	065GW003	6.90	0.87	ND	0.44	1.8	NA	5
	065GW004	1.00	ND	ND	ND			
Calcium (Ca)	065GW001	79100.00	74800.00	67600.00	77000.00	NA	NA	NA
	065GW002	116000.00	101000.00	134000.00	136000.00			
	065GW003	ND	6730.00	10300.00	9940.00			
	065GW004	33400.00	81000.00	41550.00	24500.00			
	065GW005	73600.00	82200.00	88100.00	55800.00			
	065GW006	65400.00	67000.00	66500.00	65800.00			
	065GW007	50900.00	49700.00	49500.00	NS			
	065GW008	43700.00	21500.00	38600.00	NS			
	065GW04D	66600.00	48300.00	39700.00	32200.00			
Chromium (Cr)	065GW001	ND	ND	ND	2.10	3700	12.3	100
	065GW003	245.00	93.50	61.90	49.70			
	065GW004	164.00	1.00	ND	ND			
	065GW005	ND	1.50	ND	ND			
	065GW006	ND	ND	ND	1.30			
	065GW007	1.20	NS	NS	NS			
	065GW008	0.96	NS	1.60	NS			
	065GW04D	ND	ND	ND	1.20		15.5	
Cobalt (Co)	065GW003	2.50	ND	ND	ND	220	2.5	NA
Copper (Cu)	065GW001	ND	ND	ND	1.60	150	2.7	1300
	065GW002	ND	ND	ND	3.00			
	065GW003	536.00	119.00	71.00	65.30			

Chemicals Detected in Zone E Groundwater Samples
SWMU 065

Name	Location	Round 1 Conc.	Round 2 Conc.	Round 3 Conc.	Round 4 Conc.	RBC (THQ=.1)	UTL	MCL
	065GW004	176.00	ND	1.40	ND			
	065GW005	ND	ND	0.71	4.10			
	065GW04D	ND	ND	0.78	ND		NA	
	065GW007	ND	1.80	2.50	ND			
	065GW008	ND	ND	4.20	ND			
Iron (Fe)	065GW001	6290.00	1640.00	17500.00	18600.00	1100	NA	NA
	065GW002	7010.00	5400.00	13700.00	12300.00			
	065GW003	7970.00	1110.00	644.00	695.00			
	065GW004	11050.00	556.50	216.00	151.50			
	065GW005	13100.00	9870.00	14800.00	12100.00			
	065GW006	12600.00	12300.00	7690.00	17000.00			
	065GW007	2710.00	2630.00	2050.00	NS			
	065GW008	7250.00	4960.00	9030.00	NS			
	065GW04D	2790.00	4090.00	4360.00	10500.00		NA	
Lead (Pb)	065GW003	1690.00	349.00	224.00	207.00	15	4.8	15
	065GW004	306.00	2.40	ND	1.30			
	065GW005	3.60	ND	ND	1.70			
	065GW006	8.90	5.10	4.50	7.60			
	065GW007	1.70	ND	ND	NS			
Magnesium (Mg)	065GW001	26100.00	21700.00	33600.00	25100.00	NA	NA	NA
	065GW002	56800.00	28300.00	38100.00	30000.00			
	065GW003	ND	168.00	220.00	304.00			
	065GW004	ND	1655.00	730.50	460.00			
	065GW005	9520.00	8290.00	10300.00	11000.00			
	065GW006	7860.00	6450.00	6910.00	5830.00			
	065GW007	10100.00	9340.00	8680.00	NS			
	065GW008	13100.00	2950.00	9200.00	NS			
	065GW04D	41000.00	30200.00	25600.00	20000.00			
Manganese (Mn)	065GW001	663.00	651.00	710.00	797.00	84	2560	NA
	065GW002	412.00	472.00	970.00	1390.00			
	065GW003	72.90	9.20	4.90	6.00			
	065GW004	417.50	70.65	40.30	23.60			
	065GW005	964.00	898.00	1140.00	1150.00			
	065GW006	847.00	833.00	801.00	841.00			
	065GW007	200.00	189.00	188.00	NS			
	065GW008	357.00	245.00	352.00	NS			
	065GW04D	140.00	190.00	183.00	178.00		869	
Mercury (Hg)	065GW001	ND	ND	2.30	ND	1.1	NA	2
	065GW003	0.81	0.31	ND	0.23			
	065GW004	5.80	ND	ND	ND			
Nickel (Ni)	065GW001	2.30	ND	1.30	1.80	73	15.2	100
	065GW002	ND	ND	2.60	ND			
	065GW003	36.00	8.60	5.80	5.30			
	065GW004	23.20	ND	ND	ND			
	065GW005	2.10	2.40	ND	ND			
	065GW006	ND	ND	0.84	0.86			
	065GW007	3.50	ND	2.60	NS			
	065GW008	ND	ND	1.50	NS			
	065GW04D	ND	ND	ND	2.00		42.2	

Chemicals Detected in Zone E Groundwater Samples
SWMU 065

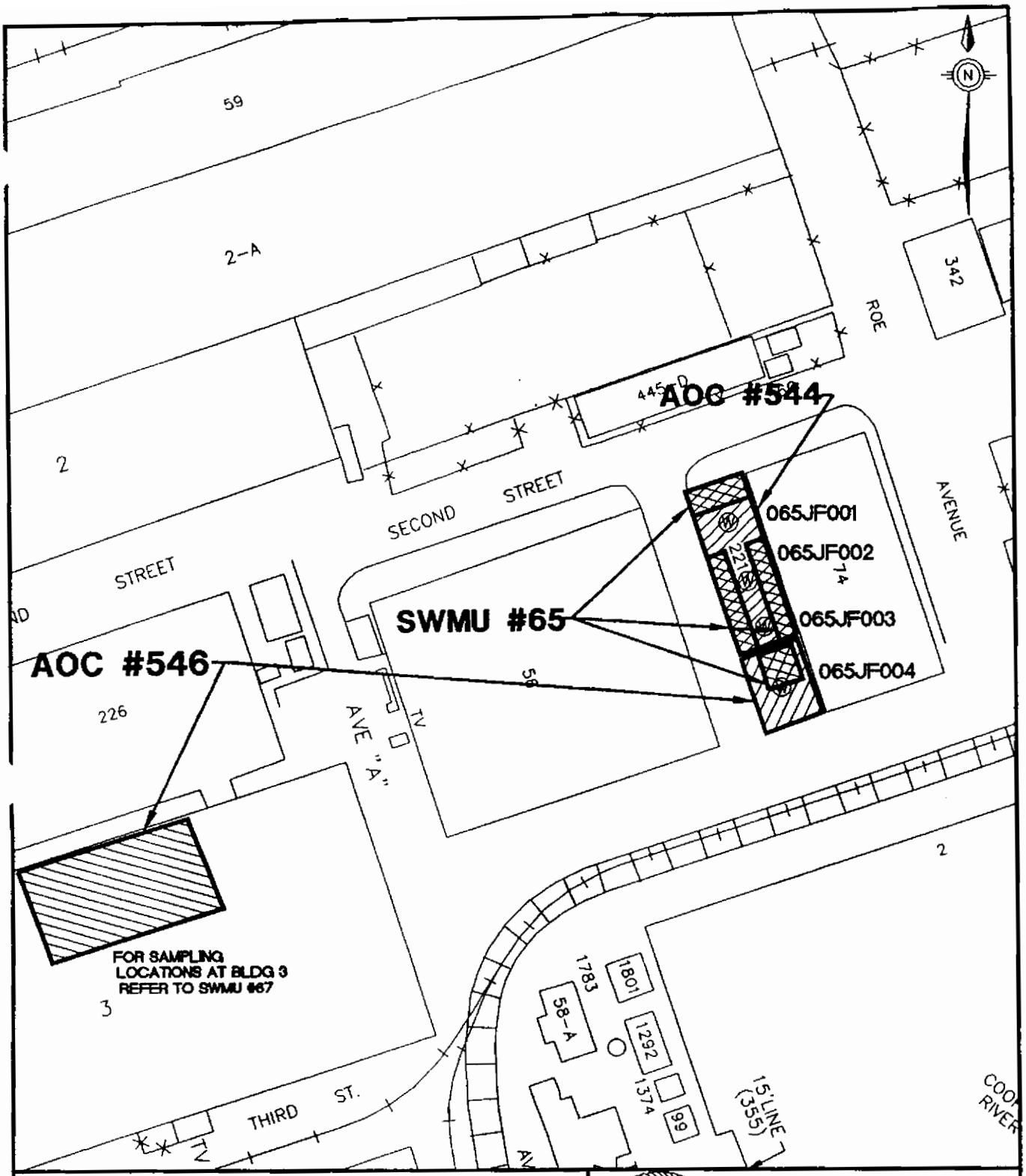
Name	Location	Round 1 Conc.	Round 2 Conc.	Round 3 Conc.	Round 4 Conc.	RBC (THQ=.1)	UTL	MCL
Potassium (K)	065GW001	27300.00	28400.00	39600.00	25200.00	NA	NA	NA
	065GW002	33700.00	26800.00	28100.00	23100.00			
	065GW003	ND	9040.00	5930.00	5420.00			
	065GW004	2735.00	4285.00	1825.00	1270.00			
	065GW005	12500.00	13900.00	12700.00	12100.00			
	065GW006	ND	12300.00	9540.00	7450.00			
	065GW007	12400.00	9910.00	11000.00	NS			
	065GW008	17700.00	4820.00	12400.00	NS			
	065GW04D	13500.00	11200.00	12000.00	9870.00			
Selenium (Se)	065GW003	ND	ND	3.40	ND	18	NA	50
Sodium (Na)	065GW001	296000.00	205000.00	371000.00	244000.00	NA	NA	NA
	065GW002	574000.00	229000.00	292000.00	212000.00			
	065GW003	285000.00	108000.00	80400.00	73300.00			
	065GW004	ND	27350.00	22000.00	11650.00			
	065GW005	ND	29700.00	40600.00	50400.00			
	065GW006	ND	21500.00	29800.00	17400.00			
	065GW007	50200.00	44200.00	43800.00	NS			
	065GW008	119000.00	17800.00	73500.00	NS			
	065GW04D	518000.00	363000.00	339000.00	280000.00			
Thallium (Tl)	065GW002	ND	ND	2.80	ND	0.29	5.4	2
Tin (Sn)	065GW003	219.00	62.80	44.50	36.50	2200	NA	NA
	065GW004	157.50	ND	ND	ND			
Vanadium (V)	065GW001	ND	8.50	1.70	2.90	26	11.4	NA
	065GW003	62.50	18.00	6.70	12.00			
	065GW004	162.00	ND	0.96	1.20			
	065GW005	ND	ND	0.83	1.60			
	065GW006	ND	ND	0.99	ND			
	065GW008	4.30	ND	2.50	NS			
Zinc (Zn)	065GW002	ND	ND	ND	7.90	1100	27.3	NA
	065GW003	1290.00	248.00	88.15	80.90			
	065GW004	393.00	18.85	17.10	17.40			
	065GW005	ND	ND	ND	6.20			
	065GW006	ND	18.80	68.70	152.00			
	065GW007	19.10	ND	6.50	NS			
	065GW008	5.70	ND	8.50	NS			

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.

NAVAL BASE CHARLESTON, SOUTH CAROLINA
CHARLESTON ZONE E
SWMU 65; AOC 544, AOC 546

LEAD							
	SAMPLE ID ------->	065-J-F001-01	065-J-F002-01	065-J-F003-01			
	ORIGINAL ID ----->	065JF00101	065JF00201	065JF00301			
	LAB SAMPLE ID --->	23628.01	23628.02	23628.03			
	ID FROM REPORT -->	065JF00101	065JF00201	065JF00301			
	SAMPLE DATE ----->	09/23/95	09/23/95	09/23/95			
	DATE EXTRACTED -->	09/28/95	09/28/95	09/28/95			
	DATE ANALYZED --->	10/06/95	10/06/95	10/06/95			
	MATRIX ---------->	Wipe	Wipe	Wipe			
	UNITS ---------->	UG/W	UG/W	UG/W			
CAS #	Parameter	23628 VAL	23628 VAL	23628 VAL			
7439-92-1	Lead (Pb)	60.6	210.	149.			

*** Validation Complete ***



LEGEND

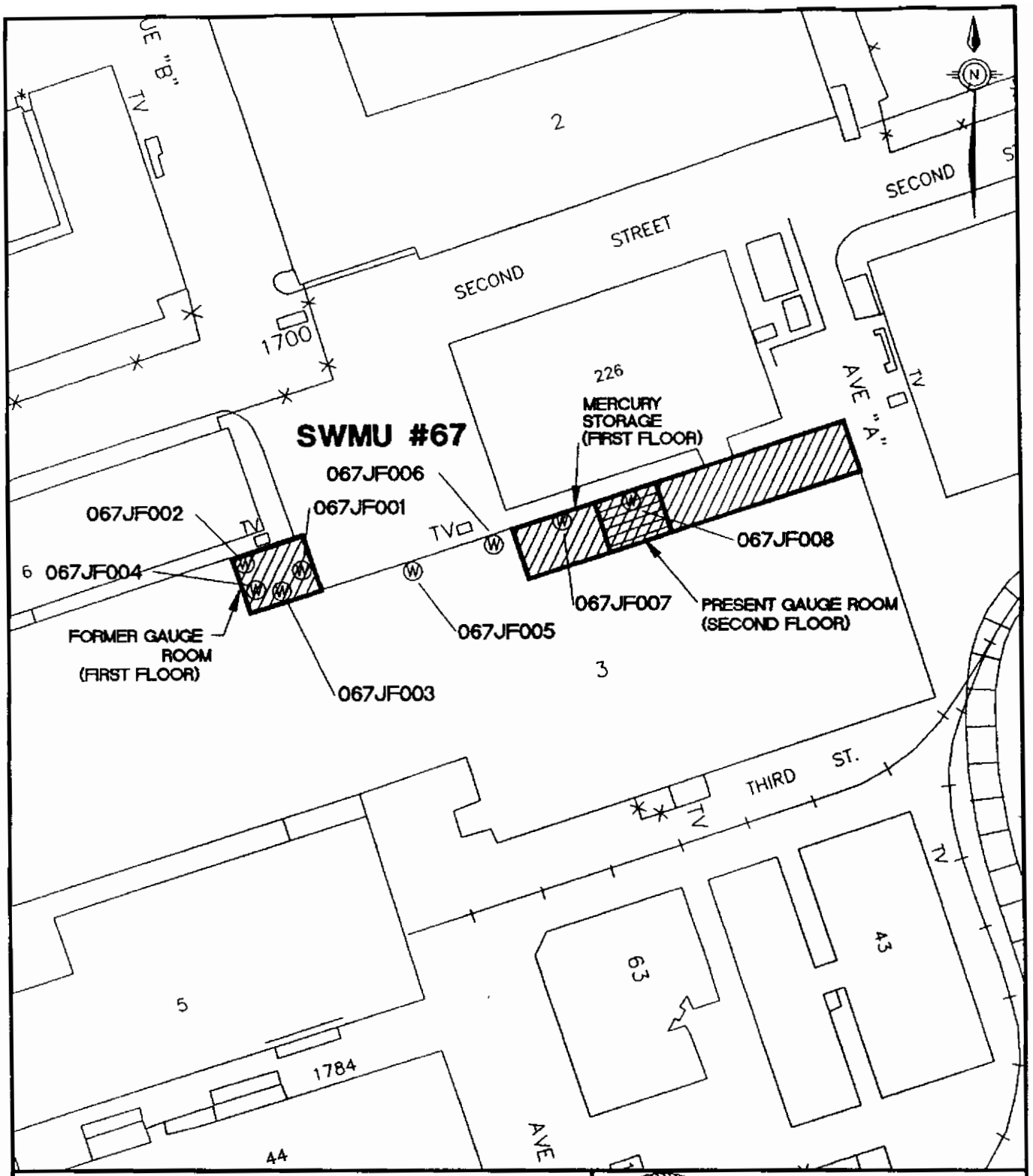
- ● – SOIL BORINGS
- Ⓒ – CORE SAMPLES
- ◒ – DEEP MONITORING WELLS
- ◮ – SHALLOW MONITORING WELLS
- ▲ – SEDIMENT SAMPLES
- Ⓣ – THICKNESS SAMPLES
- Ⓦ – WIPE SAMPLES
- Ⓢ – SURFACE WATER SAMPLES

GRAPHIC SCALE 100 0 100 200

ZONE E
RFI REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 10.6.4
WIPE SAMPLE LOCATIONS
SWMU #65, LEAD STORAGE AREA
AOC #544, PICKLING PLANT
AOC #546, GALVANIZING SHOP

DWG DATE: 09/02/97 | DWG NAME: 10-06-4



LEGEND

- ● – SOIL BORINGS
- Ⓒ – CORE SAMPLES
- ◒ – DEEP MONITORING WELLS
- ◮ – SHALLOW MONITORING WELLS
- ▲ – SEDIMENT SAMPLES
- Ⓣ – THICKNESS SAMPLES
- Ⓦ – WIPE SAMPLES
- Ⓢ – SURFACE WATER SAMPLES

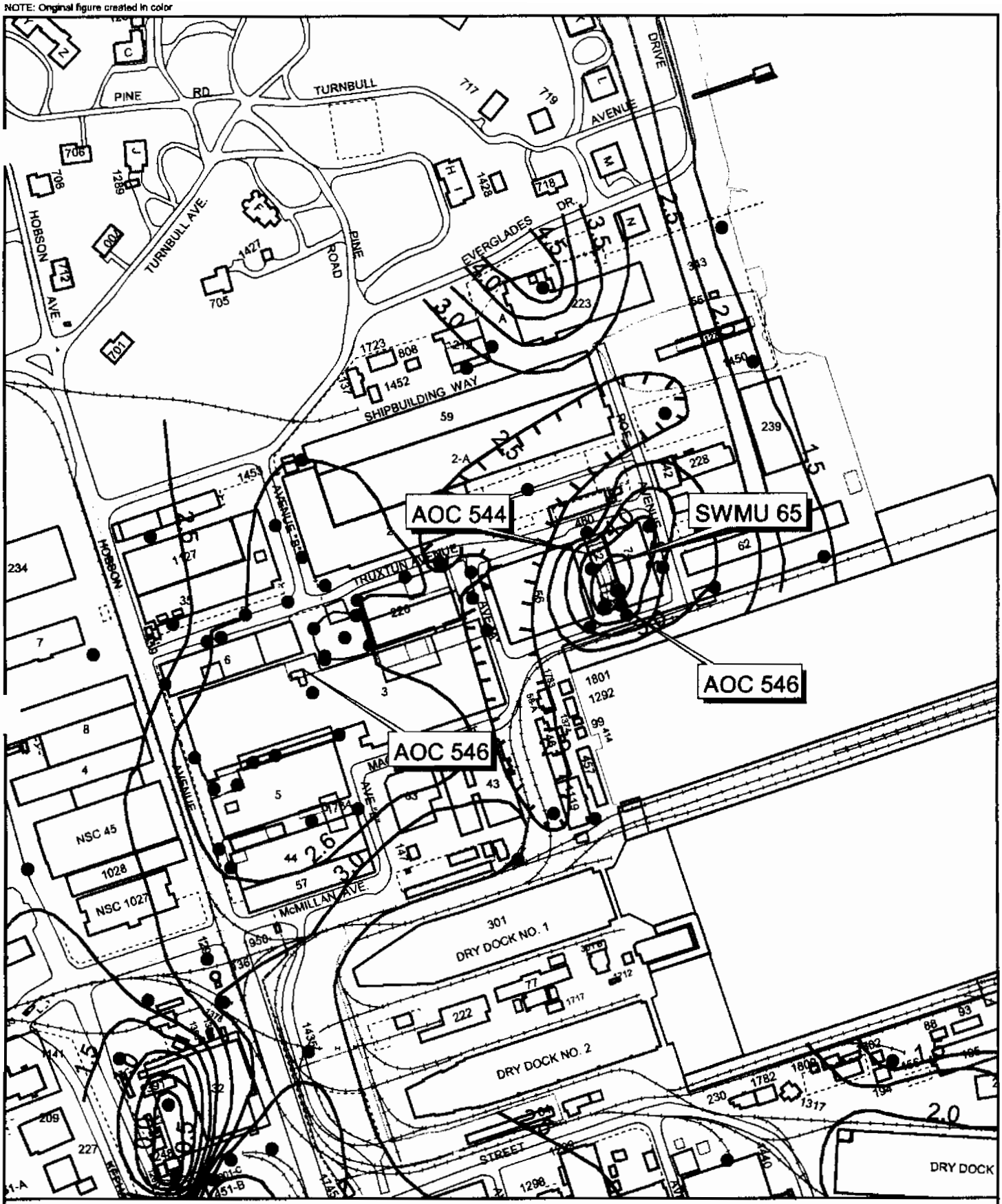
GRAPHIC SCALE 100 0 100 200

ZONE E
RFI REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 10.7.3
WIPE SAMPLE LOCATIONS
SWMU #67
GAUGE ROOM
BUILDING 3

DWG DATE: 09/02/97 | DWG NAME: 10-7-3

NOTE: Original figure created in color



Shallow Groundwater Elevation (ft. above msl)
Shallow Groundwater Monitoring Well
Fence
Railroads
Roads
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary

N

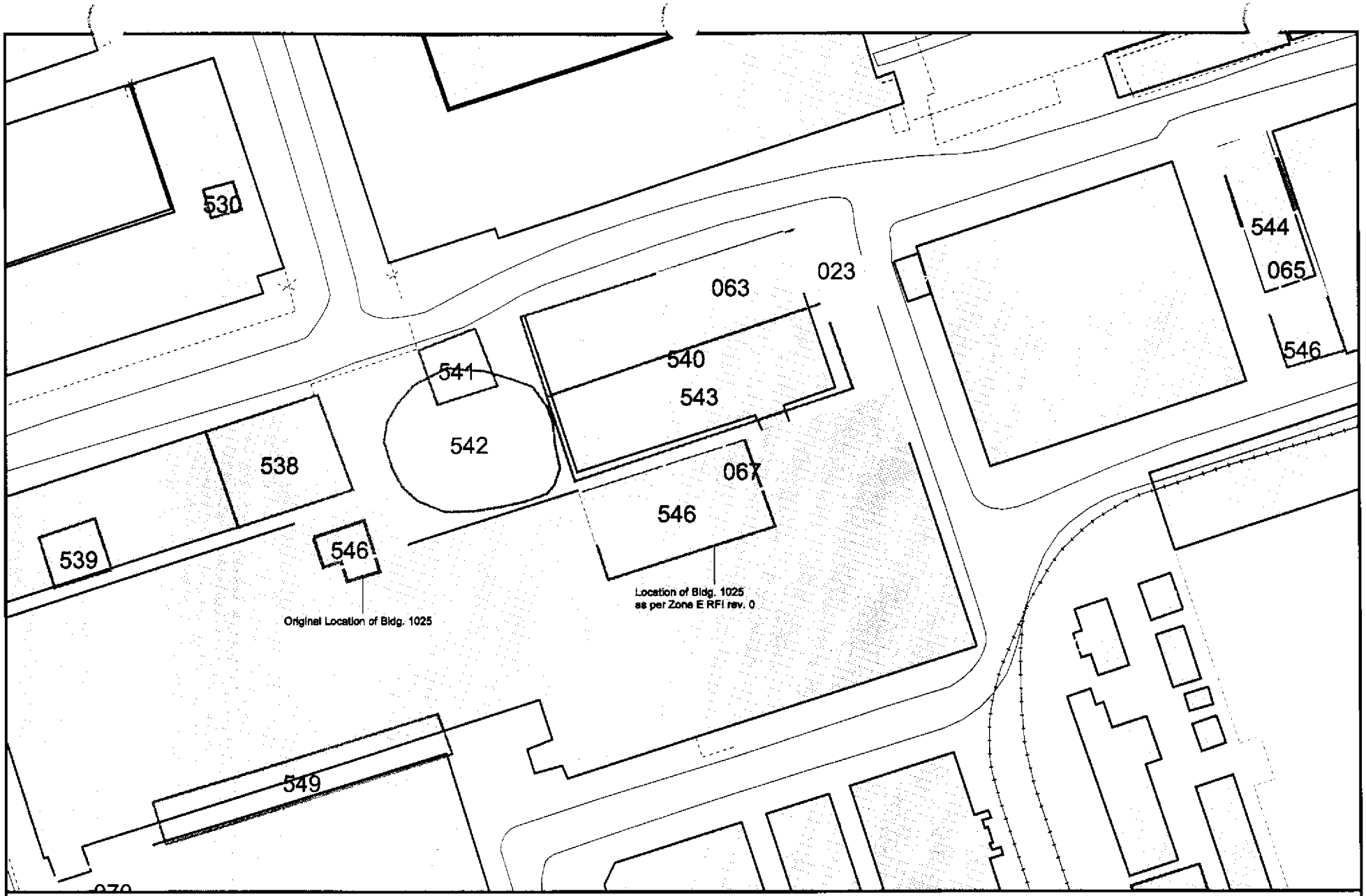
0 200 400 Feet

1 inch = 300 feet

Figure B-1
Shallow Groundwater Contour Map, May 2002
SWMU 65, AOC 544, and AOC 546, Zone E
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\projects\zone_e\swmu 65 aocs 544 546-cnc-egis.apr, Date: 01 Oct 2002 10:13, User: TWILEY



Fence
Railroads
Roads
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary

N

0 70 140 Feet

1 inch = 100 feet

Figure B-2
Previous Location of Building 1025, Zone E
Charleston Naval Complex

CH2MHILL

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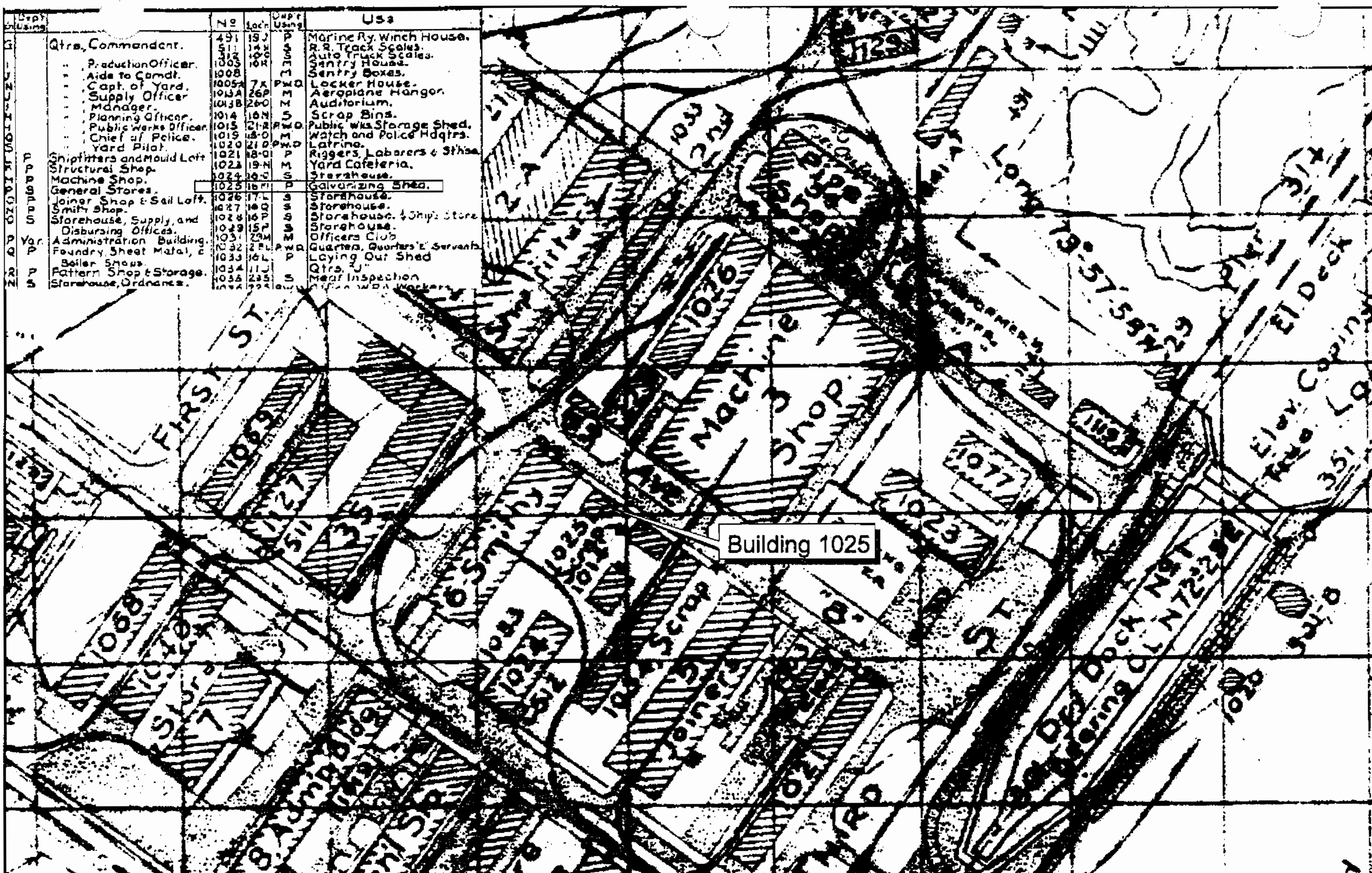


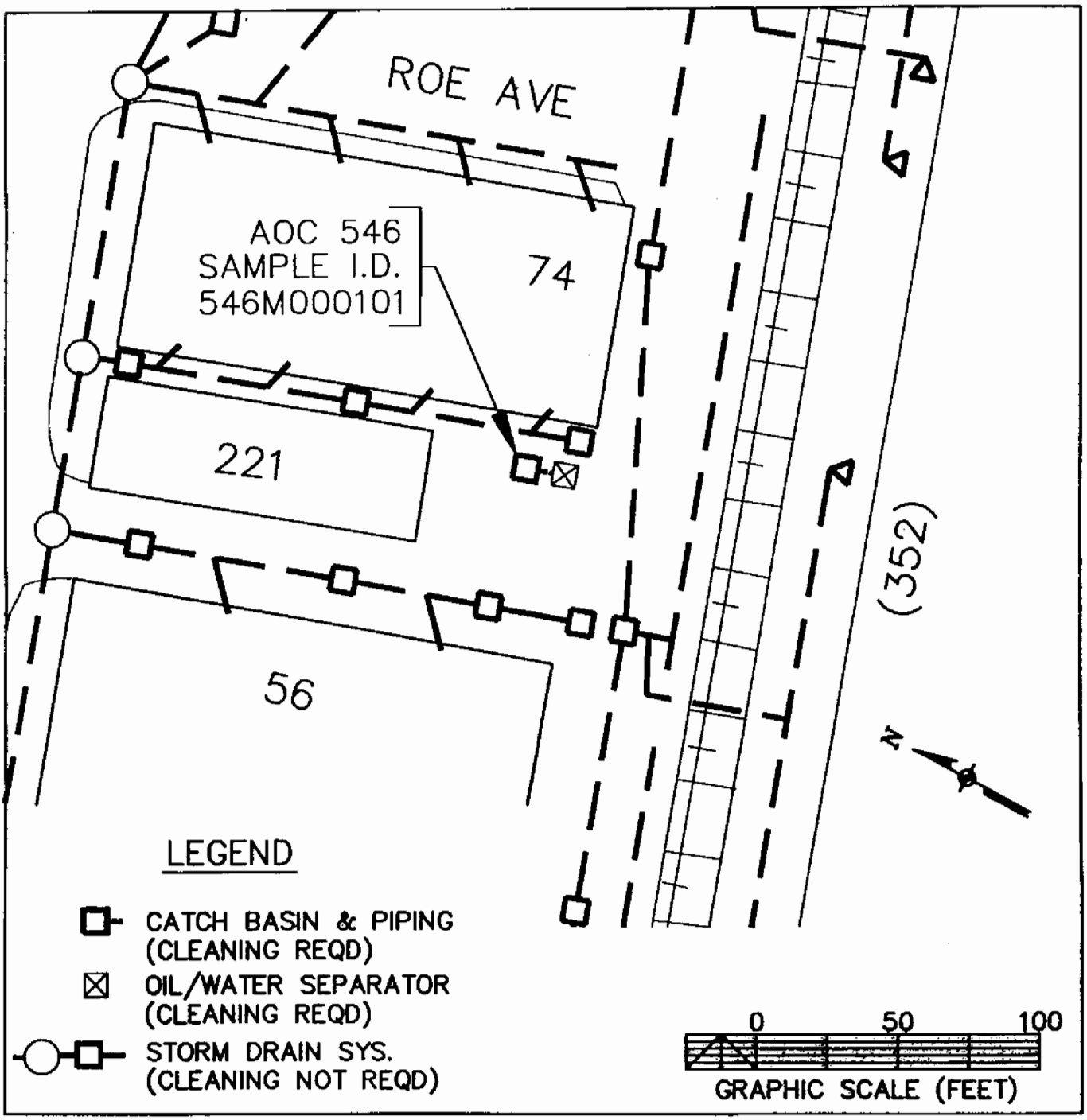
Layout from Public Works Map, June 30, 1937 h606-39

Figure B-3
Original Location of Building 1025
AOC 546, Zone E
Charleston Naval Complex

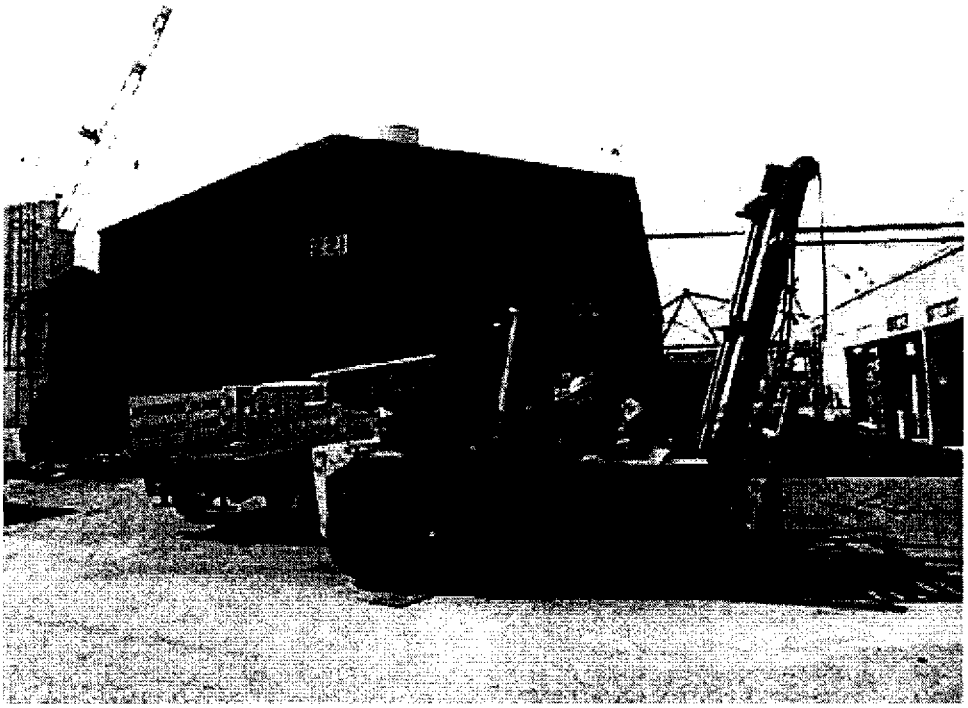
CH2MHILL

Appendix C

Figure 2


ROE AVE
AOC 546
SAMPLE I.D.
546M000101
74
221
56
(352)
N
LEGEND
CATCH BASIN & PIPING
(CLEANING REQD)
OIL/WATER SEPARATOR
(CLEANING REQD)
STORM DRAIN SYS.
(CLEANING NOT REQD)
0
50
100
GRAPHIC SCALE (FEET)

Appendix D



BUILDING MATRIX

Building Number	221
Square Footage	4,370
Map Location	K-42
Zone	E
EBS Binder No.	86
Street Address	1115 Truxtun Avenue
Use:	"Pickling"/galvanizing plant until 1983. Thereafter, building 221 served as a lead storage facility, both bare & encapsulated.
Year Built:	1970
Historic (Y/N)	N
Notes:	Site of AOC 544, "pickling" plant. Site of PSWMU 129, pickling operation. Site of PSWMU 130, lead storage.

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

Date Received State Use Only

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

I OWNERSHIP OF UST(S)

Agency/Owner: Southern Division, Naval Facilities Engineering Command, Caretaker Site Office

Mailing Address: P.O. Box 190010

City: N. Charleston State: SC Zip Code: 29419-9010

Area Code: 803 Telephone Number: 743-9985 Contact Person: LCDR Paul Rose

II SITE IDENTIFICATION AND LOCATION

Site I.D. #: Not regulated

Facility Name: Charleston Naval Base Complex, UST 221-1

Street Address: South Hobson Avenue

City: North Charleston, 29405-2413 County: Charleston

III CLOSURE INFORMATION

Closure Started: 14 June 1996 Closure Completed: 18 June 1996

Number of USTs Closed: 1

N/A
Consultant

SPORTENVDETCHASN
UST Removal Contractor

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

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

LCDR Paul Rose
Name (Type or Print)

Signature

V. UST INFORMATION

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A. Product.....	Waste Oil					
B. Capacity.....	280gal.					
C. Age.....	> 20 yrs.					
D. Construction Material.....	Steel					
E. Month/Year of Last Use.....	1984					
F. Depth (ft.) To Base of Tank.....	5'					
G. Spill Prevention Equipment Y/N.....	N					
H. Overfill Prevention Equipment Y/N.....	N					
I. Method of Closure Removed/Filled.....	R					
J. Visible Corrosion or Pitting Y/N.....	N					
K. Visible Holes Y/N.....						

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

The UST was removed from the ground, drained, and cleaned. It was then cut up for recycling as scrap metal. See Attachment III.

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

The residual waste oil was recycled.

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

The tank was in good condition. No corrosion, pitting, or holes were observed.

VI. PIPING INFORMATION

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A. Construction Material.....	Steel					
B. Distance from UST to Dispenser.....	5'					
C. Number of Dispensers.....	1					
D. Type of System P/S.....	N/A*					
E. Was Piping Removed from the Ground? Y/N....	Y					
F. Visible Corrosion or Pitting Y/N.....	N					
G. Visible Holes Y/N.....	N					
H. Age.....	> 20 years					

* UST 221-1was a gravity fed holding tank for an oily water separator. It was periodically emptied by suction.

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

Pipes were mildly corroded, but overall in good condition. However, the feed pipe from the separator to the UST had a loose mechanical connection at the UST.

VII. BRIEF SITE DESCRIPTION AND HISTORY

Bldg 221 is a former pickling plant and galvanizing shop located inside the Controlled Industrial Area of the Charleston Naval Shipyard. Building 221 was part of the Bldg 56, Pipe Shop area. The oil/water separator and tank system at the Bldg 221 site was part of a steam cleaning pad. The pad was used for cleaning oily/greasy parts and components. A drain in the pad emptied into the oil/water separator. In 1983-1984 the operation was shut down.

Most of the water present in the Attachment I photographs is the result of a leaking water pipe adjacent to Building 74. See Attachment I.

VIII. SITE CONDITIONS

		Yes	No	Unk
A.	Were any petroleum-stained or contaminated soils found in the UST excavation, soil borings, trenches, or monitoring wells? If yes, indicate depth and location on the site map.		X	
B.	Were any petroleum odors detected in the excavation, soil borings, trenches, or monitoring wells? If yes, indicate location on site map and describe the odor (strong, mild, etc.)		X	
C.	Was water present in the UST excavation, soil borings, or trenches? If yes, how far below land surface (indicate location and depth)? GW was 6" deep throughout the excavation, GSL 5'	X		
D.	Did contaminated soils remain stockpiled on site after closure? If yes, indicate the stockpile location on the site map. Name of DHEC representative authorizing soil removal: _____		X	
E.	Was a petroleum sheen or free product detected on any excavation or boring waters? If yes, indicate location and thickness. [* sheen]	X*		

IX. SAMPLE INFORMATION

S.C.D.H.E.C. Lab Certification Number 10120

Sample #	Location	Sample Type (Soil/Water)	Depth*	Date/Time of Collection	Collected By	OVA#
SPORT 0080-1	Bottom center of excavation.	Water	5'	6/17/96 1430	R. Atkins	Not Taken
SPORT 0080-2	West end of tank.	Soil	3'	6/17/96 1430	R. Atkins	Not Taken
SPORT 0080-3	East end of tank.	Soil	3'	6/17/96 1430	R. Atkins	Not Taken

* = Depth Below the Surrounding Land Surface

X. SAMPLING METHODOLOGY

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

After the removal of UST 221-1 soil and ground water samples were taken. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

The samples are identified as follows:

	Detachment Charleston		General Engineering Labs
Ground Water Sample	UST221-1	=	SPORT -0080-1
Soil Sample	UST221-2	=	SPORT -0080-2
Soil Sample	UST221-3	=	SPORT -0080-3

Sample jars were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Soil samples were extracted at the tank ends just above the ground water level. The ground water sample was taken from the bottom center of the excavation.

The samples were marked, logged, and immediately placed in sample coolers packed with ice to maintain an approximate temperature of 4 C. Tools were thoroughly cleaned and decontaminated with organic-free soap and water after each sample.

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

XI. RECEPTORS

		Yes	No
A.	Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system? [*Cooper River 103'] If yes, indicate type of receptor, distance, and direction on site map.	X*	
B.	Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system? If yes, indicate type of well, distance, and direction on site map.		X
C.	Are there any underground structures (e.g., basements) located within 100 feet of the UST system? If yes, indicate the type of structure, distance, and direction on site map.		X
D.	Are there any underground utilities (e.g., telephone, electricity, gas, water, sewer, storm drain) located within 100 feet of the UST system that could potentially come in contact with the contamination? [*water, storm drain] If yes, indicate the type of utility, distance, and direction on the site map.	X*	
E.	Has contaminated soil been identified at a depth of less than 3 feet below land surface in an area that is not capped by asphalt or concrete? If yes, indicate the area of contaminated soil on the site map.		X

Attachment I

SITE MAP

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

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

Attachment II

ANALYTICAL RESULTS

You must submit the laboratory report and chain-of-custody form for the samples. These samples must be analyzed by a South Carolina certified laboratory.

Certified Analytical Results
Chain-of-Custody

Attachment III

Certificate of Disposal (tank)

UST 221

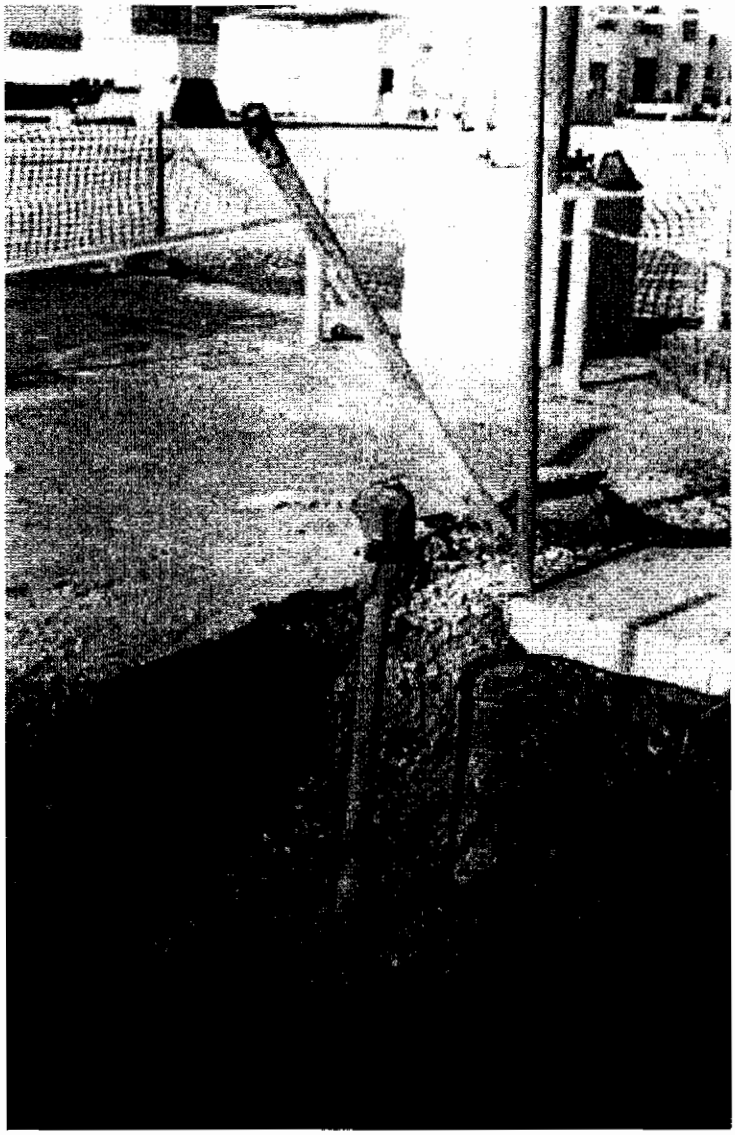


Photo 1: UST 221-1 before removal.

UST 221

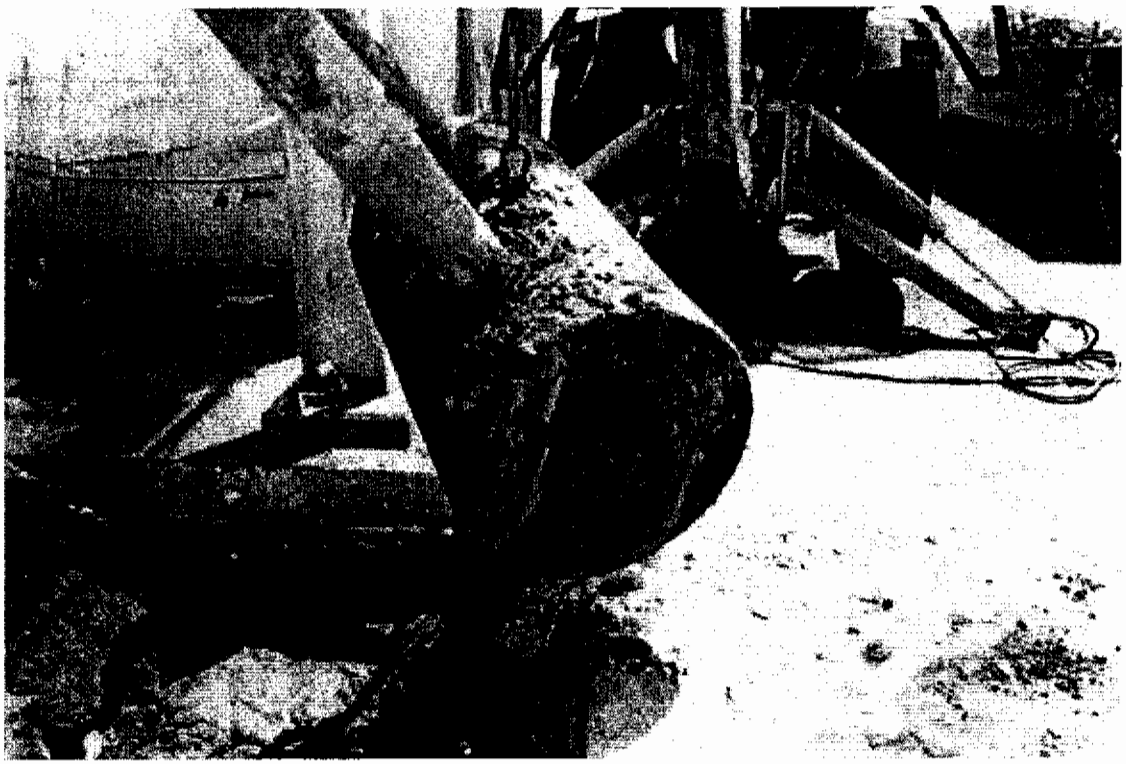


Photo 2: UST 221 being removed.

Photo 2: UST 221 excavation after removal of the UST. Electric line is being indicated.

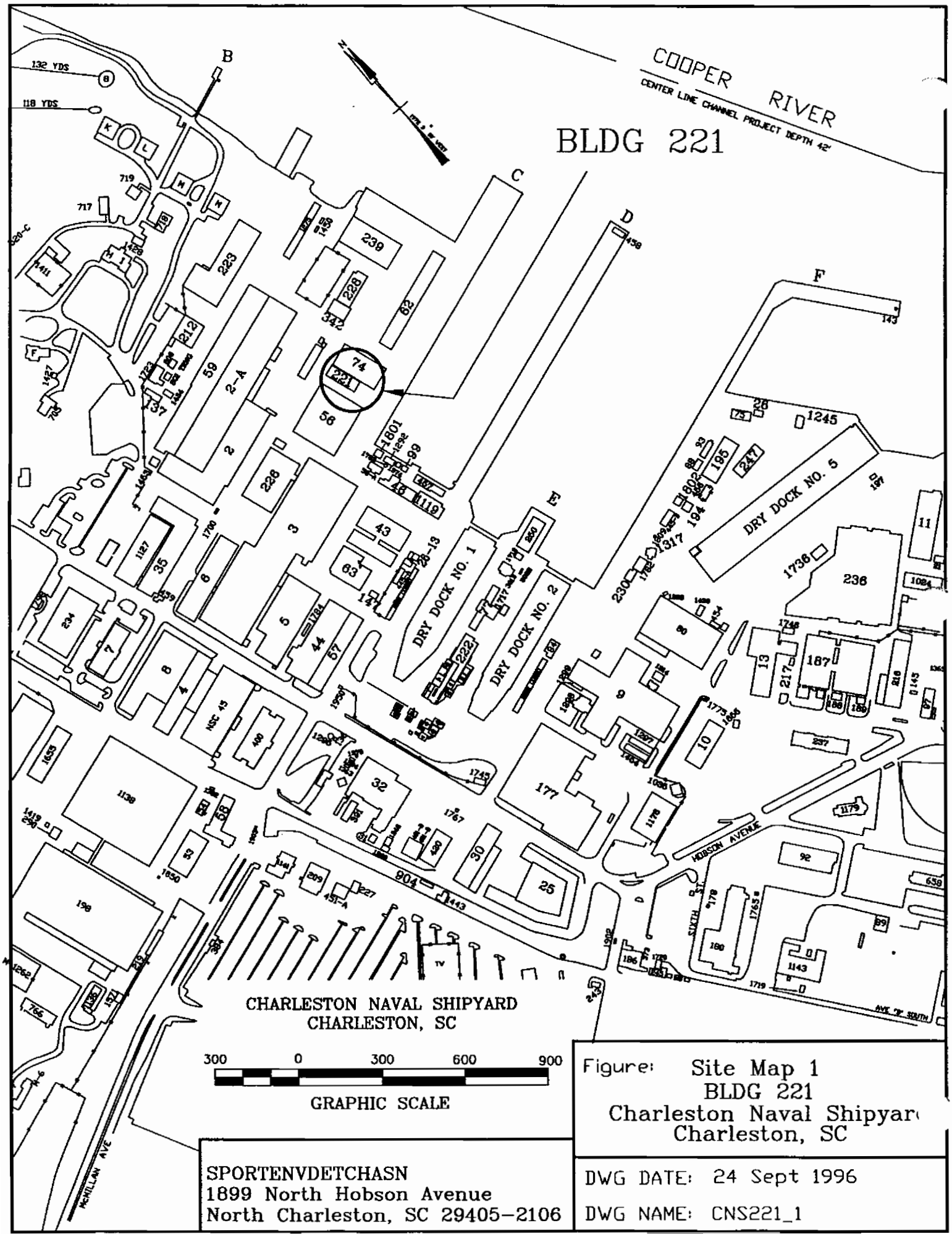
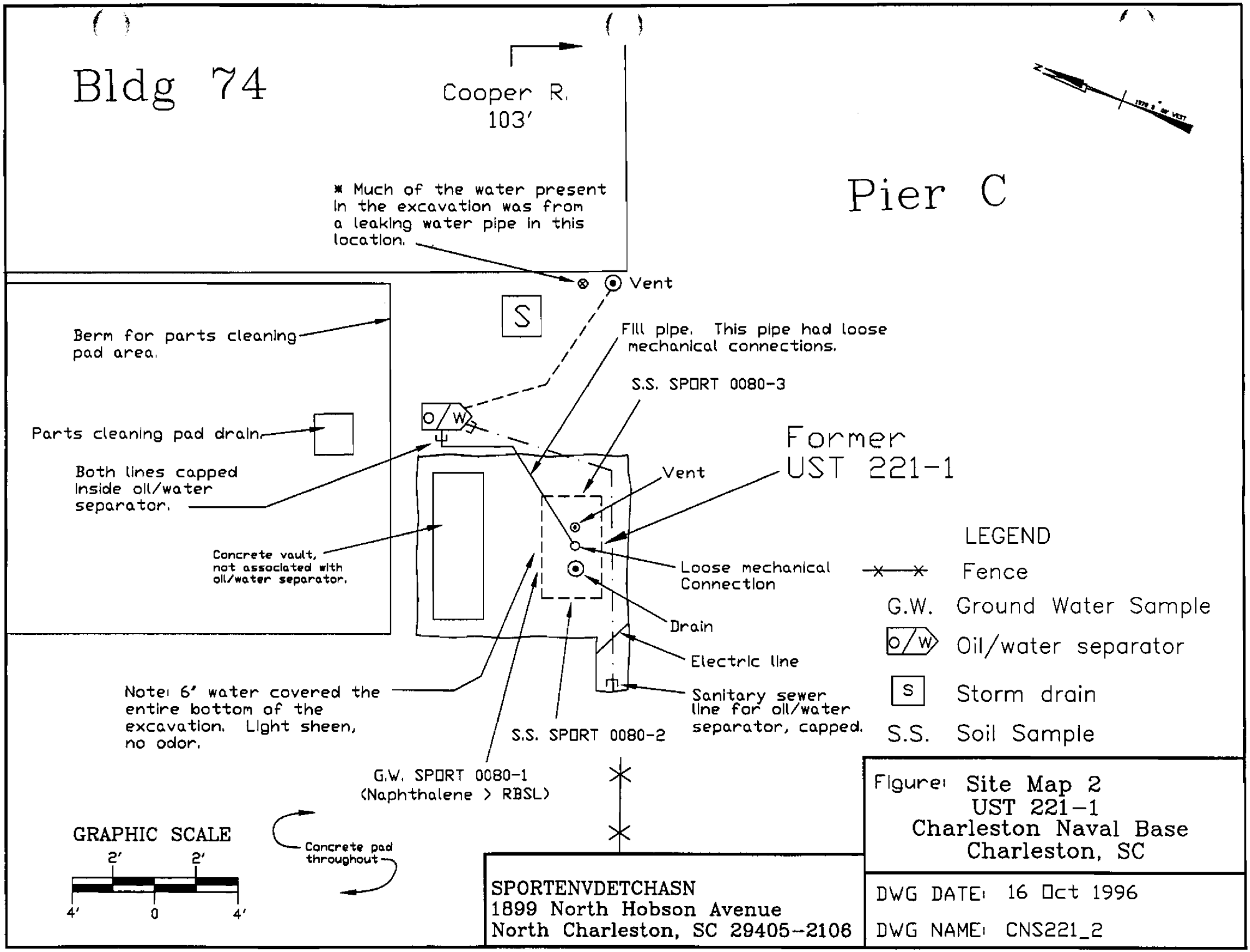


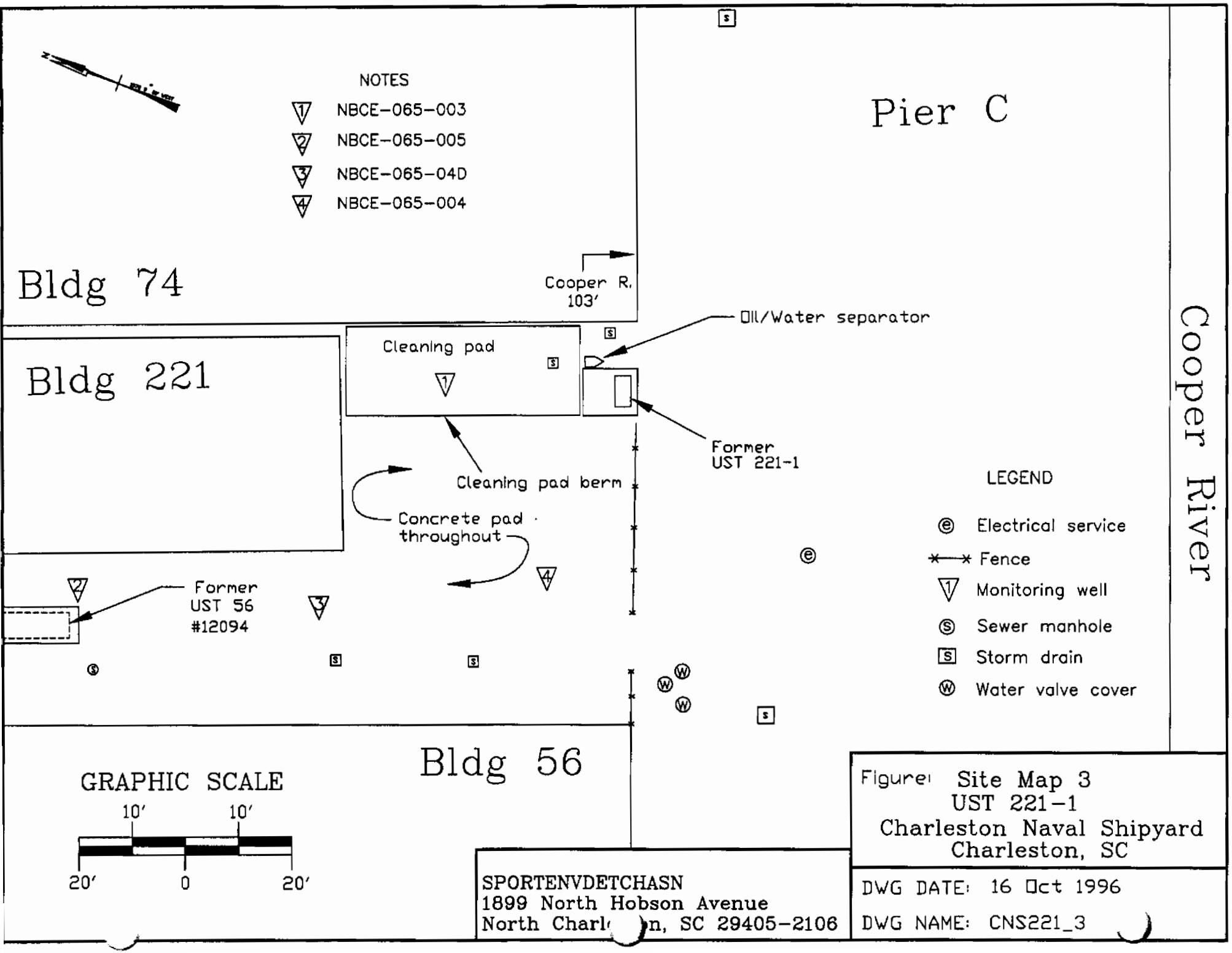
Figure: Site Map 1
BLDG 221
Charleston Naval Shipyard
Charleston, SC

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

DWG DATE: 24 Sept 1996

DWG NAME: CNS221_1


Bldg 74
Cooper R.
103'
Pier C
* Much of the water present in the excavation was from a leaking water pipe in this location.
Vent
S
Fill pipe. This pipe had loose mechanical connections.
S.S. SPORT 0080-3
Berm for parts cleaning pad area.
Parts cleaning pad drain.
Both lines capped inside oil/water separator.
Concrete vault, not associated with oil/water separator.
Former UST 221-1
Vent
Loose mechanical Connection
Drain
Electric line
Sanitary sewer line for oil/water separator, capped.
Note: 6' water covered the entire bottom of the excavation. Light sheen, no odor.
S.S. SPORT 0080-2
G.W. SPORT 0080-1 (Naphthalene > RBSL)
LEGEND
Fence
G.W. Ground Water Sample
O/W Oil/water separator
S Storm drain
S.S. Soil Sample
GRAPHIC SCALE
2' 2'
4' 0 4'
Concrete pad throughout
SPORTENVDETCHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106
Figure: Site Map 2
UST 221-1
Charleston Naval Base
Charleston, SC
DWG DATE: 16 Oct 1996
DWG NAME: CNS221_2


NOTES
NBCE-065-003
NBCE-065-005
NBCE-065-04D
NBCE-065-004
Pier C
Bldg 74
Cooper R.
103'
Oil/Water separator
Cleaning pad
Bldg 221
Former
UST 221-1
Cleaning pad berm
Concrete pad
throughout
Former
UST 56
#12094
LEGEND
Electrical service
Fence
Monitoring well
Sewer manhole
Storm drain
Water valve cover
Cooper River
Bldg 56
GRAPHIC SCALE
10'
10'
20'
0
20'
SPORTENVDETCHASN
1899 North Hobson Avenue
North Charl n, SC 29405-2106
Figure: Site Map 3
UST 221-1
Charleston Naval Shipyard
Charleston, SC
DWG DATE: 16 Oct 1996
DWG NAME: CNS221_3

Attachment II

ANALYTICAL RESULTS

You must submit the laboratory report and chain-of-custody form for the samples. These samples must be analyzed by a South Carolina certified laboratory.

Certified Analytical Results
Chain-of-Custody

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

CERTIFICATE OF ANALYSIS

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-1
Lab ID : 9606324-01
Matrix : GroundH2O
Date Collected : 06/17/96
Date Received : 06/18/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/l	1.0	RMB	06/21/96	1058	86230	1
Ethylbenzene		4.90	1.00	2.00	ug/l	1.0					
Toluene	U	0.00	1.00	2.00	ug/l	1.0					
Xylenes (TOTAL)		18.7	1.00	4.00	ug/l	1.0					
Naphthalene		34.7	1.00	2.00	ug/l	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	5.00	10.0	ug/l	1.0	BDG	06/25/96	1950	86220	2
Acenaphthylene	U	0.00	5.00	10.0	ug/l	1.0					
Anthracene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(a)anthracene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(a)pyrene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(b)fluoranthene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(ghi)perylene	U	0.00	5.00	10.0	ug/l	1.0					
Benzo(k)fluoranthene	U	0.00	5.00	10.0	ug/l	1.0					
Chrysene	U	0.00	5.00	10.0	ug/l	1.0					
Dibenzo(a,h)anthracene	U	0.00	5.00	10.0	ug/l	1.0					
Fluoranthene	U	0.00	5.00	10.0	ug/l	1.0					
Fluorene	U	0.00	5.00	10.0	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	5.00	10.0	ug/l	1.0					
Naphthalene		10.4	5.00	10.0	ug/l	1.0					
Phenanthrene	U	0.00	5.00	10.0	ug/l	1.0					
Pyrene	U	0.00	5.00	10.0	ug/l	1.0					
Metals Analysis											
Mercury	J	0.225	0.0148	0.500	ug/l	1.0	RMJ	06/20/96	1312	86170	N
Silver	J	2.68	2.49	10.0	ug/l	1.0	NRM	06/21/96	2338	86194	3
Arsenic		13.4	1.86	10.0	ug/l	1.0					

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CERTIFICATE OF ANALYSIS

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

Contact: Mr. Bill Hicks

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		133	0.0663	10.0	ug/l	1.0					
Cadmium		5.30	0.0970	5.00	ug/l	1.0	NRM	06/21/96	2338	86194	3
Chromium		221	0.596	10.0	ug/l	1.0					
Lead		527	1.13	5.00	ug/l	1.0					
Selenium	J	4.30	1.43	5.00	ug/l	1.0					
General Chemistry											
Tot. Rec. Petro. Hydrocarbons		9.08	2.00	2.00	mg/l	1.0	JEN	06/24/96	1025	86317	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	GWL	06/20/96	1600	86220	5
Mercury	RMI	06/19/96	1230	86170	6
TRACE	FGD	06/20/96	1530	86194	7

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	58.6	(43.0 - 108.)
Nitrobenzene-d5	M610	56.0	(35.0 - 111.)
p-Terphenyl-d14	M610	49.8	(33.0 - 125.)
Bromofluorobenzene	BTEX-8260	88.8	(80.0 - 128.)
Dibromofluoromethane	BTEX-8260	103.	(67.7 - 135.)
Toluene-d8	BTEX-8260	98.8	(76.8 - 122.)
Bromofluorobenzene	NAP-8260	88.8	(80.0 - 128.)
Dibromofluoromethane	NAP-8260	103.	(67.7 - 135.)
Toluene-d8	NAP-8260	98.8	(76.8 - 122.)

M = Method	Method-Description
M1	EPA 8260
M2	EPA 8270
M3	EPA 6010A
M4	EPA 9070A
M5	EPA 3510

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CERTIFICATE OF ANALYSIS

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

oc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-1

M = Method	Method-Description
M 6	EPA 7470
M 7	EPA 3005

Notes:

The qualifiers in this report are defined as follows:

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

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

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

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

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

cc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-1

GEL Laboratory Certifications EPI Laboratory Certifications

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Analytical Report Specialist

GENERAL ENGINEERING LABORATORIES

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CERTIFICATE OF ANALYSIS

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

oc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-2
Lab ID : 9606324-02
Matrix : Soil
Date Collected : 06/17/96
Date Received : 06/18/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	06/19/96	0943	86165	1
Ethylbenzene	J	1.30	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)		6.50	1.00	4.00	ug/kg	1.0					
Naphthalene		4.70	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	1650	3300	ug/kg	10.	JCB	06/25/96	2032	86390	2
Acenaphthylene	U	0.00	1650	3300	ug/kg	10.					
Anthracene	U	0.00	1650	3300	ug/kg	10.					
Benzo(a)anthracene	U	0.00	1650	3300	ug/kg	10.					
Benzo(a)pyrene	U	0.00	1650	3300	ug/kg	10.					
Benzo(b)fluoranthene	U	0.00	1650	3300	ug/kg	10.					
Benzo(ghi)perylene	U	0.00	1650	3300	ug/kg	10.					
Benzo(k)fluoranthene	U	0.00	1650	3300	ug/kg	10.					
Chrysene	U	0.00	1650	3300	ug/kg	10.					
Dibenzo(a,h)anthracene	U	0.00	1650	3300	ug/kg	10.					
Fluoranthene	U	0.00	1650	3300	ug/kg	10.					
Fluorene	U	0.00	1650	3300	ug/kg	10.					
Indeno(1,2,3-c,d)pyrene	U	0.00	1650	3300	ug/kg	10.					
Naphthalene	U	0.00	1650	3300	ug/kg	10.					
Phenanthrene	U	0.00	1650	3300	ug/kg	10.					
Pyrene	U	0.00	1650	3300	ug/kg	10.					
Metals Analysis											
Mercury		0.410	0.00243	0.200	mg/kg	1.0	RMJ	06/21/96	1604	86172	N
Silver		882	123	500	ug/kg	1.0	WCC	06/21/96	1404	86195	3
Arsenic		2120	92.1	500	ug/kg	1.0					

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		33300	3.28	500	ug/kg	1.0					
Cadmium		2000	4.80	250	ug/kg	1.0	WCC	06/21/96	1404	86195	3
Chromium		68200	29.5	500	ug/kg	1.0					
Lead		259000	55.9	250	ug/kg	1.0					
Selenium		321	70.8	250	ug/kg	1.0					
General Chemistry											
tal Rec. Petro. Hydrocarbons		400	10.0	50.0	mg/kg	1.0	JEN	06/26/96	1200	86423	4

ie following prep procedures were performed:

GC/MS Base/Neutral Compounds	GWL	06/25/96	1630	86390	5
Mercury	RMJ	06/20/96	1500	86172	6
TRACE	DVW	06/20/96	1745	86195	7

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

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	0.00*	(30.0 - 115.)
Nitrobenzene-d5	M610	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610	0.00*	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	108.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	101.	(74.0 - 128.)
Toluene-d8	BTEX-8260	98.0	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	108.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	101.	(74.0 - 128.)
Toluene-d8	NAP-8260	98.0	(53.4 - 163.)

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CERTIFICATE OF ANALYSIS

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

ce: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-2

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 6010A
M 4	EPA 9071
M 5	EPA 3550
M 6	EPA 7471
M 7	EPA 3050

Notes:

The qualifiers in this report are defined as follows:

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

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

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

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02934
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-2

GEL Laboratory Certifications		EPI Laboratory Certifications	
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
Analytical Report Specialist

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GENERAL ENGINEERING LABORATORIES

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CERTIFICATE OF ANALYSIS

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

cc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-3
Lab ID : 9606324-03
Matrix : Soil
Date Collected : 06/17/96
Date Received : 06/18/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
BTEX - 4 items											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	06/19/96	1303	86165	I
Ethylbenzene	U	0.590	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	J	2.70	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.740	1.00	2.00	ug/kg	1.0					
Extractable Organics											
Polynuclear Aromatic Hydrocarbons - 16 items											
Acenaphthene	U	0.00	650	1300	ug/kg	4.0	JCB	06/25/96	2104	86390	2
Acenaphthylene	U	0.00	650	1300	ug/kg	4.0					
Anthracene	U	0.00	650	1300	ug/kg	4.0					
Benzo(a)anthracene	U	0.00	650	1300	ug/kg	4.0					
Benzo(a)pyrene	U	0.00	650	1300	ug/kg	4.0					
Benzo(b)fluoranthene	U	0.00	650	1300	ug/kg	4.0					
Benzo(ghi)perylene	U	0.00	650	1300	ug/kg	4.0					
Benzo(k)fluoranthene	U	0.00	650	1300	ug/kg	4.0					
Chrysene	U	0.00	650	1300	ug/kg	4.0					
Dibenzo(a,h)anthracene	U	0.00	650	1300	ug/kg	4.0					
Fluoranthene	U	0.00	650	1300	ug/kg	4.0					
Fluorene	U	0.00	650	1300	ug/kg	4.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	650	1300	ug/kg	4.0					
Naphthalene	U	0.00	650	1300	ug/kg	4.0					
Phenanthrene	U	0.00	650	1300	ug/kg	4.0					
Pyrene	U	0.00	650	1300	ug/kg	4.0					
Metals Analysis											
Mercury	J	0.0538	0.00215	0.200	mg/kg	1.0	RMI	06/21/96	1606	86172	N
Silver	J	281	125	500	ug/kg	1.0	WCC	06/21/96	1409	86195	3
Arsenic		1290	93.0	500	ug/kg	1.0					

Original on special paper

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CERTIFICATE OF ANALYSIS

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

wo: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Barium		21200	3.32	500	ug/kg	1.0					
Cadmium		631	4.85	250	ug/kg	1.0	WCC	06/21/96	1409	86195	3
Chromium		39200	29.8	500	ug/kg	1.0					
Lead		81100	56.5	250	ug/kg	1.0					
Selenium		389	71.5	250	ug/kg	1.0					
General Chemistry											
Rec. Petro. Hydrocarbons		115	10.0	50.0	mg/kg	1.0	JEN	06/26/96	1200	86423	4

The following prep procedures were performed:

GC/MS Base/Neutral Compounds	GWL	06/25/96	1630	86390	5
Mercury	RMJ	06/20/96	1500	86172	6
TRACE	DVW	06/20/96	1745	86195	7

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

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	89.0	(30.0 - 115.)
Nitrobenzene-d5	M610	57.7	(23.0 - 120.)
p-Terphenyl-d14	M610	97.0	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	104.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	101.	(74.0 - 128.)
Toluene-d8	BTEX-8260	95.6	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	104.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	101.	(74.0 - 128.)
Toluene-d8	NAP-8260	95.6	(53.4 - 163.)

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GENERAL ENGINEERING LABORATORIES

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CERTIFICATE OF ANALYSIS

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

Sample ID : SPORT0080-3

M = Method	Method-Description
M1	EPA 8260
M2	EPA 8270
M3	EPA 6010A
M4	EPA 9071
M5	EPA 3550
M6	EPA 7471
M7	EPA 3050

otes:

The qualifiers in this report are defined as follows:

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

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

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

GEL Laboratory Certifications		EPI Laboratory Certifications	
AL - 41040	AZ - AZ0514	AL - 41050	AZ - AZ0514
CA - 2089	CT - PH-0169	CA - I-1023/2056	CT - PH-0175
DE - SC012	FL - E87156/87294	FL - E87472/87458	MS - 29417
ME - SC012	MS - 10120	NY - 11502	RI - 138
NC - 233	NY - 11501	SC - 10582	TN - 02954
RI - 135	SC - 10120	UT - E-227	VA - 00111
TN - 02934	UT - E-251	WA - C225	NJ - 79002

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CERTIFICATE OF ANALYSIS

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

cc: NPWC00196 Report Date: June 27, 1996

Sample ID : SPORT0080-3

GEL Laboratory Certifications		EPI Laboratory Certifications	
VA - 00151	WA - C223	PA - 68-485	WV - 235
WI - 999887790			

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney

Analytical Report Specialist

P.O. Box 30712 • Charleston, SC 29417 • (803) 556-8171 • Fax (803) 766-1178

CHAIN OF CUSTODY RECORD

2040 Savage Road
Charleston, South Ca
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

Page 1 of 1 9606324

Client Name/Facility Name: SPORTENVDETCHASN

Collected by/Company: SPORTENVDETCHASN

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

CCL 21882

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	RCRA METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	TPH/PAH	BTEX+MTBE	Remarks	
SPORT0080-1	6/17/96	1430				X	8							X									X	+	UST221-1 GW	.1
SPORT0080-2	6/17/96	1430		X		X	4							X									X	X	UST221-2 SOIL	.2
SPORT0080-3	6/17/96	1430		X		X	4							X									X	X	UST221-3 SOIL	.2
SPORT0080-4	6/17/96	1430		X		X	~~4~~ 3							~~X~~									~~X~~	X	VOA TRIP BLANK	.3

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	6/17/96	1530	[signature]	W.K. Hiers, Jr.	6/18/96	1442	[signature]
Relinquished by: [signature]	Date: 6/18/96	Time: 1300	Received by lab by: [signature]	Date: 6/18/96	Time: 1300	Remarks:	

White = sa collector Yellow = file Pink = with report

Attachment III

Certificate of Disposal (tank)

UST Certificate of Disposal

CONTRACTOR

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

Telephone (803) 743-6482

TANK ID & LOCATION

UST 221-1, Bldg 221, Charleston Naval Shipyard, Charleston, SC

DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning
& Disposal Area
Charleston Naval Complex

TYPE OF TANK	SIZE (GAL)
Waste Oil	280 gal.

CLEANING/DISPOSAL METHOD

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

DISPOSAL CERTIFICATION

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

D. Ellison 9-26-96
(Name) (Date)

Appendix E

	StationID	E065GW004	
	SampleID	065GW004M1	
	DateCollected	7/15/2002	
	DateExtracted	7/17/2002	
	DateAnalyzed	7/24/2002	
	SDGNumber	63635	
Parameter	**Units**		
Aldrin	ug/L	0.038	UJ
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/L	0.038	UJ
Alpha-chlordane	ug/L	0.038	UJ
Beta BHC (Beta Hexachlorocyclohexane)	ug/L	0.038	UJ
Chlordane	ug/L	0.38	UJ
Delta BHC (Delta Hexachlorocyclohexane)	ug/L	0.038	UJ
Dieldrin	ug/L	0.077	UJ
Endosulfan I	ug/L	0.038	UJ
Endosulfan II	ug/L	0.077	UJ
Endosulfan Sulfate	ug/L	0.077	UJ
Endrin Aldehyde	ug/L	0.077	UJ
Endrin Ketone	ug/L	0.077	UJ
Endrin	ug/L	0.077	UJ
Gamma BHC (Lindane)	ug/L	0.038	UJ
Gamma-chlordane	ug/L	0.038	UJ
Heptachlor Epoxide	ug/L	0.038	UJ
Heptachlor	ug/L	0.038	UJ
Methoxychlor	ug/L	0.36	UJ
p,p'-DDD	ug/L	0.077	UJ
p,p'-DDE	ug/L	0.077	UJ
p,p'-DDT	ug/L	0.0073	J
Toxaphene	ug/L	2.4	UJ

	StationID	E065GW004		E065GW005		E065GW006	
	SampleID	065GW004M1		065GW005M1		065GW006M1	
	DateCollected	7/15/2002		7/15/2002		7/12/2002	
	DateExtracted	7/17/2002		7/17/2002		7/15/2002	
	DateAnalyzed	7/18/2002		7/22/2002		7/16/2002	
	SDGNumber	63635		63635		63529	
Parameter	**Units**						
Phenol	ug/L	10	U	10	U	10.1	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L	10	U	10	U	10.1	U
2-Chlorophenol	ug/L	10	U	10	U	10.1	U
Benzyl alcohol	ug/L	10	UJ	10	U	10.1	U
Bis(2-Chloroisopropyl)Ether	ug/L	10	U	10	U	10.1	U
2-Methylphenol (o-Cresol)	ug/L	10	U	10	U	10.1	U
N-Nitrosodi-n-propylamine	ug/L	10	U	10	U	10.1	U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/L	10	U	10	U	10.1	U
Hexachloroethane	ug/L	10	U	10	U	10.1	U
Nitrobenzene	ug/L	10	U	10	U	10.1	U
Isophorone	ug/L	10	U	10	U	10.1	U
2-Nitrophenol	ug/L	10	U	10	U	10.1	U
2,4-Dimethylphenol	ug/L	10	U	10	U	10.1	U
bis(2-Chloroethoxy) Methane	ug/L	10	U	10	U	10.1	U
2,4-Dichlorophenol	ug/L	10	U	10	U	10.1	U
Benzoic acid	ug/L	50	U	50	U	50.5	UJ
Naphthalene	ug/L	10	U	10	U	10.1	U
4-Chloroaniline	ug/L	10	U	10	U	10.1	U
Hexachlorobutadiene	ug/L	10	U	10	U	10.1	U
4-Chloro-3-methylphenol	ug/L	10	U	10	U	10.1	U
2-Methylnaphthalene	ug/L	10	U	10	U	10.1	U
Hexachlorocyclopentadiene	ug/L	10	U	10	U	10.1	UJ
2,4,6-Trichlorophenol	ug/L	10	U	10	U	10.1	U
2,4,5-Trichlorophenol	ug/L	50	U	50	U	50.5	U
2-Chloronaphthalene	ug/L	10	U	10	U	10.1	U
2-Nitroaniline	ug/L	50	U	50	U	50.5	U
3-Nitroaniline	ug/L	50	U	50	U	50.5	U
Dimethyl Phthalate	ug/L	10	U	10	U	10.1	U
2,6-Dinitrotoluene	ug/L	10	U	10	U	10.1	U
Acenaphthylene	ug/L	10	U	10	U	10.1	U

	StationID	E065GW009		E065GW009	
	SampleID	065GW009M1		065HW009M1	
	DateCollected	7/16/2002		7/16/2002	
	DateExtracted	7/17/2002		7/17/2002	
	DateAnalyzed	7/24/2002		7/24/2002	
	SDGNumber	63635		63635	
Parameter	**Units**				
Phenol	ug/L	10	U	10	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L	10	U	10	U
2-Chlorophenol	ug/L	10	U	10	U
Benzyl alcohol	ug/L	10	U	10	U
Bis(2-Chloroisopropyl)Ether	ug/L	10	U	10	U
2-Methylphenol (o-Cresol)	ug/L	10	U	10	U
N-Nitrosodi-n-propylamine	ug/L	10	U	10	U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/L	10	U	10	U
Hexachloroethane	ug/L	10	U	10	U
Nitrobenzene	ug/L	10	U	10	U
Isophorone	ug/L	10	U	10	U
2-Nitrophenol	ug/L	10	U	10	U
2,4-Dimethylphenol	ug/L	10	U	10	U
bis(2-Chloroethoxy) Methane	ug/L	10	U	10	U
2,4-Dichlorophenol	ug/L	10	U	10	U
Benzoic acid	ug/L	50	U	50	U
Naphthalene	ug/L	10	U	10	U
4-Chloroaniline	ug/L	10	U	10	U
Hexachlorobutadiene	ug/L	10	U	10	U
4-Chloro-3-methylphenol	ug/L	10	U	10	U
2-Methylnaphthalene	ug/L	10	U	10	U
Hexachlorocyclopentadiene	ug/L	10	U	10	U
2,4,6-Trichlorophenol	ug/L	10	U	10	U
2,4,5-Trichlorophenol	ug/L	50	U	50	U
2-Chloronaphthalene	ug/L	10	U	10	U
2-Nitroaniline	ug/L	50	U	50	U
3-Nitroaniline	ug/L	50	U	50	U
Dimethyl Phthalate	ug/L	10	U	10	U
2,6-Dinitrotoluene	ug/L	10	U	10	U
Acenaphthylene	ug/L	10	U	10	U

	StationID	E065GW004		E065GW005		E065GW006	
	SampleID	065GW004M1		065GW005M1		065GW006M1	
	DateCollected	7/15/2002		7/15/2002		7/12/2002	
	DateExtracted	7/17/2002		7/17/2002		7/15/2002	
	DateAnalyzed	7/18/2002		7/22/2002		7/16/2002	
	SDGNumber	63635		63635		63529	
Parameter	**Units**						
Acenaphthene	ug/L	0.65	J	10	U	10.1	U
2,4-Dinitrophenol	ug/L	50	U	50	U	50.5	UJ
Dibenzofuran	ug/L	10	U	10	U	10.1	U
2,4-Dinitrotoluene	ug/L	10	U	10	U	10.1	U
Diethyl Phthalate	ug/L	10	U	10	U	10.1	U
4-Nitrophenol	ug/L	50	U	50	UJ	50.5	U
Fluorene	ug/L	10	U	10	U	10.1	U
4-Chlorophenyl Phenyl Ether	ug/L	10	U	10	U	10.1	U
4,6-Dinitro-2-methylphenol	ug/L	50	U	50	U	50.5	U
4-Nitroaniline	ug/L	50	U	50	UJ	50.5	U
Diphenylamine	ug/L	10	U	10	U	10.1	U
4-Bromophenyl Phenyl Ether	ug/L	10	U	10	U	10.1	U
Hexachlorobenzene	ug/L	10	U	10	U	10.1	U
Pentachlorophenol	ug/L	50	U	50	U	50.5	U
Phenanthrene	ug/L	10	U	10	U	10.1	U
Anthracene	ug/L	10	U	10	U	10.1	U
Di-n-butyl Phthalate	ug/L	10	U	10	U	10.1	U
Fluoranthene	ug/L	10	U	10	U	10.1	U
Pyrene	ug/L	10	U	10	U	10.1	U
Benzyl Butyl Phthalate	ug/L	10	U	10	U	10.1	U
Benzo(a)Anthracene	ug/L	10	U	10	U	10.1	U
3,3'-Dichlorobenzidine	ug/L	20	U	20	U	20.2	U
Chrysene	ug/L	10	U	10	U	10.1	U
bis(2-Ethylhexyl) Phthalate	ug/L	10	U	10	U	10.1	U
Di-n-octylphthalate	ug/L	10	U	10	U	10.1	U
Benzo(b)Fluoranthene	ug/L	10	U	10	U	10.1	U
Benzo(k)Fluoranthene	ug/L	10	U	10	U	10.1	U
Benzo(a)Pyrene	ug/L	1	U	1	U	1	U
Indeno(1,2,3-c,d)pyrene	ug/L	10	U	10	U	10.1	U
Dibenz(a,h)anthracene	ug/L	10	UJ	10	UJ	10.1	U

	StationID	E065GW009		E065GW009	
	SampleID	065GW009M1		065HW009M1	
	DateCollected	7/16/2002		7/16/2002	
	DateExtracted	7/17/2002		7/17/2002	
	DateAnalyzed	7/24/2002		7/24/2002	
	SDGNumber	63635		63635	
Parameter	**Units**				
Acenaphthene	ug/L	4	J	4.9	J
2,4-Dinitrophenol	ug/L	50	U	50	U
Dibenzofuran	ug/L	0.46	J	10	U
2,4-Dinitrotoluene	ug/L	10	U	10	U
Diethyl Phthalate	ug/L	10	U	10	U
4-Nitrophenol	ug/L	50	UJ	50	UJ
Fluorene	ug/L	1.3	J	1.4	J
4-Chlorophenyl Phenyl Ether	ug/L	10	U	10	U
4,6-Dinitro-2-methylphenol	ug/L	50	U	50	U
4-Nitroaniline	ug/L	50	U	50	U
Diphenylamine	ug/L	10	U	10	U
4-Bromophenyl Phenyl Ether	ug/L	10	U	10	U
Hexachlorobenzene	ug/L	10	U	10	U
Pentachlorophenol	ug/L	50	U	50	U
Phenanthrene	ug/L	10	U	10	U
Anthracene	ug/L	10	U	10	U
Di-n-butyl Phthalate	ug/L	10	U	10	U
Fluoranthene	ug/L	10	U	10	U
Pyrene	ug/L	10	U	10	U
Benzyl Butyl Phthalate	ug/L	10	U	10	U
Benzo(a)Anthracene	ug/L	10	U	10	U
3,3'-Dichlorobenzidine	ug/L	20	U	20	U
Chrysene	ug/L	10	U	10	U
bis(2-Ethylhexyl) Phthalate	ug/L	10	U	10	U
Di-n-octylphthalate	ug/L	10	U	10	U
Benzo(b)Fluoranthene	ug/L	10	U	10	U
Benzo(k)Fluoranthene	ug/L	10	U	10	U
Benzo(a)Pyrene	ug/L	1	U	1	U
Indeno(1,2,3-c,d)pyrene	ug/L	10	U	10	U
Dibenz(a,h)anthracene	ug/L	10	UJ	10	UJ

	StationID	E065GW004		E065GW005		E065GW006	
	SampleID	065GW004M1		065GW005M1		065GW006M1	
	DateCollected	7/15/2002		7/15/2002		7/12/2002	
	DateExtracted	7/17/2002		7/17/2002		7/15/2002	
	DateAnalyzed	7/18/2002		7/22/2002		7/16/2002	
	SDGNumber	63635		63635		63529	
Parameter	**Units**						
Benzo(g,h,i)Perylene	ug/L	10	UJ	10	UJ	10.1	U
Carbazole	ug/L	10	U	10	U	10.1	U

	StationID	E065GW009		E065GW009	
	SampleID	065GW009M1		065HW009M1	
	DateCollected	7/16/2002		7/16/2002	
	DateExtracted	7/17/2002		7/17/2002	
	DateAnalyzed	7/24/2002		7/24/2002	
	SDGNumber	63635		63635	
Parameter	**Units**				
Benzo(g,h,i)Perylene	ug/L	10	UJ	10	UJ
Carbazole	ug/L	10	U	10	U

	StationID	E065GW001		E065GW002		E065GW003	
	SampleID	065GW001M1		065GW002M1		065GW003M1	
	DateCollected	7/12/2002		7/12/2002		7/15/2002	
	DateExtracted	7/16/2002		7/16/2002		7/22/2002	
	DateAnalyzed	7/16/2002		7/16/2002		7/22/2002	
	SDGNumber	63529		63529		63635	
Parameter	**Units**						
Chloromethane	ug/L	10	UJ	10	UJ	10	U
Vinyl chloride	ug/L	10	U	10	U	3.3	J
Bromomethane	ug/L	10	U	10	U	10	U
Chloroethane	ug/L	10	UJ	10	UJ	10	U
1,1-Dichloroethene	ug/L	5	U	5	U	5	U
Acetone	ug/L	10	U	2.5	J	10	U
Carbon Disulfide	ug/L	5	U	5	U	5	U
Methylene Chloride	ug/L	5	U	5	U	5	U
trans-1,2-Dichloroethene	ug/L	5	U	5	U	5	U
1,1-Dichloroethane	ug/L	5	U	1.1	J	5	U
Vinyl acetate	ug/L	10	UJ	10	UJ	10	U
Methyl ethyl ketone (2-Butanone)	ug/L	10	U	10	U	10	U
cis-1,2-Dichloroethylene	ug/L	5	U	5	U	2.7	J
1,2-Dichloroethene (total)	ug/L	5	U	5	U	2.7	J
Chloroform	ug/L	5	U	5	U	5	U
1,1,1-Trichloroethane	ug/L	5	U	5	U	5	U
Carbon Tetrachloride	ug/L	5	U	5	U	5	U
1,2-Dichloroethane	ug/L	5	U	5	U	5	U
Benzene	ug/L	5	U	5	U	5	U
Trichloroethylene (TCE)	ug/L	5	U	5	U	1.9	J
1,2-Dichloropropane	ug/L	5	U	5	U	5	U
Bromodichloromethane	ug/L	5	U	5	U	5	U
2-Chloroethyl vinyl ether	ug/L	10	UJ	10	UJ	10	R
cis-1,3-Dichloropropene	ug/L	5	U	5	U	5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U	10	U	10	U
Toluene	ug/L	5	U	5	U	5	U
trans-1,3-Dichloropropene	ug/L	5	U	5	U	5	U
1,1,2-Trichloroethane	ug/L	5	U	5	U	5	U
2-Hexanone	ug/L	10	U	10	U	10	U
Tetrachloroethylene (PCE)	ug/L	5	U	5	U	5	U

	StationID	E065GW004		E065GW005		E065GW006	
	SampleID	065GW004M1		065GW005M1		065GW006M1	
	DateCollected	7/15/2002		7/15/2002		7/12/2002	
	DateExtracted	7/22/2002		7/23/2002		7/16/2002	
	DateAnalyzed	7/22/2002		7/23/2002		7/16/2002	
	SDGNumber	63635		63635		63529	
Parameter	**Units**						
Chloromethane	ug/L	10	U	10	U	10	UJ
Vinyl chloride	ug/L	10	U	10	U	10	U
Bromomethane	ug/L	10	U	10	U	10	U
Chloroethane	ug/L	10	U	10	U	10	UJ
1,1-Dichloroethene	ug/L	5	U	5	U	5	U
Acetone	ug/L	10	U	10	U	3.3	J
Carbon Disulfide	ug/L	5	U	5	U	5	U
Methylene Chloride	ug/L	5	U	5	U	5	U
trans-1,2-Dichloroethene	ug/L	5	U	5	U	5	U
1,1-Dichloroethane	ug/L	5	U	5	U	5	U
Vinyl acetate	ug/L	10	U	10	U	10	UJ
Methyl ethyl ketone (2-Butanone)	ug/L	10	U	10	U	10	U
cis-1,2-Dichloroethylene	ug/L	2.2	J	5	U	0.74	J
1,2-Dichloroethene (total)	ug/L	2.2	J	5	U	0.74	J
Chloroform	ug/L	5	U	5	U	5	U
1,1,1-Trichloroethane	ug/L	5	U	5	U	5	U
Carbon Tetrachloride	ug/L	5	U	5	U	5	U
1,2-Dichloroethane	ug/L	5	U	5	U	5	U
Benzene	ug/L	5	U	5	U	5	U
Trichloroethylene (TCE)	ug/L	0.87	J	5	U	5	U
1,2-Dichloropropane	ug/L	5	U	5	U	5	U
Bromodichloromethane	ug/L	5	U	5	U	5	U
2-Chloroethyl vinyl ether	ug/L	10	UJ	10	UJ	10	UJ
cis-1,3-Dichloropropene	ug/L	5	U	5	U	5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U	10	U	10	U
Toluene	ug/L	5	U	5	U	5	U
trans-1,3-Dichloropropene	ug/L	5	U	5	U	5	U
1,1,2-Trichloroethane	ug/L	5	U	5	U	5	U
2-Hexanone	ug/L	10	U	10	U	10	U
Tetrachloroethylene (PCE)	ug/L	5	U	5	U	5	U

	StationID	E065GW008		E065GW009		E065GW009	
	SampleID	065GW008M1		065GW009M1		065HW009M1	
	DateCollected	7/15/2002		7/16/2002		7/16/2002	
	DateExtracted	7/23/2002		7/23/2002		7/23/2002	
	DateAnalyzed	7/23/2002		7/23/2002		7/23/2002	
	SDGNumber	63635		63635		63635	
Parameter	**Units**						
Chloromethane	ug/L	10	U	10	U	10	U
Vinyl chloride	ug/L	10	U	10	U	10	U
Bromomethane	ug/L	10	U	10	U	10	U
Chloroethane	ug/L	10	U	10	U	10	U
1,1-Dichloroethene	ug/L	5	U	5	U	5	U
Acetone	ug/L	10	U	10	U	10	U
Carbon Disulfide	ug/L	5	U	5	U	5	U
Methylene Chloride	ug/L	5	U	5	U	5	U
trans-1,2-Dichloroethene	ug/L	5	U	5	U	5	U
1,1-Dichloroethane	ug/L	5	U	5	U	5	U
Vinyl acetate	ug/L	10	U	10	U	10	U
Methyl ethyl ketone (2-Butanone)	ug/L	10	U	10	U	10	U
cis-1,2-Dichloroethylene	ug/L	5	U	5	U	5	U
1,2-Dichloroethene (total)	ug/L	5	U	5	U	5	U
Chloroform	ug/L	5	U	5	U	5	U
1,1,1-Trichloroethane	ug/L	5	U	5	U	5	U
Carbon Tetrachloride	ug/L	5	U	5	U	5	U
1,2-Dichloroethane	ug/L	5	U	5	U	5	U
Benzene	ug/L	5	U	5	U	5	U
Trichloroethylene (TCE)	ug/L	5	U	5	U	5	U
1,2-Dichloropropane	ug/L	5	U	5	U	5	U
Bromodichloromethane	ug/L	5	U	5	U	5	U
2-Chloroethyl vinyl ether	ug/L	10	UJ	10	UJ	10	UJ
cis-1,3-Dichloropropene	ug/L	5	U	5	U	5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U	10	U	10	U
Toluene	ug/L	5	U	5	U	5	U
trans-1,3-Dichloropropene	ug/L	5	U	5	U	5	U
1,1,2-Trichloroethane	ug/L	5	U	5	U	5	U
2-Hexanone	ug/L	10	U	10	U	10	U
Tetrachloroethylene (PCE)	ug/L	5	U	5	U	5	U

	StationID	E065GW04D	
	SampleID	065GW04DM1	
	DateCollected	7/15/2002	
	DateExtracted	7/22/2002	
	DateAnalyzed	7/22/2002	
	SDGNumber	63635	
Parameter	**Units**		
Chloromethane	ug/L	10	U
Vinyl chloride	ug/L	3.2	J
Bromomethane	ug/L	10	U
Chloroethane	ug/L	10	U
1,1-Dichloroethene	ug/L	5	U
Acetone	ug/L	10	U
Carbon Disulfide	ug/L	5	U
Methylene Chloride	ug/L	5	U
trans-1,2-Dichloroethene	ug/L	0.92	J
1,1-Dichloroethane	ug/L	5	U
Vinyl acetate	ug/L	10	U
Methyl ethyl ketone (2-Butanone)	ug/L	10	U
cis-1,2-Dichloroethylene	ug/L	5.9	=
1,2-Dichloroethene (total)	ug/L	6.8	=
Chloroform	ug/L	5	U
1,1,1-Trichloroethane	ug/L	5	U
Carbon Tetrachloride	ug/L	5	U
1,2-Dichloroethane	ug/L	5	U
Benzene	ug/L	5	U
Trichloroethylene (TCE)	ug/L	4.3	J
1,2-Dichloropropane	ug/L	5	U
Bromodichloromethane	ug/L	5	U
2-Chloroethyl vinyl ether	ug/L	10	UJ
cis-1,3-Dichloropropene	ug/L	5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U
Toluene	ug/L	5	U
trans-1,3-Dichloropropene	ug/L	5	U
1,1,2-Trichloroethane	ug/L	5	U
2-Hexanone	ug/L	10	U
Tetrachloroethylene (PCE)	ug/L	5	U

	StationID	E065GW001		E065GW002		E065GW003	
	SampleID	065GW001M1		065GW002M1		065GW003M1	
	DateCollected	7/12/2002		7/12/2002		7/15/2002	
	DateExtracted	7/16/2002		7/16/2002		7/22/2002	
	DateAnalyzed	7/16/2002		7/16/2002		7/22/2002	
	SDGNumber	63529		63529		63635	
Parameter	**Units**						
Dibromochloromethane	ug/L	5	U	5	U	5	U
Chlorobenzene	ug/L	5	U	5	U	5	U
Ethylbenzene	ug/L	5	U	5	U	5	U
m+p Xylene	ug/L	5	U	5	U	5	U
o-Xylene	ug/L	5	U	5	U	5	U
Xylenes, Total	ug/L	5	U	5	U	5	U
Styrene	ug/L	5	U	5	U	5	U
Bromoform	ug/L	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U	5	U	5	U
1,3-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,4-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,2-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,2,4-Trichlorobenzene	ug/L	5	U	5	U	5	U
1,2,3-Trichlorobenzene	ug/L	5	U	5	U	5	U

	StationID	E065GW004		E065GW005		E065GW006	
	SampleID	065GW004M1		065GW005M1		065GW006M1	
	DateCollected	7/15/2002		7/15/2002		7/12/2002	
	DateExtracted	7/22/2002		7/23/2002		7/16/2002	
	DateAnalyzed	7/22/2002		7/23/2002		7/16/2002	
	SDGNumber	63635		63635		63529	
Parameter	**Units**						
Dibromochloromethane	ug/L	5	U	5	U	5	U
Chlorobenzene	ug/L	5	U	5	U	5	U
Ethylbenzene	ug/L	5	U	5	U	5	U
m+p Xylene	ug/L	5	U	5	U	5	U
o-Xylene	ug/L	5	U	5	U	5	U
Xylenes, Total	ug/L	5	U	5	U	5	U
Styrene	ug/L	5	U	5	U	5	U
Bromoform	ug/L	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U	5	U	5	U
1,3-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,4-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,2-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,2,4-Trichlorobenzene	ug/L	5	U	5	U	5	U
1,2,3-Trichlorobenzene	ug/L	5	U	5	U	5	U

	StationID	E065GW008		E065GW009		E065GW009	
	SampleID	065GW008M1		065GW009M1		065HW009M1	
	DateCollected	7/15/2002		7/16/2002		7/16/2002	
	DateExtracted	7/23/2002		7/23/2002		7/23/2002	
	DateAnalyzed	7/23/2002		7/23/2002		7/23/2002	
	SDGNumber	63635		63635		63635	
Parameter	**Units**						
Dibromochloromethane	ug/L	5	U	5	U	5	U
Chlorobenzene	ug/L	5	U	5	U	5	U
Ethylbenzene	ug/L	5	U	5	U	5	U
m+p Xylene	ug/L	5	U	5	U	5	U
o-Xylene	ug/L	5	U	5	U	5	U
Xylenes, Total	ug/L	5	U	5	U	5	U
Styrene	ug/L	5	U	5	U	5	U
Bromoform	ug/L	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U	5	U	5	U
1,3-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,4-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,2-Dichlorobenzene	ug/L	5	U	5	U	5	U
1,2,4-Trichlorobenzene	ug/L	5	U	5	U	5	U
1,2,3-Trichlorobenzene	ug/L	5	U	5	U	5	U

	StationID	E065GW04D	
	SampleID	065GW04DM1	
	DateCollected	7/15/2002	
	DateExtracted	7/22/2002	
	DateAnalyzed	7/22/2002	
	SDGNumber	63635	
Parameter	**Units**		
Dibromochloromethane	ug/L	5	U
Chlorobenzene	ug/L	5	U
Ethylbenzene	ug/L	5	U
m+p Xylene	ug/L	5	U
o-Xylene	ug/L	5	U
Xylenes, Total	ug/L	5	U
Styrene	ug/L	5	U
Bromoform	ug/L	5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U
1,3-Dichlorobenzene	ug/L	5	U
1,4-Dichlorobenzene	ug/L	0.6	J
1,2-Dichlorobenzene	ug/L	5	U
1,2,4-Trichlorobenzene	ug/L	5	U
1,2,3-Trichlorobenzene	ug/L	5	U

	StationID	E065GW001		E065GW002		E065GW003		E065GW004	
	SampleID	065GW001M2		065GW002M2		065GW003M2		065GW004M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted								
	DateAnalyzed	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	SDGNumber	66889		66889		66889		66889	
Parameter	**Units**								
Chromium (Hexavalent)	ug/L	10	R	9	UJ	50	R	10	R

	StationID	E065GW005		E065GW006		E065GW008		E065GW009	
	SampleID	065GW005M2		065GW006M2		065GW008M2		065GW009M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted								
	DateAnalyzed	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	SDGNumber	66889		66889		66889		66889	
Parameter	Units								
Chromium (Hexavalent)	ug/L	6	UJ	10	R	10	R	10	R

	StationID	E065GW009		E065GW04D	
	SampleID	065HW009M2		065GW04DM2	
	DateCollected	9/11/2002		9/11/2002	
	DateExtracted				
	DateAnalyzed	9/11/2002		9/11/2002	
	SDGNumber	66889		66889	
Parameter	**Units**				
Chromium (Hexavalent)	ug/L	10	R	10	R

	StationID	E065GW001		E065GW001		E065GW001		E065GW002	
	SampleID	065GW001M2		065GW001M2		065GW001M2		065GW002M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted			9/16/2002		9/19/2002			
	DateAnalyzed	9/11/2002		9/20/2002		9/20/2002		9/11/2002	
	SDGNumber	66890		66903		66903		66890	
Parameter	**Units**								
Antimony, Dissolved	ug/L			4.79	U				
Arsenic, Dissolved	ug/L			3.97	U				
Barium, Dissolved	ug/L			3.24	J				
Cadmium, Dissolved	ug/L			0.21	U				
Chromium (Hexavalent), Dissolved	ug/L	11	J					6	J
Chromium, Dissolved	ug/L			0.742	U				
Lead, Dissolved	ug/L			2.53	U				
Mercury, Dissolved	ug/L					0.04	U		
Selenium, Dissolved	ug/L			2.67	U				
Silver, Dissolved	ug/L			1.15	U				
Zinc, Dissolved	ug/L			1.89	U				

	StationID	E065GW002		E065GW002		E065GW003		E065GW003	
	SampleID	065GW002M2		065GW002M2		065GW003M2		065GW003M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/16/2002		9/19/2002				9/16/2002	
	DateAnalyzed	9/20/2002		9/20/2002		9/11/2002		9/20/2002	
	SDGNumber	66903		66903		66890		66903	
Parameter	**Units**								
Antimony, Dissolved	ug/L	4.79	U					28.2	J
Arsenic, Dissolved	ug/L	3.97	U					11	=
Barium, Dissolved	ug/L	137	J					9.14	J
Cadmium, Dissolved	ug/L	0.21	U					0.889	U
Chromium (Hexavalent), Dissolved	ug/L					10	R		
Chromium, Dissolved	ug/L	0.532	U					31.5	=
Lead, Dissolved	ug/L	1.36	U					227	=
Mercury, Dissolved	ug/L			0.04	U				
Selenium, Dissolved	ug/L	2.67	U					2.67	U
Silver, Dissolved	ug/L	1.15	U					1.15	U
Zinc, Dissolved	ug/L	1.26	U					234	=

	StationID	E065GW003		E065GW004		E065GW004		E065GW004	
	SampleID	065GW003M2		065GW004M2		065GW004M2		065GW004M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/19/2002				9/16/2002		9/19/2002	
	DateAnalyzed	9/20/2002		9/11/2002		9/20/2002		9/20/2002	
	SDGNumber	66903		66890		66903		66903	
Parameter	**Units**								
Antimony, Dissolved	ug/L					4.79	U		
Arsenic, Dissolved	ug/L					13.1	=		
Barium, Dissolved	ug/L					25.7	J		
Cadmium, Dissolved	ug/L					0.252	U		
Chromium (Hexavalent), Dissolved	ug/L			10	R				
Chromium, Dissolved	ug/L					8.31	J		
Lead, Dissolved	ug/L					19.9	=		
Mercury, Dissolved	ug/L	0.041	J					0.04	U
Selenium, Dissolved	ug/L					2.67	U		
Silver, Dissolved	ug/L					1.15	U		
Zinc, Dissolved	ug/L					36.7	=		

	StationID	E065GW005		E065GW005		E065GW005		E065GW006	
	SampleID	065GW005M2		065GW005M2		065GW005M2		065GW006M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted			9/16/2002		9/19/2002			
	DateAnalyzed	9/11/2002		9/20/2002		9/20/2002		9/11/2002	
	SDGNumber	66890		66903		66903		66890	
Parameter	**Units**								
Antimony, Dissolved	ug/L			4.79	U				
Arsenic, Dissolved	ug/L			3.97	U				
Barium, Dissolved	ug/L			4.93	J				
Cadmium, Dissolved	ug/L			0.21	U				
Chromium (Hexavalent), Dissolved	ug/L	10	R					10	R
Chromium, Dissolved	ug/L			0.532	U				
Lead, Dissolved	ug/L			1.85	U				
Mercury, Dissolved	ug/L					0.04	U		
Selenium, Dissolved	ug/L			2.67	U				
Silver, Dissolved	ug/L			1.15	U				
Zinc, Dissolved	ug/L			6.47	U				

	StationID	E065GW006		E065GW006		E065GW008		E065GW008	
	SampleID	065GW006M2		065GW006M2		065GW008M2		065GW008M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/16/2002		9/19/2002				9/16/2002	
	DateAnalyzed	9/20/2002		9/20/2002		9/11/2002		9/20/2002	
	SDGNumber	66903		66903		66890		66903	
Parameter	**Units**								
Antimony, Dissolved	ug/L	4.79	U					4.79	U
Arsenic, Dissolved	ug/L	3.97	U					5.02	J
Barium, Dissolved	ug/L	6.5	J					34.3	J
Cadmium, Dissolved	ug/L	0.21	U					0.21	U
Chromium (Hexavalent), Dissolved	ug/L					10	R		
Chromium, Dissolved	ug/L	0.532	U					0.532	U
Lead, Dissolved	ug/L	1.24	U					1.24	U
Mercury, Dissolved	ug/L			0.04	U				
Selenium, Dissolved	ug/L	2.67	U					2.67	U
Silver, Dissolved	ug/L	1.15	U					1.15	U
Zinc, Dissolved	ug/L	2.42	U					1.26	U

	StationID	E065GW008		E065GW009		E065GW009		E065GW009	
	SampleID	065GW008M2		065GW009M2		065GW009M2		065GW009M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/19/2002				9/16/2002		9/19/2002	
	DateAnalyzed	9/20/2002		9/11/2002		9/20/2002		9/20/2002	
	SDGNumber	66903		66890		66903		66903	
Parameter	**Units**								
Antimony, Dissolved	ug/L					4.79	U		
Arsenic, Dissolved	ug/L					3.97	U		
Barium, Dissolved	ug/L					14.9	J		
Cadmium, Dissolved	ug/L					0.21	U		
Chromium (Hexavalent), Dissolved	ug/L			6	J				
Chromium, Dissolved	ug/L					0.532	U		
Lead, Dissolved	ug/L					1.24	U		
Mercury, Dissolved	ug/L	0.04	U					0.04	U
Selenium, Dissolved	ug/L					2.67	U		
Silver, Dissolved	ug/L					1.15	U		
Zinc, Dissolved	ug/L					1.28	U		

	StationID	E065GW009		E065GW009		E065GW009		E065GW04D	
	SampleID	065HW009M2		065HW009M2		065HW009M2		065GW04DM2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted			9/16/2002		9/19/2002			
	DateAnalyzed	9/11/2002		9/20/2002		9/20/2002		9/11/2002	
	SDGNumber	66890		66903		66903		66890	
Parameter	**Units**								
Antimony, Dissolved	ug/L			4.79	U				
Arsenic, Dissolved	ug/L			3.97	U				
Barium, Dissolved	ug/L			14.6	J				
Cadmium, Dissolved	ug/L			0.21	U				
Chromium (Hexavalent), Dissolved	ug/L	10	R					10	R
Chromium, Dissolved	ug/L			0.725	U				
Lead, Dissolved	ug/L			1.24	U				
Mercury, Dissolved	ug/L					0.04	U		
Selenium, Dissolved	ug/L			2.67	U				
Silver, Dissolved	ug/L			1.15	U				
Zinc, Dissolved	ug/L			1.26	U				

	StationID	E065GW04D		E065GW04D	
	SampleID	065GW04DM2		065GW04DM2	
	DateCollected	9/11/2002		9/11/2002	
	DateExtracted	9/16/2002		9/19/2002	
	DateAnalyzed	9/20/2002		9/20/2002	
	SDGNumber	66903		66903	
Parameter	**Units**				
Antimony, Dissolved	ug/L	4.79	U		
Arsenic, Dissolved	ug/L	16.2	=		
Barium, Dissolved	ug/L	7.28	J		
Cadmium, Dissolved	ug/L	0.21	U		
Chromium (Hexavalent), Dissolved	ug/L				
Chromium, Dissolved	ug/L	0.532	U		
Lead, Dissolved	ug/L	1.24	U		
Mercury, Dissolved	ug/L			0.04	U
Selenium, Dissolved	ug/L	2.67	U		
Silver, Dissolved	ug/L	1.15	U		
Zinc, Dissolved	ug/L	1.26	U		

	StationID	E065GW001		E065GW002		E065GW003		E065GW004	
	SampleID	065GW001M2		065GW002M2		065GW003M2		065GW004M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted								
	DateAnalyzed	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	SDGNumber	66889		66889		66889		66889	
Parameter	**Units**								
Chromium (Hexavalent)	ug/L	10	R	9	UJ	50	R	10	R

	StationID	E065GW005		E065GW006		E065GW008		E065GW009	
	SampleID	065GW005M2		065GW006M2		065GW008M2		065GW009M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted								
	DateAnalyzed	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	SDGNumber	66889		66889		66889		66889	
Parameter	Units								
Chromium (Hexavalent)	ug/L	6	UJ	10	R	10	R	10	R

	StationID	E065GW009		E065GW04D	
	SampleID	065HW009M2		065GW04DM2	
	DateCollected	9/11/2002		9/11/2002	
	DateExtracted				
	DateAnalyzed	9/11/2002		9/11/2002	
	SDGNumber	66889		66889	
Parameter	**Units**				
Chromium (Hexavalent)	ug/L	10	R	10	R

	StationID	E065GW001		E065GW001		E065GW002		E065GW002	
	SampleID	065GW001M2		065GW001M2		065GW002M2		065GW002M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/17/2002		9/19/2002		9/17/2002		9/19/2002	
	DateAnalyzed	9/20/2002		9/20/2002		9/20/2002		9/20/2002	
	SDGNumber	66902		66902		66902		66902	
Parameter	**Units**								
Antimony	ug/L	4.79	U			4.79	U		
Arsenic	ug/L	3.97	U			3.97	U		
Barium	ug/L	17.4	J			159	J		
Cadmium	ug/L	0.21	U			0.21	U		
Chromium, Total	ug/L	0.624	U			0.532	U		
Lead	ug/L	1.24	U			1.57	U		
Selenium	ug/L	2.67	U			2.67	U		
Silver	ug/L	1.15	U			1.15	U		
Zinc	ug/L	2.36	U			1.26	U		
Mercury	ug/L			0.04	U			0.04	U

	StationID	E065GW003		E065GW003		E065GW004		E065GW004	
	SampleID	065GW003M2		065GW003M2		065GW004M2		065GW004M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/17/2002		9/19/2002		9/17/2002		9/19/2002	
	DateAnalyzed	9/20/2002		9/20/2002		9/20/2002		9/20/2002	
	SDGNumber	66902		66902		66902		66902	
Parameter	**Units**								
Antimony	ug/L	30.7	J			4.79	U		
Arsenic	ug/L	11.5	=			11.9	=		
Barium	ug/L	22.7	J			27.4	J		
Cadmium	ug/L	2.95	J			0.21	U		
Chromium, Total	ug/L	69.6	=			12.9	=		
Lead	ug/L	683	=			25.6	=		
Selenium	ug/L	3.38	U			2.67	U		
Silver	ug/L	1.15	U			1.15	U		
Zinc	ug/L	762	=			45.3	=		
Mercury	ug/L			0.35	=			0.086	J

	StationID	E065GW005		E065GW005		E065GW006		E065GW006	
	SampleID	065GW005M2		065GW005M2		065GW006M2		065GW006M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/17/2002		9/19/2002		9/17/2002		9/19/2002	
	DateAnalyzed	9/20/2002		9/20/2002		9/20/2002		9/20/2002	
	SDGNumber	66902		66902		66902		66902	
Parameter	**Units**								
Antimony	ug/L	4.79	U			4.79	U		
Arsenic	ug/L	3.97	U			10.9	=		
Barium	ug/L	10.8	J			12.6	J		
Cadmium	ug/L	0.21	U			0.21	U		
Chromium, Total	ug/L	0.532	U			0.714	U		
Lead	ug/L	1.77	U			2.1	U		
Selenium	ug/L	2.67	U			2.67	U		
Silver	ug/L	1.15	U			1.15	U		
Zinc	ug/L	16.1	U			12.9	U		
Mercury	ug/L			0.04	U			0.04	U

	StationID	E065GW008		E065GW008		E065GW009		E065GW009	
	SampleID	065GW008M2		065GW008M2		065GW009M2		065GW009M2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/17/2002		9/19/2002		9/17/2002		9/19/2002	
	DateAnalyzed	9/20/2002		9/20/2002		9/20/2002		9/20/2002	
	SDGNumber	66902		66902		66902		66902	
Parameter	**Units**								
Antimony	ug/L	4.79	U			4.79	U		
Arsenic	ug/L	13.9	=			3.97	U		
Barium	ug/L	59.6	J			34	J		
Cadmium	ug/L	0.21	U			0.21	U		
Chromium, Total	ug/L	0.532	U			0.671	U		
Lead	ug/L	1.24	U			1.24	U		
Selenium	ug/L	2.67	U			2.67	U		
Silver	ug/L	1.15	U			1.15	U		
Zinc	ug/L	3.05	U			3.42	U		
Mercury	ug/L			0.04	U			0.04	U

	StationID	E065GW009		E065GW009		E065GW04D		E065GW04D	
	SampleID	065HW009M2		065HW009M2		065GW04DM2		065GW04DM2	
	DateCollected	9/11/2002		9/11/2002		9/11/2002		9/11/2002	
	DateExtracted	9/17/2002		9/19/2002		9/17/2002		9/19/2002	
	DateAnalyzed	9/20/2002		9/20/2002		9/20/2002		9/20/2002	
	SDGNumber	66902		66902		66902		66902	
Parameter	**Units**								
Antimony	ug/L	4.79	U			4.79	U		
Arsenic	ug/L	3.97	U			19.1	=		
Barium	ug/L	31.6	J			37.3	J		
Cadmium	ug/L	0.21	U			0.21	U		
Chromium, Total	ug/L	0.635	U			0.598	U		
Lead	ug/L	1.24	U			1.24	U		
Selenium	ug/L	2.67	U			2.67	U		
Silver	ug/L	1.15	U			1.15	U		
Zinc	ug/L	1.26	U			2.21	U		
Mercury	ug/L			0.04	U			0.04	U

	StationID	E544SB005	
	SampleID	544SB00502 (3-5ft)	
	DateCollected	7/22/2002	
	DateExtracted	8/5/2002	
	DateAnalyzed	8/6/2002	
	SDGNumber	63943	
Parameter	**Units**		
Mercury	mg/kg	1.27	=

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366348		BLK0366349		BLK0366373	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/5/1995		10/6/1995		10/6/1995	
	SDGNumber	23663		23663		23663	
Parameter	**Units**						
1,1,1,2-Tetrachloroethane	ug/Kg	5	U	5	U		
1,2,3-Trichloropropane	ug/Kg	5	U	5	U		
1,2-Dibromo-3-chloropropane	ug/Kg	10	U	10	U		
1,4-Dioxane	ug/Kg	500	U	500	U		
3-Chloropropene	ug/Kg	5	U	5	U		
Acetonitrile	ug/Kg	200	U	200	U		
Acrolein	ug/Kg	50	U	50	U		
Acrylonitrile	ug/Kg	50	U	50	U		
Chloroprene	ug/Kg	5	U	5	U		
Dichlorodifluoromethane	ug/Kg	5	U	5	U		
Ethylene Dibromide (1,2-Dibromoethane)	ug/Kg	5	U	5	U		
Isobutyl alcohol	ug/Kg	200	U	200	U		
Methacrylonitrile	ug/Kg	100	U	100	U		
Methyl iodide	ug/Kg	5	U	5	U		
Methylene bromide	ug/Kg	10	U	10	U		
Propionitrile	ug/Kg	100	U	100	U		
trans-1,4-Dichloro-2-butene	ug/Kg	5	U	5	U		
Trichlorofluoromethane	ug/Kg	5	U	5	U		
1,2,4-Trichlorobenzene	ug/Kg						
1,2,4-Trichlorobenzene	ug/L						
Chloromethane	ug/Kg	10	U	10	U		
Chloromethane	ug/L					10	U
Vinyl chloride	ug/Kg	10	U	10	U		
Vinyl chloride	ug/L					10	U
Bromomethane	ug/Kg	10	U	10	U		
Bromomethane	ug/L					10	U
Chloroethane	ug/Kg	10	U	10	U		
Chloroethane	ug/L					10	U
1,1-Dichloroethene	ug/Kg	5	U	5	U		
1,1-Dichloroethene	ug/L					5	U
Acetone	ug/Kg	10	U	10	U		
Acetone	ug/L					10	U
Carbon Disulfide	ug/Kg	5	U	5	U		

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366374		BLK0366375		BLK0366376	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/9/1995		10/10/1995		10/10/1995	
	SDGNumber	23663		23663		23663	
Parameter	**Units**						
1,1,1,2-Tetrachloroethane	ug/Kg						
1,2,3-Trichloropropane	ug/Kg						
1,2-Dibromo-3-chloropropane	ug/Kg						
1,4-Dioxane	ug/Kg						
3-Chloropropene	ug/Kg						
Acetonitrile	ug/Kg						
Acrolein	ug/Kg						
Acrylonitrile	ug/Kg						
Chloroprene	ug/Kg						
Dichlorodifluoromethane	ug/Kg						
Ethylene Dibromide (1,2-Dibromoethane)	ug/Kg						
Isobutyl alcohol	ug/Kg						
Methacrylonitrile	ug/Kg						
Methyl iodide	ug/Kg						
Methylene bromide	ug/Kg						
Propionitrile	ug/Kg						
trans-1,4-Dichloro-2-butene	ug/Kg						
Trichlorofluoromethane	ug/Kg						
1,2,4-Trichlorobenzene	ug/Kg						
1,2,4-Trichlorobenzene	ug/L						
Chloromethane	ug/Kg	10	U	10	U	1200	U
Chloromethane	ug/L						
Vinyl chloride	ug/Kg	10	U	10	U	1200	U
Vinyl chloride	ug/L						
Bromomethane	ug/Kg	10	U	10	U	1200	U
Bromomethane	ug/L						
Chloroethane	ug/Kg	10	U	10	U	1200	U
Chloroethane	ug/L						
1,1-Dichloroethene	ug/Kg	5	U	5	U	620	U
1,1-Dichloroethene	ug/L						
Acetone	ug/Kg	10	U	10	U	320	J
Acetone	ug/L						
Carbon Disulfide	ug/Kg	5	U	5	U	620	U

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366377		BLK0370404		BLK0370405	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/10/1995		10/9/1995		10/10/1995	
	SDGNumber	23663		23704		23704	
Parameter	**Units**						
1,1,1,2-Tetrachloroethane	ug/Kg			5	U	5	U
1,2,3-Trichloropropane	ug/Kg			5	U	5	U
1,2-Dibromo-3-chloropropane	ug/Kg			10	U	10	U
1,4-Dioxane	ug/Kg			500	U	500	U
3-Chloropropene	ug/Kg			5	U	5	U
Acetonitrile	ug/Kg			200	U	200	U
Acrolein	ug/Kg			50	U	50	U
Acrylonitrile	ug/Kg			50	U	50	U
Chloroprene	ug/Kg			5	U	5	U
Dichlorodifluoromethane	ug/Kg			5	U	5	U
Ethylene Dibromide (1,2-Dibromoethane)	ug/Kg			5	U	5	U
Isobutyl alcohol	ug/Kg			200	U	200	U
Methacrylonitrile	ug/Kg			100	U	100	U
Methyl iodide	ug/Kg			5	U	5	U
Methylene bromide	ug/Kg			10	U	10	U
Propionitrile	ug/Kg			100	U	100	U
trans-1,4-Dichloro-2-butene	ug/Kg			5	U	5	U
Trichlorofluoromethane	ug/Kg			5	U	5	U
1,2,4-Trichlorobenzene	ug/Kg						
1,2,4-Trichlorobenzene	ug/L						
Chloromethane	ug/Kg			10	U	10	U
Chloromethane	ug/L	10	U				
Vinyl chloride	ug/Kg			10	U	10	U
Vinyl chloride	ug/L	10	U				
Bromomethane	ug/Kg			10	U	10	U
Bromomethane	ug/L	10	U				
Chloroethane	ug/Kg			10	U	10	U
Chloroethane	ug/L	10	U				
1,1-Dichloroethene	ug/Kg			5	U	5	U
1,1-Dichloroethene	ug/L	5	U				
Acetone	ug/Kg			10	U	10	U
Acetone	ug/L	10	U				
Carbon Disulfide	ug/Kg			5	U	5	U

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0370448		BLK0370449		BLK0370450	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/10/1995		10/10/1995		10/11/1995	
	SDGNumber	23704		23704		23704	
Parameter	**Units**						
1,1,1,2-Tetrachloroethane	ug/Kg						
1,2,3-Trichloropropane	ug/Kg						
1,2-Dibromo-3-chloropropane	ug/Kg						
1,4-Dioxane	ug/Kg						
3-Chloropropene	ug/Kg						
Acetonitrile	ug/Kg						
Acrolein	ug/Kg						
Acrylonitrile	ug/Kg						
Chloroprene	ug/Kg						
Dichlorodifluoromethane	ug/Kg						
Ethylene Dibromide (1,2-Dibromoethane)	ug/Kg						
Isobutyl alcohol	ug/Kg						
Methacrylonitrile	ug/Kg						
Methyl iodide	ug/Kg						
Methylene bromide	ug/Kg						
Propionitrile	ug/Kg						
trans-1,4-Dichloro-2-butene	ug/Kg						
Trichlorofluoromethane	ug/Kg						
1,2,4-Trichlorobenzene	ug/Kg						
1,2,4-Trichlorobenzene	ug/L						
Chloromethane	ug/Kg			10	U		
Chloromethane	ug/L	10	U			10	U
Vinyl chloride	ug/Kg			10	U		
Vinyl chloride	ug/L	10	U			10	U
Bromomethane	ug/Kg			10	U		
Bromomethane	ug/L	10	U			10	U
Chloroethane	ug/Kg			10	U		
Chloroethane	ug/L	10	U			10	U
1,1-Dichloroethene	ug/Kg			5	U		
1,1-Dichloroethene	ug/L	5	U			5	U
Acetone	ug/Kg			10	U		
Acetone	ug/L	6	J			10	U
Carbon Disulfide	ug/Kg			5	U		

	StationID	LABQC		LABQC		
	SampleID	BLK0370451		BLK0370452		
	DateCollected					
	DateExtracted					
	DateAnalyzed	10/11/1995		10/12/1995		
	SDGNumber	23704		23704		
Parameter	**Units**					
1,1,1,2-Tetrachloroethane	ug/Kg					
1,2,3-Trichloropropane	ug/Kg					
1,2-Dibromo-3-chloropropane	ug/Kg					
1,4-Dioxane	ug/Kg					
3-Chloropropene	ug/Kg					
Acetonitrile	ug/Kg					
Acrolein	ug/Kg					
Acrylonitrile	ug/Kg					
Chloroprene	ug/Kg					
Dichlorodifluoromethane	ug/Kg					
Ethylene Dibromide (1,2-Dibromoethane)	ug/Kg					
Isobutyl alcohol	ug/Kg					
Methacrylonitrile	ug/Kg					
Methyl iodide	ug/Kg					
Methylene bromide	ug/Kg					
Propionitrile	ug/Kg					
trans-1,4-Dichloro-2-butene	ug/Kg					
Trichlorofluoromethane	ug/Kg					
1,2,4-Trichlorobenzene	ug/Kg					
1,2,4-Trichlorobenzene	ug/L					
Chloromethane	ug/Kg	10	U	10	U	
Chloromethane	ug/L					
Vinyl chloride	ug/Kg	10	U	10	U	
Vinyl chloride	ug/L					
Bromomethane	ug/Kg	10	U	10	U	
Bromomethane	ug/L					
Chloroethane	ug/Kg	10	U	10	U	
Chloroethane	ug/L					
1,1-Dichloroethene	ug/Kg	5	U	5	U	
1,1-Dichloroethene	ug/L					
Acetone	ug/Kg	10	U	5	J	
Acetone	ug/L					
Carbon Disulfide	ug/Kg	5	U	5	U	

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366348		BLK0366349		BLK0366373	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/5/1995		10/6/1995		10/6/1995	
	SDGNumber	23663		23663		23663	
Parameter	**Units**						
Carbon Disulfide	ug/L					5	U
Methylene Chloride	ug/Kg	5	U	5	U		
Methylene Chloride	ug/L					5	U
1,1-Dichloroethane	ug/Kg	5	U	5	U		
1,1-Dichloroethane	ug/L					5	U
Vinyl acetate	ug/Kg	10	U	10	U		
Vinyl acetate	ug/L					10	U
Methyl ethyl ketone (2-Butanone)	ug/Kg	10	U	10	U		
Methyl ethyl ketone (2-Butanone)	ug/L					10	U
1,2-Dichloroethene (total)	ug/Kg	5	U	5	U		
1,2-Dichloroethene (total)	ug/L					5	U
Chloroform	ug/Kg	5	U	5	U		
Chloroform	ug/L					5	U
1,1,1-Trichloroethane	ug/Kg	5	U	5	U		
1,1,1-Trichloroethane	ug/L					5	U
Carbon Tetrachloride	ug/Kg	5	U	5	U		
Carbon Tetrachloride	ug/L					5	U
1,2-Dichloroethane	ug/Kg	5	U	5	U		
1,2-Dichloroethane	ug/L					5	U
Benzene	ug/Kg	5	U	5	U		
Benzene	ug/L					5	U
Trichloroethylene (TCE)	ug/Kg	5	U	5	U		
Trichloroethylene (TCE)	ug/L					5	U
1,2-Dichloropropane	ug/Kg	5	U	5	U		
1,2-Dichloropropane	ug/L					5	U
Bromodichloromethane	ug/Kg	5	U	5	U		
Bromodichloromethane	ug/L					5	U
2-Chloroethyl vinyl ether	ug/Kg	10	U	10	U		
2-Chloroethyl vinyl ether	ug/L					10	U
cis-1,3-Dichloropropene	ug/Kg	5	U	5	U		
cis-1,3-Dichloropropene	ug/L					5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg	10	U	10	U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L					10	U

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366374		BLK0366375		BLK0366376	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/9/1995		10/10/1995		10/10/1995	
	SDGNumber	23663		23663		23663	
Parameter	**Units**						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/Kg	5	U	5	U	300	J
Methylene Chloride	ug/L						
1,1-Dichloroethane	ug/Kg	5	U	5	U	620	U
1,1-Dichloroethane	ug/L						
Vinyl acetate	ug/Kg	10	U	10	U	1200	U
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/Kg	10	U	10	U	1200	U
Methyl ethyl ketone (2-Butanone)	ug/L						
1,2-Dichloroethene (total)	ug/Kg	5	U	5	U	620	U
1,2-Dichloroethene (total)	ug/L						
Chloroform	ug/Kg	5	U	5	U	620	U
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/Kg	5	U	5	U	620	U
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/Kg	5	U	5	U	620	U
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/Kg	5	U	5	U	620	U
1,2-Dichloroethane	ug/L						
Benzene	ug/Kg	5	U	5	U	620	U
Benzene	ug/L						
Trichloroethylene (TCE)	ug/Kg	5	U	5	U	620	U
Trichloroethylene (TCE)	ug/L						
1,2-Dichloropropane	ug/Kg	5	U	5	U	620	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/Kg	5	U	5	U	620	U
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/Kg	10	U	10	U	1200	U
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/Kg	5	U	5	U	620	U
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg	10	U	10	U	1200	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366377		BLK0370404		BLK0370405	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/10/1995		10/9/1995		10/10/1995	
	SDGNumber	23663		23704		23704	
Parameter	**Units**						
Carbon Disulfide	ug/L	5	U				
Methylene Chloride	ug/Kg			5	U	5	U
Methylene Chloride	ug/L	5	U				
1,1-Dichloroethane	ug/Kg			5	U	5	U
1,1-Dichloroethane	ug/L	5	U				
Vinyl acetate	ug/Kg			10	U	10	U
Vinyl acetate	ug/L	10	U				
Methyl ethyl ketone (2-Butanone)	ug/Kg			10	U	10	U
Methyl ethyl ketone (2-Butanone)	ug/L	10	U				
1,2-Dichloroethene (total)	ug/Kg			5	U	5	U
1,2-Dichloroethene (total)	ug/L	5	U				
Chloroform	ug/Kg			5	U	5	U
Chloroform	ug/L	5	U				
1,1,1-Trichloroethane	ug/Kg			5	U	5	U
1,1,1-Trichloroethane	ug/L	5	U				
Carbon Tetrachloride	ug/Kg			5	U	5	U
Carbon Tetrachloride	ug/L	5	U				
1,2-Dichloroethane	ug/Kg			5	U	5	U
1,2-Dichloroethane	ug/L	5	U				
Benzene	ug/Kg			5	U	5	U
Benzene	ug/L	5	U				
Trichloroethylene (TCE)	ug/Kg			5	U	5	U
Trichloroethylene (TCE)	ug/L	5	U				
1,2-Dichloropropane	ug/Kg			5	U	5	U
1,2-Dichloropropane	ug/L	5	U				
Bromodichloromethane	ug/Kg			5	U	5	U
Bromodichloromethane	ug/L	5	U				
2-Chloroethyl vinyl ether	ug/Kg			10	U	10	U
2-Chloroethyl vinyl ether	ug/L	10	U				
cis-1,3-Dichloropropene	ug/Kg			5	U	5	U
cis-1,3-Dichloropropene	ug/L	5	U				
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg			10	U	10	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U				

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0370448		BLK0370449		BLK0370450	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/10/1995		10/10/1995		10/11/1995	
	SDGNumber	23704		23704		23704	
Parameter	**Units**						
Carbon Disulfide	ug/L	5	U			5	U
Methylene Chloride	ug/Kg			6			
Methylene Chloride	ug/L	9				5	U
1,1-Dichloroethane	ug/Kg			5	U		
1,1-Dichloroethane	ug/L	5	U			5	U
Vinyl acetate	ug/Kg			10	U		
Vinyl acetate	ug/L	10	U			10	U
Methyl ethyl ketone (2-Butanone)	ug/Kg			10	U		
Methyl ethyl ketone (2-Butanone)	ug/L	2	J			10	U
1,2-Dichloroethene (total)	ug/Kg			5	U		
1,2-Dichloroethene (total)	ug/L	5	U			5	U
Chloroform	ug/Kg			5	U		
Chloroform	ug/L	5	U			5	U
1,1,1-Trichloroethane	ug/Kg			5	U		
1,1,1-Trichloroethane	ug/L	5	U			5	U
Carbon Tetrachloride	ug/Kg			5	U		
Carbon Tetrachloride	ug/L	5	U			5	U
1,2-Dichloroethane	ug/Kg			5	U		
1,2-Dichloroethane	ug/L	5	U			5	U
Benzene	ug/Kg			5	U		
Benzene	ug/L	5	U			5	U
Trichloroethylene (TCE)	ug/Kg			5	U		
Trichloroethylene (TCE)	ug/L	5	U			5	U
1,2-Dichloropropane	ug/Kg			5	U		
1,2-Dichloropropane	ug/L	5	U			5	U
Bromodichloromethane	ug/Kg			5	U		
Bromodichloromethane	ug/L	5	U			5	U
2-Chloroethyl vinyl ether	ug/Kg			10	U		
2-Chloroethyl vinyl ether	ug/L	10	U			10	U
cis-1,3-Dichloropropene	ug/Kg			5	U		
cis-1,3-Dichloropropene	ug/L	5	U			5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg			10	U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U			10	U

	StationID	LABQC		LABQC		
	SampleID	BLK0370451		BLK0370452		
	DateCollected					
	DateExtracted					
	DateAnalyzed	10/11/1995		10/12/1995		
	SDGNumber	23704		23704		
Parameter	**Units**					
Carbon Disulfide	ug/L					
Methylene Chloride	ug/Kg	3	J	4	J	
Methylene Chloride	ug/L					
1,1-Dichloroethane	ug/Kg	5	U	5	U	
1,1-Dichloroethane	ug/L					
Vinyl acetate	ug/Kg	10	U	10	U	
Vinyl acetate	ug/L					
Methyl ethyl ketone (2-Butanone)	ug/Kg	10	U	10	U	
Methyl ethyl ketone (2-Butanone)	ug/L					
1,2-Dichloroethene (total)	ug/Kg	5	U	5	U	
1,2-Dichloroethene (total)	ug/L					
Chloroform	ug/Kg	5	U	5	U	
Chloroform	ug/L					
1,1,1-Trichloroethane	ug/Kg	5	U	5	U	
1,1,1-Trichloroethane	ug/L					
Carbon Tetrachloride	ug/Kg	5	U	5	U	
Carbon Tetrachloride	ug/L					
1,2-Dichloroethane	ug/Kg	5	U	5	U	
1,2-Dichloroethane	ug/L					
Benzene	ug/Kg	5	U	5	U	
Benzene	ug/L					
Trichloroethylene (TCE)	ug/Kg	5	U	5	U	
Trichloroethylene (TCE)	ug/L					
1,2-Dichloropropane	ug/Kg	5	U	5	U	
1,2-Dichloropropane	ug/L					
Bromodichloromethane	ug/Kg	5	U	5	U	
Bromodichloromethane	ug/L					
2-Chloroethyl vinyl ether	ug/Kg	10	U	10	U	
2-Chloroethyl vinyl ether	ug/L					
cis-1,3-Dichloropropene	ug/Kg	5	U	5	U	
cis-1,3-Dichloropropene	ug/L					
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg	10	U	10	U	
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L					

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366348		BLK0366349		BLK0366373	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/5/1995		10/6/1995		10/6/1995	
	SDGNumber	23663		23663		23663	
Parameter	**Units**						
Toluene	ug/Kg	5	U	5	U		
Toluene	ug/L					5	U
trans-1,3-Dichloropropene	ug/Kg	5	U	5	U		
trans-1,3-Dichloropropene	ug/L					5	U
1,1,2-Trichloroethane	ug/Kg	5	U	5	U		
1,1,2-Trichloroethane	ug/L					5	U
2-Hexanone	ug/Kg	10	U	10	U		
2-Hexanone	ug/L					10	U
Tetrachloroethylene (PCE)	ug/Kg	5	U	5	U		
Tetrachloroethylene (PCE)	ug/L					5	U
Dibromochloromethane	ug/Kg	5	U	5	U		
Dibromochloromethane	ug/L					5	U
Chlorobenzene	ug/Kg	5	U	5	U		
Chlorobenzene	ug/L					5	U
Ethylbenzene	ug/Kg	5	U	5	U		
Ethylbenzene	ug/L					5	U
Xylenes, Total	ug/Kg	5	U	5	U		
Xylenes, Total	ug/L					5	U
Styrene	ug/Kg	5	U	5	U		
Styrene	ug/L					5	U
Bromoform	ug/Kg	5	U	5	U		
Bromoform	ug/L					5	U
1,1,2,2-Tetrachloroethane	ug/Kg	5	U	5	U		
1,1,2,2-Tetrachloroethane	ug/L					5	U

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366374		BLK0366375		BLK0366376	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/9/1995		10/10/1995		10/10/1995	
	SDGNumber	23663		23663		23663	
Parameter	**Units**						
Toluene	ug/Kg	5	U	5	U	620	U
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/Kg	5	U	5	U	620	U
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/Kg	5	U	5	U	620	U
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/Kg	10	U	10	U	1200	U
2-Hexanone	ug/L						
Tetrachloroethylene (PCE)	ug/Kg	5	U	5	U	620	U
Tetrachloroethylene (PCE)	ug/L						
Dibromochloromethane	ug/Kg	5	U	5	U	620	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/Kg	5	U	5	U	620	U
Chlorobenzene	ug/L						
Ethylbenzene	ug/Kg	5	U	5	U	620	U
Ethylbenzene	ug/L						
Xylenes, Total	ug/Kg	5	U	5	U	620	U
Xylenes, Total	ug/L						
Styrene	ug/Kg	5	U	5	U	620	U
Styrene	ug/L						
Bromoform	ug/Kg	5	U	5	U	620	U
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/Kg	5	U	5	U	620	U
1,1,2,2-Tetrachloroethane	ug/L						

	StationID	LABQC		LABQC		LABQC	
	SampleID	BLK0366377		BLK0370404		BLK0370405	
	DateCollected						
	DateExtracted						
	DateAnalyzed	10/10/1995		10/9/1995		10/10/1995	
	SDGNumber	23663		23704		23704	
Parameter	**Units**						
Toluene	ug/Kg			5	U	5	U
Toluene	ug/L	5	U				
trans-1,3-Dichloropropene	ug/Kg			5	U	5	U
trans-1,3-Dichloropropene	ug/L	5	U				
1,1,2-Trichloroethane	ug/Kg			5	U	5	U
1,1,2-Trichloroethane	ug/L	5	U				
2-Hexanone	ug/Kg			10	U	10	U
2-Hexanone	ug/L	10	U				
Tetrachloroethylene (PCE)	ug/Kg			5	U	5	U
Tetrachloroethylene (PCE)	ug/L	5	U				
Dibromochloromethane	ug/Kg			5	U	5	U
Dibromochloromethane	ug/L	5	U				
Chlorobenzene	ug/Kg			5	U	5	U
Chlorobenzene	ug/L	5	U				
Ethylbenzene	ug/Kg			5	U	5	U
Ethylbenzene	ug/L	5	U				
Xylenes, Total	ug/Kg			5	U	5	U
Xylenes, Total	ug/L	5	U				
Styrene	ug/Kg			5	U	5	U
Styrene	ug/L	5	U				
Bromoform	ug/Kg			5	U	5	U
Bromoform	ug/L	5	U				
1,1,2,2-Tetrachloroethane	ug/Kg			5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U				

The following primary flags are used to qualify data:

[=] Detected. The analyte was analyzed for and detected at the concentration shown.

[J] Estimated. The analyte was present but the reported value may not be accurate or precise.

[U] Undetected. The analyte was analyzed for but not detected above the method detection limit.

[UJ] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.

[R] Rejected. The data is not useable.

Secondary Data Validation Qualifiers

Code	Definition
2S	Second Source
BL	Blank
BD	Blank Spike/Blank Spike Duplicate or (LCS/LCSD) Precision
BS	Blank Spike/LCS
CC	Continuing Calibration Verification
DL	Dilution
FD	Field Duplicate
HT	Holding Time
IB	In-Between (metals - B's → J's)
IC	Initial Calibration
IS	Internal Standard
LD	Lab Duplicate
LR	Concentration exceeded Linear Range
MD	MS/MSD or LCS/LCSD Precision
MS	Matrix Spike/Matrix Spike Duplicate
OT	Other (see DV worksheet)
PD	Pesticide Degradation
PS	Post Spike
RE	Re-extraction/Re-analysis
SD	Serial Dilution
SS	Spiked Surrogate
TN	Tune

Table 1 - Chemical Analytical Methods – Field and Quality Control Samples

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	Upper Depth	Lower Depth	Date Collected	Mercury SW7470A SW7471A
63943	E544SB005	544SB00502	63943001	SO	N	3	5	07/22/02	X
63943	LABQC	1200269446	1200269446	SQ	LB				X
63943	LABQC	1200269450	1200269450	SQ	BS				X
63944	FIELDQC	544EB005M1	63944001	WQ	EB			07/22/02	X
63944	LABQC	1200269314	1200269314	WQ	LB				X
63944	LABQC	1200269317	1200269317	WQ	BS				X

MATRIX CODE

SO – Soil
SQ – Soil QC Samples
WQ – Water QC Samples

SAMPLE TYPE CODE

EB - Equipment Blank
N - Native Sample
LB – Laboratory Blank
BS – Blank Spike

Inorganic Parameters

Quality Control Review

The following list represents the QA/QC measures that are typically reviewed during the data quality evaluation procedure for inorganic parameters.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Sample preparation, initial calibration blanks/continuing calibration blanks, and equipment blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", in which target parameters have been added prior to digestion/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **Pre/Post Digestion Spike (MS/MSD)** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **ICP Interference Check Sample** – This sample verifies the lab's interelement and background correction factors.
- **Initial Calibration Verification** – This parameter ensures that the instrument is capable of producing acceptable quantitative data for the target analyte list to be measured.
- **Continuing Calibration Verification** – This one-point, mid-range parameter establishes that the initial calibration is still valid by checking the performance of the instrument on a continual basis.
- **ICP Serial Dilution** – The serial dilution of samples quantitated by ICP determines whether or not significant physical or chemical interferences exist due to the sample matrix.

Mercury Analyses

The QA/QC parameters for the Mercury analyses for all of the samples were within acceptable control limits.

Rejected Data

No data were rejected based upon the validation process for this sampling event.

Conclusion

A review of the analytical data submitted regarding the investigation of Zone E, AOCs 544 and 546 at the Charleston Naval Complex, Charleston, South Carolina by CH2M HILL has been completed. An overall evaluation of the data indicates that the sample handling, shipment, and analytical procedures have been adequately completed. The validation review demonstrated that the analytical systems were generally in control and the data results can be used in the decision making process.

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZE544-070202-01** page 1 of 2

Laboratory:	GEL
Project Name:	Charleston Navy Complex
Site Name:	Zone E, AOC 544 & 546
Project Number:	158814.PM.04
TAT:	standard
Project Manager:	Tom Beisel/ATL
Level:	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278
Send Report To:	see last page of COC
EDD:	CNC format

Lab Batch/SDG:

	Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Mercury (SW7471A) 1 - 4 ounce jar	Mercury (SW7470A) 1 - 250mL HDPE, HNO3	Comments
01	544SB00502	E544SB005	3	5	7-22-02/1415	SO	1	X		63943%
01	544EB005M1	E544EB005			7-22-02/1425	SQ	1		X	EB 63944%
										* RCRA
										* Sample complete

Sampled By ANDREW O'CONOR & A. STOKES Date/Time 7-22-02

Relinquished by: [signature] Date/Time 7-22-02/1640

Additional Samplers:

Received By Lab: [signature] Date/Time 7-22-02 1600

Relinquished by: Date/Time

Received By: Date/Time

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks:

Temperature:

Receipt Exceptions:

Data Validation Summary - Charleston Naval Complex - Zone E, SWMU 65

TO: Tom Wiley/CH2M HILL/ATL

FROM: Amy Juchem/CH2M HILL/GNA
Herb Kelly/CH2M HILL/GNA

DATE: September 18, 2002

The purpose of this memorandum is to present the results of the data validation process for the samples collected in Zone E, SWMU 65. The samples were collected between the dates of July 12 and 16, 2002.

The specific samples and analytical fractions reviewed are summarized below in Table 1.

The Quality Control areas that were reviewed and the resulting findings are documented within each subsection that follows. This data was validated for compliance with the analytical method requirements. This process also included a review of the data to assess the accuracy, precision, and completeness based upon procedures described in the guidance documents such as the Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review (EPA 1994) and National Functional Guidelines for Organic Data Review (EPA 1999)*. Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for the following analyses: SW-846 8260 Volatile Organic Compounds (VOC), SW-846 8270 Semivolatile Organic Compounds (SVOC), and SW-846 8081 Organochlorine Pesticides.

Sample results that were not within the acceptance limits were appended with a qualifying flag, which consisted of a single- or double-letter code that indicated a possible problem with the data. The qualifying flags originated during the data review and validation processes. These also include the secondary, or the two-digit "sub-qualifier" flags. The secondary qualifiers provide the reasoning behind the assignment of a qualifier flag to the data. The secondary qualifiers are presented and defined below.

Attachment 1 lists the changes in data qualifiers, due to the validation process.

The following primary flags were used to qualify the data:

[=] Detected. The analyte was analyzed for and detected at the concentration shown.

[J] Estimated. The analyte was present but the reported value may not be accurate or precise.

[U] Undetected. The analyte was analyzed for but not detected above the method detection limit.

[UJ] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.

[R] Rejected. The data is not useable.

Secondary Data Validation Qualifiers

Code	Definition
2S	Second Source
BL	Blank
BD	Blank Spike/Blank Spike Duplicate or (LCS/LCSD) Precision
BS	Blank Spike/LCS
CC	Continuing Calibration Verification
DL	Dilution
FD	Field Duplicate
HT	Holding Time
IB	In-Between (metals - B's → J's)
IC	Initial Calibration
IS	Internal Standard
LD	Lab Duplicate
LR	Concentration exceeded Linear Range
MD	MS/MSD or LCS/LCSD Precision
MS	Matrix Spike/Matrix Spike Duplicate
OT	Other (see DV worksheet)
PD	Pesticide Degradation
PS	Post Spike
RE	Re-extraction/Re-analysis
SD	Serial Dilution
SS	Spiked Surrogate
TN	Tune

Table 1 - Chemical Analytical Methods – Field and Quality Control Samples

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	Date Collected	VOC SW8260B	SVOC SW8270C	Pesticides SW8081A
63529	E065GW001	065GW001M1	63529001	WG	N	07/12/02	X		
63529	E065GW002	065GW002M1	63529002	WG	N	07/12/02	X		
63529	FIELDQC	065TW001M1	63529003	WQ	TB	07/12/02	X		
63529	FIELDQC	065EW001M1	63529004	WQ	EB	07/12/02	X	X	X
63529	E065GW006	065GW006M1	63529005	WG	N	07/12/02	X	X	
63529	LABQC	1200262320	1200262320	WQ	LB			X	
63529	LABQC	1200262323	1200262323	WQ	BS			X	
63529	LABQC	1200262360	1200262360	WQ	LB				X
63529	LABQC	1200262363	1200262363	WQ	BS				X
63529	LABQC	1200263479	1200263479	WQ	LB		X		
63529	LABQC	1200263481	1200263481	WQ	BS		X		
63635	E065GW004	065GW004M1MS	1200263914	WG	MS	07/15/02		X	
63635	E065GW004	065GW004M1SD	1200263915	WG	SD	07/15/02		X	
63635	E065GW004	065GW004M1MS	1200263978	WG	MS	07/15/02			X
63635	E065GW004	065GW004M1SD	1200263979	WG	SD	07/15/02			X
63635	E065GW003	065GW003M1MS	1200265239	WG	MS	07/15/02	X		
63635	E065GW003	065GW003M1SD	1200265240	WG	SD	07/15/02	X		
63635	E065GW003	065GW003M1	63635001	WG	N	07/15/02	X		
63635	E065GW004	065GW004M1	63635002	WG	N	07/15/02	X	X	X

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	Date Collected	VOC SW8260B	SVOC SW8270C	Pesticides SW8081A
63635	E065GW04D	065GW04DM1	63635003	WG	N	07/15/02	X		
63635	E065GW008	065GW008M1	63635004	WG	N	07/15/02	X		
63635	E065GW005	065GW005M1	63635005	WG	N	07/15/02	X	X	
63635	E065GW009	065GW009M1	63635006	WG	N	07/16/02	X	X	
63635	E065GW009	065HW009M1	63635007	WG	FD	07/16/02	X	X	
63635	LABQC	1200263912	1200263912	WQ	LB			X	
63635	LABQC	1200263913	1200263913	WQ	BS			X	
63635	LABQC	1200263976	1200263976	WQ	LB				X
63635	LABQC	1200263977	1200263977	WQ	BS				X
63635	LABQC	1200269626	1200269626	WQ	LB		X		
63635	LABQC	1200269627	1200269627	WQ	BS		X		

MATRIX CODE

WG – Groundwater
WQ – Water QC Sample

SAMPLE TYPE CODE

BS - Blank Spike
EB - Equipment Blank
TB – Trip Blank
N - Native Sample
FD – Field Duplicate
LB - Laboratory Blank
MS – Matrix Spike
SD – Matrix Spike Duplicate

ANALYSIS CODE

VOC - Volatile Organic Compounds
SVOC - Semivolatile Organic Compounds

Organic Parameters

Quality Control Review

The following list represents the QA/QC measures that were reviewed during the data quality evaluation procedure for organic data.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Method blanks, equipment blanks, and trip blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Surrogate Recoveries** – Surrogate Compounds are added to each sample and the recoveries are used to monitor lab performance and possible matrix interference.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", either laboratory reagent water or Ottawa sand, in which target compounds have been added prior to extraction/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **GC/MS Tuning** – The mass spectrum of the tuning compound is evaluated for method compliance. The criteria are established to verify the proper mass assignment and mass resolution.
- **Initial Calibration** – The initial calibration ensures that the instrument is capable of producing acceptable qualitative and quantitative data for the compounds of interest.
- **Continuing Calibration** – The continuing calibration checks satisfactory performance of the instrument and its predicted response to the target compounds.
- **Pesticide Degradation** – Degradation checks on the gas chromatograph with electron capture detector system are performed to ensure minimal instrument breakdown of target compounds. These criteria are not sample specific.
- **Confirmation** – If GCMS methodology is not initially used for analysis, SW-846 method 8000 requires confirmation when the composition of samples is not well characterized. Therefore, even when the identification has been confirmed on a dissimilar column or detector, the agreement of the quantitative results on both columns is evaluated. For Pesticide and PCB analyses covered in this report, confirmation was performed using a

dissimilar analytical column. The laboratory analyzed samples with a gas chromatograph (GC) utilizing simultaneous primary and confirmation data acquisition. Per SW-86 method 8000, 40% RPD criteria was used as the acceptance limit.

- **Internal Standards** – The internal standards (retention time and response) are evaluated for method compliance. The internal standards are used in quantitation of the target parameters and monitor the instrument sensitivity and response for stability during each analysis.

Volatile Organic Compounds (VOC) Analyses

The QA/QC parameters for VOC analyses for all of the samples were within acceptable control limits, except as noted below:

Recoveries - Surrogate, MS/MSD and LCS/LCSD

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), Laboratory Control Sample (LCS) and Laboratory Control Duplicate Sample (LCSD) recoveries were within acceptable quality control limits, except as noted in Table 2 below.

TABLE 2
Surrogate, MS/MSD, and LCS/LCSD Recoveries Out of QC Limits: VOC
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

SDG	Sample	Parameter	Recovery	Recovery Limits	Associated Samples	Flag
63529	1200263481 LCS	4-Methyl-2-pentanone	134.4*	70-130	63529 - All	Detects only - J
63635	63635001	Toluene-d8	114*	88-110	63635001	Detects only - J
63635	63635001	Bromofluorobenzene	117*	86-115	63635001	Detects only - J
63635	63635006	Toluene-d8	116*	88-110	63635006	Detects only - J
63635	63635006	Bromofluorobenzene	117*	86-115	63635006	Detects only - J
63635	63635001 MS/MSD	2-Chloroethylvinylether	0* / 0*	70-130	63635001	Detects-J, non-detects-R

* - out of control limits

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 3.

TABLE 3
Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: VOC
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation or R^2 (ICAL)/%Difference (CCAL)	Associated Samples
VOA1-ICAL-06/19/02, 2308	2-Chloroethyl vinyl ether	RRF=0.043	63529 - All
VOA1-CCAL-07/16/02, 1212	Chloromethane	26.3% low	63529 - All
	Chloroethane	20.0% low	
	Methylene chloride	20.6% high	
	Vinyl acetate	25.4% low	
	2-Butanone	23.2% high	
	2-Chloroethyl vinyl ether	RRF=0.042	
	4-Methyl-2-pentanone	34.3% high	
	Dibromochloromethane	21.3% high	
	Bromoform	21.2% high	
VOA5-CCAL-07/22/02, 2003	2-Chloroethyl vinyl ether	31.3% low	63635 - All
	Bromoform	21.3% high	

Flags were applied to the compounds in the associated samples in the following manner:

- When the Average Relative Response Factor (RRF) was low in the initial calibration, detected compounds were flagged "J", and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was high in the continuing calibration standards, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.
- When the Relative Response Factor (RRF) was low in the continuing calibration, detected compounds were flagged "J", and non-detected compounds were flagged "UJ", as estimated.

Semivolatile Organic Compounds (SVOC) Analyses

The QA/QC parameters for the SVOC analyses for all of the samples were within acceptable control limits, except as noted below.

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 4.

TABLE 4
Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOC
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation or R^2 (ICAL) %Difference (CCAL)	Associated Samples
MSD8-ICAL-07/11/02, 2012	Benzoic acid	R^2=0.980	63529 – All
MSD8-CCAL-07/15/02, 1700	Nitrobenzene	24.2% high	63529 - All
	Hexachlorocyclopentadiene	32.8% low	
	2,4-Dinitrophenol	28.2% low	
	2-Methyl-4,6-Dinitrophenol	32.7% high	
MSD4-ICAL-07/15/02, 2138	Dibenzo(a,h)anthracene	R^2=0.988	63635 - All
	Benzo(ghi)perylene	R^2=0.989	
MSD4-CCAL-07/18/02, 1013	Benzyl alcohol	41.2% low	63635002
MSD4-CCAL-07/22/02, 1856	Hexachlorocyclopentadiene	33.9% high	63635005
	4-Nitrophenol	20.4% low	
	p-Nitroaniline	22.9% low	
MSD4-CCAL-07/24/02, 1258	Benzyl alcohol	34.7% high	63635006, 63635007
	Benzoic acid	33.4% high	
	4-Nitrophenol	24.3% low	
	bis(2-ethylhexyl)phthalate	29.4% high	

Flags were applied to the compounds in the associated samples in the following manner:

- When the percent Relative Standard Deviation (%RSD) or correlation coefficient (R^2) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was high in the continuing calibration standards, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.

Organochlorine Pesticide Analyses

The QA/QC parameters for the Organochlorine Pesticide analyses for all of the samples were within acceptable control limits, except as noted below:

Recoveries - Surrogate, MS/MSD and LCS

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), and Laboratory Control Sample (LCS) recoveries were within acceptable quality control limits, except as noted in Table 5 below.

TABLE 5
Surrogate, MS/MSD and LCS Recoveries Out of QC Limits: Pesticides
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

SDG	Sample	Parameter	Recovery	Recovery Limits	Associated Samples	Flag
63635	63635002	4-cmx	58* / 52*	60-150	63635002	Detects-J, non-detects-UJ
		Decachlorobiphenyl	27* / 43*	60-150		

* - out of control limits

Rejected Data

There were selected results qualified as "R", rejected, due to associated QC parameters out of criteria. The rejected data are summarized below.

- 2-Chloroethyl vinyl ether was rejected in sample 63635001 due to extremely low recoveries in the MS/MSD samples.

Conclusion

A review of the analytical data submitted regarding the investigation of Zone E, SWMU 65 at the Charleston Naval Complex, Charleston, South Carolina by CH2M HILL has been completed. An overall evaluation of the data indicates that the sample handling, shipment, and analytical procedures have been adequately completed, and that the analytical results should be considered usable as qualified.

As discussed above, there was a specific result that was rejected, in which the data cannot be used. With the exception of this result, the validation review demonstrated that the analytical systems were generally in control and the data can be used in the decision making process.

Attachment 1 - Changed Qualifiers and Results
Zone E, SWMU - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
PEST	SW8081A	ALDRIN	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	ALPHA BHC	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	ALPHA-CHLORDANE	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	BETA BHC	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	Chlordane	63635	065GW004M1	63635002	WG	0.38	U	0.38	UJ	ug/L	SS
PEST	SW8081A	DELTA BHC	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	DIELDRIN	63635	065GW004M1	63635002	WG	0.077	U	0.077	UJ	ug/L	SS
PEST	SW8081A	ENDOSULFAN I	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	ENDOSULFAN II	63635	065GW004M1	63635002	WG	0.077	U	0.077	UJ	ug/L	SS
PEST	SW8081A	ENDOSULFAN SULFATE	63635	065GW004M1	63635002	WG	0.077	U	0.077	UJ	ug/L	SS
PEST	SW8081A	ENDRIN	63635	065GW004M1	63635002	WG	0.077	U	0.077	UJ	ug/L	SS
PEST	SW8081A	ENDRIN ALDEHYDE	63635	065GW004M1	63635002	WG	0.077	U	0.077	UJ	ug/L	SS
PEST	SW8081A	ENDRIN KETONE	63635	065GW004M1	63635002	WG	0.077	U	0.077	UJ	ug/L	SS
PEST	SW8081A	GAMMA BHC (LINDANE)	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	GAMMA-CHLORDANE	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	HEPTACHLOR	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	HEPTACHLOR EPOXIDE	63635	065GW004M1	63635002	WG	0.038	U	0.038	UJ	ug/L	SS
PEST	SW8081A	METHOXYCHLOR	63635	065GW004M1	63635002	WG	0.36	U	0.36	UJ	ug/L	SS
PEST	SW8081A	p,p'-DDD	63635	065GW004M1	63635002	WG	0.077	U	0.077	UJ	ug/L	SS
PEST	SW8081A	p,p'-DDE	63635	065GW004M1	63635002	WG	0.077	U	0.077	UJ	ug/L	SS
PEST	SW8081A	p,p'-DDT	63635	065GW004M1	63635002	WG	0.007	JP	0.007	J	ug/L	SS
PEST	SW8081A	TOXAPHENE	63635	065GW004M1	63635002	WG	2.4	U	2.4	UJ	ug/L	SS
SVOA	SW8270C	2,4-DINITROPHENOL	63529	065GW006M1	63529005	WG	50.5	U	50.5	UJ	ug/L	CC
SVOA	SW8270C	4-NITROANILINE	63635	065GW005M1	63635005	WG	50	U	50	UJ	ug/L	CC
SVOA	SW8270C	4-NITROPHENOL	63635	065GW005M1	63635005	WG	50	U	50	UJ	ug/L	CC
SVOA	SW8270C	4-NITROPHENOL	63635	065GW009M1	63635006	WG	50	U	50	UJ	ug/L	CC
SVOA	SW8270C	4-NITROPHENOL	63635	065HW009M1	63635007	WG	50	U	50	UJ	ug/L	CC
SVOA	SW8270C	BENZO(g,h,i)PERYLENE	63635	065GW004M1	63635002	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270C	BENZO(g,h,i)PERYLENE	63635	065GW005M1	63635005	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270C	BENZO(g,h,i)PERYLENE	63635	065GW009M1	63635006	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270C	BENZO(g,h,i)PERYLENE	63635	065HW009M1	63635007	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270C	Benzoic acid	63529	065GW006M1	63529005	WG	50.5	U	50.5	UJ	ug/L	IC

Attachment 1 - Changed Qualifiers and Results
Zone E, SWMU 65 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
SVOA	SW8270C	Benzyl alcohol	63635	065GW004M1	63635002	WG	10	U	10	UJ	ug/L	CC
SVOA	SW8270C	DIBENZ(a,h)ANTHRACENE	63635	065GW004M1	63635002	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270C	DIBENZ(a,h)ANTHRACENE	63635	065GW005M1	63635005	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270C	DIBENZ(a,h)ANTHRACENE	63635	065GW009M1	63635006	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270C	DIBENZ(a,h)ANTHRACENE	63635	065HW009M1	63635007	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270C	HEXACHLOROCYCLOPENTADIENE	63529	065GW006M1	63529005	WG	10.1	U	10.1	UJ	ug/L	CC
VOA	SW8260B	1,2-Dichloroethene (total)	63635	065GW003M1	63635001	WG	2.7	J	2.7	J	ug/L	SS
VOA	SW8260B	2-Chloroethyl vinyl ether	63529	065GW001M1	63529001	WG	10	U	10	UJ	ug/L	IC, CC
VOA	SW8260B	2-Chloroethyl vinyl ether	63529	065GW002M1	63529002	WG	10	U	10	UJ	ug/L	IC, CC
VOA	SW8260B	2-Chloroethyl vinyl ether	63529	065GW006M1	63529005	WG	10	U	10	UJ	ug/L	CC, IC
VOA	SW8260B	2-Chloroethyl vinyl ether	63635	065GW003M1	63635001	WG	10	U	10	R	ug/L	MS
VOA	SW8260B	2-Chloroethyl vinyl ether	63635	065GW004M1	63635002	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	2-Chloroethyl vinyl ether	63635	065GW04DM1	63635003	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	2-Chloroethyl vinyl ether	63635	065GW008M1	63635004	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	2-Chloroethyl vinyl ether	63635	065GW005M1	63635005	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	2-Chloroethyl vinyl ether	63635	065GW009M1	63635006	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	2-Chloroethyl vinyl ether	63635	065HW009M1	63635007	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	CHLOROETHANE	63529	065GW001M1	63529001	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	CHLOROETHANE	63529	065GW002M1	63529002	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	CHLOROETHANE	63529	065GW006M1	63529005	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	CHLOROMETHANE	63529	065GW001M1	63529001	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	CHLOROMETHANE	63529	065GW002M1	63529002	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	CHLOROMETHANE	63529	065GW006M1	63529005	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	cis-1,2-DICHLOROETHYLENE	63635	065GW003M1	63635001	WG	2.7	J	2.7	J	ug/L	SS
VOA	SW8260B	TRICHLOROETHYLENE (TCE)	63635	065GW003M1	63635001	WG	1.9	J	1.9	J	ug/L	SS
VOA	SW8260B	Vinyl acetate	63529	065GW001M1	63529001	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	Vinyl acetate	63529	065GW002M1	63529002	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	Vinyl acetate	63529	065GW006M1	63529005	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260B	VINYL CHLORIDE	63635	065GW003M1	63635001	WG	3.3	J	3.3	J	ug/L	SS

( )

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZE065-070202-01** page 1 of 2

Laboratory:	GEL		
Project Name:	Charleston Navy Complex	**Site Name:**	Zone E, SWMU 65
Project Number:	158814.PM.04	**TAT:**	standard
Project Manager:	Tom Beisel/ATL	**Level:**	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605		
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278		
Send Report To:	see last page of COC	**EDD:**	CNC format

Lab Batch/SDG:

	Sample ID (635299%)	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Pesticides (SW8081A) (2 - 1L amber)	VOCs (SW8260B) (3 - 40ml vial, HCl)	SVOCs (SW8270C) (2 - 1L amber)								Comments
01	065GW001M1	E065GW001			7/12/02 1205	WG	3		X									
02	065GW002M1	E065GW002			7/12/02 1400	WG	3		X									
	~~065GW003M1~~	~~E065GW003~~				~~WG~~			~~X~~									
	~~065GW003M1MS~~	~~E065GW003~~				~~WG~~			~~X~~									MS
	~~065GW003M1SD~~	~~E065GW003~~				~~WG~~			~~X~~									MSD
	~~065GW004M1~~	~~E065GW004~~				~~WG~~		~~X~~	~~X~~	~~X~~								
	~~065GW04DM1~~	~~E065GW04D~~				~~WG~~			~~X~~									
	~~065GW005M1~~	~~E065GW005~~				~~WG~~			~~X~~	~~X~~								
05	065GW006M1	E065GW006			7/12/02 1040	WG	5		X	X								
	~~065GW007M1~~	~~E065GW007~~				~~WG~~			~~X~~	~~X~~								
	~~065HW007M1~~	~~E065GW007~~				~~WG~~			~~X~~	~~X~~								
	065GW008M1	E065GW008				~~WG~~			~~X~~									
	~~065EW001M1~~	~~E065EW001~~				~~WQ~~		~~X~~	~~X~~	~~X~~								EB
03	065TW001M1	E065TW001			Lab Supplied	WQ	3	[redacted]	X									TB
	~~065TW003M1~~	~~E065TW002~~				~~WQ~~			~~X~~									
04	065EW001M1	E065EW001			7/12/02 1625	WG		X	X	X								RCRA Site

Crossed out samples, will be sampled next week

Sampled By: [redacted] Kim-Lee Murphy/Stan Eller Date/Time: 7/12/2002

Relinquished by: Stan Eller Date/Time: 7/12/02 @ 1717

Additional Samplers:

Received By Lab: J Mthaley Date/Time: 7/12/02 1717

Relinquished by: Date/Time

Received By: Date/Time

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks:

Temperature:

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZE065-070202-01** page 1 of 2

Laboratory:	GEL		
Project Name:	Charleston Navy Complex	**Site Name:**	Zone E, SWMU 65
Project Number:	158814.PM.04	**TAT:**	standard
Project Manager:	Tom Beisel/ATL	**Level:**	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605		
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278		
Send Report To:	see last page of COC	**EDD:**	CNC format

Lab Batch/SDG:

63635%

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Pesticides (SW8081A) 2 - 1L amber	VOCs (SW8260B) 3 - 40ml vial, HCl	SVOCs (SW8270C) 2 - 1L amber								Comments
~~065GW001M1~~	~~E065GW001~~			~~7/12/02 1205~~	~~WG~~	~~3~~		~~X~~									
~~065GW002M1~~	~~E065GW002~~			~~7/12/02 1400~~	~~WG~~	~~3~~		~~X~~									
065GW003M1	E065GW003			7-15-02/1527	WG	3		X									Samples
065GW003M1MS	E065GW003			7-15-02/1530	WG	3		X									MS complete
065GW003M1SD	E065GW003			7-15-02/1532	WG	3		X									MSD
002 065GW004M1	E065GW004			7/15/02 @ 1502	WG	7	X	X	X								
003 065GW04DM1	E065GW04D			7/15/02 @ 1706	WG	3		X									
005 065GW005M1	E065GW005			7-15-02/1605	WG	5		X	X								
~~065GW006M1~~	~~E065GW006~~			~~7/12/02 1040~~	~~WG~~	~~5~~		~~X~~	~~X~~								
006 065GW00~~7~~M1	009 E065GW00~~7~~ 009			7-16-02/0945	WG	5		X	X							*	well is now
007 065HW007M1	009 E065GW007 009			7-16-02/0950	WG	5		X	X							*	065GW 009
004 065GW008M1	E065GW008			7-15-02/1445	WG	3		X									
~~065EW001M1~~	~~E065EW001~~				~~WQ~~		~~X~~	~~X~~	~~X~~								EB
~~065TW001M1~~	~~E065TW001~~				~~WQ~~			~~X~~									~~TB~~
~~065TW003M1~~	~~E065TW003~~				~~WQ~~			~~X~~									RCRA Site

Crossed out Samples already brought to lab

Sampled By: Stan Ellis, A. O'Carver, A. Stokes Date/Time: 7-12 to 7-16-02

Relinquished by: [signature] Date/Time: 7/16/02 @ 1247

Additional Samplers: King Lee

Received By Lab: [signature] Date/Time: 7-16-02 1245

Relinquished by: Date/Time

Received By: Date/Time

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: Temperature

Data Validation Summary - Charleston Naval Complex - Zone E, SWMU 65

TO: Tom Wiley/CH2M HILL/ATL

FROM: Amy Juchem/CH2M HILL/GNA

Herb Kelly/CH2M HILL/GNA

DATE: October 17, 2002

The purpose of this memorandum is to present the results of the data validation process for the samples collected in Zone E, SWMU 65. The samples were collected on September 11, 2002.

The specific samples and analytical fractions reviewed are summarized below in Table 1.

The Quality Control areas that were reviewed and the resulting findings are documented within each subsection that follows. This data was validated for compliance with the analytical method requirements. This process also included a review of the data to assess the accuracy, precision, and completeness based upon procedures described in the guidance documents such as the Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review (EPA 1994) and National Functional Guidelines for Organic Data Review (EPA 1999)*. Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for the following analyses: SW-846 7196A Hexavalent Chromium, and Metals following SW-846 6010/7000 Series methodology.

Sample results that were not within the acceptance limits were appended with a qualifying flag, which consisted of a single- or double-letter code that indicated a possible problem with the data. The qualifying flags originated during the data review and validation processes. These also include the secondary, or the two-digit "sub-qualifier" flags. The secondary qualifiers provide the reasoning behind the assignment of a qualifier flag to the data. The secondary qualifiers are presented and defined below.

Attachment 1 lists the changes in data qualifiers, due to the validation process.

The following primary flags were used to qualify the data:

[=] Detected. The analyte was analyzed for and detected at the concentration shown.

[J] Estimated. The analyte was present but the reported value may not be accurate or precise.

[U] Undetected. The analyte was analyzed for but not detected above the method detection limit.

[UJ] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.

[R] Rejected. The data is not useable.

Secondary Data Validation Qualifiers

Code	Definition
2S	Second Source
BL	Blank
BD	Blank Spike/Blank Spike Duplicate or (LCS/LCSD) Precision
BS	Blank Spike/LCS
CC	Continuing Calibration Verification
DL	Dilution
FD	Field Duplicate
HT	Holding Time
IB	In-Between (metals - B's → J's)
IC	Initial Calibration
IS	Internal Standard
LD	Lab Duplicate
LR	Concentration exceeded Linear Range
MD	MS/MSD or LCS/LCSD Precision
MS	Matrix Spike/Matrix Spike Duplicate
OT	Other (see DV worksheet)
PD	Pesticide Degradation
PS	Post Spike
RE	Re-extraction/Re-analysis
SD	Serial Dilution
SS	Spiked Surrogate
TD	Total vs Dissolved
TN	Tune

Table 1 - Chemical Analytical Methods – Field and Quality Control Samples

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	LR Type	Date Collected	Total Metals SW6010B	Dissolved Metals SW6010B	Total Mercury SW7470A	Dissolved Mercury SW7470A	Total Hexavalent Chromium SW7196A	Dissolved Hexavalent Chromium SW7196A
66889	E065GW003	065GW003M2	66889001	WG	N		09/11/02					X	
66889	E065GW003	065GW003M2LR	1200298082	WG	LR	D	09/11/02					X	
66889	E065GW003	065GW003M2MS	1200298084	WG	MS		09/11/02					X	
66889	E065GW003	065GW003M2SD	1200300342	WG	SD		09/11/02					X	
66889	FIELDQC	065EW001M2	66889002	WQ	EB		09/11/02					X	
66889	E065GW001	065GW001M2	66889003	WG	N		09/11/02					X	
66889	E065GW002	065GW002M2	66889004	WG	N		09/11/02					X	
66889	E065GW004	065GW004M2	66889005	WG	N		09/11/02					X	
66889	E065GW04D	065GW04DM2	66889006	WG	N		09/11/02					X	
66889	E065GW005	065GW005M2	66889007	WG	N		09/11/02					X	
66889	E065GW006	065GW006M2	66889008	WG	N		09/11/02					X	
66889	E065GW009	065GW009M2	66889009	WG	N		09/11/02					X	
66889	E065GW009	065HW009M2	66889010	WG	FD		09/11/02					X	
66889	E065GW008	065GW008M2	66889011	WG	N		09/11/02					X	
66889	LABQC	1200298081	1200298081	WQ	LB							X	
66889	LABQC	1200298086	1200298086	WQ	BS							X	
66890	E065GW003	065GW003M2	66890001	WG	N		09/11/02						X
66890	E065GW003	065GW003M2LR	66890001	WG	LR	D	09/11/02						X

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	LR Type	Date Collected	Total Metals SW6010B	Dissolved Metals SW6010B	Total Mercury SW7470A	Dissolved Mercury SW7470A	Total Hexavalent Chromium SW7196A	Dissolved Hexavalent Chromium SW7196A
66890	E065GW003	065GW003M2MS	1200298085	WG	MS		09/11/02						X
66890	E065GW003	065GW003M2SD	1200300343	WG	SD		09/11/02						X
66890	FIELDQC	065EW001M2	66890002	WQ	EB		09/11/02						X
66890	E065GW001	065GW001M2	66890003	WG	N		09/11/02						X
66890	E065GW002	065GW002M2	66890004	WG	N		09/11/02						X
66890	E065GW004	065GW004M2	66890005	WG	N		09/11/02						X
66890	E065GW04D	065GW04DM2	66890006	WG	N		09/11/02						X
66890	E065GW005	065GW005M2	66890007	WG	N		09/11/02						X
66890	E065GW006	065GW006M2	66890008	WG	N		09/11/02						X
66890	E065GW009	065GW009M2	66890009	WG	N		09/11/02						X
66890	E065GW009	065HW009M2	66890010	WG	FD		09/11/02						X
66890	E065GW008	065GW008M2	66890011	WG	N		09/11/02						X
66890	LABQC	1200298081	1200298081	WQ	LB							X	
66890	LABQC	1200298086	1200298086	WQ	BS							X	
66902	E065GW003	065GW003M2	66902001	WG	N		09/11/02	X		X			
66902	E065GW003	065GW003M2MS	1200298835	WG	MS		09/11/02			X			
66902	E065GW003	065GW003M2SD	1200298836	WG	SD		09/11/02			X			
66902	E065GW003	065GW003M2MS	1200299109	WG	MS		09/11/02	X					
66902	E065GW003	065GW003M2SD	1200299110	WG	SD		09/11/02	X					
66902	FIELDQC	065EW001M2	66902002	WQ	EB		09/11/02	X		X			
66902	E065GW001	065GW001M2	66902003	WG	N		09/11/02	X		X			

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	LR Type	Date Collected	Total Metals SW6010B	Dissolved Metals SW6010B	Total Mercury SW7470A	Dissolved Mercury SW7470A	Total Hexavalent Chromium SW7196A	Dissolved Hexavalent Chromium SW7196A
66902	E065GW002	065GW002M2	66902004	WG	N		09/11/02	X		X			
66902	E065GW004	065GW004M2	66902005	WG	N		09/11/02	X		X			
66902	E065GW04D	065GW04DM2	66902006	WG	N		09/11/02	X		X			
66902	E065GW005	065GW005M2	66902007	WG	N		09/11/02	X		X			
66902	E065GW006	065GW006M2	66902008	WG	N		09/11/02	X		X			
66902	E065GW009	065GW009M2	66902009	WG	N		09/11/02	X		X			
66902	E065GW009	065HW009M2	66902010	WG	FD		09/11/02	X		X			
66902	E065GW008	065GW008M2	66902011	WG	N		09/11/02	X		X			
66902	LABQC	1200298834	1200298834	WQ	LB					X			
66902	LABQC	1200298837	1200298837	WQ	BS					X			
66902	LABQC	1200299107	1200299107	WQ	LB			X					
66902	LABQC	1200299111	1200299111	WQ	BS			X					
66903	E065GW003	065GW003M2	66903001	WG	N		09/11/02		X		X		
66903	E065GW003	065GW003M2MS	1200298839	WG	MS		09/11/02				X		
66903	E065GW003	065GW003M2SD	1200298840	WG	SD		09/11/02				X		
66903	E065GW003	065GW003M2MS	1200299120	WG	MS		09/11/02		X				
66903	E065GW003	065GW003M2SD	1200299121	WG	SD		09/11/02		X				
66903	FIELDQC	065EW001M2	66903002	WQ	EB		09/11/02		X		X		
66903	E065GW001	065GW001M2	66903003	WG	N		09/11/02		X		X		
66903	E065GW002	065GW002M2	66903004	WG	N		09/11/02		X		X		
66903	E065GW004	065GW004M2	66903005	WG	N		09/11/02		X		X		

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	LR Type	Date Collected	Total Metals SW6010B	Dissolved Metals SW6010B	Total Mercury SW7470A	Dissolved Mercury SW7470A	Total Hexavalent Chromium SW7196A	Dissolved Hexavalent Chromium SW7196A
66903	E065GW04D	065GW04DM2	66903006	WG	N		09/11/02		X		X		
66903	E065GW005	065GW005M2	66903007	WG	N		09/11/02		X		X		
66903	E065GW006	065GW006M2	66903008	WG	N		09/11/02		X		X		
66903	E065GW009	065GW009M2	66903009	WG	N		09/11/02		X		X		
66903	E065GW009	065HW009M2	66903010	WG	FD		09/11/02		X		X		
66903	E065GW008	065GW008M2	66903011	WG	N		09/11/02		X		X		
66903	LABQC	1200298838	1200298838	WQ	LB					X			
66903	LABQC	1200298841	1200298841	WQ	BS					X			
66903	LABQC	1200299118	1200299118	WQ	LB			X					
66903	LABQC	1200299122	1200299122	WQ	BS			X					

MATRIX CODE

WG – Groundwater
WQ – Water QC Samples

SAMPLE TYPE CODE

BS - Blank Spike
EB - Equipment Blank
FD - Field Duplicate
N - Native Sample
LB - Laboratory Blank
LR – Laboratory Replicate
MS - Matrix Spike
SD - Matrix Spike duplicate

LR TYPE CODE

D – Dilution

Inorganic Parameters

Quality Control Review

The following list represents the QA/QC measures that are typically reviewed during the data quality evaluation procedure for inorganic parameters.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Sample preparation, initial calibration blanks/continuing calibration blanks, and equipment blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", in which target parameters have been added prior to digestion/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **Pre/Post Digestion Spike (MS/MSD)** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **ICP Interference Check Sample** – This sample verifies the lab's interelement and background correction factors.
- **Initial Calibration Verification** – This parameter ensures that the instrument is capable of producing acceptable quantitative data for the target analyte list to be measured.
- **Continuing Calibration Verification** – This one-point, mid-range parameter establishes that the initial calibration is still valid by checking the performance of the instrument on a continual basis.
- **ICP Serial Dilution** – The serial dilution of samples quantitated by ICP determines whether or not significant physical or chemical interferences exist due to the sample matrix.

Metals Analyses

The QA/QC parameters for the Metals analyses for all of the samples were within acceptable control limits, except as noted below.

Blanks

The metals target parameters detected in blank samples are listed in Table 2.

TABLE 2
Blank Contamination: Metals
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

SDG	Sample ID	Lab Sample ID	Sample Type	Parameter	Lab Result	Units	Flag Concentrations less than the value listed below
66902	CCB		CCB	Barium	0.440	µg/L	2.2 µg/L
66902	CCB		CCB	Cadmium	0.374	µg/L	1.87 µg/L
66902	CCB		CCB	Chromium	0.895	µg/L	4.475 µg/L
66902	CCB		CCB	Lead	1.57	µg/L	7.85 µg/L
66902	CCB		CCB	Selenium	3.08	µg/L	15.4 µg/L
66902	CCB		CCB	Silver	1.72	µg/L	8.6 µg/L
66902	CCB		CCB	Zinc	1.90	µg/L	9.5 µg/L
66902	1200299107	1200299107	LB	Zinc	3.59	µg/L	17.95 µg/L
66902	065EW001M2	66902002	EB	Barium	0.221	µg/L	1.105 µg/L
66902	065EW001M2	66902002	EB	Cadmium	0.247	µg/L	1.235 µg/L
66902	065EW001M2	66902002	EB	Chromium	0.990	µg/L	4.95 µg/L
66902	065EW001M2	66902002	EB	Zinc	2.050	µg/L	10.25 µg/L
66903	CCB		CCB	Barium, dissolved	0.440	µg/L	2.2 µg/L
66903	CCB		CCB	Cadmium, dissolved	0.374	µg/L	1.87 µg/L
66903	CCB		CCB	Chromium, dissolved	0.895	µg/L	4.475 µg/L
66903	CCB		CCB	Lead, dissolved	1.57	µg/L	7.85 µg/L
66903	CCB		CCB	Selenium, dissolved	3.08	µg/L	15.4 µg/L
66903	CCB		CCB	Silver, dissolved	1.72	µg/L	8.6 µg/L
66903	CCB		CCB	Zinc, dissolved	1.90	µg/L	9.5 µg/L
66903	1200299118	1200299118	LB	Lead, dissolved	1.34	µg/L	6.7 µg/L
66903	065EW001M2	66903002	EB	Barium, dissolved	0.333	µg/L	1.665 µg/L

TABLE 2
Blank Contamination: Metals
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

SDG	Sample ID	Lab Sample ID	Sample Type	Parameter	Lab Result	Units	Flag: Concentrations less than the value listed below
66903	065EW001M2	66903002	EB	Chromium, dissolved	0.802	µg/L	4.01 µg/L
66903	065EW001M2	66903002	EB	Zinc, dissolved	2.270	µg/L	11.35 µg/L

If a target parameter determined to be a common contaminant was reported in a field sample, and the concentration was below the level determined to be due to blank contamination, the numeric result was unchanged, but it was flagged "U", as undetected.

The results qualified due to blank contamination are listed in Attachment 1.

Hexavalent Chromium Analyses

The QA/QC parameters for the Metals analyses for all of the samples were within acceptable control limits, except as noted below.

Blanks

The metals target parameters detected in blank samples are listed below.

- Hexavalent chromium was detected in sample 065EW001M2 (66889002) in SDG 66889 at 8 µg/L. Sample results less than or equal to 40 µg/L were qualified for blank contamination.

If a target parameter determined to be a common contaminant was reported in a field sample, and the concentration was below the level determined to be due to blank contamination, the numeric result was unchanged, but it was flagged "U", as undetected.:

The results qualified due to blank contamination are listed in Attachment 1.

Recoveries – PS/PSD and LCS

All Post Spike (PS), Post Spike Duplicate (PSD), and Laboratory Control Sample (LCS) recoveries and relative percent deviations (RPDs) were within acceptable quality control limits, except as noted in Table 3 below.

TABLE 3
PS/PSD and LCS Recoveries and RPDs Out of QC Limits: Metals
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

SDG	Sample	Parameter	Recovery	Recovery Limits	RPD	RPD Limits	Associated Samples	Flag
66889	065GW003M2 MS/SD	Hexavalent Chromium	11* / 13*	80-120			66889 - All	Detects-J, non-detects-R
66890	065GW003M2 MS/SD	Hexavalent Chromium, dissolved	29* / 22*	80-120	28*	20	66890 - All	Detects-J, non-detects-R

* - out of control limits

Rejected Data

There were selected results qualified as "R", rejected, due to associated QC parameters out of criteria. The rejected data are summarized in Table 4 below.

TABLE 4
Data Qualification Summary: Rejected Data
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

SDG	Sample ID	Parameter Class	Parameter	Lab Result	Lab Qual	Final Qual	Units	Validation Notes
66889	065GW003M2	GENCHEM	Hexavalent Chromium	50	U	R	ug/L	PS
66889	065GW001M2	GENCHEM	Hexavalent Chromium	10	U	R	ug/L	PS
66889	065GW004M2	GENCHEM	Hexavalent Chromium	10	U	R	ug/L	PS
66889	065GW04DM2	GENCHEM	Hexavalent Chromium	10	U	R	ug/L	PS
66889	065GW006M2	GENCHEM	Hexavalent Chromium	10	U	R	ug/L	PS
66889	065GW009M2	GENCHEM	Hexavalent Chromium	10	U	R	ug/L	PS
66889	065HW009M2	GENCHEM	Hexavalent Chromium	10	U	R	ug/L	PS
66889	065GW008M2	GENCHEM	Hexavalent Chromium	10	U	R	ug/L	PS
66890	065GW003M2	FLTMET	Hexavalent Chromium , Dissolved	10	U	R	ug/L	PS
66890	065GW004M2	FLTMET	Hexavalent Chromium , Dissolved	10	U	R	ug/L	PS
66890	065GW04DM2	FLTMET	Hexavalent Chromium , Dissolved	10	U	R	ug/L	PS
66890	065GW005M2	FLTMET	Hexavalent Chromium , Dissolved	10	U	R	ug/L	PS
66890	065GW006M2	FLTMET	Hexavalent Chromium , Dissolved	10	U	R	ug/L	PS

TABLE 4
Data Qualification Summary: Rejected Data
Charleston Naval Complex, Zone E, SWMU 65, Charleston, SC

SDG	Sample ID	Parameter Class	Parameter	Lab Result	Lab Qual	Final Qual	Units	Validation Notes
66890	065HW009M2	FLTMET	Hexavalent Chromium , Dissolved	10	U	R	ug/L	PS
66890	065GW008M2	FLTMET	Hexavalent Chromium , Dissolved	10	U	R	ug/L	PS

Conclusion

A review of the analytical data submitted regarding the investigation of Zone E, SWMU 65 at the Charleston Naval Complex, Charleston, South Carolina by CH2M HILL has been completed. An overall evaluation of the data indicates that the sample handling, shipment, and analytical procedures have been adequately completed, and that the analytical results should be considered usable as qualified.

As discussed above, there were specific results that were rejected, in which the data cannot be used. The laboratory reported poor matrix spike and matrix spike duplicate recoveries (less than 30%) for hexavalent chromium, indicating significant sample matrix interference. Due to lack of confidence in the reported values, a majority of the data was rejected, as per *EPA National Functional Guidelines*.

For the remainder of the analyses and results, the validation review demonstrated that the analytical systems were generally in control and the data can be used in the decision making process.

Attachment 1 - Changed Qualifiers and Results
Zone E, SWMU [illegible] Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
METAL	SW6010B	ANTIMONY	66902	065GW003M2	66902001	WG	30.7	B	30.7	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW003M2	66902001	WG	22.7	B	22.7	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW001M2	66902003	WG	17.4	B	17.4	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW002M2	66902004	WG	159	B	159	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW004M2	66902005	WG	27.4	B	27.4	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW04DM2	66902006	WG	37.3	B	37.3	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW005M2	66902007	WG	10.8	B	10.8	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW006M2	66902008	WG	12.6	B	12.6	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW009M2	66902009	WG	34	B	34	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065HW009M2	66902010	WG	31.6	B	31.6	J	ug/L	IB
METAL	SW6010B	BARIUM	66902	065GW008M2	66902011	WG	59.6	B	59.6	J	ug/L	IB
METAL	SW6010B	CADMIUM	66902	065GW003M2	66902001	WG	2.95	B	2.95	J	ug/L	IB
METAL	SW6010B	CHROMIUM, TOTAL	66902	065GW001M2	66902003	WG	0.624	B	0.624	U	ug/L	BL
METAL	SW6010B	CHROMIUM, TOTAL	66902	065GW04DM2	66902006	WG	0.598	B	0.598	U	ug/L	BL
METAL	SW6010B	CHROMIUM, TOTAL	66902	065GW006M2	66902008	WG	0.714	B	0.714	U	ug/L	BL
METAL	SW6010B	CHROMIUM, TOTAL	66902	065GW009M2	66902009	WG	0.671	B	0.671	U	ug/L	BL
METAL	SW6010B	CHROMIUM, TOTAL	66902	065HW009M2	66902010	WG	0.635	B	0.635	U	ug/L	BL
METAL	SW6010B	LEAD	66902	065GW002M2	66902004	WG	1.57	B	1.57	U	ug/L	BL
METAL	SW6010B	LEAD	66902	065GW005M2	66902007	WG	1.77	B	1.77	U	ug/L	BL
METAL	SW6010B	LEAD	66902	065GW006M2	66902008	WG	2.1	B	2.1	U	ug/L	BL
METAL	SW7470A	MERCURY	66902	065GW004M2	66902005	WG	0.086	B	0.086	J	ug/L	IB
METAL	SW6010B	SELENIUM	66902	065GW003M2	66902001	WG	3.38	B	3.38	U	ug/L	BL
METAL	SW6010B	ZINC	66902	065GW001M2	66902003	WG	2.36	B	2.36	U	ug/L	BL
METAL	SW6010B	ZINC	66902	065GW04DM2	66902006	WG	2.21	B	2.21	U	ug/L	BL
METAL	SW6010B	ZINC	66902	065GW005M2	66902007	WG	16.1	B	16.1	U	ug/L	BL
METAL	SW6010B	ZINC	66902	065GW006M2	66902008	WG	12.9	B	12.9	U	ug/L	BL
METAL	SW6010B	ZINC	66902	065GW009M2	66902009	WG	3.42	B	3.42	U	ug/L	BL
METAL	SW6010B	ZINC	66902	065GW008M2	66902011	WG	3.05	B	3.05	U	ug/L	BL
FLTMET	SW6010B	ANTIMONY, Dissolved	66903	065GW003M2	66903001	WG	28.2	B	28.2	J	ug/L	IB

Attachment 1 - Changed Qualifiers and Results
Zone E, SWMU 65 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
FLTMET	SW6010B	ARSENIC, Dissolved	66903	065GW008M2	66903011	WG	5.02	B	5.02	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW003M2	66903001	WG	9.14	B	9.14	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW001M2	66903003	WG	3.24	B	3.24	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW002M2	66903004	WG	137	B	137	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW004M2	66903005	WG	25.7	B	25.7	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW04DM2	66903006	WG	7.28	B	7.28	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW005M2	66903007	WG	4.93	B	4.93	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW006M2	66903008	WG	6.5	B	6.5	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW009M2	66903009	WG	14.9	B	14.9	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065HW009M2	66903010	WG	14.6	B	14.6	J	ug/L	IB
FLTMET	SW6010B	BARIUM, Dissolved	66903	065GW008M2	66903011	WG	34.3	B	34.3	J	ug/L	IB
FLTMET	SW6010B	CADMIUM, Dissolved	66903	065GW003M2	66903001	WG	0.889	B	0.889	U	ug/L	BL
FLTMET	SW6010B	CADMIUM, Dissolved	66903	065GW004M2	66903005	WG	0.252	B	0.252	U	ug/L	BL
FLTMET	SW6010B	CHROMIUM, TOTAL, Dissolved	66903	065GW001M2	66903003	WG	0.742	B	0.742	U	ug/L	BL
FLTMET	SW6010B	CHROMIUM, TOTAL, Dissolved	66903	065GW004M2	66903005	WG	8.31	B	8.31	J	ug/L	IB
FLTMET	SW6010B	CHROMIUM, TOTAL, Dissolved	66903	065HW009M2	66903010	WG	0.725	B	0.725	U	ug/L	BL
FLTMET	SW6010B	LEAD, Dissolved	66903	065GW001M2	66903003	WG	2.53	B	2.53	U	ug/L	BL
FLTMET	SW6010B	LEAD, Dissolved	66903	065GW002M2	66903004	WG	1.36	B	1.36	U	ug/L	BL
FLTMET	SW6010B	LEAD, Dissolved	66903	065GW005M2	66903007	WG	1.85	B	1.85	U	ug/L	BL
FLTMET	SW7470A	MERCURY, Dissolved	66903	065GW003M2	66903001	WG	0.041	B	0.041	J	ug/L	IB
FLTMET	SW6010B	ZINC, Dissloved	66903	065GW001M2	66903003	WG	1.89	B	1.89	U	ug/L	BL
FLTMET	SW6010B	ZINC, Dissloved	66903	065GW005M2	66903007	WG	6.47	B	6.47	U	ug/L	BL
FLTMET	SW6010B	ZINC, Dissloved	66903	065GW006M2	66903008	WG	2.42	B	2.42	U	ug/L	BL
FLTMET	SW6010B	ZINC, Dissloved	66903	065GW009M2	66903009	WG	1.28	B	1.28	U	ug/L	BL
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW003M2	66889001	WG	50	U	50	R	ug/L	PS
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW001M2	66889003	WG	10	U	10	R	ug/L	PS
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW002M2	66889004	WG	9	J	9	UJ	ug/L	BL,PS
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW004M2	66889005	WG	10	U	10	R	ug/L	PS
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW04DM2	66889006	WG	10	U	10	R	ug/L	PS

Attachment 1 - Changed Qualifiers and Results
Zone E, SWMU [illegible] Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW005M2	66889007	WG	6	J	6	UJ	ug/L	PS,BL
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW006M2	66889008	WG	10	U	10	R	ug/L	PS
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW009M2	66889009	WG	10	U	10	R	ug/L	PS
GENCHEM	SW7196A	Hexavalent Chromium	66889	065HW009M2	66889010	WG	10	U	10	R	ug/L	PS
GENCHEM	SW7196A	Hexavalent Chromium	66889	065GW008M2	66889011	WG	10	U	10	R	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW003M2	66890001	WG	10	U	10	R	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW001M2	66890003	WG	11	=	11	J	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW002M2	66890004	WG	6	J	6	J	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW004M2	66890005	WG	10	U	10	R	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW04DM2	66890006	WG	10	U	10	R	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW005M2	66890007	WG	10	U	10	R	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW006M2	66890008	WG	10	U	10	R	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW009M2	66890009	WG	6	J	6	J	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065HW009M2	66890010	WG	10	U	10	R	ug/L	PS
FLTMET	SW7196A	Hexavalent Chromium, Dissolved	66890	065GW008M2	66890011	WG	10	U	10	R	ug/L	PS

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory:	GEL
Project Name:	Charleston Navy Complex
Site Name:	Zone E, SWMU 65
Project Number:	158814.PM.04
TAT:	standard
Project Manager:	Tom Beisel/ATL
Level:	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278
Send Report To:	see last page of COC
EDD:	CNC format

Lab Batch/SDG: 66889%, 66890%, 66902%, 66903%

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	RCRA Metals (SW6010B/ 7000 series) * 0.5L HDPE	Dissolved RCRA Metals **	Hexavalent chromium (7196) 0.5L HDPE	Dissolved Hexavalent chromium **							Comments
065GW001M1	E065GW001			9-11-02 / 1435	WG	2	X	X	X	X							
065GW002M1	E065GW002			1440	WG	2	X	X	X	X							
065GW003M1	E065GW003			1150	WG	2	X	X	X	X							
065GW003M1MS	E065GW003			1150	WG	2	X	X	X	X							MS
065GW003M1SD	E065GW003			1150	WG	2	X	X	X	X							MSD
065GW004M1	E065GW004			1029	WG	2	X	X	X	X							
065GW04DM1	E065GW04D			1035	WG	2	X	X	X	X							
065GW005M1	E065GW005			1415	WG	2	X	X	X	X							
065GW006M1	E065GW006			1340	WG	2	X	X	X	X							
065GW009M1	E065GW009			0920	WG	2	X	X	X	X							
065HW009M1	E065GW009			0920	WG	2	X	X	X	X							
065GW008M1	E065GW008			0940	WG	2	X	X	X	X							
065EW001M1	E065EW001			1520	WQ	2	X	X	X	X							EB

RCRA complete

Sampled By: Darryl Gates / Andrew Olcomb Date/Time: 9-11-02 / as noted

Relinquished by: [signature] Date/Time: 9-11-02 / 1540

Additional Samplers:

Received By Lab: J M Hanley Date/Time: 9/11/02 1615

Relinquished by: Date/Time:

Received By: Date/Time:

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: * Lab - preserve once filtered aliquot removed. ** Lab to filter & preserve samples for dissolved parameters.

Temperature:

Reports

Receipt Exceptions: MONITORING WELL 065GW007 has bee ABANDONED, SAMPLED 065GW009 INSTEAD

Appendix G

Figure 6-1

Groundwater Sampling Form

Groundwater Sampling — Sample ID: NBCE065SG003

PROJECT NAME: Naval Base Charleston — JOB NO: 2905-08442 — DATE: 4-18-96

WELL NO.: NBCE/065-003 — LOCATION: Zone E

WEATHER CONDITIONS: Sunny, clear — AMBIENT TEMP: 80°

REVIEWED BY: M Post — PERSONNEL: A. Merrill, B. Blythe

PURGING DEVICE

Type device? Peristaltic Pump

How was the device decontaminated? Per CSAP

How was the line decontaminated? Per CSAP

Which well was previously purged? NBCE/065-040

SAMPLING DEVICE

Type device? Peristaltic Pump

How was the device decontaminated? Per CSAP

How was the line decontaminated? Per CSAP

Which well was previously sampled? NBCE/065-040

INITIAL WELL VOLUME

Well diameter (in.) 2

Stickup (ft.) FM

Depth to bottom of well from TOC (ft.) 12.31

Depth to water surface from TOC (ft.) 3.36

Length of water (ft.) 8.95

Volume of water (ft.)

(gal.) 1.43

Amount of sediment at bottom of well (ft.) —

3 Volumes of water (gal.) 4.29

PURGING

Time started 1334 — Finished 1420

Volume purged 7.0

Comments on Well Recovery Good

Depth to water (ft.) 4.19 - 5.63

Completion Yes

Additional Comments Org. stain (blk/brn) strange odor?

Sample Collected: Start 1430

Finish 1510

IN-SITU TESTING

Time:	1341	1345	1350	1352	1356	1409	1412
	1	2	3	4	5	6	7
Well Volume Purged (gal.)	.75	1.5	2.5	3.0	4.0	5.0	7.0
Turbidity	142	166	288	240	247	191	295
Odor	Pungent odor	"	"	"	"	"	"
pH (units)	9.33	9.36	9.37	9.30	9.31	9.31	9.20
Conductivity (µmho)	1.10	.93	.856	.854	.893	.885	.882
Water Temperature (°C)	21.8	23.1	22.6	22.0	21.9	20.0	21.9
Depth to water (ft.)	4.19	4.95	5.22	5.20	5.35	5.58	5.63

NOTES: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. — 1 ft. length 2" = 0.022 ft³ or 0.16 gal.
Turbidity choices: clear, turbid, opaque — Revision Date: 8/5/92

Figure 6-1

Groundwater Sampling Form

Groundwater Sampling — Sample ID: 065-004

PROJECT NAME: Naval Base Charleston — JOB NO: 2905-08490 — DATE: 4-17-96

WELL NO.: NBCE/0656 HW MW00401 — LOCATION: Zone E

WEATHER CONDITIONS: Sunny; warm — AMBIENT TEMP: 95° F

REVIEWED BY: — PERSONNEL: H Sukes D. Hooks

PURGING DEVICE

Type device? PERISTALTIC PUMP

How was the device decontaminated? PER CSAP

How was the line decontaminated? PER CSAP

Which well was previously purged? 065-004

SAMPLING DEVICE

Type device? PERISTALTIC PUMP

How was the device decontaminated? PER CSAP

How was the line decontaminated? PER CSAP

Which well was previously sampled? NA 1st Rd.

INITIAL WELL VOLUME

Well diameter (in.) 2

Stickup (ft.)

Depth to bottom of well from TOC (ft.) 12.27

Depth to water surface from TOC (ft.) 3.25

Length of water (ft.) 9.02

Volume of water (ft.)

(gal.) 1.53

Amount of sediment at bottom of well (ft.)

3 Volumes of water (gal.) 4.59

PURGING

Time started 1234 — Finished 1332

Volume purged 5.0 gal

Comments on Well Recovery FAIR

Depth to water (ft.) 3.25

Completion 5.91

Additional Comments Tea color stain, to purge H_2O Duplicate Sample taken

Sample Collected: Start 1335

Finish 1450

IN-SITU TESTING

Time:	1246	1253	1306	1316	1325	1331	
	1	2	3	4	5	6	7
Well Volume Purged (gal.)	.5	1.0	2.0	3.0	4.0	5.0	
Turbidity	29	8	6	4	3	4	
Odor	None	None	None	None	None	None	
pH (units)	6.56	7.36	7.48	7.53	7.48	7.46	
Conductivity (mho)	.434	.311	.319	.398	.365	.374	
Water Temperature (°C)	22.0	21.4	21.4	21.3	21.4	21.0	
Depth to water (ft.)	5.20	5.16	5.32	5.69	5.92	5.91	

NOTES: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. — 1 ft. length 2" = 0.022 ft³ or 0.16 gal.
Turbidity choices: clear, tubid, opaque — Revision Date: 8/5/92

Appendix H

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: Sam Naik/CH2M-Jones
(770) 604-9182 ext. 255

Date: June 13, 2003

Re: CH2M-Jones' Responses to Comments by EPA regarding the *RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Revision 0*

Quantity	Description
4	CH2M-Jones' Responses to Comments by EPA regarding the *RFI Report Addendum and CMS Work Plan, Combined SWMU 65, Zone E, Revision 0* – Originally Submitted on April 14, 2003

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

Remarks:

Copy To:

Tim Frederick/Gannett Fleming, Inc., w/att
Dann Spariosu/USEPA, w/att
Rob Harrell/Navy, w/att
Gary Foster/CH2M-Jones, w/att

General Comment

1. The RFI Report Addendum and CMS Work Plan for Combined SWMU 65, Zone E appears to be complete with the exceptions noted in the Specific Comments below.

Specific Comments

1. Section 5.3.10, Page 5-8.

   This section states that copper concentrations detected in shallow groundwater did not exceed the TTAL for copper of 1,300 μg/L. However, Table 5-3 lists the value cited of 1,300 μg/L as being the MCL for copper. It is assumed that the TTAL is being used in a similar manner as the MCL. However, the text should be re-written to define and clarify the use of a TTAL as a screening value. A reference for the TTAL values should also be provided.

   CH2M-Jones Response:
   The text in Revision 1 of this report will be revised to clarify that since no primary MCL exists for copper, the screening value used to compare the groundwater detections of copper is the TTAL of 1,300 μg/L. Table 5-3 will also be updated to clarify this screening value, and a footnote will be included to indicate the EPA reference document which presents this value.

2. Section 5.3.12, Page 5-9.

   This section discusses the consideration of dioxin as a COC in shallow groundwater based on the detection of TEQs exceeding the appropriate RBC. The calculated TEQ values are not presented in this section. These values are presented in previous sections. However, for clarity, the concentrations should also be included in the text of this section.

   CH2M-Jones Response:
   The range of TEQ detections will be included in the Revision 1 text.

3. Section 5.3.13, Page 5-10.

   The text appears to interchange the terms TTAL and MCL throughout this section. It is assumed from this section that both the TTAL and MCL, are in fact, one and the same. The text should be re-written to clarify which comparison level is being used, and references should be provided for the source of the values used.

   CH2M-Jones Response:
   The text in this section will be revised to replace the acronym MCL (which was inadvertently used), with the acronym TTAL.

4. Section 5.3.15, Page 5-11.

   The text discusses the identification of TCE as a deep groundwater COC in the RFI report due to its detection above the MCL in samples collected from the first two sampling events. The text notes that TCE concentrations in the last three sampling

events were below the MCL. Despite these results, TCE was retained as a COC for deep groundwater. For purposes of clarification, the rationale for retaining TCE as a COC should be presented in this section.

CH2M-Jones Response:
It appears that the TCE concentrations in shallow and deep groundwater have diminished to levels below the MCL in recent sampling events, after exceeding the MCL in historic RFI sampling events. Additionally, vinyl chloride, which is a degradation product of TCE, was detected in the groundwater samples from shallow well E065GW003 and deep well E065GW04D, in the last sampling event conducted during July 2002, indicating the likelihood of a small source area of TCE which may have undergone natural attenuation. TCE has been retained as a COC in shallow and deep groundwater so that additional sampling can be done to verify if a low-level source area of TCE or vinyl chloride still exists. If additional sampling indicates the absence of TCE or vinyl chloride above their respective MCLs, TCE and vinyl chloride may be dropped from the groundwater COC list for this site.

5. Section 6.4, Page 6-2.

This section states that PAHs were detected in the sample from boring LE699GP106, and the PAH detections do not appear to indicate a connection with operations at the site. The section then indicates that the detection of these PAHs may be related to the previous observance of a small amount of LNAPL during installation of well E065W006, located approximately 17 feet from boring LE699GP106. The text states that BTEX , which commonly occur with significant fuel releases, were not detected at LE699GP106, and this indicates that a hydrocarbon release capable of creating a significant mobile plume is not likely present. The text in this section needs to further clarify the potential source of the previously observed LNAPL, if it is not from the former UST, why the LNAPL was only observed during well installation activities, and the source of the PAHs.

CH2M-Jones Response:
It is unclear from the available information what the source of the free product observed during the installation of the monitoring well E065GW006 is. This area of Zone E has undergone heavy industrial use over several decades, with some of the older buildings being replaced by newer structures, and it is likely that a minor petroleum spill may have occurred during redevelopment. Additionally, historic Public Works maps of the area indicate the presence of railroad tracks in this area during the 1930s and later. There was also an aboveground storage tank (AST) formerly located at the site to store diesel and this could potentially have been the source of this petroleum stain in the subsurface soil. This information will be added to the text to indicate the possible source of this PAH contamination.