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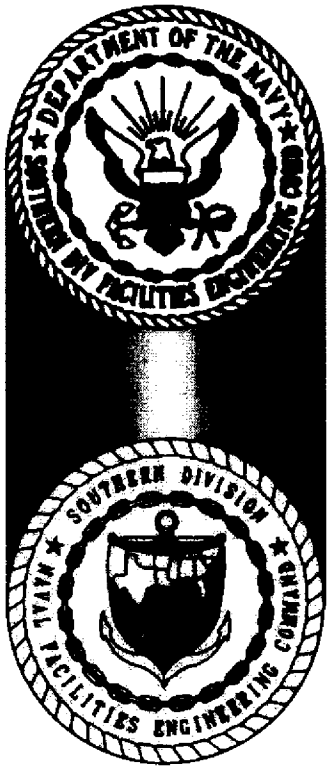
RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT ADDENDUM AREA OF CONCERN 558 (AOC 558) ZONE E CNC CHARLESTON SC

7/2/2002

CH2M HILL

RFI REPORT ADDENDUM

Area of Concern 558, Zone E



Charleston Naval Complex
North Charleston, South Carolina

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

CH2M-Jones

July 2002

Contract N62467-99-C-0960

CH2M HILL
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CH2MHILL

July 2, 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 558, Zone E

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum (Revision 0) for AOC 558 in Zone E of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

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

Sincerely,

CH2M HILL

Dean Williamson, P.E.

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

RFI REPORT ADDENDUM

Area of Concern 558, Zone E

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

July 2002

Revision 0
Contract N62467-99-C-0960
158814.ZE.PR.01

Certification Page for RFI Report Addendum (Revision 0) – AOC 558, 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.

7/1/2002

Date

Contents

Contents, Continued

Acronyms and Abbreviations

AOC	area of concern
AST	aboveground storage tank
BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure Act
CA	corrective action
CMS	corrective measures study
CNC	Charleston Naval Complex
COC	contaminant of concern
COPC	contaminant of potential concern
CSI	Corrective Study Investigation
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
HHRA	Human Health Risk Assessment
HI	hazard index
IM	interim measure
LUC	land use control
MCL	maximum contaminant level
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
NAVBASE	Naval Base
NFA	no further action
NFI	no further investigation
OWS	oil/water separator
PCB	polychlorinated biphenyl
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control

Acronyms and Abbreviations, Continued

SVOC	semivolatile organic compound
SWMU	solid waste management unit
TCE	trichloroethene
VOC	volatile organic compound
UST	underground storage tank

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 RCRA Part B 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 Area of Concern (AOC) 558 in Zone E of the CNC. The location of AOC 558 in Zone E is shown in Figure 1-1. Figure 1-2 shows an aerial photograph of AOC 558.

AOC 558 consists of an electrical substation in Building 77. Building 77 is located in the working area between Dry Dock No. 1 and Dry Dock No. 2 in Zone E of the CNC. Building 77 is a two-story concrete structure built in 1942 that housed transformers, switches and other electrical equipment. Building 77 is divided into three sections. The east section contains a steam room, restrooms and shower facilities. The middle section contains nine transformers and several switch stations. The west section contains a field office. The last polychlorinated biphenyl (PCB)-containing equipment was removed in 1991. The RCRA Facility Assessment (RFA) reported that the cable vaults leading from the substation were cleaned in 1991 to remove PCBs and asbestos. Building 77 is currently vacant.

Materials of concern identified based on historical operations for AOC 558 in the *Final Zone E RFI Work Plan, Revision 1* (EnSafe Inc. [EnSafe]/Allen & Hoshall, 1995) include metals, ethylene glycol, PCBs, monoethanolamine, mercury, perchloroethylene, trichloroethene (TCE), and petroleum hydrocarbons. This area of Zone E is zoned M2 (industrial). The CNC RCRA Permit identified AOC 558 as requiring a Confirmatory Sampling Investigation (CSI).

The RFI was initially conducted by EnSafe and the *Zone E RFI Report, Revision 0* (EnSafe, 1997) was prepared and submitted during 1997. Regulatory review was conducted on this document and draft responses to the comments from SCDHEC were prepared by the Navy/EnSafe team; copies of responses are provided in Appendix B.

1.1 Purpose of the RFI Report Addendum

The purpose of this RFI Report Addendum is to document the results of the previous RFI investigation conducted by the Navy/EnSafe team at AOC 558. This RFI Report Addendum also discusses 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 Solid Waste Management Unit (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 RFI Report Addendum to expedite evaluation of closure of the site.

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 RFI Report Addendum.

2.0 Summary of RFI Conclusions for AOC 558 – Summarizes the conclusions from the RFI investigation and risk evaluation for AOC 558 as presented in the *Zone E RFI Report, Revision 0.*

3.0 Interim Measures and UST/AST Removals – Provides information regarding any interim measures (IMs) or 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 the RFI and additional data used 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 No Further Action (NFA) at AOC 558.

8.0 References – Lists the references used in this document.

Appendix A – Contains excerpts from the *Zone E RFI Report, Revision 0,* including summary of detections of chemicals for the site vicinity.

Appendix B – Contains responses to SCDHEC comments for AOC 558 from the *Zone E RFI Report, Revision.*

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

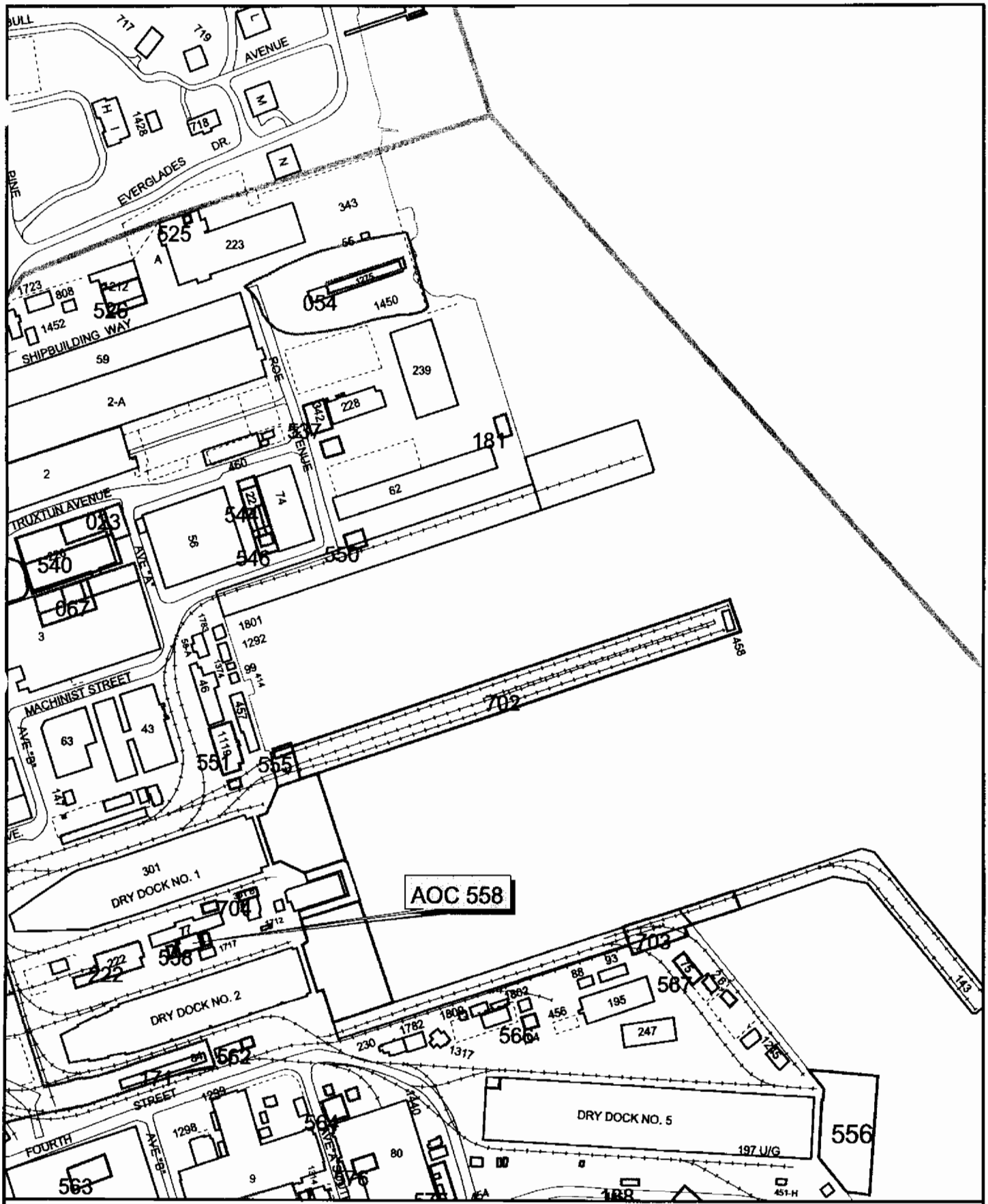


Figure 1-1
Location of AOC 558 in Zone E
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\projects\zone_e\non_priority\non_pri_figs.apr, Date: 25 Jun 2002 11:18, User: NMOUDRY, Figure 1-1 Location of AOC 558 in Zone E

NOTE: Aerial Photo Date is 1997

Fence
Railroads
Roads
Shoreline
AOC/SWMU Boundary
Buildings
Zone Boundary

N

0 40 80 Feet

1 inch = 50 feet

Figure 1-2
Site Map
AOC 558
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\projects\zone_e\non_priority\non_pro_fig2.apr, Date: 25 Jun 2002 11:33, User: NMOUDRY, AOC 558

Section 2.0

2.0 Summary of RFI Conclusions for AOC 558

This section summarizes the results and conclusions from the RFI conducted at AOC 558 that were reported in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). No soil or groundwater sampling was proposed or conducted at AOC 558. Concrete and wipe sampling was proposed to address the objectives of the CSI. Figures 10.28.1 and 10.28.2 from the *Zone E RFI Report, Revision 0* (see Appendix A) show wipe and concrete sampling locations.

The RFI report presented the results of this investigation and conclusions concerning contamination and risk, as summarized in the following sections. Appendix A also presents a summary of detected chemicals in concrete core samples at AOC 558 (Tables 10.28.4.1 and 10.28.4.2 from the RFI report).

2.1 Concrete Sampling and Analysis

Concrete was sampled during one sampling event at AOC 558. Wipe samples were collected from the surface of the concrete floor at sample locations E558JF001 through E558JF004 in the middle section of Building 77 (see Appendix A). Concrete core samples were collected at sample locations E558CC001 through E558CC004 in the east and west sections of Building 77. Wipe samples were analyzed for PCBs. Concrete core samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs, metals and cyanide. No duplicate samples were collected.

2.2 Wipe Sampling

The RFI Work Plan for AOC 558 proposed collecting four wipe samples based on the location of PCB-containing equipment and visual evidence of spills and leaks. Four wipe samples were collected from the concrete floor at the locations shown in Figure 10.28.1 (see Appendix A). Wipe samples were analyzed for PCBs.

Detected concentrations of PCBs from wipe samples were as follows:

- **PCBs:** PCBs were not detected above laboratory detection limits.

2.3 Concrete Core Sampling

The RFI Work Plan for AOC 558 proposed collecting four concrete core samples from Building 77. Four concrete core samples were collected from the east and west sections of Building 77 at the locations shown in Figure 10.28.2 (see Appendix A). The concrete core samples were analyzed for VOCs, SVOCs, pesticides, PCBs, metals and cyanide. Duplicate samples were not collected.

Detected concentrations of organic and inorganic compounds from the concrete core samples are as follows:

- **VOCs:** VOCs were not detected in concrete core samples above the screening criteria. Only one VOC, acetone, was detected in a single sample, at a concentration of 96J µg/kg. COPC screening criteria have not been established for concrete samples, but the result is well below the residential soil risk-based concentration (RBC) of 780 µg/kg (hazard index (HI) = 0.1).
- **SVOCs**: SVOCs were not detected in the concrete core samples above laboratory detection limits.
- **Pesticides**: Pesticides were not detected in the concrete core samples above laboratory detection limits.
- **PCBs:** PCBs were not detected in the concrete core samples above laboratory detection limits.
- **Inorganics:** As would be expected for concrete samples, metals were detected. COPC screening criteria have not been established for concrete samples; however, the reported concentrations were below industrial soil RBCs.
- **Cyanide:** Cyanide was detected in a single concrete sample at a concentration of 460J µg/kg. This value is well below the industrial soil RBC of 410 mg/kg and well below the residential soil RBC of 16 mg/kg (HI = 0.1).

2.4 RFI Human Health Risk Assessment (HHRA)

Concrete wipe and core samples were the only samples collected at AOC 558. Therefore, a formal risk assessment was not conducted (*Zone E RFI Report, Revision 0*).

2.5 RFI Conclusions and Recommendations

The *Zone E RFI Report, Revision 0* concluded that due to the type of samples collected and the analytical results, corrective measures were not necessary for AOC 558.

Section 3.0

3.0 Summary of Interim Measures and UST/AST Removals at AOC 558

3.1 UST/AST Removals

There is no indication of an underground storage tank (UST) or aboveground storage tank (AST) being present at AOC 558.

3.2 Interim Measures

There were no IMs conducted at AOC 558. However, according to the RFA, a PCB and asbestos removal action was performed in 1991 within the cable vaults.

Section 4.0

4.0 Summary of Additional Investigations

No additional investigations have been conducted at AOC 558 since the RFI was completed by the Navy/EnSafe team during 1995-1997.

Section 5.0

1 5.0 COPC/COC Refinement

2 The *Zone E RFI Report, Revision 0* did not identify any COCs for AOC 558. Detected
3 concentrations of site constituents are below the industrial soil COPC screening criteria.

4 5.1 Wipe Samples

5 No COCs were identified for wipe samples at AOC 558.

6 5.2 Concrete Core

7 No COCs were identified for concrete core samples at AOC 558.

8 No corrective measures were considered necessary for this site.

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 AOC 558.

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 corrective measures study (CMS). The RFI for AOC 558 did not identify any COCs for wipe or concrete core samples. Soil and groundwater sampling was not recommended by the RFI Work Plan. Therefore, no soil or groundwater investigations were conducted at this site.

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 detection of several metals (primarily arsenic, thallium, and antimony) in groundwater at concentrations above the applicable maximum contaminant level (MCL), preceded or followed by detections of these same metals below the MCL or below the practicable quantitation limit. There are no data suggesting that there was an impact to groundwater from AOC 558. Groundwater was not a medium of concern at AOC 558. Therefore, 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 direct connection from AOC 558 to the storm sewers is known to exist. No COCs requiring further evaluation are present at the site. 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 railroad lines to AOC 558 are approximately 50 feet northwest and 50 feet southeast of Building 77. There are no known connections between AOC 558 and the investigated railroad lines in Zone E at the CNC. 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 558 is the Cooper River, which lies approximately 100 feet northeast of the site. The only potential migration pathway from the site to surface water is by overland flow from stormwater runoff. AOC 558 consists of covered buildings and pavement, which eliminate 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. No further evaluation of a potential pathway for contaminant migration by stormwater runoff is warranted.

6.7 Potential Contamination in Oil/Water Separators (OWSs)

There are no OWSs associated with AOC 558. In addition, there is no reference to an OWS at the site in the *Oil Water Separator Data* report (Department of the Navy, September 2000). Therefore, further evaluation of this issue is not warranted.

6.8 Land Use Control (LUC)

No COCs were identified at AOC 558 . The BCT has agreed, however, that all of Zone E will have some LUCs. At a minimum, these LUCs are expected to include restrictions against residential land use. Site-specific LUCs are also expected to be applied at specific sites within Zone E depending on site-specific investigations. No COCs were identified for industrial land use at AOC 558. LUCs will be applied to limit the reuse of this site to non-residential use.

Section 7.0

7.0 Recommendations

AOC 558 consists of an electrical substation in Building 77. Building 77 is located in the working area between Dry Dock No. 1 and Dry Dock No. 2 in Zone E of the CNC. Building 77 is a two-story concrete structure built in 1942 that housed transformers, switches and other electrical equipment. The last PCB-containing equipment was removed in 1991. The cable vaults leading from the substation were cleaned in 1991 to remove PCBs and asbestos. Building 77 is currently vacant. The CNC RCRA Permit identified AOC 558 as requiring a CSI.

The *Zone E RFI Report, Revision 0* did not identify any COCs at AOC 558. Because the site is located within Zone E, LUCs will restrict future land use to non-residential uses only.

AOC 558 is recommended for NFA status in the RCRA Corrective Action Plan Permit for the CNC.

Provided that the information presented in this report is adequate to address RFI completion and site closeout issues, it is expected that the BCT will concur that NFA is appropriate for AOC 558. After BCT concurrence for NFA, a Statement of Basis will be prepared and made available for public comment to allow for public participation in the final remedy selection, in accordance with SCDHEC policy.

Section 8.0

8.0 References

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

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

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

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

CH2M-Jones. *Technical Memorandum: Results from Additional Background Sampling of the CNC Railroad Lines and Naval Annex (Zone K). CNC.* August 2001.

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

Appendix A

Table 10.28.2.1
AOC 558
Wipe Sampling Analytical Results

Frequency of Detection	Parameter	Range of Detections (µg/wipe)
0/4	PCB	NA

Note:
µg/wipe = Micrograms per wipe sample

Table 10.28.4.1
AOC 558
Organics Detected in Concrete Samples (µg/kg)

Compound	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.
Acetone	1/4	96	96

Note:
µg/kg = Micrograms per kilogram

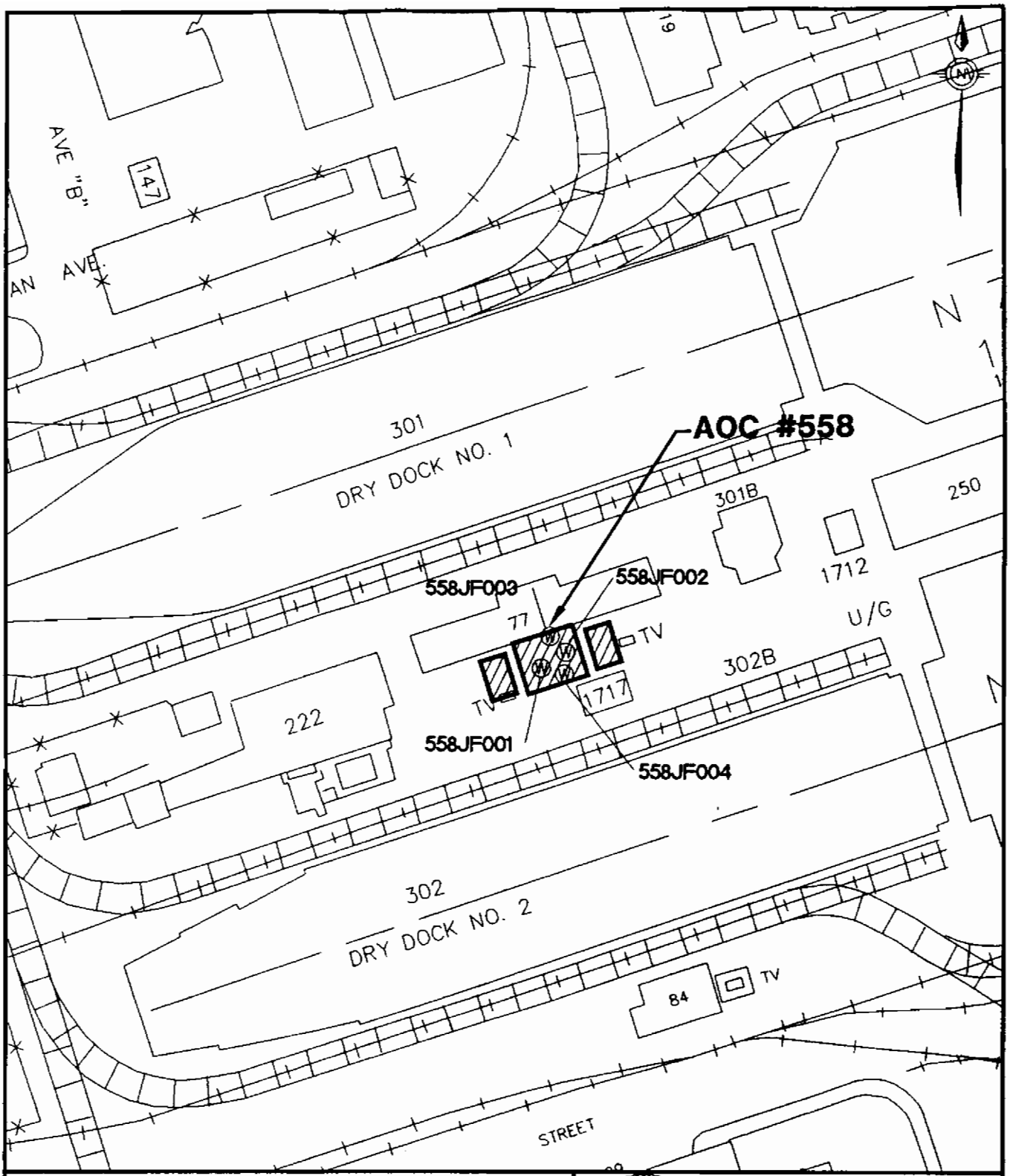
Table 10.28.4.2
AOC 558
Inorganics Detected in Concrete Samples (mg/kg)

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.
Aluminum (Al)	4/4	4,310 - 5,150	4,620
Arsenic (As)	4/4	1.70 - 2.70	2.05
Barium (Ba)	4/4	27.4 - 33.3	30.3
Beryllium (Be)	4/4	0.260 - 0.430	0.338
Cadmium (Cd)	3/4	0.260 - 0.570	0.420
Calcium (Ca)	4/4	83,300 - 102,000	90,400
Chromium (Cr)	4/4	8.80 - 24.2	17.3
Cobalt (Co)	4/4	0.850 - 2.00	1.56
Copper (Cu)	4/4	14.7 - 63.7	34.2
Cyanide (CN)	1/4	0.460	0.460

Table 10.28.4.2
AOC 558
Inorganics Detected in Concrete Samples (mg/kg)

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.
Iron (Fe)	4/4	3,210 - 4,100	3,550
Lead (Pb)	4/4	3.30 - 5.70	4.15
Magnesium (Mg)	4/4	1,080 - 4,130	2,560
Manganese (Mn)	4/4	15.1 - 52.9	40.1
Mercury (Hg)	1/4	2.50	2.50
Nickel (Ni)	4/4	4.10 - 16.8	9.45
Potassium (K)	4/4	478 - 729	596
Sodium (Na)	2/4	213 - 231	222
Vanadium (V)	4/4	9.40 - 21.7	14.9
Zinc (Zn)	4/4	91.5 - 254	157

Note:
mg/kg = Milligrams per kilogram



LEGEND

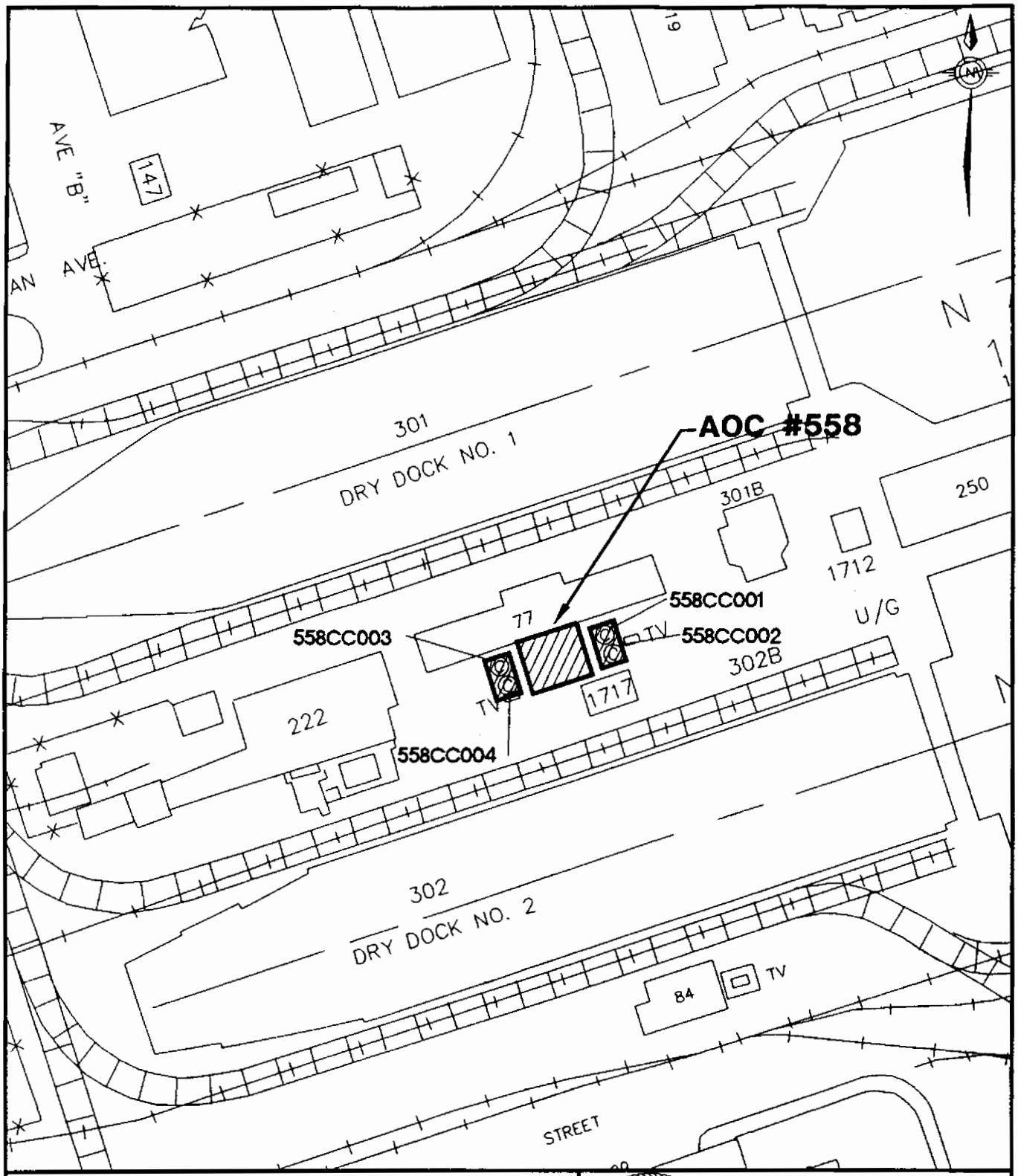
- ● – SOIL BORINGS
- Ⓒ – CORE SAMPLES
- ◒ – DEEP MONITORING WELLS
- ◭ – SHALLOW MONITORING WELLS
- ▲ – SEDIMENT SAMPLES
- Ⓣ – THICKNESS SAMPLES
- Ⓦ – WIPE SAMPLES
- Ⓢ – SURFACE WATER SAMPLES

GRAPHIC SCALE 100 0 100 200

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

FIGURE 10.28.1
WIPE SAMPLE LOCATIONS
AOC #558
SUBSTATION
BUILDING 77

DWG DATE: 09/02/97 | DWG NAME: 10-28-1



LEGEND

- ● – SOIL BORINGS
- Ⓒ – CORE SAMPLES
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- ◭ – 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 10.28.2
CONCRETE SAMPLE LOCATIONS
AOC #558
SUBSTATION
BUILDING 77

DWG DATE: 09/02/97 | DWG NAME: 10-28-2

Appendix B

Response To Comments from Charles B. Watson — SCDHEC for Draft Zone E RCRA Facility Investigation Report Charleston Naval Complex

Site-Specific Comments and Responses

AOC 558

SCDHEC Comment 18:
An explanation is needed as to why concrete core samples were not collected in the middle of the building.

EnSafe/Navy Response 18:
Concrete samples were collected from the concrete pads associated with the switchgear located outside the building to investigate possible releases of dielectric fluid. Wipe samples were collected from the several areas within the transformer vault and included any stained areas inside the building to detect any possible migration pathway of released dielectric fluid.

CH2M-Jones Response 18:
No additional comment needed.

SCDHEC Comment 19:
The Navy should collect soil samples around building 77 for DQO Level III for the standard suite of parameters which includes VOCs, SVOCs, pesticides/PCBs, metals, and cyanides.

EnSafe/Navy Response 19:
An attempt will be made to collect soil samples from around Building 77 for the standard suite of parameters.

CH2M-Jones Response 19:
The RFA for AOC 558 recommended the site for a Confirmatory Sampling Investigation. The Final Zone E RFI Work Plan recommended four wipe samples and four concrete core samples to fulfill the CSI objectives. During the review of the Zone E RFI WP, submitted on June 2, 1995, SCDHEC provided a single comment related to AOC 558, which focused on possible collection of sediment samples in the event that the wipe samples or concrete core samples identified COPCs. Thus, SCDHEC concurred with the proposed scope of sampling at AOC 558 to meet the CSI objectives.

The wipe and concrete core samples proposed in the RFI WP were collected and analyzed per the work plan. Based on the results from the wipe samples and concrete core samples, the RFI did not identify any COPCs or COCs. Thus the objectives of the confirmatory sampling were met. Therefore further investigation at this site is not warranted.