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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT
ADDENDUM AREA OF CONCERN 567 (AOC 567) ZONE E CNC CHARLESTON SC
5/1/2002
CH2M HILL

RFI REPORT ADDENDUM

Area of Concern 567. Zone E



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

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

CH2M-Jones

May 2002

Contract N62467-99-C-0960

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June 4, 2002

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

Re: RFI Report Addendum (Revision 0) – AOC 567, Zone E

Dear Mr. Scaturo:

Enclosed are four copies of the RFI Report Addendum (Revision 0) for AOC 567 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 contact him at 770/604-9182, extension 255, should you have any questions or comments.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read "Dean Williamson".

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att
Tim Frederick/Gannett-Fleming, Inc.

RFI REPORT ADDENDUM

Area of Concern 567, Zone E



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

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

PREPARED BY
CH2M-Jones

May 2002

*Revision 0
Contract N62467-99-C-0960
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6 **A Excerpts from the *Zone E RFI Report, Revision 0***

7 **B Responses to SCDHEC Comments for AOC 567 from the *Zone E RFI Report,***

8 ***Revision 0***

1 **Acronyms and Abbreviations**

2	AOC	area of concern
3	AST	aboveground storage tank
4	BCT	BRAC Cleanup Team
5	BRAC	Base Realignment and Closure Act
6	BRC	background reference concentration
7	CA	corrective action
8	CMS	corrective measures study
9	CNC	Charleston Naval Complex
10	COC	chemical of concern
11	COPC	chemical of potential concern
12	CSI	confirmatory sampling investigation
13	DAF	dilution attenuation factor
14	EnSafe	EnSafe Inc.
15	EPA	U.S. Environmental Protection Agency
16	FRE	fixed-point risk evaluation
17	HI	hazard index
18	IM	interim measure
19	LUC	land use control
20	$\mu\text{g}/\text{L}$	micrograms per liter
21	MCL	maximum contaminant level
22	NAVBASE	Naval Base
23	NFA	no further action

1 **Acronyms and Abbreviations, Continued**

2	NFI	no further investigation
3	OWS	oil/water separator
4	PCB	polychlorinated biphenyl
5	PCE	tetrachloroethene
6	RBC	risk-based concentration
7	RCRA	Resource Conservation and Recovery Act
8	RFI	RCRA Facility Investigation
9	SCDHEC	South Carolina Department of Health and Environmental Control
10	SSL	soil screening level
11	SVOC	semivolatile organic compound
12	SWMU	solid waste management unit
13	TDS	total dissolved solids
14	UST	underground storage tank
15	VOC	volatile organic compound

Section 1.0

1 1.0 Introduction

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

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

11 In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation
12 and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to
13 complete the RCRA Facility Investigation (RFI) for Area of Concern (AOC) 567 in Zone E of
14 CNC. The location of this site in Zone E is shown in Figure 1-1. Figure 1-2 shows an aerial
15 photograph of the site.

16 AOC 567 is Building 75, an inactive electrical substation that was constructed in 1942.
17 Building 75 is a single-story structure with a concrete slab floor. An outdoor substation was
18 installed some time after 1984 on the southern side of the building and provides power to
19 the Dry Dock area. The indoor substation is inactive, but contains several high-voltage
20 switches, breakers, and transformers. A battery bank in the southeast corner of the building
21 provided emergency power for the facility. Old switches and breakers are stored in the
22 north end of the building.

23 Materials of concern identified in the *Final Zone E RFI Work Plan, Revision 1* (EnSafe Inc.
24 [EnSafe]/Allen & Hoshall, 1995) include PCBs, lead, and acids. This area of Zone E is
25 zoned M2 (industrial). The CNC RCRA Permit identified AOC 567 as requiring a
26 Confirmatory Sampling Investigation (CSI).

27 The RFI was initially conducted by the Navy/EnSafe team. The RFI activities were
28 documented in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). A regulatory review was
29 conducted on this document and a draft response to the comments from SCDHEC were
30 prepared by the Navy/EnSafe team.

1.1 Purpose of the RFI Report Addendum

The purpose of this RFI Report Addendum is to document the results of previous RFI investigations conducted by the Navy/EnSafe team at AOC 567. This RFI Report Addendum also discusses various closeout issues and the findings of previous investigations, existing site conditions, and the surrounding area land use.

1.2 Report Organization

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

1.0 Introduction – Presents the purpose of the report and background information relating to the site.

2.0 Summary of RFI Conclusions for AOC 567 – Summarizes the conclusions from the RFI and risk evaluations for AOC 567 as presented in the RFI report.

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

4.0 Summary of Additional Investigations – Summarizes any information collected after completion of the RFI report.

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 BRAC Cleanup Team (BCT) agreed to evaluate prior to site closeout.

7.0 Recommendations – Provides recommendations for proceeding with site closure.

8.0 References – Lists the references used in this document.

Appendix A – Contains excerpts from the RFI report, including a summary of detections of chemicals and a groundwater flow map for the site vicinity.

Appendix B – Contains responses to SCDHEC comments for AOC 567 from the RFI report.



-  Railroads
-  Fence
-  Roads
-  AOC Boundary
-  SWMU Boundary
-  Buildings

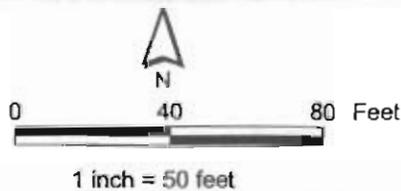


Figure 1-2
Site Map
AOC 567, Zone E
Charleston Naval Complex

2.0 Summary of RFI Conclusions for AOC 567

This section summarizes the results and conclusions from the soil and concrete surface investigations conducted at AOC 567 which were reported in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). Figure 2-1 shows soil and concrete surface sampling locations.

As part of the Zone E RFI, soil and concrete surface investigations were conducted at AOC 567 during 1995. The RFI report presented the results of these investigations and conclusions concerning contamination and risk, as summarized in the following sections. A further evaluation of COCs at this site is provided in Section 5.0.

2.1 Soil Sampling and Analysis

Soil sampling at AOC 567 involved the collection and analysis of four surface soil and three subsurface soil samples from locations under concrete and asphalt pavement. Figure 2-1 shows the RFI sampling locations. All samples were analyzed for metals, PCBs, and pH. These boring locations were identified as E567SB001 through E567SB004. No duplicate samples were collected at this site.

2.1.1 Surface Soil

During the RFI, 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). PCB results were compared to industrial land use criteria.

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

- **Inorganics:** No inorganic detections exceeded the screening criteria in surface soils.
- **PCBs:** There were no detections of PCBs above screening criteria in surface soils.
- **pH:** pH values ranged from 8.34 to 8.47.

2.1.2 Subsurface Soil

During the RFI, subsurface soil detections of inorganic compounds were compared with generic SSLs (using a DAF=10) and the Zone E BRCs. PCB results were compared to industrial land use criteria.

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

- 3 • **Inorganics:** No inorganic detections exceeded the screening criteria in subsurface soils.
- 4 • **PCBs:** There were no PCB detections above laboratory detection limits in subsurface soil
5 samples from AOC 567.
- 6 • **pH:** pH values ranged from 7.98 to 8.86.

7

8 **2.2 Wipe Samples**

9 The RFI investigation for AOC 567 consisted of four wipe samples collected from concrete
10 surfaces. Sample locations were selected in the field based on locations of PCB-containing
11 equipment and visual evidence of spills and leaks. The wipe samples were analyzed for
12 PCBs. No PCBs were detected above laboratory detection limits.

13 **2.3 RFI Human Health Risk Assessment**

14 The RFI report used a fixed-point risk evaluation (FRE) approach at this site, which
15 considered site resident and site worker scenarios. The detailed risk assessment for the
16 AOC 567 site is presented in Sections 10.33.6.2 and 10.33.6.3 of the RFI report.

17 **2.3.1 Soils**

18 The FRE did not identify any COCs in surface or subsurface soil at AOC 567.

19 **2.3.2 Wipe Samples**

20 The FRE did not address wipe samples at AOC 567.

21 **2.4 RFI Conclusions and Recommendations**

22 The RFI report identified no COCs at AOC 567 and recommended no corrective measures.

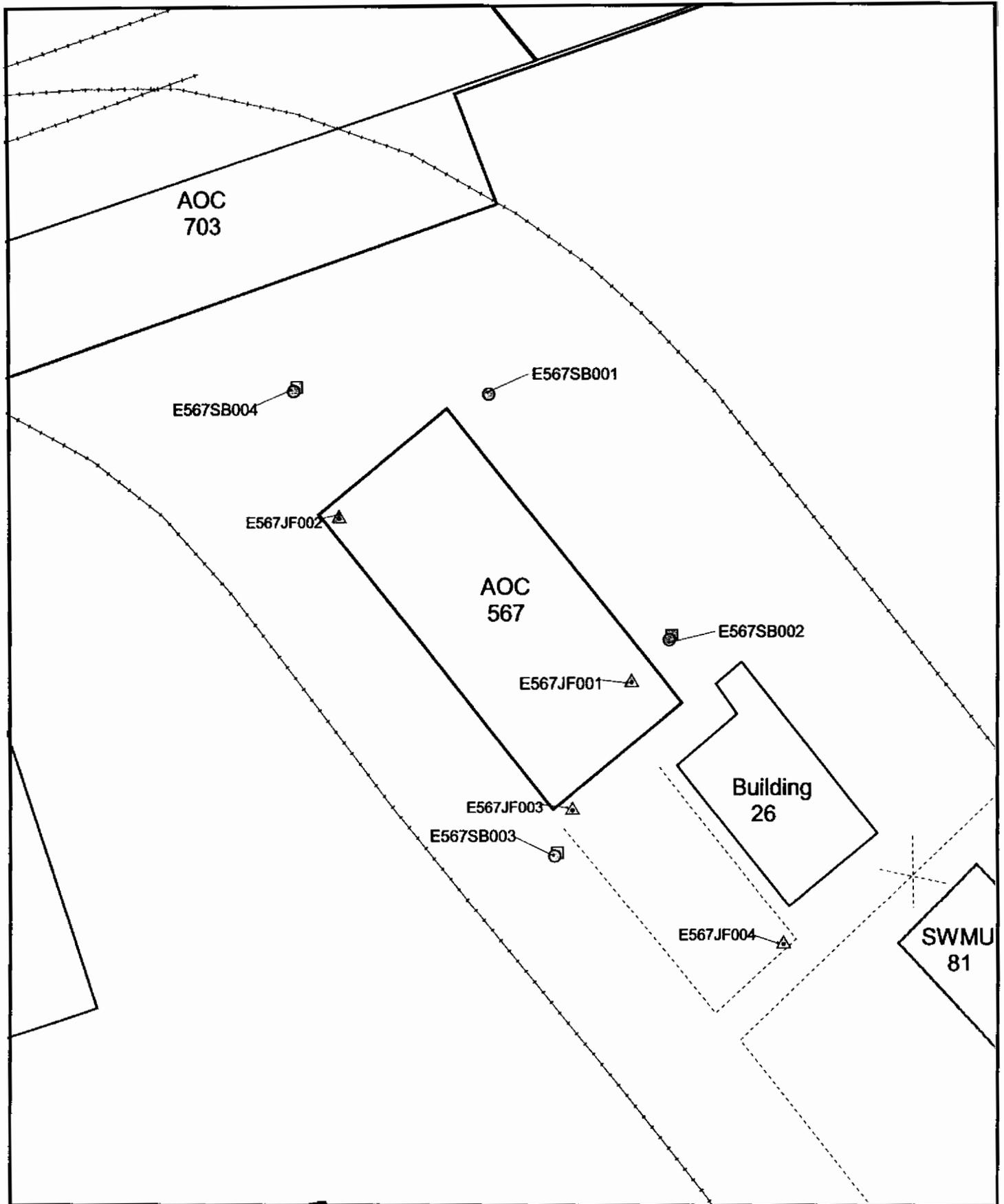


Figure 2-1
RFI Sample Locations
AOC 567, Zone E
Charleston Naval Complex

1 **3.0 Summary of Interim Measures and UST/AST**
2 **Removals at AOC 567**

3 **3.1 UST/AST Removals**

4 There is no indication of a UST being present at this site. An abandoned AST was observed
5 at the northwest corner of Building 75 during a site visit conducted by CH2M-Jones as part
6 of the Environmental Baseline Survey during 1993.

7 **3.2 Interim Measures**

8 There were no IMs conducted at the site.

1 **4.0 Summary of Additional Investigations**

- 2 No additional investigations have been conducted at AOC 567 since the RFI field
- 3 investigations conducted by EnSafe during 1995.

1 **5.0 COPC/COC Refinement**

- 2 The *Zone E RFI Report, Revision 0* (EnSafe, 1997) did not identify any COCs for the soil and
3 concrete wipe samples collected at AOC 567, based on the industrial land use scenario.

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 AOC 567.

In accordance with the RFI completion process, if a determination of No Further Investigation (NFI) is made upon completion of the RFI, then a site may proceed to either NFA status or to a CMS. The RFI for AOC 567 identified no COCs for surface or subsurface soil. Based on the RFI conclusion and discussion presented in Section 5 above, there are no COCs present at AOC 567; therefore, no further investigation or active corrective measures are needed.

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.

Groundwater was not a media of concern in the RFI investigation for AOC 567. Further evaluation of this issue is not warranted.

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

There are no data suggesting that there was an impact to the sanitary sewers from this site. Therefore, further evaluation of this issue is not warranted.

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

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

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

The nearest existing railroad line to AOC 567 is approximately 20 feet west of the site. There is no known linkage between AOC 567 and the investigated railroad lines of AOC 504; therefore, further evaluation of this issue is not warranted.

6.6 Potential Migration Pathways to Surface Water Bodies at the CNC

The nearest surface water body to AOC 567 is the Cooper River, which lies approximately 50 feet northeast of the site. The only potential migration pathway from the site to surface water is via overland flow via stormwater runoff. The entire site is covered with buildings and pavement, which eliminates contact of surface soil with stormwater. Similarly, runoff directed to the storm sewer system, which discharges to the Cooper River, does not contact the surface soil. Since no COCs requiring further evaluation are present at this site, no further evaluation of a potential pathway for contaminant migration via stormwater runoff is warranted.

The groundwater is not a media of concern at this unit; consequently, the potential for groundwater contamination associated with AOC 567 to enter the Cooper River is not likely. Therefore, further evaluation of potential migration of contaminated groundwater to a surface water body is not warranted.

6.7 Potential Contamination in Oil/Water Separators

There are no oil/water separators (OWSs) associated with AOC 567. In addition, there is no reference to an OWS at the site in the *Oil Water Separator Data* report, Department of the Navy, September 2000. Therefore, further evaluation of this issue is not warranted.

1 **6.8 Land Use Control**

2 The CNC BCT has agreed that all of Zone E will have at least some land use controls (LUCs)
3 and restrictions. At a minimum, these LUCs are likely to include restrictions against
4 residential land use. Site-specific LUCs are also expected to be required at specific sites
5 within Zone E, depending on the results of the site-specific investigations.

6 No COCs were identified for the industrial use scenario. LUCs will be applied to limit
7 reuse of this site to industrial use.

8

1 **7.0 Recommendations**

2 AOC 567 is Building 75, an inactive electrical substation that was constructed in 1942.
3 Building 75 is a single-story structure with a concrete slab floor. An outdoor substation was
4 installed some time after 1984 on the southern side of the building and provides power to
5 the dry dock area. The indoor substation is inactive, but contains several high-voltage
6 switches, breakers and transformers. A battery bank in the southeast corner of the building
7 provided emergency power for the facility. Old switches and breakers are stored in the
8 north end of the building.

9 The CNC RCRA Permit identified AOC 567 as requiring a CSI.

10 The *Zone E RFI Report, Revision 0* (EnSafe, 1997) identified no COCs in surface and
11 subsurface soil or concrete surfaces at AOC 567, based on an industrial land use scenario
12 and recommended no corrective measures. Therefore, this site is suitable for continued
13 industrial reuse without an active corrective measures. LUCs to limit site use to industrial
14 will be implemented as part of the overall Zone E LUCs.

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

1 **8.0 References**

- 2 EnSafe Inc. *Zone E RFI Report, Revision 0, NAVBASE Charleston. 1997.*
- 3 EnSafe Inc./Allen & Hoshall. *Final RCRA Facility Assessment, NAVBASE Charleston. July*
4 *1995.*
- 5 EnSafe Inc./Allen & Hoshall. *Final Zone E RFI Work Plan, Revision 1, NAVBASE Charleston.*
6 *June 1995.*
- 7 South Carolina Department of Health and Environmental Control, *Final RCRA Part B*
8 *Permit No. SC0 170 022 560.*

**Chemicals Detected in Zone E Soil Samples
AOC 567**

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
<i>Polychlorinated Biphenyls (ug/kg)</i>						
Aroclor-1260	567SB001	58.10	NS	83	NA	NA
	567SB002	53.40	ND			
	567SB003	25.90	ND			
<i>Inorganic Compounds (mg/kg)</i>						
Aluminum (Al)	567SB001	2940.00	NS	7800	28000	41100
	567SB002	3510.00	4780.00			
	567SB003	5300.00	6920.00			
	567SB004	1650.00	1160.00			
Antimony (Sb)	567SB001	6.70	NS	3.1	1.77	1.6
	567SB002	3.90	ND			
	567SB003	0.97	ND			
Arsenic (As)	567SB001	7.20	NS	0.43	23.9	19.9
	567SB002	5.40	5.10			
	567SB003	4.10	9.60			
	567SB004	3.90	5.80			
Barium (Ba)	567SB001	25.70	NS	550	130	94.1
	567SB002	41.90	29.30			
	567SB003	39.20	32.70			
	567SB004	12.60	16.20			
Beryllium (Be)	567SB001	0.33	NS	0.15	1.7	2.71
	567SB002	0.31	0.38			
	567SB003	0.31	0.60			
	567SB004	0.25	0.50			
Cadmium (Cd)	567SB001	0.71	NS	3.9	1.5	0.96
	567SB002	0.29	NS			
	567SB003	0.30	NS			
	567SB004	ND	0.18			
Calcium (Ca)	567SB001	29900.00	NS	NA	NA	NA
	567SB002	20800.00	6180.00			
	567SB003	5580.00	14900.00			
	567SB004	18500.00	120000.00			
Chromium (Cr)	567SB001	27.10	NS	39	94.6	75.2
	567SB002	9.40	11.80			
	567SB003	78.60	21.60			
	567SB004	5.90	5.40			
Cobalt (Co)	567SB001	2.00	NS	470	19	14.9
	567SB002	1.40	1.20			
	567SB003	1.20	2.90			
	567SB004	11.20	2.80			
Copper (Cu)	567SB001	127.00	ND	310	66	152
	567SB002	39.40	9.30			
	567SB003	68.30	69.10			
	567SB004	5.70	2.00			
Iron (Fe)	567SB001	9730.00	NS	2300	NA	NA
	567SB002	6350.00	8860.00			
	567SB003	5050.00	12100.00			
	567SB004	4930.00	3280.00			
Lead (Pb)	567SB001	135.00	NS	400	265	173
	567SB002	81.30	34.20			

**Chemicals Detected in Zone E Soil Samples
AOC 587**

Name	ID	Surface Conc.	Subsurface Conc.	RBC (THQ=.1)	Surface UTL	Subsurface UTL *
	567SB003	98.70	214.00			
	567SB004	26.40	6.00			
Magnesium (Mg)	567SB001	535.00	NS	NA	NA	NA
	567SB002	737.00	653.00			
	567SB003	819.00	2120.00			
	567SB004	570.00	786.00			
Manganese (Mn)	567SB001	82.70	NS	180	302	881
	567SB002	90.80	65.60			
	567SB003	108.00	201.00			
	567SB004	82.80	105.00			
Mercury (Hg)	567SB001	0.18	NS	2.3	2.6	1.59
	567SB002	0.11	0.03			
	567SB003	0.06	0.04			
Nickel (Ni)	567SB001	7.30	ND	160	77.1	57
	567SB002	4.20	2.20			
	567SB003	4.80	6.30			
	567SB004	7.40	1.80			
Potassium (K)	567SB002	835.00	864.00	NA	NA	NA
	567SB003	ND	1530.00			
	567SB004	762.00	851.00			
Silver (Ag)	567SB004	0.43	ND	39	NA	NA
Sodium (Na)	567SB001	273.00	NS	NA	NA	NA
	567SB002	304.00	283.00			
	567SB003	278.00	567.00			
	567SB004	392.00	1200.00			
Tin (Sn)	567SB001	4.00	NS	4700	59.4	9.23
	567SB003	4.00	5.50			
	567SB004	ND	2.10			
Vanadium (V)	567SB001	6.60	NS	55	94.3	155
	567SB002	9.80	10.40			
	567SB003	7.80	20.30			
	567SB004	7.00	5.60			
Zinc (Zn)	567SB001	426.00	NS	2300	827	886
	567SB002	144.00	61.00			
	567SB003	369.00	192.00			
	567SB004	31.30	19.30			

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.

Response To SCDHEC Comments on AOC 567 of the
Zone E RCRA Facility Investigation Report, Revision 0 (EnSafe, 1997)
Charleston Naval Complex
North Charleston, SC

CHARLES B. WATSON COMMENTS

SITE-SPECIFIC COMMENTS

SCDHEC Comment 20:

Arsenic, antimony, beryllium, and chromium were detected in soil above their residential RBC values. The vertical and horizontal extent of contamination needs to be determined.

Navy/EnSafe Response:

Arsenic, beryllium, and chromium were addressed in the site-specific risk assessment which identified the fact that each of these elements were well below their respective background reference concentrations. Antimony was above its residential RBC and background reference concentration, however, it was well below its industrial RBC.

CH2M-Jones Response:

No further response.