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INVESTIGATION REPORT ZONE E ELECTRICAL VAULTS WITH TRANSMITTAL CNC CHARLESTON SC
11/17/1998
CNC CHARLESTON

ZONE E ELECTRICAL VAULTS INVESTIGATION REPORT

NAVAL BASE CHARLESTON
CHARLESTON, SC

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON SC

Prepared by:

Supervisor of Shipbuilding, Conversion and Repair, USN, (SUPSHIP) Portsmouth Va.,
Environmental Detachment Charleston, S.C.
1899 North Hobson Ave.
North Charleston, SC 29405-2106

November 13, 1998

DEPARTMENT OF THE NAVY
SUPERVISOR OF SHIPBUILDING, CONVERSION AND REPAIR, USN
PORTSMOUTH, VIRGINIA, ENVIRONMENTAL DETACHMENT CHARLESTON
1899 NORTH HOBSON AVENUE, BUILDING 30
NORTH CHARLESTON, SOUTH CAROLINA 29405-2106

IN REPLY REFER TO:

Ser: 869
NOV 17 1998

MEMORANDUM

From: Director, Supervision of Shipbuilding, Conversion and Repair, USN, Portsmouth, VA, Environmental Detachment Charleston SC (SPORTENVDETCHASN)

To: Southern Division Naval Facilities Engineering Command (SOUTHDIV) (Code 1877 – Tony Hunt)

Subj: ZONE E ELECTRICAL VAULTS INVESTIGATION REPORT

Encl: (1) Zone E Electrical Vaults Investigation Report

1. Enclosure (1) is the Investigation Report for Zone E Electrical Vaults Sampling And Analysis, Project No. C98064. If SOUTHDIV should have any questions, please contact Mike Wheeler of SPORTENVDETCHASN at (843)743-6777 ext. 149.

Sincerely,

for E.R. Dearhart
Director

INVESTIGATION REPORT

For Zone E Electrical Vaults
Charleston Naval Complex, Charleston, SC

Engineering Branch Head: _____ **Date:** 11-16-98

Prepared By: _____ **Date:** 10/9/98

REPORT GENERATED BY:
ENVIRONMENTAL DETACHMENT CHARLESTON

1899 NORTH HOBSON AVENUE
NORTH CHARLESTON, SC 29405

ZONE E ELECTRICAL VAULTS INVESTIGATION REPORT

NAVAL BASE CHARLESTON
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Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
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1899 North Hobson Ave.
North Charleston, SC 29405-2106

November 13, 1998

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ACRONYMS, ABBREVIATIONS, AND SYMBOL

AOC	Area of Concern
CFR	Code of Federal Regulations
COC	Constituents of Concern
CMS	Corrective Measures Study
DERP	Defense Environmental Restoration Program
DET	Environmental Detachment Charleston
DHEC	Department of Health and Environmental Control
EPA	Environmental Protection Agency
IM	Interim Measure
IR	Interim Remediation
ppb	Parts Per Billion
ppm	Parts Per Million
SARA	Superfund Amendments and Reauthorization Act
SOUTHDIV	Southern Division Facilities Naval Engineering Command
RBC	Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SWMU	Solid Waste Management Unit
SVOC	Semi-Volatile Organic Compounds
VOC	Volatile Organic Compounds

1. INTRODUCTION

1.1 ZONE E ELECTRICAL VAULTS.

Zone E is the site of the former Charleston Naval Shipyard Controlled Industrial Area. Zone E is located on flat, low-lying land, almost entirely covered with buildings and pavement. Several Zone E facilities are currently leased to private industrial clients. The electrical service vaults involved in this investigation are located throughout Zone E.

1.2 ZONE E ELECTRIAL VAULTS INVESTIGATION.

During the interval between the RFI and the completion of the CMS, it was decided by Southern Division Naval Facilities Engineering Command (SOUTHDIV) that an investigation would be performed by Supervisor of Shipbuilding, Conversion and Repair, United States Navy, Portsmouth Va. Environmental Detachment Charleston (DET). The objective of this investigation was to determine/delineate the extent of contamination in the Zone E electrical service vaults located adjacent to previously identified Areas of Concern (AOC) and/or Solid Waste Management Units (SWMU) and provide SOUTHDIV with resulting data and possible corrective measures.

These service vaults are located adjacent to AOC and SWMUs with constituents of concern (COC) exceeding the limits specified by the United States Environmental Protection Agency (USEPA) Region III Risk Based Concentrations (RBCs).

Contaminants of concern consist of Chromium, Cadmium, Nickel, Mercury, Trichlorethene, Volatile (VOC) and (SVOC) Semi-Volatile Organic Compounds, Arsenic, Barium, Vinyl Chloride, Tetrachloroethylene, Beryllium, and Lead.

2. INVESTIGATION EXECUTION

2.1 ACTIONS REQUIRED BY INVESTIGATION WORK PLAN.

- Sample fluid from electrical service vaults located within 25 feet from an identified SWMU and/or AOC.
- Develop site layout drawings.
- Develop Work Plans required to define limits of contaminant removal, clean up criteria, and site actions.
- Provide recommendations for Personal Protective Equipment (PPE) and Interim Remediation.
- Determine alternatives to eliminate the infiltration of contaminates into the electrical service vaults.

2.2 RESULTS OF ACTIONS.

2.2.1 Fluid Within the Electrical Service Vaults.

At the conclusion of the investigation, 60 electrical service vaults were sampled. A listing of the electrical service vaults and associated COCs are provided in Table 1. Laboratory reports for this sampling are provided in Appendix A. A matrix of lab reports are provided in Table 2.

2.2.2 Site Layout Drawings.

Site drawings of contaminated vaults are provided in Figures 1 and 2. This contamination is limited to:

- Visual chromium contamination in electrical service vaults 7, 7A, and 7B.
- Beryllium contamination in electrical service vault 14.

2.2.3 Work Plans To Define Limits of Contaminant Removal.

An investigation report titled "SWMU 25 Investigation Report" dated 24 September 1998, has been submitted to SOUTHDIV which suggests interim remediation (IR) to stabilize the migration of contamination at SWMU 25. If the suggested IR is deemed necessary, the resulting work plan will define the limits of contaminant removal and site actions for electrical service vaults 7, 7A and 7B.

Electrical service vault 14's beryllium contamination is theorized to be a result of migration of contaminants from AOC 576 where beryllium contamination was detected in groundwater samples. Electrical service vault 14 is not considered to be the source of contamination at AOC 576. The vault is currently used for its intended purpose. However, if the vault is ever abandoned, remedial action should be considered. Sampling of adjacent electrical service vaults revealed no additional vault beryllium contamination.

2.2.4 Recommendations For Personal Protective Equipment And Interim Remediation.

For entry into electrical service vaults 7, 7A, 7B, and 14:

- Follow the requirements specified in an approved confined space entry program.
- Don required safety equipment: Tyvek coveralls, respirator, boots, and nitrile gloves.
- Isolate and tagout/lockout electrical power to the cables in the vault, if required.

2.2.5 Alternatives to Eliminate The Infiltration of Contaminates.

The statement of work requested that the Detachment determine alternatives to eliminate the infiltration of contamination into the electrical service vaults.

Fluid analyzed from electrical service vaults 7, 7A & 7B was below the EPA's RBC table for industrial applications. However, these vaults contain visible evidence of contamination. This evidence consists of yellow deposits consistent with chromium

contamination. The source of contamination at electrical service vault 7 and 7B is electrical service vault 7A and associated cable conduits. An Investigation Report submitted to SOUTHDIV recommended the following protective measures for electrical service vault 7A:

- De-energize or re-route the electrical cables from electrical service vault 7A.
- Remove the existing electrical cables from electrical service vault 7A.
- Remove the cable conduits leading to and from electrical service vault 7A.
- Remove electrical service vault 7A and backfill.

Electrical service vaults 7 and 7B are currently used for their intended purpose. No IR measures are recommended.

Electrical service vault 14's beryllium contamination is theorized to be a result of migration of contaminants from AOC 576. The table below summarizes the COCs AND Zone E background reference values at electrical service vault 14 which exceed the United States Environmental Protection Agency Region III Risk-Based Concentration Table for industrial limits. It should be noted that arsenic results at vault 14 are below the established Zone E background reference values.

COC	RESULT	RBC IND LIMIT	ZONE E BACKGRD
ARSENIC	4.3 PPM	3.8 PPM	23.9 PPM
BERYLLIUM	22.1 PPM	1.3 PPM	1.7 PPM

The electrical service vaults adjacent to vault 14 have beryllium levels below RBC limits. The beryllium contamination of electrical vaults is limited to vault 14. Since this contamination is theorized to be a result of groundwater contamination migrating from AOC 576 (refer to section 6 of this report) and since this vault is currently used for its intended purpose, no IR measures are recommended.

2.3 PLAN MODIFICATIONS AND JUSTIFICATIONS.

The Detachment's internal Work Plan indicated that fluid samples be taken inside the electrical vaults. However, several service vaults did not contain fluid. For these vaults, sludge samples were taken.

Vault 64B could not be located. This vault is buried beneath several feet of run of crusher on the north side of Building 218. However, adjacent vaults 64 and 64C were sampled. The results of these adjacent vaults were acceptable.

3. INVESTIGATION OUTCOME

3.1 SITE CONDITIONS FOLLOWING COMPLETION OF WORK.

Following completion of work on 21 September, 1998, the DET had sampled 60 electrical service vaults. Vault covers were removed and re-installed after completion of sampling.

4. SAMPLING

4.1 SAMPLING EVOLUTIONS AND RESULTS.

4.1.1 Investigative Sampling.

Laboratory results for the investigative sampling can be found in the Appendices of this report. Field sampling consisted of collecting fluid or sediment if no fluid was present.

- Electrical service vault sampling consisted of grab samples.

5. WASTE GENERATION

5.1 HAZARDOUS/POTENTIALLY HAZARDOUS WASTE.

No hazardous or potentially hazardous waste was generated during the accomplishment of this investigation.

5.2 NON-HAZARDOUS WASTE.

No non-hazardous waste was generated during the accomplishment of this investigation.

6. CONCLUSIONS

6.1 ELECTRICAL SERVICE VAULTS.

Proposed utility work in the Zone E electrical vaults does not meet the requirements specified in the Hazardous Waste Operations and Emergency Response regulation, 29 Code of Federal Regulations (CFR) 1910.120. Therefore, personnel performing proposed utility work in these vaults are not required to be trained in accordance with 29 CFR 1910.120.

Zone E electrical vaults meet the definition of a confined space as specified by 29 CFR 1910.146. The requirements of an established confined space program must be met prior to entry into these vaults.

29 CFR 1910.333 states the selection and use of work practices to prevent electrical shock or other injuries resulting from either direct or indirect electrical contacts. These practices should be followed prior to entry into these vaults.

Of the 60 electrical service vaults sampled, only vault 14 exceeded the Environmental Protection Agency's Risk Based Concentration Table for Industrial Soil Ingestion limits of the COCs listed in Table 1. Electrical service vault 14 is contaminated with beryllium.

However, yellow deposits consistent with chromium contamination are visible in electrical service vaults 7, 7A, and 7B. Although these vaults do not exceed the RBC limit for chromium, vault 7A appears to be the source of contamination at SWMU 25. Ensafe Inc. performed a SWMU Manhole/Confined Space study which incorporates recommendations for electrical service vaults 7, 7A, and 7B. The results of this study are provided in Appendix B.

Based on the visual observations, results of laboratory analytical results, and a review of applicable standards, the following actions should be considered:

6.1.1 Electrical Service Vault 7A.

Electrical service vault 7A should be removed as recommended in paragraph 2.2.5 of this investigation report. Also, appropriate PPE as recommended in paragraph 2.2.4 should be worn by personnel entering vault 7A.

6.1.2 Electrical Service Vaults 7 and 7B.

Electrical service vaults 7 and 7B are currently being used for their intended purpose. Appropriate PPE as recommended in paragraph 2.2.4 should be worn by personnel entering these vaults.

6.1.3 Electrical Service Vault 14.

Extensive soil sampling was performed in the areas adjacent to vault 14 during the Zone E Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI). The areas adjacent to vault 14 investigated during the RFI were SWMU 83, SWMU 84, AOC

574 and AOC 576. Appendix C provides the RFI Investigation Report for SWMU 83, SWMU 84, and AOC 574. Appendix D provides the RFI Investigation Report for AOC 576.

AOC 576 is the site of a former oil and paint storehouse/print office. Operations were conducted from 1909 until 1930. No other information could be found regarding the operating practices of the storehouse or the print office. Materials of concern include inks, paints, metals, solvents, and petroleum hydrocarbons. AOC 576 site-specific evaluation is addressed in the Draft Zone E RCRA Facility Investigation Report. Analytical results of soil and groundwater sampling performed at SWMU 83, SWMU 84, and AOC 574 were below industrial/tap water RBC limits for beryllium.

Analytical results of soil sampling performed at AOC 576 were below industrial RBC limits for beryllium. However, beryllium levels above tap water RBC limits were detected in one groundwater sample (NBCE576001) in a shallow monitoring well located on the West Side of Building 80. This groundwater contamination is located adjacent to an electrical cable conduit which connects to electrical service vault 14. It is theorized that this groundwater has migrated contamination to vault 14. Over numerous years, this migration has caused a build-up of beryllium contamination in vault 14. The electrical service vaults adjacent to vault 14 were sampled and their beryllium levels are below RBC limits. The beryllium contamination of electrical vaults is limited to vault 14.

Electrical service vault 14 is currently used for its intended purpose. Appropriate PPE as recommended in paragraph 2.2.4 should be worn by personnel entering this vault. If electrical service vault 14 is ever abandoned, remedial action should be considered.

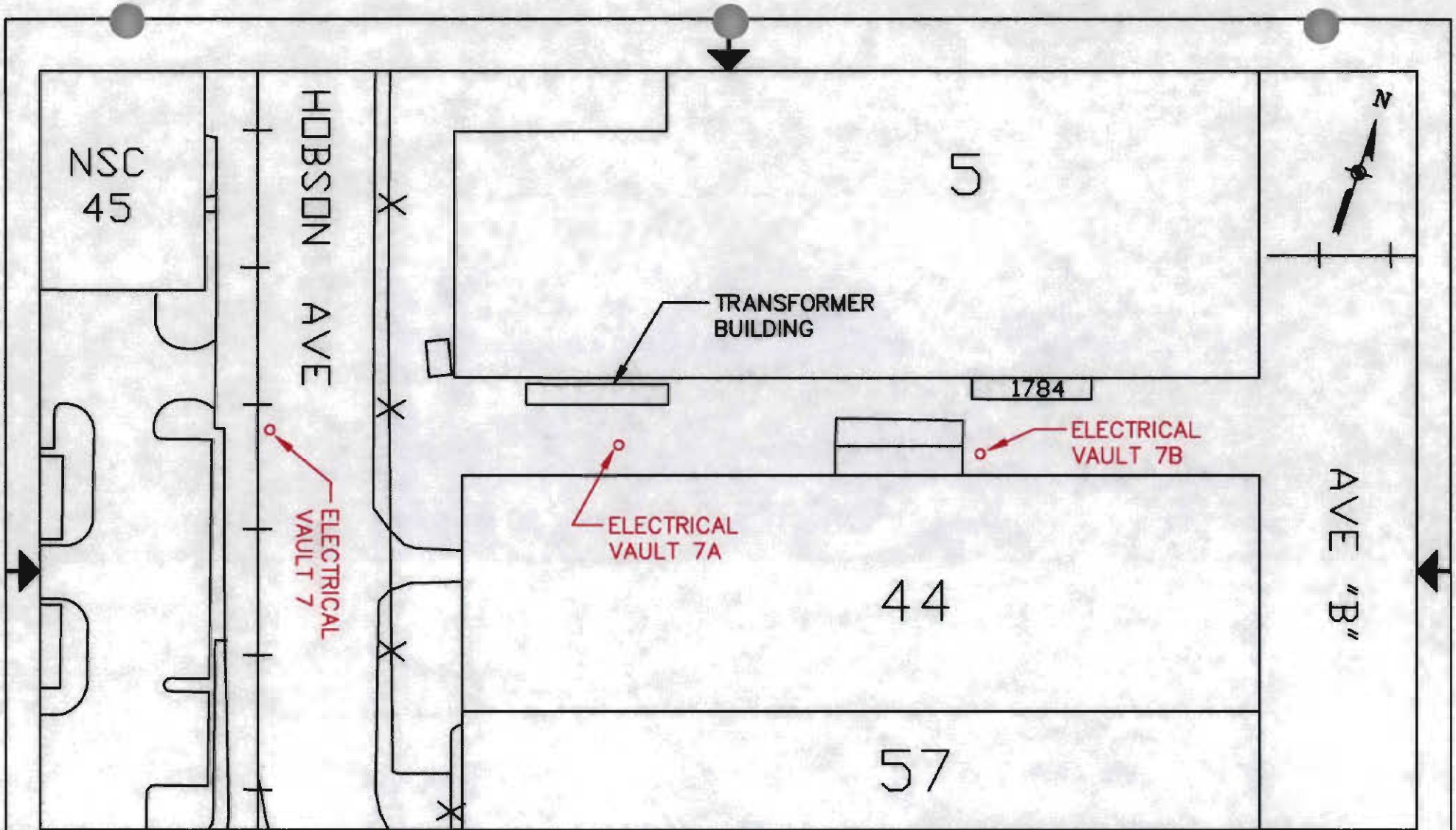
FIGURES

FIGURE 1:

SITE LAYOUT DRAWING OF VAULTS 7, 7A, & 7B

FIGURE 2:

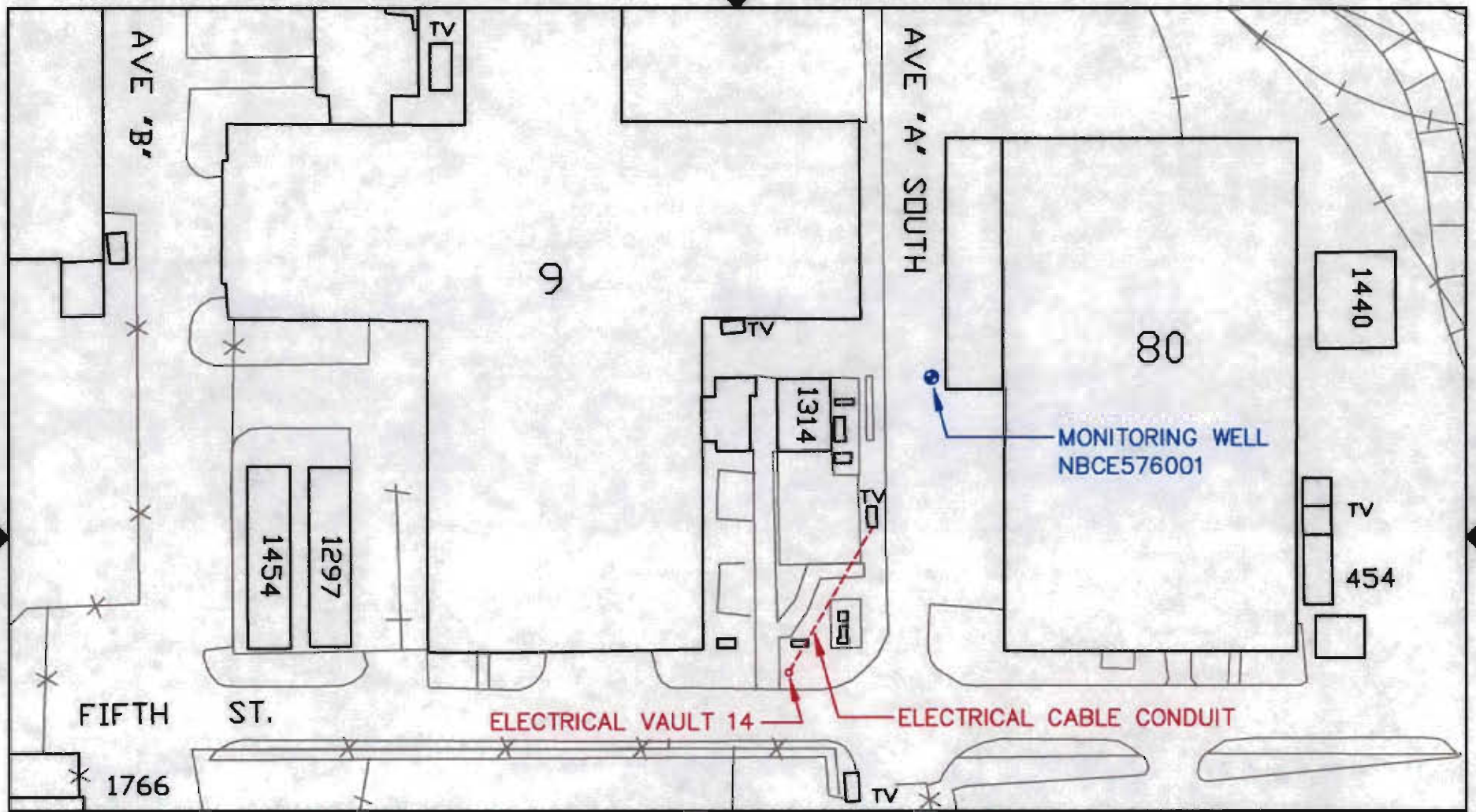
SITE LAYOUT DRAWINGS OF VAULT 14



ENVIRONMENTAL DETACHMENT CHARLESTON
1899 NORTH HOBSON AVENUE – BUILDING 30
NORTH CHARLESTON, SOUTH CAROLINA 29405–2108

FIGURE 1
SITE LAYOUT DRAWING OF VAULTS 7, 7A, AND 7B

SIZE	DATE:	PREPARED BY:	REV
A	10–07–98	M. WHEELER	–
SCALE: –		SHEET: F1	



LEGEND

TV TRANSFORMER

40 0 40 80

GRAPHIC SCALE (FEET)

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1899 NORTH HOBSON AVENUE – BUILDING 30
NORTH CHARLESTON, SOUTH CAROLINA 29405–2106

FIGURE 2
SITE LAYOUT DRAWING OF VAULT 14

SIZE	DATE:	PREPARED BY:	REV
A	10–07–98	M. WHEELER	–
SCALE: –		SHEET: F2	

TABLES

TABLE 1:

MATRIX OF ELECTRICAL VAULTS

TABLE 2:

MATRIX OF VAULT LAB REPORTS

MATRIX OF ELECTRICAL VAULTS

SITE	COC	ELECTRICAL SERVICE VAULTS
SWMU 25	CHROMIUM, CADMIUM, NICKEL	7A, 7, 7B
SWMU 65	CHROMIUM, MERCURY	19B, 19A, 19C, 95E5, 95E4, C4
SWMU 70	TRICHLORETHENE, CHROMIUM, VOC	15D, 15C, 7, 9B, 9
SWMU 84	ARSENIC	10, 10A, 12
SWMU 102	BARIUM	64D, 64C, 64E
SWMU 106	BARIUM	76I, 76J, 76H
SWMU 172	VINYL CHLORIDE	NO SERVICE VAULTS OR CABLE CONDUIT WITHIN 25'
AOC 538	ARSENIC	MH13, MH11, MH15, 15D, 15C, 9
AOC 539	TRICHLORETHENE, CHROMIUM, VOC	SAME AS AOC 538
AOC 549	VOC, ARSENIC	SAME AS SWMU 70
AOC 551	TRICHLORETHENE, TETRACHLOROETHYLENE	97, 103A, 95G, DD2
AOC 563	TRICHLORETHENE	6A, 6, MH44, MH48
AOC 569	TRICHLORETHENE, TETRACHLOROETHYLENE	SAME AS AOC 570
AOC 570	VOC, ARSENIC, LEAD	DD16, DD15, DD17, 52, 54, 56, 4
AOC 573	CADMIUM	10A, 10, 12
AOC 576	VOC, BERYLLIUM	14 (BERYLLIUM ONLY IN 12, 16, & DD12)
AOC 580	ARSENIC	DD12A, DD12, DD13, DD5, 14
AOC 583	VOC	DD20, DD19A, DD21
AOC 590	ARSENIC	64D, 64C, 64E
AOC 596	LEAD, MERCURY	64E, 64D, LP4A, LP5
GRIDWELL 13	VOC	NO SERVICE VAULTS OR CABLE CONDUIT WITHIN 25'
GRIDWELL 20	VOC	NO SERVICE VAULTS OR CABLE CONDUIT WITHIN 25'
GRIDWELL 9	VOC	64B, 64
GRIDWELL 17	VOC	NO SERVICE VAULTS OR CABLE CONDUIT WITHIN 25'
GRIDWELL 24	VOC, LEAD	NO SERVICE VAULTS OR CABLE CONDUIT WITHIN 25'
GRIDWELL 1	VOC	76H, 76I
GRIDWELL 10	SVOC, TETRACHLOROETHYLENE	DD10, DD9
GRIDWELL 25	SVOC	NO SERVICE VAULTS OR CABLE CONDUIT WITHIN 25'
GRIDWELL 2	ARSENIC	76J, 76I
GRIDWELL 3	ARSENIC	76U, 76T, K2, K1A
GRIDWELL 8	ARSENIC	68A, 68
GRIDWELL 18	ARSENIC	NO SERVICE VAULTS OR CABLE CONDUIT WITHIN 25'

TABLE 1

MATRIX OF VAULT LAB REPORTS

VAULT #	LAB REPORT #
4	SPORT 0808-7
6	SPORT 0803-10
7	SPORT 0777-1 & 0799-8
9	SPORT 0777-7
10	SPORT 0794-3 & 0799-6
12	SPORT 0794-4, 0799-4 & 990019-1
14	SPORT 0794-1 & 0799-5
16	SPORT 990019-3
52	SPORT 0808-5
54	SPORT 0808-6
56	SPORT 0792-2
64	SPORT 0797-2
68	SPORT 0797-7
97	SPORT 0792-6
103A	SPORT 0792-7
10A	SPORT 0794-2 & 0799-7
15C	SPORT 0777-6
15D	SPORT 0811-2
19A	SPORT0803-2
19B	SPORT 0803-3
19C	SPORT 0803-4
64C	SPORT 0795-1 & 0797-3
64D	SPORT 0795-2
64E	SPORT 0795-3
68A	SPORT 0797-8
6A	SPORT 0803-9
76H	SPORT 0795-4 & 0797-1
76I	SPORT 0811-4
76J	SPORT 0797-6
76T	SPORT 0797-12

VAULT #	LAB REPORT #
76U	SPORT 0797-10
7A	SPORT 0777-2
7B	SPORT 0777-3
95E4	SPORT 0803-6
95E5	SPORT 0803-5
95G	SPORT 0792-9
9B	SPORT 0777-5
C4	SPORT 0803-7
DD10	SPORT 0799-2
DD12	SPORT 0799-10 & 990019-2
DD12A	SPORT 0799-9
DD13	SPORT 0799-11
DD15	SPORT 0808-4
DD16	SPORT 0808-3
DD17	SPORT 0808-2
DD19A	SPORT 0792-3
DD2	SPORT 0792-8
DD20	SPORT 0792-4
DD21	SPORT 0792-5
DD5	SPORT 0799-12
DD9	SPORT 0799-1
K1A	SPORT 0797-9
K2	SPORT 0797-11
LP4A	SPORT 0795-5
LP5	SPORT 0811-3
MH11	SPORT 0777-8
MH13	SPORT 0777-10
MH15	SPORT 0777-9
MH44	SPORT 0803-11
MH48	SPORT 0803-8

TABLE 2

APPENDIX A

LABORATORY REPORTS

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-1
Lab ID	: 9809384-01
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/14/98	1653	131084	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/14/98	1653	131084	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	U	ND	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	83.3	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	83.9	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	102.	(68.4 - 135.)

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-1

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
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standard operating procedures. Please direct
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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-2
Lab ID	: 9809384-02
Matrix	: TCLP
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Chromium, Hexavalent		16.8	0.600	1.00	mg/l	100	BJR	09/11/98	1750	131068	1
The following prep procedures were performed:											
TCLP Prep for Metals							JL	09/15/98	1030	131132	2

M = Method	Method-Description
M 1	EPA 7196
M 2	EPA 1311

Notes:
The qualifiers in this report are defined as follows:
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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-2
Lab ID	: 9809384-03
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	2.23	0.730	5.00	ug/l	1.0	MBL	09/14/98	1537	131077	1
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		19.3	0.510	5.00	ug/l	1.0					
Beryllium	U	ND	0.260	5.00	ug/l	1.0					
Cadmium	J	0.862	0.440	5.00	ug/l	1.0					
Cobalt	J	0.743	0.690	5.00	ug/l	1.0					
Chromium		17200	0.560	5.00	ug/l	1.0					
Copper		7.50	1.04	5.00	ug/l	1.0					
Nickel	U	ND	1.29	5.00	ug/l	1.0					
Lead		23.5	1.59	5.00	ug/l	1.0					
Antimony	J	4.22	3.94	10.0	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					
Thallium	U	ND	3.08	10.0	ug/l	1.0					
Vanadium	J	0.646	0.590	5.00	ug/l	1.0					
Zinc		47.8	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE FGD 09/14/98 1230 131077 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 3005

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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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-2

M = Method	Method-Description

Notes:
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Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-3
Lab ID	: 9809384-04
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Silver	J	1.95	0.730	5.00	ug/l	1.0	MBL	09/14/98	1543	131077	1
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		70.9	0.510	5.00	ug/l	1.0					
Beryllium	U	ND	0.260	5.00	ug/l	1.0					
Cadmium	J	2.60	0.440	5.00	ug/l	1.0					
Cobalt	J	1.22	0.690	5.00	ug/l	1.0					
Chromium		459	0.560	5.00	ug/l	1.0					
Copper		33.9	1.04	5.00	ug/l	1.0					
Nickel		5.98	1.29	5.00	ug/l	1.0					
Lead		127	1.59	5.00	ug/l	1.0					
Antimony	U	ND	3.94	10.0	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					
Thallium	U	ND	3.08	10.0	ug/l	1.0					
Vanadium	J	1.59	0.590	5.00	ug/l	1.0					
Zinc		118	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE FGD 09/14/98 1230 131077 2

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 3005

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TN	02934	02934

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Contact:	Mr. Bill Hiers
Project Description:	SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-3

M = Method	Method-Description

Notes:
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North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-4
Lab ID	: 9809384-05
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1747	131146	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone		12.7	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone		16.4	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1747	131146	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		13.5	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	J	0.510	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	85.8	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	103.	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	93.2	(68.4 - 135.)

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Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-4

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-5
Lab ID	: 9809384-06
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1819	131146	I
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1819	131146	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		4.38	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Silver	J	0.976	0.730	5.00	ug/l	1.0	MBL	09/14/98	1548	131077	2
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		19.7	0.510	5.00	ug/l	1.0					
Beryllium	U	ND	0.260	5.00	ug/l	1.0					
Cadmium	J	0.548	0.440	5.00	ug/l	1.0					
Cobalt	U	ND	0.690	5.00	ug/l	1.0					

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chromium		8.39	0.560	5.00	ug/l	1.0					
Copper		27.2	1.04	5.00	ug/l	1.0	MBL	09/14/98	1548	131077	2
Nickel	U	ND	1.29	5.00	ug/l	1.0					
Lead		62.5	1.59	5.00	ug/l	1.0					
Antimony	U	ND	3.94	10.0	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					
Thallium	U	ND	3.08	10.0	ug/l	1.0					
Vanadium	J	2.15	0.590	5.00	ug/l	1.0					
Zinc		306	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE FGD 09/14/98 1230 131077 3

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	85.9	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	99.3	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	92.7	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-5

M = Method	Method-Description

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
Reviewed By

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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: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-6
Lab ID	: 9809384-07
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1851	131146	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-6

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1851	131146	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		4.95	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Silver	J	2.01	0.730	5.00	ug/l	1.0	MBL	09/14/98	1554	131077	2
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		37.6	0.510	5.00	ug/l	1.0					
Beryllium	U	ND	0.260	5.00	ug/l	1.0					
Cadmium	J	1.50	0.440	5.00	ug/l	1.0					
Cobalt	J	1.26	0.690	5.00	ug/l	1.0					

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TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-6

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chromium		8.80	0.560	5.00	ug/l	1.0					
Copper		93.7	1.04	5.00	ug/l	1.0	MBL	09/14/98	1554	131077	2
Nickel	U	ND	12.9	50.0	ug/l	10.	MBL	09/14/98	1731	131077	2
Lead		89.6	1.59	5.00	ug/l	1.0	MBL	09/14/98	1554	131077	2
Antimony	U	ND	3.94	10.0	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					
Thallium	J	5.29	3.08	10.0	ug/l	1.0					
Vanadium	J	1.24	0.590	5.00	ug/l	1.0					
Zinc		361	15.9	50.0	ug/l	10.	MBL	09/14/98	1731	131077	2

The following prep procedures were performed:

TRACE	FGD	09/14/98	1230	131077	3

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	85.3	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	92.7	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	86.0	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specificd acceptance criteria.

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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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-6

M = Method	Method-Description

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
Reviewed By

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-7
Lab ID	: 9809384-08
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1922	131146	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	J	2.64	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-7

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1922	131146	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		3.49	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Silver	J	2.10	0.730	5.00	ug/l	1.0	MBL	09/14/98	1600	131077	2
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		40.6	0.510	5.00	ug/l	1.0					
Beryllium	U	ND	0.260	5.00	ug/l	1.0					
Cadmium	J	2.43	0.440	5.00	ug/l	1.0					
Cobalt	J	0.819	0.690	5.00	ug/l	1.0					

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-7

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chromium		21.8	0.560	5.00	ug/l	1.0					
Copper		124	1.04	5.00	ug/l	1.0	MBL	09/14/98	1600	131077	2
Nickel		5.46	1.29	5.00	ug/l	1.0					
Lead		139	1.59	5.00	ug/l	1.0					
Antimony	U	ND	3.94	10.0	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					
Thallium	U	ND	3.08	10.0	ug/l	1.0					
Vanadium		5.26	0.590	5.00	ug/l	1.0					
Zinc		615	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE FGD 09/14/98 1230 131077 3

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	86.1	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	102.	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	90.8	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-7

M = Method	Method-Description

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
Reviewed By

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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: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-8
Lab ID	: 9809384-09
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1953	131146	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-8

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	J	0.680	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	1953	131146	1
Chloroform	J	0.970	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	J	0.720	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		4.86	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Silver	J	2.38	0.730	5.00	ug/l	1.0	MBL	09/14/98	1606	131077	2
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		38.6	0.510	5.00	ug/l	1.0					
Beryllium	U	ND	0.260	5.00	ug/l	1.0					
Cadmium	J	0.887	0.440	5.00	ug/l	1.0					
Cobalt	U	ND	0.690	5.00	ug/l	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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-8

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chromium		16.2	0.560	5.00	ug/l	1.0					
Copper		91.4	1.04	5.00	ug/l	1.0	MBL	09/14/98	1606	131077	2
Nickel	U	ND	12.9	50.0	ug/l	10.	MBL	09/14/98	1737	131077	2
Lead		80.1	1.59	5.00	ug/l	1.0	MBL	09/14/98	1606	131077	2
Antimony	U	ND	3.94	10.0	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					
Thallium	J	3.23	3.08	10.0	ug/l	1.0					
Vanadium	J	3.52	0.590	5.00	ug/l	1.0					
Zinc		350	15.9	50.0	ug/l	10.	MBL	09/14/98	1737	131077	2

The following prep procedures were performed:

TRACE	FGD	09/14/98	1230	131077	3

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	83.8	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	91.5	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	86.3	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-8

M = Method	Method-Description

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
Reviewed By

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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: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-9
Lab ID	: 9809384-10
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	2024	131146	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-9

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	2024	131146	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		5.36	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Silver	J	1.57	0.730	5.00	ug/l	1.0	MBL	09/14/98	1612	131077	2
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		30.8	0.510	5.00	ug/l	1.0					
Beryllium	U	ND	0.260	5.00	ug/l	1.0					
Cadmium	U	ND	0.440	5.00	ug/l	1.0					
Cobalt	U	ND	0.690	5.00	ug/l	1.0					

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-9

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chromium		7.00	0.560	5.00	ug/l	1.0					
Copper		70.2	1.04	5.00	ug/l	1.0	MBL	09/14/98	1612	131077	2
Nickel	J	4.43	1.29	5.00	ug/l	1.0					
Lead		84.4	1.59	5.00	ug/l	1.0					
Antimony	U	ND	3.94	10.0	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					
Thallium	U	ND	3.08	10.0	ug/l	1.0					
Vanadium	J	3.63	0.590	5.00	ug/l	1.0					
Zinc		388	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE FGD 09/14/98 1230 131077 3

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	85.7	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	97.0	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	89.2	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-9

M = Method	Method-Description

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

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID	: SPORT0777-10
Lab ID	: 9809384-11
Matrix	: GroundH2O
Date Collected	: 09/11/98
Date Received	: 09/11/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	2055	131146	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone		6.05	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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Laboratory Certifications

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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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-10

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/14/98	2055	131146	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		3.99	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Silver	U	ND	0.730	5.00	ug/l	1.0	MBL	09/15/98	1808	131078	2
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		19.4	0.510	5.00	ug/l	1.0					
Beryllium	U	ND	0.260	5.00	ug/l	1.0					
Cadmium	J	0.749	0.440	5.00	ug/l	1.0					
Cobalt	U	ND	0.690	5.00	ug/l	1.0					

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TN	02934	02934

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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-10

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chromium	J	0.794	0.560	5.00	ug/l	1.0					
Copper		71.0	1.04	5.00	ug/l	1.0	MBL	09/15/98	1808	131078	2
Nickel	J	2.41	1.29	5.00	ug/l	1.0					
Lead		76.1	1.59	5.00	ug/l	1.0					
Antimony	U	ND	3.94	10.0	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					
Thallium	U	ND	3.08	10.0	ug/l	1.0					
Vanadium	U	ND	0.590	5.00	ug/l	1.0					
Zinc		175	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE FGD 09/14/98 1230 131078 3

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	85.6	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	95.1	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	87.5	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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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: NPWC00197 Report Date: September 21, 1998

Sample ID : SPORT0777-10

M = Method	Method-Description

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
Reviewed By

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CHAIN OF CUSTODY RECORD

980938 4%

Page 1 of 1

Client Name/Facility Name: SPORTENVDETCHASN

Collected by/Company: SPORTENVDETCHASN

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

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

CCL 35308

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	APPENDIX IX Method required	APPENDIX IX METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	TCLP HEX CR	Remarks	
01	SPORT0777-1	9-11-98	0900				X	3						X											VAULT 7	.1
02 03	SPORT0777-2	9-11-98	0905				X	2							X									X	VAULT 7A	.2 .3
04	SPORT0777-3	9-11-98	0930				X	1							X										VAULT 7B	.3
05	SPORT0777-4	9-11-98	0800				X	3						X											TRIP BLANK	.1
06	SPORT0777-5	9-11-98	1025				X	4						X	X										VAULT 9B	.4
07	SPORT0777-6	9-11-98	0950				X	4						X	X										VAULT 15C	.4
08	SPORT0777-7	9-11-98	1015				X	4						X	X										VAULT 9	.4
09	SPORT0777-8	9-11-98	1045				X	4						X	X										VAULT MH11	.4
10	SPORT0777-9	9-11-98	1100				X	4						X	X										VAULT MH15	.4
11	SPORT0777-10	9-11-98	1055				X	4						X	X										VAULT MH13	.4

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Mike Zeff	9-11-98	1500	Christy Washington	Christy Washington	9/11/98	1510	S Feller

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
S Feller	9/11/98	1526	D Franco	9/11/98	1526	

White = sample collector Yellow = file Pink = with report

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0792-1
Lab ID	: 9809599-01
Matrix	: GroundH2O
Date Collected	: 09/18/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/19/98	1024	131547	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	J	4.51	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/19/98	1024	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	U	ND	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	84.9	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	84.4	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	104	(68.4 - 135.)

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-1

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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
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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	. SPORT0792-2
Lab ID	: 9809599-02
Matrix	: GroundH2O
Date Collected	: 09/18/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/19/98	1056	131547	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/19/98	1056	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	U	ND	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Arsenic	U	ND	4.51	5.00	ug/l	1.0	MBL	09/21/98	2027	131642	2
Lead		314	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE	FGD	09/21/98	1100	131642	3

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID . SPORT0792-2

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	84.9	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	85.0	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	105.	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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
Reviewed By

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-3
Lab ID : 9809599-03
Matrix : GroundH2O
Date Collected : 09/18/98
Date Received : 09/18/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	3.00	10.0	ug/l	10.	JEB	09/19/98	1232	131547	1
1,1,1-Trichloroethane	U	ND	2.00	10.0	ug/l	10.					
1,1,2,2-Tetrachloroethane	U	ND	5.00	10.0	ug/l	10.					
1,1,2-Trichloroethane	U	ND	4.00	10.0	ug/l	10.					
1,1-Dichloroethane	U	ND	4.00	10.0	ug/l	10.					
1,1-Dichloroethylene	U	ND	7.00	10.0	ug/l	10.					
1,2,3-Trichloropropane	U	ND	5.00	10.0	ug/l	10.					
1,2-Dibromo-3-chloropropane	U	ND	6.00	10.0	ug/l	10.					
1,2-Dibromoethane	U	ND	4.00	10.0	ug/l	10.					
1,2-Dichlorobenzene	U	ND	4.00	10.0	ug/l	10.					
1,2-Dichloroethane	U	ND	2.00	10.0	ug/l	10.					
1,2-Dichloropropane	U	ND	2.00	10.0	ug/l	10.					
1,2-cis-Dichloroethylene	U	ND	7.00	10.0	ug/l	10.					
1,2-trans-Dichloroethylene	U	ND	7.00	10.0	ug/l	10.					
2-Butanone	U	ND	59.0	100	ug/l	10.					
2-Hexanone	U	ND	32.0	50.0	ug/l	10.					
4-Methyl-2-pentanone	U	ND	16.0	50.0	ug/l	10.					
Acetone		70.2	37.0	50.0	ug/l	10.					
Acetonitrile	U	ND	156	250	ug/l	10.					
Acrolein	U	ND	89.0	100	ug/l	10.					
Acrylonitrile	U	ND	82.0	100	ug/l	10.					
Allyl Chloride	U	ND	21.0	50.0	ug/l	10.					
Benzene	U	ND	3.00	10.0	ug/l	10.					
Bromoform	U	ND	4.00	10.0	ug/l	10.					
Carbon Disulfide	U	ND	18.0	50.0	ug/l	10.					
Carbon Tetrachloride	U	ND	2.00	10.0	ug/l	10.					
Chlorobenzene	U	ND	3.00	10.0	ug/l	10.					

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TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	3.00	10.0	ug/l	10.					
Chloroethane	U	ND	3.00	10.0	ug/l	10.	JEB	09/19/98	1232	131547	1
Chloroform	U	ND	7.00	10.0	ug/l	10.					
Chloroprene	U	ND	1.00	200	ug/l	10.					
Dibromomethane	U	ND	2.00	10.0	ug/l	10.					
Dichlorobromomethane	U	ND	4.00	10.0	ug/l	10.					
Dichlorodifluoromethane	U	ND	12.0	50.0	ug/l	10.					
Ethylbenzene	U	ND	3.00	10.0	ug/l	10.					
Isobutyl Alcohol	U	ND	360	500	ug/l	10.					
Methacrylonitrile	U	ND	38.0	50.0	ug/l	10.					
Methyl Bromide	U	ND	3.00	10.0	ug/l	10.					
Methyl Chloride	U	ND	2.00	10.0	ug/l	10.					
Methyl Iodide	U	ND	52.0	100	ug/l	10.					
Methyl Methacrylate	U	ND	39.0	50.0	ug/l	10.					
Methylene Chloride	U	ND	12.0	50.0	ug/l	10.					
Propionitrile	U	ND	26.0	100	ug/l	10.					
Styrene	U	ND	2.00	10.0	ug/l	10.					
Tetrachloroethylene	U	ND	7.00	10.0	ug/l	10.					
Toluene	U	ND	5.00	10.0	ug/l	10.					
Trichloroethylene	U	ND	6.00	10.0	ug/l	10.					
Trichlorofluoromethane	U	ND	17.0	50.0	ug/l	10.					
Vinyl Acetate	U	ND	18.0	50.0	ug/l	10.					
Vinyl chloride	U	ND	4.00	10.0	ug/l	10.					
Xylenes (TOTAL)	U	ND	11.0	20.0	ug/l	10.					
bis(2-Chloromethylethyl)ether	U	ND	37.0	100	ug/l	10.					
cis-1,3-Dichloropropylene	U	ND	3.00	10.0	ug/l	10.					
trans-1,3-Dichloropropylene	U	ND	3.00	10.0	ug/l	10.					
trans-1,4-Dichloro-2-butene	U	ND	28.0	50.0	ug/l	10.					

Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	87.6	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	86.6	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	102.	(68.4 - 135.)

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TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-3

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
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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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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.

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0792-4
Lab ID	: 9809599-04
Matrix	: GroundH2O
Date Collected	: 09/18/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/19/98	1128	131547	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/19/98	1128	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	1.22	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	84.5	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	84.6	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	105.	(68.4 - 135.)

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SC	10120	10582
TN	02934	02934

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

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-4

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
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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.
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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0792-5
Lab ID	: 9809599-05
Matrix	: GroundH2O
Date Collected	: 09/18/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1416	131666	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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SC	10120	10582
TN	02934	02934

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

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1416	131666	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	3.64	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1 0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	95.6	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	97.0	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	120.	(68.4 - 135.)

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-5

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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
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TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0792-6
Lab ID	: 9809599-06
Matrix	: GroundH2O
Date Collected	: 09/18/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1449	131666	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-6

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1449	131666	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	3.01	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	96.0	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	98.5	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	118.	(68.4 - 135.)

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Client: Supervisor of Ship Building & Conversion
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Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-6

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0792-7
Lab ID	: 9809599-07
Matrix	: GroundH2O
Date Collected	: 09/18/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1521	131666	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-7

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1521	131666	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	2.54	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	97.0	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	98.8	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	119.	(68.4 - 135.)

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TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-7

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0792-8
Lab ID	: 9809599-08
Matrix	: GroundH2O
Date Collected	: 09/18/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1554	131666	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-8

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1554	131666	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	2.70	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	94.1	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	98.0	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	119.	(68.4 - 135.)

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-8

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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
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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0792-9
Lab ID	: 9809599-09
Matrix	: GroundH2O
Date Collected	: 09/18/98
Date Received	: 09/18/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1627	131666	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-9

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/21/98	1627	131666	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	3.25	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	96.5	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	96.9	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	118.	(68.4 - 135.)

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Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0792-9

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
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Karen Blakeney
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CHAIN OF CUSTODY RECORD

9809599 1.

Page 1 of 1

Client Name/Facility Name: SPORTENVDETCHAS

Collected by/Company: SPORTENVDETCHAS

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

CCL 35465

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	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	ICP LEAD	ICP ARSENIC	Remarks	
1	SPORT0792-1	9-18-98	0800				X	3						X												TRIP BLANK	.1
2	SPORT0792-2	9-18-98	0920				X	4						X										X	X	VAULT 56	.2
3	SPORT0792-3	9-18-98	0945				X	3						X												VAULT DD 19A	.1
4	SPORT0792-4	9-18-98	1000				X	3						X												VAULT DD20	.1
5	SPORT0792-5	9-18-98	1010				X	3						X												VAULT DD21	.1
6	SPORT0792-6	9-18-98	1020				X	3						X												VAULT 97	.1
7	SPORT0792-7	9-18-98	1030				X	3						X												VAULT 103A	.1
8	SPORT0792-8	9-18-98	1035				X	3						X												VAULT DD2	.1
9	SPORT0792-9	9-18-98	1045				X	3						X												VAULT 95G	.1

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Mike Zhale	9-18-98	1230	D. Washington	D. Washington	9/18/98	1500	Stephanie Bechelter

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
Stephanie Bechelter	9-18-98	1525	Bonnie Harvey	9/18/98	1525	

White = sample collector Yellow = file Pink = with report

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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: NPWC00197 Report Date: September 10, 1998

Sample ID	: SPORT0794-1
Lab ID	: 9809197-01
Matrix	: Soil
Date Collected	: 09/04/98
Date Received	: 09/04/98
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.204	1.02	ug/kg	1.0	TCL	09/08/98	1502	130654	1
1,1,1-Trichloroethane	U	ND	0.102	1.02	ug/kg	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.612	1.02	ug/kg	1.0					
1,1,2-Trichloroethane	U	ND	0.306	1.02	ug/kg	1.0					
1,1-Dichloroethane	U	ND	0.102	1.02	ug/kg	1.0					
1,1-Dichloroethylene	U	ND	0.306	1.02	ug/kg	1.0					
1,2,3-Trichloropropane	U	ND	0.408	1.02	ug/kg	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.408	1.02	ug/kg	1.0					
1,2-Dibromoethane	U	ND	0.204	1.02	ug/kg	1.0					
1,2-Dichlorobenzene	U	ND	0.510	1.02	ug/kg	1.0					
1,2-Dichloroethane	U	ND	0.204	1.02	ug/kg	1.0					
1,2-Dichloropropane	U	ND	0.204	1.02	ug/kg	1.0					
1,2-cis-Dichloroethylene	U	ND	0.102	1.02	ug/kg	1.0					
1,2-trans-Dichloroethylene	U	ND	0.102	1.02	ug/kg	1.0					
2-Butanone		8.90	3.26	5.10	ug/kg	1.0					
2-Hexanone	U	ND	2.86	5.10	ug/kg	1.0					
4-Methyl-2-pentanone	J	3.92	3.16	5.10	ug/kg	1.0					
Acetone		146	10.5	10.5	ug/kg	1.0					
Acetonitrile	U	ND	1.02	25.5	ug/kg	1.0					
Acrolein	U	ND	4.69	10.2	ug/kg	1.0					
Acrylonitrile	U	ND	3.98	10.2	ug/kg	1.0					
Allyl Chloride	U	ND	0.408	5.10	ug/kg	1.0					
Benzene		2.47	0.510	1.02	ug/kg	1.0					
Bromoform	U	ND	0.306	1.02	ug/kg	1.0					
Carbon Disulfide	J	2.00	0.306	5.10	ug/kg	1.0					
Carbon Tetrachloride	U	ND	0.510	1.02	ug/kg	1.0					
Chlorobenzene	U	ND	0.306	1.02	ug/kg	1.0					

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Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 10, 1998

Sample ID : SPORT0794-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.204	1.02	ug/kg	1.0					
Chloroethane	U	ND	0.306	1.02	ug/kg	1.0	TCL	09/08/98	1502	130654	1
Chloroform	U	ND	0.102	1.02	ug/kg	1.0					
Chloroprene	U	ND	10.2	20.4	ug/kg	1.0					
Dibromomethane	U	ND	0.204	1.02	ug/kg	1.0					
Dichlorobromomethane	U	ND	0.102	1.02	ug/kg	1.0					
Dichlorodifluoromethane	U	ND	1.22	1.22	ug/kg	1.0					
Ethylbenzene		1.07	0.306	1.02	ug/kg	1.0					
Isobutyl Alcohol	U	ND	6 43	10.2	ug/kg	1.0					
Methacrylonitrile	U	ND	0.918	5.10	ug/kg	1.0					
Methyl Bromide		1.19	0.306	1.02	ug/kg	1.0					
Methyl Chloride		3.32	0.204	1.02	ug/kg	1.0					
Methyl Iodide		8.10	0.612	5.10	ug/kg	1.0					
Methyl Methacrylate	U	ND	0.408	5.10	ug/kg	1.0					
Methylene Chloride	U	ND	1.43	1.43	ug/kg	1.0					
Propionitrile	U	ND	3.47	10.2	ug/kg	1.0					
Styrene	U	ND	0.306	1.02	ug/kg	1.0					
Tetrachloroethylene	U	ND	0.408	1.02	ug/kg	1.0					
Toluene		3.21	0.918	1.02	ug/kg	1.0					
Trichloroethylene	U	ND	0.306	1.02	ug/kg	1.0					
Trichlorofluoromethane	U	ND	0.306	1.02	ug/kg	1.0					
Vinyl Acetate	U	ND	2.14	5.10	ug/kg	1.0					
Vinyl chloride	U	ND	0.408	1.02	ug/kg	1.0					
Xylenes (TOTAL)		3.35	0.714	2.04	ug/kg	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.19	10.2	ug/kg	1.0					
cis-1,3-Dichloropropylene	U	ND	0.204	1.02	ug/kg	1.0					
trans-1,3-Dichloropropylene	U	ND	0.306	1.02	ug/kg	1.0					
trans-1,4-Dichloro-2-butene	U	ND	0.510	5.10	ug/kg	1.0					
Metals Analysis											
Beryllium		22100	11.4	250	ug/kg	1.0	AME	09/09/98	1543	130692	2

The following prep procedures were performed:

GC/MS Volatiles (8260 High Level)	TCL	09/04/98	1616	130654	3
TRACE	AJM	09/08/98	1430	130692	4

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SC	10120	10582
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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 10, 1998

Sample ID : SPORT0794-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

Comments:
Data reported in mass/mass units is reported 'as received'.

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	134.	(53.5 - 154.)
Dibromofluoromethane	APP 9 VOA-8260B	74.9	(63.4 - 136.)
Toluene-d8	APP 9 VOA-8260B	77.8	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 5035
M 4	EPA 3050

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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TN	02934	02934

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: NPWC00197 Report Date: September 10, 1998

Sample ID	: SPORT0794-2
Lab ID	: 9809197-02
Matrix	: WasteH2O
Date Collected	: 09/04/98
Date Received	: 09/04/98
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Cadmium	J	0.485	0.440	5.00	ug/l	1.0	AME	09/08/98	1822	130689	1
The following prep procedures were performed:											
TRACE							FGD	09/08/98	1130	130689	2

M = Method	Method-Description
M 1	EPA 200.7
M 2	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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.

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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: NPWC00197 Report Date: September 10, 1998

Sample ID	: SPORT0794-3
Lab ID	: 9809197-03
Matrix	: WasteH2O
Date Collected	: 09/04/98
Date Received	: 09/04/98
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Cadmium	J	1.91	0.440	5.00	ug/l	1.0	AME	09/08/98	1828	130689	1
The following prep procedures were performed:											
TRACE							FGD	09/08/98	1130	130689	2

M = Method	Method-Description
M 1	EPA 200.7
M 2	EPA 3005

Notes:
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SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 10, 1998

Sample ID	: SPORT0794-4
Lab ID	: 9809197-04
Matrix	: WasteH2O
Date Collected	: 09/04/98
Date Received	: 09/04/98
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Cadmium	J	0.556	0.440	5.00	ug/l	1.0	AME	09/08/98	1857	130689	1
The following prep procedures were performed:											
TRACE							FGD	09/08/98	1130	130689	2

M = Method	Method-Description
M 1	EPA 200.7
M 2	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 10, 1998

Sample ID	: SPORT0794-5
Lab ID	: 9809197-05
Matrix	: GroundH2O
Date Collected	: 09/04/98
Date Received	: 09/04/98
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/08/98	1111	130711	l
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone		13.9	5.90	5.90	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	J	1.98	1.60	5.00	ug/l	1.0					
Acetone		24.9	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 10, 1998

Sample ID : SPORT0794-5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	TCL	09/08/98	1111	130711	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	1.20	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	36.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	5.20	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		7.79	1.20	1.20	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	J	0.680	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	1.70	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	0.620	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	5.09	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	114.	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	74.4	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	73.2	(68.4 - 135.)

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1899 North Hobson Ave
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 10, 1998

Sample ID : SPORT0794-5

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-1

Surrogate Recovery	Test	Percent%	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0811-2
Lab ID	: 9809631-02
Matrix	: GroundH2O
Date Collected	: 09/21/98
Date Received	: 09/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/24/98	1343	131910	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/24/98	1343	131910	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	U	ND	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Mercury		1.77	0.0350	0.200	ug/l	1.0	RMJ	09/22/98	1731	131779	N
Silver		56.1	0.730	5.00	ug/l	1.0	MBL	09/24/98	1245	131775	2
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		31.0	0.510	5.00	ug/l	1.0					
Cadmium	J	1.06	0.440	5.00	ug/l	1.0					
Chromium		5.60	0.560	5.00	ug/l	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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead		49.6	1.59	5.00	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0	MBL	09/24/98	1245	131775	2

The following prep procedures were performed:

Mercury	RMJ	09/22/98	1130	131779	3
TRACE	FGD	09/22/98	1200	131775	4

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	85.0	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	84.9	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	102.	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 7470
M 4	EPA 3005

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1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-2

M = Method	Method-Description

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0811-3
Lab ID	: 9809631-03
Matrix	: GroundH2O
Date Collected	: 09/21/98
Date Received	: 09/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Mercury	J	0.196	0.0350	0.200	ug/l	1.0	RMJ	09/22/98	1732	131779	N
Silver		69.3	0.730	5.00	ug/l	1.0	MBL	09/24/98	1250	131775	1
Arsenic		9.77	4.51	5.00	ug/l	1.0					
Barium		26.2	0.510	5.00	ug/l	1.0					
Cadmium	J	0.448	0.440	5.00	ug/l	1.0					
Chromium	J	2.84	0.560	5.00	ug/l	1.0					
Lead		13.1	1.59	5.00	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0					

The following prep procedures were performed:

Mercury	RMJ	09/22/98	1130	131779	2
TRACE	FGD	09/22/98	1200	131775	3

M = Method	Method-Description
M 1	EPA 6010A
M 2	EPA 7470
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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9809631-03

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-3

M = Method	Method-Description

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
Reviewed By

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0811-4
Lab ID	: 9809631-04
Matrix	: GroundH2O
Date Collected	: 09/21/98
Date Received	: 09/21/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/24/98	1415	131910	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/24/98	1415	131910	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	U	ND	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Mercury	J	0.115	0.0350	0.200	ug/l	1.0	RMJ	09/22/98	1734	131779	N
Silver		5.33	0.730	5.00	ug/l	1.0	MBL	09/24/98	1255	131775	2
Arsenic	U	ND	4.51	5.00	ug/l	1.0					
Barium		229	0.510	5.00	ug/l	1.0					
Cadmium	U	ND	0.440	5.00	ug/l	1.0					
Chromium	U	ND	0.560	5.00	ug/l	1.0					

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SUPSHIP-Portsmouth Detachment-Env.
1899 North Hobson Ave.
North Charleston, South Carolina 29405-2106
Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID . SPORT0811-4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Lead	J	2.35	1.59	5.00	ug/l	1.0					
Selenium	U	ND	2.71	5.00	ug/l	1.0	MBL	09/24/98	1255	131775	2

The following prep procedures were performed:

Mercury	RMJ	09/22/98	1130	131779	3
TRACE	FGD	09/22/98	1200	131775	4

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	83.9	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	82.8	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	102.	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 7470
M 4	EPA 3005

Notes:
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TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-4

M = Method	Method-Description

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
Reviewed By

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CHAIN OF CUSTODY RECORD

980963216

Page 1 of 1

Client Name/Facility Name: SPORT ENV DET CHASN

Collected by/Company: SPORTENV DET CHASN

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

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

CCL 3549Z

	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			Remarks	
01	SPORT-0811-1	9-21-98	0800				X	3						X												TRIP BLANK	.1
02	SPORT0811-2	9-21-98	0945				X	4						X	X											VAULT 150	.2
03	SPORT0811-3	9-21-98	1000				X	1							X											VAULT LP5	.3
04	SPORT0811-4	9-21-98	1010				X	4						X	X											VAULT 26I	.2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Mike Zulgh	9-21-98	1130	Raymond Reed	Darren Wadleigh	9-21-98	1330	Raymond Reed

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
Raymond Reed	9/21/98	1:50	Karen Blakeney	9/21/98	1350	

White = sample collector Yellow = file Pink = with report

— 3 DAY TURN AROUND —

CHAIN OF CUSTODY RECORD

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Charleston, South Carolina 29417
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Client Name/Facility Name: SPORTENV DETCHASN

Collected by/Company: SPORTENV DETCHASN

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

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

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	ICP BERYLLIUM		Remarks
SPORT 990019-01	10-23-98	0900				X	1																X		VAULT 12
SPORT 990019-02	10-23-98	0915				X	1																X		VAULT 16
SPORT 990019-03	10-23-98	0930				X	1																X		VAULT 0012

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Mike Rubeler	10-23-98	1000					

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:

White = sample collector Yellow = file Pink = with report

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: October 27, 1998

Sample ID	: 99 SPORT0019-01
Lab ID	: 9810851-01
Matrix	: WasteH2O
Date Collected	: 10/23/98
Date Received	: 10/23/98
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Beryllium	U	ND	0.260	5.00	ug/l	1.0	MBL	10/26/98	2356	134390	1
The following prep procedures were performed:											
TRACE							FGD	10/26/98	1000	134390	2

M = Method	Method-Description
M 1	EPA 200.7
M 2	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detecrion limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
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standard operating procedures. Please direct
any questions to your Project Manager, Karen Blakeney at (843) 769-7386.

Karen Blakeney
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STATE	GEL	EPI
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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: October 27, 1998

Sample ID	: 99 SPORT0019-02
Lab ID	: 9810851-02
Matrix	: WasteH2O
Date Collected	: 10/23/98
Date Received	: 10/23/98
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Beryllium	U	ND	0.260	5.00	ug/l	1.0	MBL	10/27/98	0001	134390	1
The following prep procedures were performed:											
TRACE							FGD	10/26/98	1000	134390	2

M = Method	Method-Description
M 1	EPA 200.7
M 2	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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Karen Blakeney
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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: October 27, 1998

Sample ID	: 99 SPORT0019-03
Lab ID	: 9810851-03
Matrix	: WasteH2O
Date Collected	: 10/23/98
Date Received	: 10/23/98
Priority	: Rush
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Metals Analysis											
Beryllium	U	ND	0.260	5.00	ug/l	1.0	MBL	10/27/98	0007	134390	1
The following prep procedures were performed:											
TRACE							FGD	10/26/98	1000	134390	2

M = Method	Method-Description
M 1	EPA 200.7
M 2	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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NPC 200197
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9810851 %

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Client Name/Facility Name: SPORTENV DET CHASN

Collected by/Company: SPORTENV DET CHASN

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

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

CCL 36214

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	ICP BERYLLIUM (P)	Remarks
D1	SPORT 990019-D1	10-23-98	0900				X	1																X	VAULT 12 .1
D2	SPORT 990019-02	10-23-98	0915				X	1																X	VAULT 16 .1
D3	SPORT 990019-03	10-23-98	0930				X	1																X	VAULT DD12 .1

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[illegible]	10-23-98	1000	[illegible]	[illegible]	10-23	1515	[illegible]

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
[illegible]	10/23/98	1552	Karen Blakeney	10/23/98	1550	

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TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1147	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	1.60	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	83.3	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	84.6	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	103.	(68.4 - 135.)

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-1

Surrogate Recovery	Test	Percent %	Acceptable Limits

M = Method	Method-Description
M 1	EPA 8260B

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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
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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0808-2
Lab ID	: 9809553-02
Matrix	: GroundH2O
Date Collected	: 09/17/98
Date Received	: 09/17/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1323	131547	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1 0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1323	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	1.29	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Arsenic		6.33	4.51	5.00	ug/l	1.0	MBL	09/23/98	1902	131529	2
Lead		871	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE	AJM	09/18/98	1730	131529	3

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-2

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	87 0	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	86.2	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	105.	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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standard operating procedures. Please direct
any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

Karen Blakeney
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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-3
Lab ID : 9809553-03
Matrix : GroundH2O
Date Collected : 09/17/98
Date Received : 09/17/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1355	131547	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1355	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	J	1.37	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Arsenic	U	ND	4.51	5.00	ug/l	1.0	MBL	09/23/98	1908	131529	2
Lead		28.6	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE	AJM	09/18/98	1730	131529	3

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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID . SPORT0808-3

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	94.2	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	93.8	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	114.	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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Karen Blakeney
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NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0808-4
Lab ID	: 9809553-04
Matrix	: GroundH2O
Date Collected	: 09/17/98
Date Received	: 09/17/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1427	131547	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1427	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	U	ND	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Arsenic	U	ND	4.51	5.00	ug/l	1.0	MBL	09/23/98	1913	131529	2
Lead		18.5	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE	AJM	09/18/98	1730	131529	3

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-4

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	96.0	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	94.4	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	120.	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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
Reviewed By

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0808-5
Lab ID	: 9809553-05
Matrix	: GroundH2O
Date Collected	: 09/17/98
Date Received	: 09/17/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1459	131547	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1459	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	U	ND	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Arsenic		10.8	4.51	5.00	ug/l	1.0	MBL	09/23/98	1919	131529	2
Lead		308	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE	AJM	09/18/98	1730	131529 3

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-5

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	96.5	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	93.0	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	121.	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
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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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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.

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SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-6
Lab ID : 9809553-06
Matrix : GroundH2O
Date Collected : 09/17/98
Date Received : 09/17/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1532	131547	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	U	ND	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-6

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/18/98	1532	131547	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride	U	ND	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					
Metals Analysis											
Arsenic	U	ND	4.51	5.00	ug/l	1.0	MBL	09/23/98	1925	131529	2
Lead		36.9	1.59	5.00	ug/l	1.0					

The following prep procedures were performed:

TRACE	AJM	09/18/98	1730	131529	3

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-6

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	98.1	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	95.1	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	112.	(68.4 - 135.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 3005

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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
Reviewed By

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STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID	: SPORT0808-7
Lab ID	: 9809553-07
Matrix	: Soil
Date Collected	: 09/17/98
Date Received	: 09/17/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.181	1.00	ug/kg	1.0	TCL	09/18/98	1611	131552	1
1,1,1-Trichloroethane	U	ND	0.0907	1.00	ug/kg	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.544	1.00	ug/kg	1.0					
1,1,2-Trichloroethane	U	ND	0.272	1.00	ug/kg	1.0					
1,1-Dichloroethane	U	ND	0.0907	1.00	ug/kg	1.0					
1,1-Dichloroethylene	U	ND	0.272	1.00	ug/kg	1.0					
1,2,3-Trichloropropane	U	ND	0.363	1.00	ug/kg	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.363	1.00	ug/kg	1.0					
1,2-Dibromoethane	U	ND	0.181	1.00	ug/kg	1.0					
1,2-Dichlorobenzene	U	ND	0.454	1.00	ug/kg	1.0					
1,2-Dichloroethane	U	ND	0.181	1.00	ug/kg	1.0					
1,2-Dichloropropane	U	ND	0.181	1.00	ug/kg	1.0					
1,2-cis-Dichloroethylene	U	ND	0.0907	1.00	ug/kg	1.0					
1,2-trans-Dichloroethylene	U	ND	0.0907	1.00	ug/kg	1.0					
2-Butanone	U	ND	2.90	5.00	ug/kg	1.0					
2-Hexanone	U	ND	2.54	5.00	ug/kg	1.0					
4-Methyl-2-pentanone	U	ND	2.81	5.00	ug/kg	1.0					
Acetone		14.7	9.34	9.34	ug/kg	1.0					
Acetonitrile	U	ND	0.907	25.0	ug/kg	1.0					
Acrolein	U	ND	4.17	10.0	ug/kg	1.0					
Acrylonitrile	U	ND	3.54	10.0	ug/kg	1.0					
Allyl Chloride	U	ND	0.363	5.00	ug/kg	1.0					
Benzene	J	0.671	0.454	1.00	ug/kg	1.0					
Bromoform	U	ND	0.272	1.00	ug/kg	1.0					
Carbon Disulfide	U	ND	0.272	5.00	ug/kg	1.0					
Carbon Tetrachloride	U	ND	0.454	1.00	ug/kg	1.0					
Chlorobenzene	U	ND	0.272	1.00	ug/kg	1.0					

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-7

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.181	1.00	ug/kg	1.0					
Chloroethane	U	ND	0.272	1.00	ug/kg	1.0	TCL	09/18/98	1611	131552	1
Chloroform	U	ND	0.0907	1.00	ug/kg	1.0					
Chloroprene	U	ND	9.07	20.0	ug/kg	1.0					
Dibromomethane	U	ND	0.181	1.00	ug/kg	1.0					
Dichlorobromomethane	U	ND	0.0907	1.00	ug/kg	1.0					
Dichlorodifluoromethane	U	ND	1.09	1.09	ug/kg	1.0					
Ethylbenzene	J	0.698	0.272	1.00	ug/kg	1.0					
Isobutyl Alcohol	U	ND	5.71	10.0	ug/kg	1.0					
Methacrylonitrile	U	ND	0.816	5.00	ug/kg	1.0					
Methyl Bromide	U	ND	0.272	1.00	ug/kg	1.0					
Methyl Chloride	U	ND	0.181	1.00	ug/kg	1.0					
Methyl Iodide	U	ND	0.544	5.00	ug/kg	1.0					
Methyl Methacrylate	U	ND	0.363	5.00	ug/kg	1.0					
Methylene Chloride	U	ND	1.27	1.27	ug/kg	1.0					
Propionitrile	U	ND	3.08	10.0	ug/kg	1.0					
Styrene	U	ND	0.272	1.00	ug/kg	1.0					
Tetrachloroethylene	U	ND	0.363	1.00	ug/kg	1.0					
Toluene	J	0.925	0.816	1.00	ug/kg	1.0					
Trichloroethylene	U	ND	0.272	1.00	ug/kg	1.0					
Trichlorofluoromethane	U	ND	0.272	1.00	ug/kg	1.0					
Vinyl Acetate	U	ND	1.90	5.00	ug/kg	1.0					
Vinyl chloride	U	ND	0.363	1.00	ug/kg	1.0					
Xylenes (TOTAL)	U	ND	0.635	2.00	ug/kg	1.0					
bis(2-Chloromethylethyl)ether	U	ND	4.62	10.0	ug/kg	1.0					
cis-1,3-Dichloropropylene	U	ND	0.181	1.00	ug/kg	1.0					
trans-1,3-Dichloropropylene	U	ND	0.272	1.00	ug/kg	1.0					
trans-1,4-Dichloro-2-butene	U	ND	0.454	5.00	ug/kg	1.0					
Metals Analysis											
Arsenic		3060	421	463	ug/kg	2.0	MBL	09/22/98	1432	131644	2
Lead		303000	145	463	ug/kg	2.0					

The following prep procedures were performed:

GC/MS Volatiles (8260 High Level) TCL 09/18/98 0921 131552 3

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Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0808-7

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
TRACE							FGD	09/21/98	1500	131644	4

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	89.9	(53 5 - 154.)
Dibromofluoromethane	APP 9 VOA-8260B	94.2	(63.4 - 136.)
Toluene-d8	APP 9 VOA-8260B	93.0	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260B
M 2	EPA 6010A
M 3	EPA 5035
M 4	EPA 3050

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
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
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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
Reviewed By

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BB NPWC 00147

General Engineering Labor[illegible]s, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

CHAIN OF CUSTODY RECORD

9809553 1/2

Page 1 of 1

Client Name/Facility Name: SPORTENVDETCHAS

Collected by/Company: SPORTENVDETCHAS

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

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

CCL 35436

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	ICP - LEAD	ICP - ARSENIC	Remarks	
01	SPORT0808-1	9-17-98	0800				X	3						X												TRIP BLANK	.1
02	SPORT0808-2	9-17-98	0840				X	4						X										X	X	VAULT DD17	.2
03	SPORT0808-3	9-17-98	0855				X	3						X										X	X	VAULT DD16	.2
04	SPORT0808-4	9-17-98	0905				X	4						X										X	X	VAULT DD15	.2
05	SPORT0808-5	9-17-98	1010				X	4						X										X	X	VAULT 52	.2
06	SPORT0808-6	9-17-98	0950		X		X	4						X										X	X	VAULT 54	.2
07	SPORT0808-7	9-17-98	1100		X		X	2						X										X	X	VAULT 4	.2

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Mike Zuhlke	9-17-98	1230	Vivian Washington	Vivian Washington	9-17-98	0550	Stephanie Bartlett
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
Stephanie Bartlett	9-17-98	1615	Karen Blakeney	9/17/98	1615		

White = sample collector Yellow = file Pink = with report

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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: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-1
Lab ID : 9809631-01
Matrix : GroundH2O
Date Collected : 09/21/98
Date Received : 09/21/98
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Volatile Organics											
Appendix IX Volatiles - 55 items											
1,1,1,2-Tetrachloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/24/98	1311	131910	1
1,1,1-Trichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,1,2,2-Tetrachloroethane	U	ND	0.500	1.00	ug/l	1.0					
1,1,2-Trichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethane	U	ND	0.400	1.00	ug/l	1.0					
1,1-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2,3-Trichloropropane	U	ND	0.500	1.00	ug/l	1.0					
1,2-Dibromo-3-chloropropane	U	ND	0.600	1.00	ug/l	1.0					
1,2-Dibromoethane	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichlorobenzene	U	ND	0.400	1.00	ug/l	1.0					
1,2-Dichloroethane	U	ND	0.200	1.00	ug/l	1.0					
1,2-Dichloropropane	U	ND	0.200	1.00	ug/l	1.0					
1,2-cis-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
1,2-trans-Dichloroethylene	U	ND	0.700	1.00	ug/l	1.0					
2-Butanone	U	ND	5.90	10.0	ug/l	1.0					
2-Hexanone	U	ND	3.20	5.00	ug/l	1.0					
4-Methyl-2-pentanone	U	ND	1.60	5.00	ug/l	1.0					
Acetone	J	4.08	3.70	5.00	ug/l	1.0					
Acetonitrile	U	ND	15.6	25.0	ug/l	1.0					
Acrolein	U	ND	8.90	10.0	ug/l	1.0					
Acrylonitrile	U	ND	8.20	10.0	ug/l	1.0					
Allyl Chloride	U	ND	2.10	5.00	ug/l	1.0					
Benzene	U	ND	0.300	1.00	ug/l	1.0					
Bromoform	U	ND	0.400	1.00	ug/l	1.0					
Carbon Disulfide	U	ND	1.80	5.00	ug/l	1.0					
Carbon Tetrachloride	U	ND	0.200	1.00	ug/l	1.0					
Chlorobenzene	U	ND	0.300	1.00	ug/l	1.0					

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Contact: Mr. Bill Hiers
Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197 Report Date: September 28, 1998

Sample ID : SPORT0811-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Chlorodibromomethane	U	ND	0.300	1.00	ug/l	1.0					
Chloroethane	U	ND	0.300	1.00	ug/l	1.0	JEB	09/24/98	1311	131910	1
Chloroform	U	ND	0.700	1.00	ug/l	1.0					
Chloroprene	U	ND	0.100	20.0	ug/l	1.0					
Dibromomethane	U	ND	0.200	1.00	ug/l	1.0					
Dichlorobromomethane	U	ND	0.400	1.00	ug/l	1.0					
Dichlorodifluoromethane	U	ND	1.20	5.00	ug/l	1.0					
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Isobutyl Alcohol	U	ND	36.0	50.0	ug/l	1.0					
Methacrylonitrile	U	ND	3.80	5.00	ug/l	1.0					
Methyl Bromide	U	ND	0.300	1.00	ug/l	1.0					
Methyl Chloride	U	ND	0.200	1.00	ug/l	1.0					
Methyl Iodide	U	ND	5.20	10.0	ug/l	1.0					
Methyl Methacrylate	U	ND	3.90	5.00	ug/l	1.0					
Methylene Chloride		11.7	1.20	5.00	ug/l	1.0					
Propionitrile	U	ND	2.60	10.0	ug/l	1.0					
Styrene	U	ND	0.200	1.00	ug/l	1.0					
Tetrachloroethylene	U	ND	0.700	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Trichloroethylene	U	ND	0.600	1.00	ug/l	1.0					
Trichlorofluoromethane	U	ND	1.70	5.00	ug/l	1.0					
Vinyl Acetate	U	ND	1.80	5.00	ug/l	1.0					
Vinyl chloride	U	ND	0.400	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
bis(2-Chloromethylethyl)ether	U	ND	3.70	10.0	ug/l	1.0					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/l	1.0					
trans-1,4-Dichloro-2-butene	U	ND	2.80	5.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	APP 9 VOA-8260B	87.2	(60.2 - 139.)
Dibromofluoromethane	APP 9 VOA-8260B	84.1	(70.6 - 152.)
Toluene-d8	APP 9 VOA-8260B	101	(68.4 - 135.)

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APPENDIX B

ENSAFE INC. SWMU MANHOLE/CONFINED SPACE STUDY

ENSAFE

ENSAFE INC. ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

935 Houston Northcutt Blvd., Suite 113 • Mt. Pleasant, SC 92464 • Telephone 843-884-0029 • Facsimile 843-856-0107 • www.ensafe.com

13 August, 1998

Commanding Officer
ATTN: Mr. Tony Hunt
SOUTHNAVFACENGCOM
2155 Eagle Drive
North Charleston, South Carolina 29410-9010

Subject: SWMU Manhole / Confined Space Study

Dear Mr. Hunt:

In support of Southern Division, NAVFACENGCOM, EnSafe performed a study of the Manholes 7, 7A, and 7B located adjacent to, and under the former plating shop now referred to as SWMU 25. The purpose of the limited study was to determine the types of chemical contaminants which may be encountered by personnel entering the manholes, and to provide NAVFACENGCOM guidance regarding appropriate safety systems and procedures for compliance with appropriate occupational safety and health standards and for safe entry into the manholes. EnSafe met with representatives from the South Carolina Electric and Gas (SCE&G), Environmental Detachment, Charleston, and NAVFACENGCOM, on July 8, 1998, to view the manholes and identify and evaluate potential chemical hazards within the manholes.

Hazard Evaluation

The SWMU 25 Manholes 7, 7A, and 7B serve primarily as electric utility vaults and were formerly located under a plating facility, which is now demolished. According to SCE&G and Navy representatives familiar with the former site operations, there was reason to believe that significant chemical and physical hazards exist in the manholes. Based on that information, and on the configuration of the vaults, EnSafe agreed with Navy and SCE&G personnel that entry into the space was not appropriate until a hazard evaluation was complete according to the requirements of the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.146, Permit-Required Confined Spaces. The general requirements of the standard require the identification and evaluation of hazards and development and implementation of means, procedures, and practices for safe entry operations, prior to entry by any personnel.

Based visual observations, and on discussions with Navy and SCE&G personnel, it was apparent that in addition to potential for hazardous energy sources and oxygen deficient and/or

explosive gases, chemical contamination of the surfaces within the respective vaults was likely and therefore identification and evaluation of the chemical hazards was appropriate. To identify and evaluate the specific chemical species which formed the hazard, EnSafe collected wipe samples for poly-chlorinated biphenyls (SW846 Method 8082) and metals (SW846,6010/7000)from various surfaces within each respective manhole/vault. Since entry was not possible until appropriate hazard evaluation was performed, EnSafe used non-conductive tool extension devices to collect the samples from surfaces within each respective manhole. Those surfaces sampled are as follows:

- Vertical surfaces including walls and cables (Samples 025MW0701, 025MW07A04, 025MW07B07).
- Horizontal surfaces including brackets, cables, and hangers Samples 025MW0701, 025MW07A04, 025MW07B07)
- Miscellaneous surfaces including cables with obvious discoloration and or apparently contaminated coatings (Samples 025MW0701, 025MW07A04, 025MW07B07)

Findings

Based on visual observation, discussions with local technical representatives, review of applicable OSHA standards (hazardous waste site operations (29 CFR 1910.120), permit-required confined spaces (29 CFR 1910.146) and control of hazardous energy (29 CFR 1910.147), and on analytical data from manhole surface wipe samples (see Attachment), EnSafe presents the following findings:

- As defined by the OSHA standard, the SWMU 25 manhole/utility vaults 7, 7A, and 7B, configuration, access limitations, and design determine that these manholes meet the definition of a *Confined Space*.

- The analytical results from wipe samples (Tables 1 and 2) collected from various surfaces in the respective manhole/vaults, indicate that chemical hazards exist on all accessible surfaces within the respective manholes, and therefore represent significant dermal and inhalation hazards, depending on the activities planned. These chemical hazards exist as metal salt deposits, specifically lead, arsenic, chromium, and nickel,

- The analytical results from wipe samples (Tables 1 and 2) collected from various surfaces in the respective manhole/vaults indicate that poly-chlorinated biphenyls do not exist within the respective manhole/utility vaults.

- The manhole/utility vaults potentially contain oxygen deficient and/or explosive atmospheres and have potentially hazardous energy sources because of high voltage cables submerged in standing water.

- Based on the manhole/utility vault configuration and presence of significant chemical and physical hazards within those spaces, the spaces are defined as *Permit-Required Confined Spaces*, and thus entry of personnel into those spaces requires the following:
  - Specification of Acceptable Entry Conditions
  - Specification and provisioning of appropriate testing and monitoring, ventilation, communication, rescue, ingress and egress, and personal protective equipment.
  - Development and implementation of appropriate testing and monitoring protocols for oxygen combustible gases and vapors, and toxic gases and vapors.
  - Trained Attendant(s).
  - Development and implementation of rescue procedures.
  - Training of personnel performing confined space entry to establish proficiency in the duties required by the standard.
  - Development of a Hazard Communication Program that addresses the specific chemicals that were identified in the manholes.

- OSHA's Hazardous Waste Operations and Emergency Response regulation (29 CFR 1910.120) covers the following operations:
  - Required and voluntary clean-up operations at uncontrolled hazardous waste sites that have been identified for clean-up by a governmental health or environmental agency;
  - Corrective actions involving clean-up operations at RCRA sites;
  - Operations involving hazardous waste that are conducted at treatment, storage and disposal (TSD) facilities; and
  - Emergency response operations for releases of, or substantial threats of releases of, hazardous substances.

  Because the proposed utility work in the manholes / vaults at SWMU 25 do not include any of the previous operations, workers entering the manholes to perform these operations are not required to be trained in accordance with 29 CFR 1910.120.

- Because chemical and physical hazards have been identified in the manholes / vaults, any work performed in them must be done by a crew specifically trained and equipped to perform confined space entries. A carefully prepared confined space permit must also be prepared for each entry.

- EnSafe does not claim to be knowledgeable of appropriate procedures for electrical isolation of the cables within the manholes/utility vaults; however, we are confident that SCE&G technicians can be trained and equipped to safely enter the manhole/utility vaults given the condition that they assume responsibility for all aspects of hazardous energy source safety.

Recommendations

The following recommendations are based on the findings discussed above and are intended to provide guidance to Southern Division NAVFACENGCOM contractors and service providers who are required to enter the SWMU 25 manhole/utility vaults.

- All personnel contractors and/or service providers tasked to enter the manhole/utility vaults will be required to have a written and fully implemented Confined Space Entry Program. All personnel performing entry activities should be trained and equipped pursuant to 29 CFR 1910.146. The contractors and/or service provider management should be able to demonstrate compliance with the standard via written certifications of employee competence.

- A confined space entry permit should be prepared for each contractors and service provider entry and should include the following:

  - A description of the permit space to be entered

  - The purpose of the entry
    - *Identify whether the operations will be disruptive or non-disruptive to the material in the manhole.*
    - *Disruptive operations will require a greater level of protection for workers.*

  - The date and authorized duration of the entry permit

  - The authorized entrants within the space

  - The names of the attendants

  - The name of the entry supervisor

  - The hazards of the permit space
    - *Hazardous energy*
    - *Water / submersion, entrapment*
    - *Chemical hazards from dermal or inhalation routes as identified above*

  - The measures used to isolate the space to eliminate or control hazards
    - *Pump water from the space*
    - *Implement SCE&G procedures for identification and control of hazardous energy sources.*

- *Establish barriers around space*
- *Ventilate the space as needed*

- The acceptable entry conditions
  - *O_2 greater than or equal to 19.5% and less than 23.5%*
  - *Atmosphere less than 10% of the lower explosive limit*
  - *No contaminants above the permissible exposure limit*

- The results of initial and periodic monitoring

- The emergency and rescue services to be used
  - *In-house or contracted emergency services may be used*
  - *Local fire and EMS teams may be used*
  - *Identify method of summoning the rescue team*

- The safety equipment to be used
  - *Tyvek coveralls*
  - *Half mask, air purifying respirator with P100 filters*
  - *Hard hat*
  - *Steel-toe boots*
  - *Nitrile gloves*
  - *Safety glasses*
  - *Ventilation equipment*

Should you have any additional questions or comments, please do not hesitate to call me at (843)884-0029.

Sincerely,
EnSafe Inc.

Robert W. Batts, CIH
Senior Industrial Hygienist

Attachments

Attachment

Table 1
Wipe Sample Data

and

Table 2
Metals Detections in Wipe Samples

TABLE 1
SWMU 25 - MANHOLE SAMPLING
WIPE SAMPLE DATA
7/8/98

Field ID#	Location/Activity	Analyte	µg/wipe
025MSW00701	Manhole 7 South Wall	Aluminum	3,900
		Antimony	10.6
		Arsenic	1.6 B
		Barium	63.3
		Beryllium	0.16 B
		Cadmium	21
		Calcium	6,900
		Chromium	5,710
		Cobalt	3.3 B
		Copper	842
		Iron	5,120
		Lead	254
		Magnesium	752
		Manganese	163
		Nickel	60.5
		Potassium	1,060
		Silver	3
		Sodium	905
		Vanadium	16.1
		Zinc	1,310
		PCB	ND
025MW00702	Manhole 7 Bracket and Cable	Aluminum	12,800
		Antimony	26.2
		Arsenic	40.8
		Barium	71.6
		Beryllium	0.44 B
		Cadmium	7.2
		Calcium	21,600
		Chromium	665
		Cobalt	3.1 B
		Copper	318
		Iron	20,800
		Lead	5,120
		Magnesium	1,440
		Manganese	142
		Nickel	35.1
		Potassium	1,100
		Silver	0.91 B
		Sodium	728
		Vanadium	32.6
		Zinc	26,400
		PCB	ND

TABLE 1
SWMU 25 - MANHOLE SAMPLING
WIPE SAMPLE DATA
7/8/98

Field ID#	Location/Activity	Analyte	µg/wipe
025MW00703	Manhole 7 Lead-Covered Cable — Yellow Coating	Aluminum	10,300
		Antimony	10.5
		Arsenic	63.4
		Barium	52.6
		Beryllium	0.32 B
		Cadmium	8.4
		Calcium	7,210
		Chromium	7,950
		Cobalt	4.2 B
		Copper	334
		Iron	14,600
		Lead	26,500
		Magnesium	1,200
		Manganese	128
		Nickel	34.2
		Potassium	980
		Silver	3.2
		Sodium	800
		Vanadium	32.5
		Zinc	824
		PCB	ND
025MW07A04	Manhole 7A South Wall — deteriorating delaminating	Aluminum	1,350
		Antimony	14.9
		Arsenic	5.1 B
		Barium	182
		Beryllium	0.05 B
		Cadmium	2.6
		Calcium	2,930
		Chromium	8,110
		Cobalt	1.5 B
		Copper	93.6
		Iron	13,000
		Lead	235
		Magnesium	130 B
		Manganese	24
		Nickel	5.1
		Potassium	1,920
		Silver	2.9
		Sodium	648
		Vanadium	11.5
		Zinc	150
		PCB	ND

TABLE 1
SWMU 25 - MANHOLE SAMPLING
WIPE SAMPLE DATA
7/8/98

Field ID#	Location/Activity	Analyte	µg/wipe
025MW07A05	Manhole 7A Cable in Middle of Vault	Aluminum	27,300
		Antimony	25.6
		Arsenic	25.1
		Barium	267
		Beryllium	[illegible]
		Cadmium	20.9
		Calcium	8,230
		Chromium	14,800
		Cobalt	40.1
		Copper	437
		Iron	36,200
		Lead	2,880
		Magnesium	1,300
		Manganese	437
		Nickel	130
		Potassium	1,600
		Silver	18.7
		Sodium	238
		Thallium	6.6 B
		Vanadium	34.2
		Zinc	1,580
		PCB	ND
025MW07A06	Manhole 7A Lead Covered Cable — Near top of Vault (Yellow coating)	Aluminum	729
		Antimony	10.4
		Arsenic	3.1 B
		Barium	113
		Beryllium	0.03 B
		Cadmium	13.6
		Calcium	987
		Chromium	5,220
		Cobalt	1 B
		Copper	169
		Iron	3,250
		Lead	19,200
		Magnesium	99 B
		Manganese	12.3
		Nickel	12.6
		Potassium	130 B
		Selenium	3.2 B
		Silver	6
		Sodium	744
		Vanadium	5.8
		Zinc	139
		PCB	ND

TABLE 1
SWMU 25 - MANHOLE SAMPLING
WIPE SAMPLE DATA
7/8/98

Field ID#	Location/Activity	Analyte	µg/wipe
025MW07B07	Manhole 7B Cable	Aluminum	1,260
		Antimony	126
		Arsenic	3.4
		Barium	6.1
		Beryllium	0.14 B
		Cadmium	14.9
		Calcium	3,150
		Chromium	3,850
		Cobalt	4.8
		Copper	39
		Iron	21,500
		Lead	13,600
		Magnesium	292 B
		Manganese	276
		Nickel	51.2
		Potassium	309 B
		Silver	6
		Sodium	637
		Thallium	2.6 B
		Vanadium	10
		Zinc	334
		PCB	ND
025MW07B08	Manhole 7B Hanger (Yellow)	Aluminum	634
		Antimony	27.6
		Barium	32
		Beryllium	0.03 B
		Cadmium	53.4
		Calcium	3,280
		Chromium	13,600
		Cobalt	0.95 B
		Copper	240
		Iron	1,600
		Lead	878
		Magnesium	136 B
		Manganese	68.9
		Nickel	28.9
		Potassium	1,030
		Silver	7.2
		Sodium	984
		Vanadium	6.8
		Zinc	49400
		PCB	ND
025MW07B09	Manhole 7B Blank	Aluminum	8.3 B
		Barium	1.1 B
		Beryllium	0.04 B
		Calcium	592
		Chromium	2.3
		Copper	5.3
		Iron	13.9
		Magnesium	59.7 B
		Manganese	0.85 B
		Nickel	0.87 B
		Potassium	69.3 B
		Silver	0.52 B
		Sodium	592
		Zinc	15.1
		PCB	ND

Note:
The lead standard is 200µg/ft² (Housing and Urban Development, 1990).

Table 2
Metals Detections in Wipe Samples

Element	Freq. Of Detection	Range of Detected Conc. (µg/wipe[a])	Mean of Detected Conc. (µg/wipe)	Airborne PELs (µg/m³)
Aluminum	8/8	634 - 27,300	7,409	5,000[b]
Antimony	8/8	10.9 - 126	31.5	500
Arsenic	7/8	4.6 - 63.2	21.4	10
Barium	8/8	32 - 267	107	500
Beryllium	8/8	0.03 - 1.1	0.28	2
Cadmium	8/8	2.6 - 53.4	11.9	5
Calcium	8/8	987 - 21,600	6,798	5,000[b]
Chromium	8/8	665 - 14,800	7,301	500
Cobalt	8/8	0.95 - 9.1	3.94	100
Copper	8/8	93.6 - 837	351	100
Iron	8/8	1,600 - 36,200	14,384	10,000
Lead	8/8	235 - 26,500	8,621	50
Magnesium	8/8	99 - 1,800	731	15,000
Manganese	8/8	12.3 - 437	156	5,000
Nickel	8/8	5.1 - 110	48.5	1,000
Potassium	8/8	130 - 1,920	1,024	NA[c]
Selenium	1/8	3.2	3.2	200
Silver	8/8	0.91 - 18.7	6.7	10
Sodium	8/8	837 - 984	776	NA
Thallium	2/8	2.6 - 6.6	4.6	100
Vanadium	8/8	5.8 - 56.2	21.4	500[b]
Zinc	8/8	139 - 49,400	10,080	500[b]

Note:

a = micrograms per wipe sample
b = respirable fraction
c = not applicable

APPENDIX C

DRAFT ZONE E RCRA FACILITY INVESTIGATION REPORT SITE-SPECIFIC EVALUATION FOR SWMU 83

10.10 SWMU 83, Foundry, Building 9; SWMU 84, Lead Storage, Building 9; and AOC 574, Building 9 Fuel Tank

SWMU 83 is a former foundry in Building 9. The foundry operations have been discontinued since at least 1991, and currently the building contains electrical power supply equipment, capacitors, transformers, rectifiers, furnaces, and ovens. The building is also used to repair hydraulic equipment. The foundry was built in 1906 and was used to cast metal parts in refitting ships. The primary industrial process associated with this facility was melting and casting copper alloy parts. Two fuel oil above-ground storage tanks (ASTs), which have not been decommissioned, are adjacent to the building. An abandoned oven was posted as containing PCBs. An approximately 10-cubic-foot pit of soot and metal scraps was observed below the electric furnace. The smoldering pots contain friable asbestos. Lead bricks and drums of hazardous materials from previous operations are present in the building. Most recently, the foundry was used to repair hydraulic equipment and as a power substation (providing electricity for smoldering activities). Several foundry-related air emissions sources remain within the unit. These include the following:

- The foundry furnace, designated as company point I.D. No. 53 on the Bureau of Air Quality Control Permit No. 0560-0002, has an associated 67-foot stack with no continuous emission monitors.

- The foundry mold's cyclone, designated as company point I.D. No. 54 on the Bureau of Air Quality Control Permit No. 0560-0002, has a 30-foot high, 2-foot inside diameter stack with no continuous emission monitors.

SWMU 84 consists of an area outside of Building 9 used to store lead blankets and shielding. The majority of the lead is encased in either rubber or fabric; however, uncovered lead materials have been stored here. The lead-containing materials are placed either on pallets or directly on the

concrete pavement. No containment structures are associated with this unit. No information could be found regarding the period of operation.

AOC 574 is the site of a 3,700-gallon AST east of Building 9. The inactive fuel tank formerly contained fuel oil for the furnaces and torches in Building 9. The tank is in an unpaved area and has no secondary containment. No information could be found regarding the period of operation.

SWMU 84 and AOC 574 have not been investigated previously. The following incidents and/or investigations occurred at SWMU 83:

- In a hand-written Department of the Navy memorandum, a transformer oil spill is reported to have occurred on August 22, 1979, in Building 9. The spill occurred while removing transformers. More than 100 gallons of transformer oil spilled on the ground and concrete pavement southeast of Building 9. The oil was sampled and submitted for PCB analysis; no documentation concerning the results has been found. The spill area was covered with absorbent materials, roped off, and posted with signs limiting access due to the presence of PCBs. No other spill cleanup activities are known to have occurred.

- According to Hazardous Material Incident Report No. 84-55, a capacitor in an electrical power supply exploded on September 18, 1984, spraying burned Pyranol oil residue inside an 8' x 6' x 7' containment room. The containment room was subsequently sealed and posted with PCB warning labels. The damaged capacitor was removed on October 3, 1984, and the room was cleaned up on October 19, 1984. The capacitor and cleanup debris were containerized in a 55-gallon drum and submitted for disposal through a Defense Logistics Agency (DLA) contract.

- Environmental Incident Report No. 88-68 states that a half gallon of oil mixed with soot spilled in August 1988. The spill area included an electrical rectifier and concrete foundation. On August 26, 1988, a composite sample from three locations in the spill area was collected and analyzed for PCBs; the results showed 124 ppm of Aroclor-1260. Following cleanup, the debris was placed in a drum and transferred to Building 246, a NAVBASE hazardous waste storage facility, for disposal. Two wipe samples were subsequently taken and analyzed for PCBs. The wipe sample from the rectifier indicated 120 micrograms per swab (μg/swab) of Aroclor-1254; the wipe sample from the concrete pad indicated 347 μg/swab of Aroclor-1254. Based upon these results, a double-rinse cleanup was conducted on September 7, 1988.

- Wipe samples were collected in January 1989 from around the drain plug and the cement foundation for the transformer NS 1A cabinet. The PCB analysis indicated 1,290 μg/swab of Aroclor-1260 (drain plug area) and 19,000 μg/swab of Aroclor-1260 (cement pad). The same two areas were sampled in early February 1989 with PCB results of 125 μg/swab and 5,620 μg/swab Aroclor-1260, respectively. The analytical results necessitated further cleaning to meet the USEPA requirements of 100 micrograms per 100 square centimeters (μg/100 cm^2). The spill area was recleaned and resampled on April 15, 1989, with results of 78 μg/swab in the drain plug area and 132 μg/swab of Aroclor-1260 on the concrete pad. Sampling on May 27, 1989, indicated <10 μg/swab of Aroclor-1260 on the cement pad.

- Environmental Incident Report No. 91-83 states a fire was discovered in the generating station at the foundry on May 23, 1991. The generating station provided the electricity to operate the induction heaters which operated the foundry's ovens. The generating station contained PCB capacitors. It was determined that an air-cooled transformer overheated

and caught fire. The PCB capacitors were not damaged. No known PCB investigation or cleanup is known to have been conducted.

- On September 19, 1988, three wipe samples were collected from the interior of the foundry Ajax oven and analyzed for PCBs. One sample was a wipe of a 100 cm^2 area on top of the second capacitor from the left in the bottom bank; analysis indicated 386.32 micrograms per wipe (μg/wipe) of Aroclor-1254. The other two samples are not based on a per unit area due to the large amount of dirt and grease also incidentally collected. One sample from the wooden base under the bottom bank of the capacitor indicated 235.29 milligrams per gram (mg/g) of Aroclor-1254. The second was taken from the floor behind the capacitor banks, and indicated 26.28 mg/g of Aroclor-1254.

- On October 27, 1988, airborne PCB (Aroclors-1254 and 1242) monitoring was conducted inside an Ajax Oven Control Center in the foundry while the oven was operating. Three areas were monitored approximately three hours; only one area had a reported PCB concentration (0.0029 milligrams per cubic meter [mg/m^3] Aroclor-1254) above the laboratory quantitation limit of 0.0020 mg/m^3.

Materials of concern identified in the *Final Zone E RFI Work Plan* are as follows: SWMU 83, lead, paints, solvents, friable asbestos, dielectric fluid, and petroleum hydrocarbons; at SWMU 84, lead; and at AOC 574, petroleum hydrocarbons. Potential receptors that may be exposed to site contaminants include current and future building users and any site workers this area may support following base closure.

To fulfill the RFI objectives at SWMUs 83 and 84 and AOC 574, air, soil, groundwater, and wipe samples were collected in accordance with the *Final Zone E RFI Work Plan* and Section 3 of this report to determine whether any contamination resulted from onsite activities.

10.10.1 Soil Sampling and Analysis

Soil was sampled in two rounds at SWMUs 83 and 84 and AOC 574 from the locations shown in Figure 10.10.1. The *Final Zone E RFI Work Plan*&H proposed collecting 12 soil samples from the upper interval and 12 from the lower interval. Soil samples were also collected at both intervals from the seven shallow monitoring well locations proposed at this site. During the first round of sampling, all 19 proposed upper-and 19 proposed lower-interval samples locations were collected.

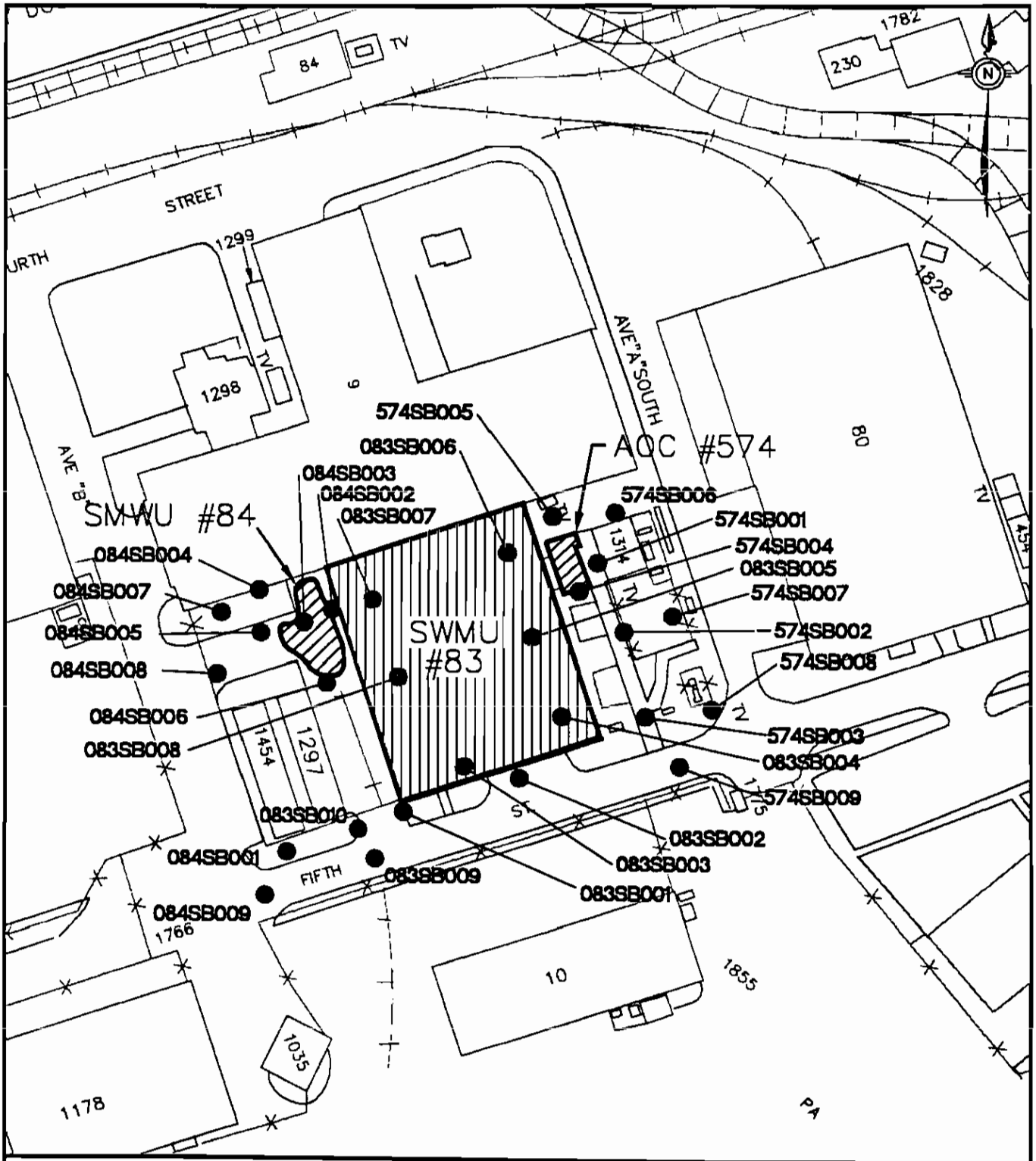
First-round Sampling — First-round samples were submitted for analysis at DQO Level III for organotins and the standard suite of parameters, which includes VOCs, SVOCs, pesticides/PCBs, metals and cyanide at DQO Level III. Five upper-interval and six lower-interval samples were also submitted for TPH analysis due to high OVA readings at SWMU 83 and surface staining around AOC 574. No duplicate samples were collected at this site. Table 10.10.1.1 summarizes the first round of soil sampling at SWMU 83 and associated sites.

Table 10.10.1.1
SWMUs 83 and 84 and AOC 574
First Round Soil Sampling Summary

Interval	Samples Proposed	Samples Collected	Analyses Proposed	Analyses Collected	Deviations
Upper	19	19	Standard Suite[a], organotins	Standard Suite[a], organotins	Five samples were analyzed for TPH
Lower	19	19	Standard Suite[a], organotins	Standard Suite[a], organotins	Six samples were analyzed for TPH

Note:
a = Standard Suite includes VOCs, SVOCs, pesticides/PCB, metals, and cyanide

Second-round Sampling — Second-round sampling was performed at SWMUs 83 and 84 and AOC 574 after first-round analytical results were compared to the USEPA Region III RBCs



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 10.10.1
SOIL BORING LOCATIONS
SWMU#83, BUILDING 9
SWMU #84, LEAD STORAGE, BLDG 9
AOC #574, BUILDING 9, SAA

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

and SSLs (April 1996). The second round included nine upper- and nine lower-interval samples to determine the extent of constituents detected during first-round sampling. Eight of nine proposed upper-interval samples and eight of nine lower-interval soil samples were collected. One upper-interval sample was not collected due to surface obstructions and one lower-interval sample was not collected due to sample saturation, or subsurface obstructions such as wood or rocks. Parameters exceeding RBCs included SVOCs, metal, and pesticides/PCBs. Section 10.10.2 details specific parameters and locations which exceeded RBCs.

All second-round samples at SWMUs 83 and 84 and AOC 574 were submitted for analysis of SVOCs and VOCs. One upper-interval duplicate sample was collected and analyzed for Appendix IX SVOCs, pesticides, metals, and cyanide. Table 10.10.1.2 summarizes the second round of soil sampling at SWMU 83 and associated sites.

Table 10.10.1.2
SWMUs 83 and 84 and AOC 574
Second Round Soil Sampling Summary

Interval	Samples Proposed	Samples Collected	Analyses Proposed	Analyses Collected	Deviations
Upper	9	8	Metals, SVOCs	Metals, SVOCs	One sample was not collected due to surface obstructions. Four samples were also analyzed for VOCs, pesticides, PCBs
Lower	9	8	Metals, SVOCs	Metals, SVOCs	One sample was not collected due to subsurface obstructions. Four samples were also analyzed for VOCs, pesticides, and PCBs.

10.10.2 Nature of Contamination in Soil

Organic compound analytical results for soil are summarized in Table 10.10.2.1. Inorganic analytical results for soil are summarized in Table 10.10.2.2. Appendix H contains the complete data report for all samples collected in Zone E.

Table 10.10.2.1
SWMUs 83 and 84 and AOC 574
Organic Compounds Detected in Soil (μg/kg)

Compound	Sampling Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Number of Samples Exceeding RBC
VOCs						
Acetone	Upper	12/23	6.00 - 200	75.2	20,000,000	0
	Lower	11/23	13.0 - 730	117	NA	NA
2-Butanone (MEK)	Upper	1/23	6.00	6.00	100,000,000	0
Carbon disulfide	Lower	1/23	4.00	4.00	NA	NA
Chlorobenzene	Lower	1/23	2.00	2.00	NA	NA
2-Hexanone	Upper	1/23	20.0	20.0	NA	NA
Methylene chloride	Upper	6/23	1.000 - 14.0	4.33	760,000	0
	Lower	5/23	2.00 - 7.00	5.20	NA	NA
Toluene	Upper	4/23	1.000	1.000	41,000,000	0
	Lower	1/23	2.00	2.00	NA	NA
1,1,1-Trichloroethane	Upper	2/23	1.000	1.000	7,200,000	0
Trichloroethene	Upper	1/23	37.0	37.0	520,000	0
Xylene (Total)	Upper	2/23	2.00 - 6.00	4.00	100,000,000	0
	Lower	2/23	2.00 - 5.00	3.50	NA	NA
SVOCs						
Acenaphthene	Upper	9/27	94.0 - 8,800	2,020	12,000,000	0
	Lower	4/27	140 - 2,400	1,170	NA	NA

Table 10.10.2.1
SWMUs 83 and 84 and AOC 574
Organic Compounds Detected in Soil (μg/kg)

Compound	Sampling Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Number of Samples Exceeding RBC
SVOCs						
Acenaphthylene	Upper	7/27	84.0 - 290	157	8,200,000	0
	Lower	2/27	43.0 - 190	117	NA	NA
Anthracene	Upper	15/27	95.0 - 18,000	2,430	61,000,000	0
	Lower	8/27	79.0 - 3,400	814	NA	NA
Benzo(g,h,i)perylene	Upper	20/27	50.0 - 8,400	1,830	8,200,000	0
	Lower	7/27	100 - 2,900	854	NA	NA
Benzoic acid	Upper	1/27	89.0	89.0	100,000,000	0
bis(2-Ethylhexyl)phthalate	Upper	3/27	140 - 680	380	410,000	0
Butylbenzylphthalate	Upper	4/27	130 - 300	215	41,000,000	0
	Lower	1/27	110	110	NA	NA
Carbazole	Upper	1/10	130	130	290,000	0
	Lower	1/8	200	200	NA	NA
2-Chlorophenol	Upper	1/27	100	100	1,000,000	0
Dibenzofuran	Upper	6/27	47.0 - 5,600	1,920	820,000	0
	Lower	5/27	45.0 - 1,700	627	NA	NA
Di-n-butylphthalate	Upper	1/27	74.0	74.0	20,000,000	0
	Lower	1/27	140	140	NA	NA
Diethylphthalate	Upper	2/27	790 - 5,900	3,350	100,000,000	0
	Lower	3/27	210 - 370	267	NA	NA
Dimethylphthalate	Upper	1/27	2,400	2,400	100,000,000	0
Di-n-octyl phthalate	Upper	2/27	52.0 - 170	111	4,100,000	0
Fluoranthene	Upper	20/27	100 - 73,000	8,330	8,200,000	0
	Lower	12/27	70.0 - 7,700	1,650	NA	NA

Table 10.10.2.1
SWMUs 83 and 84 and AOC 574
Organic Compounds Detected in Soil (μg/kg)

Compound	Sampling Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Number of Samples Exceeding RBC
SVOCs						
Fluorene	Upper	10/27	100 - 8,200	2,210	8,200,000	0
	Lower	7/27	140 - 3,700	1,630	NA	NA
2-Methylnaphthalene	Upper	12/27	51.0 - 5,500	1,170	8,200,000	0
	Lower	10/27	47.0 - 62,000	9,300	NA	NA
4-Methylphenol (p-Cresol)	Upper	3/27	44.0 - 110	83.3	1,000,000	0
Naphthalene	Upper	9/27	64.0 - 6,900	1,560	8,200,000	0
	Lower	6/27	74.0 - 1,800	651	NA	NA
Pentachlorophenol	Upper	1/27	320	320	48,000	0
	Lower	1/27	270	270	NA	NA
Phenanthrene	Upper	21/27	96.0 - 83,000	8,200	8,200,000	0
	Lower	14/27	120 - 11,000	2,190	NA	NA
Pyrene	Upper	21/27	120 - 59,000	6,590	6,100,000	0
	Lower	14/27	84.0 - 8,600	1,330	NA	NA
SVOCs (B(a)P Equivalents)						
B(a)P Equiv.	Upper	20/27	86.3 - 29,000	4,670	780	15
	Lower	9/27	140 - 7,830	1,680	NA	NA
Benzo(a)anthracene	Upper	19/27	79.0 - 26,000	3,680	7,800	3
	Lower	8/27	130 - 4,900	1,360	NA	NA
Benzo(b)fluoranthene	Upper	18/27	100 - 21,000	3,290	7,800	2
	Lower	8/27	120 - 5,200	1,180	NA	NA
Benzo(k)fluoranthene	Upper	17/27	290 - 17,000	3,200	78,000	0
	Lower	8/27	120 - 3,400	955	NA	NA
Benzo(a)pyrene	Upper	20/27	64.0 - 20,000	3,070	780	13
	Lower	9/27	140 - 5,700	1,190	NA	NA

Table 10.10.2.1
SWMUs 83 and 84 and AOC 574
Organic Compounds Detected in Soil (μg/kg)

Compound	Sampling Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Number of Samples Exceeding RBC
SVOCs (B(a)P Equivalents)						
Chrysene	Upper	19/27	99.0 - 21,000	3,560	780,000	0
	Lower	8/27	150 - 4,500	1,210	NA	NA
Dibenz(a,h)anthracene	Upper	14/27	83.0 - 3,600	1,040	780	4
	Lower	4/27	170 - 700	390	NA	NA
Indeno(1,2,3-cd)pyrene	Upper	19/27	43.0 - 10,000	2,060	7,800	1
	Lower	6/27	94.0 - 3,800	1,140	NA	NA
Pesticides						
gamma-BHC (Lindane)	Lower	1/27	2.30	2.30	NA	NA
alpha-Chlordane	Upper	1/27	20.0	20.0	4,400	0
gamma-Chlordane	Upper	3/27	3.40 - 60.0	25.1	4,400	0
	Lower	2/27	2.00 - 2.20	2.10	NA	NA
4,4'-DDD	Upper	2/27	3.00 - 33.0	18.0	24,000	0
	Lower	1/27	40.0	40.0	NA	NA
4,4'-DDE	Upper	6/27	3.30 - 250	48.7	17,000	0
	Lower	1/27	5.20	5.20	NA	NA
4,4'-DDT	Upper	5/27	4.50 - 290	67.1	17,000	0
	Lower	1/27	16.0	16.0	NA	NA
Dieldrin	Upper	1/27	9.40	9.40	360	0
	Lower	2/27	4.60 - 6.50	5.55	NA	NA
Endosulfan sulfate	Lower	1/27	36.0	36.0	NA	NA
Endrin	Upper	6/27	3.30 - 19.0	12.0	61,000	0
	Lower	3/27	5.60 - 23.0	13.9	NA	NA
Endrin aldehyde	Upper	1/27	14.0	14.0	61,000	0
	Lower	2/27	5.60 - 32.0	18.8	NA	NA

Table 10.10.2.1
SWMUs 83 and 84 and AOC 574
Organic Compounds Detected in Soil (μg/kg)

Compound	Sampling Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Number of Samples Exceeding RBC
Pesticides						
Endrin ketone	Upper	1/27	4.80	4.80	61,000	0
	Lower	1/27	6.30	6.30	NA	NA
Heptachlor	Upper	3/27	1.80 - 2.30	2.03	1,300	0
	Lower	2/27	1.80 - 2.50	2.15	NA	NA
Heptachlor epoxide	Upper	2/27	3.90 - 33.0	18.5	630	0
Methoxychlor	Lower	4/27	21.0 - 27.0	24.3	NA	NA
TPH						
Gasoline	Upper	2/5	124 - 5,460	2,790	NA	NA
	Lower	5/6	1.15 - 23,200	5,100	NA	NA

Notes:
μg/kg = Micrograms per kilogram
RBC = Risk-based concentration
NA = No industrial RBC established

Table 10.10.2.2
SWMUs 83 and 84 and AOC 574
Inorganic Detections for Soil (mg/kg)

Element	Sample Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Reference Conc.	Number of Samples Exceeding RBC and RC
Aluminum (Al)	Upper	27/27	1,350 - 6,640	4,370	100,000	26,600	0
	Lower	27/27	1,340 - 13,700	6,190	NA	41,100	NA
Antimony (Sb)	Upper	15/27	0.590 - 10.7	4.27	82.0	1.77	0
	Lower	9/27	0.660 - 7.70	2.53	NA	1.60	NA
Arsenic (As)	Upper	26/27	0.870 - 25.0	6.10	3.80	23.9	1
	Lower	27/27	0.810 - 16.7	5.76	NA	19.9	NA
Barium (Ba)	Upper	25/27	10.7 - 142	45.1	14,000	130	0
	Lower	25/27	6.90 - 84.8	28.0	NA	94.1	NA

Table 10.10.2.2
SWMUs 83 and 84 and AOC 574
Inorganic Detections for Soil (mg/kg)

Element	Sample Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Reference Conc.	Number of Samples Exceeding RBC and RC
Beryllium (Be)	Upper	27/27	0.110 - 0.760	0.386	1.30	1.70	0
	Lower	26/27	0.140 - 1.10	0.491	NA	2.71	NA
Cadmium (Cd)	Upper	18/27	0.170 - 2.50	0.971	100	1.50	0
	Lower	13/27	0.230 - 2.20	0.484	NA	0.960	NA
Calcium (Ca)	Upper	27/27	123 - 26,700	8,310	NA	NA	NA
	Lower	25/27	617 - 49,000	13,800	NA	NA	NA
Chromium (Cr)	Upper	27/27	1.90 - 39.6	10.9	1,000	94.6	0
	Lower	27/27	2.80 - 31.5	14.7	NA	75.2	NA
Cobalt (Co)	Upper	27/27	1.000 - 61.6	9.03	12,000	19.0	0
	Lower	27/27	0.640 - 11.2	2.74	NA	14.9	NA
Copper (Cu)	Upper	27/27	4.20 - 1,260	355	8,200	66.0	0
	Lower	26/27	1.10 - 761	112	NA	152	NA
Cyanide (CN)	Upper	4/27	0.340 - 0.570	0.420	4,100	0.500	0
	Lower	2/27	0.250 - 20.7	10.5	NA	NA	NA
Iron (Fe)	Upper	27/27	1,250 - 60,000	11,900	61,000	NA	0
	Lower	27/27	1,270 - 25,200	9,970	NA	NA	NA
Lead (Pb)	Upper	27/27	2.90 - 1,400	231	1,300	265	1
	Lower	26/27	2.90 - 675	69.9	NA	173	NA
Magnesium (Mg)	Upper	27/27	66.6 - 9,220	1,030	NA	NA	NA
	Lower	26/27	106 - 6,470	1,420	NA	NA	NA
Manganese (Mn)	Upper	27/27	22.5 - 441	126	4,700	302	0
	Lower	27/27	4.60 - 267	75.6	NA	881	NA
Mercury (Hg)	Upper	19/27	0.0300 - 19.4	1.22	61.0	2.60	0
	Lower	14/27	0.0300 - 12.3	0.949	NA	1.59	NA
Nickel (Ni)	Upper	27/27	1.40 - 83.0	16.2	4,100	77.1	0
	Lower	27/27	1.20 - 38.7	7.55	NA	57.0	NA

Table 10.10.2.2
SWMUs 83 and 84 and AOC 574
Inorganic Detections for Soil (mg/kg)

Element	Sample Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Reference Conc.	Number of Samples Exceeding RBC and RC
Potassium (K)	Upper	20/27	308 - 1,060	719	NA	NA	NA
	Lower	20/27	436 - 3470	1,160	NA	NA	NA
Selenium (Se)	Upper	8/27	0.580 - 0.740	0.651	1,000	1.70	0
	Lower	8/27	0.750 - 3.10	1.53	NA	2.40	NA
Silver (Ag)	Upper	8/27	0.250 - 3.00	1.03	1,000	NA	0
Sodium (Na)	Upper	14/27	38.0 - 559	167	NA	NA	NA
	Lower	15/27	35.7 - 774	363	NA	NA	NA
Thallium (Tl)	Upper	3/27	0.590 - 2.80	1.73	16.0	2.80	0
	Lower	1/27	0.720	0.720	NA	NA	NA
Tin (Sn)	Upper	15/27	4.00 - 148	47.8	100,000	59.4	0
	Lower	8/27	4.40 - 61.1	15.9	NA	9.23	NA
Vanadium (V)	Upper	27/27	1.80 - 21.9	10.3	1,400	94.3	0
	Lower	27/27	3.00 - 37.8	16.6	NA	155	NA
Zinc (Zn)	Upper	27/27	12.3 - 1,210	334	61,000	827	0
	Lower	26/27	5.10 - 1,300	158	NA	886	NA

Notes:
mg/kg = Milligrams per kilogram
RBC = Risk-based concentration
RC = Reference concentration
NA = No industrial RBC or RC established

Volatile Organic Compounds in Soil

Ten VOCs were detected in soil samples collected at SWMUs 83 and 84 and AOC 574. Twenty-nine detections occurred in the upper interval and 21 in the lower interval. No VOC exceeded its respective industrial RBC in the upper interval or respective SSL in the lower interval.

Semivolatile Organic Compounds in Soil

Twenty-nine SVOCs were detected in soil samples collected at SWMUs 83 and 84 and AOC 574. Two hundred and ninety-six detections occurred in the upper-interval and 147 in the lower interval. Five SVOCs — benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene — exceeded their respective industrial RBC in the upper interval. Additionally, four SVOCs — benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and chrysene — exceeded their respective SSL in the lower interval.

Benzo(a)anthracene was detected in 19 of 27 upper-interval samples with a range of 79.0 to 26,000 μg/kg and a mean of 3,680 μg/kg. Three upper-interval samples (084SB004, 11,000 μg/kg; 574SB005, 26,000 μg/kg; and 574SB008, 9,300 μg/kg) exceeded the benzo(a)anthracene industrial RBC of 7,800 μg/kg. Benzo(a)anthracene was detected in eight of 27 lower-interval samples with a range of 130 to 4,900 μg/kg and a mean of 1,360 μg/kg. Three lower-interval samples (083SB001, 4,900 μg/kg; 083SB006, 3,600 μg/kg; and 574SB005, 840 μg/kg) exceeded the benzo(a)anthracene SSL of 700 μg/kg.

Benzo(b)fluoranthene was detected in 18 of 27 samples with a range of 100 to 21,000 μg/kg and a mean of 3,290 μg/kg. Two upper-interval samples (084SB004, 8,500 μg/kg; and 574SB005, 21,000 μg/kg) exceeded the benzo(b)fluoranthene industrial RBC of 7,800 μg/kg. Benzo(b)fluoranthene was detected in eight of 27 lower-interval samples with a range of 120 to 5,200 μg/kg and a mean of 1,180 μg/kg. One lower-interval sample (083SB001, 5,200 μg/kg) exceeded the benzo(b)fluoranthene SSL of 4,000 μg/kg.

Benzo(a)pyrene was detected in 20 of 27 upper-interval samples with a range of 64.0 to 20,000 μg/kg and a mean of 3,070 μg/kg. The following thirteen upper-interval samples exceeded the benzo(a)pyrene industrial RBC of 780 μg/kg:

083SB001	(860 μg/kg)	084SB004	(9,300 μg/kg)	574SB003	(2,600 μg/kg)
083SB006	(2,900 μg/kg)	084SB005	(3,400 μg/kg)	574SB005	(20,000 μg/kg)
083SB010	(1,100 μg/kg)	084SB007	(1,200 μg/kg)	574SB007	(1,300 μg/kg)
084SB001	(4,100 μg/kg)	574SB001	(3,100 μg/kg)	574SB008	(7,600 μg/kg)
084SB003	(1,700 μg/kg)				

Benzo(a)pyrene was detected in nine of 27 lower-interval samples with a range of 140 to 5,700 μg/kg and a mean of 1,190 μg/kg. One lower-interval sample (083SB001, 5,700 μg/kg) exceeded the benzo(a)pyrene SSL of 4,000 μg/kg.

In accordance with recent cPAH guidance, BEQs were calculated for cPAHs at SWMUs 83 and 84 and AOC 574. BEQs were calculated for 20 of 27 upper-interval samples with a range of 86.3 to 29,000 μg/kg and a mean of 4,670 μg/kg. The following fifteen samples exceeded the benzo(a)pyrene industrial RBC of 780 μg/kg.

083SB001	(1,280 μg/kg)	084SB004	(15,629 μg/kg)	574SB002	(874 μg/kg)
083SB006	(4,281 μg/kg)	084SB005	(5,491 μg/kg)	574SB003	(3,458 μg/kg)
083SB010	(1,523 μg/kg)	084SB007	(2,070 μg/kg)	574SB005	(29,000 μg/kg)
084SB001	(5,904 μg/kg)	084SB008	(788 μg/kg)	574SB007	(2,191 μg/kg)
084SB003	(2,824 μg/kg)	574SB001	(4,517 μg/kg)	574SB008	(12,438 μg/kg)

Chrysene was detected in eight of 27 lower-interval samples with a range of 150 to 4,500 μg/kg and a mean of 1,210 μg/kg. Two lower-interval samples (083SB001, 4,500 μg/kg; 083SB006, 2,800 μg/kg) exceeded the chrysene SSL of 1,000 μg/kg.

Dibenz(a,h)anthracene was detected in 14 of 27 upper-interval samples with a range of 83.0 to 3,600 μg/kg and a mean of 1,040 μg/kg. Four samples (084SB004, 3,600 μg/kg; 084SB005,

1,200 μg/kg; 574SB005, 3,100 μg/kg; and 574SB008, 2,700 μg/kg) exceeded the dibenz(a,h)anthracene industrial RBC of 780 μg/kg.

Indeno(1,2,3-cd)pyrene was detected in 19 of 27 upper-interval samples with a range of 43.0 to 10,000 μg/kg and a mean of 2,060 μg/kg. One upper-interval sample (574SB005, 10,000 μg/kg) exceeded the indeno(1,2,3-cd)pyrene industrial RBC of 7,800 μg/kg.

Pesticides and PCBs in Soil

Fourteen pesticides were detected in soil samples collected at SWMUs 83 and 84 and AOC 574. Thirty-one detections occurred in the upper interval and 21 occurred in the lower interval. No pesticide exceeded its respective industrial RBC in the upper interval. However, one pesticide — dieldrin — exceeded its respective SSL in the lower interval.

Dieldrin was detected in two of 27 lower-interval samples with a range of 4.60 to 6.50 μg/kg and a mean of 5.55 μg/kg. Two lower-interval samples (574SB005, 4.6 μg/kg; 574SB007, 6.5 μg/kg) exceeded the dieldrin SSL of 1.0 μg/kg.

No PCBs were detected in soil samples collected at SWMUs 83 and 84 and AOC 574.

Other Organic Compounds in Soil

No other organic compounds were detected in the soil samples collected at SWMUs 83 and 84 and AOC 574.

Inorganic Elements in Soil

Twenty-five metals were detected in soil samples collected at SWMUs 83 and 84 and AOC 574. Five hundred and twenty-six detections occurred in the upper interval and 486 in the lower interval. Two metals — arsenic and lead — exceeded both their respective industrial RBC and

background RC in the upper interval. No metal exceeded both its respective SSL and background RC in the lower interval.

Arsenic was detected in 26 of 27 upper-interval samples with a range of 0.870 to 25.0 mg/kg and a mean of 6.10 mg/kg. One upper-interval sample (084SB007, 25.0 mg/kg) exceeded both the arsenic industrial RBC of 3.80 mg/kg and the arsenic background RC of 23.9 mg/kg.

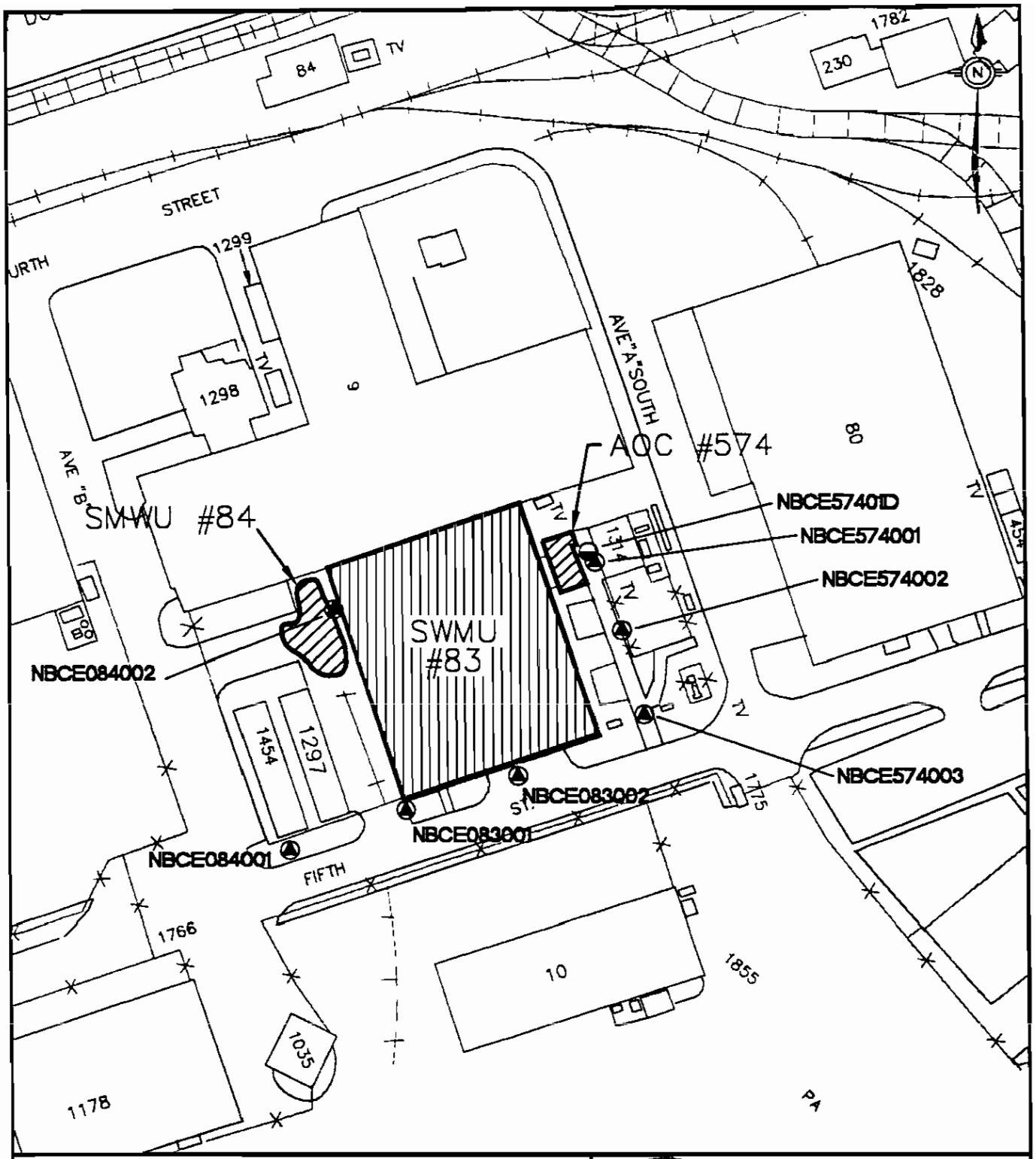
Lead was detected in 27 of 27 upper-interval samples with a range of 2.90 to 1,400 mg/kg and a mean of 231 mg/kg. The following upper-interval sample exceeded the lead industrial RBC of 1,300 mg/kg and the lead background RC of 265 mg/kg: 083SB010 (1,400 mg/kg).

10.10.3 Groundwater Sampling and Analysis

One deep monitoring well and seven shallow monitoring wells were installed and sampled to assess groundwater quality at SWMUs 83 and 84 and AOC 574 as shown in Figure 10.10.2. The wells were installed as follows:

- Shallow Wells installed at SWMU 83 — NBCE083001 and NBCE083002
- Shallow Wells installed at SWMU 84 — NBCE084001 and NBCE084002
- Shallow Wells installed at AOC 574 — NBCE574001, NBCE574002, and NBCE574003
- Deep Well installed at AOC 574 — NBCE57401D

Groundwater samples were submitted for analysis at DQO Level III for VOCs, SVOCs, pesticides/PCBs, metals, cyanide, chlorides, sulfates, TDS, and organotins. One sample was duplicated and submitted for analysis at DQO Level IV for the suite of parameters listed above plus a more comprehensive list of VOCs and SVOCs, as well as herbicides, organophosphorus pesticides, dioxin and hexavalent chromium. Table 10.10.3.1 summarizes groundwater sampling and analysis at SWMUs 83 and 84 and AOC 574.



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 10.10.2
MONITORING WELL LOCATIONS
SWMU#83, BUILDING 9
SWMU #84, LEAD STORAGE, BLDG 9
AOC #574, BUILDING 9, SAA

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

Table 10.10.3.1
SWMUs 83 and 84 and AOC 574
Groundwater Sampling Summary

Depth	Wells Proposed	Wells Installed	Analyses Proposed	Analyses Collected	Deviations
Shallow	7	7	Standard Suite[a], chlorides, TDS, sulfates, and organotins	Standard Suite[a], chlorides, TDS, sulfates, and organotins	None
Deep	1	1	Standard Suite[a], chlorides, TDS, sulfates, and organotins	Standard Suite[a], chlorides, TDS, sulfates, and organotins	None

Note:
a = Standard Suite includes VOCs, SVOCs, metals, cyanide, pesticides/PCBs

The shallow monitoring wells were installed at 12.5 feet bgs in the surficial aquifer. The deep well was installed at 29.7 feet bgs at the base of the surficial aquifer. All wells were installed in accordance with Section 3.3 of this report.

10.10.4 Nature of Contamination in Groundwater

Organic compound analytical results for shallow groundwater are summarized in Table 10.10.4.1. No organic compounds were detected in deep groundwater at this site. Inorganic analytical results for shallow and deep groundwater are summarized in Tables 10.10.4.2 and 10.10.4.3, respectively. Appendix H contains the complete data report for all samples collected in Zone E.

Table 10.10.4.1
SWMUs 83 and 84 and AOC 574
Organic Compounds Detected in First-Quarter Groundwater
Shallow Monitoring Wells

Compound	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap Water RBC	MCL	Number of Samples Exceeding RBC
SVOCs (μg/L)						
Acenaphthene	1/7	2.00	2.00	220	NA	0
Benzoic acid	1/7	3.00	3.00	15,000	NA	0

Table 10.10.4.1
SWMUs 83 and 84 and AOC 574
Organic Compounds Detected in First-Quarter Groundwater
Shallow Monitoring Wells

Compound	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap Water RBC	MCL	Number of Samples Exceeding RBC
SVOCs (μg/L)						
Dibenzofuran	1/7	3.00	3.00	15,000	NA	0
Fluorene	1/7	5.00	5.00	150	NA	0
2-Methylnaphthalene	1/7	75.0	75.0	150	NA	0
Naphthalene	1/7	7.00	7.00	150	NA	0
Phenanthrene	1/7	3.00	3.00	150	NA	0
Dioxins (pg/L)						
Dioxin Equiv.	1/1	0.0455	0.0455	0.4	NA	0
1234678-HpCDF	1/1	3.50	3.50	NA	NA	NA
OCDD	1/1	10.5	10.5	NA	NA	NA
Organotin (μg/L)						
Tributyltin	1/7	24.0	24.0	NA	NA	NA

Notes:
μg/L = Micrograms per liter
pg/L = Picograms per liter
RBC = Risk-based concentration
MCL = Maximum contaminant level
NA = No RBC or MCL established

Table 10.10.4.2
SWMUs 83 and 84 and AOC 574
Inorganic Detections for First-Quarter Groundwater (μg/L)
Shallow Monitoring Wells

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap Water RBC	Reference Conc.	MCL	Number of Samples Exceeding RBC
Aluminum (Al)	5/7	54.7 - 695	270	3,700	2,810	NA	0
Arsenic (As)	3/7	7.70 - 36.9	21.2	0.0450	18.7	50.0	2
Barium (Ba)	4/7	9.70 - 32.0	16.7	260	211	2,000	0
Calcium (Ca)	5/7	10,300 - 81,200	37,700	NA	NA	NA	NA
Chromium (Cr)	1/7	2.40	2.40	18.0	12.3	100	0
Cobalt (Co)	1/7	2.70	2.70	220	2.5	NA	0
Copper (Cu)	1/7	3.00	3.00	150	2.7	1,300	0

Table 10.10.4.2
SWMUs 83 and 84 and AOC 574
Inorganic Detections for First-Quarter Groundwater (µg/L)
Shallow Monitoring Wells

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap Water RBC	Reference Conc.	MCL	Number of Samples Exceeding RBC
Iron (Fe)	7/7	167 - 11,400	3,350	1,100	NA	NA	6
Magnesium (Mg)	5/7	6,730 - 46,300	18,100	NA	NA	NA	NA
Manganese (Mn)	7/7	34.2 - 383	191	84.0	2,560	NA	0
Nickel (Ni)	3/7	1.50 - 2.20	1.90	73.0	15.2	100	0
Potassium (K)	5/7	6,510 - 24,200	13,900	NA	NA	NA	NA
Silver (Ag)	1/7	2.10	2.10	18.0	NA	NA	0
Sodium (Na)	5/7	24,600 - 1,130,000	315,000	NA	NA	NA	NA
Vanadium (V)	5/7	1.40 - 3.20	2.12	26.0	11.4	NA	0
Zinc (Zn)	2/7	4.10 - 8.70	6.40	1,100	27.3	NA	0

Notes:
µg/L = Micrograms per liter
RBC = Risk-based concentration
MCL = Maximum contaminant level
RC = Reference concentration
NA = No RBC, MCL, or RC established

Table 10.10.4.3
SWMUs 83 and 84 and AOC 574
Inorganic Detections for First-Quarter Groundwater (µg/L)
Deep Monitoring Well

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap Water RBC	Reference Conc.	MCL	Number of Samples Exceeding RBC and RC
Aluminum (Al)	1/1	32.7	32.7	3,700	319	NA	0
Arsenic (As)	1/1	67.5	67.5	0.0450	16.4	50.0	1
Barium (Ba)	1/1	198	198	260	218	2,000	0
Calcium (Ca)	1/1	227,000	227,000	NA	NA	NA	NA
Cobalt (Co)	1/1	2.30	2.30	220	12.9	NA	0
Iron (Fe)	1/1	37,000	37,000	1,100	NA	NA	1
Magnesium (Mg)	1/1	125,000	125,000	NA	NA	NA	NA
Manganese (Mn)	1/1	3,380	3,380	84.0	869	NA	1
Nickel (Ni)	1/1	4.30	4.30	73.0	42.2	100	0

Table 10.10.4.3
SWMUs 83 and 84 and AOC 574
Inorganic Detections for First-Quarter Groundwater (µg/L)
Deep Monitoring Well

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap Water RBC	Reference Conc.	MCL	Number of Samples Exceeding RBC and RC
Potassium (K)	1/1	51,500	51,500	NA	NA	NA	NA
Sodium (Na)	1/1	1,290,000	12,90,000	NA	NA	NA	NA
Vanadium (V)	1/1	1.90	1.90	26.0	5.3	NA	0

Notes:
µg/L = Micrograms per liter
RBC = Risk-based concentration
MCL = Maximum contaminant level
RC = Reference concentration
NA = No RBC, MCL, or RC established

Semivolatile Organic Compounds in Groundwater

Shallow Groundwater

Seven SVOCs were detected in shallow groundwater samples collected at SWMUs 83 and 84 and AOC 574. No SVOC exceeded its respective tap-water RBC. No MCLs have been established for the detected SVOCs.

Other Organic Compounds in Groundwater

Shallow Groundwater

One organotin — tributylin — was detected in one of seven shallow groundwater samples at SWMU 83. No tap-water RBC or MCL has been established for this parameter.

Two dioxins were detected in shallow groundwater samples collected at SWMUs 83 and 84 and AOC 574. No tap-water RBCs or MCLs have been established for these parameters.

In accordance with recent dioxin guidance, TEQs (dioxin equivalent) were calculated for the samples. The TEQ was calculated for one sample at 0.0455 pg/L, below the 2,3,7,8-TCDD tap-water RBC of 0.4 pg/L. No MCL has been established for the dioxin equivalent.

Inorganic Elements in Groundwater

Shallow Groundwater

Sixteen metals were detected in shallow groundwater samples collected at SWMUs 83 and 84 and AOC 574. Two metals — arsenic and iron — exceeded both their respective tap-water RBC and shallow groundwater RC.

Arsenic was detected in three of seven samples with a range of 7.70 to 36.9 μg/L and a mean of 21.2 μg/L. Two samples from wells NBCE083001 (18.9 μg/L) and NBCE084002 (36.9 μg/L) exceeded both the arsenic tap-water RBC of 0.0450 μg/L and the arsenic shallow groundwater RC of 18.7 μg/L. Neither sample exceeded the arsenic MCL of 50.0 μg/L.

Iron was detected in seven of seven samples with a range of 167 to 11,400 μg/L and a mean of 3,350 μg/L. Samples from the following six wells exceeded the iron tap-water RBC of 1,100 μg/L:

NBCE083001 (11,400 μg/L)	NBCE084002 (2,230 μg/L)	NBCE574002 (1,650 μg/L)
NBCE083002 (2,470 μg/L)	NBCE574001 (4,220 μg/L)	NBCE574003 (1,310 μg/L)

No shallow groundwater RC or MCL has been established for iron.

Deep Groundwater

Twelve metals were detected in the deep groundwater sample collected at AOC 574 (no deep groundwater wells were installed at SWMUs 83 and 84). Three metals — arsenic, iron, and

manganese — exceeded both their respective tap-water RBC and deep groundwater RC. One metal — arsenic — also exceeded its MCL.

Arsenic was detected in well NBCE57401D (67.5 μg/L), exceeding both its tap-water RBC of 0.0450 μg/L and its deep groundwater RC of 16.4 μg/L. The detection also exceeded the arsenic MCL of 50.0 μg/L.

Iron was detected in well NBCE57401D (37,000 μg/L), exceeding its tap-water RBC of 1,100 μg/L. No deep groundwater RC or MCL has been established for iron.

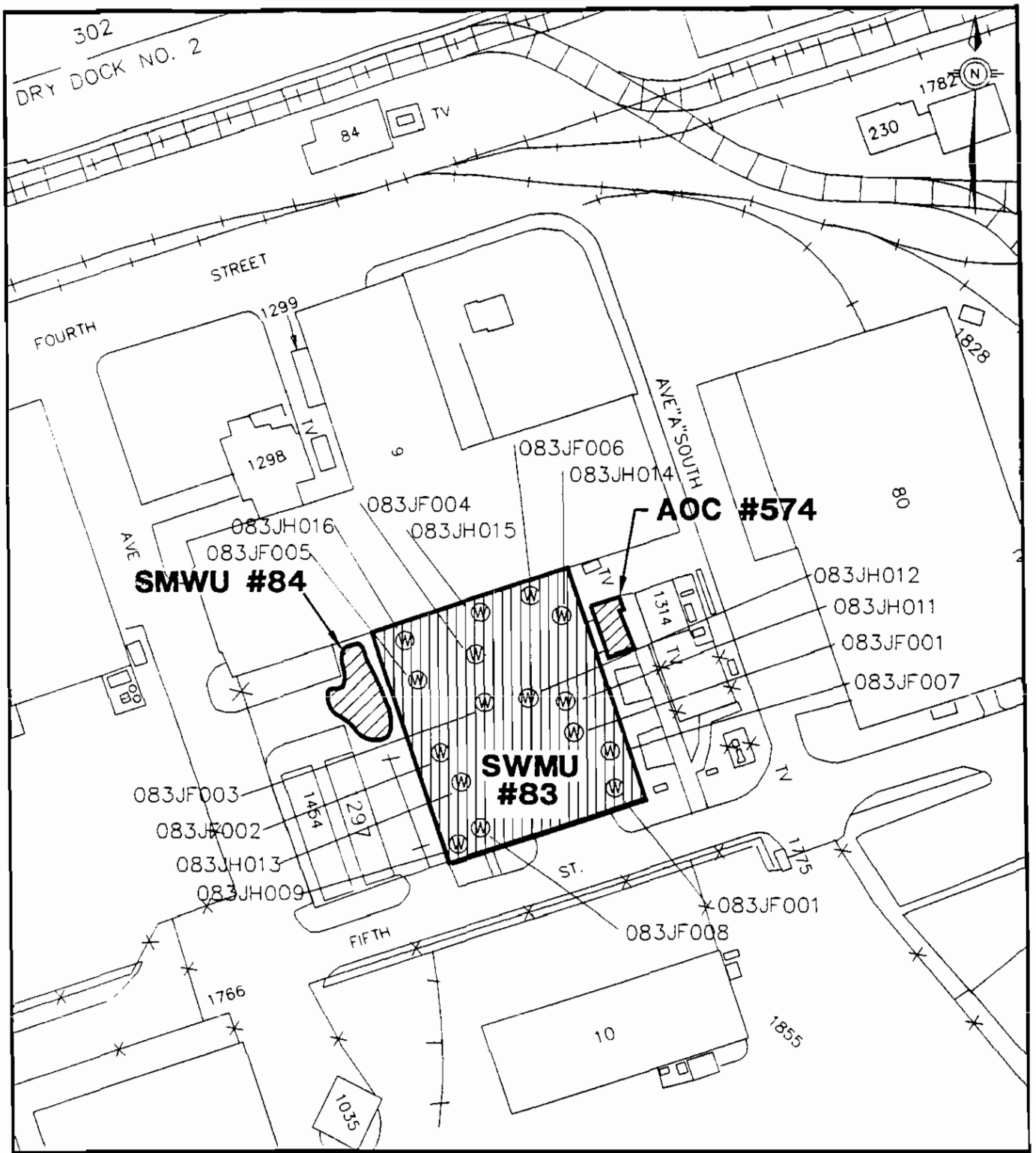
Manganese was detected in well NBCE57401D (3,380 μg/L), exceeding both its tap-water RBC of 84.0 μg/L and its deep groundwater RC of 869 μg/L. No MCL has been established for manganese.

10.10.5 Wipe Sampling and Analysis

The *Final Zone E RFI Work Plan* proposed the collection of sixteen wipe samples at SWMUs 83, 84, and AOC 574. All sixteen wipe samples were collected. Sample locations were determined in the field and are shown on Figure 10.10.3. Table 10.10.5.1 summarizes wipe sampling activity for SWMU 83.

Table 10.10.5.1
SWMU 83
Wipe Sampling Summary

Samples Proposed	Samples Collected	Analyses Proposed	Analyses Performed	Deviations
16	16	Metals, SW-846	Metals, SW-846	No deviation from proposed strategy



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 10.10.3
WIPE SAMPLE LOCATIONS
SWMU #83, BUILDING 9
SWMU #84, LEAD STORAGE, BLDG 9
AOC #574, BUILDING 9, SAA

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

10.10.6 Nature of Contamination in Dust

Organic compound analytical results for wipe samples are summarized in Table 10.10.6.1. Inorganic analytical results for wipe samples are summarized in Table 10.10.6.2. Appendix H contains the complete data report for all samples collected in Zone E.

Table 10.10.6.1
SWMUs 83 and 84 and AOC 574
Organic Compounds Detected in Wipe Samples

Element	Freq. of Detection	Range of Detected Conc. (μg/wipe)	Mean of Detected Conc. (μg/wipe)
PCBs			
Aroclor-1242	1/3	9.80	9.8

Note:
μg/wipe = Micrograms per wipe sample

Table 10.10.6.2
SWMUs 83 and 84 and AOC 574
Inorganic Detections in Wipe Samples

Element	Freq. of Detection	Range of Detected Conc. (mg/wipe)	Mean of Detected Conc. (mg/wipe)
Aluminum (Al)	16/16	554 - 47,000	4,870
Antimony (Sb)	16/16	1.30 - 74.8	11.5
Arsenic (As)	14/16	1.10 - 59.8	7.74
Barium (Ba)	16/16	13.6 - 308	95.0
Beryllium (Be)	3/16	0.200 - 0.220	0.213
Cadmium (Cd)	16/16	0.850 - 15.6	5.07
Calcium (Ca)	16/16	1,150 - 12,500	5,810
Chromium (Cr)	16/16	6.50 - 300	55.7
Cobalt (Co)	16/16	0.620 - 116	10.3
Copper (Cu)	16/16	956 - 594,000	42,900

Table 10.10.6.2
SWMUs 83 and 84 and AOC 574
Inorganic Detections in Wipe Samples

Element	Freq. of Detection	Range of Detected Conc. (mg/wipe)	Mean of Detected Conc. (mg/wipe)
Iron (Fe)	16/16	1,660 - 167,000	18,500
Lead (Pb)	16/16	84.5 - 11,500	1,120
Magnesium (Mg)	16/16	77.0 - 1,750	419
Manganese (Mn)	16/16	57.0 - 3,640	460
Mercury (Hg)	15/16	0.0500 - 1.80	0.446
Nickel (Ni)	16/16	120 - 74,500	5370
Potassium (K)	16/16	238 - 1,160	708
Selenium (Se)	3/16	1.000 - 2.40	1.90
Silver (Ag)	11/16	0.460 - 52.3	6.07
Sodium (Na)	4/16	1,130 - 4,840	2,340
Tin (Sn)	16/16	74.6 - 25,100	1,930
Vanadium (V)	16/16	0.970 - 39.5	8.36
Zinc (Zn)	16/16	339 - 21,300	2,790

Note:
mg/wipe = Milligrams per wipe sample

Inorganic Elements Detected on Surfaces

Twenty-three metals were detected in wipe samples collected at SWMUs 83 and 84 and AOC 574. Thallium was not detected in the collected samples. No residential or industrial RBCs exist for wipe samples.

PCBs Detected on Surfaces

Three wipe samples were collected from SWMUs 83 and 84 and AOC 574 and analyzed for PCBs. Aroclor-1242 was detected in one of three samples at 9.80 mg/wipe. No residential or industrial RBCs exist for wipe samples.

10.10.7 Air Sampling and Analysis

The *Final Zone E RFI Work Plan* proposed collecting 17 air samples at SWMU 83. Sample locations were determined in the field. A total of fifteen air samples were collected. Table 10.10.7.1 summarizes air sampling activity at SWMU 83.

Table 10.10.7.1
SWMU 83
Air Sampling Summary

Samples Proposed	Samples Collected	Analyses Proposed	Analyses Performed	Deviations
17	15	Metals, SW-846	Metals, SW-846	Collected 15 rather than 17 air samples

10.10.8 Nature of Contamination in Air

Table 10.10.8.1 summarizes the analytical results of air samples collected at SWMU 83. Sample locations were biased in an attempt to identify worst case situations.

Table 10.10.8.1
SWMU 83
Air Sample Results

Element	Frequency of Detection	Range of Detections ($\mu g/m^3$)
Aluminum	15/15	0.012 - 0.060
Arsenic	10/15	0.0012 - 0.0022
Barium	15/15	0.0013 - 0.0027
Beryllium	8/15	0.0001 - 0.0001
Cadmium	10/15	0.0001 - 0.0002
Calcium	15/15	0.05 - 0.112
Chromium	15/15	0.0004 - 0.0016
Cobalt	4/15	0.0001 - 0.0002

Table 10.10.8.1
SWMU 83
Air Sample Results

Element	Frequency of Detection	Range of Detections ($\mu g/m^3$)
Copper	14/15	0.0103 - 0.060
Iron	15/15	0.021 - 0.164
Lead	11/15	0.0009 - 0.0034
Magnesium	15/15	0.016 - 0.0352
Manganese	15/15	0.0014 - 0.0038
Mercury	15/15	0.0001 - 0.0006
Nickel	15/15	0.0009 - 0.0774
Potassium	15/15	0.022 - 0.088
Selenium	10/15	0.0010 - 0.0022
Sodium	15/15	0.10 - 0.22
Thallium	2/15	0.0015 - 0.0023
Vanadium	15/15	0.0010 - 0.0070
Zinc	15/15	0.0066 - 0.021
Alkalinity		
Total Alkalinity	15/15	4.3 - 30.4

Note:
$\mu g/m^3$ = Micrograms per cubic meter

Metals Detected in Air

Metals were detected in nearly all air samples. No residential or industrial RBCs exist for comparison to the air sampling results.

10.10.9 Fate and Transport Assessment for SWMUs 83 and 84 and AOC 574

Combined SWMU 83 is comprised of a former foundry at Building 9, which more recently has been used as a power substation, a lead blanket and shielding storage facility, and an AST location. Most of the ground around the site is covered by asphalt or thick concrete, but the AST (AOC 574) is in an unpaved area on the east side of Building 9. There are also small grassy strips along Fifth Street on the south side of the foundry building and along Avenue "A" to the west. Environmental media sampled as part of the combined SWMU 83 RFI include surface soil, subsurface soil, shallow groundwater, deep groundwater, air, and dust. Potential constituent migration pathways investigated for combined SWMU 83 include soil to groundwater, groundwater to surface water, and emission of volatiles from surface soil to air.

10.10.9.1 Soil-to-Groundwater Cross-Media Transport: Tier One

Table 10.10.9.1 compares maximum detected organic constituent concentrations in surface soil and subsurface soil samples to risk-based SSLs considered protective of groundwater. For inorganics, maximum concentrations in soil are compared to the greater of (a) risk-based SSLs, or (b) background RCs. To provide a conservative screen, generic SSLs are used; leachate entering the aquifer is assumed to be diluted by a ratio of 10:1, with no attenuation of constituents in soil (DAF=10).

Nine organic compounds — methylene chloride, trichloroethene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, pentachlorophenol, and dieldrin — were detected in combined SWMU 83 soil at concentrations greater than groundwater protection SSLs and were carried over to the second-tier screen. None of the nine compounds were detected in groundwater samples, indicating that the current soil-groundwater equilibrium is sufficiently protective of the surficial aquifer. Maximum surface soil concentrations were all higher than concentrations in subsurface soil for these nine organics, indicating that high concentrations have not migrated deeply into subsurface soil.

Benzo(a)anthracene was the most pervasive of the nine organics as it was detected above its SSL at 12 locations in surface soil and three in subsurface soil. Of the other carcinogenic PAHs, benzo(a)pyrene was detected above its generic SSL in four surface soil samples and one subsurface sample; benzo(b)fluoranthene was detected in eight surface soil and one subsurface soil samples; dibenzo(a,h)anthracene was detected in four surface soil samples; and indeno(1,2,3-cd)pyrene was detected in one surface soil sample. Maximum concentrations of 16 SVOCs in surface soil, including six of the seven carcinogenic PAHs, were detected in sample 574SB005, located at the north end of the AST site.

Pentachlorophenol, dieldrin, and trichloroethene were detected above their respective generic SSLs in one surface soil sample each (574SB008, 574SB006, and 084SB004, respectively). Dieldrin was also reported above its SSL in two subsurface soil samples (574SB005 and 574SB007) and pentachlorophenol in one subsurface sample (084SB009). Trichloroethene was not detected above its SSL in subsurface soil samples.

Eleven inorganics — antimony, arsenic, cobalt, copper, cyanide, lead, mercury, nickel, selenium, thallium, and tin — were detected in soil at concentrations equal to or greater than their respective generic SSLs or background reference values and were carried over to the second-tier screen. Arsenic, cobalt, copper, and nickel were also detected in groundwater, indicating a completed pathway from soil to groundwater for these metals. Of these four inorganics, only arsenic was detected in groundwater at concentrations above its groundwater standard. Cyanide and selenium were the only inorganics of the eleven that were detected at higher maximum concentrations in subsurface soil samples than surface samples.

Copper was detected above its background reference value in 13 surface soil samples and five subsurface samples, the most frequent of the 11 inorganics. Relatively high copper concentrations in soil likely reflect past site use involving the casting of copper alloy parts. Antimony was the

second most commonly detected metal above its SSL, as it was detected in eight surface soil samples and two subsurface samples at concentrations exceeding its standard. Lead was detected above its *de facto* SSL of 400 mg/kg in seven surface soil samples and two subsurface samples; the maximum lead detection of 1,400 mg/kg in surface soil sample 083SB010 was twice as high as the next highest detection. Mercury detections above its SSL were confined to the two intervals at a single sample location (574SB005). Arsenic, cyanide, selenium, and thallium were detected above their respective SSLs or background reference values in only one sample each.

10.10.9.2 Groundwater-to-Surface Water Cross-Media Transport: Tier One

Table 10.10.9.1 also compares maximum detected organic constituent concentrations in shallow groundwater samples to RBCs for drinking water, and to chronic ambient saltwater quality criteria values for the protection of aquatic life (saltwater surface water chronic screening values). For inorganics, maximum concentrations in groundwater are compared to the greater of (a) risk-based drinking water concentrations, or (b) background RCs for groundwater, as well as to the saltwater surface water chronic values. To provide a conservative first-tier screen, no attenuation or dilution of constituents in groundwater is assumed before comparison to the relevant standards.

Tributyltin was the only organic compound detected in the first-quarter at a concentration above its tap water RBC or its saltwater surface water chronic screening level. Due to detection in a single shallow groundwater sample (well NBCE083002), it was carried over to the second-tier screen. Preliminary evaluation of results from subsequent sampling rounds indicates that tributyltin was not detected at well NBCE083002 after the first quarter.

Arsenic and manganese were detected in first-round groundwater samples above their respective background reference values and carried over to the second-tier screen. Arsenic concentrations exceeded its background reference value of 18.7 μg/L in first-round samples in two of seven shallow wells and the single deep well at combined SWMU 83. Arsenic also exceeded its

saltwater surface water chronic screening value in the sample from deep well NBCE57401D. Arsenic was detected at elevated concentrations (above background) in both shallow and deep wells in an area approximately 600 feet across, centered roughly on SWMU 83 and including wells from SWMUs 83, 84, 145, and 172, and AOCs 563, 574, 576, and 580. Concentrations are higher in deep groundwater than in shallow groundwater, with exceedances of arsenic's MCL (50 μg/L) reported in first-round samples from wells NBCE57401D (67.5 μg/L) and NBCE58001D (84.4 μg/L). In later rounds, arsenic detections were also above its MCL in samples from deep wells NBCE14501D and NBCE57602D. Manganese was detected above its background reference value in only one deep well (NBCE57401D).

Silver was detected in shallow well NBCE574001 at a concentration greater than its saltwater surface water screening value and was carried over to the second-tier screen. Preliminary analysis of subsequent sampling round results indicates that silver concentrations decreased below its surface water standard at well NBCE574001. However, silver detections were greater than its surface water standard at two other locations during the second round: shallow well NBCE574002 and deep well NBCE57401D. Copper was detected in a single first-round shallow groundwater sample at a concentration marginally higher than its saltwater surface water chronic screening level.

10.10.9.3 Soil and Groundwater-to-Surface Water Cross-Media Transport: Tier Two

Table 10.10.9.2 provides a second screening tier for all constituents detected in soil or groundwater at concentrations exceeding any of the first-tier screening levels. Constituent concentrations in groundwater are compared to combined ecological/human health RBCs that have been adjusted upward for site-specific dilution by surface water in the Cooper River, while soil constituent concentrations are compared to calculated SSLs that are based on the adjusted RBCs rather than the original target leachate concentrations. For the second-tier screen, no dilution of leachate by groundwater or attenuation of constituents in soil is assumed (DAF=1). The second

screening tier identifies any constituents in soil or groundwater that pose a potential threat to surface water quality, after allowing for dilution of groundwater by surface water when the groundwater discharges into the river. The site-specific surface-water dilution factor calculated for combined SWMU 83 is 79,000:1 (see Table 6.2.1).

None of the first-tier constituent concentrations exceeded the adjusted screening levels of the second tier, indicating that site constituents in soil and groundwater pose no threat to human health or the environment in the Cooper River through the associated migration pathways. The elevated concentrations of several BEQs in surface and subsurface soil samples are not of concern because PAHs are not particularly mobile in soil or groundwater. The high concentrations of copper and lead in soil and arsenic in groundwater are below their respective adjusted screening levels. Maximum copper concentrations in soil samples remained 84% lower than its adjusted SSL of 8,070 mg/kg. The adjusted SSLs for combined SWMU 83 were obtained assuming a DAF of 1, which implies zero attenuation of contaminants as leachate moves downward through subsurface soil toward the shallow aquifer. Due to a combination of high clay content and a thin, localized layer of peat, combined SWMU 83 exhibits a perched water table that is approximately 2 to 3 feet higher than that of the shallow aquifer in the area around the site. Both clay particles and peat strongly attenuate any dissolved organic or inorganic constituents moving through the soil. Consequently, the margin between detected soil concentrations and levels protective of the Cooper River is actually much greater than indicated in the table.

10.10.9.4 Soil-to-Air Cross-Media Transport

Table 10.10.9.3 lists the VOCs detected in surface soil samples collected at combined SWMU 83 along with corresponding soil-to-air volatilization screening levels. Exposed soil constitutes a small portions of the surface area at the site. In addition, none of the VOCs was reported at a maximum concentration exceeding its corresponding soil-to-air volatilization screening level. As a result, the soil-to-air migration pathway is not expected to be significant at combined SWMU 83.

10.10.9.5 Fate and Transport Summary

In the first-tier screen, nine organic compounds detected at concentrations above groundwater protection SSLs in soil were not found extensively distributed vertically throughout the shallow subsurface nor were they detected in groundwater. Occurrences of trichloroethene and pentachlorophenol above SSLs in soil were isolated to single locations. Detections of BEQs in soil but not groundwater reflect the immobility of PAH compounds. Lack of detections of organic compounds in groundwater above tap water RBCs indicates that the present soil-groundwater equilibrium is protective of groundwater.

Although eleven inorganics were detected above their generic SSLs or background reference values in soil during the first-tier screen, only four were additionally detected in groundwater samples. Arsenic was the only metal of the four found to be above its groundwater standard. Vertical distribution of the eleven metals in soil appeared limited due to the greater concentrations in surface soil compared to subsurface soil. Relatively high concentrations of copper, lead, and zinc in soil, likely related to past foundry activities, have had little or no impact on groundwater.

None of the constituents exceeding first-tier screening values exceeded the adjusted screening values of the second-tier comparisons, indicating no threat to surface water in the Cooper River via the evaluated migration pathways.

Table 10.10.9.1
Chemicals Detected in Surface Soil, Subsurface Soil, Shallow Groundwater, and Deep Groundwater
Comparison to SSLs, Tap Water RBCs, Salt Water Surface Water Chronic Screening Levels, and Background Concentrations: Tier One
NAVBASE-Charleston, Zone E: SWMUs 83 and 84 and AOC 574
Charleston, South Carolina

Parameter	Max. Concentration Surface Soil	Max. Concentration Subsurfac Soil	Max. Concentration Shallow GW	Max. Concentration Deep GW	Screening Concentration * Soil to GW SSL	Screening Concentration * Tap Water RBC	Screening Concentration * Salt Wtr. Surf. Wtr. Chronic	Soil Units	Water Units	Leaching Potential	Ground-Water Migration Concern	Surface Water Migration Concern
Volatile Organic Compounds												
Acetone	200	730	ND	ND	8000	3700	NA	UG/KG	UG/L	NO	NO	NO
2-Butanone (MEK)	6	ND	ND	ND	4000	1900	NA	UG/KG	UG/L	NO	NO	NO
Carbon disulfide	ND	4	ND	ND	16000	1000	NA	UG/KG	UG/L	NO	NO	NO
Chlorobenzene	ND	2	ND	ND	350	39	105	UG/KG	UG/L	NO	NO	NO
2-Hexanone	20	ND	ND	ND	13800	2900	NA	UG/KG	UG/L	NO	NO	NO
Methylene chloride	14	7	ND	ND	10	4.1	2560	UG/KG	UG/L	YES	NO	NO
Toluene	1	2	ND	ND	6000	750	37	UG/KG	UG/L	NO	NO	NO
1,1,1-Trichloroethane	1	ND	ND	ND	1000	790	312	UG/KG	UG/L	NO	NO	NO
Trichloroethene	37	ND	ND	ND	30	1.6	NA	UG/KG	UG/L	YES	NO	NO
Xylene (total)	6	5	ND	ND	71000	12000	NA	UG/KG	UG/L	NO	NO	NO
Semivolatile Organic Compounds												
Acenaphthene	8800	2400	2	ND	285000	2200	9.7	UG/KG	UG/L	NO	NO	NO
Acenaphthylene	290	190	ND	ND	150000	1500	NA	UG/KG	UG/L	NO	NO	NO
Anthracene	18000	3400	ND	ND	5900000	11000	NA	UG/KG	UG/L	NO	NO	NO
Benzoic acid	89	ND	3	ND	200000	150000	NA	UG/KG	UG/L	NO	NO	NO
Benzo(g,h,i)perylene	8400	2900	ND	ND	2.33E+08	1500	NA	UG/KG	UG/L	NO	NO	NO
Benzo(a)pyrene equivalents												
Benzo(a)anthracene	26000	4900	ND	ND	800	0.092	NA	UG/KG	UG/L	YES	NO	NO
Benzo(a)pyrene	20000	5700	ND	ND	4000	0.0092	NA	UG/KG	UG/L	YES	NO	NO
Benzo(b)fluoranthene	21000	5200	ND	ND	2500	0.092	NA	UG/KG	UG/L	YES	NO	NO
Benzo(k)fluoranthene	17000	3400	ND	ND	24500	0.92	NA	UG/KG	UG/L	NO	NO	NO
Chrysene	21000	4500	ND	ND	80000	9.2	NA	UG/KG	UG/L	NO	NO	NO
Dibenzo(a,h)anthracene	3600	700	ND	ND	800	0.0092	NA	UG/KG	UG/L	YES	NO	NO
Indeno(1,2,3-cd)pyrene	10000	3800	ND	ND	7000	0.092	NA	UG/KG	UG/L	YES	NO	NO
Butylbenzylphthalate	300	110	ND	ND	930000	7300	29.4	UG/KG	UG/L	NO	NO	NO
Carbazole	130	200	ND	ND	300	3.4	NA	UG/KG	UG/L	NO	NO	NO
2-Chlorophenol	100	ND	ND	ND	2000	180	NA	UG/KG	UG/L	NO	NO	NO
Dibenzofuran	5600	1700	3	ND	NA	150	NA	UG/KG	UG/L	NO	NO	NO
Di-n-butylphthalate	74	140	ND	ND	2300000	3700	3.4	UG/KG	UG/L	NO	NO	NO
Diethylphthalate	5900	370	ND	ND	235000	29000	75.9	UG/KG	UG/L	NO	NO	NO
Dimethylphthalate	2400	ND	ND	ND	1200000	370000	580	UG/KG	UG/L	NO	NO	NO
Di-n-octylphthalate	170	ND	ND	ND	10000000	730	NA	UG/KG	UG/L	NO	NO	NO
bis(2-Ethylhexyl)phthalate (BEHP)	680	ND	ND	ND	1800000	4.8	NA	UG/KG	UG/L	NO	NO	NO
Fluoranthene	73000	7700	ND	ND	2150000	1500	1.6	UG/KG	UG/L	NO	NO	NO
Fluorene	8200	3700	5	ND	280000	1500	NA	UG/KG	UG/L	NO	NO	NO
2-Methylnaphthalene	5500	62000	75	ND	63000	1500	NA	UG/KG	UG/L	NO	NO	NO
4-Methylphenol (p-cresol)	110	ND	ND	ND	690	180	NA	UG/KG	UG/L	NO	NO	NO
Naphthalene	6900	1800	7	ND	42000	1500	23.5	UG/KG	UG/L	NO	NO	NO
Pentachlorophenol	320	270	ND	ND	15	0.56	7.9	UG/KG	UG/L	YES	NO	NO
Phenanthrene	83000	11000	3	ND	690000	1500	NA	UG/KG	UG/L	NO	NO	NO
Pyrene	59000	8600	ND	ND	2100000	1100	NA	UG/KG	UG/L	NO	NO	NO
Pesticides/PCB Compounds												
gamma-BHC (Lindane)	ND	2.3	ND	ND	4.5	0.052	0.016	UG/KG	UG/L	NO	NO	NO
alpha-Chlordane	20	ND	ND	ND	5000	0.052	0.004	UG/KG	UG/L	NO	NO	NO
gamma-Chlordane	60	2.2	ND	ND	5000	0.052	0.004	UG/KG	UG/L	NO	NO	NO
4,4'-DDD	33	40	ND	ND	8000	0.28	0.025	UG/KG	UG/L	NO	NO	NO
4,4'-DDE	250	5.2	ND	ND	27000	0.2	0.14	UG/KG	UG/L	NO	NO	NO
4,4'-DDT	290	16	ND	ND	16000	0.2	0.001	UG/KG	UG/L	NO	NO	NO
Dieldrin	9.4	6.5	ND	ND	2	0.0042	0.0019	UG/KG	UG/L	YES	NO	NO
Endosulfan sulfate	ND	36	ND	ND	9000	220	NA	UG/KG	UG/L	NO	NO	NO
Endrin	19	23	ND	ND	500	11	0.0023	UG/KG	UG/L	NO	NO	NO
Endrin aldehyde	14	32	ND	ND	500	11	NA	UG/KG	UG/L	NO	NO	NO
Endrin ketone	4.8	6.3	ND	ND	500	11	NA	UG/KG	UG/L	NO	NO	NO
Heptachlor	2.3	2.5	ND	ND	11500	0.0023	0.0036	UG/KG	UG/L	NO	NO	NO

Table 10.10.9.1
Chemicals Detected in Surface Soil, Subsurface Soil, Shallow Groundwater, and Deep Groundwater
Comparison to SSLs, Tap Water RBCs, Salt Water Surface Water Chronic Screening Levels, and Background Concentrations: Tier One
NAVBASE-Charleston, Zone E: SWMUs 83 and 84 and AOC 574
Charleston, South Carolina

Parameter	Max. Concentration Surface Soil	Max. Concentration Subsurfac Soil	Max. Concentration Shallow GW	Max. Concentration Deep GW	Screening Concentration * Soil to GW SSL	Screening Concentration * Tap Water RBC	Screening Concentration * Salt Wtr. Surf. Wtr. Chronic	Soil Units	Water Units	Leaching Potential	Ground-Water Migration Concern	Surface Water Migration Concern
Heptachlor epoxide	33	ND	ND	ND	350	0.0012	0.0036	UG/KG	UG/L	NO	NO	NO
Methoxychlor	ND	27	ND	ND	80000	180	0.03	UG/KG	UG/L	NO	NO	NO
Dioxin Compounds												
Dioxin (TCDD TEQ)	ND	ND	0.0455	ND	950	0.43	10	NG/KG	PG/L	NO	NO	NO
Organotin Compounds												
Tributyltin	ND	ND	24	ND	NA	1.1	0.01	UG/KG	UG/L	NO	YES	YES
TPH - Gasoline Range Organics												
Gasoline	5460	23200	ND	ND	NA	NA	NA	UG/KG	UG/L	NO	NO	NO
Inorganic Compounds												
Aluminum	6640	13700	695	32.7	41100	37000	NA	MG/KG	UG/L	NO	NO	NO
Antimony	10.7	7.7	ND	ND	2.5	15	NA	MG/KG	UG/L	YES	NO	NO
Arsenic	25	16.7	36.9	67.5	23.9	18.7	36	MG/KG	UG/L	YES	YES	YES
Barium	142	84.8	32	198	820	2600	NA	MG/KG	UG/L	NO	NO	NO
Beryllium	0.76	1.1	ND	ND	32	1.2	NA	MG/KG	UG/L	NO	NO	NO
Cadmium	2.5	2.2	ND	ND	4	18	9.3	MG/KG	UG/L	NO	NO	NO
Chromium (total)	39.6	31.5	2.4	ND	94.6	37000	103	MG/KG	UG/L	NO	NO	NO
Cobalt	61.6	11.2	2.7	2.3	19	2200	NA	MG/KG	UG/L	YES	NO	NO
Copper	1260	761	3	ND	152	1500	2.9	MG/KG	UG/L	YES	NO	YES
Cyanide	0.57	20.7	ND	ND	20	730	37.3	MG/KG	UG/L	YES	NO	NO
Lead	1400	675	ND	ND	400	15	8.5	MG/KG	UG/L	YES	NO	NO
Manganese	441	267	383	3380	881	2560	NA	MG/KG	UG/L	NO	YES	NO
Mercury	19.4	12.3	ND	ND	2.6	11	0.2	MG/KG	UG/L	YES	NO	NO
Nickel	83	38.7	2.2	4.3	77.1	730	42.2	MG/KG	UG/L	YES	NO	NO
Selenium	0.74	3.1	ND	ND	2.5	180	71	MG/KG	UG/L	YES	NO	NO
Silver	3	ND	2.1	ND	17	180	0.23	MG/KG	UG/L	NO	NO	YES
Thallium	2.8	0.72	ND	ND	2.8	2.9	21.3	MG/KG	UG/L	YES	NO	NO
Tin	148	61.1	ND	ND	59.4	22000	NA	MG/KG	UG/L	YES	NO	NO
Vanadium	21.9	37.8	3.2	1.9	3000	260	NA	MG/KG	UG/L	NO	NO	NO
Zinc	1210	1300	8.7	ND	6000	11000	86	MG/KG	UG/L	NO	NO	NO

* Screening Concentrations:
Soil to GW - Generic SSLs based on DAF = 10, adapted from 1996 EPA Soil Screening Guidance or calculated using values from Table 6.2
Tap Water RBC - From EPA Region III Risk-Based Concentration Table, June 3, 1996
Salt Water Surface Water Chronic - From EPA Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment, November, 1995; Table 2
In each case, the value shown is the greater of the relevant screening value or the corresponding background reference value

Units: See notes for Table 10.1.5.1

Table 10.10.9.2
Chemicals Detected in Surface Soil, Subsurface Soil, Shallow Groundwater, or Deep Groundwater at Concentrations Exceeding any Initial Screening Concentration
Comparison to Combined Ecological/Human Health RBCs Adjusted for Surface Water Dilution, and to SSLs Based on Adjusted Ecological/Human Health RBCs: Tier Two
NAVBASE-Charleston, Zone E: SWMUs 83 and 84 and AOC 574
Charleston, South Carolina

Parameter	Max. Concentration		Max. Concentration		Initial Screening Concentration *			Adjusted Screening Concentrations #					Units		Screening Results	
	Surface Soil	Subsurface Soil	Shallow GW	Deep GW	Soil to GW SSL	Tap Water RBC	Salt Wtr. Surf. Wtr. Chronic	Combined Eco/HH Surf. Wtr. RBC	Adjusted Eco/HH GW RBC	Target Leachate Conc. (DAF=1)	SSL Multi-plier	Adjusted SSL (DAF=1)	Soil Units	Water Units	Leaching Potential	Surface Water Migration Concern
Volatile Organic Compounds																
Methylene chloride	14	7	ND	ND	10	4.1	2560	4.1	3.24E+05	5	6.48E+04	6.48E+04	ug/kg	ug/L	NO	NO
Trichloroethene	37	ND	ND	ND	30	1.6	NA	1.6	1.26E+05	5	2.53E+04	7.58E+04	ug/kg	ug/L	NO	NO
Semivolatile Organic Compounds																
Benzo(a)pyrene equivalents																
Benzo(a)anthracene	26000	4900	ND	ND	800	0.092	NA	0.092	7.27E+03	0.1	7.27E+04	5.81E+06	ug/kg	ug/L	NO	NO
Benzo(a)pyrene	20000	5700	ND	ND	4000	0.0092	NA	0.0092	7.27E+02	0.2	3.63E+03	1.45E+06	ug/kg	ug/L	NO	NO
Benzo(b)fluoranthene	21000	5200	ND	ND	2500	0.092	NA	0.092	7.27E+03	0.1	7.27E+04	1.04E+07	ug/kg	ug/L	NO	NO
Dibenzo(a,h)anthracene	3600	700	ND	ND	800	0.0092	NA	0.0092	7.27E+02	0.01	7.27E+04	5.81E+06	ug/kg	ug/L	NO	NO
Indeno(1,2,3-cd)pyrene	10000	3800	ND	ND	7000	0.092	NA	0.092	7.27E+03	0.1	7.27E+04	1.04E+07	ug/kg	ug/L	NO	NO
Pentachlorophenol	320	270	ND	ND	15	0.56	7.9	0.56	4.42E+04	1	4.42E+04	6.64E+04	ug/kg	ug/L	NO	NO
Pesticides/PCB Compounds																
Dieldrin	9.4	6.5	ND	ND	2	0.0042	0.0019	0.0019	1.50E+02	0.005	3.00E+04	6.00E+03	ug/kg	ug/L	NO	NO
Organotin Compounds																
Tributyltin	ND	ND	24	ND	NA	1.1	0.01	0.01	7.90E+02	1.1	7.18E+02	NA	ug/kg	ug/L	NO	NO
Inorganic Compounds																
Antimony	10.7	7.7	ND	ND	2.5	15	NA	15	1.19E+06	6	1.98E+05	4.94E+04	mg/kg	ug/L	NO	NO
Arsenic	25	16.7	36.9	67.5	14.6	0.045	36	0.045	3.56E+03	50	7.11E+01	1.04E+02	mg/kg	ug/L	NO	NO
Cobalt	61.6	11.2	2.7	2.3	1040	2200	NA	2200	1.74E+08	2200	7.90E+04	1.00E+06	mg/kg	ug/L	NO	NO
Copper	1260	761	3	ND	458	1500	2.9	2.9	2.29E+05	1300	1.76E+02	8.07E+03	mg/kg	ug/L	NO	NO
Cyanide	0.57	20.7	ND	ND	20	730	37.3	37.3	2.95E+06	200	1.47E+04	2.95E+04	mg/kg	ug/L	NO	NO
Lead	1400	675	ND	ND	400	15	8.5	8.5	6.72E+05	15	4.48E+04	1.00E+06	mg/kg	ug/L	NO	NO
Manganese	441	267	383	3380	548	840	NA	840	6.64E+07	840	7.90E+04	1.00E+06	mg/kg	ug/L	NO	NO
Mercury	19.4	12.3	ND	ND	1.04	11	0.2	0.2	1.58E+04	2	7.90E+03	8.22E+02	mg/kg	ug/L	NO	NO
Nickel	83	38.7	2.2	4.3	65	730	42.2	42.2	3.33E+06	100	3.33E+04	2.17E+05	mg/kg	ug/L	NO	NO
Selenium	0.74	3.1	ND	ND	2.5	180	71	71	5.61E+06	50	1.12E+05	2.80E+04	mg/kg	ug/L	NO	NO
Silver	3	ND	2.1	ND	17	180	0.23	0.23	1.82E+04	200	9.09E+01	1.54E+02	mg/kg	ug/L	NO	NO
Thallium	2.8	0.72	ND	ND	0.36	2.9	21.3	2.9	2.29E+05	2	1.15E+05	4.12E+03	mg/kg	ug/L	NO	NO
Tin	148	61.1	ND	ND	55000	22000	NA	22000	1.74E+09	22000	7.90E+04	1.00E+06	mg/kg	ug/L	NO	NO

* Initial Screening Concentrations: See notes for Table 10.1.5.2
In this table, the screening values shown are not adjusted for background reference values.

\# Adjusted Screening Concentrations: See notes for Table 10.1.5.2
Adjusted Eco/HH Groundwater RBC - Combined Eco/HH Surface Water RBCs multiplied by site-specific surface water dilution factor of 79,000: GW concentrations protective of surface water

Units: See notes for Table 10.1.5.2

Table 10.10.9.3
Soil-to-Air Volatilization Screening Analysis
NAVBASE-Charleston, Zone E: SWMUs 83 and 84 and AOC 574
Charleston, South Carolina

VOCs	Maximum Concentration in Surface Soil	Soil to Air SSL*	Units	Exceeds SSL
Acetone	200	62000000	UG/KG	NO
2-Butanone (MEK)	6	10000	UG/KG	NO
2-Hexanone	20	10000	UG/KG	NO
Methylene chloride	14	7000	UG/KG	NO
Toluene	1	520000	UG/KG	NO
1,1,1-Trichloroethane	1	980000	UG/KG	NO
Trichloroethene	37	3000	UG/KG	NO
Xylene (total)	6	320000	UG/KG	NO

* - Soil screening levels for transfers from soil to air were obtained from USEPA Region III Risk-Based Concentration Table, June 1996. Values for 2-Butanone (MEK) and 2-Hexanone were estimated.

APPENDIX D

DRAFT ZONE E RCRA FACILITY INVESTIGATION REPORT SITE-SPECIFIC EVALUATION FOR AOC 576

10.38 AOC 576, Oil and Paint Storehouse/Print Office, Former Building 1012

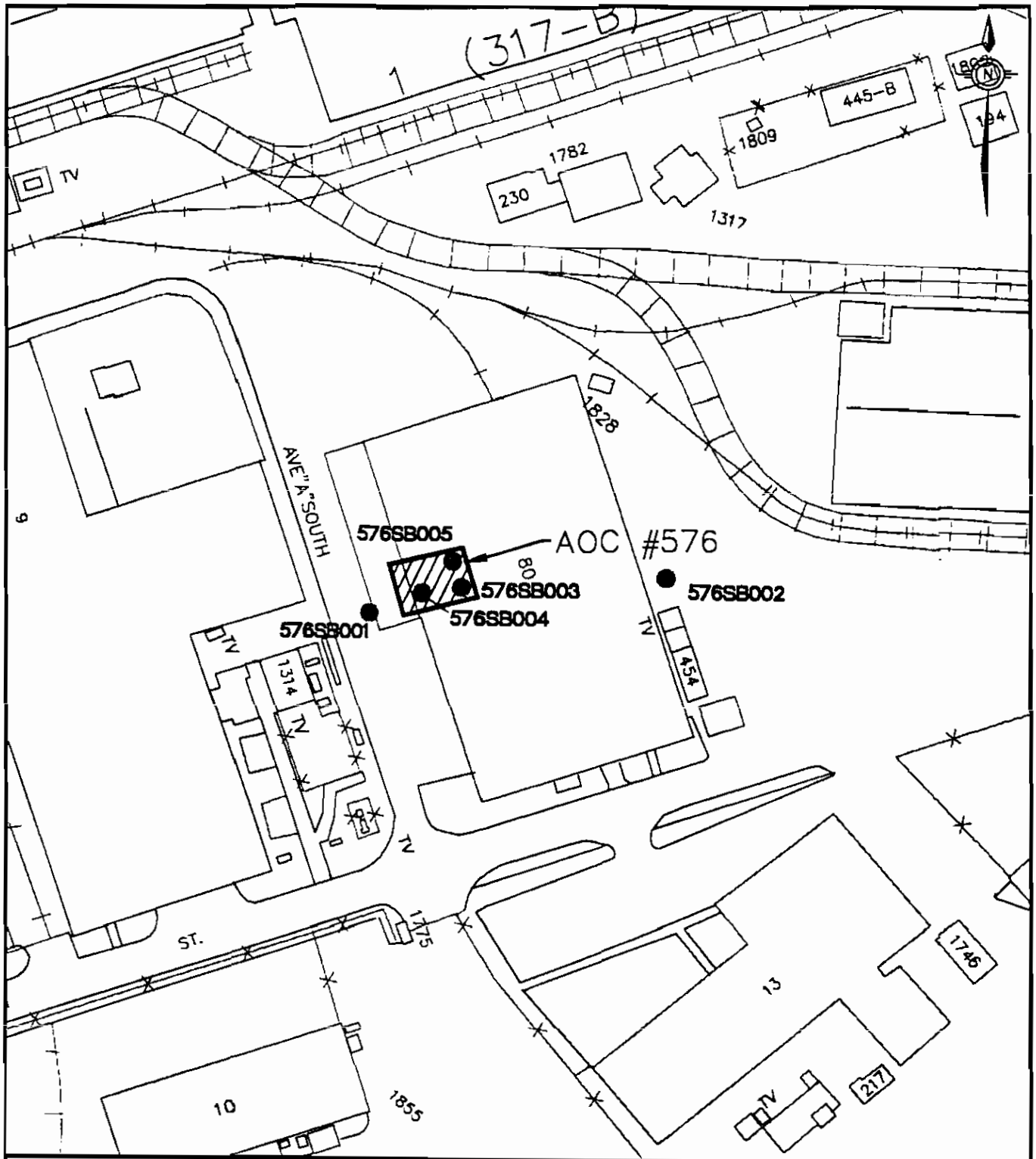
AOC 576, an oil and paint storehouse/print office, was in former Building 1012. Operations were conducted from 1909 until 1930. No other information could be found regarding the operating practices of the storehouse or the print office. Currently, this site is occupied by Building 80. Materials of concern identified in the *Final Zone E RFI Work Plan* include inks, paints, metals, solvents, and petroleum hydrocarbons. Potential receptors that may be exposed to site contaminants include current and future building users and any site workers this area may support following base closure.

To fulfill the CSI objectives for AOC 576, soil and groundwater samples were collected in accordance with the *Final Zone E RFI Work Plan*, and Section 3 of this report to determine whether any contamination resulted from onsite activities.

10.38.1 Soil Sampling and Analysis

Soil samples were collected in one round at AOC 576 from the locations shown in Figure 10.38.1. The *Final Zone E RFI Work Plan*, proposed collecting three soil samples from the upper interval, and three samples from the lower interval. Soil samples were also collected from both intervals at the two shallow monitoring wells proposed for this site.

All samples were collected and submitted for analysis at DQO Level III for VOCs, SVOCs, and metals. One upper-interval sample was selected for duplication and analyzed at DQO Level IV for Appendix IX parameters which includes the suite of parameters proposed for the site, plus a more comprehensive list of VOCs and SVOCs, plus organophosphorus pesticides, hexavalent chromium, herbicides, and dioxins. Table 10.38.1.1 summarizes soil sampling at AOC 576.



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 10.38.1
SOIL BORING LOCATIONS
AOC #576
OIL AND PAINT STOREHOUSE
FORMER BUILDING 1012

DWG DATE: 09/02/97 | DWG NAME: 10-38-1

Table 10.38.1.1
AOC 576
Soil Sampling Summary

Interval	Samples Proposed	Samples Collected	Analyses Proposed	Analyses Collected	Deviations
Upper	5	5	VOCs, SVOCs, metals	VOCs, SVOCs, metals	None
Lower	5	5	VOCs, SVOCs, metals	VOCs, SVOCs, metals	None

10.38.2 Nature of Contamination in Soil

Organic compound analytical results for soil are summarized in Table 10.38.2.1. Inorganic analytical results for soil are summarized in Table 10.38.2.2. Appendix H contains the complete data report for all samples collected in Zone E.

Table 10.38.2.1
AOC 576
Organic Compounds Detected in Soil

Compound	Sampling Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Number of Samples Exceeding RBC
VOCs (μg/kg)						
Acetone	Upper	3/5	27.0 - 70.0	45.0	20,000,000	0
	Lower	3/5	19.0 - 68.0	35.7	NA	NA
Methylene chloride	Upper	3/5	24.0 - 25.0	24.3	760,000	0
	Lower	3/5	8.00 - 18.0	13.3	NA	NA
SVOCs (μg/kg)						
Acenaphthene	Upper	1/5	170	170	12,000,000	0
Anthracene	Upper	1/5	250	250	61,000,000	0
Benzo(g,h,i)perylene	Upper	4/5	110 - 270	153	8,200,000	0
bis(2-Ethylhexyl)phthalate	Upper	1/5	440	440	410,000	0
	Lower	1/5	3,200	3,200	NA	NA

Table 10.38.2.1
AOC 576
Organic Compounds Detected in Soil

Compound	Sampling Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Number of Samples Exceeding RBC
SVOCs (μg/kg)						
Butylbenzylphthalate	Upper	2/5	440 - 520	480	41,000,000	0
	Lower	1/5	56.0	56.0	NA	NA
Dibenzofuran	Upper	1/5	110	110	820,000	0
Di-n-butylphthalate	Upper	1/5	44.0	44.0	20,000,000	0
Fluoranthene	Upper	4/5	67.0 - 1,200	454	8,200,000	0
Fluorene	Upper	1/5	190	190	8,200,000	0
2-Methylnaphthalene	Upper	1/5	73.0	73.0	8,200,000	0
Naphthalene	Upper	1/5	170	170	8,200,000	0
Phenanthrene	Upper	3/5	150 - 1,200	503	8,200,000	0
Pyrene	Upper	4/5	71.0 - 1,300	480	6,100,000	0
SVOCs (B(a)P Equivalents) (μg/kg)						
B(a)P Equiv.	Upper	5/5	82.9 - 726	267	780	0
Benzo(a)anthracene	Upper	4/5	42.0 - 610	228	7,800	0
Benzo(b)fluoranthene	Upper	2/5	92.0 - 380	236	7,800	0
Benzo(k)fluoranthene	Upper	4/5	120 - 410	228	78,000	0
Benzo(a)pyrene	Upper	5/5	69.0 - 460	179	780	0
Chrysene	Upper	4/5	62.0 - 710	281	780,000	0
Dibenz(a,h)anthracene	Upper	3/5	43.0 - 140	80.3	780	0
Indeno(1,2,3-cd)pyrene	Upper	4/5	80.0 - 220	118	7,800	0
Pesticides (μg/kg)						
Endrin aldehyde	Upper	1/1	9.70	9.70	61,000	0
Dioxins (ng/kg)						
Dioxin Equiv.	Upper	1/1	0.376	0.376	43	0
1234678-HpCDD	Upper	1/1	19.5	19.5	NA	NA

Table 10.38.2.1
AOC 576
Organic Compounds Detected in Soil

Compound	Sampling Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Number of Samples Exceeding RBC
Dioxins (ng/kg)						
123789-HxCDD	Upper	1/1	1.80	1.80	NA	NA
OCDF	Upper	1/1	1.41	1.41	NA	NA

Notes:
µg/kg = Micrograms per kilogram
ng/kg = Nanograms per kilogram
RBC = Risk-based concentration
NA = No industrial RBC established

Table 10.38.2.2
AOC 576
Inorganic Detections for Soil (mg/kg)

Element	Sample Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Reference Conc.	Number of Samples Exceeding RBC and RC
Aluminum (Al)	Upper	5/5	3,730 - 6,110	5,030	100,000	26,600	0
	Lower	5/5	4,170 - 8,410	6,150	NA	41,100	NA
Antimony (Sb)	Upper	2/5	0.680 - 0.770	0.725	82	1.77	0
	Lower	3/5	0.490 - 0.840	0.683	NA	1.60	NA
Arsenic (As)	Upper	5/5	2.10 - 5.70	4.14	3.8	23.9	0
	Lower	5/5	2.50 - 10.4	5.78	NA	19.9	NA
Barium (Ba)	Upper	5/5	19.0 - 31.2	25.4	14,000	130	0
	Lower	5/5	13.4 - 21.5	17.1	NA	94.1	NA
Beryllium (Be)	Upper	5/5	0.390 - 0.480	0.424	1.3	1.70	0
	Lower	4/5	0.120 - 0.240	0.198	NA	2.71	NA
Cadmium (Cd)	Upper	2/5	0.140 - 0.160	0.150	100	1.50	0
Calcium (Ca)	Upper	5/5	3,860 - 36,300	15,800	NA	NA	NA
	Lower	5/5	956 - 1,970	1,350	NA	NA	NA

Table 10.38.2.2
AOC 576
Inorganic Detections for Soil (mg/kg)

Element	Sample Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Reference Conc.	Number of Samples Exceeding RBC and RC
Chromium (Cr)	Upper	5/5	5.80 - 11.6	8.22	1,000	94.6	0
	Lower	5/5	6.60 - 23.4	14.1	NA	75.2	NA
Cobalt (Co)	Upper	5/5	0.670 - 37.9	14.5	12,000	19.0	0
	Lower	5/5	0.640 - 2.20	1.31	NA	14.9	NA
Copper (Cu)	Upper	5/5	1.40 - 24.1	11.4	8,200	66.0	0
	Lower	5/5	0.490 - 1.60	1.03	NA	152	NA
Iron (Fe)	Upper	5/5	3,560 - 5,940	4,920	61,000	NA	0
	Lower	5/5	7,480 - 28,100	14,900	NA	NA	NA
Lead (Pb)	Upper	5/5	4.10 - 335	108	1,300	265	0
	Lower	5/5	4.70 - 16.2	8.72	NA	173	NA
Magnesium (Mg)	Upper	5/5	224 - 913	693	NA	NA	NA
	Lower	5/5	200 - 692	457	NA	NA	NA
Manganese (Mn)	Upper	5/5	20.4 - 136	62.2	4,700	302	0
	Lower	5/5	29.1 - 62.0	44.1	NA	881	NA
Mercury (Hg)	Upper	4/5	0.0400 - 0.430	0.198	61	2.60	0
	Lower	2/5	0.0400 - 0.0800	0.0600	NA	1.59	NA
Nickel (Ni)	Upper	3/5	4.50 - 5.30	5.00	4,100	77.1	0
	Lower	3/5	1.30 - 1.70	1.53	NA	57.0	NA
Potassium (K)	Upper	5/5	332 - 1,010	576	NA	NA	NA
	Lower	2/5	347 - 398	373	NA	NA	NA
Selenium (Se)	Upper	1/5	0.580	0.580	1,000	1.70	0
	Lower	2/5	1.000 - 1.20	1.10	NA	2.40	NA
Sodium (Na)	Upper	5/5	143 - 300	209	NA	NA	NA
	Lower	5/5	44.9 - 214	139	NA	NA	NA

Table 10.38.2.2
AOC 576
Inorganic Detections for Soil (mg/kg)

Element	Sample Interval	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Industrial RBC	Reference Conc.	Number of Samples Exceeding RBC and RC
Tin (Sn)	Upper	3/5	2.60 - 4.80	3.47	100,000	59.4	0
Vanadium (V)	Upper	5/5	5.80 - 11.0	8.62	1,400	94.3	0
	Lower	5/5	15.5 - 38.3	26.9	NA	155	NA
Zinc (Zn)	Upper	5/5	6.00 - 247	76.1	61,000	827	0
	Lower	5/5	5.20 - 18.4	9.14	NA	886	NA

Notes:
mg/kg = Milligrams per kilogram
RBC = Risk-based concentration
RC = Reference concentration
NA = No RBC or RC established

Volatile Organic Compounds in Soil

Two VOCs were detected in soil samples collected at AOC 576. Six detections occurred in both the upper and lower intervals. No VOC exceeded its respective industrial RBC in the upper interval or respective SSL in the lower interval.

Semivolatile Organic Compounds in Soil

Twenty SVOCs were detected in soil samples collected at AOC 576. Fifty-one detections occurred in the upper interval and two in the lower interval. No SVOCs exceeded their respective industrial RBC in the upper interval or respective SSL in the lower interval.

In accordance with recent cPAH guidance, BEQs were calculated for cPAHs at AOC 576. The upper-interval BEQ was calculated for five samples with a range of 82.9 to 501 μg/kg and a mean of 222 μg/kg. The BEQ did not exceed the BEQ industrial RBC of 780.0 μg/kg.

Pesticides in Soil

One pesticide was detected in the duplicate upper-interval sample. The pesticide did not exceed its industrial RBC. No lower-interval samples were analyzed for pesticides.

Other Organic Compounds in Soil

Three dioxins were detected in upper-interval soil samples collected at AOC 576. No industrial RBCs have been established for the detected dioxins. No lower-interval samples were collected.

In accordance with recent dioxin guidance, TEQs (dioxin equivalent) were calculated for dioxins at AOC 576. The upper-interval TEQ was calculated for one sample at 0.376 ng/kg, below the industrial RBC of 1,000 ng/kg.

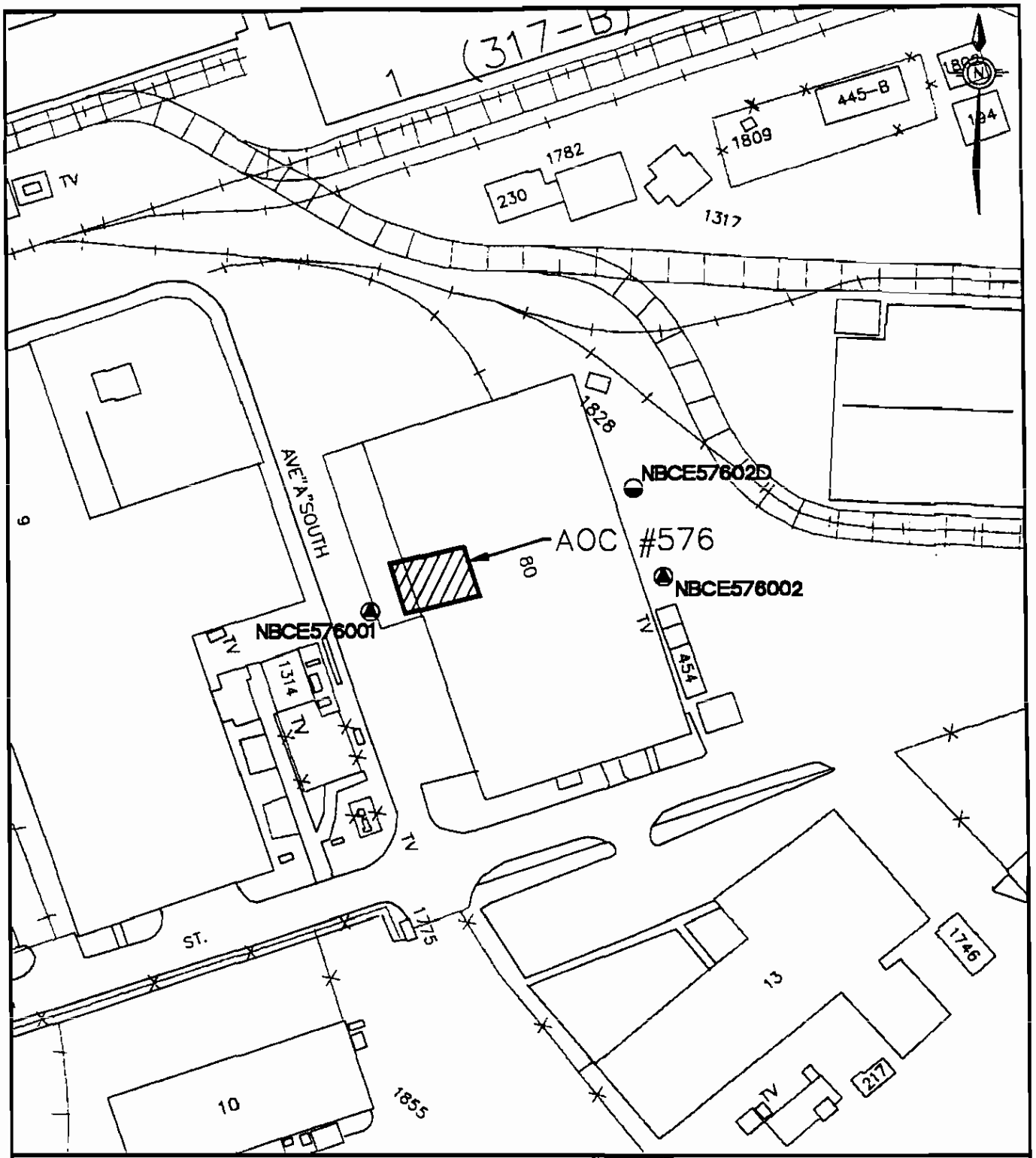
Inorganic Elements in Soil

Twenty-two metals were detected in soil samples collected at AOC 576. Ninety-five detections occurred in the upper interval and 86 in the lower interval. No metal exceeded both its respective industrial RBC and background RC in the upper interval or respective SSL and background RC in the lower interval.

10.38.3 Groundwater Sampling and Analysis

One deep monitoring well and two shallow monitoring wells were installed and sampled to assess groundwater quality at AOC 576 as shown in Figure 10.38.2. The wells were installed as follows:

- Shallow Wells — NBCE576001, NBCE576002
- Deep Well — NBCE57602D



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 10.38.2
MONITORING WELL LOCATIONS
AOC #576
OIL AND PAINT STOREHOUSE
FORMER BUILDING 1012

DWG DATE: 09/02/97 | DWG NAME: 10-38-2

Groundwater samples were submitted for analysis at DQO Level III for VOCs, SVOCs, metals, chlorides, sulfates, and TDS. No duplicate samples were collected at this site. Table 10.38.3.1 summarizes groundwater sampling and analysis at AOC 576.

Table 10.38.3.1
AOC 576
Groundwater Sampling Summary

Depth	Wells Proposed	Wells Installed	Analyses Proposed	Analyses Collected	Deviations
Shallow	2	2	VOCs, SVOCs, metals, chlorides, sulfates, and TDS	VOCs, SVOCs, metals, chlorides, sulfates, and TDS	None
Deep	1	1	VOCs, SVOCs, metals, chlorides, sulfates, and TDS	VOCs, SVOCs, metals, chlorides, sulfates, and TDS	None

The shallow monitoring wells were installed at 13 and 14.5 feet bgs in the surficial aquifer. The deep well was installed at 28 feet bgs at the base of the shallow aquifer. All wells were installed in accordance with Section 3.3 of this report.

10.38.4 Nature of Contamination in Groundwater

Organic compound analytical results for shallow and deep groundwater are summarized in Tables 10.38.4.1 and 10.38.4.2, respectively. Inorganic analytical results for shallow and deep groundwater are summarized in Tables 10.38.4.3 and 10.38.4.4, respectively. Appendix H contains the complete data report for all samples collected in Zone E.

Volatile Organic Compounds in Groundwater

Shallow Groundwater

One VOC was detected in one of two shallow groundwater samples collected at AOC 576. The VOC — bromodichloromethane — exceeded its respective tap-water RBC.

Table 10.38.4.1
AOC 576
Organic Compounds Detected in First Quarter Groundwater (μg/L)
Shallow Monitoring Wells

Compound	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap-Water RBC	MCL	Number of Samples Exceeding RBC
VOCs						
Bromodichloromethane	1/2	9.00	9.00	0.170	100	1
SVOCs						
Pentachlorophenol	1/2	6.00	6.00	0.560	1	1

Notes:
μg/L = Micrograms per liter
RBC = Risk-based concentration
MCL = Maximum contaminant level

Table 10.38.4.2
AOC 576
Organic Compounds Detected in First Quarter Groundwater (μg/L)
Deep Monitoring Wells

Compound	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap-Water RBC	MCL	Number of Samples Exceeding RBC
VOCs						
1,2-Dichloroethene (total)	1/1	2.00	2	5.5	70	0

Notes:
μg/L = Micrograms per liter
RBC = Risk-based concentration
MCL = Maximum contaminant level

Table 10.38.4.3
AOC 576
Inorganic Detections for First Quarter Groundwater (μg/L)
Shallow Monitoring Wells

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap-Water RBC	Reference Conc.	MCL	Number of Samples Exceeding RBC and RC
Aluminum (Al)	2/2	1,080 - 5,970	3,530	3,700	2,810	NA	1
Beryllium (Be)	1/2	3.00	3.00	0.0160	0.430	4.00	1

Table 10.38.4.3
AOC 576
Inorganic Detections for First Quarter Groundwater (μg/L)
Shallow Monitoring Wells

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap-Water RBC	Reference Conc.	MCL	Number of Samples Exceeding RBC and RC
Calcium (Ca)	1/2	280,000	280,000	NA	NA	NA	NA
Chromium (Cr)	1/2	10.9	10.9	18.0	12.3	100	0
Cobalt (Co)	2/2	3.60 - 183	93.3	220	2.50	NA	0
Iron (Fe)	2/2	570 - 51,700	26,100	1,100	NA	NA	1
Lead (Pb)	½	9.60	9.60	NA	4.80	15.0*	0
Magnesium (Mg)	2/2	4,280 - 69,400	36,800	NA	NA	NA	NA
Manganese (Mn)	2/2	68.2 - 2,340	1,200	84.0	2,560	NA	0
Nickel (Ni)	2/2	1.10 - 67.0	34.1	73.0	15.2	100	0
Sodium (Na)	1/2	889,000	889,000	NA	NA	NA	NA
Vanadium (V)	1/2	10.9	10.9	26.0	11.4	NA	0
Zinc (Zn)	1/2	101	101	1,100	27.3	NA	0

Notes:
μg/L = Micrograms per liter
RBC = Risk-based concentration
MCL = Maximum contaminant level
RC = Reference concentration
NA = No RBC, MCL, or RC established
* = TTAL

Table 10.38.4.4
AOC 576
Inorganic Detections for First Quarter Groundwater (μg/L)
Deep Monitoring Wells

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap-Water RBC	Reference Conc.	MCL	Number of Samples Exceeding RBC and RC
Inorganic Elements							
Arsenic (As)	1/1	35.1	35.1	0.0450	16.4	50.0	1
Barium (Ba)	1/1	51.1	51.1	260	218	2,000	0
Calcium (Ca)	1/1	186,000	186,000	NA	NA	NA	NA
Cobalt (Co)	1/1	18.1	18.1	220	12.9	NA	0
Iron (Fe)	1/1	2,730	2,730	1,100	NA	NA	1

Table 10.38.4.4
AOC 576
Inorganic Detections for First Quarter Groundwater (μg/L)
Deep Monitoring Wells

Element	Freq. of Detection	Range of Detected Conc.	Mean of Detected Conc.	Tap-Water RBC	Reference Conc.	MCL	Number of Samples Exceeding RBC and RC
Inorganic Elements							
Magnesium (Mg)	1/1	15,900	15,900	NA	NA	NA	NA
Manganese (Mn)	1/1	1,070	1,070	84.0	869	NA	1
Nickel (Ni)	1/1	10.7	10.7	73.0	42.2	100	0
Potassium (K)	1/1	5,040	5,040	NA	NA	NA	NA
Sodium (Na)	1/1	279,000	279,000	NA	NA	NA	NA
Zinc (Zn)	1/1	5.60	5.60	1,100	11.8	NA	0

Notes:
μg/L = Micrograms per liter
RBC = Risk-based concentration
MCL = Maximum contaminant level
RC = Reference concentration
NA = No RBC, MCL, or RC established

Bromodichloromethane was detected in well NBCE576002 (9.00 μg/L), exceeding its tap-water RBC of 0.170 μg/L. The detection did not exceed the bromodichloromethane MCL of 100 μg/L.

Deep Groundwater

One VOC — 1,2-dichloroethene — was detected in the one deep groundwater sample collected at AOC 576. The VOC did not exceed its tap-water RBC or MCL.

Semivolatile Organic Compounds in Groundwater

Shallow Groundwater

One SVOC was detected in one of two shallow groundwater samples collected at AOC 576. The SVOC — pentachlorophenol — exceeded its respective tap-water RBC.

Pentachlorophenol was detected in well NBCE576002 (6.00 μg/L), exceeding its tap-water RBC of 0.560 μg/L. The detection also exceeded the pentachlorophenol MCL of 1.00 μg/L.

Inorganic Elements in Groundwater

Shallow Groundwater

Thirteen metals were detected in shallow groundwater samples collected at AOC 576. Three metals — aluminum, beryllium, and iron — exceeded both their respective tap-water RBC and background shallow groundwater RC (where applicable).

Aluminum was detected in two of two samples with a range of 1,080 to 5,970 μg/L and a mean of 3,530 μg/L. One sample from well NBCE576001 (5,970 μg/L) exceeded both the aluminum tap-water RBC of 3,700 μg/L and shallow groundwater RC of 2,810 μg/L. No MCL has been established for aluminum.

Beryllium was detected in one of two samples in well NBCE576001 (3.00 μg/L), exceeding both its tap-water RBC of 0.0160 μg/L and shallow groundwater RC of 0.430 μg/L. The detection did not exceed the beryllium MCL of 4.00 μg/L.

Iron was detected in two of two samples with a range of 570 to 51,700 μg/L and a mean of 26,100 μg/L. One sample from well NBCE576001 (51,700 μg/L) exceeded the iron tap-water RBC of 1,100 μg/L. No shallow groundwater RC or MCL has been established for iron.

Deep Groundwater

Eleven metals were detected in the deep groundwater sample collected at AOC 576. Three metals — arsenic, iron, and manganese — exceeded both their respective tap-water RBC and background deep groundwater RC (where applicable).

Arsenic was detected in well NBCE57602D (35.1 μg/L), exceeding both its tap-water RBC of 0.0450 μg/L and deep groundwater RC of 16.4 μg/L. The detection did not exceed the arsenic MCL of 50.0 μg/L.

Iron was detected in well NBCE57602D (2,730 μg/L), exceeding its tap-water RBC of 1,100 μg/L. No deep groundwater RC or MCL has been established for iron.

Manganese was detected in well NBCE57602D (1,070 μg/L), exceeding both its tap-water RBC of 84.0 μg/L and deep groundwater RC of 869 μg/L. No MCL has been established for manganese.

10.38.5 Fate and Transport Assessment for AOC 576

AOC 576 consists of former Building 1012 oil and paint storehouse/print office previously located at the site of current Building 80. The physical setting surrounding the site is predominantly concrete and asphalt pavement and other buildings. Environmental media sampled as part of the AOC 576 CSI include surface soil, subsurface soil, and shallow and deep groundwater. Potential constituent migration pathways investigated for AOC 576 include soil to groundwater, groundwater to surface water, and emission of volatiles from surface soil to air.

10.38.5.1 Soil-to-Groundwater Cross-Media Transport: Tier One

Table 10.38.5.1 compares maximum detected organic constituent concentrations in surface soil and subsurface soil samples to risk-based soil screening levels considered protective of groundwater. For inorganics, maximum concentrations in soil are compared to the greater of (a) risk-based soil screening levels, or (b) background reference concentrations. To provide a conservative screen, generic soil screening levels are used; leachate entering the aquifer is assumed to be diluted by a ratio of 10:1, with no attenuation of constituents in soil (DAF=10).

Methylene chloride was detected in AOC 576 soil at concentrations that exceeded its generic groundwater protection SSL in three surface soil samples (576SB003, 576SB004, and 576SB005) and in two subsurface soil samples (576SB004 and 576SB005). Methylene chloride was not, however, detected in first-quarter groundwater samples. No other organic compounds were detected in AOC 576 soil at concentrations exceeding generic groundwater protection SSLs.

Cobalt was detected in AOC 576 soil at concentrations that exceeded its background reference value in two surface soil samples (576SB003 and 576SB005). Cobalt was also detected in first-quarter groundwater samples from both deep and shallow wells, but not at concentrations exceeding its tap water RBC. No other inorganics were detected in AOC 576 soil at concentrations exceeding generic SSLs and/or background reference values.

10.38.5.2 Groundwater-to-Surface Water Cross-Media Transport: Tier One

Table 10.38.5.1 also compares maximum detected organic constituent concentrations in shallow and deep groundwater samples to risk-based concentrations for drinking water, and to chronic ambient saltwater quality criteria values for the protection of aquatic life (saltwater surface water chronic screening values). For inorganics, maximum concentrations in groundwater are compared to the greater of (a) risk-based drinking water concentrations, or (b) background reference concentrations for groundwater, as well as to the saltwater surface water chronic values. To provide a conservative first-tier screen, no attenuation or dilution of constituents in groundwater is assumed before comparison to the relevant standards.

Two organic compounds — bromodichloromethane and pentachlorophenol — were detected in first-quarter groundwater samples from the same shallow well (NBCE576002) at concentrations exceeding their tap water RBCs. Neither constituent was detected in samples from downgradient wells at nearby combined SWMU 87. No organic compounds were detected in first-quarter AOC 576 deep groundwater samples at concentrations exceeding tap water RBCs, nor were any

organic compounds detected in first-quarter groundwater samples (deep or shallow) at concentrations exceeding saltwater surface water chronic screening levels.

Five inorganics — arsenic, beryllium, lead, nickel, and zinc — were detected in first-quarter groundwater samples at concentrations exceeding either tap water RBCs, background reference values, or saltwater surface water chronic screening levels. Arsenic was detected at a concentration exceeding its background reference value in the first-quarter groundwater sample from the deep well NBCE57602D. Beryllium was detected at a concentration exceeding its tap water RBC in one first-quarter shallow groundwater sample from well NBCE576001. Lead, nickel, and zinc were detected at concentrations exceeding their respective saltwater surface water chronic screening levels in the same first-quarter shallow groundwater sample from well NBCE576001. The maximum detected concentrations of arsenic, beryllium, and nickel (35.1 μg/L, 3.0 μg/L, and 67 μg/L, respectively) do not exceed their corresponding MCLs (50 μg/L, 4.0 μg/L, and 100 μg/L). There are no current MCLs for lead and zinc; however, the maximum detected concentration of lead in groundwater (9.6 μg/L) is less than its established TTAL (15 μg/L), and the maximum detected concentration of zinc (101 μg/L) is less than its respective tap water RBC (11,000 μg/L).

10.38.5.3 Soil and Groundwater-to-Surface Water Transport: Tier Two

Table 10.38.5.2 provides a second screening tier for all constituents detected in soil or groundwater at concentrations exceeding any of the first-tier screening levels. Constituent concentrations in groundwater are compared to combined ecological/human health RBCs that have been adjusted upward for site-specific dilution by surface water in the Cooper River, while soil constituent concentrations are compared to calculated SSLs that are based on the adjusted RBCs rather than the original target leachate concentrations. For the second-tier screen, no dilution of leachate by groundwater or attenuation of constituents in soil is assumed (DAF=1). The second screening tier identifies any constituents in soil or groundwater that pose a potential threat to

surface water quality, after allowing for dilution of groundwater by surface water when the groundwater discharges into the river. The site-specific surface-water dilution factor calculated for AOC 576 is 73,100:1 (see Table 6.2.1).

None of the first-tier constituent concentrations exceeded the adjusted screening levels of the second tier, indicating that site constituents in soil and groundwater pose no threat to human health or the environment in the Cooper River.

10.38.5.4 Soil-to-Air Cross-Media Transport

Table 10.38.5.3 lists the VOCs detected in surface soil samples collected at AOC 576 along with corresponding soil-to-air volatilization screening levels. Minimal surface soil is exposed at AOC 576. In addition, no VOCs maximum concentration exceeded its respective soil-to-air volatilization screening level. As a result, the soil-to-air migration pathway is not expected to be a viable pathway at AOC 576.

10.38.5.5 Fate and Transport Summary

In the first-tier screen, methylene chloride was detected at a concentration exceeding its generic SSL in three surface soil samples and two subsurface soil samples. Cobalt was detected at a concentration exceeding its background reference value in two surface soil samples.

Bromodichloromethane and pentachlorophenol were detected in the same first-quarter shallow groundwater sample at concentrations exceeding their tap water RBCs. Arsenic exceeded its background reference value in the single deep first-quarter groundwater sample. Beryllium exceeded its tap water RBC and lead, nickel, and zinc exceeded their respective saltwater surface water screening levels in the same first-quarter shallow groundwater sample. Concentrations of inorganics that were above first-quarter groundwater criteria were all below their respective MCLs, TTALs, or tap water RBCs.

None of the constituents exceeding first-tier screening values also exceeded the adjusted screening values of the second-tier comparisons, indicating that there is no threat to surface water in the Cooper River via the evaluated migration pathways.

Table 10.38.5.1
Chemicals Detected in Surface Soil, Subsurface Soil, Shallow Groundwater, and Deep Groundwater
Comparison to SSLs, Tap Water RBCs, Salt Water Surface Water Chronic Screening Levels, and Background Concentrations: Tier One
NAVBASE-Charleston, Zone E: AOC 576
Charleston, South Carolina

Parameter	Max. Concentration Surface Soil	Max. Concentration Subsurface Soil	Max. Concentration Shallow GW	Max. Concentration Deep GW	Screening Concentration * Soil to GW SSL	Screening Concentration * Tap Water RBC	Screening Concentration * Salt Wtr. Surf. Wtr. Chronic	Soil Units	Water Units	Leaching Potential	Ground-Water Migration Concern	Surface Water Migration Concern
Volatile Organic Compounds												
Acetone	70	68	ND	ND	8000	3700	NA	UG/KG	UG/L	NO	NO	NO
Bromodichloromethane	ND	ND	9	ND	300	0.17	NA	UG/KG	UG/L	NO	YES	NO
1,2-Dichloroethene (total)	ND	ND	ND	2	200	55	NA	UG/KG	UG/L	NO	NO	NO
Methylene chloride	25	18	ND	ND	10	4.1	2560	UG/KG	UG/L	YES	NO	NO
Semivolatile Organic Compounds												
Acenaphthene	170	ND	ND	ND	285000	2200	9.7	UG/KG	UG/L	NO	NO	NO
Anthracene	250	ND	ND	ND	5900000	11000	NA	UG/KG	UG/L	NO	NO	NO
Benzo(g,h,i)perylene	270	ND	ND	ND	2.33E+08	1500	NA	UG/KG	UG/L	NO	NO	NO
Benzo(a)pyrene equivalents												
Benzo(a)anthracene	610	ND	ND	ND	800	0.092	NA	UG/KG	UG/L	NO	NO	NO
Benzo(a)pyrene	460	ND	ND	ND	4000	0.0092	NA	UG/KG	UG/L	NO	NO	NO
Benzo(b)fluoranthene	380	ND	ND	ND	2500	0.092	NA	UG/KG	UG/L	NO	NO	NO
Benzo(k)fluoranthene	410	ND	ND	ND	24500	0.92	NA	UG/KG	UG/L	NO	NO	NO
Chrysene	710	ND	ND	ND	80000	9.2	NA	UG/KG	UG/L	NO	NO	NO
Dibenzo(a,h)anthracene	140	ND	ND	ND	800	0.0092	NA	UG/KG	UG/L	NO	NO	NO
Indeno(1,2,3-cd)pyrene	220	ND	ND	ND	7000	0.092	NA	UG/KG	UG/L	NO	NO	NO
Butylbenzylphthalate	520	56	ND	ND	930000	7300	29.4	UG/KG	UG/L	NO	NO	NO
Dibenzofuran	110	ND	ND	ND	NA	150	NA	UG/KG	UG/L	NO	NO	NO
Di-n-butylphthalate	44	ND	ND	ND	2300000	3700	3.4	UG/KG	UG/L	NO	NO	NO
bis(2-Ethylhexyl)phthalate (BEHP)	440	3200	ND	ND	1800000	4.8	NA	UG/KG	UG/L	NO	NO	NO
Fluoranthene	1200	ND	ND	ND	2150000	1500	1.6	UG/KG	UG/L	NO	NO	NO
Fluorene	190	ND	ND	ND	280000	1500	NA	UG/KG	UG/L	NO	NO	NO
2-Methylnaphthalene	73	ND	ND	ND	63000	1500	NA	UG/KG	UG/L	NO	NO	NO
Naphthalene	170	ND	ND	ND	42000	1500	23.5	UG/KG	UG/L	NO	NO	NO
Pentachlorophenol	ND	ND	6	ND	15	0.56	7.9	UG/KG	UG/L	NO	YES	NO
Phenanthrene	1200	ND	ND	ND	690000	1500	NA	UG/KG	UG/L	NO	NO	NO
Pyrene	1300	ND	ND	ND	2100000	1100	NA	UG/KG	UG/L	NO	NO	NO
Pesticides/PCB Compounds												
Endrin aldehyde	9.7	NA	NA	NA	500	11	NA	UG/KG	UG/L	NO	NO	NO
Dioxin Compounds												
Dioxin (TCDD TEQ)	0.376	NA	NA	NA	950	0.43	10	NG/KG	PG/L	NO	NO	NO
Inorganic Compounds												
Aluminum	6110	8410	5970	ND	41100	37000	NA	MG/KG	UG/L	NO	NO	NO
Antimony	0.77	0.84	ND	ND	2.5	15	NA	MG/KG	UG/L	NO	NO	NO
Arsenic	5.7	10.4	ND	35.1	23.9	18.7	36	MG/KG	UG/L	NO	YES	NO
Barium	31.2	21.5	ND	51.1	820	2600	NA	MG/KG	UG/L	NO	NO	NO
Beryllium	0.48	0.24	3	ND	32	1.2	NA	MG/KG	UG/L	NO	YES	NO
Cadmium	0.16	ND	ND	ND	4	18	9.3	MG/KG	UG/L	NO	NO	NO
Chromium (total)	11.6	23.4	10.9	ND	94.6	37000	103	MG/KG	UG/L	NO	NO	NO
Cobalt	37.9	2.2	183	18.1	19	2200	NA	MG/KG	UG/L	YES	NO	NO
Copper	24.1	1.6	ND	ND	152	1500	2.9	MG/KG	UG/L	NO	NO	NO
Lead	335	16.2	9.6	ND	400	15	8.5	MG/KG	UG/L	NO	NO	YES
Manganese	136	62	2340	1070	881	2560	NA	MG/KG	UG/L	NO	NO	NO
Mercury	0.43	0.08	ND	ND	2.6	11	0.2	MG/KG	UG/L	NO	NO	NO
Nickel	5.3	1.7	67	10.7	77.1	730	42.2	MG/KG	UG/L	NO	NO	YES
Selenium	0.58	1.2	ND	ND	2.5	180	71	MG/KG	UG/L	NO	NO	NO
Tin	4.8	ND	ND	ND	59.4	22000	NA	MG/KG	UG/L	NO	NO	NO
Vanadium	11	38.3	10.9	ND	3000	260	NA	MG/KG	UG/L	NO	NO	NO
Zinc	247	18.4	101	5.6	6000	11000	86	MG/KG	UG/L	NO	NO	YES

* Screening Concentrations:
Soil to GW - Generic SSLs based on DAF = 10, adapted from 1996 EPA Soil Screening Guidance or calculated using values from Table 6.2
Tap Water RBC - From EPA Region III Risk-Based Concentration Table, June 3, 1996
Salt Water Surface Water Chronic - From EPA Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment, November, 1995; Table
In each case, the value shown is the greater of the relevant screening value or the corresponding background reference value

Units: See notes for Table 10.1.5.1

Table 10.38.5.2
Chemicals Detected in Surface Soil, Subsurface Soil, Shallow Groundwater, or Deep Groundwater at Concentrations Exceeding any Initial Screening Concentration
Comparison to Combined Ecological/Human Health RBCs Adjusted for Surface Water Dilution, and to SSLs Based on Adjusted Ecological/Human Health RBCs: Tier Two
NAVBASE-Charleston, Zone E: AOC 576
Charleston, South Carolina

Parameter	Max. Concentration		Max. Concentration		Initial Screening Concentrations *			Adjusted Screening Concentrations #					Units		Screening Results	
	Surface Soil	Subsurface Soil	Shallow GW	Deep GW	Soil to GW SSL	Tap Water RBC	Salt Wtr. Surf. Wtr. Chronic	Combined Eco/HH Surf. Wtr. RBC	Adjusted Eco/HH GW RBC	Target Leachate Conc. (DAF=1)	SSL Multi-plier	Adjusted SSL (DAF=1)	Soil Units	Water Units	Leaching Potential	Surface Water Migration Concern
Volatile Organic Compounds																
Bromodichloromethane	ND	ND	9	ND	300	0.17	NA	0.17	1.24E+04	100	1.24E+02	3.73E+03	UG/KG	UG/L	NO	NO
Methylene chloride	25	18	ND	ND	10	4.1	2560	4.1	3.00E+05	5	5.99E+04	5.99E+04	UG/KG	UG/L	NO	NO
Semivolatile Organic Compounds																
Pentachlorophenol	ND	ND	6	ND	15	0.56	7.9	0.56	4.09E+04	1	4.09E+04	6.14E+04	UG/KG	UG/L	NO	NO
Inorganic Compounds																
Arsenic	5.7	10.4	ND	35.1	14.6	0.045	36	0.045	3.29E+03	50	6.58E+01	9.61E+01	MG/KG	UG/L	NO	NO
Beryllium	0.48	0.24	3	ND	32	0.016	NA	0.016	1.17E+03	4	2.92E+02	9.36E+02	MG/KG	UG/L	NO	NO
Cobalt	37.9	2.2	183	18.1	1040	2200	NA	2200	1.61E+08	2200	7.31E+04	1.00E+06	MG/KG	UG/L	NO	NO
Lead	335	16.2	9.6	ND	400	15	8.5	8.5	6.21E+05	15	4.14E+04	1.00E+06	MG/KG	UG/L	NO	NO
Nickel	5.3	1.7	67	10.7	65	730	42.2	42.2	3.08E+06	100	3.08E+04	2.01E+05	MG/KG	UG/L	NO	NO
Zinc	247	18.4	101	5.6	6000	11000	86	86	6.29E+06	10000	6.29E+02	3.77E+05	MG/KG	UG/L	NO	NO

* Initial Screening Concentrations: See notes for Table 10.1.5.2
In this table, the screening values shown are not adjusted for background reference values.

\# Adjusted Screening Concentrations: See notes for Table 10.1.5.2
Adjusted Eco/HH Groundwater RBC - Combined Eco/HH Surface Water RBCs multiplied by site-specific surface water dilution factor of 73,100: GW concentrations protective of surface water

Units: See notes for Table 10.1.5.2

Table 10.38.5.3
Soil-to-Air Volatilization Screening Analysis
NAVBASE-Charleston, Zone E: AOC 576
Charleston, South Carolina

VOCs	Maximum Concentration in Surface Soil	Soil to Air SSL*	Units	Exceeds SSL
Acetone	180	62000000	UG/KG	NO
2-Butanone (MEK)	10	10000	UG/KG	NO
Chloroform	2	200	UG/KG	NO
Methylene chloride	25	7000	UG/KG	NO

* - Soil screening levels for transfers from soil to air were obtained from USEPA Region III Risk-Based Concentration Table, June 1996.

10.38.6 Fixed-Point Risk Evaluation for AOC 576

10.38.6.1 Site Background and Investigative Approach

AOC 576 was an oil and paint storehouse/print office in former Building 1012. This site is located in a highly industrialized portion of Zone E. As a result, the risk assessment for this site is presented as a FRE following the framework presented in Section 7.3.

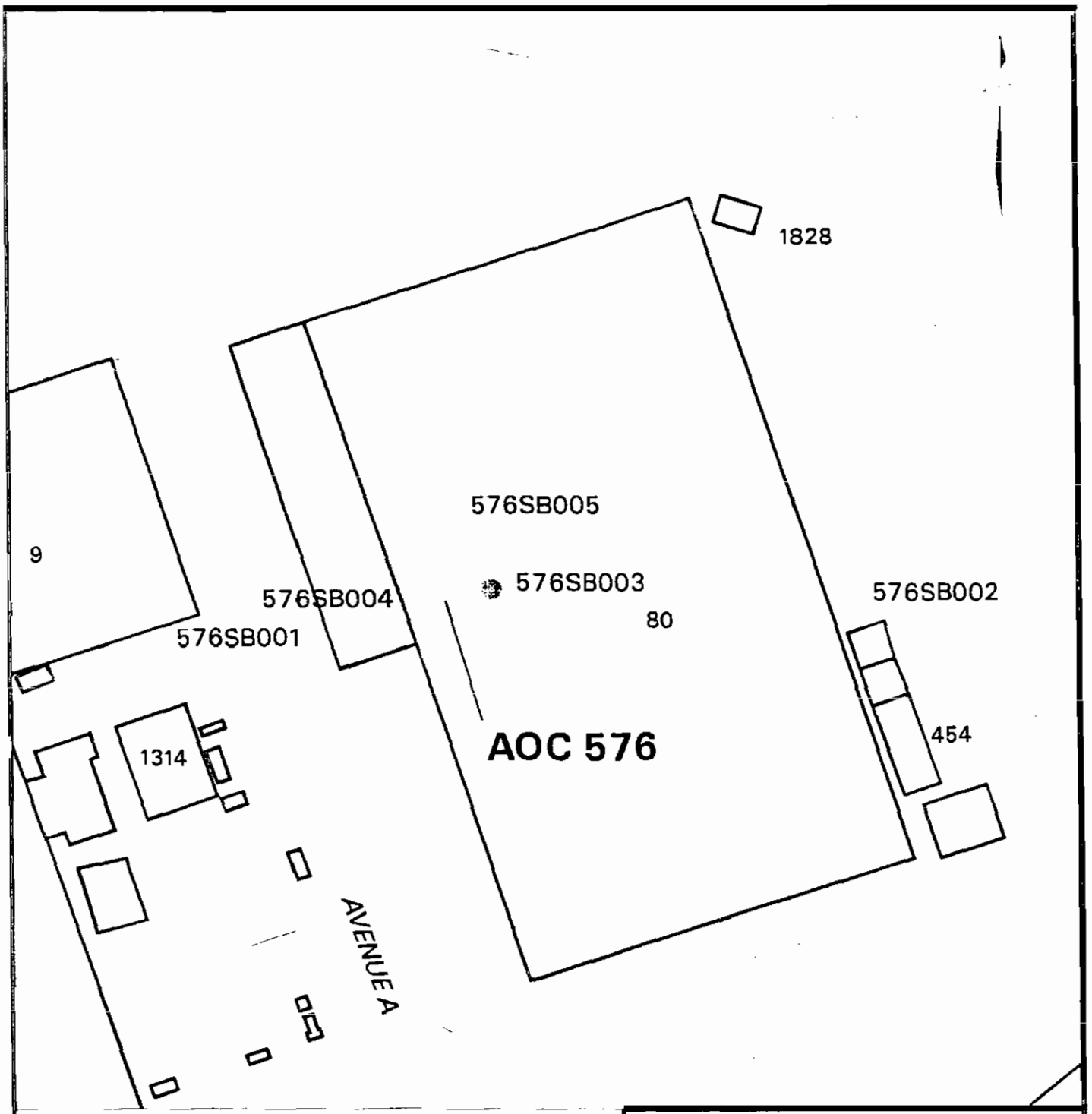
A total of five surface soil samples were considered in the AOC 576 FRE. Three monitoring wells were installed as part of the 1995 CSI. Two of these monitoring wells were installed into the shallow aquifer and one was installed into the deep aquifer. Groundwater data generated from the first quarter CSI sampling event are used to represent point risk/hazard for the AOC 576 FRE. Sections 10.38.1 and 10.38.3 contain summaries of the sampling effort for AOC 576.

10.38.6.2 Fixed-Point Risk Evaluation for Soil

Residential Scenario

Table 10.38.6.1 provides CPSS summaries for AOC 576 soil and identifies COPCs based on comparison to residential and industrial RBCs and background RCs. Based on residential RBCs, BEQ equivalents were identified as COPCs for AOC 576. Wilcoxon rank sum test analyses did not result in the inclusion of any parameter that had been screened out based on background concentration.

Table 10.38.6.2 summarizes the residential COPCs detected at each AOC 576 sample location with contribution to risk. As shown, BEQ equivalent compounds contribute to risk for AOC 576 surface soil, exceeding 1E-06 at all five locations. Figure 10.38.3 is a spatial presentation of residential risk estimates for AOC 576 surface soil. For those samples with detected concentrations of BEQ equivalents, risk estimates range from 1.3E-06 to 1E-05 with an arithmetic mean risk of 4E-06 (assuming a deminimus risk of 1E-07 for samples with no detectable concentrations of BEQ equivalent compounds).



LEGEND - CUMULATIVE SOIL RISK

- NO COPCs DETECTED
- < 1E-6
- 1E-6 to 5E-6
- 5E-6 to 1E-5
- 1E-5 to 1E-4
- > 1E-4

0 feet 100

ZONE E - RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE, CHARLESTON
CHARLESTON, S.C.

FIGURE 10.38.3
CUMULATIVE SOIL RISK
RESIDENTIAL SCENARIO
AOC 576

No COPCs were detected in AOC 576 surface soil that would have contributed to HI estimates.

Industrial Scenario

No COPCs were identified in AOC 576 surface soil, based on industrial RBCs.

10.38.6.3 Fixed-Point Risk Evaluation for Groundwater

Table 10.38.6.3 provides CPSS summaries for AOC 576 groundwater. COPC identification was based on comparison of first quarter groundwater concentrations to tap water RBCs, as well as corresponding background concentrations for inorganics. Based on tap water RBCs, arsenic and manganese were identified as COPCs in the deep well, while aluminum, beryllium, pentachlorophenol, and bromodichloromethane were identified as COPCs in the shallow wells. The maximum concentration of manganese reported in the shallow aquifer exceeded its RBC and was eliminated from consideration in the groundwater FRE based on comparison to its background RC. AOC 576 shallow groundwater data were not sufficient to perform Wilcoxon rank sum test analyses. As a result, manganese was eliminated from the shallow groundwater FRE based on direct comparison of its maximum concentration to its background RC.

Table 10.38.6.4 summarizes the COPCs identified at each AOC 576 monitoring well, with contribution to risk and hazard. As shown, arsenic contributes to risk for AOC 576 in the deep aquifer, exceeding 1E-06. Both arsenic and manganese contribute to hazard in the deep aquifer, exceeding unity. In the deep well, the risk estimate is 8E-04, and the HI is 10. Beryllium, bromodichloromethane, and pentachlorophenol contribute to both risk and hazard in the shallow aquifer, and aluminum contributes to hazard only. Risk estimates in the shallow aquifer range from 3E-05 to 2E-04, with an arithmetic mean of 1E-04. Hazard estimates in the shallow aquifer range from 0.1 to 0.4, and do not exceed unity at either sample location in the shallow aquifer.

Figure 10.38.4 is a spatial presentation of risk estimates and Figure 10.38.5 is a spatial presentation of hazard estimates for AOC 576 groundwater.

10.38.6.4 Uncertainty

AOC 576 uncertainty issues specific to the FRE and essential to the risk management process are presented in the following paragraphs.

Characterization of Exposure Setting and Identification of Exposure Pathways

The potential for high bias is introduced through the exposure setting and pathway selection due to the highly conservative assumptions (i.e., future residential use) recommended by USEPA Region IV when assessing potential future and current exposure. The exposure assumptions made in the site worker scenario are highly protective and would tend to overestimate exposure.

Residential use of the site would not be expected, based on current site uses and the nature of surrounding buildings. Current reuse plans call for continued industrial use of Zone E, specifically as a marine cargo terminal and drydocking facility. If this area were to be redeveloped, the buildings and other structures would be demolished, and the surface soil conditions would likely change — the soils could be covered with landscaping soil and/or a house. Consequently, chronic exposure to surface soil conditions, as represented by the sample results used in this FRE, would not be likely under any future use scenario. These factors indicate that exposure pathways assessed in this FRE would generally overestimate the risk and hazard posed to current/future site workers and future site residents.

Groundwater is not currently used as a potable water source at AOC 576, nor is it used at NAVBASE or in the surrounding area. Municipal water is readily available. As previously mentioned, it is highly unlikely that the site will be developed as a residential area, and it is unlikely that a potable-use well would be installed onsite. It is probable that, if residences were

constructed onsite and an unfiltered well were installed, the salinity and dissolved solids would preclude this aquifer from being an acceptable potable water source.

Quantification of Risk/Hazard

Soil

A conservative screening process was used to identify COPCs for AOC 576. The potential for eliminating CPSSs with the potential for cumulative HI greater than one was addressed for noncarcinogens through the use of RBCs that were reduced one order of magnitude. For carcinogens the RBCs are based on a conservative target risk of 1E-06. Use of conservative RBCs in combination with the use of maximum detected concentrations for comparison minimizes the likelihood of a significant contribution to risk/hazard based on eliminated CPSSs. Of the CPSSs screened and eliminated from formal assessment based on comparison to RBCs, none was reported at a concentration close to its RBC (e.g. within 10% of its RBC).

Groundwater

The same conservative screening process used for soil was also applied to groundwater. Use of conservative RBCs in combination with the use of maximum detected concentrations for comparison minimizes the likelihood of a significant contribution to risk/hazard based on eliminated CPSSs. Of the CPSSs screened and eliminated from formal assessment, none was reported at a concentration close to its RBC (e.g. within 10% of its RBC).

Manganese was reported in AOC 576 shallow monitoring wells at a maximum concentration above its RBC benchmark and was eliminated from consideration in the FRE based on comparison to its corresponding background concentrations. As a result, its contribution to hazard has not been considered in the shallow groundwater FRE.

10.38.6.5 FRE Summary

The risk and hazard posed by contaminants at AOC 576 were assessed for the future site worker and the future site resident as sample point-specific estimates. In surface soils, the incidental ingestion and dermal contact pathways are reflected. The groundwater FRE was based on first quarter data and considers both the ingestion and inhalation pathways. Risk and HI estimates are presented on Tables 10.38.6.2 and 10.38.6.4 such that a risk (E-06) or HI that exceeds one for any COPC at any given sample location is an indication that the concentration of that COPC exceeds its RGO (calculated at a target risk of 1E-06 and a target hazard quotient of 1). Section 7, Tables 7.3.1, 7.3.2, and 7.3.3 provide residential, industrial, and residential groundwater RGOs, respectively, for all of the COPCs identified for Zone E.

Soil — Residential Scenario

BEQ equivalent compounds were detected in AOC 576 surface soil at concentrations above their residential RGOs in all five samples. The calculated mean risk estimate was 4E-06 which exceeds the 1E-06 SCDHEC risk level of concern, but is within USEPA's 1E-06 to 1E-04 acceptable risk range.

Soil — Site Worker Scenario

No COPCs were identified for AOC surface soil, based on industrial RBCs.

Groundwater — Residential Scenario

Arsenic and manganese were detected in groundwater samples collected from the AOC 576 deep monitoring well at concentrations above their residential RGOs. The risk estimate for the deep aquifer was 8E-04, which exceeds the 1E-06 SCDHEC risk level of concern and USEPA's 1E-06 to 1E-04 acceptable range. The hazard estimate for the deep aquifer was 10, which exceeds USEPA's acceptable limit of unity. Manganese was not detected in deep groundwater at a concentration exceeding its shallow groundwater background RC. Since there is no physical

barrier between the shallow and deep water bearing zones, manganese concentrations reported in deep groundwater may reflect naturally occurring conditions. Arsenic concentrations reported in AOC 576 deep groundwater are consistent with those reported in deep groundwater for adjacent sites AOC 145, AOC 580, and AOC 574.

Beryllium, bromodichloromethane, and pentachlorophenol were detected in AOC 576 shallow monitoring wells at concentrations above their residential RGOs. The mean risk estimate for the shallow aquifer was 1E-04, which exceeds the 1E-06 SCDHEC risk level of concern, and is equal to USEPA's upper-bound acceptable risk value. The mean hazard estimate was 0.28, and is below USEPA's acceptable limit of unity. Concentrations of beryllium and bromodichloromethane reported in groundwater samples collected in subsequent rounds were reasonably consistent with first quarter results. Conversely, pentachlorophenol was only detected in the first quarter groundwater sample collected from NBCE576002 and was not reported in any other AOC 576 groundwater sample (shallow or deep) collected over four quarters of sampling.

Thallium was reported in both fourth quarter shallow groundwater samples at concentrations above its MCL, however, it was not detected in deep groundwater or first, second or third quarter shallow groundwater. Arsenic was detected at a concentration exceeding its MCL in second and third quarter deep groundwater samples.

Table 10.38.6.1
Chemicals Present in Site Samples
AOC 576 - Surface Soil
NAVBASE - Charleston
Charleston, South Carolina

Parameter		Frequency of Detection		Range of Detection		Average Detected Conc.	Range of SQL		Screening Concentrations Residential RBC	Industrial RBC	Reference	Units	Number Exceeding Res.	Ind.	Ref.
Carcinogenic PAHs															
B(a)P Equiv.	*	5	5	82.862	725.81	267	NA	NA	88	780	NA	UG/KG	3		
Benzo(a)anthracene		4	5	42	610	228	370	370	880	7800	NA	UG/KG			
Benzo(a)pyrene	*	5	5	69	460	179	NA	NA	88	780	NA	UG/KG	3		
Benzo(b)fluoranthene		2	5	92	380	236	370	410	880	7800	NA	UG/KG			
Benzo(k)fluoranthene		4	5	120	410	228	370	370	8800	78000	NA	UG/KG			
Chrysene		4	5	62	710	281	370	370	88000	780000	NA	UG/KG			
Dibenz(a,h)anthracene	*	3	5	43	140	80	370	410	88	780	NA	UG/KG	1		
Indeno(1,2,3-cd)pyrene		4	5	80	220	118	370	370	880	7800	NA	UG/KG			
TCDD Equivalents															
Dioxin Equiv.		1	1	0.3757	0.3757	0.38	NA	NA	1000	1000	NA	NG/KG			
Inorganics															
Aluminum (Al)		5	5	3730	6110	5034	NA	NA	7800	100000	26600	MG/KG			
Antimony (Sb)		2	5	0.68	0.77	0.73	0.44	0.5	3.1	82	1.77	MG/KG			
Arsenic (As)		5	5	2.1	5.7	4.14	NA	NA	0.43	3.8	23.9	MG/KG			
Barium (Ba)		5	5	19	31.2	25.42	NA	NA	550	14000	130	MG/KG			
Beryllium (Be)		5	5	0.39	0.48	0.42	NA	NA	0.15	1.3	1.7	MG/KG			
Cadmium (Cd)		2	5	0.14	0.16	0.15	0.11	0.12	3.9	100	1.5	MG/KG			
Calcium (Ca)	N	5	5	3860	36300	15752	NA	NA	NA	NA	NA	MG/KG			
Chromium (Cr)		5	5	5.8	11.6	8.22	NA	NA	39	1000	94.6	MG/KG			
Cobalt (Co)		5	5	0.67	37.9	14.49	NA	NA	470	12000	19	MG/KG			
Copper (Cu)		5	5	1.4	24.1	11.42	NA	NA	310	8200	66	MG/KG			
Iron (Fe)	N	5	5	3560	5940	4920	NA	NA	NA	NA	NA	MG/KG			
Lead (Pb)		5	5	4.1	335	108	NA	NA	400	1300	265	MG/KG			1
Magnesium (Mg)	N	5	5	224	913	693	NA	NA	NA	NA	NA	MG/KG			
Manganese (Mn)		5	5	20.4	136	62	NA	NA	180	4700	302	MG/KG			
Mercury (Hg)		4	5	0.04	0.43	0.20	0.12	0.12	2.3	61	2.6	MG/KG			
Nickel (Ni)		3	5	4.5	5.3	5.00	3	6.8	160	4100	77.1	MG/KG			
Potassium (K)	N	5	5	332	1010	576	NA	NA	NA	NA	NA	MG/KG			
Selenium (Se)		1	5	0.58	0.58	0.58	0.55	0.62	39	1000	1.7	MG/KG			
Sodium (Na)	N	5	5	143	300	209	NA	NA	NA	NA	NA	MG/KG			
Tin (Sn)		3	5	2.6	4.8	3.47	2.2	2.5	4700	100000	59.4	MG/KG			
Vanadium (V)		5	5	5.8	11	8.62	NA	NA	55	1400	94.3	MG/KG			
Zinc (Zn)		5	5	6	247	76	NA	NA	2300	61000	827	MG/KG			
Pesticides															
Endrin aldehyde		1	1	9.7	9.7	9.70	NA	NA	2300	61000	NA	UG/KG			

Table 10.38.6.1
Chemicals Present in Site Samples
AOC 576 - Surface Soil
NAVBASE - Charleston
Charleston, South Carolina

Parameter	Frequency of Detection		Range of Detection		Average Detected Conc.	Range of SQL		Screening Concentrations Residential RBC	Industrial RBC	Reference	Units	Number Exceeding Res.	Ind.	Ref.
Semivolatile Organics														
2-Methylnaphthalene	1	5	73	73	73	370	410	310000	8200000	NA	UG/KG			
Acenaphthene	1	5	170	170	170	370	410	470000	12000000	NA	UG/KG			
Anthracene	1	5	250	250	250	370	410	2300000	61000000	NA	UG/KG			
Benzo(g,h,i)perylene	4	5	110	270	153	370	370	310000	8200000	NA	UG/KG			
bis(2-Ethylhexyl)phthalate	1	5	440	440	440	370	390	46000	410000	NA	UG/KG			
Butylbenzylphthalate	2	5	440	520	480	370	410	1600000	41000000	NA	UG/KG			
Dibenzofuran	1	5	110	110	110	370	410	31000	820000	NA	UG/KG			
Di-n-butylphthalate	1	5	44	44	44	370	410	780000	20000000	NA	UG/KG			
Fluoranthene	4	5	67	1200	454	370	370	310000	8200000	NA	UG/KG			
Fluorene	1	5	190	190	190	370	410	310000	8200000	NA	UG/KG			
Naphthalene	1	5	170	170	170	370	410	310000	8200000	NA	UG/KG			
Phenanthrene	3	5	150	1200	503	370	410	310000	8200000	NA	UG/KG			
Pyrene	4	5	71	1300	480	370	370	230000	6100000	NA	UG/KG			
Volatile Organics														
Acetone	3	5	27	70	45	12	12	780000	20000000	NA	UG/KG			
Methylene chloride	3	5	24	25	24	6	6	85000	760000	NA	UG/KG			

Notes:
* - Identified as a residential COPC
** - Identified as an industrial COPC
N - Essential nutrient
MG/KG - milligram per kilogram
UG/KG - microgram per kilogram
NG/KG - nanogram per kilogram
SQL - Sample quantitation limit
RBC - Risk-based concentration
NA - Not applicable

Table 10.38.6.2
Point Estimates of Risk and Hazard - Surface Soil Pathways
Residential Scenario
AOC 576
NAVBASE-Charleston
Charleston, South Carolina

Site	Location	Parameter	Concentration	Units	Hazard Index	% HI	Risk (E-06)	% Risk
576	B001	B(a)P Equiv.	82.86	UG/KG	NA		1.3722	11.87
		Total			NA		1.3722	
576	B002	B(a)P Equiv.	88.00	UG/KG	NA		1.4573	20.99
		Total			NA		1.4573	
576	B003	B(a)P Equiv.	725.81	UG/KG	NA		12.0196	58.24
		Total			NA		12.0196	
576	B004	B(a)P Equiv.	223.58	UG/KG	NA		3.7026	19.92
		Total			NA		3.7026	
576	B005	B(a)P Equiv.	213.57	UG/KG	NA		3.5368	19.20
		Total			NA		3.5368	

Table 10.38.6.3
Chemicals Present in Site Samples
AOC 576 - Groundwater
NAVBASE - Charleston
Charleston, South Carolina

Parameter		Frequency of Detection		Range of Detection		Average Detected Conc.	Range of SQL		Screening Concentrations Residential RBC	Reference	Units	Number Exceeding RBC	Ref.
Deep Wells													
Inorganics													
Arsenic (As)	*	1	1	35.1	35.1	35.1	NA	NA	0.045	16.4	UG/L	1	1
Barium (Ba)		1	1	51.1	51.1	51.1	NA	NA	260	218	UG/L		
Calcium (Ca)	N	1	1	186000	186000	186000	NA	NA	NA	NA	UG/L		
Cobalt (Co)		1	1	18.1	18.1	18.1	NA	NA	220	12.9	UG/L		1
Iron (Fe)	N	1	1	2730	2730	2730	NA	NA	NA	NA	UG/L		
Magnesium (Mg)	N	1	1	15900	15900	15900	NA	NA	NA	NA	UG/L		
Manganese (Mn)	*	1	1	1070	1070	1070	NA	NA	84	869	UG/L	1	1
Nickel (Ni)		1	1	10.7	10.7	10.7	NA	NA	73	42.2	UG/L		
Potassium (K)	N	1	1	5040	5040	5040	NA	NA	NA	NA	UG/L		
Sodium (Na)	N	1	1	279000	279000	279000	NA	NA	NA	NA	UG/L		
Zinc (Zn)		1	1	5.6	5.6	5.6	NA	NA	1100	11.8	UG/L		
Volatile Organics													
1,2-Dichloroethene (total)		1	1	2	2	2	NA	NA	5.5	NA	UG/L		
Shallow Wells													
Inoganics													
Aluminum (Al)	*	2	2	1080	5970	3525	NA	NA	3700	2810	UG/L	1	1
Beryllium (Be)	*	1	2	3	3	3	1	1	0.016	0.43	UG/L	1	1
Calcium (Ca)	N	1	2	280000	280000	280000	12800	12800	NA	NA	UG/L		
Chromium (Cr)		1	2	10.9	10.9	10.9	1	1	18	12.3	UG/L		
Cobalt (Co)		2	2	3.6	183	93.3	NA	NA	220	2.5	UG/L		2

Table 10.38.6.3
Chemicals Present in Site Samples
AOC 576 - Groundwater
NAVBASE - Charleston
Charleston, South Carolina

Parameter		Frequency of Detection		Range of Detection		Average Detected Conc.	Range of SQL		Screening Concentrations Residential RBC	Reference	Units	Number Exceeding RBC	Ref.
Iron (Fe)	N	2	2	570	51700	26135	NA	NA	NA	NA	UG/L		
Lead (Pb)		1	2	9.6	9.6	9.6	3	3	15	4.8	UG/L		1
Magnesium (Mg)	N	2	2	4280	69400	36840	NA	NA	NA	NA	UG/L		
Manganese (Mn)		2	2	68.2	2340	1204.1	NA	NA	84	2560	UG/L	1	
Nickel (Ni)		2	2	1.1	67	34.05	NA	NA	73	15.2	UG/L		1
Sodium (Na)	N	1	2	889000	889000	889000	22400	22400	NA	NA	UG/L		
Vanadium (V)		1	2	10.9	10.9	10.9	1	1	26	11.4	UG/L		
Zinc (Zn)		1	2	101	101	101	9	9	1100	27.3	UG/L		1
Semivolatile Organics													
Pentachlorophenol	*	1	2	6	6	6	50	50	0.56	NA	UG/L	1	
Volatile Organics													
Bromodichloromethane	*	1	2	9	9	9	5	5	0.17	NA	UG/L	1	

Notes:
* - Identified as a COPC
N - Essential nutrient
UG/L - microgram per kilogram
SQL - Sample quantitation limit
RBC - Risk-based concentration
NA - Not applicable

Table 10.38.6.4
Point Estimates of Risk and Hazard - Groundwater Pathways
Residential Scenario
AOC 576
NAVBASE-Charleston
Charleston, South Carolina

Site	Location	Parameter	Concentration	Units	Hazard Index	% HI	Risk (E-06)	% Risk
576	G02D	Arsenic (As)	35.10	UG/L	783.0528	100.00	7.4795	100.00
		Total			783.0528		7.4795	
576	G001	Aluminum (Al)	5970.00	UG/L	NA		0.3816	90.87
576	G001	Beryllium (Be)	3.00	UG/L	191.8591	100.00	0.0384	9.13
576	G001	Bromodichloromethane	ND	UG/L	NA		NA	
576	G001	Pentachlorophenol	ND	UG/L	NA		NA	
		Total			191.8591		0.4200	
576	G002	Aluminum (Al)	1080.00	UG/L	NA		0.0690	49.54
576	G002	Beryllium (Be)	ND	UG/L	NA		NA	
576	G002	Bromodichloromethane	9.00	UG/L	16.5980	60.78	0.0575	41.28
576	G002	Pentachlorophenol	6.00	UG/L	10.7084	39.22	0.0128	9.17
		Total			27.3065		0.1394	

10.38.7 Corrective Measures Considerations

For AOC 576, the upper and lower soil intervals and the shallow and deep groundwater were investigated. Based on the analytical results and the FRE, COCs requiring further evaluation through the CMS process were identified for the upper soil interval and the shallow and deep groundwater. However, residential use of the site is not expected, based on current site uses and the nature of surrounding buildings. Current reuse plans call for continued commercial/industrial use.

BEQs were identified as COCs in the upper soil interval. BEQs were detected at concentrations above its residential risk-based remedial goal of 0.060 mg/kg and has a calculated mean risk estimate of 4E-06. This mean value is within USEPA's 1E-06 to 1E-04 acceptable risk range. All soil samples were collected below asphalt or concrete pavement. Corrective measures that prevent infiltration and percolation will be considered, along with stabilization.

Beryllium, pentachlorophenol, and bromodichloromethane were identified as COCs in the shallow groundwater at concentrations above their risk-based remedial goals of 0.000016, 0.0011, and 0.0022 mg/L, respectively. The mean risk estimate for the shallow aquifer was 1E-04, which equals USEPA's upper-bound acceptable risk value.

Arsenic and manganese were identified in deep groundwater exceeding their hazard-based remedial goals of 0.0047 and 0.36 mg/L, respectively. The mean risk estimate for the deep groundwater was 8E-04, which exceeds USEPA's upper acceptable risk of 1E-04. Corrective measures for AOC 576 are detailed in Section 9.

Potential corrective measures for the impacted media and respective COCs are in Table 10.38.7.1.

Table 10.38.7.1
Potential Corrective Measures for AOC 576

Medium	Compounds	Potential Corrective Measures
Soil	BEQs	a) No Action b) Intrinsic Remediation and Monitoring c) Containment by Capping d) Excavation and Landfill, if RCRA-nonhazardous Waste e) In-situ, Chemical and Physical Treatment f) Ex-situ, Chemical and Physical Treatment
Shallow Groundwater	Beryllium, pentachlorophenol, and bromodichloromethane	a) No Action b) Intrinsic Remediation and Monitoring c) Ex-situ, Chemical and Physical Treatment
Deep Groundwater	Arsenic and manganese	a) No Action b) Intrinsic Remediation and Monitoring c) Ex-situ, Chemical and Physical Treatment