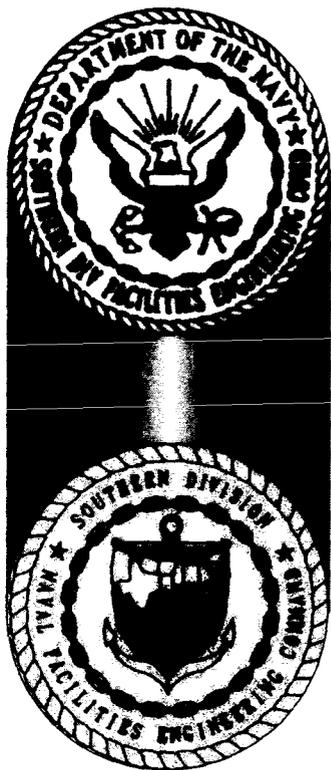


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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT  
ADDENDUM CORRECTIVE MEASURES STUDY WORK PLAN VOLUME 1 AREAS OF  
CONCERN 613 AND 615 SOLID WASTE MANAGEMENT UNIT 175 (SWMU 175) ZONE F  
CNC CHARLESTON SC  
6/5/2002  
CH2M HILL

RFI REPORT ADDENDUM - Volume I

**RFI Report Addendum and CMS Work Plan**  
**AOC 613/AOC 615 /SWMU 175, Zone F**



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

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

*CH2M HILL*

*June 2002*

*Revision 1*  
*Contract N62467-99-C-0960*



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June 5, 2002

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

Re: RFI Report Addendum and CMS Work Plan (Revision 1) – AOC 613/AOC  
615/SWMU 175, Zone F

Dear Mr. Scaturo:

Enclosed please find two sets of replacement pages which serve as Revision 1 of the RFI Report Addendum and CMS Work Plan for AOC 613/AOC 615/SWMU 175 in Zone F of the Charleston Naval Complex (CNC). Below is a summary of the material enclosed with this letter, along with the Responses to EPA Comments:

- Revision 1 text to be replaced in the Revision 0 RFI Report Addendum & CMS Work Plan (Volume I) for AOC 613/AOC 615/SWMU 175, Zone F, submitted by CH2M-Jones in March 2002.
- Revision 1 covers/spines and flysheets to be replaced in the original Revision 0 RFI Report Addendum & CMS Work Plan (Volume I) 3-ring binder.

This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Louise Palmer. Please contact her at 704/329-0072, extension 296, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

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

## SPECIFIC COMMENTS

### EPA Comment 1:

1. Page 4-1, Line 18. It is stated that soil borings for AOC 613 were sampled at depths of 0 to 1 ft bls and 3 to 5 ft bls. Thus, it appears that soil in the 1 to 3 ft bls range was not sampled. Rationale should be provided for not sampling in the 1 to 3 ft bls range. The uncertainty associated with not analyzing samples at this depth should also be discussed.

#### **CH2M-Jones Response 1:**

*The sampling interval for surface and subsurface soils was provided in the approved Final Zone F RFI Work Plan, (EnSafe/Allen & Hoshall, 1996). Surface soil samples are generally accepted at the 0 to 1-ft interval to evaluate surface contaminants with low migration potential, to avoid their dilution with uncontaminated deeper soil. Subsurface soil samples are often placed at 3 to 5 ft bls to capture the most likely zone from potential subsurface releases, such as from buried lines, maintenance pits, etc. In areas with very shallow groundwater (not at AOC 613), the subsurface soil sample depths may be raised.*

*At the CNC, the 3 to 5 ft bls-subsurface soil interval has consistently been used as the default target subsurface soil sampling depth, for several thousand soil samples at several hundred SWMUs/AOCs.*

*At AOC 613, however, 65 direct push-technology (DPT) soil samples were collected from the depth interval 0 to 4 ft bls, which covered both the surface and subsurface soil zones. These soil probe samples provide sufficient data to reduce the uncertainty associated with not collecting discreet samples from the 1 to 3-ft range in the soil borings.*

*We recommend not altering the discussion in the report regarding sampling depths.*

### EPA Comment 2:

2. Page 5-7, Line 28. It is stated that manganese is a nutritionally essential element. According to EPA Region IV guidance, the only chemicals considered to be essential nutrients for the purposes of contaminant evaluation are calcium, chloride, iodine, magnesium, phosphorus, potassium, and sodium. This statement should be removed from the text.

#### **CH2M-Jones Response 2:**

*As requested, the phrase "and nutritionally essential" will be removed from the text. However, as a point of discussion, it should be noted that dietary requirements are specified under the Recommended Dietary Allowances (RDAs) for Ca, I, Fe, Mg, P, Se and Zn; Recommended Daily Dietary Intake (DDI) levels are available for Cr, Cu, Fl, Mn, Mo; and Estimated Minimum Requirements (EMR) are available for Cl, K, and Na. The primary reference for all of this information is the following:*

National Research Council – National Academy of Science. *Recommended Daily Allowances*. 10th Edition. Food and Nutrition Board, Washington DC. 1989.

*While it is unclear what the basis is for the list provided by EPA Region IV, on other projects they have allowed for iron, manganese, and other essential nutrients to be excluded from further consideration, as they are nutritionally essential elements. EPA Region III has a Mn intake level of 1.7 milligrams per day (mg/day) as the acceptable dose. EPA Region III acknowledges Mn as a nutritionally essential element and has developed separate RfDs for food-based intake and water-based intake. As a result, several of these essential elements will be presented as such during various contaminant of potential concern (COPC)/contaminant of concern (COC) refinement discussions for sites within the CNC.*

**EPA Comment 3:**

3. Page 5-18, Line 12. Iron and manganese exceeded background and RBC values but were not selected as COPCs because they are nutritionally essential elements. According to EPA Region 4 guidance, the only chemicals considered to be essential nutrients are calcium, chloride, iodine, magnesium, phosphorus, potassium, and sodium. This statement should be removed from the text. As explained later, the rationale presented in Section 5.1.1 supports the exclusion of iron and manganese from being considered COPCs.

**CH2M-Jones Response 3:**

*As requested, the phrase "are nutritionally essential elements, and" will be removed from Line 13.*

**EPA Comment 4:**

4. Page 5-18, Line 15. The text states that three chemicals were not considered COPCs due to their low frequency of detection (< 5 percent), in accordance with EPA Region 4 policy. In fact, Region 4's policy does not allow for a chemical to not be considered a COPC, solely based on frequency of detection. This statement should be removed from the text. As explained later, the rationale presented in Section 5.1.2 supports the exclusion 1,1,2,2-tetrachloroethane, 1,1-dichloroethene, and vinyl chloride from being considered COPCs.

**CH2M-Jones Response 4:**

*Lines 13 through 17 within the text will be replaced with the following: "As described in Section 5.1.2, the three chemicals 1,1,2,2-tetrachloroethane, 1,1-dichloroethene, and vinyl chloride were not selected as COPCs."*

**Additional CH2M-Jones Revisions:**

The following revisions will also be included within the Revision 1 materials for this CMSWP/RFIRA:

- Page 5-11, Line 11: change the word "four" to "five."
- Page 5-11, Line 22: change "FGELGW006" to "F613GW006" and change "south" to "north."



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March 5, 2002

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

Re: RFI Report Addendum and CMS Work Plan (Revision 0) – AOC 613/AOC  
615/SWMU 175, Zone F

Dear Mr. Scaturo:

Enclosed please find two copies of the RFI Report Addendum and CMS Work Plan (Revision 0) for AOC 613/AOC 615/SWMU 175 in Zone F of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Louise Palmer. Please contact her at 704/329-0073, extension 296, if you have any questions or comments.

Sincerely,

CH2M HILL

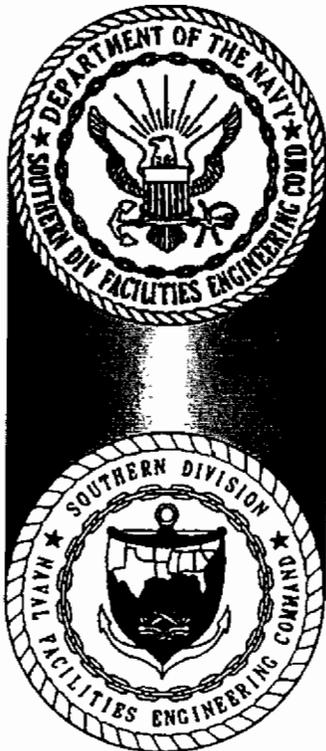
A handwritten signature in black ink that reads "Dean Williamson". The signature is fluid and cursive.

Dean Williamson, P.E.

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

RFI REPORT ADDENDUM - Volume I

**RFI Report Addendum and CMS Work Plan  
AOC 613/AOC 615 /SWMU 175, Zone F**



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

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

PREPARED BY  
***CH2M-Jones***

*June 2002*

*Revision 1  
Contract N62467-99-C-0960  
158814.ZF.PR.02*

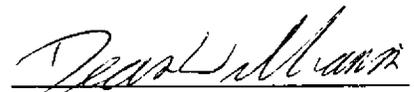
**Certification Page for RFI Report Addendum (Revision 1) – AOC  
613/AOC 615/SWMU 175, Zone F**

**RFI Report Addendum and CMS Work Plan**

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

South Carolina

Permit No. 21428



Dean Williamson, P.E.



Date

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12

13 **Volume I** contains the main report text for the RFI Report Addendum and CMS Work Plan,  
14 AOC 613/AOC 615/SWMU 175, Zone F.

15

16 **Volume II** contains the Appendices A through G.

17

18 The *Initial Ground-Water Assessment Report for Site 20, Building 240 and Rapid Assessment*

19 *Report for Site 22, Building 242* are contained on CD-ROM, and inserted into the pocket of the

20 **Volume II Binder.**

# 1 Acronyms and Abbreviations

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|    |             |                                             |
|----|-------------|---------------------------------------------|
| 2  | 1,2-DCE     | 1,2-Dichloroethene                          |
| 3  | 1,1,2,2-TCA | 1,1,2,2-Tetrachloroethane                   |
| 4  | AOC         | area of concern                             |
| 5  | AST         | aboveground storage tank                    |
| 6  | BCT         | BRAC Cleanup Team                           |
| 7  | BEQ         | benzo(a)pyrene equivalent                   |
| 8  | BRAC        | Base Realignment and Closure Act            |
| 9  | BRC         | background reference concentration          |
| 10 | BTEX        | benzene, toluene, ethylbenzene, and xylenes |
| 11 | CA          | corrective action                           |
| 12 | CMS         | corrective measures study                   |
| 13 | CNC         | Charleston Naval Complex                    |
| 14 | COC         | chemical of concern                         |
| 15 | COPC        | chemical of potential concern               |
| 16 | CVOC        | chlorinated volatile organic compound       |
| 17 | DAF         | dilution attenuation factor                 |
| 18 | DET         | Environmental Detachment Charleston         |
| 19 | DPT         | direct-push technology                      |
| 20 | DRO         | diesel range organics                       |
| 21 | EBS         | Environmental Baseline Survey               |
| 22 | EnSafe      | EnSafe Inc.                                 |
| 23 | EPA         | U.S. Environmental Protection Agency        |
| 24 | EPC         | exposure point concentration                |
| 25 | FDS         | fuel distribution system                    |
| 26 | ft bls      | feet below land surface                     |
| 27 | GEL         | General Engineering Laboratories, Inc.      |
| 28 | HHRA        | human health risk assessment                |
| 29 | HI          | hazard index                                |
| 30 | HQ          | hazard quotient                             |

# 1 **Acronyms and Abbreviations, Continued**

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|    |         |                                                               |
|----|---------|---------------------------------------------------------------|
| 2  | ILCR    | incremental lifetime cancer risk                              |
| 3  | IM      | interim measure                                               |
| 4  | IRIS    | Integrated Risk Information System                            |
| 5  | MCL     | maximum contaminant level                                     |
| 6  | µg/kg   | micrograms per kilogram                                       |
| 7  | µg/L    | micrograms per liter                                          |
| 8  | mg/kg   | milligrams per kilogram                                       |
| 9  | MTBE    | methyl tributyl ethylene                                      |
| 10 | NAVBASE | Naval Base                                                    |
| 11 | NFA     | no further action                                             |
| 12 | ng/kg   | nanograms per kilogram                                        |
| 13 | OWS     | oil/water separator                                           |
| 14 | PAH     | polycyclic aromatic hydrocarbon                               |
| 15 | PCE     | tetrachloroethene                                             |
| 16 | PCB     | polychlorinated biphenyl                                      |
| 17 | RA      | rapid assessment                                              |
| 18 | RAO     | remedial action objective                                     |
| 19 | RBC     | risk-based concentration                                      |
| 20 | RCRA    | Resource Conservation and Recovery Act                        |
| 21 | RD      | reductive dechlorination                                      |
| 22 | RFA     | RCRA Facility Assessment                                      |
| 23 | RFI     | RCRA Facility Investigation                                   |
| 24 | RGO     | remedial goal option                                          |
| 25 | SCDHEC  | South Carolina Department of Health and Environmental Control |
| 26 | SPLP    | synthetic precipitation leaching procedure                    |
| 27 | SSL     | soil screening level                                          |
| 28 | SVOC    | semivolatile organic compound                                 |
| 29 | SWMU    | solid waste management unit                                   |
| 30 | TCE     | trichloroethene                                               |

# 1 **Acronyms and Abbreviations, Continued**

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|   |       |                           |
|---|-------|---------------------------|
| 2 | ThQ   | total hazard quotient     |
| 3 | TOC   | total organic carbon      |
| 4 | TSS   | total suspended solids    |
| 5 | TtNUS | Tetra Tech NUS, Inc.      |
| 6 | VOC   | volatile organic compound |
| 7 | UST   | underground storage tank  |

**Section 1.0**

---

# 1.0 Introduction

---

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

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

In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to complete the RCRA Facility Investigation (RFI) for Areas of Concern (AOCs) 613 and 615 and Solid Waste Management Unit (SWMU) 175 in Zone F of the CNC. Figure 1-1 illustrates the location of AOC 613/AOC 615/SWMU 175 within Zone F at CNC.

## 1.1 Background

Figure 1-2 shows an aerial photograph of the AOC 613/AOC 615/SWMU 175 area, taken in 1997. AOC 613, AOC 615, and SWMU 175 were combined into one investigation because of their proximity and similar chemicals of potential concern (COPCs). While a large number of samples are available for these sites, samples collected for the investigations of the Fuel Distribution System (FDS), for SWMU 037 and AOC 699 (the utility corridors), and for AOC 504 (the investigated railroad lines), are also included to address all chemicals detected around the site regardless of their original operations related to the AOC 613/AOC 615/SWMU 175 investigation. However, the FDS, SWMU 037, and AOC 699 are not evaluated in this RFI Report Addendum.

In addition, several oil/water separators (OWSs) within the AOC 613/AOC 615/SWMU 175 area have also recently been designated as AOCs. These OWSs are discussed in Section 3.0 of this RFI Report Addendum. Additional sampling activities may be implemented at these locations. The final closeout of these OWSs will be addressed in a future document.

1 AOC 613, former Building 1169, the Locomotive Repair Shop, is located east of Hobson  
2 Avenue at the current location of Building 242. The shop operated from the 1930s until 1985,  
3 when Building 1169 was demolished. Maintenance activities included changing oil,  
4 repairing hydraulic systems, and equipment overhaul. Materials potentially released  
5 included oil, grease, diesel fuel, and cleaning solvents.

6 AOC 615, former Building 1391, the Old Chain Locker, is located adjacent to and southeast  
7 of former Building 1169. The chain locker was used to store and service anchor chain  
8 between 1970 and 1977. Historic records from the site indicate that epoxies and resins were  
9 stored in large tanks on the site; wastes were reportedly stored in drums behind the  
10 building.

11 SWMU 175, the former Crane Painting Area, is located on an asphalt-paved road near  
12 Building 1277. This area was used to repaint pier area cranes. SWMU 175 was investigated  
13 to evaluate a possible release of blast media and paint constituents, such as heavy metals  
14 and solvents.

15 These three sites are located to the east of Hobson Avenue in a heavily industrialized area,  
16 and are anticipated to continue to be used for industrial purposes. Figure 1-1 shows their  
17 locations. The AOCs 613/615 area is zoned M-1, for light industrial use, and the zoning for  
18 the SWMU 175 area is divided between M-1 and M-2, for heavy industrial use. The Zones  
19 E/F boundary is located near the centerline of SWMU 175; the investigated area extends  
20 into Zone E. The combined site area is approximately 5-percent unpaved (lawn or  
21 gravel/dirt surface), with new Buildings 242 and 255 occupying approximately one-third of  
22 the area.

23 Two underground storage tank (UST) sites are located within the investigation area. These  
24 sites, UST Sites 20 and 22, are being investigated and managed under the SCDHEC RCRA  
25 Subtitle I Program (UST Program), and are discussed further in Section 3.0 of this RFI  
26 Report Addendum. In addition, Area 17 of the FDS is located at the northern edge of the  
27 investigation area; this site involves buried fuel lines.

## 28 **1.2 Purpose of the RFI Report Addendum and CMS Work Plan**

29 This RFI Report Addendum/ CMS Work Plan provides information about AOC 613/AOC  
30 615/SWMU 175 that documents the conclusions of the *Zone F RFI Report, Revision 0* (EnSafe  
31 Inc. [EnSafe], 1999a), and provides the results of additional sampling performed after the  
32 RFI Report was completed. The results of additional investigations and sampling that were  
33 not considered in the RFI Report are presented in this RFI Report Addendum to complete

1 the nature and extent evaluation for the COPCs that were previously identified in surface  
2 soil, subsurface soil, and groundwater. Conclusions regarding site closure are also  
3 presented.

4 Specific recommendations for these sites are as follows:

| Site     | Recommendation                                                                              |
|----------|---------------------------------------------------------------------------------------------|
| AOC 613  | Corrective Measures Study (CMS) to address volatile organic compounds (VOCs) in groundwater |
| AOC 615  | No Further Action (NFA)                                                                     |
| SWMU 175 | No Further Action (NFA)                                                                     |

5

## 6 **1.3 Report Organization**

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

9 **1.0 Introduction** — Presents the purpose of the document and background information  
10 relating to the RFI Report Addendum.

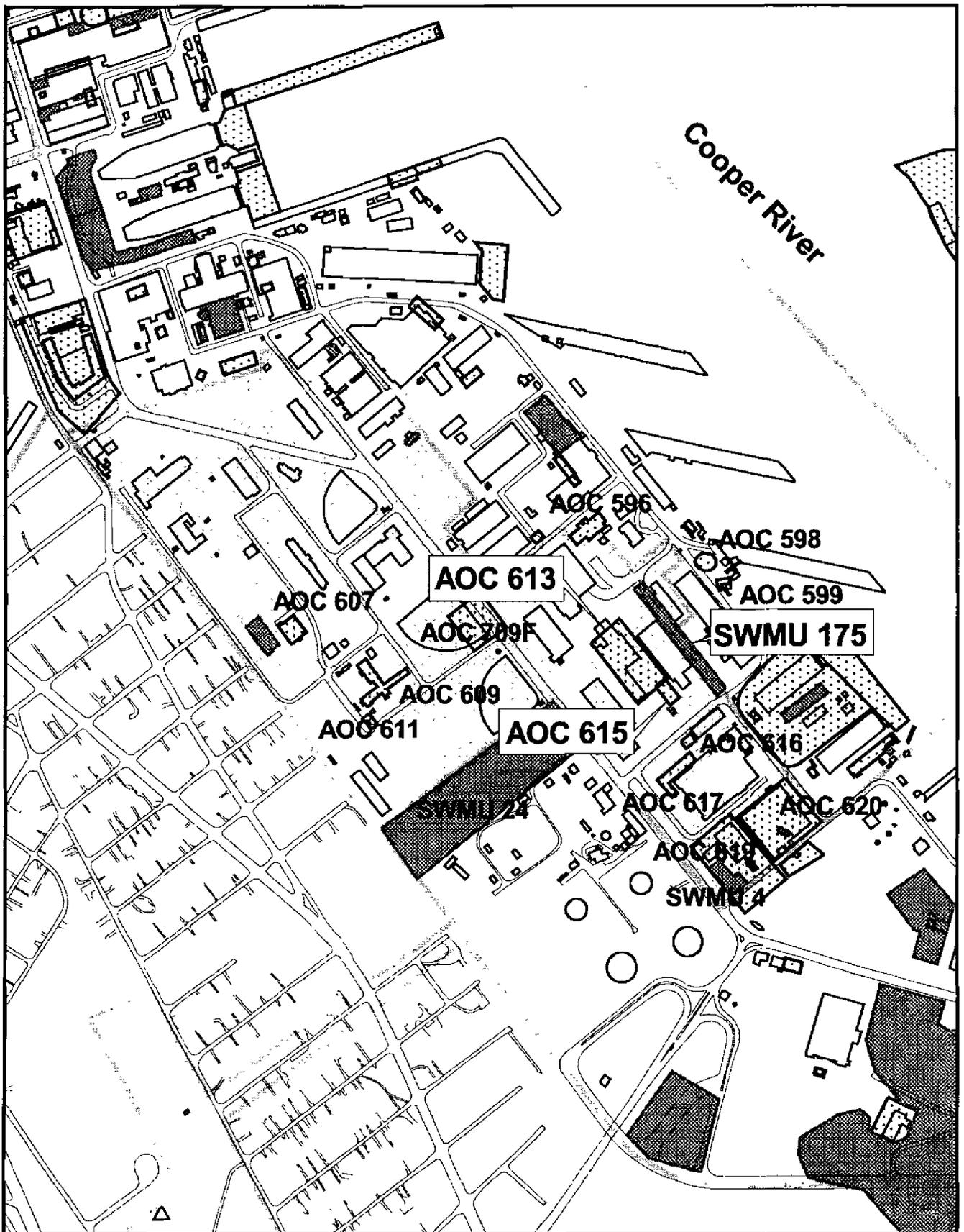
11 **2.0 Summary of RFI Conclusions for AOC 613/AOC 615/SWMU 175** — Summarizes the  
12 sample results, risk evaluations, and conclusions for AOC 613/AOC 615/SWMU 175 that  
13 were presented in the *Zone F RFI Report, Revision 0*. Also summarizes data collected for the  
14 Zone L RFI from samples geographically located within the AOC 613/AOC 615/SWMU  
15 175 investigative area.

16 **3.0 Interim Measures, UST/AST Removals, and Oil/Water Separators**—Provides  
17 information regarding any interim measures (IMs) or tank removal activities performed at  
18 the site, as well as the presence of onsite USTs and OWSs. Describes investigations relating  
19 to the FDS within the AOC 613/AOC 615/SWMU 175 investigation area.

20 **4.0 Summary of Additional Investigations** — Summarizes information collected after  
21 completion of the *Zone F RFI Report, Revision 0*.

22 **5.0 COPC/COC Refinement**—Provides further evaluation of COPCs based on RFI and  
23 additional data to assess them as chemicals of concern (COCs).

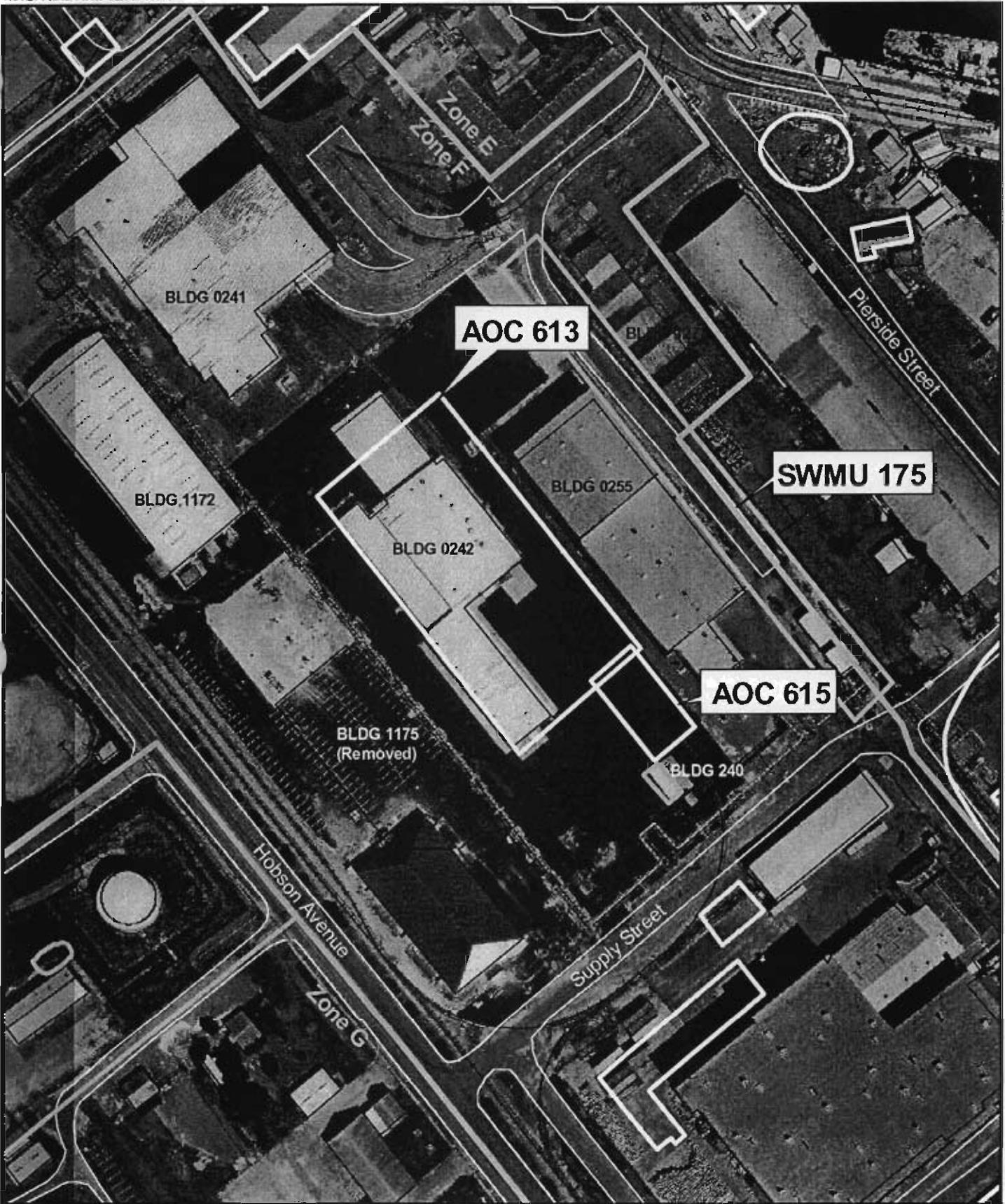
24 **6.0 Summary of Information Related to Site Closeout Issues** – Discusses the various issues  
25 that the BCT agreed to evaluate prior to site closeout.



**Figure 1-1**  
 AOCs 613, 615, and SWMU 175  
 Zone F  
 Charleston Naval Complex

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NOTE: Aerial Photo date is 1997.



-  Zone Boundary
-  AOC Boundary
-  SWMU Boundary
-  Roads
-  Buildings
-  Railroads



0 100 200 Feet



**Figure 1-2**

Aerial Photo of AOC 613, AOC 615, and SWMU 175  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex

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## 2.0 Summary of RFI Conclusions for AOC 613/AOC 615/SWMU 175

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This section summarizes the results and conclusions from the soil and groundwater investigations conducted in the areas of Building 1169, Building 1391, and near Building 1277 which were reported in the *Zone F RFI Report, Revision 0* (EnSafe, 1999a). Figure 2-1 shows the locations where soil and groundwater samples were collected using direct-push technology (DPT) methods. Figure 2-2 presents the RFI sediment sample and monitoring well locations.

Initially, RFI sampling involved soil and groundwater samples from 65 DPT locations over a grid area on approximate 50-ft centers, excluding the buildings. The samples were analyzed for SW846 volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. In approximately one-quarter of the locations, insufficient volume of groundwater was available for the full analysis, so the groundwater samples were analyzed only for VOCs. Data from groundwater samples collected by DPT were considered for screening only and were not discussed in the RFI Report, but were used to evaluate monitoring well locations for the RFI. This DPT groundwater data is discussed in Section 4.0 of this RFI Report Addendum.

Prior to the RFI, General Engineering Laboratories, Inc. (GEL) installed eight groundwater monitoring wells as part of a baseline environmental assessment of the AOC 613/AOC 615/SWMU 175 area. Monitoring wells used for the RFI include FGELGW005, FGELGW006, FGELGW007, FGELGW008, FGELGW011, FGELGW012, FGELGW013, and FGELGW014. The "GEL" wells are prefixed "F" for Zone F. Monitoring well FGELGW014 is also identified as GGELGW014. All wells installed by GEL are screened in the shallow water-bearing zone.

Five shallow groundwater wells were installed by EnSafe for the AOC 613/AOC 615/SWMU 175 RFI. These are identified as: F613GW001, F613GW003, F613GW004, F613GW005, and F240GW003. One monitoring well installed by EnSafe, F613GW02D, is screened deeper in the water-bearing zone, below a semi-confining unit.

Groundwater monitoring wells were also installed at UST areas within the AOC613/615/SWMU 175 area of investigation. Data from these wells were not included in the RFI data set, and the wells are not shown in Figure 2-2.

1 The *Zone F RFI Report, Revision 0* presented the results of the RFI sampling and conclusions  
2 concerning site contamination and human health risk. Conclusions from the RFI Report are  
3 summarized below. Excerpts from that report are presented in Appendix A of this RFI  
4 Report Addendum.

## 5 **2.1 Surface and Subsurface Soil**

6 Composite soil samples from 0 to 4 feet below land surface (ft bls) were taken from 65  
7 locations during the RFI. In the *Zone F RFI Report, Revision 0*, data from DPT soil samples  
8 were compared to the U.S. Environmental Protection Agency (EPA) Region III Risk-Based  
9 Concentrations (RBCs) for an unrestricted (residential) land use scenario. RBCs for non-  
10 carcinogenic analytes were adjusted for total hazard quotient (ThQ)=0.1 by taking one-tenth  
11 of the RBC value. The RFI Report identified arsenic and benzo(a)pyrene equivalents (BEQs)  
12 as COCs in surface soil. Soil samples were also compared to background reference  
13 concentrations (BRCs) for Zone F surface and subsurface soil, and to generic soil screening  
14 levels (SSLs), based on a dilution attenuation factor (DAF)=20, as listed in Appendix A of  
15 the *EPA Soil Screening Guidance: Technical Background Document* (May 1996). For this RFI  
16 Report Addendum, CH2M-Jones reviewed the detected concentrations of VOCs and  
17 compared them to revised SSLs based on a DAF=1.

18 A discrete subsurface soil sample (3 to 5 ft bls) was taken from one location, F613SP022,  
19 during the RFI; the concentrations were compared to SSLs. Results of the soil sampling are  
20 discussed below.

### 21 **2.1.1 VOCs**

22 VOCs were detected at low levels in the soil probe samples. All VOC detections were less  
23 than RBCs based on unrestricted (residential) land use. Soil concentrations measured from  
24 soil probe samples were compared to generic SSLs (DAF=20). Three exceedances of SSLs  
25 were identified in the *Zone F RFI Report, Revision 0*: methylene chloride at two locations  
26 (F613SP23 and F613SP26) and 1,1,2,2-tetrachloroethane (1,1,2,2-TCA) in one sample  
27 (F613SP031).

28 Several VOCs (carbon disulfide, ethylbenzene, naphthalene, and xylenes) were detected at  
29 low levels in the subsurface soil probe sample. None of the concentrations exceeded SSLs  
30 for DAF=20.

31 The RFI Report concluded that VOCs do not warrant further consideration in surface or  
32 subsurface soil at AOC 613/AOC 615/SWMU 175.

## 2.1.2 SVOCs

With the exception of one of the 65 samples collected, as described below, SVOCs were detected at levels less than unrestricted (residential) land use RBCs and site-specific SSLs in the soil probe samples. BEQs exceeded unrestricted land use RBCs in one soil probe sample, F613SP051 (1,775 micrograms per kilogram [ $\mu\text{g}/\text{kg}$ ]), which is located along the railroad lines in AOC 615. BEQs were therefore considered to be COPCs. The risk-based analysis for an unrestricted land use scenario presented in the *Zone F RFI Report, Revision 0* concluded that BEQs warranted consideration as COCs.

Subsurface soil from boring location F613SP022 contained benzo(a)anthracene, dibenzofuran, and 2-methylnaphthalene concentrations in excess of the SSLs. This boring location is between Buildings 242 and 255; the elevated concentrations have been delineated. These compounds were not detected in groundwater from monitoring wells in the vicinity of F613SP022.

## 2.1.3 Metals

Metals that exceeded Zone F BRCs and unrestricted (residential) land use RBCs (hazard index [HI]=0.1) in soil probe samples, and were therefore considered COPCs, include aluminum, arsenic, beryllium, chromium, manganese, thallium, and vanadium. Of these, only arsenic, with a concentration of 44.8 milligrams per kilogram (mg/kg) at location F613SP024 and thallium with concentrations of 1.5 and 1.3 mg/kg at locations F613SP044 and F613SP059, respectively, exceeded SSLs (29 mg/kg for arsenic and 1.24 mg/kg for thallium).

The risk-based analysis for an unrestricted land use scenario conducted in the *Zone F RFI Report, Revision 0* concluded that of these metals, only aluminum, arsenic, and beryllium warranted consideration as COCs.

## 2.2 Sediment

Two sediment samples from the site were collected from engineered structures (stormwater catch basins) and, therefore, were not compared to BRCs or other criteria. The sediment analytical results were evaluated relative to detected soil parameters as an indication of soil contaminant migration via stormwater flow.

Sediment samples contained metals and SVOCs (primarily BEQs) within the range of background concentrations identified for surface soil at the CNC. Trichloroethene (TCE) was the only VOC identified in the sediment, at a concentration of 0.002 mg/kg, which is

1 similar to the concentrations detected in site soil and less than its RBC and SSL. Dioxin was  
2 reported in one sediment sample at 1.15 nanograms per kilogram (ng/kg), which is less  
3 than the action level of 1,000 ng/kg. Appendix A of this RFI Report Addendum lists  
4 concentrations of detected analytes from sediment samples as presented in the *Zone F RFI*  
5 *Report, Revision 0*.

## 6 **2.3 Groundwater**

7 The *Zone F RFI Report, Revision 0* identified groundwater flow directions at the AOC  
8 613/315/SWMU 175 area as varied. The shallow flow (approximately 5 ft bls) did not  
9 appear influenced by tidal variations. Flow was reported to radiate from a mound at AOC  
10 615, and from a north-trending divide defined by monitoring wells FGELGW014,  
11 F613GW003, and FGELGW008. Deep groundwater (approximately 30 ft bls) appeared  
12 directly connected to the Cooper River tidal variations, flowing northward during low tide  
13 and southward during high tide. Potentiometric surface maps from the report, developed  
14 from measurements in 1996, are presented in Appendix A.

15 Screening criteria for groundwater samples consisted of tap water RBCs, adjusted for an  
16 HI=0.1 for non-carcinogenic parameters, and Zone F BRCs for either shallow or deep  
17 groundwater, as applicable. Any detections that had concentrations above the screening  
18 criteria were identified as COCs, regardless of the frequency of the detection or changes in  
19 concentration over time (i.e., during subsequent sampling events). The RFI Report  
20 identified acenaphthene, aluminum, arsenic, benzene, beryllium, cadmium, chromium, 1,2-  
21 dichlorethene (1,2-DCE), bis(2ethylhexyl)phthalate, fluorene, manganese, 2-  
22 methylnapthalene, phenanthrene, pyrene, tetrachloroethene (PCE), thallium, toluene,  
23 vanadium, and zinc as COCs in groundwater, on the basis of data from three sampling  
24 events from the monitoring wells.

### 25 **2.3.1 VOCs**

26 Low levels of chlorinated solvents and daughter products (PCE, TCE, 1,2-DCE, and vinyl  
27 chloride) were identified near the center of the site at F613GW004. Concentrations of these  
28 parameters exceeded the RBC screening criteria. The only maximum contaminant level  
29 (MCL) exceedance in F613GW004 was for vinyl chloride at a concentration of 7 micrograms  
30 per liter ( $\mu\text{g}/\text{L}$ ), which exceeded the MCL of 2  $\mu\text{g}/\text{L}$  during the second of three sampling  
31 events. Vinyl chloride was not detected in F613GW004 in the samples collected prior to or  
32 after the exceedance.

1 A single detection of chloromethane (2 µg/L) in a sample collected from FGELGW007  
2 exceeded the RBC of 1.4 µg/L. This detection occurred in the first sampling event; in  
3 subsequent sampling events chloromethane was not detected. This compound was not  
4 detected in any other site wells.

5 An Environmental Baseline Study (EBS) performed by GEL reported petroleum product in  
6 the vicinity of buried fuel lines at monitoring well FGELGW014. The first RFI sample  
7 collected from this well contained benzene at 3,800 µg/L (MCL=5 µg/L), and toluene at  
8 4,900 µg/L (MCL=1,000 µg/L). It is likely that this concentration of benzene resulted from a  
9 release of light petroleum product from the fuel line, rather than from heavier oils or  
10 greases that would generally be associated with a locomotive repair shop. Subsequent  
11 samples from this and adjacent wells contained benzene concentrations no greater than 4  
12 µg/L. Toluene was detected only once at FGELGW014, although it has consistently been  
13 detected in the deeper well F613GW02D at concentrations no greater than 24 µg/L.

### 14 **2.3.2 SVOCs**

15 With one exception, all RBC exceedances of SVOCs were from samples collected from well  
16 FGELGW014. The one exception, pentachlorophenol, was detected at an estimated  
17 concentration of 2 µg/L (the typical reporting limit is 50 µg/L) in a sample collected from  
18 well FGELGW013. This detect was reported in only one of three sampling events, and the  
19 compound was not detected in any other site wells.

20 Compounds detected in FGELGW014 samples include polycyclic aromatic hydrocarbons  
21 (PAHs) (2-methylnaphthalene, acenaphthene, dibenzofuran, fluorene, phenanthrene, and  
22 pyrene) and bis(2-ethylhexylphthalate). In the first sampling event at monitoring well  
23 FGELGW014, these compounds were detected at concentrations indicative of fuel product.  
24 In subsequent sampling events conducted after the removal of the product, these  
25 compounds were detected at concentrations 3 to 4 orders of magnitude lower than during  
26 the first sampling event.

27 Several other SVOCs that were detected in groundwater (however at concentrations less  
28 than RBCs [all less than 6 µg/L]) were reported in the *Zone F RFI Report, Revision 0*. These  
29 compounds include 2-chlorophenol, 4-chloro-3-methylphenol, anthracene, benzoic acid,  
30 diethylphthalate, butylbenzylphthalate, di-n-butylphthalate, and naphthalene. These  
31 compounds were detected in various monitoring wells across the site and were not  
32 influenced by the fuel release near FGELGW014.

### 1 **2.3.3 Metals**

2 Aluminum, arsenic, antimony, beryllium, cadmium, chromium, iron, lead, manganese,  
3 thallium, vanadium, and zinc were detected in the monitoring wells, with some  
4 exceedances of RBCs and BRCs. These metals generally occurred at extremely variable  
5 concentrations, and did not occur above screening criteria with any consistency.

6 Arsenic was detected above background concentrations near the northeast corner of the site,  
7 at well location FGELGW014, as shown in the Figure 2-2. This is in an area of buried fuel  
8 lines bounded by monitoring wells that have routinely recorded concentrations within the  
9 background levels. Samples collected from monitoring well FGELGW007 in the southwest  
10 corner of the site also had sporadic exceedances of the arsenic BRC.

## 11 **2.4 Summary of the Risk Assessment from the Zone F RFI** 12 ***Report, Revision 0***

13 The human health risk assessment (HHRA) identified aluminum, arsenic, BEQs, and  
14 beryllium as COCs for soil with a cumulative incremental lifetime cancer risk (ILCR)  
15 contribution of  $5 \times 10^{-5}$ , and HIs of 1.1 for future child residents (unrestricted [residential]  
16 land use scenario) and 0.1 for future adult residents. In addition, acenaphthene, aluminum,  
17 arsenic, benzene, beryllium, cadmium, chromium, 1,2-DCE (total), bis(2-  
18 ethylhexyl)phthalate, fluorene, manganese, 2-methylnaphthalene, thallium, vanadium,  
19 phenanthrene, pyrene, PCE, toluene, and zinc were identified as COCs in shallow  
20 groundwater with an ILCR of  $1 \times 10^{-2}$ , and an HI of 5,800 for future child residents. Risks to  
21 future workers were estimated at  $4 \times 10^{-3}$  for cumulative soil and groundwater pathways,  
22 with a cumulative HI of 890.

23 Groundwater risk assessment calculations were based solely on data from the first sampling  
24 event. Subsequent samples have shown concentrations of petroleum-related chemicals at  
25 least three orders of magnitude lower than the first sample. The majority of the HI was  
26 estimated from PAHs, specifically 2-methylnaphthalene, identified in monitoring well  
27 FGELGW014. The majority of the ILCR was estimated from bis(2-ethylhexyl)phthalate, also  
28 identified in monitoring well FGELGW014.

29 Each of the analytes identified as a COC is discussed in Section 5.0 of this RFI Report  
30 Addendum.

## 2.5 Additional Data from Zone L Investigations

Data from Zone L sites AOC 699 (Storm Sewer System), AOC 504 (Investigated Railroad Lines), and SWMU 37 (Sanitary Sewer System) were also collected from within the geographical area of AOC 613/AOC 615/SWMU 175. Figure 2-3 shows the sample locations. These samples were not originally considered in the evaluation for the RFI at AOC 613/AOC 615/SWMU 175. The data for these samples were presented in the *Zone L RFI Report, Revision 0* (EnSafe, 1998a); detected parameters for soil and groundwater samples are also presented in Appendix A of this RFI Report Addendum.

### 2.5.1 Soils

DPT soil probes from five locations within the AOC 613/AOC 615/SWMU 175 area were sampled in conjunction with SWMU 37, and analyzed for cyanide, metals, and VOCs. The sample depths were not reported; but based on the Zone L RFI Work Plan it is assumed that the samples were collected near the depths of the sewer lines, and are composed of subsurface soil. Data from SWMU 37 soil probes have been compared to Zones E and F subsurface soil BRCs and for SSLs published in the *EPA Soil Screening Guidance: Technical Background Document* (EPA, 1996), and adjusted for DAF=1 for VOCs and DAF=10 for all other parameters.

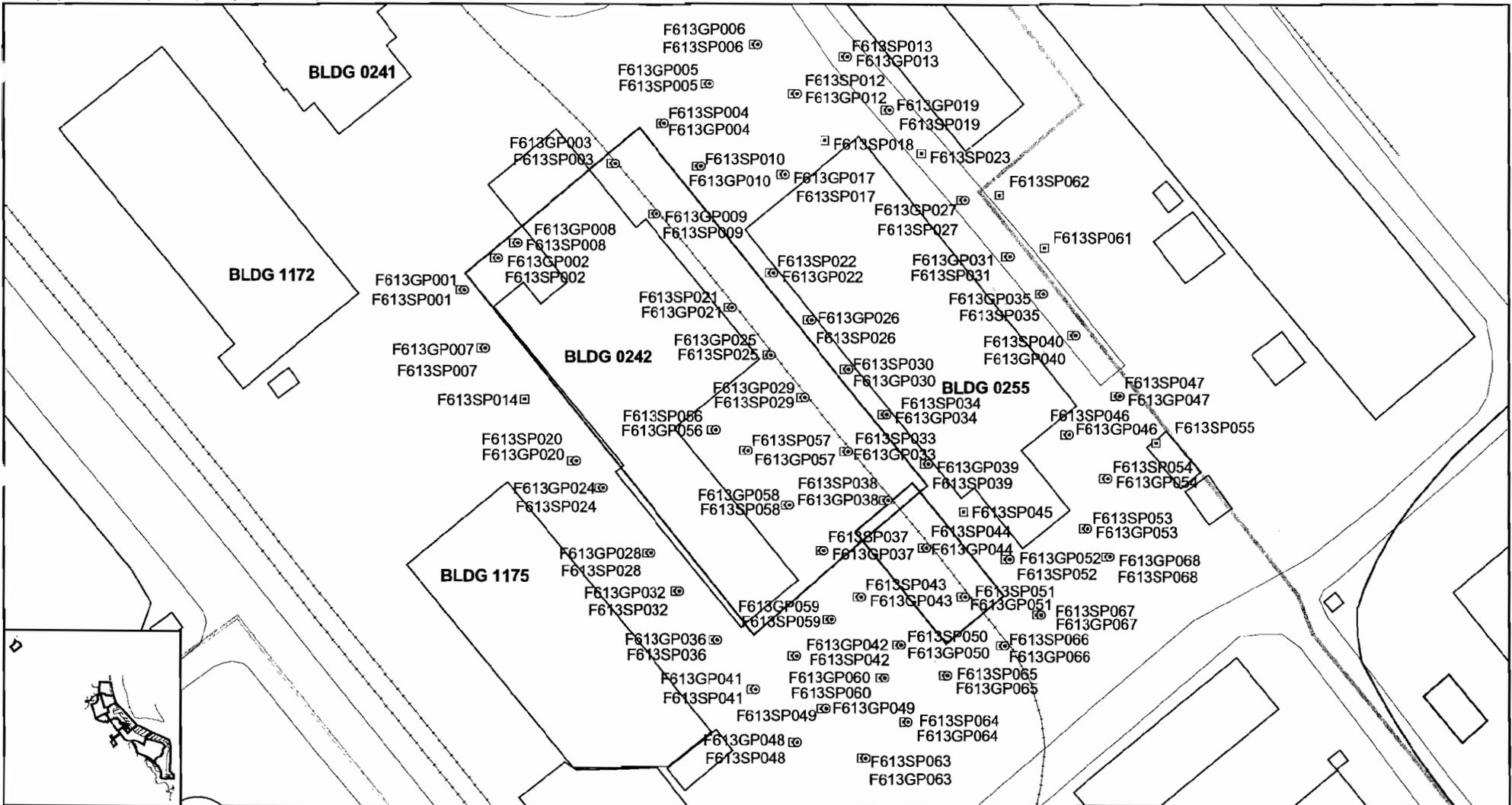
Surface and subsurface soil samples were collected from five borings sampled within SWMU 175 for the AOC 504 investigation. These samples were analyzed for cyanide, herbicides, pesticides/polychlorinated biphenyls (PCBs), VOCs, SVOCS, and metals. Data from the AOC 504 surface soil samples were compared to unrestricted (residential) land use RBCs, SSLs, and combined Zones E and F soil background concentrations. Data from the AOC 504 subsurface soil samples were compared to background concentrations and SSLs.

Detected parameters are listed in Appendix A of this RFI Report Addendum. In surface soil, Aroclor-1260 (0.34 mg/kg) and dieldrin (0.0051 mg/kg), both at LE504SB001, and mercury (5.1 mg/kg at LE504SB005), exceeded background values for combined Zones E and F, and also exceeded RBCs for unrestricted land use or SSLs. In subsurface soil, dieldrin (0.0054 mg/kg) and lindane (0.0072 mg/kg), both at LE504SB003, exceeded SSLs (DAF=10), and PCE (0.00938 mg/kg at LF037SP018) exceeded its SSL (DAF=1). These analytes are discussed in Section 5.0 of this RFI Report Addendum.

### 2.5.2 Groundwater

DPT probes from eight SWMU 37 locations and one AOC 699 location in the AOC 613/AOC 615/SWMU 175 area were sampled for groundwater and analyzed for cyanide,

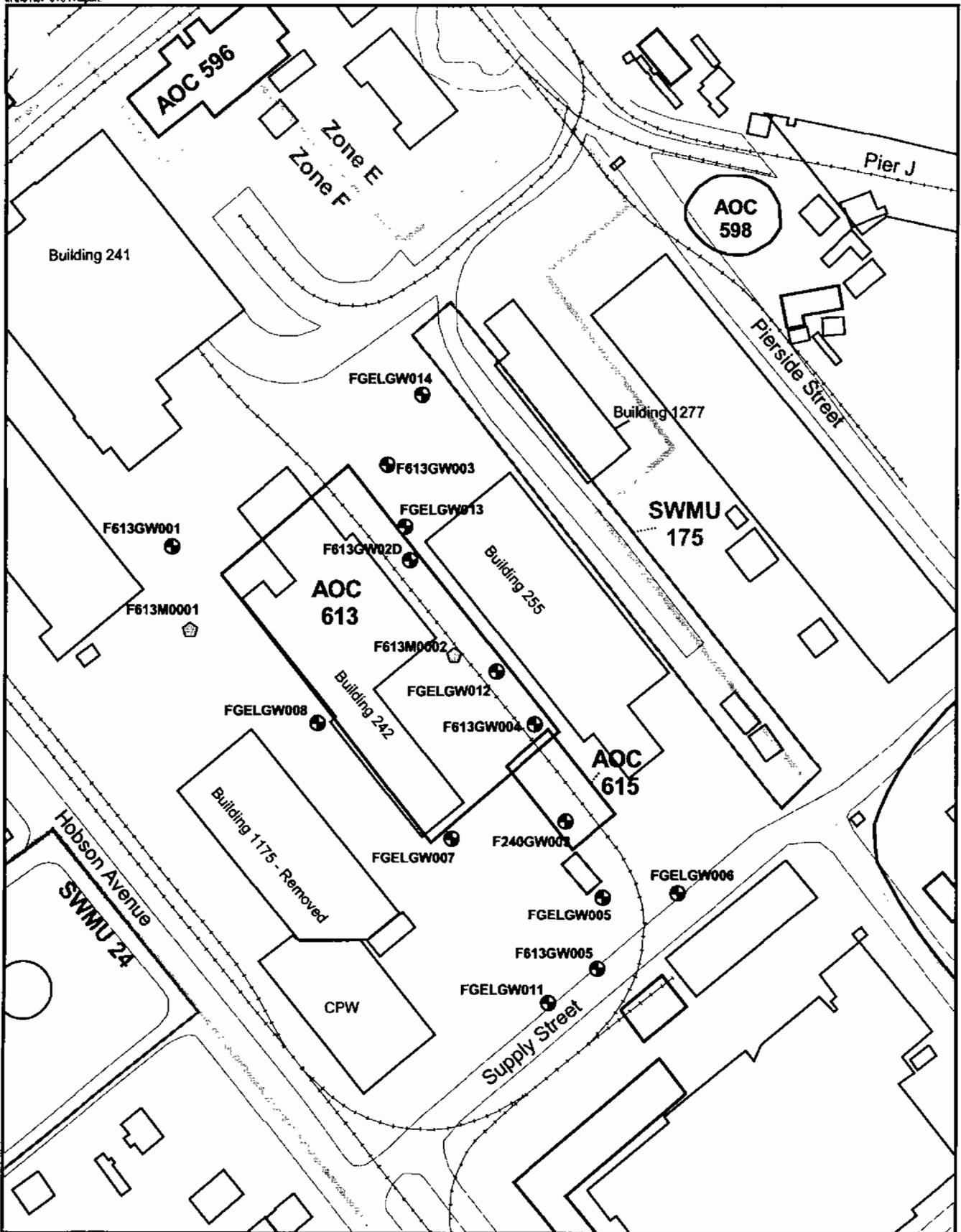
1 metals, and VOCs. The BRAC Cleanup Team (BCT) has agreed that the metals data from  
2 these unfiltered probe samples are not considered to be representative of groundwater  
3 quality, and therefore are not evaluated. No cyanide was detected in the groundwater  
4 probes. VOCs were detected only at one sample location, LF037GP037. Of the four VOCs  
5 detected, vinyl chloride was identified at 17.1 µg/L, compared to an MCL of 2 µg/L. The  
6 other VOCs detected did not exceed the tap water RBCs presented in EPA Region III RBC  
7 table (October 2000); no MCLs were available for those parameters. Detected parameters are  
8 presented in Appendix A. Vinyl chloride is discussed further in Section 5.0 of this RFI  
9 Report Addendum.



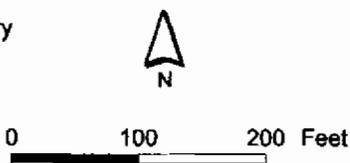
**Figure 2-1**  
 Originally Reported RFI Sample Locations  
 Soil and Groundwater Probes  
 AOC 613/615/SWMU 175  
 Charleston Naval Complex

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NOTE: Data from groundwater probes, located at soil probe locations on Figure 2-1, were not reported in the Rev. 0 RFI Report.

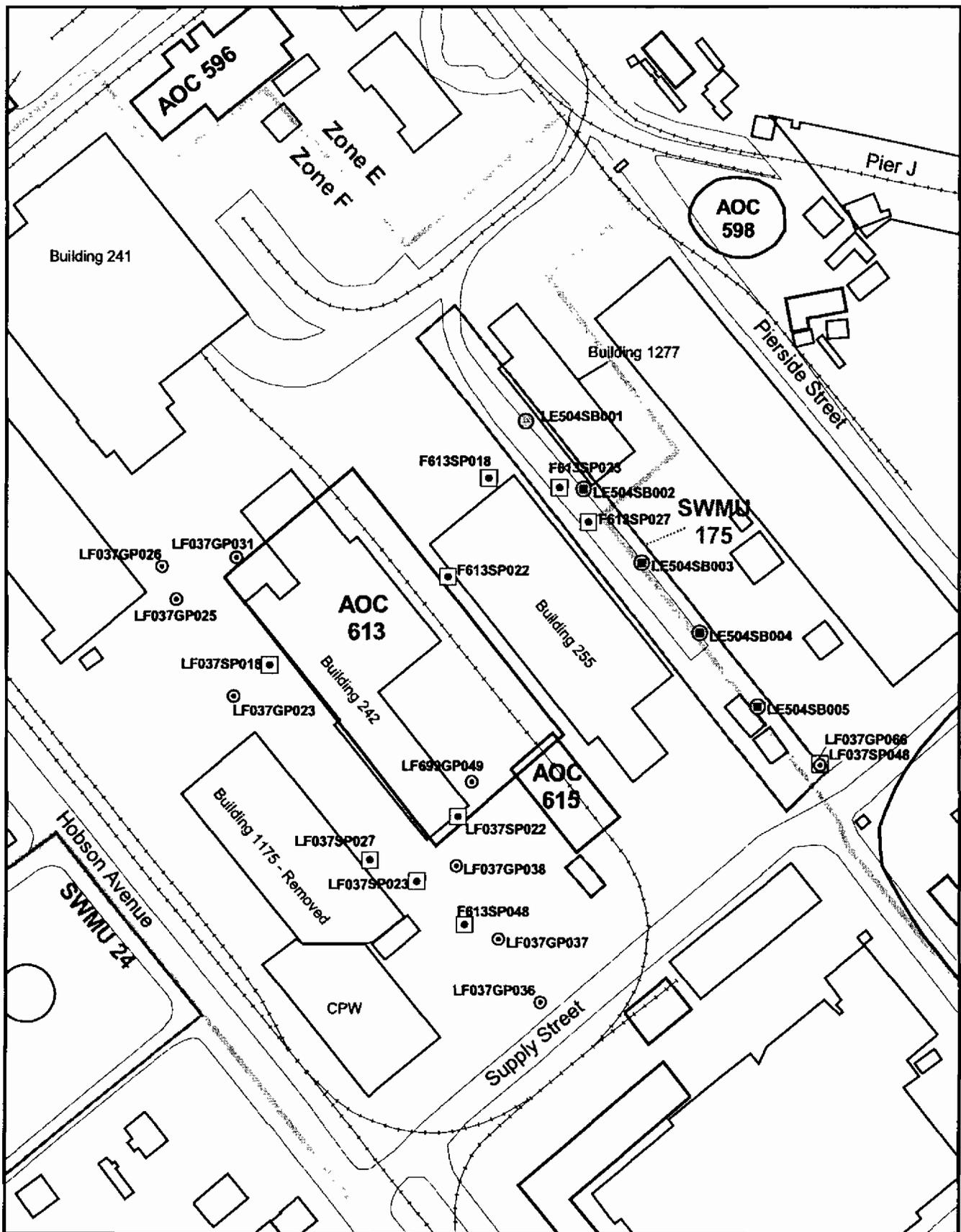


- Sediment Samples
- Groundwater Wells
- Railroads
- Roads
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary



**Figure 2-2**  
Originally Reported Groundwater and Sediment RFI Sample Locations  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex

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- Subsurface Soil Samples
- Surface Soil Samples
- Soil Probe Samples
- ⊙ Groundwater Probe
- ⌞ Roads
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ⌞ Railroads
- ⌞ Zone Boundary



0 100 200 Feet

**Figure 2-3**  
 Zone L RFI Samples  
 AOCs 613, 615, and SWMU 175, Zone F  
 Charleston Naval Complex

**CH2MHILL**



## 3.0 Interim Measures, UST/AST Removals, and Oil/Water Separators

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Several USTs, OWSs, and one aboveground storage tank (AST) are or were located within AOC 613/AOC 615/SWMU 175. UST and AST sites near Buildings 240 and 242 have been closed or are currently under investigation. UST sites relating to waste oil storage are considered relevant to the RFI if they were within the operational or contaminant release areas of AOC 613/AOC 615/SWMU 175.

Two OWSs have been identified near Building 242, and one was identified at Building 240. The OWSs have been recently designated as AOCs, and are described in *RCRA Facility Assessment, Volume VI, Revision 1, Charleston Naval Complex* (Department of the Navy, Southern Division, February 2001). These OWSs are still in use. UST and OWS locations are shown on Figure 3-1.

Each AST, UST, and OWS mentioned above is described in this section. In addition to the USTs and OWSs, a buried fuel line associated with the closed FDS is located at AOC 613, and a release area (Area 17) is associated with the pipeline. The FDS area is also discussed in this section for informational purposes, although it is not regulated under the RCRA CA Program.

### 3.1 Area 17 – FDS Buried Line

Several sites at the CNC have been identified as part of the FDS. Because the FDS managed virgin petroleum fuels, operations and release sites are not covered under RCRA CA. These sites are addressed under the State's petroleum program, and are described in the *Zone G Fuel Distribution System Contamination Assessment Report* (EnSafe, 1998b). One site, designated as Area 17, was identified at the north end of AOC 613/AOC 615/SWMU 175 as the buried FDS line that transferred fuel from the docks to the tank farm on the west side of Hobson Road. The location of the closed-in-place FDS line is shown on Figure 3-1. Because of the proximity of AOC 613 to Area 17, and the presence of RCRA COPCs (arsenic and bis[2-ethylhexyl]phthalate) in groundwater at FGELGW014, Area 17 has been included as part of AOC 613/SWMU 175. These RCRA COPCs are further discussed in Section 5.0 of this RFI Report Addendum.

1 Phase-separated hydrocarbons were identified during the first RFI sampling event in  
2 November 1996 in monitoring well FGELGW014. Except for DPT sample F613GP006, which  
3 is located 15 ft southeast of FGELGW014, groundwater samples from surrounding sample  
4 locations did not contain detectable concentrations of dissolved fuel constituents. Trace  
5 concentrations of PAHs were identified in groundwater at F613GP006. The Navy  
6 Environmental Detachment (DET) reportedly performed an IM at Area 17 in early 1997 and  
7 removed the product; however, no documentation has been found for this effort.  
8 Subsequent groundwater samples at FGELGW014 contained greatly reduced concentrations  
9 of fuel components; concentrations are lower than health-based values in the most recent  
10 samples.

11 In November 2001, undissolved fuel product was identified in monitoring well  
12 FFDSGW17B, which is located adjacent to the FDS pipeline. No fuel components, whether  
13 dissolved or undissolved, had been previously identified in groundwater at this location.  
14 Although the FDS line has been out of service, it appears that small pockets of fuel may  
15 have been released to the environment from the FDS in the vicinity of Area 17. These  
16 pockets are limited in area, as evidenced by the spatial extent of the contamination  
17 identified in 1996 at monitoring well FGELGW014. Further action regarding the FDS Area  
18 17 will be taken under the SCDHEC petroleum program. There is no evidence that there are  
19 any linkages between activities conducted at combined AOC 613 and this FDS area.

## 20 **3.2 Building 240 - UST 240 (Site 20) and OWS (AOC 712)**

21 Facility 240 is an active vehicle wash rack and includes an active OWS that drains to the  
22 sanitary sewer. A 5,000-gallon waste oil tank at the wash rack was installed in 1982 and  
23 removed in 1996. Petroleum contamination in soil and groundwater was identified during  
24 the closure investigation, and the site was designated UST Site 20 for the SCDHEC  
25 petroleum program. The contamination was addressed in a Rapid Site Assessment, as  
26 reported in the *Initial Ground-water Site Assessment Report for Site 20; Facility 240* (Tetra Tech  
27 NUS, Inc. [TTNUS], 2000a). Soil and groundwater samples surrounding the UST excavation  
28 indicated that no benzene, toluene, ethylbenzene, and xylene (BTEX), or PAHs were  
29 detected, and metals concentrations in soil were within acceptable levels for UST closure.  
30 The UST Site 20 was approved for NFA status under the SCDHEC UST program. The Initial  
31 Ground-Water Site Assessment Report and a copy of the April 2000 approval letter are  
32 provided in Appendix B of this RFI Report Addendum.

33 The OWS at Building 240 is designated AOC 712. Soil and groundwater samples  
34 surrounding the OWS were collected as part of the Site 20 UST assessment; these samples

1 revealed no indication of contamination. However, the UST assessment samples were not  
2 analyzed for the more extensive list of VOCs, SVOCs, and metals typically used in an RFI.

3 Samples from groundwater wells and DPT soil and groundwater samples within 35 ft of the  
4 UST and OWS have been analyzed as part of the AOC 613/AOC 615/SWMU 175 RFI, using  
5 the expanded list of parameters typical of the RFI. The results of these analyses are  
6 discussed in Sections 2.0, 4.0, and 5.0 of this RFI Report Addendum. CH2M-Jones is  
7 currently assessing whether additional confirmatory sampling at this AOC is needed. If so,  
8 it will be conducted in the near future.

### 9 **3.3 Building 242 - UST 242 (Site 22)**

10 Building 242 was constructed at the previous location of Building 1169, the former  
11 Locomotive Repair Shop defined as AOC 613. A 5,000-gallon fiberglass waste oil UST was  
12 installed on the east side of the building in 1989 and equipped with a leak detection  
13 monitor. The UST was closed in April 1997. A cast iron drain line directly above the UST  
14 was discovered to have leaked. Early reports identifying this UST as an OWS are in error.  
15 TTNUS conducted a Rapid Assessment (RA) on the waste oil UST at Building 242, Site 22,  
16 under the SCDHEC UST Program, and submitted the *Rapid Assessment for Site 22, Building*  
17 *242* (TTNUS, 2000b). Benzene (maximum concentration 5 µg/kg) and naphthalene  
18 (maximum concentration 572 µg/kg) were detected in subsurface soil, but concentrations  
19 were below calculated site-specific target levels. Groundwater contaminants associated  
20 with the UST are benzene (maximum detected concentration 56 µg/L) and methyl tributyl  
21 ethylene (MTBE) (maximum detected concentration 42 µg/L). PAHs were not detected, and  
22 RCRA metals concentrations were below the MCLs.

23 Intrinsic bioremediation/natural attenuation was monitored at Site 22 in accordance with  
24 the *Sampling and Analysis Plan for Zone F/Site 22 – Building 242*, (CH2M-Jones, 2000). Results  
25 of the monitoring indicate that intrinsic bioremediation is occurring and COC levels have  
26 been reduced to below site-specific target levels. This site is being considered for NFA  
27 under the UST program. The Rapid Assessment Report and the Sampling and Analysis Plan  
28 are provided in Appendix B.

### 29 **3.4 Building 242 - OWSs (AOC 714 and AOC 717)**

30 Two OWSs, which are currently in use, have been identified on the southwest side of  
31 Building 242. One is located at the southern corner of the building, and the other is located  
32 midway along the western wall of the building. Both OWSs collect drainage from floor

1 drains inside the building, which is used for vehicle maintenance by the Charleston  
2 Commission of Public Works. The building was used similarly by the Navy from 1987 to  
3 1993. No information is available on the types of waste used in the OWSs, and there have  
4 been no reported releases of hazardous waste at the facility.

5 RFI soil and groundwater samples, analyzed for VOCs, SVOCs, and metals, have been  
6 collected within 50 ft of these AOCs, with no COPCs identified. CH2M-Jones is currently  
7 addressing whether additional confirmatory sampling at this AOC is needed. If so, it will be  
8 completed in the near future.

9 An OWS previously reported to be located at the northeast corner of Building 242 does not  
10 appear to exist. Records or drawings of this unit are not available, and no physical evidence  
11 of an OWS can be observed at its reported location.

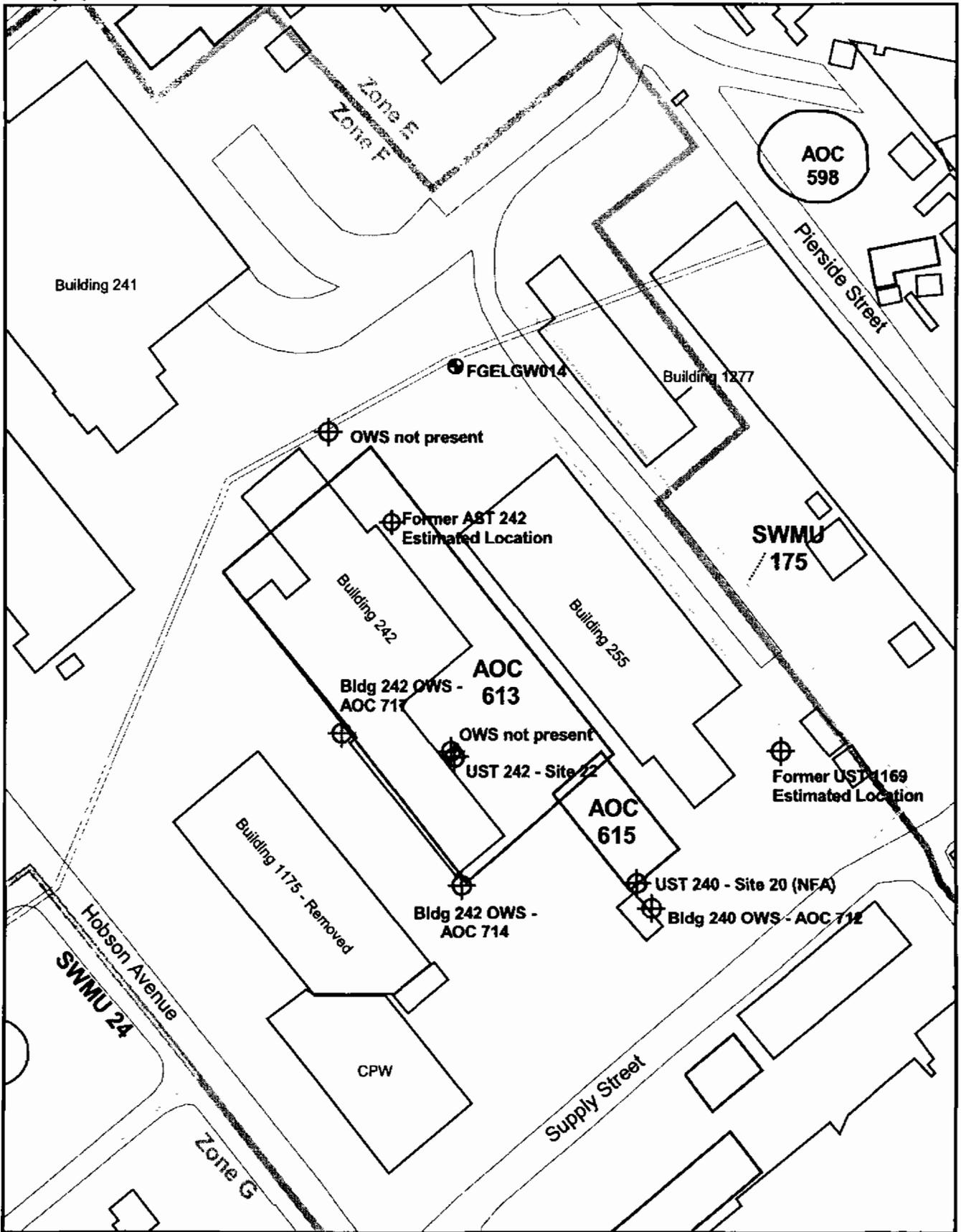
### 12 **3.5 UST 1169**

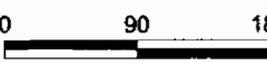
13 As reported in the RCRA Facility Assessment (RFA), UST 1169, which was used for storing  
14 waste oil and other fluids generated in former Building 1169 (Locomotive Repair Shop), was  
15 reportedly located near the former building. The location of this tank has not been  
16 identified at the site, and no records of its disposition have been found. For the RFI,  
17 subsurface soil samples and soil and groundwater DPT samples were collected over and  
18 outside of the entire AOC area, including any UST location, and analyzed for metals, VOCs,  
19 and SVOCs. Therefore, the effects of any potential releases from the UST would have been  
20 identified along with the entire AOC area.

### 21 **3.6 Building 242 - Removed AST**

22 An AST reported to have been located outside of the northeast wall of Building 242 was  
23 apparently removed before 1996. The volume of the former waste oil tank and its removal  
24 history are unknown. RFI soil and groundwater DPT samples (F613SP009 and F613GP009)  
25 were collected at the former AST location; no COPCs were identified in the groundwater.  
26 BEQs were identified above background levels in the soil; however, the concentrations of  
27 the individual detected BEQ components did not exceed any comparison criteria. Samples  
28 from monitoring well FGELGW013, approximately 40 ft from the former AST location, did  
29 not contain any COPCs.

NOTE: Original figure created in color



|                                                                                                                     |                                                                                                                                                                     |                                                                                     |                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>● Groundwater Wells</li> <li>⊕ UST</li> <li>⊕ OWS</li> <li>⊕ AST</li> </ul>  | <ul style="list-style-type: none"> <li>▭ Zone Boundary</li> <li>▭ AOC Boundary</li> <li>- - - SWMU Boundary</li> <li>▭ Buildings</li> <li>⚡ FDS Pipeline</li> </ul> |  | <p><b>Figure 3-1</b><br/>UST, AST, and OWS Locations<br/>AOCs 613, 615, and SWMU 175, Zone F<br/>Charleston Naval Complex</p> |
| <p>0      90      180 Feet</p>  |                                                                                                                                                                     | <p><b>CH2MHILL</b></p>                                                              |                                                                                                                               |



## 4.0 Summary of Additional Investigations

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This section summarizes site sampling activities conducted subsequent to the *Zone F RFI Report, Revision 0* (EnSafe, 1999a), and provides interpretation of analytical data associated with these activities. In addition, data from other RFI sampling events that were not presented in the *Zone F RFI Report, Revision 0* or the *Zone L RFI Report, Revision 0* (EnSafe, 1998a) are included in this section. Sample locations described in this section are shown in Figures 4-1 and 4-2.

Comprehensive data from sampling events described in this section are presented in Appendix C of this RFI Report Addendum, with the exception of the groundwater DPT samples that were collected for AOC 613. These groundwater DPT data were presented in an appendix to the *Zone F RFI Report, Revision 0*. Data validation discussions for the data presented in Appendix C are provided as Appendix D of this RFI Report Addendum.

### 4.1 Soil Sampling and Analysis

During 1999, field activities were conducted subsequent to the *Zone F RFI Report, Revision 0* in general accordance with the *Zone F RFI Work Plan Addendum* (EnSafe, 1999b). Twenty-nine new soil borings (F613SB001 through F613SB014 and F613SB016 through F613SB030) were advanced at the site, and surface and subsurface soil samples were collected. The AOC 613 locations were sampled at depths of 0 to 1 ft bls and 3 to 5 ft bls, and analyzed for metals. Twenty-five of them were also analyzed for naphthalene and SVOCs. Figure 4-1 presents the additional soil sampling locations.

Also in 1999, discreet samples (0 to 1 ft bls and 3 to 5 ft bls) were collected from surface and subsurface soil at previous DPT locations F613SP022, F613SP027, and F613SP051. These samples were analyzed for VOCs, SVOCs, metals, PCB/pesticides, cyanide, and total organic carbon (TOC). Leachate from the synthetic precipitation leaching procedure (SPLP) on the samples was also analyzed for the parameters listed above. No cyanide, VOCs, or PCBs were detected in the leachate. The SPLP metals leachate data are presented in Appendix C of this RFI Report Addendum. A few SVOCs and pesticides were detected in the leachate; data from detected parameters are also listed in Appendix C of this RFI Report Addendum.

In the June 2001 sampling effort, four locations were sampled by hand-auger boring, in accordance with the *Zone F RFI Work Plan Addendum, Revision 1* (CH2M-Jones, 2001a).

1 Surface and subsurface samples from locations F613SB031 and F613SB032 were analyzed for  
2 arsenic, and surface soil samples from F613SB033 and F613SB034 were analyzed for PAHs.  
3 In addition to the borings listed in the *Zone F RFI Work Plan Addendum*, three additional  
4 locations were sampled northeast of the site and analyzed for lead. Surface and subsurface  
5 soil samples were collected at F175SB035 and F175SB036, east of F613SB026, with subsurface  
6 soil sample F175SB037 located in the immediate vicinity of F613SB026.

7 Tables 4-1 through 4-4 present summary results of the detected analytes from these  
8 additional investigations of surface and subsurface soil. Tables 4-1 and 4-2 present detected  
9 inorganic analytes for surface and subsurface soil, respectively, and Tables 4-3 and 4-4  
10 present SVOCs, VOCs, PCBs, and pesticides detected in the surface and subsurface soils,  
11 respectively.

12 The tables show all detections and compare them to appropriate screening criteria as  
13 follows:

- 14 • Surface soil data were compared to EPA Region III unrestricted (residential) land use  
15 RBCs adjusted for HI=0.1 for non-carcinogens (residential RBCs were obtained from the  
16 EPA Region III RBC Tables [October 2000]).
- 17 • Both surface and subsurface soil concentrations were compared to SSLs as provided in  
18 the *EPA Soil Screening Guidance: Technical Background Document*, Appendix A, with a  
19 DAF=1 for VOCs and adjusted to a DAF=10 for all other parameters.
- 20 • Inorganic data were compared to combined Zones E and F background concentration  
21 ranges, which were evaluated from a set of background (grid) samples. Zone E  
22 background concentrations were combined with Zone F data because the AOC  
23 613/AOC 615/SWMU 175 investigated area is industrial in nature and extends into  
24 Zone E. In addition, the Zone F background data set was very small. Surface soil  
25 samples were compared to surface soil background values, and subsurface soil was  
26 compared to subsurface soil background concentrations.
- 27 • BEQs were compared to site-wide background concentrations for surface and  
28 subsurface soil taken from *Background PAHs Study Report: Technical Information for the  
29 development of Background BEQ Values* (CH2M-Jones, 2001b). In the Background PAHs  
30 Study, BEQs and arsenic were sampled around the railroad lines to establish non-  
31 SWMU related background concentrations for soils within the railroad lines and in  
32 runoff areas. For areas paved with asphalt and maintenance-related pesticide  
33 applications, these background reference values are used.

1 Detected concentrations that exceeded the screening criteria are presented in bold type and  
2 outlined in boxes within the tables. Appendix C provides the detailed analytical data for  
3 each sample, including the parameters analyzed for but not detected.

4 The following subsections discuss the screening criteria exceedances that are noted in the  
5 tables. Further evaluation and a risk assessment of these parameters is provided in Section  
6 5.0 of this RFI Report Addendum. Nine metals, BEQs, and two other SVOCs were identified  
7 as exceeding screening criteria in at least one location out of the 40 locations sampled. No  
8 VOCs, PCBs, or pesticides were identified as exceeding screening criteria from the three  
9 locations in which they were sampled.

#### 10 **4.1.1 Metals in Soil**

##### 11 **Aluminum**

12 Reported concentrations of aluminum from surface soil sample locations F613SB017 (30,400  
13 J mg/kg), F613SB018 (24,800 J mg/kg), F613SB026 (22,500 J mg/kg), F613SB027 (28,300 J  
14 mg/kg), F613SB028 (30,700 J mg/kg), and F613SP051 (22,600 mg/kg) exceed the  
15 unrestricted (residential) land use RBC at HI=0.1 (7,800 mg/kg) and the background  
16 concentration range (261 to 20,500 mg/kg). There is no SSL listed for aluminum. No  
17 aluminum concentration exceeds the RBC for industrial soil (200,000 mg/kg) at HI=0.1.

18 Subsurface soil samples collected from ten of the 33 locations exceed the Zones E and F  
19 combined background concentration range for subsurface soil of 1,220 to 29,900 mg/kg.  
20 There is no SSL listed for aluminum. The average aluminum concentration in the additional  
21 subsurface soil samples was above the average background concentration of 8,550 mg/kg  
22 for Zone F, and above the average background concentration of 7,767 mg/kg for Zone E.  
23 Therefore, aluminum is evaluated further in Section 5.0 of this RFI Report Addendum.

##### 24 **Antimony**

25 The reported concentration of antimony from surface soil sample locations F613SB019 (7.8 J  
26 mg/kg) and F613SP027 (15.6 J mg/kg) exceed the unrestricted (residential) land use RBC at  
27 HI=0.1 (3.1 mg/kg), the SSL (DAF=10) of 2.5 mg/kg, and the background concentration  
28 range for combined Zones E and F (0.5 to 7.4 mg/kg). The antimony concentrations did not  
29 exceed the RBC for industrial soil of 82 mg/kg. No subsurface soil antimony concentration  
30 exceeds the screening criteria. Therefore, antimony in surface soil is evaluated further in  
31 Section 5.0.

1 **Arsenic**

2 The reported concentration of arsenic from surface soil sample location F613SP027 (69.9 J  
3 mg/kg), exceeds the RBC at HI=0.1 (0.43 mg/kg), and the combined Zones E and F  
4 background concentration range (0.95 to 67.5 mg/kg). Subsurface soil sample locations  
5 F613SB002 (36.2 mg/kg), F613SB021 (35.7 J mg/kg), F613SB024 (31.9 J mg/kg), and  
6 F613SP022 (31.5 mg/kg) exceed the SSL (DAF=10) of 15 mg/kg and the combined  
7 background range for Zones E and F of 0.83 to 30.4 mg/kg. Therefore, arsenic is evaluated  
8 further in Section 5.0.

9 **Iron**

10 Reported concentrations of iron from surface soil sample locations F613SB017 (31,000 J  
11 mg/kg), F613SB027 (35,000 J mg/kg), and F613SB028 (39,600 J mg/kg), exceed the  
12 unrestricted (residential) land use RBC at HI=0.1 (2,300 mg/kg) and combined Zones E and  
13 F background concentration range for surface soil of 1,050 to 30,600 mg/kg. The iron  
14 concentrations did not exceed the RBC for industrial soil of 61,000 mg/kg. There is no SSL  
15 for iron.

16 Iron exceeded the combined Zones E and F background concentration range of 924 to 35,800  
17 mg/kg at five subsurface soil locations in the sampling conducted subsequent to *Zone F RFI*  
18 *Report, Revision 0*. There is no SSL listed for iron. The average concentration of iron in the  
19 additional subsurface soil samples (25,285 mg/kg) is above the average background  
20 concentrations of 12,998 mg/kg for Zone F and 9,424 mg/kg in Zone E.

21 **Lead**

22 The reported concentration of lead from surface soil sample location F613SB002 (3,980 J  
23 mg/kg) exceeds the assumed RBC for unrestricted (residential) land use (400 mg/kg) and  
24 the combined Zones E and F background concentration (1 to 400 mg/kg). The lead  
25 concentration also exceeds the default lead SSL of 400 mg/kg and the RBC for industrial  
26 soil of 1,200 mg/kg. A subsurface soil sample collected from F613SB026 also exceeds the  
27 default SSL value. The sample had a reported lead concentration (6,620 J mg/kg), which  
28 exceeds the Zones E and F combined subsurface soil background concentration range of 1.8  
29 to 322 mg/kg. The average site subsurface soil lead concentration (250 mg/kg) in the  
30 additional samples is below the SSL of 400 mg/kg, and is similar to the average background  
31 concentration levels for Zone F (123 mg/kg) and Zone E (161 mg/kg).

32 **Manganese**

33 The reported concentration of manganese from surface soil sample location F613SB017 (539  
34 J mg/kg), exceeds the SSL (DAF=10) of 480 mg/kg and the maximum combined Zones E

1 and F background concentration (508 mg/kg). The manganese concentration also exceeds  
2 the unrestricted (residential) land use RBC at HI=0.1 (160 mg/kg), but not the RBC for  
3 industrial soil of 4,100 mg/kg. No subsurface soil manganese concentration exceeded the  
4 screening criteria.

#### 5 **Nickel**

6 The reported concentration of nickel from surface soil sample location F613SP027 (79.1  
7 mg/kg), exceeds the SSL (DAF=10) of 65 mg/kg and the combined Zones E and F  
8 background concentration range of 0.6 to 71.5 mg/kg. The nickel concentration does not  
9 exceed the unrestricted (residential) land use RBC of 160 mg/kg. No subsurface soil nickel  
10 concentration exceeded the screening criteria.

#### 11 **Selenium**

12 No surface soil selenium concentration exceeds the screening criteria. Reported  
13 concentrations of selenium from subsurface sample locations F613SB001 (2.7 mg/kg),  
14 F613SB002 (3.3 mg/kg), F613SB003 (2.7 mg/kg), F613SB004 (3.0 mg/kg), F613SB007 (2.8  
15 mg/kg), F613SB008 (2.6 mg/kg), F613SB012 (3.3 mg/kg), F613SB016 (3.5 mg/kg),  
16 F613SB020 (2.9 mg/kg), F613SB021 (3.1 mg/kg), F613SB022 (2.6 mg/kg), and F613SB024  
17 (2.6J mg/kg) exceed the SSL (DAF=10) of 2.5 mg/kg and maximum combined Zones E and  
18 F background concentration (2.4 mg/kg). The average site concentration (2.1 mg/kg) in the  
19 additional subsurface soil samples is above the average background concentrations for  
20 Zone F (0.62 mg/kg) and Zone E (0.51 mg/kg).

#### 21 **Vanadium**

22 Reported concentrations of vanadium from surface soil sample locations F613SB017 (73.6J  
23 mg/kg), F613SB018 (66.0J mg/kg), F613SB027 (72.6J mg/kg), and F613SB028 (83.9J mg/kg)  
24 exceed the unrestricted (residential) land use RBC at HI=0.1 (55 mg/kg) and the maximum  
25 combined Zones E and F background concentration (60 mg/kg). None of the vanadium  
26 concentrations exceed the SSL (DAF=10) of 3,000 mg/kg or the RBC for industrial soil of  
27 1,400 mg/kg. No subsurface soil vanadium concentration exceeds the screening criteria.

### 28 **4.1.2 SVOCs in Soil**

#### 29 **BEQs**

30 Tables 4-3 and 4-4 present the results of the BEQs detected in the additional RFI samples.  
31 BEQ concentrations exceeded background values (1.304 mg/kg) in surface soil at three  
32 locations: F613SB001 (1.539 mg/kg), F613SB009 (2.042 mg/kg), and F613SB022 (1.722

1 mg/kg). At sample location F613SB022, the benzo(a)anthracene concentration exceeded its  
2 SSL.

3 BEQs were measured in many of the subsurface soil samples. The BEQ concentration at  
4 F613SB005 (1.546 mg/kg) exceeded the background value of 1.4 mg/kg; the  
5 benzo(a)anthracene concentration exceeded the SSL at that location.

#### 6 **2-Methylnaphthalene**

7 No surface soil 2-methylnaphthalene concentration exceeds the screening criteria. The  
8 reported concentration of 2-methylnaphthalene from subsurface sample location F613SB016  
9 (31 mg/kg) exceeds the SSL (DAF=10) of 11 mg/kg. This sample location is at the buried  
10 FDS line, at the northern edge of the AOCs of interest.

#### 11 **Isophorone**

12 No surface soil isophorone concentration exceeds the screening criteria. The reported  
13 concentration of isophorone from subsurface sample location F613SB021 (0.26 J mg/kg)  
14 slightly exceeds the SSL (DAF=10) of 0.25 mg/kg.

## 15 **4.2 Groundwater Sampling and Analysis**

16 Figure 4-2 presents the locations of groundwater monitoring wells sampled during the RFI  
17 Addendum activities. The results from the first three events of groundwater sampling from  
18 some of the site monitoring wells were reported in the *Zone F RFI Report, Revision 0*, as  
19 described in Section 2.0 of this RFI Report Addendum. Data from the fourth sampling event  
20 are described in this section. In addition, three new monitoring wells, identified as  
21 F613GW006, F613GW007, and F613GW008, were installed and sampled in 1999, as  
22 described in the *Zone F RFI Work Plan Addendum (EnSafe, 1999b)*. Samples from F613GW006  
23 were analyzed for VOCs, SVOCs, metals, pesticides/PCBs, and cyanide. Samples from  
24 F613GW007 were analyzed for metals, VOCs, and SVOCs. The sample from F613GW008  
25 was analyzed for VOCs. Well boring and construction logs are presented in Appendix E of  
26 this RFI Report Addendum.

27 Monitoring well F613GW009 was installed in 2001, as described in the *Zone F RFI Work Plan*  
28 *Addendum, Revision 1 (CH2M-Jones, 2001a)*. In 2001, samples from F613GW003, F613GW004,  
29 F613GW009, and FGELGW012 were analyzed for chlorinated solvents.

30 Two FDS wells had been previously installed within the SWMU 175 area, labeled  
31 FDSGW17A and FDSGW17B. These wells were installed to characterize the water quality in  
32 both the Zone F and Zone G FDSs, and have been given both "F" and "G" designations in

1 their label prefixes. They are both screened in the shallow water-bearing zone, above any  
2 confining or semi-confining unit. These wells were analyzed for metals, VOCs, SVOCs,  
3 PCBs/pesticides, cyanide, and total suspended solids (TSS). Data from these wells are also  
4 considered in this section.

5 Groundwater data from DPT samples collected in 1996 are also described in this section,  
6 because the data were not presented in the *Zone F RFI Report, Revision 0*. As shown in Figure  
7 2-1, groundwater samples were collected from 58 DPT locations over a grid area on  
8 approximate 50-ft centers, excluding the buildings. The groundwater was collected after  
9 removing soil samples from the probe holes from the surface to 4 ft bls, and generally  
10 represented a portion of the upper groundwater zone. The samples were analyzed for  
11 SW846 VOCs, SVOCs, and metals. In approximately one-quarter of the locations,  
12 insufficient volume of groundwater was available for the full analysis, so the groundwater  
13 samples were analyzed for VOCs only, or for VOCs and metals. Due to the high likelihood  
14 that groundwater samples collected using DPT sampling methods were very turbid, metals  
15 data from these samples will not be considered. VOC and SVOC data from these samples  
16 are considered for screening, as they only represent a portion of the aquifer.

17 Table 4-5 lists the parameters analyzed in each DPT groundwater sample collected for the  
18 AOC 613/AOC 615/SWMU 175 investigation. Data from these samples are summarized in  
19 Appendix D of the *Zone F RFI Report, Revision 0*, and detected parameters are presented and  
20 discussed in this section of this RFI Report Addendum.

21 Tables 4-6 and 4-7 present summary results of the detected analytes from these additional  
22 groundwater samples. These tables show all detections and compare them to appropriate  
23 screening criteria as follows:

- 24 • MCLs from EPA Drinking Water Regulations
- 25 • EPA Region III tap water RBCs (at a target risk level of 1 in a million, and an HI=0.1 for  
26 chemicals that do not have MCLs)
- 27 • Zone E and Zone F BRCs for inorganic chemicals (where no BRC was calculated, the  
28 range of background concentrations in the grid samples was used)

29 Detected concentrations that exceed the screening criteria are presented in bold type and  
30 outlined in boxes within the table. Appendix C provides the detailed analytical data for  
31 each sample collected after submission of the *Zone F RFI Report, Revision 0*, including  
32 parameters in which no concentrations were detected.

1 The following sections discuss parameters which exceeded screening criteria, as noted in  
2 the tables. Further evaluation of these parameters is provided in Section 5.0 of this RFI  
3 Report Addendum.

#### 4 **4.2.1 Metals in Groundwater**

##### 5 **Aluminum**

6 Reported concentrations of aluminum from sample locations FFDSGW17A (4,290 µg/L)  
7 and FGELGW005 (5,500 µg/L) exceed the tap water RBC (3,700 µg/L, HI=0.1), Zone E  
8 shallow groundwater BRC (2,810 µg/L), and Zone F shallow groundwater BRC (224 µg/L).  
9 No MCL is available for aluminum.

##### 10 **Arsenic**

11 Reported concentrations of arsenic from sample locations F613GW006 (207 and 211 µg/L)  
12 and FDSGW17B (ranging from 51.5 to 63.5 µg/L) exceed the MCL (50 µg/L), and Zones E  
13 and F BRCs for shallow groundwater of 18.7 and 16.7 µg/L, respectively. Monitoring well  
14 F613GW006 is located in the northeastern corner of AOC 613, and the well is downgradient  
15 of the FDS pipeline.

##### 16 **Iron**

17 A reported concentration of iron from sample location F613GW02D (25,100 µg/L) exceeds  
18 the tap water RBC (1,100 µg/L, HI=0.1) and the Zone F range of background concentrations  
19 for deep groundwater (311 to 1,150 µg/L). The iron concentration is within the range of  
20 background concentrations for Zone E (19 to 26,000 µg/L). No MCL is available for iron.

##### 21 **Manganese**

22 The reported concentration of manganese from sample location F613GW02D (2,930 µg/L)  
23 exceeds the tap water RBC (73 µg/L, HI=0.1) and the Zone F deep groundwater BRC (1,260  
24 µg/L). No MCL is available for manganese.

##### 25 **Vanadium**

26 The reported concentration of vanadium from sample location FGELGW005 (27.3 µg/L)  
27 exceeds the tap water RBC (26 µg/L, HI=0.1) and Zones E and F shallow groundwater BRCs  
28 of 11.4 and 1.58 µg/L, respectively. No MCL is available for vanadium.

## 4.2.2 Organic Compounds in Groundwater

### 1,1-DCE

1,1-DCE was detected in three samples in the southern portion of the site. The reported concentration of 1,1-DCE from screening sample location F613GP037 (20 µg/L) exceeds the MCL (7 µg/L). Other detected concentrations were less than 4 µg/L.

### 1,2-DCE

Reported concentrations of 1,2-DCE (total) from screening sample location F613GP039 (1,700 µg/L) exceeds the MCL for cis-1,2-DCE (70 µg/L). There is no MCL for 1,2-DCE (total); however there are MCLs for its two isomers. The MCL for cis-1,2-DCE is used as opposed to the MCL for trans-1,2-DCE because of its relatively lower value (70 µg/L for cis-1,2-DCE versus 100 µg/L for trans-1,2-DCE). A reported sample concentration of cis-1,2-DCE (83.6 µg/L) from monitoring well location F613GW004 also exceeds the MCL. These sample locations with exceedances are adjacent to each other in the southern portion of the site; samples from other areas of the site contained 1,2-DCE less than 33 µg/L.

### 2-Methylnaphthalene

2-methylnaphthalene was detected in groundwater in the northern corner of the site, near the buried fuel lines. Reported concentrations of 2-methylnaphthalene from screening sample location F613GP013 (17 µg/L) and from monitoring wells F613GW006 (14, 36, and 31 µg/L) and FGELGW014 (26 and 16 µg/L) exceed the tap water RBC (12 µg/L, HI=0.1). No MCL is available for 2-methylnaphthalene.

### Bis(2-ethylhexyl) phthalate

Reported concentrations of bis(2-ethylhexyl) phthalate from screening sample locations F613GP025 (100 µg/L) and F613GP033 (100 µg/L), and from monitoring wells FDSGW17B (10 µg/L), and FGELGW014 (7.7 µg/L), exceed the MCL (6 µg/L). Wells F613GP025 and F613GP033 are located near the center of the site; each is surrounded by samples in which no bis(2-ethylhexyl)phthalate was detected above an estimated concentration of 4 µg/L.

### Dibenzofuran

Dibenzofuran was detected in groundwater in the northern corner of the site. Reported concentrations of dibenzofuran from screening sample location F613GP019 (6 µg/L) and from monitoring wells F613GW006 (3 µg/L and 4 µg/L), FGELGW014 (two detects of 4 µg/L), and FDSGW17A (4 µg/L) exceed the tap water RBC (2.4 µg/L, HI=0.1). No MCL is available for dibenzofuran.

1 **Methylene chloride**

2 Methylene chloride was reported in only one sample from the data set of additional RFI  
3 samples, including the DPT samples. The reported concentration of methylene chloride  
4 from sample location FGELGW014 (83 J µg/L) exceeds the tap water RBC (4.1 µg/L). No  
5 MCL is available for methylene chloride.

6 **Naphthalene**

7 Naphthalene was detected at three locations throughout the site. No MCL is available for  
8 naphthalene. Because the tap water RBC (0.65 µg/L, HI=0.1) is lower than the detection  
9 limit, all detected samples exceeded the screening criterion. Naphthalene was reported in  
10 screening sample locations F613GP035 (40 µg/L) and F613GP065 (3 J µg/L), and from  
11 monitoring well F613GW006 (5 and 2 J µg/L).

12 **PCE and TCE**

13 PCE and TCE were both reported at screening sample location F613GP039 at concentrations  
14 exceeding the MCL of 5 µg/L. PCE was reported at 1900 J µg/L and TCE was reported at  
15 1500 J µg/L, sampled in 1996. The June 2001 sample from F613GW004, which is the  
16 monitoring well adjacent to F613GP039, contained concentrations of these solvents at 0.35 J  
17 µg/L and 4.0 J µg/L, respectively. TCE was also detected at 1 J µg/L at two other locations  
18 within the site; PCE was not detected in any other of the additional groundwater samples.

19 **Vinyl chloride**

20 Vinyl chloride was detected at two screening locations near the northwest corner of the site,  
21 F613GP002 and F613GP008, and at the two locations containing PCE and TCE exceedances,  
22 F613GW004 and F613GP039. Reported concentrations of vinyl chloride from screening  
23 sample locations F613GP002 (4 J µg/L), F613GP008 (5 J µg/L), and F613GP039 (38 µg/L),  
24 and from monitoring well F613GW004 (10.8 µg/L), exceed the MCL (2 µg/L).

25 **4.3 COPC Summary**

26 COPCs identified during the additional sampling, including the original screening DPT  
27 groundwater sampling, include the following:

- 28 • In surface soil, aluminum, antimony, arsenic, iron, lead, and BEQs were detected at  
29 concentrations in excess of RBCs and background values. In addition, antimony, arsenic,  
30 lead, manganese, nickel, and benzo(a)anthracene were detected at concentrations in  
31 excess of SSLs.

- 1 • In subsurface soil, aluminum, arsenic, iron, lead, selenium, benzo(a)anthracene, 2-  
2 methylnaphthalene, and isophorone were detected at concentrations in excess of SSLs  
3 and background values.
- 4 • In groundwater, aluminum, arsenic, iron, manganese, vanadium, 1,1-DCE, 1,2-DCE  
5 (total), 2-methylnaphthalene, bis(2-ethylhexyl)phthalate, dibenzofuran, methylene  
6 chloride, naphthalene, PCE, TCE, and vinyl chloride were detected at concentrations in  
7 excess of MCLs or RBCs.
- 8 Many of these chemicals had been identified as COCs in the *Zone F RFI Report, Revision 0*.  
9 The occurrence and locations of the COPCs are further evaluated in Section 5.0 of this RFI  
10 Report Addendum.

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|------------------|-----------------------------------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |                  |                                         |
| Aluminum  | F613SB001  | 13-Oct-99     | 4,480                 | =         | 7,800                     | 200,000                   | NL               | 261 - 20,500                            |
|           | F613SB002  | 14-Oct-99     | 9,200                 | =         |                           |                           |                  |                                         |
|           | F613SB003  | 14-Oct-99     | 16,400                | =         |                           |                           |                  |                                         |
|           | F613SB004  | 13-Oct-99     | 18,100                | =         |                           |                           |                  |                                         |
|           | F613SB005  | 13-Oct-99     | 20,000                | =         |                           |                           |                  |                                         |
|           | F613SB006  | 13-Oct-99     | 6,910                 | =         |                           |                           |                  |                                         |
|           | F613SB007  | 13-Oct-99     | 1,960                 | =         |                           |                           |                  |                                         |
|           | F613SB008  | 13-Oct-99     | 7,670                 | =         |                           |                           |                  |                                         |
|           | F613SB009  | 13-Oct-99     | 12,600                | =         |                           |                           |                  |                                         |
|           | F613SB010  | 13-Oct-99     | 7,460                 | =         |                           |                           |                  |                                         |
|           | F613SB011  | 15-Oct-99     | 14,700                | =         |                           |                           |                  |                                         |
|           | F613SB012  | 14-Oct-99     | 9,480                 | =         |                           |                           |                  |                                         |
|           | F613SB013  | 14-Oct-99     | 12,900                | =         |                           |                           |                  |                                         |
|           | F613SB014  | 13-Oct-99     | 6,560                 | =         |                           |                           |                  |                                         |
|           | F613SB016  | 13-Oct-99     | 3,350                 | =         |                           |                           |                  |                                         |
|           | F613SB017  | 16-Nov-99     | <b>30,400</b>         | J         |                           |                           |                  |                                         |
|           | F613SB018  | 16-Nov-99     | <b>24,800</b>         | J         |                           |                           |                  |                                         |
|           | F613SB019  | 13-Oct-99     | 4,990                 | J         |                           |                           |                  |                                         |
|           | F613SB020  | 13-Oct-99     | 4,580                 | J         |                           |                           |                  |                                         |
|           | F613SB021  | 13-Oct-99     | 7,940                 | J         |                           |                           |                  |                                         |
|           | F613SB022  | 13-Oct-99     | 5,560                 | J         |                           |                           |                  |                                         |
|           | F613SB023  | 16-Nov-99     | 11,700                | J         |                           |                           |                  |                                         |
|           | F613SB024  | 16-Nov-99     | 18,800                | J         |                           |                           |                  |                                         |
|           | F613SB025  | 16-Nov-99     | 17,600                | J         |                           |                           |                  |                                         |
|           | F613SB026  | 16-Nov-99     | <b>22,500</b>         | J         |                           |                           |                  |                                         |
|           | F613SB027  | 16-Nov-99     | <b>28,300</b>         | J         |                           |                           |                  |                                         |
|           | F613SB028  | 16-Nov-99     | <b>30,700</b>         | J         |                           |                           |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 3,790                 | J         |                           |                           |                  |                                         |
|           | F613SB030  | 01-Dec-99     | 17,400                | J         |                           |                           |                  |                                         |
|           | F613SP022  | 13-Oct-99     | 5,620                 | =         |                           |                           |                  |                                         |
| F613SP027 | 14-Oct-99  | 8,780         | =                     |           |                           |                           |                  |                                         |
| F613SP051 | 15-Oct-99  | <b>22,600</b> | =                     |           |                           |                           |                  |                                         |
| Antimony  | F613SB001  | 13-Oct-99     | 1.6                   | J         | 3.1                       | 82                        | 2.5              | 0.5 - 7.4                               |
|           | F613SB002  | 14-Oct-99     | 0.85                  | J         |                           |                           |                  |                                         |
|           | F613SB003  | 14-Oct-99     | 0.6                   | J         |                           |                           |                  |                                         |
|           | F613SB004  | 13-Oct-99     | 1.1                   | J         |                           |                           |                  |                                         |
|           | F613SB005  | 13-Oct-99     | 0.55                  | J         |                           |                           |                  |                                         |
|           | F613SB006  | 13-Oct-99     | 0.31                  | J         |                           |                           |                  |                                         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|------------------|-----------------------------------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |                  |                                         |
| Antimony  | F613SB007  | 13-Oct-99     | 0.41                  | J         | 3.1                       | 82                        | 2.5              | 0.5 - 7.4                               |
|           | F613SB008  | 13-Oct-99     | 0.44                  | J         |                           |                           |                  |                                         |
|           | F613SB009  | 13-Oct-99     | 0.92                  | J         |                           |                           |                  |                                         |
|           | F613SB010  | 13-Oct-99     | 0.57                  | J         |                           |                           |                  |                                         |
|           | F613SB012  | 14-Oct-99     | 0.52                  | J         |                           |                           |                  |                                         |
|           | F613SB013  | 14-Oct-99     | 1.2                   | J         |                           |                           |                  |                                         |
|           | F613SB014  | 13-Oct-99     | 3.2                   | J         |                           |                           |                  |                                         |
|           | F613SB016  | 13-Oct-99     | 0.42                  | J         |                           |                           |                  |                                         |
|           | F613SB019  | 13-Oct-99     | 7.8                   | J         |                           |                           |                  |                                         |
|           | F613SB020  | 13-Oct-99     | 0.93                  | J         |                           |                           |                  |                                         |
|           | F613SB021  | 13-Oct-99     | 0.43                  | J         |                           |                           |                  |                                         |
|           | F613SB022  | 13-Oct-99     | 1.6                   | J         |                           |                           |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 0.38                  | J         |                           |                           |                  |                                         |
|           | F613SB030  | 01-Dec-99     | 0.72                  | J         |                           |                           |                  |                                         |
|           | F613SP022  | 13-Oct-99     | 0.31                  | J         |                           |                           |                  |                                         |
|           | F613SP027  | 14-Oct-99     | 15.6                  | J         |                           |                           |                  |                                         |
|           | Arsenic    | F613SB001     | 13-Oct-99             | 8.6       | =                         | 0.43                      | 3.8              | 15                                      |
| F613SB002 |            | 14-Oct-99     | 6.1                   | =         |                           |                           |                  |                                         |
| F613SB003 |            | 14-Oct-99     | 5.9                   | =         |                           |                           |                  |                                         |
| F613SB004 |            | 13-Oct-99     | 17.1                  | =         |                           |                           |                  |                                         |
| F613SB005 |            | 13-Oct-99     | 14.7                  | =         |                           |                           |                  |                                         |
| F613SB006 |            | 13-Oct-99     | 4.6                   | =         |                           |                           |                  |                                         |
| F613SB007 |            | 13-Oct-99     | 3.2                   | =         |                           |                           |                  |                                         |
| F613SB008 |            | 13-Oct-99     | 6.1                   | =         |                           |                           |                  |                                         |
| F613SB009 |            | 13-Oct-99     | 9.8                   | =         |                           |                           |                  |                                         |
| F613SB010 |            | 13-Oct-99     | 8.7                   | =         |                           |                           |                  |                                         |
| F613SB011 |            | 15-Oct-99     | 9.5                   | =         |                           |                           |                  |                                         |
| F613SB012 |            | 14-Oct-99     | 5.3                   | =         |                           |                           |                  |                                         |
| F613SB013 |            | 14-Oct-99     | 39.5                  | =         |                           |                           |                  |                                         |
| F613SB014 |            | 13-Oct-99     | 17.1                  | =         |                           |                           |                  |                                         |
| F613SB016 |            | 13-Oct-99     | 3.8                   | =         |                           |                           |                  |                                         |
| F613SB017 |            | 16-Nov-99     | 15.4                  | J         |                           |                           |                  |                                         |
| F613SB018 |            | 16-Nov-99     | 15.8                  | J         |                           |                           |                  |                                         |
| F613SB019 |            | 13-Oct-99     | 9.4                   | J         |                           |                           |                  |                                         |
| F613SB020 |            | 13-Oct-99     | 5.9                   | J         |                           |                           |                  |                                         |
| F613SB021 |            | 13-Oct-99     | 4.9                   | J         |                           |                           |                  |                                         |
| F613SB022 |            | 13-Oct-99     | 10.8                  | J         |                           |                           |                  |                                         |
| F613SB023 |            | 16-Nov-99     | 14                    | J         |                           |                           |                  |                                         |
| F613SB024 |            | 16-Nov-99     | 17.2                  | J         |                           |                           |                  |                                         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|------------------|-----------------------------------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |                  |                                         |
| Arsenic   | F613SB025  | 16-Nov-99     | 11.3                  | J         | 0.43                      | 3.8                       | 15               | 0.95 - 67.5                             |
|           | F613SB026  | 16-Nov-99     | 12.7                  | J         |                           |                           |                  |                                         |
|           | F613SB027  | 16-Nov-99     | 23.1                  | J         |                           |                           |                  |                                         |
|           | F613SB028  | 16-Nov-99     | 24.1                  | J         |                           |                           |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 1.9                   | =         |                           |                           |                  |                                         |
|           | F613SB030  | 01-Dec-99     | 12                    | =         |                           |                           |                  |                                         |
|           | F613SB031  | 07-Jun-01     | 8.68                  | =         |                           |                           |                  |                                         |
|           | F613SB032  | 07-Jun-01     | 8.21                  | =         |                           |                           |                  |                                         |
|           | F613SP022  | 13-Oct-99     | 3.8                   | =         |                           |                           |                  |                                         |
|           | F613SP027  | 14-Oct-99     | 69.9                  | J         |                           |                           |                  |                                         |
|           | F613SP051  | 15-Oct-99     | 16.2                  | =         |                           |                           |                  |                                         |
| Barium    | F613SB001  | 13-Oct-99     | 31.3                  | =         | 550                       | 14,000                    | 800              | 1.8 - 1,980                             |
|           | F613SB002  | 14-Oct-99     | 70.6                  | =         |                           |                           |                  |                                         |
|           | F613SB003  | 14-Oct-99     | 33                    | =         |                           |                           |                  |                                         |
|           | F613SB004  | 13-Oct-99     | 38                    | =         |                           |                           |                  |                                         |
|           | F613SB005  | 13-Oct-99     | 35.1                  | =         |                           |                           |                  |                                         |
|           | F613SB006  | 13-Oct-99     | 16.5                  | J         |                           |                           |                  |                                         |
|           | F613SB007  | 13-Oct-99     | 11.1                  | J         |                           |                           |                  |                                         |
|           | F613SB008  | 13-Oct-99     | 18.1                  | J         |                           |                           |                  |                                         |
|           | F613SB009  | 13-Oct-99     | 23.4                  | =         |                           |                           |                  |                                         |
|           | F613SB010  | 13-Oct-99     | 34.1                  | =         |                           |                           |                  |                                         |
|           | F613SB011  | 15-Oct-99     | 31.2                  | =         |                           |                           |                  |                                         |
|           | F613SB012  | 14-Oct-99     | 20.8                  | =         |                           |                           |                  |                                         |
|           | F613SB013  | 14-Oct-99     | 76.6                  | =         |                           |                           |                  |                                         |
|           | F613SB014  | 13-Oct-99     | 38.6                  | =         |                           |                           |                  |                                         |
|           | F613SB016  | 13-Oct-99     | 10.8                  | J         |                           |                           |                  |                                         |
|           | F613SB017  | 16-Nov-99     | 41.6                  | J         |                           |                           |                  |                                         |
|           | F613SB018  | 16-Nov-99     | 42.9                  | J         |                           |                           |                  |                                         |
|           | F613SB019  | 13-Oct-99     | 30.8                  | J         |                           |                           |                  |                                         |
|           | F613SB020  | 13-Oct-99     | 23.8                  | J         |                           |                           |                  |                                         |
|           | F613SB021  | 13-Oct-99     | 10.9                  | J         |                           |                           |                  |                                         |
|           | F613SB022  | 13-Oct-99     | 88.5                  | J         |                           |                           |                  |                                         |
|           | F613SB023  | 16-Nov-99     | 29.6                  | J         |                           |                           |                  |                                         |
|           | F613SB024  | 16-Nov-99     | 32.8                  | J         |                           |                           |                  |                                         |
|           | F613SB025  | 16-Nov-99     | 38.6                  | J         |                           |                           |                  |                                         |
|           | F613SB026  | 16-Nov-99     | 40.4                  | J         |                           |                           |                  |                                         |
|           | F613SB027  | 16-Nov-99     | 42.8                  | J         |                           |                           |                  |                                         |
|           | F613SB028  | 16-Nov-99     | 45.8                  | J         |                           |                           |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 12.5                  | J         |                           |                           |                  |                                         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | Zones E/F |                               |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|-----------|-------------------------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |           | Background Range <sup>c</sup> |
| Barium    | F613SB030  | 01-Dec-99     | 25.9                  | =         | 550                       | 14,000                    | 800       | 1.8 - 1,980                   |
|           | F613SP022  | 13-Oct-99     | 14.2                  | J         |                           |                           |           |                               |
|           | F613SP027  | 14-Oct-99     | 60.9                  | =         |                           |                           |           |                               |
|           | F613SP051  | 15-Oct-99     | 36.3                  | =         |                           |                           |           |                               |
| Beryllium | F613SB001  | 13-Oct-99     | 0.16                  | J         | 16                        | 410                       | 32        | 0.13 - 1.6                    |
|           | F613SB002  | 14-Oct-99     | 0.53                  | =         |                           |                           |           |                               |
|           | F613SB003  | 14-Oct-99     | 0.56                  | =         |                           |                           |           |                               |
|           | F613SB004  | 13-Oct-99     | 0.81                  | =         |                           |                           |           |                               |
|           | F613SB005  | 13-Oct-99     | 0.74                  | =         |                           |                           |           |                               |
|           | F613SB006  | 13-Oct-99     | 0.08                  | J         |                           |                           |           |                               |
|           | F613SB008  | 13-Oct-99     | 0.25                  | J         |                           |                           |           |                               |
|           | F613SB009  | 13-Oct-99     | 0.71                  | =         |                           |                           |           |                               |
|           | F613SB010  | 13-Oct-99     | 0.53                  | =         |                           |                           |           |                               |
|           | F613SB011  | 15-Oct-99     | 0.38                  | J         |                           |                           |           |                               |
|           | F613SB012  | 14-Oct-99     | 0.2                   | J         |                           |                           |           |                               |
|           | F613SB013  | 14-Oct-99     | 0.95                  | =         |                           |                           |           |                               |
|           | F613SB014  | 13-Oct-99     | 0.34                  | J         |                           |                           |           |                               |
|           | F613SB017  | 16-Nov-99     | 1.7                   | =         |                           |                           |           |                               |
|           | F613SB018  | 16-Nov-99     | 1.5                   | =         |                           |                           |           |                               |
|           | F613SB019  | 13-Oct-99     | 0.45                  | J         |                           |                           |           |                               |
|           | F613SB020  | 13-Oct-99     | 0.14                  | J         |                           |                           |           |                               |
|           | F613SB021  | 13-Oct-99     | 0.15                  | J         |                           |                           |           |                               |
|           | F613SB022  | 13-Oct-99     | 0.63                  | =         |                           |                           |           |                               |
|           | F613SB023  | 16-Nov-99     | 0.82                  | =         |                           |                           |           |                               |
|           | F613SB024  | 16-Nov-99     | 1.1                   | =         |                           |                           |           |                               |
|           | F613SB025  | 16-Nov-99     | 1.1                   | =         |                           |                           |           |                               |
|           | F613SB026  | 16-Nov-99     | 1.2                   | =         |                           |                           |           |                               |
|           | F613SB027  | 16-Nov-99     | 1.6                   | =         |                           |                           |           |                               |
|           | F613SB028  | 16-Nov-99     | 1.8                   | =         |                           |                           |           |                               |
|           | F613SB030  | 01-Dec-99     | 0.92                  | =         |                           |                           |           |                               |
|           | F613SP022  | 13-Oct-99     | 0.12                  | J         |                           |                           |           |                               |
|           | F613SP027  | 14-Oct-99     | 1.2                   | =         |                           |                           |           |                               |
| F613SP051 | 15-Oct-99  | 0.69          | =                     |           |                           |                           |           |                               |
| Cadmium   | F613SB002  | 14-Oct-99     | 1.1                   | =         | 7.8                       | 100                       | 4         | 0.06 - 1.5                    |
|           | F613SB005  | 13-Oct-99     | 0.07                  | J         |                           |                           |           |                               |
|           | F613SB007  | 13-Oct-99     | 0.54                  | J         |                           |                           |           |                               |
|           | F613SB009  | 13-Oct-99     | 0.13                  | J         |                           |                           |           |                               |
|           | F613SB014  | 13-Oct-99     | 0.28                  | J         |                           |                           |           |                               |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | Zones E/F Background Range <sup>c</sup> |                  |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|-----------------------------------------|------------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |                                         | SSL <sup>b</sup> |
| Cadmium   | F613SB016  | 13-Oct-99     | 0.7                   | J         | 7.8                       | 100                       | 4                                       | 0.06 - 1.5       |
|           | F613SB019  | 13-Oct-99     | 0.08                  | J         |                           |                           |                                         |                  |
|           | F613SB020  | 13-Oct-99     | 0.75                  | J         |                           |                           |                                         |                  |
|           | F613SB022  | 13-Oct-99     | 3.2                   | J         |                           |                           |                                         |                  |
|           | F613SP022  | 13-Oct-99     | 0.3                   | J         |                           |                           |                                         |                  |
|           | F613SP027  | 14-Oct-99     | 0.36                  | J         |                           |                           |                                         |                  |
| Calcium   | F613SB001  | 13-Oct-99     | 1,570                 | =         | NL                        | NL                        | NL                                      | 167 - 182,000    |
|           | F613SB002  | 14-Oct-99     | 132,000               | J         |                           |                           |                                         |                  |
|           | F613SB003  | 14-Oct-99     | 9,710                 | J         |                           |                           |                                         |                  |
|           | F613SB004  | 13-Oct-99     | 33,100                | =         |                           |                           |                                         |                  |
|           | F613SB005  | 13-Oct-99     | 106,000               | =         |                           |                           |                                         |                  |
|           | F613SB006  | 13-Oct-99     | 2,740                 | =         |                           |                           |                                         |                  |
|           | F613SB007  | 13-Oct-99     | 275,000               | =         |                           |                           |                                         |                  |
|           | F613SB008  | 13-Oct-99     | 16,800                | =         |                           |                           |                                         |                  |
|           | F613SB009  | 13-Oct-99     | 80,000                | =         |                           |                           |                                         |                  |
|           | F613SB010  | 13-Oct-99     | 4,960                 | =         |                           |                           |                                         |                  |
|           | F613SB011  | 15-Oct-99     | 15,000                | J         |                           |                           |                                         |                  |
|           | F613SB012  | 14-Oct-99     | 9,870                 | J         |                           |                           |                                         |                  |
|           | F613SB013  | 14-Oct-99     | 9,500                 | J         |                           |                           |                                         |                  |
|           | F613SB014  | 13-Oct-99     | 25,900                | =         |                           |                           |                                         |                  |
|           | F613SB016  | 13-Oct-99     | 307,000               | =         |                           |                           |                                         |                  |
|           | F613SB017  | 16-Nov-99     | 11,000                | J         |                           |                           |                                         |                  |
|           | F613SB018  | 16-Nov-99     | 4,890                 | J         |                           |                           |                                         |                  |
|           | F613SB019  | 13-Oct-99     | 2,770                 | J         |                           |                           |                                         |                  |
|           | F613SB020  | 13-Oct-99     | 282,000               | J         |                           |                           |                                         |                  |
|           | F613SB021  | 13-Oct-99     | 6,760                 | J         |                           |                           |                                         |                  |
|           | F613SB022  | 13-Oct-99     | 16,300                | J         |                           |                           |                                         |                  |
|           | F613SB023  | 16-Nov-99     | 5,750                 | J         |                           |                           |                                         |                  |
|           | F613SB024  | 16-Nov-99     | 4,150                 | J         |                           |                           |                                         |                  |
|           | F613SB025  | 16-Nov-99     | 9,450                 | J         |                           |                           |                                         |                  |
|           | F613SB026  | 16-Nov-99     | 6,580                 | J         |                           |                           |                                         |                  |
|           | F613SB027  | 16-Nov-99     | 11,800                | J         |                           |                           |                                         |                  |
|           | F613SB028  | 16-Nov-99     | 6,240                 | J         |                           |                           |                                         |                  |
|           | F613SB029  | 01-Dec-99     | 34,900                | J         |                           |                           |                                         |                  |
|           | F613SB030  | 01-Dec-99     | 8,610                 | J         |                           |                           |                                         |                  |
|           | F613SP022  | 13-Oct-99     | 142,000               | =         |                           |                           |                                         |                  |
| F613SP027 | 14-Oct-99  | 10,900        | J                     |           |                           |                           |                                         |                  |
| F613SP051 | 15-Oct-99  | 15,000        | J                     |           |                           |                           |                                         |                  |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter        | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|------------------|------------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-----------------------------------------|
| Chromium, Total* | F613SB001  | 13-Oct-99     | 10.3                  | =         | 210 *                                  | 450 *                                | 19               | 2.3 - 567                               |
|                  | F613SB002  | 14-Oct-99     | 23.3                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB003  | 14-Oct-99     | 23.5                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB004  | 13-Oct-99     | 39.2                  | =         |                                        |                                      |                  |                                         |
|                  | F613SB005  | 13-Oct-99     | 34                    | =         |                                        |                                      |                  |                                         |
|                  | F613SB006  | 13-Oct-99     | 22.7                  | =         |                                        |                                      |                  |                                         |
|                  | F613SB007  | 13-Oct-99     | 10.3                  | =         |                                        |                                      |                  |                                         |
|                  | F613SB008  | 13-Oct-99     | 14.6                  | =         |                                        |                                      |                  |                                         |
|                  | F613SB009  | 13-Oct-99     | 28                    | =         |                                        |                                      |                  |                                         |
|                  | F613SB010  | 13-Oct-99     | 33.4                  | =         |                                        |                                      |                  |                                         |
|                  | F613SB011  | 15-Oct-99     | 43.7                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB012  | 14-Oct-99     | 22.1                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB013  | 14-Oct-99     | 23.5                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB014  | 13-Oct-99     | 23.4                  | =         |                                        |                                      |                  |                                         |
|                  | F613SB016  | 13-Oct-99     | 8.7                   | =         |                                        |                                      |                  |                                         |
|                  | F613SB017  | 16-Nov-99     | 47                    | J         |                                        |                                      |                  |                                         |
|                  | F613SB018  | 16-Nov-99     | 39.2                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB019  | 13-Oct-99     | 136                   | J         |                                        |                                      |                  |                                         |
|                  | F613SB020  | 13-Oct-99     | 31.7                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB021  | 13-Oct-99     | 11.2                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB022  | 13-Oct-99     | 30                    | J         |                                        |                                      |                  |                                         |
|                  | F613SB023  | 16-Nov-99     | 18.5                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB024  | 16-Nov-99     | 30.2                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB025  | 16-Nov-99     | 31.4                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB026  | 16-Nov-99     | 34.4                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB027  | 16-Nov-99     | 47.1                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB028  | 16-Nov-99     | 50.6                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB029  | 01-Dec-99     | 5.5                   | =         |                                        |                                      |                  |                                         |
|                  | F613SB030  | 01-Dec-99     | 32.6                  | =         |                                        |                                      |                  |                                         |
|                  | F613SP022  | 13-Oct-99     | 10.1                  | =         |                                        |                                      |                  |                                         |
| F613SP027        | 14-Oct-99  | 45            | J                     |           |                                        |                                      |                  |                                         |
| F613SP051        | 15-Oct-99  | 34.7          | J                     |           |                                        |                                      |                  |                                         |
| Cobalt           | F613SB001  | 13-Oct-99     | 15                    | J         | 470                                    | 12,000                               | 1,000            | 0.35 - 111                              |
|                  | F613SB002  | 14-Oct-99     | 4.2                   | J         |                                        |                                      |                  |                                         |
|                  | F613SB003  | 14-Oct-99     | 4.2                   | J         |                                        |                                      |                  |                                         |
|                  | F613SB004  | 13-Oct-99     | 14.9                  | J         |                                        |                                      |                  |                                         |
|                  | F613SB005  | 13-Oct-99     | 6.8                   | J         |                                        |                                      |                  |                                         |
|                  | F613SB006  | 13-Oct-99     | 10.8                  | J         |                                        |                                      |                  |                                         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | Zones E/F |                               |       |            |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|-----------|-------------------------------|-------|------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |           | Background Range <sup>c</sup> |       |            |
| Cobalt    | F613SB007  | 13-Oct-99     | 3                     | J         | 470                       | 12,000                    | 1,000     | 0.35 - 111                    |       |            |
|           | F613SB008  | 13-Oct-99     | 2.6                   | J         |                           |                           |           |                               |       |            |
|           | F613SB009  | 13-Oct-99     | 4.5                   | J         |                           |                           |           |                               |       |            |
|           | F613SB010  | 13-Oct-99     | 4                     | J         |                           |                           |           |                               |       |            |
|           | F613SB011  | 15-Oct-99     | 6                     | =         |                           |                           |           |                               |       |            |
|           | F613SB012  | 14-Oct-99     | 2.4                   | J         |                           |                           |           |                               |       |            |
|           | F613SB013  | 14-Oct-99     | 7.6                   | J         |                           |                           |           |                               |       |            |
|           | F613SB014  | 13-Oct-99     | 3.5                   | J         |                           |                           |           |                               |       |            |
|           | F613SB016  | 13-Oct-99     | 5.3                   | =         |                           |                           |           |                               |       |            |
|           | F613SB017  | 16-Nov-99     | 9.9                   | J         |                           |                           |           |                               |       |            |
|           | F613SB018  | 16-Nov-99     | 8.5                   | J         |                           |                           |           |                               |       |            |
|           | F613SB019  | 13-Oct-99     | 5.7                   | =         |                           |                           |           |                               |       |            |
|           | F613SB020  | 13-Oct-99     | 5.5                   | =         |                           |                           |           |                               |       |            |
|           | F613SB021  | 13-Oct-99     | 4.3                   | =         |                           |                           |           |                               |       |            |
|           | F613SB022  | 13-Oct-99     | 11.1                  | =         |                           |                           |           |                               |       |            |
|           | F613SB023  | 16-Nov-99     | 4                     | J         |                           |                           |           |                               |       |            |
|           | F613SB024  | 16-Nov-99     | 6.1                   | J         |                           |                           |           |                               |       |            |
|           | F613SB025  | 16-Nov-99     | 6.2                   | J         |                           |                           |           |                               |       |            |
|           | F613SB026  | 16-Nov-99     | 7.8                   | J         |                           |                           |           |                               |       |            |
|           | F613SB027  | 16-Nov-99     | 9.8                   | J         |                           |                           |           |                               |       |            |
|           | F613SB028  | 16-Nov-99     | 10.5                  | J         |                           |                           |           |                               |       |            |
|           | F613SB029  | 01-Dec-99     | 1.3                   | J         |                           |                           |           |                               |       |            |
|           | F613SB030  | 01-Dec-99     | 5                     | J         |                           |                           |           |                               |       |            |
|           | F613SP022  | 13-Oct-99     | 4.9                   | J         |                           |                           |           |                               |       |            |
|           | F613SP027  | 14-Oct-99     | 17.3                  | =         |                           |                           |           |                               |       |            |
|           | F613SP051  | 15-Oct-99     | 8                     | =         |                           |                           |           |                               |       |            |
|           | Copper     | F613SB001     | 13-Oct-99             | 24.6      | J                         | 310                       | 8,200     |                               | 5,300 | 0.47 - 866 |
|           |            | F613SB002     | 14-Oct-99             | 104       | J                         |                           |           |                               |       |            |
|           |            | F613SB003     | 14-Oct-99             | 9.7       | J                         |                           |           |                               |       |            |
|           |            | F613SB004     | 13-Oct-99             | 39.7      | J                         |                           |           |                               |       |            |
| F613SB005 |            | 13-Oct-99     | 25.5                  | J         |                           |                           |           |                               |       |            |
| F613SB006 |            | 13-Oct-99     | 4.8                   | J         |                           |                           |           |                               |       |            |
| F613SB007 |            | 13-Oct-99     | 5.8                   | J         |                           |                           |           |                               |       |            |
| F613SB008 |            | 13-Oct-99     | 9.5                   | J         |                           |                           |           |                               |       |            |
| F613SB009 |            | 13-Oct-99     | 19.9                  | J         |                           |                           |           |                               |       |            |
| F613SB010 |            | 13-Oct-99     | 18.2                  | J         |                           |                           |           |                               |       |            |
| F613SB011 |            | 15-Oct-99     | 18.9                  | J         |                           |                           |           |                               |       |            |
| F613SB012 |            | 14-Oct-99     | 7.4                   | J         |                           |                           |           |                               |       |            |
| F613SB013 |            | 14-Oct-99     | 35.5                  | J         |                           |                           |           |                               |       |            |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|------------------|-----------------------------------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |                  |                                         |
| Copper    | F613SB014  | 13-Oct-99     | 80.1                  | J         | 310                       | 8,200                     | 5,300            | 0.47 - 866                              |
|           | F613SB016  | 13-Oct-99     | 7.8                   | =         |                           |                           |                  |                                         |
|           | F613SB017  | 16-Nov-99     | 33.9                  | =         |                           |                           |                  |                                         |
|           | F613SB018  | 16-Nov-99     | 25.6                  | =         |                           |                           |                  |                                         |
|           | F613SB019  | 13-Oct-99     | 48.4                  | J         |                           |                           |                  |                                         |
|           | F613SB020  | 13-Oct-99     | 20.4                  | J         |                           |                           |                  |                                         |
|           | F613SB021  | 13-Oct-99     | 4.2                   | J         |                           |                           |                  |                                         |
|           | F613SB022  | 13-Oct-99     | 195                   | J         |                           |                           |                  |                                         |
|           | F613SB023  | 16-Nov-99     | 30.5                  | =         |                           |                           |                  |                                         |
|           | F613SB024  | 16-Nov-99     | 31.3                  | =         |                           |                           |                  |                                         |
|           | F613SB025  | 16-Nov-99     | 39.2                  | J         |                           |                           |                  |                                         |
|           | F613SB026  | 16-Nov-99     | 26.9                  | J         |                           |                           |                  |                                         |
|           | F613SB027  | 16-Nov-99     | 31.6                  | J         |                           |                           |                  |                                         |
|           | F613SB028  | 16-Nov-99     | 40.7                  | J         |                           |                           |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 1.7                   | J         |                           |                           |                  |                                         |
|           | F613SB030  | 01-Dec-99     | 43.4                  | =         |                           |                           |                  |                                         |
|           | F613SP022  | 13-Oct-99     | 10.1                  | J         |                           |                           |                  |                                         |
|           | F613SP027  | 14-Oct-99     | 325                   | =         |                           |                           |                  |                                         |
|           | F613SP051  | 15-Oct-99     | 22.5                  | J         |                           |                           |                  |                                         |
|           | Iron       | F613SB001     | 13-Oct-99             | 6,750     | =                         | 2,300                     | 61,000           | NL                                      |
| F613SB002 |            | 14-Oct-99     | 7,670                 | J         |                           |                           |                  |                                         |
| F613SB003 |            | 14-Oct-99     | 15,200                | J         |                           |                           |                  |                                         |
| F613SB004 |            | 13-Oct-99     | 19,700                | =         |                           |                           |                  |                                         |
| F613SB005 |            | 13-Oct-99     | 20,900                | =         |                           |                           |                  |                                         |
| F613SB006 |            | 13-Oct-99     | 12,400                | =         |                           |                           |                  |                                         |
| F613SB007 |            | 13-Oct-99     | 3,710                 | =         |                           |                           |                  |                                         |
| F613SB008 |            | 13-Oct-99     | 9,590                 | =         |                           |                           |                  |                                         |
| F613SB009 |            | 13-Oct-99     | 15,800                | =         |                           |                           |                  |                                         |
| F613SB010 |            | 13-Oct-99     | 10,100                | =         |                           |                           |                  |                                         |
| F613SB011 |            | 15-Oct-99     | 17,700                | J         |                           |                           |                  |                                         |
| F613SB012 |            | 14-Oct-99     | 7,980                 | J         |                           |                           |                  |                                         |
| F613SB013 |            | 14-Oct-99     | 16,900                | J         |                           |                           |                  |                                         |
| F613SB014 |            | 13-Oct-99     | 10,200                | =         |                           |                           |                  |                                         |
| F613SB016 |            | 13-Oct-99     | 4,360                 | =         |                           |                           |                  |                                         |
| F613SB017 |            | 16-Nov-99     | <b>31,000</b>         | J         |                           |                           |                  |                                         |
| F613SB018 |            | 16-Nov-99     | 30,600                | J         |                           |                           |                  |                                         |
| F613SB019 |            | 13-Oct-99     | 13,600                | J         |                           |                           |                  |                                         |
| F613SB020 |            | 13-Oct-99     | 7,710                 | J         |                           |                           |                  |                                         |
| F613SB021 |            | 13-Oct-99     | 8,970                 | J         |                           |                           |                  |                                         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |         |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|------------------|-----------------------------------------|---------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |                  |                                         |         |
| Iron      | F613SB022  | 13-Oct-99     | 10,000                | J         | 2,300                     | 61,000                    | NL               | 1,050 - 30,600                          |         |
|           | F613SB023  | 16-Nov-99     | 16,000                | J         |                           |                           |                  |                                         |         |
|           | F613SB024  | 16-Nov-99     | 20,700                | J         |                           |                           |                  |                                         |         |
|           | F613SB025  | 16-Nov-99     | 18,200                | J         |                           |                           |                  |                                         |         |
|           | F613SB026  | 16-Nov-99     | 25,700                | J         |                           |                           |                  |                                         |         |
|           | F613SB027  | 16-Nov-99     | 35,000                | J         |                           |                           |                  |                                         |         |
|           | F613SB028  | 16-Nov-99     | 39,600                | J         |                           |                           |                  |                                         |         |
|           | F613SB029  | 01-Dec-99     | 2,250                 | J         |                           |                           |                  |                                         |         |
|           | F613SB030  | 01-Dec-99     | 22,700                | J         |                           |                           |                  |                                         |         |
|           | F613SP022  | 13-Oct-99     | 5,720                 | =         |                           |                           |                  |                                         |         |
|           | F613SP027  | 14-Oct-99     | 15,400                | =         |                           |                           |                  |                                         |         |
|           | F613SP051  | 15-Oct-99     | 21,900                | J         |                           |                           |                  |                                         |         |
|           | Lead       | F613SP022     | 13-Oct-99             | 13.1      | J                         | 400 *                     | 1,000 *          | 400                                     | 1 - 400 |
|           |            | F613SP027     | 14-Oct-99             | 395       | =                         |                           |                  |                                         |         |
| F613SP051 |            | 15-Oct-99     | 33.8                  | J         |                           |                           |                  |                                         |         |
| F175SB035 |            | 07-Jun-01     | 55                    | =         |                           |                           |                  |                                         |         |
| F175SB036 |            | 07-Jun-01     | 246                   | =         |                           |                           |                  |                                         |         |
| F613SB001 |            | 13-Oct-99     | 36.2                  | J         |                           |                           |                  |                                         |         |
| F613SB002 |            | 14-Oct-99     | 3,980                 | J         |                           |                           |                  |                                         |         |
| F613SB003 |            | 14-Oct-99     | 37.3                  | J         |                           |                           |                  |                                         |         |
| F613SB004 |            | 13-Oct-99     | 65.7                  | J         |                           |                           |                  |                                         |         |
| F613SB005 |            | 13-Oct-99     | 49.5                  | J         |                           |                           |                  |                                         |         |
| F613SB006 |            | 13-Oct-99     | 20.1                  | J         |                           |                           |                  |                                         |         |
| F613SB007 |            | 13-Oct-99     | 13.9                  | J         |                           |                           |                  |                                         |         |
| F613SB008 |            | 13-Oct-99     | 58.1                  | J         |                           |                           |                  |                                         |         |
| F613SB009 |            | 13-Oct-99     | 32.6                  | J         |                           |                           |                  |                                         |         |
| F613SB010 |            | 13-Oct-99     | 32.2                  | J         |                           |                           |                  |                                         |         |
| F613SB011 |            | 15-Oct-99     | 56.3                  | J         |                           |                           |                  |                                         |         |
| F613SB012 |            | 14-Oct-99     | 25.9                  | J         |                           |                           |                  |                                         |         |
| F613SB013 |            | 14-Oct-99     | 99.3                  | J         |                           |                           |                  |                                         |         |
| F613SB014 |            | 13-Oct-99     | 277                   | J         |                           |                           |                  |                                         |         |
| F613SB016 |            | 13-Oct-99     | 9.2                   | =         |                           |                           |                  |                                         |         |
| F613SB017 |            | 16-Nov-99     | 56.8                  | J         |                           |                           |                  |                                         |         |
| F613SB018 |            | 16-Nov-99     | 37.8                  | J         |                           |                           |                  |                                         |         |
| F613SB019 |            | 13-Oct-99     | 76.9                  | J         |                           |                           |                  |                                         |         |
| F613SB020 | 13-Oct-99  | 87.7          | J                     |           |                           |                           |                  |                                         |         |
| F613SB021 | 13-Oct-99  | 9.2           | J                     |           |                           |                           |                  |                                         |         |
| F613SB022 | 13-Oct-99  | 353           | J                     |           |                           |                           |                  |                                         |         |
| F613SB023 | 16-Nov-99  | 51.2          | J                     |           |                           |                           |                  |                                         |         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use | Industrial Land Use | Zones E/F Background Range <sup>c</sup> |                  |
|-----------|------------|---------------|-----------------------|-----------|-----------------------|---------------------|-----------------------------------------|------------------|
|           |            |               |                       |           | RBC <sup>a</sup>      | RBC <sup>a</sup>    |                                         | SSL <sup>b</sup> |
| Lead      | F613SB024  | 16-Nov-99     | 92.6                  | J         | 400 *                 | 1,000 *             | 400                                     | 1 - 400          |
|           | F613SB025  | 16-Nov-99     | 81                    | J         |                       |                     |                                         |                  |
|           | F613SB026  | 16-Nov-99     | 52.6                  | J         |                       |                     |                                         |                  |
|           | F613SB027  | 16-Nov-99     | 47.5                  | J         |                       |                     |                                         |                  |
|           | F613SB028  | 16-Nov-99     | 64.4                  | J         |                       |                     |                                         |                  |
|           | F613SB029  | 01-Dec-99     | 5.7                   | J         |                       |                     |                                         |                  |
|           | F613SB030  | 01-Dec-99     | 28.8                  | J         |                       |                     |                                         |                  |
| Magnesium | F613SB001  | 13-Oct-99     | 363                   | J         | NL                    | NL                  | NL                                      | 31 - 14,800      |
|           | F613SB002  | 14-Oct-99     | 3,410                 | J         |                       |                     |                                         |                  |
|           | F613SB003  | 14-Oct-99     | 1,520                 | J         |                       |                     |                                         |                  |
|           | F613SB004  | 13-Oct-99     | 4,680                 | =         |                       |                     |                                         |                  |
|           | F613SB005  | 13-Oct-99     | 4,150                 | =         |                       |                     |                                         |                  |
|           | F613SB006  | 13-Oct-99     | 681                   | =         |                       |                     |                                         |                  |
|           | F613SB007  | 13-Oct-99     | 2,720                 | =         |                       |                     |                                         |                  |
|           | F613SB008  | 13-Oct-99     | 1,290                 | =         |                       |                     |                                         |                  |
|           | F613SB009  | 13-Oct-99     | 3,200                 | =         |                       |                     |                                         |                  |
|           | F613SB010  | 13-Oct-99     | 977                   | =         |                       |                     |                                         |                  |
|           | F613SB011  | 15-Oct-99     | 2,310                 | J         |                       |                     |                                         |                  |
|           | F613SB012  | 14-Oct-99     | 951                   | J         |                       |                     |                                         |                  |
|           | F613SB013  | 14-Oct-99     | 1,680                 | J         |                       |                     |                                         |                  |
|           | F613SB014  | 13-Oct-99     | 890                   | =         |                       |                     |                                         |                  |
|           | F613SB016  | 13-Oct-99     | 6,340                 | =         |                       |                     |                                         |                  |
|           | F613SB017  | 16-Nov-99     | 4,130                 | J         |                       |                     |                                         |                  |
|           | F613SB018  | 16-Nov-99     | 2,880                 | J         |                       |                     |                                         |                  |
|           | F613SB019  | 13-Oct-99     | 452                   | J         |                       |                     |                                         |                  |
|           | F613SB020  | 13-Oct-99     | 3,440                 | J         |                       |                     |                                         |                  |
|           | F613SB021  | 13-Oct-99     | 611                   | J         |                       |                     |                                         |                  |
|           | F613SB022  | 13-Oct-99     | 1,220                 | J         |                       |                     |                                         |                  |
|           | F613SB023  | 16-Nov-99     | 1,510                 | J         |                       |                     |                                         |                  |
|           | F613SB024  | 16-Nov-99     | 2,560                 | J         |                       |                     |                                         |                  |
|           | F613SB025  | 16-Nov-99     | 2,100                 | J         |                       |                     |                                         |                  |
|           | F613SB026  | 16-Nov-99     | 2,710                 | J         |                       |                     |                                         |                  |
|           | F613SB027  | 16-Nov-99     | 4,640                 | J         |                       |                     |                                         |                  |
|           | F613SB028  | 16-Nov-99     | 4,210                 | J         |                       |                     |                                         |                  |
|           | F613SB029  | 01-Dec-99     | 556                   | J         |                       |                     |                                         |                  |
|           | F613SB030  | 01-Dec-99     | 1,970                 | J         |                       |                     |                                         |                  |
|           | F613SP022  | 13-Oct-99     | 2,320                 | =         |                       |                     |                                         |                  |
| F613SP027 | 14-Oct-99  | 909           | J                     |           |                       |                     |                                         |                  |
| F613SP051 | 15-Oct-99  | 3,440         | J                     |           |                       |                     |                                         |                  |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | Zones E/F |                               |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|-----------|-------------------------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |           | Background Range <sup>c</sup> |
| Manganese | F613SB001  | 13-Oct-99     | 39.6                  | =         | 160                       | 4,100                     | 480       | 0.93 - 508                    |
|           | F613SB002  | 14-Oct-99     | 82.2                  | J         |                           |                           |           |                               |
|           | F613SB003  | 14-Oct-99     | 61                    | J         |                           |                           |           |                               |
|           | F613SB004  | 13-Oct-99     | 268                   | =         |                           |                           |           |                               |
|           | F613SB005  | 13-Oct-99     | 326                   | =         |                           |                           |           |                               |
|           | F613SB006  | 13-Oct-99     | 57.9                  | =         |                           |                           |           |                               |
|           | F613SB007  | 13-Oct-99     | 224                   | =         |                           |                           |           |                               |
|           | F613SB008  | 13-Oct-99     | 112                   | =         |                           |                           |           |                               |
|           | F613SB009  | 13-Oct-99     | 403                   | =         |                           |                           |           |                               |
|           | F613SB010  | 13-Oct-99     | 61.2                  | =         |                           |                           |           |                               |
|           | F613SB011  | 15-Oct-99     | 164                   | J         |                           |                           |           |                               |
|           | F613SB012  | 14-Oct-99     | 104                   | J         |                           |                           |           |                               |
|           | F613SB013  | 14-Oct-99     | 161                   | J         |                           |                           |           |                               |
|           | F613SB014  | 13-Oct-99     | 83.8                  | =         |                           |                           |           |                               |
|           | F613SB016  | 13-Oct-99     | 264                   | =         |                           |                           |           |                               |
|           | F613SB017  | 16-Nov-99     | 539                   | J         |                           |                           |           |                               |
|           | F613SB018  | 16-Nov-99     | 255                   | J         |                           |                           |           |                               |
|           | F613SB019  | 13-Oct-99     | 152                   | J         |                           |                           |           |                               |
|           | F613SB020  | 13-Oct-99     | 419                   | J         |                           |                           |           |                               |
|           | F613SB021  | 13-Oct-99     | 43.6                  | J         |                           |                           |           |                               |
|           | F613SB022  | 13-Oct-99     | 128                   | J         |                           |                           |           |                               |
|           | F613SB023  | 16-Nov-99     | 240                   | J         |                           |                           |           |                               |
|           | F613SB024  | 16-Nov-99     | 234                   | J         |                           |                           |           |                               |
|           | F613SB025  | 16-Nov-99     | 223                   | J         |                           |                           |           |                               |
|           | F613SB026  | 16-Nov-99     | 263                   | J         |                           |                           |           |                               |
|           | F613SB027  | 16-Nov-99     | 350                   | J         |                           |                           |           |                               |
|           | F613SB028  | 16-Nov-99     | 467                   | J         |                           |                           |           |                               |
|           | F613SB029  | 01-Dec-99     | 39.5                  | J         |                           |                           |           |                               |
|           | F613SB030  | 01-Dec-99     | 167                   | J         |                           |                           |           |                               |
|           | F613SP022  | 13-Oct-99     | 153                   | =         |                           |                           |           |                               |
| F613SP027 | 14-Oct-99  | 149           | =                     |           |                           |                           |           |                               |
| F613SP051 | 15-Oct-99  | 206           | J                     |           |                           |                           |           |                               |
| Mercury   | F613SB001  | 13-Oct-99     | 0.05                  | =         | 2.3                       | 61                        | 1         | 0.03 - 2.7                    |
|           | F613SB002  | 14-Oct-99     | 0.12                  | =         |                           |                           |           |                               |
|           | F613SB003  | 14-Oct-99     | 0.17                  | =         |                           |                           |           |                               |
|           | F613SB004  | 13-Oct-99     | 0.22                  | =         |                           |                           |           |                               |
|           | F613SB005  | 13-Oct-99     | 0.26                  | =         |                           |                           |           |                               |
|           | F613SB006  | 13-Oct-99     | 0.09                  | =         |                           |                           |           |                               |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |            |
|-----------|------------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-----------------------------------------|------------|
| Mercury   | F613SB008  | 13-Oct-99     | 0.28                  | =         | 2.3                                    | 61                                   | 1                | 0.03 - 2.7                              |            |
|           | F613SB009  | 13-Oct-99     | 0.1                   | =         |                                        |                                      |                  |                                         |            |
|           | F613SB010  | 13-Oct-99     | 0.13                  | =         |                                        |                                      |                  |                                         |            |
|           | F613SB011  | 15-Oct-99     | 0.18                  | =         |                                        |                                      |                  |                                         |            |
|           | F613SB012  | 14-Oct-99     | 0.12                  | =         |                                        |                                      |                  |                                         |            |
|           | F613SB013  | 14-Oct-99     | 0.32                  | =         |                                        |                                      |                  |                                         |            |
|           | F613SB014  | 13-Oct-99     | 0.43                  | =         |                                        |                                      |                  |                                         |            |
|           | F613SB017  | 16-Nov-99     | 0.3                   | =         |                                        |                                      |                  |                                         |            |
|           | F613SB018  | 16-Nov-99     | 0.3                   | =         |                                        |                                      |                  |                                         |            |
|           | F613SB019  | 13-Oct-99     | 0.64                  | J         |                                        |                                      |                  |                                         |            |
|           | F613SB020  | 13-Oct-99     | 0.08                  | J         |                                        |                                      |                  |                                         |            |
|           | F613SB021  | 13-Oct-99     | 0.05                  | J         |                                        |                                      |                  |                                         |            |
|           | F613SB022  | 13-Oct-99     | 0.31                  | J         |                                        |                                      |                  |                                         |            |
|           | F613SB023  | 16-Nov-99     | 0.3                   | =         |                                        |                                      |                  |                                         |            |
|           | F613SB024  | 16-Nov-99     | 0.64                  | =         |                                        |                                      |                  |                                         |            |
|           | F613SB025  | 16-Nov-99     | 0.63                  | J         |                                        |                                      |                  |                                         |            |
|           | F613SB026  | 16-Nov-99     | 0.28                  | J         |                                        |                                      |                  |                                         |            |
|           | F613SB027  | 16-Nov-99     | 0.34                  | J         |                                        |                                      |                  |                                         |            |
|           | F613SB028  | 16-Nov-99     | 0.5                   | J         |                                        |                                      |                  |                                         |            |
|           | F613SB030  | 01-Dec-99     | 0.17                  | =         |                                        |                                      |                  |                                         |            |
|           | F613SP022  | 13-Oct-99     | 0.06                  | =         |                                        |                                      |                  |                                         |            |
|           | F613SP027  | 14-Oct-99     | 1.1                   | =         |                                        |                                      |                  |                                         |            |
|           | F613SP051  | 15-Oct-99     | 0.09                  | =         |                                        |                                      |                  |                                         |            |
|           | Nickel     | F613SB001     | 13-Oct-99             | 5.5       | =                                      | 160                                  | 4,100            | 65                                      | 0.6 - 71.5 |
|           |            | F613SB002     | 14-Oct-99             | 11.4      | J                                      |                                      |                  |                                         |            |
|           |            | F613SB003     | 14-Oct-99             | 7.6       | J                                      |                                      |                  |                                         |            |
|           |            | F613SB004     | 13-Oct-99             | 21        | =                                      |                                      |                  |                                         |            |
| F613SB005 |            | 13-Oct-99     | 17.6                  | =         |                                        |                                      |                  |                                         |            |
| F613SB006 |            | 13-Oct-99     | 4.9                   | =         |                                        |                                      |                  |                                         |            |
| F613SB007 |            | 13-Oct-99     | 9.7                   | =         |                                        |                                      |                  |                                         |            |
| F613SB008 |            | 13-Oct-99     | 5.2                   | =         |                                        |                                      |                  |                                         |            |
| F613SB009 |            | 13-Oct-99     | 11.6                  | =         |                                        |                                      |                  |                                         |            |
| F613SB010 |            | 13-Oct-99     | 8.8                   | =         |                                        |                                      |                  |                                         |            |
| F613SB011 |            | 15-Oct-99     | 10.3                  | J         |                                        |                                      |                  |                                         |            |
| F613SB012 |            | 14-Oct-99     | 4.1                   | J         |                                        |                                      |                  |                                         |            |
| F613SB013 |            | 14-Oct-99     | 19.6                  | J         |                                        |                                      |                  |                                         |            |
| F613SB014 |            | 13-Oct-99     | 10.3                  | =         |                                        |                                      |                  |                                         |            |
| F613SB016 |            | 13-Oct-99     | 13                    | =         |                                        |                                      |                  |                                         |            |
| F613SB017 |            | 16-Nov-99     | 16.8                  | J         |                                        |                                      |                  |                                         |            |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date          | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|------------------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-----------------------------------------|
| Nickel    | F613SB018  | 16-Nov-99              | 14.3                  | J         | 160                                    | 4,100                                | 65               | 0.6 - 71.5                              |
|           | F613SB019  | 13-Oct-99              | 48.4                  | J         |                                        |                                      |                  |                                         |
|           | F613SB020  | 13-Oct-99              | 36.1                  | J         |                                        |                                      |                  |                                         |
|           | F613SB021  | 13-Oct-99              | 3.3                   | J         |                                        |                                      |                  |                                         |
|           | F613SB022  | 13-Oct-99              | 39.7                  | J         |                                        |                                      |                  |                                         |
|           | F613SB023  | 16-Nov-99              | 7.8                   | J         |                                        |                                      |                  |                                         |
|           | F613SB024  | 16-Nov-99              | 10.6                  | J         |                                        |                                      |                  |                                         |
|           | F613SB025  | 16-Nov-99              | 15.3                  | J         |                                        |                                      |                  |                                         |
|           | F613SB026  | 16-Nov-99              | 13                    | J         |                                        |                                      |                  |                                         |
|           | F613SB027  | 16-Nov-99              | 16.4                  | J         |                                        |                                      |                  |                                         |
|           | F613SB028  | 16-Nov-99              | 17.9                  | J         |                                        |                                      |                  |                                         |
|           | F613SB029  | 01-Dec-99              | 2.4                   | J         |                                        |                                      |                  |                                         |
|           | F613SB030  | 01-Dec-99              | 9.2                   | J         |                                        |                                      |                  |                                         |
|           | F613SP022  | 13-Oct-99              | 9.3                   | =         |                                        |                                      |                  |                                         |
|           | F613SP027  | 14-Oct-99              | 79.1                  | =         |                                        |                                      |                  |                                         |
|           | F613SP051  | 15-Oct-99              | 13.4                  | J         |                                        |                                      |                  |                                         |
| Potassium | F613SB001  | 13-Oct-99              | 243                   | J         | NL                                     | NL                                   | NL               | 45.6 - 2,620                            |
|           | F613SB002  | 14-Oct-99              | 1,070                 | J         |                                        |                                      |                  |                                         |
|           | F613SB003  | 14-Oct-99              | 888                   | J         |                                        |                                      |                  |                                         |
|           | F613SB004  | 13-Oct-99              | 1,830                 | J         |                                        |                                      |                  |                                         |
|           | F613SB005  | 13-Oct-99              | 2,470                 | J         |                                        |                                      |                  |                                         |
|           | F613SB006  | 13-Oct-99              | 333                   | J         |                                        |                                      |                  |                                         |
|           | F613SB007  | 13-Oct-99              | 884                   | J         |                                        |                                      |                  |                                         |
|           | F613SB008  | 13-Oct-99              | 699                   | J         |                                        |                                      |                  |                                         |
|           | F613SB009  | 13-Oct-99              | 1,600                 | J         |                                        |                                      |                  |                                         |
|           | F613SB010  | 13-Oct-99              | 620                   | J         |                                        |                                      |                  |                                         |
|           | F613SB011  | 15-Oct-99              | 1,370                 | J         |                                        |                                      |                  |                                         |
|           | F613SB012  | 14-Oct-99              | 535                   | J         |                                        |                                      |                  |                                         |
|           | F613SB013  | 14-Oct-99              | 1,140                 | J         |                                        |                                      |                  |                                         |
|           | F613SB014  | 13-Oct-99              | 517                   | J         |                                        |                                      |                  |                                         |
|           | F613SB016  | 13-Oct-99              | 1,430                 | J         |                                        |                                      |                  |                                         |
|           | F613SB017  | 16-Nov-99              | 3,310                 | =         |                                        |                                      |                  |                                         |
|           | F613SB018  | 16-Nov-99              | 2,240                 | =         |                                        |                                      |                  |                                         |
|           | F613SB019  | 13-Oct-99              | 327                   | J         |                                        |                                      |                  |                                         |
|           | F613SB020  | 13-Oct-99 <sup>o</sup> | 1,280                 | J         |                                        |                                      |                  |                                         |
|           | F613SB021  | 13-Oct-99              | 401                   | J         |                                        |                                      |                  |                                         |
|           | F613SB022  | 13-Oct-99              | 570                   | J         |                                        |                                      |                  |                                         |
|           | F613SB023  | 16-Nov-99              | 866                   | =         |                                        |                                      |                  |                                         |
|           | F613SB024  | 16-Nov-99              | 1,680                 | =         |                                        |                                      |                  |                                         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted              | Industrial                | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|---------------|-----------------------|-----------|---------------------------|---------------------------|------------------|-----------------------------------------|
|           |            |               |                       |           | Land Use RBC <sup>a</sup> | Land Use RBC <sup>a</sup> |                  |                                         |
| Potassium | F613SB025  | 16-Nov-99     | 1,220                 | J         | NL                        | NL                        | NL               | 45.6 - 2,620                            |
|           | F613SB026  | 16-Nov-99     | 1,830                 | J         |                           |                           |                  |                                         |
|           | F613SB027  | 16-Nov-99     | 2,720                 | J         |                           |                           |                  |                                         |
|           | F613SB028  | 16-Nov-99     | 2,480                 | J         |                           |                           |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 173                   | J         |                           |                           |                  |                                         |
|           | F613SB030  | 01-Dec-99     | 1,180                 | =         |                           |                           |                  |                                         |
|           | F613SP022  | 13-Oct-99     | 839                   | J         |                           |                           |                  |                                         |
|           | F613SP027  | 14-Oct-99     | 612                   | J         |                           |                           |                  |                                         |
|           | F613SP051  | 15-Oct-99     | 2,260                 | J         |                           |                           |                  |                                         |
| Selenium  | F613SB001  | 13-Oct-99     | 0.97                  | J         | 39                        | 1,022                     | 2.5              | 0.44 - 4                                |
|           | F613SB002  | 14-Oct-99     | 0.9                   | =         |                           |                           |                  |                                         |
|           | F613SB003  | 14-Oct-99     | 1.3                   | =         |                           |                           |                  |                                         |
|           | F613SB004  | 13-Oct-99     | 1.4                   | =         |                           |                           |                  |                                         |
|           | F613SB005  | 13-Oct-99     | 1.3                   | J         |                           |                           |                  |                                         |
|           | F613SB006  | 13-Oct-99     | 1.1                   | =         |                           |                           |                  |                                         |
|           | F613SB008  | 13-Oct-99     | 0.82                  | J         |                           |                           |                  |                                         |
|           | F613SB009  | 13-Oct-99     | 1.2                   | =         |                           |                           |                  |                                         |
|           | F613SB010  | 13-Oct-99     | 1.2                   | =         |                           |                           |                  |                                         |
|           | F613SB011  | 15-Oct-99     | 1.3                   | =         |                           |                           |                  |                                         |
|           | F613SB012  | 14-Oct-99     | 1                     | =         |                           |                           |                  |                                         |
|           | F613SB013  | 14-Oct-99     | 1.4                   | =         |                           |                           |                  |                                         |
|           | F613SB014  | 13-Oct-99     | 0.61                  | J         |                           |                           |                  |                                         |
|           | F613SB016  | 13-Oct-99     | 0.24                  | J         |                           |                           |                  |                                         |
|           | F613SB017  | 16-Nov-99     | 1.8                   | J         |                           |                           |                  |                                         |
|           | F613SB018  | 16-Nov-99     | 2                     | J         |                           |                           |                  |                                         |
|           | F613SB023  | 16-Nov-99     | 1.2                   | J         |                           |                           |                  |                                         |
|           | F613SB024  | 16-Nov-99     | 1.2                   | J         |                           |                           |                  |                                         |
|           | F613SB025  | 16-Nov-99     | 1.7                   | J         |                           |                           |                  |                                         |
|           | F613SB026  | 16-Nov-99     | 1.7                   | J         |                           |                           |                  |                                         |
|           | F613SB027  | 16-Nov-99     | 1.7                   | J         |                           |                           |                  |                                         |
|           | F613SB028  | 16-Nov-99     | 2.3                   | J         |                           |                           |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 0.27                  | J         |                           |                           |                  |                                         |
|           | F613SB030  | 01-Dec-99     | 1.9                   | J         |                           |                           |                  |                                         |
|           | F613SP022  | 13-Oct-99     | 0.22                  | J         |                           |                           |                  |                                         |
|           | F613SP027  | 14-Oct-99     | 1.6                   | =         |                           |                           |                  |                                         |
|           | F613SP051  | 15-Oct-99     | 2                     | =         |                           |                           |                  |                                         |
| Silver    | F613SB001  | 13-Oct-99     | 2.1                   | J         | 39                        | 1,000                     | 17               | 0.75 - 5                                |
|           | F613SB002  | 14-Oct-99     | 0.05                  | J         |                           |                           |                  |                                         |

**TABLE 4-1**  
**Metals Detected in Surface Soil in RFI Addendum Samples**  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-----------------------------------------|
| Silver    | F613SB019  | 13-Oct-99     | 1.2                   | =         | 39                                     | 1,000                                | 17               | 0.75 - 5                                |
|           | F613SB022  | 13-Oct-99     | 0.3                   | J         |                                        |                                      |                  |                                         |
|           | F613SP027  | 14-Oct-99     | 0.12                  | J         |                                        |                                      |                  |                                         |
| Sodium    | F613SB001  | 13-Oct-99     | 95.7                  | J         | NL                                     | NL                                   | NL               | 11.9 - 28,200                           |
|           | F613SB002  | 14-Oct-99     | 1,180                 | =         |                                        |                                      |                  |                                         |
|           | F613SB003  | 14-Oct-99     | 417                   | J         |                                        |                                      |                  |                                         |
|           | F613SB004  | 13-Oct-99     | 1,460                 | =         |                                        |                                      |                  |                                         |
|           | F613SB005  | 13-Oct-99     | 791                   | =         |                                        |                                      |                  |                                         |
|           | F613SB006  | 13-Oct-99     | 298                   | J         |                                        |                                      |                  |                                         |
|           | F613SB007  | 13-Oct-99     | 621                   | =         |                                        |                                      |                  |                                         |
|           | F613SB008  | 13-Oct-99     | 331                   | J         |                                        |                                      |                  |                                         |
|           | F613SB009  | 13-Oct-99     | 961                   | =         |                                        |                                      |                  |                                         |
|           | F613SB010  | 13-Oct-99     | 279                   | J         |                                        |                                      |                  |                                         |
|           | F613SB011  | 15-Oct-99     | 777                   | =         |                                        |                                      |                  |                                         |
|           | F613SB012  | 14-Oct-99     | 367                   | J         |                                        |                                      |                  |                                         |
|           | F613SB013  | 14-Oct-99     | 663                   | =         |                                        |                                      |                  |                                         |
|           | F613SB014  | 13-Oct-99     | 251                   | J         |                                        |                                      |                  |                                         |
|           | F613SB016  | 13-Oct-99     | 627                   | =         |                                        |                                      |                  |                                         |
|           | F613SB017  | 16-Nov-99     | 360                   | J         |                                        |                                      |                  |                                         |
|           | F613SB018  | 16-Nov-99     | 276                   | J         |                                        |                                      |                  |                                         |
|           | F613SB019  | 13-Oct-99     | 160                   | J         |                                        |                                      |                  |                                         |
|           | F613SB020  | 13-Oct-99     | 1,330                 | =         |                                        |                                      |                  |                                         |
|           | F613SB021  | 13-Oct-99     | 230                   | J         |                                        |                                      |                  |                                         |
|           | F613SB022  | 13-Oct-99     | 281                   | J         |                                        |                                      |                  |                                         |
|           | F613SB023  | 16-Nov-99     | 219                   | J         |                                        |                                      |                  |                                         |
|           | F613SB024  | 16-Nov-99     | 246                   | J         |                                        |                                      |                  |                                         |
|           | F613SB025  | 16-Nov-99     | 204                   | J         |                                        |                                      |                  |                                         |
|           | F613SB026  | 16-Nov-99     | 426                   | J         |                                        |                                      |                  |                                         |
|           | F613SB027  | 16-Nov-99     | 441                   | J         |                                        |                                      |                  |                                         |
|           | F613SB028  | 16-Nov-99     | 460                   | J         |                                        |                                      |                  |                                         |
| F613SB029 | 01-Dec-99  | 174           | J                     |           |                                        |                                      |                  |                                         |
| F613SB030 | 01-Dec-99  | 212           | J                     |           |                                        |                                      |                  |                                         |
| F613SP022 | 13-Oct-99  | 318           | J                     |           |                                        |                                      |                  |                                         |
| F613SP027 | 14-Oct-99  | 359           | J                     |           |                                        |                                      |                  |                                         |
| F613SP051 | 15-Oct-99  | 1,750         | =                     |           |                                        |                                      |                  |                                         |
| Thallium  | F613SB002  | 14-Oct-99     | 0.28                  | J         | 0.55                                   | 14                                   | 0.35             | 0.61 - 2.8                              |
|           | F613SB017  | 16-Nov-99     | 0.63                  | J         |                                        |                                      |                  |                                         |
|           | F613SB025  | 16-Nov-99     | 0.97                  | J         |                                        |                                      |                  |                                         |
|           | F613SB028  | 16-Nov-99     | 0.47                  | J         |                                        |                                      |                  |                                         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-----------------------------------------|
| Tin       | F613SB011  | 15-Oct-99     | 9.3                   | =         | NL                                     | NL                                   | NL               | 0.77 - 44.7                             |
|           | F613SB022  | 13-Oct-99     | 25                    | =         |                                        |                                      |                  |                                         |
|           | F613SP027  | 14-Oct-99     | 60.8                  | =         |                                        |                                      |                  |                                         |
| Vanadium  | F613SB001  | 13-Oct-99     | 15.4                  | =         | 55                                     | 1,400                                | 3,000            | 1.1 - 60.4                              |
|           | F613SB002  | 14-Oct-99     | 19.7                  | =         |                                        |                                      |                  |                                         |
|           | F613SB003  | 14-Oct-99     | 33.3                  | =         |                                        |                                      |                  |                                         |
|           | F613SB004  | 13-Oct-99     | 42.4                  | =         |                                        |                                      |                  |                                         |
|           | F613SB005  | 13-Oct-99     | 54.5                  | =         |                                        |                                      |                  |                                         |
|           | F613SB006  | 13-Oct-99     | 15.2                  | =         |                                        |                                      |                  |                                         |
|           | F613SB007  | 13-Oct-99     | 6.4                   | =         |                                        |                                      |                  |                                         |
|           | F613SB008  | 13-Oct-99     | 21.4                  | =         |                                        |                                      |                  |                                         |
|           | F613SB009  | 13-Oct-99     | 32.8                  | =         |                                        |                                      |                  |                                         |
|           | F613SB010  | 13-Oct-99     | 24.1                  | =         |                                        |                                      |                  |                                         |
|           | F613SB011  | 15-Oct-99     | 35                    | =         |                                        |                                      |                  |                                         |
|           | F613SB012  | 14-Oct-99     | 17.1                  | =         |                                        |                                      |                  |                                         |
|           | F613SB013  | 14-Oct-99     | 37.8                  | =         |                                        |                                      |                  |                                         |
|           | F613SB014  | 13-Oct-99     | 24.6                  | =         |                                        |                                      |                  |                                         |
|           | F613SB016  | 13-Oct-99     | 10                    | =         |                                        |                                      |                  |                                         |
|           | F613SB017  | 16-Nov-99     | <b>73.6</b>           | J         |                                        |                                      |                  |                                         |
|           | F613SB018  | 16-Nov-99     | <b>66</b>             | J         |                                        |                                      |                  |                                         |
|           | F613SB019  | 13-Oct-99     | 19.2                  | J         |                                        |                                      |                  |                                         |
|           | F613SB020  | 13-Oct-99     | 12.5                  | J         |                                        |                                      |                  |                                         |
|           | F613SB021  | 13-Oct-99     | 20.2                  | J         |                                        |                                      |                  |                                         |
|           | F613SB022  | 13-Oct-99     | 20.2                  | J         |                                        |                                      |                  |                                         |
|           | F613SB023  | 16-Nov-99     | 28.1                  | J         |                                        |                                      |                  |                                         |
|           | F613SB024  | 16-Nov-99     | 44.3                  | J         |                                        |                                      |                  |                                         |
|           | F613SB025  | 16-Nov-99     | 42.8                  | J         |                                        |                                      |                  |                                         |
|           | F613SB026  | 16-Nov-99     | 56.3                  | J         |                                        |                                      |                  |                                         |
|           | F613SB027  | 16-Nov-99     | <b>72.6</b>           | J         |                                        |                                      |                  |                                         |
|           | F613SB028  | 16-Nov-99     | <b>83.9</b>           | J         |                                        |                                      |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 5.7                   | =         |                                        |                                      |                  |                                         |
|           | F613SB030  | 01-Dec-99     | 53.6                  | =         |                                        |                                      |                  |                                         |
|           | F613SP022  | 13-Oct-99     | 14                    | =         |                                        |                                      |                  |                                         |
| F613SP027 | 14-Oct-99  | 24.1          | =                     |           |                                        |                                      |                  |                                         |
| F613SP051 | 15-Oct-99  | 52.2          | =                     |           |                                        |                                      |                  |                                         |
| Zinc      | F613SB001  | 13-Oct-99     | 104                   | J         | 2,300                                  | 61,000                               | 6,000            | 1.9 - 855                               |
|           | F613SB002  | 14-Oct-99     | 498                   | J         |                                        |                                      |                  |                                         |
|           | F613SB003  | 14-Oct-99     | 44.6                  | J         |                                        |                                      |                  |                                         |

**TABLE 4-1**

Metals Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Station ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use | Industrial Land Use | SSL <sup>b</sup> | Zones E/F Background Range <sup>c</sup> |
|-----------|------------|---------------|-----------------------|-----------|-----------------------|---------------------|------------------|-----------------------------------------|
|           |            |               |                       |           | RBC <sup>a</sup>      | RBC <sup>a</sup>    |                  |                                         |
| Zinc      | F613SB004  | 13-Oct-99     | 118                   | J         | 2,300                 | 61,000              | 6,000            | 1.9 - 855                               |
|           | F613SB005  | 13-Oct-99     | 96.9                  | J         |                       |                     |                  |                                         |
|           | F613SB006  | 13-Oct-99     | 39.3                  | J         |                       |                     |                  |                                         |
|           | F613SB007  | 13-Oct-99     | 36                    | J         |                       |                     |                  |                                         |
|           | F613SB008  | 13-Oct-99     | 41.8                  | J         |                       |                     |                  |                                         |
|           | F613SB009  | 13-Oct-99     | 95.5                  | J         |                       |                     |                  |                                         |
|           | F613SB010  | 13-Oct-99     | 96.1                  | J         |                       |                     |                  |                                         |
|           | F613SB011  | 15-Oct-99     | 111                   | J         |                       |                     |                  |                                         |
|           | F613SB012  | 14-Oct-99     | 83.1                  | J         |                       |                     |                  |                                         |
|           | F613SB013  | 14-Oct-99     | 123                   | J         |                       |                     |                  |                                         |
|           | F613SB014  | 13-Oct-99     | 215                   | J         |                       |                     |                  |                                         |
|           | F613SB016  | 13-Oct-99     | 21                    | =         |                       |                     |                  |                                         |
|           | F613SB017  | 16-Nov-99     | 123                   | J         |                       |                     |                  |                                         |
|           | F613SB018  | 16-Nov-99     | 97.4                  | J         |                       |                     |                  |                                         |
|           | F613SB019  | 13-Oct-99     | 338                   | J         |                       |                     |                  |                                         |
|           | F613SB020  | 13-Oct-99     | 110                   | J         |                       |                     |                  |                                         |
|           | F613SB021  | 13-Oct-99     | 21.6                  | J         |                       |                     |                  |                                         |
|           | F613SB022  | 13-Oct-99     | 403                   | J         |                       |                     |                  |                                         |
|           | F613SB023  | 16-Nov-99     | 72.2                  | J         |                       |                     |                  |                                         |
|           | F613SB024  | 16-Nov-99     | 109                   | J         |                       |                     |                  |                                         |
|           | F613SB025  | 16-Nov-99     | 276                   | J         |                       |                     |                  |                                         |
|           | F613SB026  | 16-Nov-99     | 98.7                  | J         |                       |                     |                  |                                         |
|           | F613SB027  | 16-Nov-99     | 100                   | J         |                       |                     |                  |                                         |
|           | F613SB028  | 16-Nov-99     | 126                   | J         |                       |                     |                  |                                         |
|           | F613SB029  | 01-Dec-99     | 10                    | =         |                       |                     |                  |                                         |
|           | F613SB030  | 01-Dec-99     | 62.3                  | =         |                       |                     |                  |                                         |
|           | F613SP022  | 13-Oct-99     | 34.9                  | J         |                       |                     |                  |                                         |
|           | F613SP027  | 14-Oct-99     | 1,100                 | J         |                       |                     |                  |                                         |
|           | F613SP051  | 15-Oct-99     | 82.9                  | J         |                       |                     |                  |                                         |

Concentrations shown outlined and in bold print indicate exceedance of screening criteria.

<sup>a</sup> RBCs are from EPA Region III RBC Tables, October 2000. RBCs for non-carcinogenic compounds are adjusted for HI = 0.1.

<sup>b</sup> Values extrapolated from EPA Soil Screening Guidance: User's Guide; DAF = 10.

<sup>c</sup> Background Range values are the minimum and maximum concentrations detected in Zones E and F combined grid samples.

\* RBCs for Total Chromium and Lead from EPA Region IX PRG Tables, November 2000.

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Aluminum  | F613SB001 | 13-Oct-99     | 24,800                | =         | NL                        | 1,220 - 29,900             |
|           | F613SB002 | 14-Oct-99     | 38,400                | =         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 34,000                | =         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 24,700                | =         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 16,100                | =         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 18,300                | =         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 22,700                | =         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 24,400                | =         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 27,600                | =         |                           |                            |
|           | F613SB010 | 13-Oct-99     | 15,800                | =         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 12,900                | =         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 35,400                | =         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 22,800                | =         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 18,300                | =         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 34,100                | =         |                           |                            |
|           | F613SB017 | 16-Nov-99     | 7,620                 | J         |                           |                            |
|           | F613SB018 | 16-Nov-99     | 4,660                 | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 4,230                 | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 21,000                | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 21,700                | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 18,200                | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 31,300                | J         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 39,300                | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 33,600                | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 6,770                 | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 6,880                 | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 4,560                 | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 31,300                | J         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 25,100                | =         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 14,300                | =         |                           |                            |
| F613SP051 | 15-Oct-99 | 35,700        | =                     |           |                           |                            |
| Antimony  | F613SB001 | 13-Oct-99     | 0.84                  | J         | 2.5                       | 0.52 - 1.6                 |
|           | F613SB002 | 14-Oct-99     | 2                     | J         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 1.7                   | J         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 1                     | J         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 0.69                  | J         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 0.62                  | J         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 0.68                  | J         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 0.79                  | J         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 0.72                  | J         |                           |                            |

**TABLE 4-2**  
 Metals Detected in Subsurface Soil in RFI Addendum Samples  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Antimony  | F613SB010 | 13-Oct-99     | 0.38                  | J         | 2.5                       | 0.52 - 1.6                 |
|           | F613SB012 | 14-Oct-99     | 1.3                   | J         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 0.95                  | J         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 0.37                  | J         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 1.2                   | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 0.27                  | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 0.84                  | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 1.3                   | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 0.7                   | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 0.45                  | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 1.4                   | J         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 0.88                  | J         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 1.9                   | J         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 1.8                   | J         |                           |                            |
|           | Arsenic   | F613SB001     | 13-Oct-99             | 18        |                           |                            |
| F613SB002 |           | 14-Oct-99     | 36.2                  | =         |                           |                            |
| F613SB003 |           | 14-Oct-99     | 22.3                  | =         |                           |                            |
| F613SB004 |           | 13-Oct-99     | 26.9                  | =         |                           |                            |
| F613SB005 |           | 13-Oct-99     | 12.4                  | =         |                           |                            |
| F613SB006 |           | 13-Oct-99     | 13.2                  | =         |                           |                            |
| F613SB007 |           | 13-Oct-99     | 26                    | =         |                           |                            |
| F613SB008 |           | 13-Oct-99     | 17.7                  | =         |                           |                            |
| F613SB009 |           | 13-Oct-99     | 19.6                  | =         |                           |                            |
| F613SB010 |           | 13-Oct-99     | 21.5                  | =         |                           |                            |
| F613SB011 |           | 15-Oct-99     | 7.2                   | =         |                           |                            |
| F613SB012 |           | 14-Oct-99     | 30.1                  | =         |                           |                            |
| F613SB013 |           | 14-Oct-99     | 15                    | =         |                           |                            |
| F613SB014 |           | 13-Oct-99     | 10.2                  | =         |                           |                            |
| F613SB016 |           | 13-Oct-99     | 24.6                  | =         |                           |                            |
| F613SB017 |           | 16-Nov-99     | 7.4                   | J         |                           |                            |
| F613SB018 |           | 16-Nov-99     | 2.1                   | J         |                           |                            |
| F613SB019 |           | 13-Oct-99     | 2.5                   | J         |                           |                            |
| F613SB020 |           | 13-Oct-99     | 22.7                  | J         |                           |                            |
| F613SB021 |           | 13-Oct-99     | 35.7                  | J         |                           |                            |
| F613SB022 |           | 13-Oct-99     | 21.9                  | J         |                           |                            |
| F613SB023 |           | 16-Nov-99     | 21.9                  | J         |                           |                            |
| F613SB024 |           | 16-Nov-99     | 31.9                  | J         |                           |                            |
| F613SB026 |           | 17-Nov-99     | 21.1                  | J         |                           |                            |
| F613SB027 |           | 16-Nov-99     | 2.1                   | J         |                           |                            |
| F613SB028 |           | 16-Nov-99     | 2.5                   | J         |                           |                            |

**TABLE 4-2**  
**Metals Detected in Subsurface Soil in RFI Addendum Samples**  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Arsenic   | F613SB029 | 01-Dec-99     | 3.5                   | =         | 15                        | 0.83 - 30.4                |
|           | F613SB030 | 01-Dec-99     | 12.5                  | =         |                           |                            |
|           | F613SB031 | 07-Jun-01     | 7                     | =         |                           |                            |
|           | F613SB032 | 07-Jun-01     | 22.6                  | =         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 31.5                  | =         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 9.3                   | J         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 20.1                  | =         |                           |                            |
| Barium    | F613SB001 | 13-Oct-99     | 38.6                  | =         | 800                       | 6.1 - 91                   |
|           | F613SB002 | 14-Oct-99     | 54.2                  | =         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 50.7                  | =         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 37.7                  | =         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 39.2                  | =         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 64.7                  | =         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 37.6                  | =         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 39.5                  | =         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 45.3                  | =         |                           |                            |
|           | F613SB010 | 13-Oct-99     | 43.8                  | =         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 27.0                  | =         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 48.4                  | =         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 57.8                  | =         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 37.2                  | =         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 47.6                  | =         |                           |                            |
|           | F613SB017 | 16-Nov-99     | 17.5                  | J         |                           |                            |
|           | F613SB018 | 16-Nov-99     | 15.1                  | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 13.6                  | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 33.5                  | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 36.6                  | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 33.3                  | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 44.3                  | J         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 50.2                  | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 48.9                  | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 25.4                  | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 22.9                  | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 9.0                   | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 47.2                  | =         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 37.7                  | =         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 25.6                  | =         |                           |                            |
| F613SP051 | 15-Oct-99 | 50.7          | =                     |           |                           |                            |
| Beryllium | F613SB001 | 13-Oct-99     | 1.2                   | =         | 32                        | 0.15 - 1.6                 |
|           | F613SB002 | 14-Oct-99     | 1.5                   | =         |                           |                            |

**TABLE 4-2**  
 Metals Detected in Subsurface Soil in RFI Addendum Samples  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |   |   |             |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|---|---|-------------|
| Beryllium | F613SB003 | 14-Oct-99     | 1.3                   | =         | 32                        | 0.15 - 1.6                 |   |   |             |
|           | F613SB004 | 13-Oct-99     | 1.2                   | =         |                           |                            |   |   |             |
|           | F613SB005 | 13-Oct-99     | 0.69                  | =         |                           |                            |   |   |             |
|           | F613SB006 | 13-Oct-99     | 0.86                  | =         |                           |                            |   |   |             |
|           | F613SB007 | 13-Oct-99     | 1.3                   | =         |                           |                            |   |   |             |
|           | F613SB008 | 13-Oct-99     | 1.3                   | =         |                           |                            |   |   |             |
|           | F613SB009 | 13-Oct-99     | 1.4                   | =         |                           |                            |   |   |             |
|           | F613SB010 | 13-Oct-99     | 1.2                   | =         |                           |                            |   |   |             |
|           | F613SB011 | 15-Oct-99     | 0.26                  | J         |                           |                            |   |   |             |
|           | F613SB012 | 14-Oct-99     | 1.30                  | =         |                           |                            |   |   |             |
|           | F613SB013 | 14-Oct-99     | 0.92                  | =         |                           |                            |   |   |             |
|           | F613SB014 | 13-Oct-99     | 0.54                  | =         |                           |                            |   |   |             |
|           | F613SB016 | 13-Oct-99     | 1.5                   | =         |                           |                            |   |   |             |
|           | F613SB017 | 16-Nov-99     | 0.53                  | J         |                           |                            |   |   |             |
|           | F613SB018 | 16-Nov-99     | 0.42                  | J         |                           |                            |   |   |             |
|           | F613SB020 | 13-Oct-99     | 1.2                   | =         |                           |                            |   |   |             |
|           | F613SB021 | 13-Oct-99     | 1.5                   | =         |                           |                            |   |   |             |
|           | F613SB022 | 13-Oct-99     | 1.3                   | =         |                           |                            |   |   |             |
|           | F613SB023 | 16-Nov-99     | 1.7                   | =         |                           |                            |   |   |             |
|           | F613SB024 | 16-Nov-99     | 1.8                   | =         |                           |                            |   |   |             |
|           | F613SB026 | 17-Nov-99     | 1.7                   | =         |                           |                            |   |   |             |
|           | F613SB027 | 16-Nov-99     | 0.48                  | =         |                           |                            |   |   |             |
|           | F613SB028 | 16-Nov-99     | 0.36                  | J         |                           |                            |   |   |             |
|           | F613SB029 | 01-Dec-99     | 0.11                  | J         |                           |                            |   |   |             |
|           | F613SB030 | 01-Dec-99     | 1.6                   | =         |                           |                            |   |   |             |
|           | F613SP022 | 13-Oct-99     | 1.20                  | =         |                           |                            |   |   |             |
|           | F613SP027 | 14-Oct-99     | 0.56                  | =         |                           |                            |   |   |             |
|           | F613SP051 | 15-Oct-99     | 1.2                   | =         |                           |                            |   |   |             |
|           | Cadmium   | F613SB005     | 13-Oct-99             | 0.29      |                           |                            | J | 4 | 0.08 - 0.96 |
|           |           | F613SB019     | 13-Oct-99             | 0.19      |                           |                            | J |   |             |
| Calcium   | F613SB001 | 13-Oct-99     | 11,500                | =         | NL                        | 323 – 229,000              |   |   |             |
|           | F613SB002 | 14-Oct-99     | 31,600                | J         |                           |                            |   |   |             |
|           | F613SB003 | 14-Oct-99     | 6,730                 | J         |                           |                            |   |   |             |
|           | F613SB004 | 13-Oct-99     | 19,500                | =         |                           |                            |   |   |             |
|           | F613SB005 | 13-Oct-99     | 111,000               | =         |                           |                            |   |   |             |
|           | F613SB006 | 13-Oct-99     | 9,300                 | =         |                           |                            |   |   |             |
|           | F613SB007 | 13-Oct-99     | 14,000                | =         |                           |                            |   |   |             |
|           | F613SB008 | 13-Oct-99     | 12,100                | =         |                           |                            |   |   |             |
|           | F613SB009 | 13-Oct-99     | 7,370                 | =         |                           |                            |   |   |             |
|           | F613SB010 | 13-Oct-99     | 8,320                 | =         |                           |                            |   |   |             |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter       | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Calcium         | F613SB011 | 15-Oct-99     | 6,530                 | J         | NL                        | 323 – 229,000              |
|                 | F613SB012 | 14-Oct-99     | 10,500                | J         |                           |                            |
|                 | F613SB013 | 14-Oct-99     | 10,500                | J         |                           |                            |
|                 | F613SB014 | 13-Oct-99     | 1,720                 | =         |                           |                            |
|                 | F613SB016 | 13-Oct-99     | 20,700                | =         |                           |                            |
|                 | F613SB017 | 16-Nov-99     | 1,420                 | J         |                           |                            |
|                 | F613SB018 | 16-Nov-99     | 404                   | J         |                           |                            |
|                 | F613SB019 | 13-Oct-99     | 514                   | J         |                           |                            |
|                 | F613SB020 | 13-Oct-99     | 11,400                | J         |                           |                            |
|                 | F613SB021 | 13-Oct-99     | 25,200                | J         |                           |                            |
|                 | F613SB022 | 13-Oct-99     | 29,600                | J         |                           |                            |
|                 | F613SB023 | 16-Nov-99     | 6,770                 | J         |                           |                            |
|                 | F613SB024 | 16-Nov-99     | 10,400                | J         |                           |                            |
|                 | F613SB026 | 17-Nov-99     | 8,410                 | J         |                           |                            |
|                 | F613SB027 | 16-Nov-99     | 494                   | J         |                           |                            |
|                 | F613SB028 | 16-Nov-99     | 483                   | J         |                           |                            |
|                 | F613SB029 | 01-Dec-99     | 32,500                | J         |                           |                            |
|                 | F613SB030 | 01-Dec-99     | 23,500                | J         |                           |                            |
|                 | F613SP022 | 13-Oct-99     | 15,000                | =         |                           |                            |
|                 | F613SP027 | 14-Oct-99     | 8,200                 | J         |                           |                            |
| F613SP051       | 15-Oct-99 | 30,800        | J                     |           |                           |                            |
| Chromium, Total | F613SB001 | 13-Oct-99     | 45                    | =         | 19                        | 1.6 - 75.2                 |
|                 | F613SB002 | 14-Oct-99     | 58.9                  | J         |                           |                            |
|                 | F613SB003 | 14-Oct-99     | 53.3                  | J         |                           |                            |
|                 | F613SB004 | 13-Oct-99     | 42.3                  | =         |                           |                            |
|                 | F613SB005 | 13-Oct-99     | 31.7                  | =         |                           |                            |
|                 | F613SB006 | 13-Oct-99     | 30.1                  | =         |                           |                            |
|                 | F613SB007 | 13-Oct-99     | 51.4                  | =         |                           |                            |
|                 | F613SB008 | 13-Oct-99     | 41.8                  | =         |                           |                            |
|                 | F613SB009 | 13-Oct-99     | 44.7                  | =         |                           |                            |
|                 | F613SB010 | 13-Oct-99     | 34                    | =         |                           |                            |
|                 | F613SB011 | 15-Oct-99     | 22.6                  | J         |                           |                            |
|                 | F613SB012 | 14-Oct-99     | 49.8                  | J         |                           |                            |
|                 | F613SB013 | 14-Oct-99     | 34.5                  | J         |                           |                            |
|                 | F613SB014 | 13-Oct-99     | 26.7                  | =         |                           |                            |
|                 | F613SB016 | 13-Oct-99     | 51.1                  | =         |                           |                            |
|                 | F613SB017 | 16-Nov-99     | 9.6                   | J         |                           |                            |
|                 | F613SB018 | 16-Nov-99     | 5                     | J         |                           |                            |
|                 | F613SB019 | 13-Oct-99     | 5                     | J         |                           |                            |
|                 | F613SB020 | 13-Oct-99     | 36.8                  | J         |                           |                            |
|                 | F613SB021 | 13-Oct-99     | 42.5                  | J         |                           |                            |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter       | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Chromium, Total | F613SB022 | 13-Oct-99     | 36.6                  | J         | 19                        | 1.6 - 75.2                 |
|                 | F613SB023 | 16-Nov-99     | 47.8                  | J         |                           |                            |
|                 | F613SB024 | 16-Nov-99     | 55.5                  | J         |                           |                            |
|                 | F613SB026 | 17-Nov-99     | 52.1                  | J         |                           |                            |
|                 | F613SB027 | 16-Nov-99     | 6                     | J         |                           |                            |
|                 | F613SB028 | 16-Nov-99     | 9.4                   | J         |                           |                            |
|                 | F613SB029 | 01-Dec-99     | 7.9                   | =         |                           |                            |
|                 | F613SB030 | 01-Dec-99     | 53                    | =         |                           |                            |
|                 | F613SP022 | 13-Oct-99     | 40.9                  | =         |                           |                            |
|                 | F613SP027 | 14-Oct-99     | 28.1                  | J         |                           |                            |
|                 | F613SP051 | 15-Oct-99     | 52.6                  | J         |                           |                            |
| Cobalt          | F613SB001 | 13-Oct-99     | 8.8                   | J         | 1,000                     | 0.41 - 14.9                |
|                 | F613SB002 | 14-Oct-99     | 13.6                  | J         |                           |                            |
|                 | F613SB003 | 14-Oct-99     | 10.2                  | J         |                           |                            |
|                 | F613SB004 | 13-Oct-99     | 9.2                   | J         |                           |                            |
|                 | F613SB005 | 13-Oct-99     | 6.6                   | J         |                           |                            |
|                 | F613SB006 | 13-Oct-99     | 5.7                   | J         |                           |                            |
|                 | F613SB007 | 13-Oct-99     | 9                     | J         |                           |                            |
|                 | F613SB008 | 13-Oct-99     | 10.1                  | J         |                           |                            |
|                 | F613SB009 | 13-Oct-99     | 7.9                   | J         |                           |                            |
|                 | F613SB010 | 13-Oct-99     | 7.2                   | J         |                           |                            |
|                 | F613SB011 | 15-Oct-99     | 3.5                   | J         |                           |                            |
|                 | F613SB012 | 14-Oct-99     | 11.5                  | J         |                           |                            |
|                 | F613SB013 | 14-Oct-99     | 6.5                   | J         |                           |                            |
|                 | F613SB014 | 13-Oct-99     | 2.8                   | J         |                           |                            |
|                 | F613SB016 | 13-Oct-99     | 10.4                  | =         |                           |                            |
|                 | F613SB017 | 16-Nov-99     | 2.1                   | J         |                           |                            |
|                 | F613SB018 | 16-Nov-99     | 1.4                   | J         |                           |                            |
|                 | F613SB019 | 13-Oct-99     | 0.51                  | J         |                           |                            |
|                 | F613SB020 | 13-Oct-99     | 8.3                   | J         |                           |                            |
|                 | F613SB021 | 13-Oct-99     | 10                    | =         |                           |                            |
|                 | F613SB022 | 13-Oct-99     | 7.8                   | =         |                           |                            |
|                 | F613SB023 | 16-Nov-99     | 10.1                  | J         |                           |                            |
|                 | F613SB024 | 16-Nov-99     | 11.3                  | J         |                           |                            |
|                 | F613SB026 | 17-Nov-99     | 9.5                   | J         |                           |                            |
|                 | F613SB027 | 16-Nov-99     | 2.5                   | J         |                           |                            |
|                 | F613SB028 | 16-Nov-99     | 1.7                   | J         |                           |                            |
|                 | F613SB029 | 01-Dec-99     | 1.2                   | J         |                           |                            |
|                 | F613SB030 | 01-Dec-99     | 9.1                   | =         |                           |                            |
|                 | F613SP022 | 13-Oct-99     | 9                     | J         |                           |                            |
|                 | F613SP027 | 14-Oct-99     | 4.8                   | J         |                           |                            |

**TABLE 4-2**  
 Metals Detected in Subsurface Soil in RFI Addendum Samples  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Cobalt    | F613SP051 | 15-Oct-99     | 13.5                  | =         | 1,000                     | 0.41 - 14.9                |
| Copper    | F613SB001 | 13-Oct-99     | 36.8                  | J         | 5,300                     | 1.3 - 192                  |
|           | F613SB002 | 14-Oct-99     | 76.2                  | J         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 43                    | J         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 33.2                  | J         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 26.9                  | J         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 24.3                  | J         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 30.3                  | J         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 29.9                  | J         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 33.7                  | J         |                           |                            |
|           | F613SB010 | 13-Oct-99     | 35.5                  | J         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 14.7                  | J         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 34.5                  | J         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 31.2                  | J         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 2.3                   | J         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 38.1                  | =         |                           |                            |
|           | F613SB017 | 16-Nov-99     | 4.8                   | =         |                           |                            |
|           | F613SB018 | 16-Nov-99     | 0.46                  | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 2                     | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 28.1                  | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 37.3                  | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 32.7                  | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 30.2                  | =         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 37.4                  | =         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 39.3                  | =         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 1.1                   | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 0.94                  | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 2.3                   | =         |                           |                            |
| F613SB030 | 01-Dec-99 | 42            | =                     |           |                           |                            |
| F613SP022 | 13-Oct-99 | 28.5          | J                     |           |                           |                            |
| F613SP027 | 14-Oct-99 | 35.6          | =                     |           |                           |                            |
| F613SP051 | 15-Oct-99 | 35.1          | J                     |           |                           |                            |
| Iron      | F613SB001 | 13-Oct-99     | 29,700                | =         | NL                        | 924 – 35,800               |
|           | F613SB002 | 14-Oct-99     | 40,600                | J         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 34,800                | J         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 35,000                | =         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 20,300                | =         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 23,500                | =         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 32,900                | =         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 33,900                | =         |                           |                            |

**TABLE 4-2**

**Metals Detected in Subsurface Soil in RFI Addendum Samples**

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Iron      | F613SB009 | 13-Oct-99     | 29,600                | =         | NL                        | 924 – 35,800               |
|           | F613SB010 | 13-Oct-99     | 21,800                | =         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 12,300                | J         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 40,200                | J         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 23,200                | J         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 19,800                | =         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 41,700                | =         |                           |                            |
|           | F613SB017 | 16-Nov-99     | 6,630                 | J         |                           |                            |
|           | F613SB018 | 16-Nov-99     | 2,870                 | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 2,700                 | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 30,700                | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 31,700                | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 24,600                | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 31,600                | J         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 42,600                | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 34,400                | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 3,860                 | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 6,680                 | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 4,290                 | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 30,000                | J         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 35,400                | =         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 16,300                | =         |                           |                            |
| F613SP051 | 15-Oct-99 | 40,200        | J                     |           |                           |                            |
| Lead      | 175SB035  | 07-Jun-01     | 22.3                  | =         | 400*                      | 1.8 - 322                  |
|           | 175SB036  | 07-Jun-01     | 218                   | =         |                           |                            |
|           | 175SB037  | 07-Jun-01     | 139                   | =         |                           |                            |
|           | F613SB001 | 13-Oct-99     | 56.3                  | J         |                           |                            |
|           | F613SB002 | 14-Oct-99     | 94.1                  | J         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 55.3                  | J         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 55                    | J         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 67.1                  | J         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 79                    | J         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 52.3                  | J         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 61.5                  | J         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 44.2                  | J         |                           |                            |
|           | F613SB010 | 13-Oct-99     | 39.6                  | J         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 37.4                  | J         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 98.7                  | J         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 149                   | J         |                           |                            |
| F613SB014 | 13-Oct-99 | 11.4          | J                     |           |                           |                            |
| F613SB016 | 13-Oct-99 | 56.7          | =                     |           |                           |                            |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Lead      | F613SB017 | 16-Nov-99     | 14.3                  | J         | 400 *                     | 1.8 - 322                  |
|           | F613SB018 | 16-Nov-99     | 4.9                   | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 5.1                   | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 46.6                  | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 61.5                  | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 90.2                  | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 54.2                  | J         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 53.9                  | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | <b>6,620</b>          | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 5                     | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 4.1                   | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 4.1                   | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 46.2                  | J         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 52.5                  | J         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 42.7                  | =         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 68.6                  | J         |                           |                            |
|           | Magnesium | F613SB001     | 13-Oct-99             | 4,020     |                           |                            |
| F613SB002 |           | 14-Oct-99     | 6,060                 | J         |                           |                            |
| F613SB003 |           | 14-Oct-99     | 4,140                 | J         |                           |                            |
| F613SB004 |           | 13-Oct-99     | 5,340                 | =         |                           |                            |
| F613SB005 |           | 13-Oct-99     | 3,900                 | =         |                           |                            |
| F613SB006 |           | 13-Oct-99     | 3,650                 | =         |                           |                            |
| F613SB007 |           | 13-Oct-99     | 5,340                 | =         |                           |                            |
| F613SB008 |           | 13-Oct-99     | 4,600                 | =         |                           |                            |
| F613SB009 |           | 13-Oct-99     | 4,450                 | =         |                           |                            |
| F613SB010 |           | 13-Oct-99     | 3,670                 | =         |                           |                            |
| F613SB011 |           | 15-Oct-99     | 1,820                 | J         |                           |                            |
| F613SB012 |           | 14-Oct-99     | 4,510                 | J         |                           |                            |
| F613SB013 |           | 14-Oct-99     | 3,040                 | J         |                           |                            |
| F613SB014 |           | 13-Oct-99     | 1,060                 | =         |                           |                            |
| F613SB016 |           | 13-Oct-99     | 4,600                 | =         |                           |                            |
| F613SB017 |           | 16-Nov-99     | 542                   | J         |                           |                            |
| F613SB018 |           | 16-Nov-99     | 262                   | J         |                           |                            |
| F613SB019 |           | 13-Oct-99     | 350                   | J         |                           |                            |
| F613SB020 |           | 13-Oct-99     | 4,810                 | J         |                           |                            |
| F613SB021 |           | 13-Oct-99     | 5,390                 | J         |                           |                            |
| F613SB022 |           | 13-Oct-99     | 4,430                 | J         |                           |                            |
| F613SB023 |           | 16-Nov-99     | 4,640                 | J         |                           |                            |
| F613SB024 |           | 16-Nov-99     | 4,850                 | J         |                           |                            |
| F613SB026 |           | 17-Nov-99     | 4,460                 | J         |                           |                            |
| F613SB027 |           | 16-Nov-99     | 397                   | J         |                           |                            |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Magnesium | F613SB028 | 16-Nov-99     | 481                   | J         | NL                        | 76.5 – 9,140               |
|           | F613SB029 | 01-Dec-99     | 622                   | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 4,220                 | J         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 4,240                 | =         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 1,730                 | J         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 6,230                 | J         |                           |                            |
| Manganese | F613SB001 | 13-Oct-99     | 225                   | =         | 480                       | 4.9 – 1,120                |
|           | F613SB002 | 14-Oct-99     | 593                   | J         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 267                   | J         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 654                   | =         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 540                   | =         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 394                   | =         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 474                   | =         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 405                   | =         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 362                   | =         |                           |                            |
|           | F613SB010 | 13-Oct-99     | 296                   | =         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 100                   | J         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 1,060                 | J         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 269                   | J         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 49.4                  | =         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 538                   | =         |                           |                            |
|           | F613SB017 | 16-Nov-99     | 32.4                  | J         |                           |                            |
|           | F613SB018 | 16-Nov-99     | 19.7                  | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 22.6                  | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 561                   | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 562                   | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 404                   | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 449                   | J         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 677                   | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 270                   | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 27.4                  | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 24.3                  | J         |                           |                            |
| F613SB029 | 01-Dec-99 | 28.4          | J                     |           |                           |                            |
| F613SB030 | 01-Dec-99 | 255           | J                     |           |                           |                            |
| F613SP022 | 13-Oct-99 | 799           | =                     |           |                           |                            |
| F613SP027 | 14-Oct-99 | 246           | =                     |           |                           |                            |
| F613SP051 | 15-Oct-99 | 594           | J                     |           |                           |                            |
| Mercury   | F613SB001 | 13-Oct-99     | 0.28                  | =         | 1                         | 0.04 - 0.9                 |
|           | F613SB002 | 14-Oct-99     | 0.35                  | =         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 0.48                  | =         |                           |                            |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |   |    |             |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|---|----|-------------|
| Mercury   | F613SB004 | 13-Oct-99     | 0.84                  | =         | 1                         | 0.04 - 0.9                 |   |    |             |
|           | F613SB005 | 13-Oct-99     | 0.28                  | =         |                           |                            |   |    |             |
|           | F613SB006 | 13-Oct-99     | 0.35                  | =         |                           |                            |   |    |             |
|           | F613SB007 | 13-Oct-99     | 0.33                  | =         |                           |                            |   |    |             |
|           | F613SB008 | 13-Oct-99     | 0.35                  | =         |                           |                            |   |    |             |
|           | F613SB009 | 13-Oct-99     | 0.28                  | =         |                           |                            |   |    |             |
|           | F613SB010 | 13-Oct-99     | 0.33                  | =         |                           |                            |   |    |             |
|           | F613SB011 | 15-Oct-99     | 0.15                  | =         |                           |                            |   |    |             |
|           | F613SB012 | 14-Oct-99     | 0.29                  | =         |                           |                            |   |    |             |
|           | F613SB013 | 14-Oct-99     | 0.58                  | =         |                           |                            |   |    |             |
|           | F613SB014 | 13-Oct-99     | 0.05                  | =         |                           |                            |   |    |             |
|           | F613SB016 | 13-Oct-99     | 0.42                  | =         |                           |                            |   |    |             |
|           | F613SB017 | 16-Nov-99     | 0.06                  | =         |                           |                            |   |    |             |
|           | F613SB020 | 13-Oct-99     | 0.48                  | J         |                           |                            |   |    |             |
|           | F613SB021 | 13-Oct-99     | 0.36                  | J         |                           |                            |   |    |             |
|           | F613SB022 | 13-Oct-99     | 0.49                  | J         |                           |                            |   |    |             |
|           | F613SB023 | 16-Nov-99     | 0.31                  | =         |                           |                            |   |    |             |
|           | F613SB024 | 16-Nov-99     | 0.29                  | =         |                           |                            |   |    |             |
|           | F613SB026 | 17-Nov-99     | 0.36                  | J         |                           |                            |   |    |             |
|           | F613SB030 | 01-Dec-99     | 0.31                  | =         |                           |                            |   |    |             |
|           | F613SP022 | 13-Oct-99     | 0.46                  | =         |                           |                            |   |    |             |
|           | F613SP027 | 14-Oct-99     | 0.16                  | =         |                           |                            |   |    |             |
|           | F613SP051 | 15-Oct-99     | 0.37                  | =         |                           |                            |   |    |             |
|           | Nickel    | F613SB001     | 13-Oct-99             | 19.8      |                           |                            | = | 65 | 0.85 - 19.7 |
|           |           | F613SB002     | 14-Oct-99             | 22.7      |                           |                            | J |    |             |
|           |           | F613SB003     | 14-Oct-99             | 16.6      |                           |                            | J |    |             |
|           |           | F613SB004     | 13-Oct-99             | 14.9      |                           |                            | = |    |             |
| F613SB005 |           | 13-Oct-99     | 17.8                  | =         |                           |                            |   |    |             |
| F613SB006 |           | 13-Oct-99     | 9.6                   | =         |                           |                            |   |    |             |
| F613SB007 |           | 13-Oct-99     | 16.1                  | =         |                           |                            |   |    |             |
| F613SB008 |           | 13-Oct-99     | 13.7                  | =         |                           |                            |   |    |             |
| F613SB009 |           | 13-Oct-99     | 14.4                  | =         |                           |                            |   |    |             |
| F613SB010 |           | 13-Oct-99     | 12.2                  | =         |                           |                            |   |    |             |
| F613SB011 |           | 15-Oct-99     | 8.4                   | J         |                           |                            |   |    |             |
| F613SB012 |           | 14-Oct-99     | 18.6                  | J         |                           |                            |   |    |             |
| F613SB013 |           | 14-Oct-99     | 12.8                  | J         |                           |                            |   |    |             |
| F613SB014 |           | 13-Oct-99     | 7.5                   | =         |                           |                            |   |    |             |
| F613SB016 |           | 13-Oct-99     | 18.4                  | =         |                           |                            |   |    |             |
| F613SB017 |           | 16-Nov-99     | 3.9                   | J         |                           |                            |   |    |             |
| F613SB018 |           | 16-Nov-99     | 2.5                   | J         |                           |                            |   |    |             |
| F613SB019 |           | 13-Oct-99     | 1.9                   | J         |                           |                            |   |    |             |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Nickel    | F613SB020 | 13-Oct-99     | 12.6                  | J         | 65                        | 0.85 - 19.7                |
|           | F613SB021 | 13-Oct-99     | 15.6                  | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 14.2                  | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 17.2                  | J         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 20.8                  | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 18.1                  | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 4                     | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 3.9                   | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 3                     | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 17.7                  | J         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 14.2                  | =         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 15.4                  | =         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 19.7                  | J         |                           |                            |
| Potassium | F613SB001 | 13-Oct-99     | 2,130                 | J         | NL                        | 106 – 3,440                |
|           | F613SB002 | 14-Oct-99     | 3,510                 | J         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 3,050                 | J         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 2,620                 | J         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 2,360                 | J         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 2,070                 | J         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 2,930                 | J         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 2,790                 | J         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 2,590                 | J         |                           |                            |
|           | F613SB010 | 13-Oct-99     | 1,860                 | J         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 1,170                 | J         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 2,870                 | J         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 1,980                 | J         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 657                   | J         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 3,040                 | J         |                           |                            |
|           | F613SB017 | 16-Nov-99     | 399                   | J         |                           |                            |
|           | F613SB018 | 16-Nov-99     | 140                   | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 145                   | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 2,530                 | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 2,860                 | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 2,160                 | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 2,660                 | =         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 2,970                 | =         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 2,880                 | =         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 176                   | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 242                   | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 282                   | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 2,430                 | =         |                           |                            |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Potassium | F613SP022 | 13-Oct-99     | 2,410                 | J         | NL                        | 106 – 3,440                |
|           | F613SP027 | 14-Oct-99     | 1,080                 | J         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 4,030                 | J         |                           |                            |
| Selenium  | F613SB001 | 13-Oct-99     | 2.7                   | =         | 2.5                       | 0.4 - 2.4                  |
|           | F613SB002 | 14-Oct-99     | 3.3                   | =         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 2.7                   | =         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 3                     | =         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 1.1                   | J         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 1.5                   | =         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 2.8                   | =         |                           |                            |
|           | F613SB008 | 13-Oct-99     | 2.6                   | =         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 2                     | =         |                           |                            |
|           | F613SB010 | 13-Oct-99     | 2.1                   | =         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 1.2                   | =         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 3.3                   | =         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 1.9                   | =         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 1.9                   | =         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 3.5                   | =         |                           |                            |
|           | F613SB017 | 16-Nov-99     | 0.62                  | J         |                           |                            |
|           | F613SB018 | 16-Nov-99     | 0.58                  | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 2.9                   | =         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 3.1                   | =         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 2.6                   | =         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 1.6                   | J         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 2.6                   | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 1.7                   | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 0.42                  | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 0.82                  | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 0.34                  | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 2.1                   | J         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 2.9                   | =         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 1.7                   | =         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 3                     | =         |                           |                            |
| Sodium    | F613SB001 | 13-Oct-99     | 547                   | J         | NL                        | 20.8 – 1,430               |
|           | F613SB002 | 14-Oct-99     | 2,290                 | =         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 1,440                 | =         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 2,970                 | =         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 1,140                 | =         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 2,640                 | =         |                           |                            |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Sodium    | F613SB007 | 13-Oct-99     | 4,910                 | =         | NL                        | 20.8 – 1,430               |
|           | F613SB008 | 13-Oct-99     | 2,290                 | =         |                           |                            |
|           | F613SB009 | 13-Oct-99     | 1,960                 | =         |                           |                            |
|           | F613SB010 | 13-Oct-99     | 2,580                 | =         |                           |                            |
|           | F613SB011 | 15-Oct-99     | 984                   | =         |                           |                            |
|           | F613SB012 | 14-Oct-99     | 2,180                 | =         |                           |                            |
|           | F613SB013 | 14-Oct-99     | 996                   | =         |                           |                            |
|           | F613SB014 | 13-Oct-99     | 449                   | =         |                           |                            |
|           | F613SB016 | 13-Oct-99     | 627                   | J         |                           |                            |
|           | F613SB017 | 16-Nov-99     | 70.2                  | J         |                           |                            |
|           | F613SB018 | 16-Nov-99     | 43.8                  | J         |                           |                            |
|           | F613SB019 | 13-Oct-99     | 448                   | J         |                           |                            |
|           | F613SB020 | 13-Oct-99     | 4,940                 | =         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 2,530                 | =         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 1,150                 | =         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 839                   | =         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 645                   | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 575                   | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 90.6                  | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 106                   | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 218                   | J         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 359                   | J         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 997                   | =         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 271                   | J         |                           |                            |
| F613SP051 | 15-Oct-99 | 4,110         | =                     |           |                           |                            |
| Thallium  | F613SB020 | 13-Oct-99     | 0.47                  | J         | 0.35                      | 0.4 - 1.2                  |
|           | F613SB021 | 13-Oct-99     | 0.8                   | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 0.48                  | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 0.53                  | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 0.82                  | J         |                           |                            |
| Tin       | F613SB002 | 14-Oct-99     | 12.1                  | J         | NL                        | 2.8 - 23.9                 |
|           | F613SP027 | 14-Oct-99     | 10.8                  | =         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 10                    | J         |                           |                            |
| Vanadium  | F613SB001 | 13-Oct-99     | 63.6                  | =         | 3,000                     | 1.6 - 71.9                 |
|           | F613SB002 | 14-Oct-99     | 97.4                  | =         |                           |                            |
|           | F613SB003 | 14-Oct-99     | 82                    | =         |                           |                            |
|           | F613SB004 | 13-Oct-99     | 83.8                  | =         |                           |                            |
|           | F613SB005 | 13-Oct-99     | 43.2                  | =         |                           |                            |
|           | F613SB006 | 13-Oct-99     | 48.1                  | =         |                           |                            |
|           | F613SB007 | 13-Oct-99     | 71.2                  | =         |                           |                            |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |   |       |           |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|---|-------|-----------|
| Vanadium  | F613SB008 | 13-Oct-99     | 76.1                  | =         | 3,000                     | 1.6 - 71.9                 |   |       |           |
|           | F613SB009 | 13-Oct-99     | 75.4                  | =         |                           |                            |   |       |           |
|           | F613SB010 | 13-Oct-99     | 77.2                  | =         |                           |                            |   |       |           |
|           | F613SB011 | 15-Oct-99     | 29.3                  | =         |                           |                            |   |       |           |
|           | F613SB012 | 14-Oct-99     | 84.7                  | =         |                           |                            |   |       |           |
|           | F613SB013 | 14-Oct-99     | 52.1                  | =         |                           |                            |   |       |           |
|           | F613SB014 | 13-Oct-99     | 42.2                  | =         |                           |                            |   |       |           |
|           | F613SB016 | 13-Oct-99     | 86.6                  | =         |                           |                            |   |       |           |
|           | F613SB017 | 16-Nov-99     | 14.3                  | J         |                           |                            |   |       |           |
|           | F613SB018 | 16-Nov-99     | 6.9                   | J         |                           |                            |   |       |           |
|           | F613SB019 | 13-Oct-99     | 4.1                   | J         |                           |                            |   |       |           |
|           | F613SB020 | 13-Oct-99     | 71.9                  | J         |                           |                            |   |       |           |
|           | F613SB021 | 13-Oct-99     | 75.6                  | J         |                           |                            |   |       |           |
|           | F613SB022 | 13-Oct-99     | 58.6                  | J         |                           |                            |   |       |           |
|           | F613SB023 | 16-Nov-99     | 77.2                  | J         |                           |                            |   |       |           |
|           | F613SB024 | 16-Nov-99     | 89.8                  | J         |                           |                            |   |       |           |
|           | F613SB026 | 17-Nov-99     | 75.2                  | J         |                           |                            |   |       |           |
|           | F613SB027 | 16-Nov-99     | 9                     | J         |                           |                            |   |       |           |
|           | F613SB028 | 16-Nov-99     | 14.9                  | J         |                           |                            |   |       |           |
|           | F613SB029 | 01-Dec-99     | 9.7                   | =         |                           |                            |   |       |           |
|           | F613SB030 | 01-Dec-99     | 73.5                  | =         |                           |                            |   |       |           |
|           | F613SP022 | 13-Oct-99     | 76.9                  | =         |                           |                            |   |       |           |
|           | F613SP027 | 14-Oct-99     | 34                    | =         |                           |                            |   |       |           |
|           | F613SP051 | 15-Oct-99     | 80.1                  | =         |                           |                            |   |       |           |
|           | Zinc      | F613SB001     | 13-Oct-99             | 162       |                           |                            | J | 6,000 | 5.8 - 438 |
|           |           | F613SB002     | 14-Oct-99             | 150       |                           |                            | J |       |           |
|           |           | F613SB003     | 14-Oct-99             | 113       |                           |                            | J |       |           |
|           |           | F613SB004     | 13-Oct-99             | 116       |                           |                            | J |       |           |
|           |           | F613SB005     | 13-Oct-99             | 98.6      |                           |                            | J |       |           |
|           |           | F613SB006     | 13-Oct-99             | 176       |                           |                            | J |       |           |
| F613SB007 |           | 13-Oct-99     | 126                   | J         |                           |                            |   |       |           |
| F613SB008 |           | 13-Oct-99     | 119                   | J         |                           |                            |   |       |           |
| F613SB009 |           | 13-Oct-99     | 109                   | J         |                           |                            |   |       |           |
| F613SB010 |           | 13-Oct-99     | 133                   | J         |                           |                            |   |       |           |
| F613SB011 |           | 15-Oct-99     | 63.8                  | J         |                           |                            |   |       |           |
| F613SB012 |           | 14-Oct-99     | 154                   | J         |                           |                            |   |       |           |
| F613SB013 |           | 14-Oct-99     | 223                   | J         |                           |                            |   |       |           |
| F613SB014 |           | 13-Oct-99     | 19.7                  | J         |                           |                            |   |       |           |
| F613SB016 |           | 13-Oct-99     | 133                   | J         |                           |                            |   |       |           |
| F613SB017 |           | 16-Nov-99     | 16.5                  | J         |                           |                            |   |       |           |
| F613SB018 |           | 16-Nov-99     | 5.2                   | J         |                           |                            |   |       |           |

**TABLE 4-2**

Metals Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> (DAF=10) | Zones E/F Background Range |
|-----------|-----------|---------------|-----------------------|-----------|---------------------------|----------------------------|
| Zinc      | F613SB019 | 13-Oct-99     | 9.9                   | J         | 6,000                     | 5.8 - 438                  |
|           | F613SB020 | 13-Oct-99     | 101                   | J         |                           |                            |
|           | F613SB021 | 13-Oct-99     | 142                   | J         |                           |                            |
|           | F613SB022 | 13-Oct-99     | 128                   | J         |                           |                            |
|           | F613SB023 | 16-Nov-99     | 106                   | J         |                           |                            |
|           | F613SB024 | 16-Nov-99     | 133                   | J         |                           |                            |
|           | F613SB026 | 17-Nov-99     | 184                   | J         |                           |                            |
|           | F613SB027 | 16-Nov-99     | 9.2                   | J         |                           |                            |
|           | F613SB028 | 16-Nov-99     | 8.5                   | J         |                           |                            |
|           | F613SB029 | 01-Dec-99     | 7.8                   | =         |                           |                            |
|           | F613SB030 | 01-Dec-99     | 129                   | =         |                           |                            |
|           | F613SP022 | 13-Oct-99     | 110                   | J         |                           |                            |
|           | F613SP027 | 14-Oct-99     | 179                   | J         |                           |                            |
|           | F613SP051 | 15-Oct-99     | 143                   | J         |                           |                            |

Concentrations shown outlined and in bold print indicate exceedance of comparison criteria.

<sup>a</sup>Values extrapolated from EPA Soil Screening Guidance: User's Guide; DAF = 10

<sup>b</sup>Background Range values are the minimum and maximum concentrations detected in combined Zones E/F.

\*Default SSL for lead = 400 mg/kg.

**TABLE 4-3**

Organic Compounds Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter           | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Concentration <sup>c</sup> |
|---------------------|-----------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-------------------------------------------------|
| 2-Methylnaphthalene | F613SB008 | 13-Oct-99     | 0.9                   | =         | 160                                    | 4,100                                | 11               | NA                                              |
|                     | F613SB009 | 13-Oct-99     | 11                    | =         |                                        |                                      |                  |                                                 |
|                     | F613SB025 | 16-Nov-99     | 0.2                   | J         |                                        |                                      |                  |                                                 |
| Acenaphthene        | F613SB003 | 14-Oct-99     | 0.37                  | J         | 470                                    | 12,000                               | 290              | NA                                              |
|                     | F613SB008 | 13-Oct-99     | 0.2                   | J         |                                        |                                      |                  |                                                 |
|                     | F613SB009 | 13-Oct-99     | 1.1                   | J         |                                        |                                      |                  |                                                 |
|                     | F613SB022 | 16-Nov-99     | 0.14                  | J         |                                        |                                      |                  |                                                 |
| Acetone             | F613SP022 | 13-Oct-99     | 0.019                 | J         | 780                                    | 20,000                               | 0.8              | NA                                              |
|                     | F613SP027 | 14-Oct-99     | 0.17                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SP051 | 15-Oct-99     | 0.053                 | =         |                                        |                                      |                  |                                                 |
| Alpha-chlordane     | F613SP022 | 13-Oct-99     | 0.0054                | =         | 1.8                                    | 16                                   | 5                | NA                                              |
|                     | F613SP027 | 14-Oct-99     | 0.014                 | J         |                                        |                                      |                  |                                                 |
| Anthracene          | F613SB001 | 13-Oct-99     | 0.36                  | J         | 2,300                                  | 61,000                               | 6,000            | NA                                              |
|                     | F613SB003 | 14-Oct-99     | 0.39                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB008 | 13-Oct-99     | 0.23                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB009 | 13-Oct-99     | 1                     | J         |                                        |                                      |                  |                                                 |
|                     | F613SB022 | 16-Nov-99     | 0.23                  | J         |                                        |                                      |                  |                                                 |
| Benzo(a)Anthracene  | F613SB001 | 13-Oct-99     | <b>0.92</b>           | J         | 0.87                                   | 7.8                                  | 1                | 0.616                                           |
|                     | F613SB003 | 14-Oct-99     | 0.75                  | =         |                                        |                                      |                  |                                                 |
|                     | F613SB004 | 13-Oct-99     | 0.24                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB008 | 13-Oct-99     | 0.24                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB009 | 13-Oct-99     | 0.52                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB010 | 13-Oct-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB012 | 14-Oct-99     | 0.09                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB013 | 14-Oct-99     | 0.14                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB021 | 16-Nov-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB022 | 16-Nov-99     | <b>1.2</b>            | =         |                                        |                                      |                  |                                                 |
|                     | F613SB024 | 16-Nov-99     | 0.13                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB033 | 07-Jun-01     | 0.194                 | =         |                                        |                                      |                  |                                                 |
|                     | F613SB034 | 07-Jun-01     | 0.188                 | =         |                                        |                                      |                  |                                                 |
|                     | F613SP027 | 14-Oct-99     | 0.1                   | J         |                                        |                                      |                  |                                                 |
| Benzo(a)Pyrene      | F613SB001 | 13-Oct-99     | <b>0.91</b>           | J         | 0.087                                  | 0.78                                 | 4                | 0.598                                           |
|                     | F613SB003 | 14-Oct-99     | <b>0.7</b>            | J         |                                        |                                      |                  |                                                 |
|                     | F613SB004 | 13-Oct-99     | 0.22                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB005 | 13-Oct-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                     | F613SB010 | 13-Oct-99     | 0.087                 | J         |                                        |                                      |                  |                                                 |

**TABLE 4-3**

Organic Compounds Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter            | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Concentration <sup>c</sup> |
|----------------------|-----------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-------------------------------------------------|
| Benzo(a)Pyrene       | F613SB011 | 15-Oct-99     | 0.092                 | J         | 0.087                                  | 0.78                                 | 4                | 0.598                                           |
|                      | F613SB012 | 14-Oct-99     | 0.084                 | J         |                                        |                                      |                  |                                                 |
|                      | F613SB013 | 14-Oct-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB021 | 16-Nov-99     | 0.13                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB022 | 16-Nov-99     | 1.2                   | J         |                                        |                                      |                  |                                                 |
|                      | F613SB023 | 16-Nov-99     | 0.095                 | J         |                                        |                                      |                  |                                                 |
|                      | F613SB024 | 16-Nov-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB033 | 07-Jun-01     | 0.196                 | =         |                                        |                                      |                  |                                                 |
|                      | F613SB034 | 07-Jun-01     | 0.165                 | =         |                                        |                                      |                  |                                                 |
|                      | F613SP022 | 13-Oct-99     | 0.076                 | J         |                                        |                                      |                  |                                                 |
|                      | F613SP027 | 14-Oct-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
| Benzo(b)Fluoranthene | F613SB001 | 13-Oct-99     | 0.83                  | J         | 0.87                                   | 7.8                                  | 2.5              | 0.608                                           |
|                      | F613SB003 | 14-Oct-99     | 0.71                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB004 | 13-Oct-99     | 0.24                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB005 | 13-Oct-99     | 0.13                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB010 | 13-Oct-99     | 0.099                 | J         |                                        |                                      |                  |                                                 |
|                      | F613SB011 | 15-Oct-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB012 | 14-Oct-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB013 | 14-Oct-99     | 0.15                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB021 | 16-Nov-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB022 | 16-Nov-99     | 1.5                   | J         |                                        |                                      |                  |                                                 |
|                      | F613SB023 | 16-Nov-99     | 0.13                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB024 | 16-Nov-99     | 0.13                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB033 | 07-Jun-01     | 0.418                 | J         |                                        |                                      |                  |                                                 |
|                      | F613SB034 | 07-Jun-01     | 0.471                 | J         |                                        |                                      |                  |                                                 |
|                      | F613SP027 | 14-Oct-99     | 0.16                  | J         |                                        |                                      |                  |                                                 |
| F613SP051            | 15-Oct-99 | 0.11          | J                     |           |                                        |                                      |                  |                                                 |
| Benzo(g,h,i)Perylene | F613SB001 | 13-Oct-99     | 0.41                  | J         | NL                                     | NL                                   | NL               | NA                                              |
|                      | F613SB003 | 14-Oct-99     | 0.25                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB004 | 13-Oct-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB022 | 16-Nov-99     | 0.46                  | J         |                                        |                                      |                  |                                                 |
| Benzo(k)Fluoranthene | F613SB001 | 13-Oct-99     | 0.92                  | J         | 8.7                                    | 78                                   | 25               | 0.596                                           |
|                      | F613SB003 | 14-Oct-99     | 0.77                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB004 | 13-Oct-99     | 0.22                  | J         |                                        |                                      |                  |                                                 |
|                      | F613SB010 | 13-Oct-99     | 0.098                 | J         |                                        |                                      |                  |                                                 |
|                      | F613SB011 | 15-Oct-99     | 0.097                 | J         |                                        |                                      |                  |                                                 |
| F613SB013            | 14-Oct-99 | 0.15          | J                     |           |                                        |                                      |                  |                                                 |

**TABLE 4-3**

Organic Compounds Detected in Surface Soil in RFI Addendum Samples

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter                   | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Concentration <sup>c</sup> |
|-----------------------------|-----------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-------------------------------------------------|
| Benzo(k)Fluoranthene        | F613SB021 | 16-Nov-99     | 0.13                  | J         | 8.7                                    | 78                                   | 25               | 0.596                                           |
|                             | F613SB022 | 16-Nov-99     | 1.2                   | J         |                                        |                                      |                  |                                                 |
|                             | F613SB023 | 16-Nov-99     | 0.086                 | J         |                                        |                                      |                  |                                                 |
|                             | F613SB024 | 16-Nov-99     | 0.098                 | J         |                                        |                                      |                  |                                                 |
|                             | F613SB033 | 07-Jun-01     | 0.17                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SP027 | 14-Oct-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SP051 | 15-Oct-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
| Benzoic acid*               | F613SB005 | 13-Oct-99     | 0.11                  | J         | 31,000                                 | 820,000                              | 200              | NA                                              |
|                             | F613SB024 | 16-Nov-99     | 0.097                 | J         |                                        |                                      |                  |                                                 |
|                             | F613SB027 | 16-Nov-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
| bis(2-Ethylhexyl) Phthalate | F613SB012 | 14-Oct-99     | 0.13                  | J         | 46                                     | 410                                  | 1,800            | NA                                              |
|                             | F613SB029 | 01-Dec-99     | 0.88                  | =         |                                        |                                      |                  |                                                 |
|                             | F613SB030 | 01-Dec-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
| Carbon Disulfide            | F613SP022 | 13-Oct-99     | 0.002                 | J         | 780                                    | 20,000                               | 2                | NA                                              |
|                             | F613SP027 | 14-Oct-99     | 0.005                 | J         |                                        |                                      |                  |                                                 |
|                             | F613SP051 | 15-Oct-99     | 0.005                 | J         |                                        |                                      |                  |                                                 |
| Chrysene                    | F613SB001 | 13-Oct-99     | 0.94                  | J         | 87                                     | 780                                  | 80               | 0.62                                            |
|                             | F613SB003 | 14-Oct-99     | 0.87                  | =         |                                        |                                      |                  |                                                 |
|                             | F613SB004 | 13-Oct-99     | 0.27                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB005 | 13-Oct-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB008 | 13-Oct-99     | 0.36                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB009 | 13-Oct-99     | 1.0                   | J         |                                        |                                      |                  |                                                 |
|                             | F613SB010 | 13-Oct-99     | 0.15                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB011 | 15-Oct-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB012 | 14-Oct-99     | 0.10                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB013 | 14-Oct-99     | 0.16                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB021 | 16-Nov-99     | 0.13                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB022 | 16-Nov-99     | 1.3                   | =         |                                        |                                      |                  |                                                 |
|                             | F613SB023 | 16-Nov-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB024 | 16-Nov-99     | 0.14                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SB033 | 07-Jun-01     | 0.22                  | =         |                                        |                                      |                  |                                                 |
|                             | F613SB034 | 07-Jun-01     | 0.2                   | =         |                                        |                                      |                  |                                                 |
|                             | F613SP022 | 13-Oct-99     | 0.088                 | J         |                                        |                                      |                  |                                                 |
|                             | F613SP027 | 14-Oct-99     | 0.14                  | J         |                                        |                                      |                  |                                                 |
|                             | F613SP051 | 15-Oct-99     | 0.1                   | J         |                                        |                                      |                  |                                                 |

**TABLE 4-3**  
 Organic Compounds Detected in Surface Soil in RFI Addendum Samples  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter               | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Concentration <sup>c</sup> |       |
|-------------------------|-----------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-------------------------------------------------|-------|
| Dibenz(a,h)anthracene   | F613SB003 | 14-Oct-99     | 0.17                  | J         | 0.087                                  | 0.78                                 | 1                | 0.525                                           |       |
|                         | F613SB022 | 16-Nov-99     | 0.24                  | J         |                                        |                                      |                  |                                                 |       |
| Dibenzofuran            | F613SB003 | 14-Oct-99     | 0.14                  | J         | 31                                     | 820                                  | 3.9              | NA                                              |       |
|                         | F613SB008 | 13-Oct-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB009 | 13-Oct-99     | 0.76                  | J         |                                        |                                      |                  |                                                 |       |
| Di-n-butyl Phthalate    | F613SB008 | 13-Oct-99     | 0.24                  | J         | 780                                    | 20,000                               | 1,200            | NA                                              |       |
|                         | F613SB023 | 16-Nov-99     | 0.17                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB027 | 16-Nov-99     | 1.5                   | J         |                                        |                                      |                  |                                                 |       |
| Flouranthene            | F613SB001 | 13-Oct-99     | 1.7                   | J         | 310                                    | 8,200                                | 2,200            | NA                                              |       |
|                         | F613SB002 | 14-Oct-99     | 0.086                 | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB003 | 14-Oct-99     | 1.6                   | =         |                                        |                                      |                  |                                                 |       |
|                         | F613SB004 | 13-Oct-99     | 0.48                  | =         |                                        |                                      |                  |                                                 |       |
|                         | F613SB005 | 13-Oct-99     | 0.18                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB008 | 13-Oct-99     | 0.40                  | =         |                                        |                                      |                  |                                                 |       |
|                         | F613SB009 | 13-Oct-99     | 0.58                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB010 | 13-Oct-99     | 0.20                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB011 | 15-Oct-99     | 0.17                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB012 | 14-Oct-99     | 0.19                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB013 | 14-Oct-99     | 0.23                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB014 | 13-Oct-99     | 1.2                   | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB021 | 16-Nov-99     | 0.24                  | J         |                                        |                                      |                  |                                                 |       |
|                         | F613SB022 | 16-Nov-99     | 2.4                   | =         |                                        |                                      |                  |                                                 |       |
|                         | F613SB023 | 16-Nov-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |       |
|                         | Fluorene  | F613SB003     | 14-Oct-99             | 0.096     | J                                      | 310                                  | 8,200            | 280                                             | NA    |
| F613SB008               |           | 13-Oct-99     | 0.39                  | J         |                                        |                                      |                  |                                                 |       |
| F613SB009               |           | 13-Oct-99     | 2.2                   | =         |                                        |                                      |                  |                                                 |       |
| F613SB022               |           | 16-Nov-99     | 0.084                 | J         |                                        |                                      |                  |                                                 |       |
| Gamma-chlordane**       |           | F613SP022     | 13-Oct-99             | 0.0063    | =                                      | 1.8                                  | 16               | 5                                               | NA    |
|                         |           | F613SP027     | 14-Oct-99             | 0.099     | J                                      |                                      |                  |                                                 |       |
| Indeno(1,2,3-c,d)pyrene |           | F613SB001     | 13-Oct-99             | 0.44      | J                                      | 0.87                                 | 7.8              | 7                                               | 0.525 |
|                         |           | F613SB003     | 14-Oct-99             | 0.28      | J                                      |                                      |                  |                                                 |       |
|                         |           | F613SB004     | 13-Oct-99             | 0.11      | J                                      |                                      |                  |                                                 |       |

**TABLE 4-3**

Organic Compounds Detected in Surface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter                | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Concentration <sup>c</sup> |
|--------------------------|-----------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-------------------------------------------------|
| Indeno(1,2,3-c,d) pyrene | F613SB022 | 16-Nov-99     | 0.49                  | J         | 0.87                                   | 7.8                                  | 7                | 0.525                                           |
|                          | F613SB033 | 07-Jun-01     | 0.099                 | =         |                                        |                                      |                  |                                                 |
|                          | F613SB034 | 07-Jun-01     | 0.0706                | =         |                                        |                                      |                  |                                                 |
| Isophorone               | F613SB026 | 16-Nov-99     | 0.18                  | J         | 670                                    | 6,000                                | 0.25             | NA                                              |
| Methyl ethyl ketone      | F613SP051 | 15-Oct-99     | 0.015                 | =         | 4,700                                  | 120,000                              | 0.4              | NA                                              |
| Naphthalene              | F613SB008 | 13-Oct-99     | 0.23                  | J         | 160                                    | 4,100                                | 4.0              | NA                                              |
|                          | F613SB009 | 13-Oct-99     | 2.4                   | =         |                                        |                                      |                  |                                                 |
|                          | F613SB025 | 16-Nov-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
| p,p'-DDD                 | F613SP022 | 13-Oct-99     | 0.0078                | =         | 2.7                                    | 24                                   | 8                | NA                                              |
|                          | F613SP027 | 14-Oct-99     | 1.6                   | =         |                                        |                                      |                  |                                                 |
| p,p'-DDE                 | F613SP027 | 14-Oct-99     | 1.4                   | =         | 1.9                                    | 17                                   | 27               | NA                                              |
| p,p'-DDT                 | F613SP027 | 14-Oct-99     | 0.021                 | =         | 1.9                                    | 17                                   | 16               | NA                                              |
| PCB-1260 (Aroclor 1260)  | F613SP027 | 14-Oct-99     | 0.072                 | =         | 0.32                                   | 2.9                                  | NA               | NA                                              |
| Phenanthrene             | F613SB001 | 13-Oct-99     | 0.63                  | J         | NL                                     | NL                                   | NL               | NA                                              |
|                          | F613SB002 | 14-Oct-99     | 0.099                 | J         |                                        |                                      |                  |                                                 |
|                          | F613SB003 | 14-Oct-99     | 1.2                   | =         |                                        |                                      |                  |                                                 |
|                          | F613SB004 | 13-Oct-99     | 0.31                  | J         |                                        |                                      |                  |                                                 |
|                          | F613SB008 | 13-Oct-99     | 0.77                  | =         |                                        |                                      |                  |                                                 |
|                          | F613SB009 | 13-Oct-99     | 5.0                   | =         |                                        |                                      |                  |                                                 |
|                          | F613SB012 | 14-Oct-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
|                          | F613SB013 | 14-Oct-99     | 0.17                  | J         |                                        |                                      |                  |                                                 |
|                          | F613SB016 | 13-Oct-99     | 0.086                 | J         |                                        |                                      |                  |                                                 |
|                          | F613SB021 | 16-Nov-99     | 0.1                   | J         |                                        |                                      |                  |                                                 |
|                          | F613SB022 | 16-Nov-99     | 1.4                   | =         |                                        |                                      |                  |                                                 |
|                          | F613SB024 | 16-Nov-99     | 0.11                  | J         |                                        |                                      |                  |                                                 |
|                          | F613SP022 | 13-Oct-99     | 0.083                 | J         |                                        |                                      |                  |                                                 |
|                          | F613SP027 | 14-Oct-99     | 0.14                  | J         |                                        |                                      |                  |                                                 |
|                          | F613SP051 | 15-Oct-99     | 0.098                 | J         |                                        |                                      |                  |                                                 |
| Pyrene                   | F613SB001 | 13-Oct-99     | 2.0                   | J         | 230                                    | 6,100                                | 2,100            | NA                                              |
|                          | F613SB002 | 14-Oct-99     | 0.092                 | J         |                                        |                                      |                  |                                                 |
|                          | F613SB003 | 14-Oct-99     | 1.5                   | =         |                                        |                                      |                  |                                                 |
|                          | F613SB004 | 13-Oct-99     | 0.42                  | J         |                                        |                                      |                  |                                                 |
|                          | F613SB005 | 13-Oct-99     | 0.20                  | J         |                                        |                                      |                  |                                                 |
|                          | F613SB008 | 13-Oct-99     | 1.1                   | J         |                                        |                                      |                  |                                                 |
| F613SB009                | 13-Oct-99 | 2.4           | J                     |           |                                        |                                      |                  |                                                 |

**TABLE 4-3**

Organic Compounds Detected in Surface Soil in RFI Addendum Samples

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter         | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | Unrestricted Land Use RBC <sup>a</sup> | Industrial Land Use RBC <sup>a</sup> | SSL <sup>b</sup> | Zones E/F Background Concentration <sup>c</sup> |
|-------------------|-----------|---------------|-----------------------|-----------|----------------------------------------|--------------------------------------|------------------|-------------------------------------------------|
| Pyrene            | F613SB010 | 13-Oct-99     | 0.20                  | J         | 230                                    | 6,100                                | 2,100            | NA                                              |
|                   | F613SB011 | 15-Oct-99     | 0.27                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SB012 | 14-Oct-99     | 0.15                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SB013 | 14-Oct-99     | 0.21                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SB014 | 13-Oct-99     | 0.96                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SB021 | 16-Nov-99     | 0.25                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SB022 | 16-Nov-99     | 2.7                   | =         |                                        |                                      |                  |                                                 |
|                   | F613SB023 | 16-Nov-99     | 0.15                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SB024 | 16-Nov-99     | 0.25                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SP022 | 13-Oct-99     | 0.12                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SP027 | 14-Oct-99     | 0.23                  | J         |                                        |                                      |                  |                                                 |
|                   | F613SP051 | 15-Oct-99     | 0.27                  | J         |                                        |                                      |                  |                                                 |
| Toluene           | F613SP027 | 14-Oct-99     | 0.004                 | J         | 16,000                                 | 410,000                              | 0.6              | NA                                              |
| BEQs <sup>d</sup> | F613SB001 | 13-Oct-99     | 1.539                 | =         | NA                                     | NA                                   | NA               | 1.304                                           |
|                   | F613SB003 | 14-Oct-99     | 1.053                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB004 | 13-Oct-99     | 0.511                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB005 | 13-Oct-99     | 0.454                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB008 | 13-Oct-99     | 0.466                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB009 | 13-Oct-99     | 2.042                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB010 | 13-Oct-99     | 0.341                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB011 | 15-Oct-99     | 0.350                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB012 | 14-Oct-99     | 0.326                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB013 | 14-Oct-99     | 0.371                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB021 | 16-Nov-99     | 0.364                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB022 | 16-Nov-99     | 1.772                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB023 | 16-Nov-99     | 0.367                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB024 | 16-Nov-99     | 0.385                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB033 | 07-Jun-01     | 0.289                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SB034 | 07-Jun-01     | 0.259                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SP022 | 13-Oct-99     | 0.318                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SP027 | 14-Oct-99     | 0.352                 | =         |                                        |                                      |                  |                                                 |
|                   | F613SP051 | 15-Oct-99     | 0.496                 | =         |                                        |                                      |                  |                                                 |

\*No Region III generic SSL available, value listed is from Region IX RBC table, November 2000.

\*\*RBCs and SSL for Chlordane

<sup>a</sup>RBCs from EPA Region III RBC Tables, October 2000. RBCs for non-carcinogenic compounds are adjusted for HI = 0.1.

<sup>b</sup>Values extrapolated from EPA Soil Screening Guidance: User's Guide; DAF = 1.0 used for VOCs (italicized); DAF = 10 for others.

<sup>c</sup>Sitewide background concentration from Background PAHs Study Report: Technical Information for the Development of Background BEQ Values (CH2M-Jones, 2001b).

**TABLE 4-4**  
 Organic Compounds Detected in Subsurface Soil in RFI Addendum Samples  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter            | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> | Zones E/F Background Concentration <sup>b</sup> |
|----------------------|-----------|---------------|-----------------------|-----------|------------------|-------------------------------------------------|
| 2-Methylnaphthalene  | F613SB008 | 13-Oct-99     | 0.24                  | J         | 11               | NA                                              |
|                      | F613SB009 | 13-Oct-99     | 0.12                  | J         |                  |                                                 |
|                      | F613SB011 | 15-Oct-99     | 0.4                   | J         |                  |                                                 |
|                      | F613SB014 | 13-Oct-99     | 0.54                  | =         |                  |                                                 |
|                      | F613SB016 | 13-Oct-99     | 31                    | =         |                  |                                                 |
| Acenaphthene         | F613SB016 | 13-Oct-99     | 1.4                   | J         | 290              | NA                                              |
| Acenaphthylene       | F613SB005 | 13-Oct-99     | 0.19                  | J         | 50               | NA                                              |
| Acetone              | F613SP022 | 13-Oct-99     | 0.070                 | =         | 0.8              | NA                                              |
|                      | F613SP027 | 14-Oct-99     | 0.055                 | J         |                  |                                                 |
|                      | F613SP051 | 15-Oct-99     | 0.13                  | =         |                  |                                                 |
| Anthracene           | F613SB004 | 13-Oct-99     | 0.39                  | J         | 6,000            | NA                                              |
|                      | F613SB005 | 13-Oct-99     | 0.19                  | J         |                  |                                                 |
| Benzo(a)Anthracene   | F613SB004 | 13-Oct-99     | 0.33                  | J         | 1                | 0.627                                           |
|                      | F613SB005 | 13-Oct-99     | 1.2                   | =         |                  |                                                 |
|                      | F613SB006 | 13-Oct-99     | 0.17                  | J         |                  |                                                 |
|                      | F613SB008 | 13-Oct-99     | 0.14                  | J         |                  |                                                 |
|                      | F613SB009 | 13-Oct-99     | 0.13                  | J         |                  |                                                 |
|                      | F613SB010 | 13-Oct-99     | 0.18                  | J         |                  |                                                 |
|                      | F613SB013 | 14-Oct-99     | 0.14                  | J         |                  |                                                 |
|                      | F613SB016 | 13-Oct-99     | 0.29                  | J         |                  |                                                 |
|                      | F613SB026 | 17-Nov-99     | 0.19                  | J         |                  |                                                 |
| Benzo(a)Pyrene       | F613SB004 | 13-Oct-99     | 0.32                  | J         | 4                | 0.623                                           |
|                      | F613SB005 | 13-Oct-99     | 1.0                   | =         |                  |                                                 |
|                      | F613SB006 | 13-Oct-99     | 0.19                  | J         |                  |                                                 |
|                      | F613SB008 | 13-Oct-99     | 0.15                  | J         |                  |                                                 |
|                      | F613SB009 | 13-Oct-99     | 0.12                  | J         |                  |                                                 |
|                      | F613SB010 | 13-Oct-99     | 0.21                  | J         |                  |                                                 |
|                      | F613SB013 | 14-Oct-99     | 0.13                  | J         |                  |                                                 |
|                      | F613SB016 | 13-Oct-99     | 0.21                  | J         |                  |                                                 |
|                      | F613SB026 | 17-Nov-99     | 0.16                  | J         |                  |                                                 |
| Benzo(b)Fluoranthene | F613SB004 | 13-Oct-99     | 0.29                  | J         | 2.5              | NA                                              |
|                      | F613SB005 | 13-Oct-99     | 1.1                   | =         |                  |                                                 |
|                      | F613SB006 | 13-Oct-99     | 0.22                  | J         |                  |                                                 |
|                      | F613SB008 | 13-Oct-99     | 0.14                  | J         |                  |                                                 |
|                      | F613SB009 | 13-Oct-99     | 0.12                  | J         |                  |                                                 |
|                      | F613SB010 | 13-Oct-99     | 0.21                  | J         |                  |                                                 |
|                      | F613SB013 | 14-Oct-99     | 0.15                  | J         |                  |                                                 |
|                      | F613SB016 | 13-Oct-99     | 0.26                  | J         |                  |                                                 |
| F613SB026            | 17-Nov-99 | 0.13          | J                     |           |                  |                                                 |

**TABLE 4-4**

Organic Compounds Detected in Subsurface Soil in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter                   | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> | Zones E/F Background Concentration <sup>b</sup> |
|-----------------------------|-----------|---------------|-----------------------|-----------|------------------|-------------------------------------------------|
| Benzo(g,h,i)Perylene        | F613SB004 | 13-Oct-99     | 0.15                  | J         | NL               | NA                                              |
|                             | F613SB005 | 13-Oct-99     | 0.43                  | J         |                  |                                                 |
|                             | F613SB006 | 13-Oct-99     | 0.14                  | J         |                  |                                                 |
| Benzo(k)Fluoranthene        | F613SB004 | 13-Oct-99     | 0.36                  | J         | 25               | 0.609                                           |
|                             | F613SB005 | 13-Oct-99     | 0.87                  | =         |                  |                                                 |
|                             | F613SB006 | 13-Oct-99     | 0.21                  | J         |                  |                                                 |
|                             | F613SB008 | 13-Oct-99     | 0.15                  | J         |                  |                                                 |
|                             | F613SB010 | 13-Oct-99     | 0.19                  | J         |                  |                                                 |
|                             | F613SB013 | 14-Oct-99     | 0.13                  | J         |                  |                                                 |
|                             | F613SB016 | 13-Oct-99     | 0.24                  | J         |                  |                                                 |
|                             | F613SB026 | 17-Nov-99     | 0.15                  | J         |                  |                                                 |
|                             | F613SP027 | 14-Oct-99     | 0.094                 | J         |                  |                                                 |
| bis(2-Ethylhexyl) Phthalate | F613SB002 | 14-Oct-99     | 0.65                  | J         | 1,800            | NA                                              |
|                             | F613SB013 | 14-Oct-99     | 0.11                  | J         |                  |                                                 |
| Carbon Disulfide            | F613SP022 | 13-Oct-99     | 0.003                 | J         | 2                | NA                                              |
|                             | F613SP027 | 14-Oct-99     | 0.002                 | J         |                  |                                                 |
|                             | F613SP051 | 15-Oct-99     | 0.017                 | J         |                  |                                                 |
| Chrysene                    | F613SB004 | 13-Oct-99     | 0.36                  | J         | 80               | 0.616                                           |
|                             | F613SB005 | 13-Oct-99     | 1.2                   | =         |                  |                                                 |
|                             | F613SB006 | 13-Oct-99     | 0.23                  | J         |                  |                                                 |
|                             | F613SB008 | 13-Oct-99     | 0.17                  | J         |                  |                                                 |
|                             | F613SB009 | 13-Oct-99     | 0.15                  | J         |                  |                                                 |
|                             | F613SB010 | 13-Oct-99     | 0.21                  | J         |                  |                                                 |
|                             | F613SB013 | 14-Oct-99     | 0.16                  | J         |                  |                                                 |
|                             | F613SB016 | 13-Oct-99     | 0.31                  | J         |                  |                                                 |
| F613SB026                   | 17-Nov-99 | 0.19          | J                     |           |                  |                                                 |
| Dibenz(a,h)anthracene       | F613SB005 | 13-Oct-99     | 0.26                  | J         | 1                | 0.586                                           |
| Dibenzofuran                | F613SB016 | 13-Oct-99     | 1.4                   | J         | 3.9              | NA                                              |
| Di-n-butyl Phthalate        | F613SB009 | 13-Oct-99     | 0.21                  | J         | 1,200            | NA                                              |
| Flouranthene                | F613SB002 | 14-Oct-99     | 0.3                   | J         | 2,200            | NA                                              |
|                             | F613SB003 | 14-Oct-99     | 0.13                  | J         |                  |                                                 |
|                             | F613SB004 | 13-Oct-99     | 0.95                  | =         |                  |                                                 |
|                             | F613SB005 | 13-Oct-99     | 1.4                   | =         |                  |                                                 |
|                             | F613SB006 | 13-Oct-99     | 0.2                   | J         |                  |                                                 |
|                             | F613SB008 | 13-Oct-99     | 0.22                  | J         |                  |                                                 |
|                             | F613SB009 | 13-Oct-99     | 0.19                  | J         |                  |                                                 |
| F613SB010                   | 13-Oct-99 | 0.3           | J                     |           |                  |                                                 |

**TABLE 4-4**  
 Organic Compounds Detected in Subsurface Soil in RFI Addendum Samples  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter               | Sample ID | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> | Zones E/F Background Concentration <sup>b</sup> |
|-------------------------|-----------|---------------|-----------------------|-----------|------------------|-------------------------------------------------|
| Flouranthene            | F613SB013 | 14-Oct-99     | 0.28                  | J         | 2,200            | NA                                              |
|                         | F613SB014 | 13-Oct-99     | 0.081                 | J         |                  |                                                 |
|                         | F613SB022 | 16-Nov-99     | 0.12                  | J         |                  |                                                 |
|                         | F613SB026 | 17-Nov-99     | 0.36                  | J         |                  |                                                 |
|                         | F613SP022 | 13-Oct-99     | 0.14                  | J         |                  |                                                 |
|                         | F613SP027 | 14-Oct-99     | 0.092                 | J         |                  |                                                 |
| Fluorene                | F613SB014 | 13-Oct-99     | 0.11                  | J         | 280              | NA                                              |
|                         | F613SB016 | 13-Oct-99     | 2.8                   | J         |                  |                                                 |
| Indeno(1,2,3-c,d)pyrene | F613SB004 | 13-Oct-99     | 0.14                  | J         | 7                | 0.592                                           |
|                         | F613SB005 | 13-Oct-99     | 0.46                  | J         |                  |                                                 |
|                         | F613SB006 | 13-Oct-99     | 0.14                  | J         |                  |                                                 |
| Isophorone              | F613SB021 | 16-Nov-99     | 0.26                  | J         | 0.25             | NA                                              |
| Methyl ethyl ketone     | F613SP022 | 13-Oct-99     | 0.003                 | J         | 0.4              | NA                                              |
|                         | F613SP027 | 14-Oct-99     | 0.002                 | J         |                  |                                                 |
| Naphthalene             | F613SB004 | 13-Oct-99     | 0.41                  | J         | 4                | NA                                              |
| p,p'-DDD                | F613SP027 | 14-Oct-99     | 0.15                  | J         | 8                | NA                                              |
| p,p'-DDE                | F613SP027 | 14-Oct-99     | 0.046                 | J         | 27               | NA                                              |
| p,p'-DDT                | F613SP027 | 14-Oct-99     | 0.027                 | =         | 16               | NA                                              |
| Phenanthrene            | F613SB004 | 13-Oct-99     | 0.23                  | J         | NL               | NA                                              |
|                         | F613SB005 | 13-Oct-99     | 0.26                  | J         |                  |                                                 |
|                         | F613SB008 | 13-Oct-99     | 0.17                  | J         |                  |                                                 |
|                         | F613SB009 | 13-Oct-99     | 0.27                  | J         |                  |                                                 |
|                         | F613SB011 | 15-Oct-99     | 0.33                  | J         |                  |                                                 |
|                         | F613SB013 | 14-Oct-99     | 0.16                  | J         |                  |                                                 |
|                         | F613SB014 | 13-Oct-99     | 0.19                  | J         |                  |                                                 |
|                         | F613SB016 | 13-Oct-99     | 6.5                   | J         |                  |                                                 |
|                         | F613SB026 | 17-Nov-99     | 0.2                   | J         |                  |                                                 |
| Pyrene                  | F613SB002 | 14-Oct-99     | 0.35                  | J         | 2,100            | NA                                              |
|                         | F613SB003 | 14-Oct-99     | 0.11                  | J         |                  |                                                 |
|                         | F613SB004 | 13-Oct-99     | 1.1                   | =         |                  |                                                 |
|                         | F613SB005 | 13-Oct-99     | 1.4                   | =         |                  |                                                 |
|                         | F613SB006 | 13-Oct-99     | 0.21                  | J         |                  |                                                 |
|                         | F613SB007 | 13-Oct-99     | 0.26                  | J         |                  |                                                 |
|                         | F613SB008 | 13-Oct-99     | 0.31                  | J         |                  |                                                 |
|                         | F613SB009 | 13-Oct-99     | 0.25                  | J         |                  |                                                 |
|                         | F613SB010 | 13-Oct-99     | 0.3                   | J         |                  |                                                 |

**TABLE 4-4**

Organic Compounds Detected in Subsurface Soil in RFI Addendum Samples  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter | Sample ID  | Sampling Date | Concentration (mg/kg) | Qualifier | SSL <sup>a</sup> | Zones E/F Background Concentration <sup>b</sup> |
|-----------|------------|---------------|-----------------------|-----------|------------------|-------------------------------------------------|
| Pyrene    | F613SB011  | 15-Oct-99     | 2.2                   | J         | 2,100            | NA                                              |
|           | F613SB012  | 14-Oct-99     | 0.13                  | J         |                  |                                                 |
|           | F613SB013  | 14-Oct-99     | 0.21                  | J         |                  |                                                 |
|           | F613SB016  | 13-Oct-99     | 0.68                  | =         |                  |                                                 |
|           | F613SB026  | 17-Nov-99     | 0.29                  | J         |                  |                                                 |
|           | F613SP022  | 13-Oct-99     | 0.16                  | J         |                  |                                                 |
|           | F613SP027  | 14-Oct-99     | 0.13                  | J         |                  |                                                 |
|           | F613SP051  | 15-Oct-99     | 0.18                  | J         |                  |                                                 |
| BEQs      | F613SB004  | 13-Oct-99     | 0.740                 | =         | 1.4              |                                                 |
|           | F613SB005  | 13-Oct-99     | <b>1.546</b>          | =         |                  |                                                 |
|           | F613SB006  | 13-Oct-99     | 0.515                 | =         |                  |                                                 |
|           | F613SB008  | 13-Oct-99     | 0.548                 | =         |                  |                                                 |
|           | F613SB009  | 13-Oct-99     | 0.439                 | =         |                  |                                                 |
|           | F613SB010  | 13-Oct-99     | 0.548                 | =         |                  |                                                 |
|           | F613SB013  | 14-Oct-99     | 0.408                 | =         |                  |                                                 |
|           | F613SB016  | 13-Oct-99     | 0.609                 | =         |                  |                                                 |
|           | F613SB026  | 17-Nov-99     | 0.485                 | =         |                  |                                                 |
|           | F613SP022  | 15-Sep-96     | <b>2.321</b>          | =         |                  |                                                 |
|           | F613SP027  | 14-Oct-99     | 0.438                 | =         |                  |                                                 |
|           | LE504SB002 | 08-Jul-97     | 0.506                 | =         |                  |                                                 |
|           | LE504SB003 | 08-Jul-97     | 0.455                 | =         |                  |                                                 |

Concentrations shown outlined and in bold print indicate exceedance of comparison criteria.

<sup>a</sup>Values extrapolated from EPA Soil Screening Guidance: User's Guide; DAF = 1.0 used for VOCs (italicized).

<sup>b</sup>Sitewide background concentration for subsurface soil taken from Background PAHs Study Report: Technical Information for the development of Background BEQ Values (CH2M-Jones, 2001b).

**TABLE 4-5**

Parameters Analyzed in AOC 613 DPT Groundwater Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Location        | Sample Date | SW846<br>VOCs | SW846<br>SVOCs | SW846<br>Metals | App IX<br>VOCs | App IX<br>SVOCs | Duplicate Sample<br>Note 1 |
|-----------------|-------------|---------------|----------------|-----------------|----------------|-----------------|----------------------------|
| F613GP001       | 09/12/1996  | X             | X              | X               |                |                 |                            |
| F613GP002       | 09/13/1996  | X             | X              |                 |                |                 |                            |
| F613GP003       | 08/29/1996  | X             | X              | X               |                |                 |                            |
| F613GP004       | 10/02/1996  | X             | X              | X               |                |                 |                            |
| F613GP005       | 10/03/1996  | X             |                |                 |                |                 |                            |
| F613GP006       | 10/04/1996  |               | X              | X               |                |                 |                            |
| F613GP007       | 09/12/1996  | X             | X              | X               |                |                 |                            |
| F613GP008       | 09/13/1996  | X             |                |                 |                |                 |                            |
| F613GP009       | 08/29/1996  | X             |                |                 |                |                 |                            |
| F613GP010       | 10/02/1996  | X             | X              | X               |                |                 |                            |
| F613GP012       | 10/10/1996  | X             |                |                 |                |                 |                            |
| F613GP013       | 10/07/1996  | X             | X              | X               |                |                 |                            |
| F613GP017       | 10/03/1996  | X             |                |                 |                |                 |                            |
| F613GP019       | 10/08/1996  | X             | X              | X               |                |                 |                            |
| F613GP020       | 09/12/1996  | X             |                |                 |                |                 |                            |
| F613GP021       | 08/29/1996  | X             | X              | X               |                |                 |                            |
| F613GP022       | 09/15/1996  | X             |                |                 |                |                 |                            |
| F613GP024       | 09/11/1996  | X             |                | X               |                |                 |                            |
| F613GP025       | 08/29/1996  | X             | X              |                 |                |                 |                            |
| F613GP026       | 09/15/1996  | X             |                |                 |                |                 |                            |
| F613GP027       | 09/15/1996  | X             |                |                 |                |                 |                            |
| F613GP028       | 09/11/1996  | X             | X              | X               |                |                 |                            |
| F613GP029       | 08/28/1996  | X             | X              | X               |                |                 |                            |
| F613GP030       | 09/28/1996  | X             | X              | X               |                |                 |                            |
| F613HP030 (dup) | 09/28/1996  |               |                | X               | X              | X               | X                          |
| F613GP031       | 09/14/1996  | X             |                | X               |                |                 |                            |
| F613GP032       | 09/10/1996  | X             | X              | X               |                |                 |                            |
| F613GP033       | 08/28/1996  | X             | X              | X               |                |                 |                            |
| F613GP034       | 09/28/1996  | X             | X              | X               |                |                 |                            |
| F613GP035       | 09/16/1996  | X             | X              | X               |                |                 |                            |
| F613GP036       | 09/09/1996  | X             | X              | X               |                |                 |                            |

**TABLE 4-5**

Parameters Analyzed in AOC 613 DPT Groundwater Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Location        | Sample Date | SW846<br>VOCs | SW846<br>SVOCs | SW846<br>Metals | App IX<br>VOCs | App IX<br>SVOCs | Duplicate Sample<br>Note 1 |
|-----------------|-------------|---------------|----------------|-----------------|----------------|-----------------|----------------------------|
| F613GP037       | 08/30/1996  | X             | X              | X               |                |                 |                            |
| F613GP038       | 09/16/1996  | X             | X              | X               |                |                 |                            |
| F613GP039       | 09/29/1996  | X             |                | X               |                |                 |                            |
| F613GP040       | 09/13/1996  | X             | X              | X               |                |                 |                            |
| F613GP041       | 09/10/1996  | X             | X              | X               |                |                 |                            |
| F613HP041 (dup) | 09/10/1996  |               |                | X               | X              | X               | X                          |
| F613GP042       | 09/03/1996  | X             | X              | X               |                |                 |                            |
| F613GP043       | 09/09/1996  | X             | X              | X               |                |                 |                            |
| F613GP044       | 08/27/1996  | X             | X              | X               |                |                 |                            |
| F613GP046       | 10/09/1996  | X             | X              | X               |                |                 |                            |
| F613GP047       | 10/08/1996  | X             | X              | X               |                |                 |                            |
| F613GP048       | 09/10/1996  | X             | X              | X               |                |                 |                            |
| F613GP049       | 09/09/1996  | X             | X              | X               |                |                 |                            |
| F613GP050       | 09/04/1996  | X             | X              | X               |                |                 |                            |
| F613HP050 (dup) | 09/04/1996  |               |                | X               | X              | X               | X                          |
| F613GP051       | 08/27/1996  | X             | X              | X               |                |                 |                            |
| F613GP052       | 10/09/1996  | X             | X              | X               |                |                 |                            |
| F613GP053       | 09/17/1996  | X             |                |                 |                |                 |                            |
| F613GP054       | 09/17/1996  | X             |                |                 |                |                 |                            |
| F613GP056       | 09/03/1996  | X             |                |                 |                |                 |                            |
| F613GP057       | 08/30/1996  | X             | X              |                 |                |                 |                            |
| F613GP058       | 08/30/1996  | X             | X              | X               |                |                 |                            |
| F613GP059       | 09/03/1996  | X             | X              | X               |                |                 |                            |
| F613GP060       | 09/04/1996  | X             | X              | X               |                |                 |                            |
| F613GP063       | 10/16/1996  | X             | X              | X               |                |                 |                            |
| F613GP064       | 10/15/1996  | X             | X              | X               |                |                 |                            |
| F613GP065       | 10/14/1996  | X             | X              | X               |                |                 |                            |
| F613HP065 (dup) | 10/13/1996  |               |                | X               | X              | X               |                            |
| F613GP066       | 10/13/1996  | X             | X              | X               |                |                 |                            |
| F613GP067       | 10/12/1996  | X             | X              | X               |                |                 |                            |
| F613GP068       | 10/11/1996  | X             | X              | X               |                |                 |                            |
| F613HP068 (dup) | 10/11/1996  |               |                |                 | X              |                 |                            |

Duplicate Sample Note 1: Cyanide, Cr VI, SW846 Organophosphorous Pesticides, SW846 Dioxins,  
 App IX Herbicides, App IX Pesticides/PCBs

**TABLE 4-6**

**Metals Detected in Groundwater in RFI Addendum Samples**

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC | Zone E BRC |
|-----------|-----------|--------------|----------------------|-----------|---------|------------|------------|
| Aluminum  | F240GW003 | 12-Nov-97    | 561                  | J         | 3,700   | 224        | 2,810      |
|           | F613GW001 | 06-Nov-97    | 64.4                 | J         |         |            |            |
|           | F613GW004 | 06-Nov-97    | 637                  | =         |         |            |            |
|           | F613GW005 | 25-Nov-97    | 226                  | =         |         |            |            |
|           | F613GW006 | 20-Oct-98    | 2,690                | =         |         |            |            |
|           | F613GW007 | 19-Nov-99    | 66.6                 | J         |         |            |            |
|           | GFDSGW17A | 28-Jan-97    | 249                  | =         |         |            |            |
|           | GFDSGW17A | 17-Jun-97    | 218                  | =         |         |            |            |
|           | FFDSGW17A | 24-Apr-98    | 4,290                | =         |         |            |            |
|           | GFDSGW17A | 20-Oct-98    | 161                  | J         |         |            |            |
|           | GFDSGW17B | 28-Jan-97    | 205                  | =         |         |            |            |
|           | GFDSGW17B | 17-Jun-97    | 85.8                 | J         |         |            |            |
|           | FFDSGW17B | 24-Apr-98    | 2,580                | =         |         |            |            |
|           | FGELGW005 | 12-Nov-97    | 5,500                | J         |         |            |            |
|           | FGELGW011 | 12-Nov-97    | 323                  | J         |         |            |            |
|           | FGELGW012 | 13-Nov-97    | 439                  | J         |         |            |            |
|           | FGELGW013 | 14-Nov-97    | 213                  | J         |         |            |            |
|           | FGELGW014 | 01-Dec-97    | 89.1                 | =         |         |            |            |
|           | GGELGW014 | 22-Apr-98    | 1,970                | =         |         |            |            |
|           | F613GW02D | 07-Nov-97    | 57.6                 | J         |         |            |            |
| Antimony  | GFDSGW17A | 28-Jan-97    | 2.9                  | J         | 6       | ND         | 2 - 5 *    |
|           | GFDSGW17B | 28-Jan-97    | 3                    | J         |         |            |            |
| Arsenic   | F240GW003 | 12-Nov-97    | 9.5                  | J         | 50      | 16.7       | 18.7       |
|           | F613GW004 | 06-Nov-97    | 10.5                 | =         |         |            |            |
|           | F613GW005 | 25-Nov-97    | 34.4                 | =         |         |            |            |
|           | F613GW006 | 20-Oct-98    | 27.3                 | =         |         |            |            |
|           | F613GW006 | 18-Jun-99    | 207                  | =         |         |            |            |
|           | F613GW006 | 12-Oct-99    | 211                  | =         |         |            |            |
|           | GFDSGW17A | 17-Jun-97    | 5.5                  | J         |         |            |            |
|           | FFDSGW17A | 24-Apr-98    | 7.4                  | J         |         |            |            |
|           | GFDSGW17A | 20-Oct-98    | 12.3                 | =         |         |            |            |
|           | FFDSGW17A | 12-Oct-99    | 12.9                 | =         |         |            |            |
|           | GFDSGW17B | 28-Jan-97    | 51.5                 | =         |         |            |            |
|           | GFDSGW17B | 17-Jun-97    | 58                   | =         |         |            |            |
|           | FFDSGW17B | 24-Apr-98    | 58.5                 | =         |         |            |            |
|           | GFDSGW17B | 20-Oct-98    | 63.8                 | =         |         |            |            |
|           | FFDSGW17B | 12-Oct-99    | 66                   | =         |         |            |            |
|           | FFDSGW17B | 15-Jan-99    | 62.1                 | J         |         |            |            |
| FGELGW007 | 12-Nov-97 | 7.1          | J                    |           |         |            |            |

**TABLE 4-6**

Metals Detected in Groundwater in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC | Zone E BRC |
|-----------|-----------|--------------|----------------------|-----------|---------|------------|------------|
| Arsenic   | FGELGW008 | 14-Nov-97    | 9.7                  | J         | 50      | 16.7       | 18.7       |
|           | FGELGW011 | 12-Nov-97    | 4.9                  | J         |         |            |            |
|           | FGELGW013 | 14-Nov-97    | 11.1                 | =         |         |            |            |
|           | FGELGW014 | 01-Dec-97    | 47.4                 | =         |         |            |            |
|           | FGELGW014 | 20-Oct-98    | 36.9                 | =         |         |            |            |
|           | GGELGW014 | 22-Apr-98    | 41.8                 | =         |         |            |            |
|           | FGELGW014 | 12-Oct-99    | 18                   | =         |         |            |            |
|           | F613GW02D | 07-Nov-97    | 7.9                  | J         |         | 16.2       | 16.4       |
| Barium    | F240GW003 | 12-Nov-97    | 47.1                 | =         | 2,000   | 94.3       | 211        |
|           | F613GW001 | 06-Nov-97    | 15.7                 | =         |         |            |            |
|           | F613GW003 | 07-Nov-97    | 245                  | =         |         |            |            |
|           | F613GW004 | 06-Nov-97    | 21.4                 | =         |         |            |            |
|           | F613GW005 | 25-Nov-97    | 26.3                 | =         |         |            |            |
|           | F613GW006 | 20-Oct-98    | 34.3                 | J         |         |            |            |
|           | F613GW006 | 18-Jun-99    | 21.2                 | J         |         |            |            |
|           | F613GW006 | 12-Oct-99    | 35.2                 | J         |         |            |            |
|           | F613GW007 | 19-Nov-99    | 87.6                 | J         |         |            |            |
|           | GFDSGW17A | 28-Jan-97    | 16                   | J         |         |            |            |
|           | GFDSGW17A | 17-Jun-97    | 7.4                  | J         |         |            |            |
|           | FFDSGW17A | 24-Apr-98    | 14.7                 | =         |         |            |            |
|           | FFDSGW17A | 12-Oct-99    | 5.2                  | J         |         |            |            |
|           | GFDSGW17B | 28-Jan-97    | 7.8                  | J         |         |            |            |
|           | GFDSGW17B | 17-Jun-97    | 3.4                  | J         |         |            |            |
|           | FFDSGW17B | 24-Apr-98    | 7.4                  | J         |         |            |            |
|           | FFDSGW17B | 12-Oct-99    | 3                    | J         |         |            |            |
|           | FGELGW005 | 12-Nov-97    | 71.7                 | =         |         |            |            |
|           | FGELGW006 | 14-Nov-97    | 26.9                 | =         |         |            |            |
|           | FGELGW007 | 12-Nov-97    | 119                  | =         |         |            |            |
|           | FGELGW008 | 14-Nov-97    | 93                   | =         |         |            |            |
|           | FGELGW011 | 12-Nov-97    | 44.3                 | =         |         |            |            |
|           | FGELGW012 | 13-Nov-97    | 39.7                 | =         |         |            |            |
|           | FGELGW013 | 14-Nov-97    | 36.8                 | =         |         |            |            |
|           | FGELGW014 | 01-Dec-97    | 23.9                 | =         |         |            |            |
|           | FGELGW014 | 20-Oct-98    | 31.8                 | J         |         |            |            |
|           | GGELGW014 | 22-Apr-98    | 43.6                 | =         |         |            |            |
|           | FGELGW014 | 12-Oct-99    | 40.9                 | J         |         |            |            |
|           | F613GW02D | 07-Nov-97    | 25.9                 | =         |         | 200        | 218        |
|           | Beryllium | F613GW003    | 07-Nov-97            | 1.1       | J       | 4          | 0.66       |
| F613GW004 |           | 06-Nov-97    | 0.24                 | J         |         |            |            |

**TABLE 4-6**

Metals Detected in Groundwater in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter       | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC          | Zone E BRC         |
|-----------------|-----------|--------------|----------------------|-----------|---------|---------------------|--------------------|
| Cadmium         | GFDSGW17B | 20-Oct-98    | 1.6                  | J         | 5       | 0.82                | 1.4 *              |
|                 | FGELGW007 | 12-Nov-97    | 0.83                 | J         |         |                     |                    |
|                 | FGELGW014 | 01-Dec-97    | 1.9                  | J         |         |                     |                    |
|                 | GGELGW014 | 22-Apr-98    | 1.3                  | J         |         |                     |                    |
|                 | FGELGW014 | 12-Oct-99    | 0.3                  | J         |         |                     |                    |
| Calcium         | F240GW003 | 12-Nov-97    | 44,800               | =         | NL      | 29,700 - 97,000 *   | 1,170 - 260,000 *  |
|                 | F613GW001 | 06-Nov-97    | 52,100               | =         |         |                     |                    |
|                 | F613GW003 | 07-Nov-97    | 267,000              | =         |         |                     |                    |
|                 | F613GW004 | 06-Nov-97    | 20,400               | =         |         |                     |                    |
|                 | F613GW005 | 25-Nov-97    | 97,900               | =         |         |                     |                    |
|                 | F613GW006 | 20-Oct-98    | 32,300               | =         |         |                     |                    |
|                 | F613GW006 | 18-Jun-99    | 31,600               | =         |         |                     |                    |
|                 | F613GW006 | 12-Oct-99    | 73,900               | =         |         |                     |                    |
|                 | F613GW007 | 19-Nov-99    | 100,000              | =         |         |                     |                    |
|                 | GFDSGW17A | 28-Jan-97    | 15,400               | J         |         |                     |                    |
|                 | GFDSGW17A | 17-Jun-97    | 5,810                | =         |         |                     |                    |
|                 | FFDSGW17A | 24-Apr-98    | 6,400                | =         |         |                     |                    |
|                 | GFDSGW17A | 20-Oct-98    | 13,600               | =         |         |                     |                    |
|                 | FFDSGW17A | 12-Oct-99    | 12,500               | =         |         |                     |                    |
|                 | GFDSGW17B | 28-Jan-97    | 13,300               | J         |         |                     |                    |
|                 | GFDSGW17B | 17-Jun-97    | 7,840                | =         |         |                     |                    |
|                 | FFDSGW17B | 24-Apr-98    | 5,540                | =         |         |                     |                    |
|                 | GFDSGW17B | 20-Oct-98    | 6,630                | =         |         |                     |                    |
|                 | FFDSGW17B | 12-Oct-99    | 10,500               | =         |         |                     |                    |
|                 | FGELGW005 | 12-Nov-97    | 266,000              | =         |         |                     |                    |
|                 | FGELGW006 | 14-Nov-97    | 9,920                | =         |         |                     |                    |
|                 | FGELGW007 | 12-Nov-97    | 271,000              | =         |         |                     |                    |
|                 | FGELGW008 | 14-Nov-97    | 182,000              | =         |         |                     |                    |
|                 | FGELGW011 | 12-Nov-97    | 177,000              | =         |         |                     |                    |
|                 | FGELGW012 | 13-Nov-97    | 40,000               | =         |         |                     |                    |
|                 | FGELGW013 | 14-Nov-97    | 197,000              | =         |         |                     |                    |
|                 | FGELGW014 | 01-Dec-97    | 64,700               | =         |         |                     |                    |
|                 | FGELGW014 | 20-Oct-98    | 50,600               | =         |         |                     |                    |
|                 | GGELGW014 | 22-Apr-98    | 122,000              | =         |         |                     |                    |
|                 | FGELGW014 | 12-Oct-99    | 90,500               | =         |         |                     |                    |
|                 | F613GW02D | 07-Nov-97    | 148,000              | =         |         | 182,000 - 191,000 * | 44,000 - 391,000 * |
| Chromium, Total | F240GW003 | 12-Nov-97    | 1.2                  | J         | 100     | 2.05                | 12.3               |
|                 | F613GW007 | 19-Nov-99    | 0.6                  | J         |         |                     |                    |

**TABLE 4-6**

Metals Detected in Groundwater in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter       | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC | Zone E BRC |
|-----------------|-----------|--------------|----------------------|-----------|---------|------------|------------|
| Chromium, Total | GFDSGW17A | 28-Jan-97    | 1.2                  | J         | 100     | 2.05       | 12.3       |
|                 | FFDSGW17A | 24-Apr-98    | 7.7                  | J         |         |            |            |
|                 | GFDSGW17B | 28-Jan-97    | 1.7                  | J         |         |            |            |
|                 | FFDSGW17B | 24-Apr-98    | 6.1                  | J         |         |            |            |
|                 | FFDSGW17B | 15-Jan-99    | 1                    | J         |         |            |            |
|                 | FGELGW005 | 12-Nov-97    | 9.4                  | J         |         |            |            |
|                 | FGELGW014 | 01-Dec-97    | 1.5                  | J         |         |            |            |
|                 | GGELGW014 | 22-Apr-98    | 5.4                  | J         |         |            |            |
| Cobalt          | F613GW005 | 25-Nov-97    | 4.2                  | J         | 220     | 10.9       | 2.5        |
|                 | F613GW006 | 20-Oct-98    | 8.5                  | J         |         |            |            |
|                 | F613GW006 | 12-Oct-99    | 1.3                  | J         |         |            |            |
|                 | F613GW007 | 19-Nov-99    | 1.7                  | J         |         |            |            |
|                 | GFDSGW17A | 28-Jan-97    | 2                    | J         |         |            |            |
|                 | GFDSGW17A | 17-Jun-97    | 0.83                 | J         |         |            |            |
|                 | FFDSGW17A | 24-Apr-98    | 1.3                  | J         |         |            |            |
|                 | GFDSGW17B | 28-Jan-97    | 1.8                  | J         |         |            |            |
|                 | GFDSGW17B | 17-Jun-97    | 1.2                  | J         |         |            |            |
|                 | FFDSGW17B | 24-Apr-98    | 1.6                  | J         |         |            |            |
|                 | FGELGW005 | 12-Nov-97    | 1.1                  | J         |         |            |            |
|                 | FGELGW006 | 14-Nov-97    | 1.3                  | J         |         |            |            |
|                 | FGELGW007 | 12-Nov-97    | 30.6                 | =         |         |            |            |
|                 | FGELGW008 | 14-Nov-97    | 1.2                  | J         |         |            |            |
|                 | FGELGW011 | 12-Nov-97    | 39.6                 | =         |         |            |            |
|                 | FGELGW012 | 13-Nov-97    | 9.8                  | J         |         |            |            |
|                 | FGELGW014 | 01-Dec-97    | 3                    | J         |         |            |            |
|                 | GGELGW014 | 22-Apr-98    | 5                    | J         |         |            |            |
|                 | FGELGW014 | 12-Oct-99    | 2                    | J         |         |            |            |
|                 | F613GW02D | 07-Nov-97    | 0.86                 | J         |         | 67         | 12.9       |
| Copper          | F240GW003 | 12-Nov-97    | 2.8                  | J         | 1,300   | ND         | 2.7        |
|                 | F613GW003 | 07-Nov-97    | 2.4                  | J         |         |            |            |
|                 | F613GW004 | 06-Nov-97    | 3.8                  | J         |         |            |            |
|                 | F613GW005 | 25-Nov-97    | 1.7                  | J         |         |            |            |
|                 | F613GW006 | 20-Oct-98    | 87.3                 | =         |         |            |            |
|                 | F613GW006 | 18-Jun-99    | 20.6                 | J         |         |            |            |
|                 | F613GW006 | 12-Oct-99    | 0.7                  | J         |         |            |            |
|                 | F613GW007 | 19-Nov-99    | 2                    | J         |         |            |            |
|                 | F613GW02D | 07-Nov-97    | 1.8                  | J         |         |            | 0.6 - 6 *  |
|                 | FGELGW005 | 12-Nov-97    | 4.6                  | J         |         |            |            |
|                 | FGELGW008 | 14-Nov-97    | 4                    | J         |         |            |            |
|                 | FGELGW011 | 12-Nov-97    | 3.1                  | J         |         |            |            |

**TABLE 4-6**

Metals Detected in Groundwater in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC           | Zone E BRC        |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|-----------|-----------|--------------|----------------------|-----------|---------|----------------------|-------------------|-----------|-----------|-----------|--------|------|-----------|----------------------|-------------------|-----------|-----------|--------|-----|-----------|-----------|-----------|--------|------|-----------|----------------------|-------------------|-----------|-----------|--------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|--------|-----|-----------|-----------|-----------|-----|-----------|-----------|--------|-----|-----------|-----------|-----------|-----|-----------|-----------|-----|-----|-----------|-----------|-----|---|-----------|-----------|-----|---|
| Copper    | FGELGW014 | 01-Dec-97    | 3                    | J         | 1,300   | ND                   | 2.7               |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW014 | 12-Oct-99    | 1                    | J         |         |                      |                   | Cyanide   | GFDSGW17A | 28-Jan-97 | 3.8    | J    | 200       | 3.3                  | 7.9               | GFDSGW17B | 28-Jan-97 | 2.1    | J   | Iron      | F240GW003 | 12-Nov-97 | 17,600 | =    | 1,100     | 51,600 -<br>62,300 * | 144 -<br>76,600 * | F613GW004 | 06-Nov-97 | 577    | =   | F613GW005 | 25-Nov-97 | 30,000    | =   | F613GW006 | 20-Oct-98 | 42,200    | =   | F613GW006 | 18-Jun-99 | 44,900    | =   | F613GW006 | 12-Oct-99 | 35,200    | =   | GFDSGW17A | 28-Jan-97 | 2,960     | J   | GFDSGW17A | 17-Jun-97 | 5,500     | =   | FFDSGW17A | 24-Apr-98 | 7,070     | =   | GFDSGW17A | 20-Oct-98 | 6,110     | =   | FFDSGW17A | 12-Oct-99 | 4,850     | =   | GFDSGW17B | 28-Jan-97 | 2,890     | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300 | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100 | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 | J         | 15        | ND  | 4.8 | FFDSGW17A | 24-Apr-98 | 2.4 | J | FGELGW014 | 01-Dec-97 | 1.9 | J |
| Cyanide   | GFDSGW17A | 28-Jan-97    | 3.8                  | J         | 200     | 3.3                  | 7.9               |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GFDSGW17B | 28-Jan-97    | 2.1                  | J         |         |                      |                   | Iron      | F240GW003 | 12-Nov-97 | 17,600 | =    | 1,100     | 51,600 -<br>62,300 * | 144 -<br>76,600 * | F613GW004 | 06-Nov-97 | 577    | =   |           | F613GW005 | 25-Nov-97 | 30,000 | =    |           |                      |                   | F613GW006 | 20-Oct-98 | 42,200 | =   | F613GW006 | 18-Jun-99 | 44,900    | =   | F613GW006 | 12-Oct-99 | 35,200    | =   | GFDSGW17A | 28-Jan-97 | 2,960     | J   | GFDSGW17A | 17-Jun-97 | 5,500     | =   | FFDSGW17A | 24-Apr-98 | 7,070     | =   | GFDSGW17A | 20-Oct-98 | 6,110     | =   | FFDSGW17A | 12-Oct-99 | 4,850     | =   | GFDSGW17B | 28-Jan-97 | 2,890     | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100 | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 | J         | 15        | ND     | 4.8 |           | FFDSGW17A | 24-Apr-98 | 2.4 | J         |           |     |     | FGELGW014 | 01-Dec-97 | 1.9 | J | GGELGW014 | 22-Apr-98 | 3.9 | J |
| Iron      | F240GW003 | 12-Nov-97    | 17,600               | =         | 1,100   | 51,600 -<br>62,300 * | 144 -<br>76,600 * |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | F613GW004 | 06-Nov-97    | 577                  | =         |         |                      |                   |           | F613GW005 | 25-Nov-97 | 30,000 | =    |           |                      |                   | F613GW006 | 20-Oct-98 | 42,200 | =   |           | F613GW006 | 18-Jun-99 | 44,900 | =    |           |                      |                   | F613GW006 | 12-Oct-99 | 35,200 | =   | GFDSGW17A | 28-Jan-97 | 2,960     | J   | GFDSGW17A | 17-Jun-97 | 5,500     | =   | FFDSGW17A | 24-Apr-98 | 7,070     | =   | GFDSGW17A | 20-Oct-98 | 6,110     | =   | FFDSGW17A | 12-Oct-99 | 4,850     | =   | GFDSGW17B | 28-Jan-97 | 2,890     | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 | J         | 15        | ND     | 4.8 |           | FFDSGW17A | 24-Apr-98 | 2.4 | J         |           |        |     | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9 | J   |           |           |     |   |           |           |     |   |
|           | F613GW005 | 25-Nov-97    | 30,000               | =         |         |                      |                   |           | F613GW006 | 20-Oct-98 | 42,200 | =    |           |                      |                   | F613GW006 | 18-Jun-99 | 44,900 | =   |           | F613GW006 | 12-Oct-99 | 35,200 | =    |           |                      |                   | GFDSGW17A | 28-Jan-97 | 2,960  | J   | GFDSGW17A | 17-Jun-97 | 5,500     | =   | FFDSGW17A | 24-Apr-98 | 7,070     | =   | GFDSGW17A | 20-Oct-98 | 6,110     | =   | FFDSGW17A | 12-Oct-99 | 4,850     | =   | GFDSGW17B | 28-Jan-97 | 2,890     | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  | 4.8       |           |        |     |           | FFDSGW17A | 24-Apr-98 | 2.4 | J         |           |        |     | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9 | J   |           |           |     |   |           |           |     |   |
|           | F613GW006 | 20-Oct-98    | 42,200               | =         |         |                      |                   |           | F613GW006 | 18-Jun-99 | 44,900 | =    |           |                      |                   | F613GW006 | 12-Oct-99 | 35,200 | =   |           | GFDSGW17A | 28-Jan-97 | 2,960  | J    |           |                      |                   | GFDSGW17A | 17-Jun-97 | 5,500  | =   | FFDSGW17A | 24-Apr-98 | 7,070     | =   | GFDSGW17A | 20-Oct-98 | 6,110     | =   | FFDSGW17A | 12-Oct-99 | 4,850     | =   | GFDSGW17B | 28-Jan-97 | 2,890     | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |        |     | FFDSGW17A | 24-Apr-98 | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9    | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |     |     |           |           |     |   |           |           |     |   |
|           | F613GW006 | 18-Jun-99    | 44,900               | =         |         |                      |                   |           | F613GW006 | 12-Oct-99 | 35,200 | =    |           |                      |                   | GFDSGW17A | 28-Jan-97 | 2,960  | J   |           | GFDSGW17A | 17-Jun-97 | 5,500  | =    |           |                      |                   | FFDSGW17A | 24-Apr-98 | 7,070  | =   | GFDSGW17A | 20-Oct-98 | 6,110     | =   | FFDSGW17A | 12-Oct-99 | 4,850     | =   | GFDSGW17B | 28-Jan-97 | 2,890     | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     |           |           |        |     | FFDSGW17A | 24-Apr-98 | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9    | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |     |     |           |           |     |   |           |           |     |   |
|           | F613GW006 | 12-Oct-99    | 35,200               | =         |         |                      |                   |           | GFDSGW17A | 28-Jan-97 | 2,960  | J    |           |                      |                   | GFDSGW17A | 17-Jun-97 | 5,500  | =   |           | FFDSGW17A | 24-Apr-98 | 7,070  | =    |           |                      |                   | GFDSGW17A | 20-Oct-98 | 6,110  | =   | FFDSGW17A | 12-Oct-99 | 4,850     | =   | GFDSGW17B | 28-Jan-97 | 2,890     | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     |           | 24-Apr-98 | 2.4    | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9    | J   |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GFDSGW17A | 28-Jan-97    | 2,960                | J         |         |                      |                   |           | GFDSGW17A | 17-Jun-97 | 5,500  | =    |           |                      |                   | FFDSGW17A | 24-Apr-98 | 7,070  | =   |           | GFDSGW17A | 20-Oct-98 | 6,110  | =    |           |                      |                   | FFDSGW17A | 12-Oct-99 | 4,850  | =   | GFDSGW17B | 28-Jan-97 | 2,890     | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9    | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GFDSGW17A | 17-Jun-97    | 5,500                | =         |         |                      |                   |           | FFDSGW17A | 24-Apr-98 | 7,070  | =    |           |                      |                   | GFDSGW17A | 20-Oct-98 | 6,110  | =   |           | FFDSGW17A | 12-Oct-99 | 4,850  | =    |           |                      |                   | GFDSGW17B | 28-Jan-97 | 2,890  | J   | GFDSGW17B | 17-Jun-97 | 6,070     | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9    | J   |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FFDSGW17A | 24-Apr-98    | 7,070                | =         |         |                      |                   |           | GFDSGW17A | 20-Oct-98 | 6,110  | =    |           |                      |                   | FFDSGW17A | 12-Oct-99 | 4,850  | =   |           | GFDSGW17B | 28-Jan-97 | 2,890  | J    |           |                      |                   | GFDSGW17B | 17-Jun-97 | 6,070  | =   | FFDSGW17B | 24-Apr-98 | 7,130     | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GFDSGW17A | 20-Oct-98    | 6,110                | =         |         |                      |                   |           | FFDSGW17A | 12-Oct-99 | 4,850  | =    |           |                      |                   | GFDSGW17B | 28-Jan-97 | 2,890  | J   |           | GFDSGW17B | 17-Jun-97 | 6,070  | =    |           |                      |                   | FFDSGW17B | 24-Apr-98 | 7,130  | =   | GFDSGW17B | 20-Oct-98 | 4,350     | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FFDSGW17A | 12-Oct-99    | 4,850                | =         |         |                      |                   |           | GFDSGW17B | 28-Jan-97 | 2,890  | J    |           |                      |                   | GFDSGW17B | 17-Jun-97 | 6,070  | =   |           | FFDSGW17B | 24-Apr-98 | 7,130  | =    |           |                      |                   | GFDSGW17B | 20-Oct-98 | 4,350  | =   | FFDSGW17B | 12-Oct-99 | 4,990     | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GFDSGW17B | 28-Jan-97    | 2,890                | J         |         |                      |                   |           | GFDSGW17B | 17-Jun-97 | 6,070  | =    |           |                      |                   | FFDSGW17B | 24-Apr-98 | 7,130  | =   |           | GFDSGW17B | 20-Oct-98 | 4,350  | =    |           |                      |                   | FFDSGW17B | 12-Oct-99 | 4,990  | =   | FGELGW005 | 12-Nov-97 | 7,450     | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GFDSGW17B | 17-Jun-97    | 6,070                | =         |         |                      |                   |           | FFDSGW17B | 24-Apr-98 | 7,130  | =    |           |                      |                   | GFDSGW17B | 20-Oct-98 | 4,350  | =   |           | FFDSGW17B | 12-Oct-99 | 4,990  | =    |           |                      |                   | FGELGW005 | 12-Nov-97 | 7,450  | =   | FGELGW006 | 14-Nov-97 | 2,930     | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FFDSGW17B | 24-Apr-98    | 7,130                | =         |         |                      |                   |           | GFDSGW17B | 20-Oct-98 | 4,350  | =    |           |                      |                   | FFDSGW17B | 12-Oct-99 | 4,990  | =   |           | FGELGW005 | 12-Nov-97 | 7,450  | =    |           |                      |                   | FGELGW006 | 14-Nov-97 | 2,930  | =   | FGELGW007 | 12-Nov-97 | 6,020     | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GFDSGW17B | 20-Oct-98    | 4,350                | =         |         |                      |                   |           | FFDSGW17B | 12-Oct-99 | 4,990  | =    |           |                      |                   | FGELGW005 | 12-Nov-97 | 7,450  | =   |           | FGELGW006 | 14-Nov-97 | 2,930  | =    |           |                      |                   | FGELGW007 | 12-Nov-97 | 6,020  | =   | FGELGW008 | 14-Nov-97 | 3,400     | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FFDSGW17B | 12-Oct-99    | 4,990                | =         |         |                      |                   |           | FGELGW005 | 12-Nov-97 | 7,450  | =    |           |                      |                   | FGELGW006 | 14-Nov-97 | 2,930  | =   |           | FGELGW007 | 12-Nov-97 | 6,020  | =    |           |                      |                   | FGELGW008 | 14-Nov-97 | 3,400  | =   | FGELGW011 | 12-Nov-97 | 23,900    | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW005 | 12-Nov-97    | 7,450                | =         |         |                      |                   |           | FGELGW006 | 14-Nov-97 | 2,930  | =    |           |                      |                   | FGELGW007 | 12-Nov-97 | 6,020  | =   |           | FGELGW008 | 14-Nov-97 | 3,400  | =    |           |                      |                   | FGELGW011 | 12-Nov-97 | 23,900 | =   | FGELGW012 | 13-Nov-97 | 11,000    | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW006 | 14-Nov-97    | 2,930                | =         |         |                      |                   |           | FGELGW007 | 12-Nov-97 | 6,020  | =    |           |                      |                   | FGELGW008 | 14-Nov-97 | 3,400  | =   |           | FGELGW011 | 12-Nov-97 | 23,900 | =    |           |                      |                   | FGELGW012 | 13-Nov-97 | 11,000 | =   | FGELGW013 | 14-Nov-97 | 5,400     | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW007 | 12-Nov-97    | 6,020                | =         |         |                      |                   |           | FGELGW008 | 14-Nov-97 | 3,400  | =    |           |                      |                   | FGELGW011 | 12-Nov-97 | 23,900 | =   |           | FGELGW012 | 13-Nov-97 | 11,000 | =    |           |                      |                   | FGELGW013 | 14-Nov-97 | 5,400  | =   | FGELGW014 | 01-Dec-97 | 25,300    | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW008 | 14-Nov-97    | 3,400                | =         |         |                      |                   |           | FGELGW011 | 12-Nov-97 | 23,900 | =    |           |                      |                   | FGELGW012 | 13-Nov-97 | 11,000 | =   |           | FGELGW013 | 14-Nov-97 | 5,400  | =    |           |                      |                   | FGELGW014 | 01-Dec-97 | 25,300 | =   | FGELGW014 | 20-Oct-98 | 23,200    | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW011 | 12-Nov-97    | 23,900               | =         |         |                      |                   |           | FGELGW012 | 13-Nov-97 | 11,000 | =    |           |                      |                   | FGELGW013 | 14-Nov-97 | 5,400  | =   |           | FGELGW014 | 01-Dec-97 | 25,300 | =    |           |                      |                   | FGELGW014 | 20-Oct-98 | 23,200 | =   | GGELGW014 | 22-Apr-98 | 33,300    | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW012 | 13-Nov-97    | 11,000               | =         |         |                      |                   |           | FGELGW013 | 14-Nov-97 | 5,400  | =    |           |                      |                   | FGELGW014 | 01-Dec-97 | 25,300 | =   |           | FGELGW014 | 20-Oct-98 | 23,200 | =    |           |                      |                   | GGELGW014 | 22-Apr-98 | 33,300 | =   | FGELGW014 | 12-Oct-99 | 29,000    | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW013 | 14-Nov-97    | 5,400                | =         |         |                      |                   |           | FGELGW014 | 01-Dec-97 | 25,300 | =    |           |                      |                   | FGELGW014 | 20-Oct-98 | 23,200 | =   |           | GGELGW014 | 22-Apr-98 | 33,300 | =    |           |                      |                   | FGELGW014 | 12-Oct-99 | 29,000 | =   | F613GW02D | 07-Nov-97 | 25,100    | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW014 | 01-Dec-97    | 25,300               | =         |         |                      |                   |           | FGELGW014 | 20-Oct-98 | 23,200 | =    |           |                      |                   | GGELGW014 | 22-Apr-98 | 33,300 | =   |           | FGELGW014 | 12-Oct-99 | 29,000 | =    |           |                      |                   | F613GW02D | 07-Nov-97 | 25,100 | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9 |           | J         | 15        | ND  |           | 4.8       |           |     |           |           |           |     | FFDSGW17A |           |           |     | 24-Apr-98 |           | 2.4       | J   | FGELGW014 | 01-Dec-97 | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW014 | 20-Oct-98    | 23,200               | =         |         |                      |                   |           | GGELGW014 | 22-Apr-98 | 33,300 | =    |           |                      |                   | FGELGW014 | 12-Oct-99 | 29,000 | =   | F613GW02D | 07-Nov-97 | 25,100    | =      | Lead | GFDSGW17A | 17-Jun-97            | 1.9               | J         | 15        | ND     | 4.8 |           | FFDSGW17A | 24-Apr-98 | 2.4 |           | J         |           |     |           |           |           |     | FGELGW014 |           |           |     | 01-Dec-97 |           | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GGELGW014 | 22-Apr-98    | 33,300               | =         |         |                      |                   |           | FGELGW014 | 12-Oct-99 | 29,000 | =    |           |                      |                   | F613GW02D | 07-Nov-97 | 25,100 | =   | Lead      | GFDSGW17A | 17-Jun-97 | 1.9    |      | J         | 15                   | ND                | 4.8       |           |        |     |           | FFDSGW17A | 24-Apr-98 | 2.4 |           | J         |           |     | FGELGW014 |           |           |     | 01-Dec-97 |           | 1.9       | J   | GGELGW014 | 22-Apr-98 | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW014 | 12-Oct-99    | 29,000               | =         |         |                      |                   | F613GW02D | 07-Nov-97 | 25,100    | =      | Lead | GFDSGW17A | 17-Jun-97            | 1.9               | J         | 15        | ND     | 4.8 |           | FFDSGW17A | 24-Apr-98 | 2.4    |      | J         |                      |                   |           |           |        |     |           | FGELGW014 | 01-Dec-97 | 1.9 | J         | GGELGW014 |           |     | 22-Apr-98 |           | 3.9       | J   |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
| F613GW02D | 07-Nov-97 | 25,100       | =                    |           |         |                      |                   |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
| Lead      | GFDSGW17A | 17-Jun-97    | 1.9                  | J         | 15      | ND                   | 4.8               |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FFDSGW17A | 24-Apr-98    | 2.4                  | J         |         |                      |                   |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | FGELGW014 | 01-Dec-97    | 1.9                  | J         |         |                      |                   |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |
|           | GGELGW014 | 22-Apr-98    | 3.9                  | J         |         |                      |                   |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |        |      |           |                      |                   |           |           |        |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |        |     |           |           |           |     |           |           |     |     |           |           |     |   |           |           |     |   |

**TABLE 4-6**

Metals Detected in Groundwater in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC        | Zone E BRC         |
|-----------|-----------|--------------|----------------------|-----------|---------|-------------------|--------------------|
| Magnesium | F240GW003 | 12-Nov-97    | 22,700               | =         | NL      | 34,600 - 46,600 * | 790 - 1,160,000 *  |
|           | F613GW001 | 06-Nov-97    | 25,400               | =         |         |                   |                    |
|           | F613GW003 | 07-Nov-97    | 772,000              | =         |         |                   |                    |
|           | F613GW004 | 06-Nov-97    | 7,570                | =         |         |                   |                    |
|           | F613GW005 | 25-Nov-97    | 197,000              | =         |         |                   |                    |
|           | F613GW006 | 20-Oct-98    | 45,700               | =         |         |                   |                    |
|           | F613GW006 | 18-Jun-99    | 22,300               | =         |         |                   |                    |
|           | F613GW006 | 12-Oct-99    | 22,900               | =         |         |                   |                    |
|           | F613GW007 | 19-Nov-99    | 87,400               | =         |         |                   |                    |
|           | GFDSGW17A | 28-Jan-97    | 14,400               | J         |         |                   |                    |
|           | GFDSGW17A | 17-Jun-97    | 8,450                | =         |         |                   |                    |
|           | FFDSGW17A | 24-Apr-98    | 9,290                | =         |         |                   |                    |
|           | GFDSGW17A | 20-Oct-98    | 10,800               | =         |         |                   |                    |
|           | FFDSGW17A | 12-Oct-99    | 9,100                | =         |         |                   |                    |
|           | GFDSGW17B | 28-Jan-97    | 12,100               | J         |         |                   |                    |
|           | GFDSGW17B | 17-Jun-97    | 9,480                | =         |         |                   |                    |
|           | FFDSGW17B | 24-Apr-98    | 9,450                | =         |         |                   |                    |
|           | GFDSGW17B | 20-Oct-98    | 7,920                | =         |         |                   |                    |
|           | FFDSGW17B | 12-Oct-99    | 8,990                | =         |         |                   |                    |
|           | FGELGW005 | 12-Nov-97    | 45,800               | =         |         |                   |                    |
|           | FGELGW006 | 14-Nov-97    | 2,890                | =         |         |                   |                    |
|           | FGELGW007 | 12-Nov-97    | 53,200               | =         |         |                   |                    |
|           | FGELGW008 | 14-Nov-97    | 196,000              | =         |         |                   |                    |
|           | FGELGW011 | 12-Nov-97    | 149,000              | =         |         |                   |                    |
|           | FGELGW012 | 13-Nov-97    | 30,800               | =         |         |                   |                    |
|           | FGELGW013 | 14-Nov-97    | 81,900               | =         |         |                   |                    |
|           | FGELGW014 | 01-Dec-97    | 29,200               | =         |         |                   |                    |
|           | FGELGW014 | 20-Oct-98    | 36,000               | =         |         |                   |                    |
|           | GGELGW014 | 22-Apr-98    | 41,900               | =         |         |                   |                    |
|           | FGELGW014 | 12-Oct-99    | 45,200               | =         |         |                   |                    |
| F613GW02D | 07-Nov-97 | 52,800       | =                    |           |         | 22,000 - 24,200 * | 3,190 - 1,370,000* |
| Manganese | F240GW003 | 12-Nov-97    | 131                  | =         | 73      | 2,010             | 2,560              |
|           | F613GW001 | 06-Nov-97    | 51.5                 | J         |         |                   |                    |
|           | F613GW003 | 07-Nov-97    | 163                  | =         |         |                   |                    |
|           | F613GW004 | 06-Nov-97    | 26.8                 | =         |         |                   |                    |
|           | F613GW005 | 25-Nov-97    | 336                  | =         |         |                   |                    |
|           | F613GW006 | 20-Oct-98    | 689                  | =         |         |                   |                    |
|           | F613GW006 | 18-Jun-99    | 535                  | =         |         |                   |                    |
|           | F613GW006 | 12-Oct-99    | 464                  | =         |         |                   |                    |

**TABLE 4-6**

Metals Detected in Groundwater in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC       | Zone E BRC        |
|-----------|-----------|--------------|----------------------|-----------|---------|------------------|-------------------|
| Manganese | F613GW007 | 19-Nov-99    | 181                  | =         | 73      | 2,010            | 2,560             |
|           | GFDSGW17A | 28-Jan-97    | 130                  | J         |         |                  |                   |
|           | GFDSGW17A | 17-Jun-97    | 69.4                 | =         |         |                  |                   |
|           | FFDSGW17A | 24-Apr-98    | 90.7                 | =         |         |                  |                   |
|           | GFDSGW17A | 20-Oct-98    | 154                  | =         |         |                  |                   |
|           | FFDSGW17A | 12-Oct-99    | 133                  | =         |         |                  |                   |
|           | GFDSGW17B | 28-Jan-97    | 88.2                 | J         |         |                  |                   |
|           | GFDSGW17B | 17-Jun-97    | 66                   | =         |         |                  |                   |
|           | FFDSGW17B | 24-Apr-98    | 62.6                 | =         |         |                  |                   |
|           | GFDSGW17B | 20-Oct-98    | 49.5                 | =         |         |                  |                   |
|           | FFDSGW17B | 12-Oct-99    | 57.9                 | =         |         |                  |                   |
|           | FGELGW005 | 12-Nov-97    | 493                  | =         |         |                  |                   |
|           | FGELGW007 | 12-Nov-97    | 1,710                | =         |         |                  |                   |
|           | FGELGW008 | 14-Nov-97    | 833                  | =         |         |                  |                   |
|           | FGELGW011 | 12-Nov-97    | 1,080                | =         |         |                  |                   |
|           | FGELGW012 | 13-Nov-97    | 251                  | =         |         |                  |                   |
|           | FGELGW013 | 14-Nov-97    | 832                  | =         |         |                  |                   |
|           | FGELGW014 | 01-Dec-97    | 426                  | =         |         |                  |                   |
|           | FGELGW014 | 20-Oct-98    | 356                  | =         |         |                  |                   |
|           | GGELGW014 | 22-Apr-98    | 689                  | =         |         |                  |                   |
| FGELGW014 | 12-Oct-99 | 469          | =                    |           |         |                  |                   |
|           | F613GW02D | 07-Nov-97    | 2,930                | =         |         | 1,260            | 869               |
| Mercury   | F613GW006 | 18-Jun-99    | 0.17                 | J         | 2       | 0.17 *           | 0.14 - 0.6 *      |
| Nickel    | F613GW005 | 25-Nov-97    | 2                    | J         | 73      | 5.55             | 15.2              |
|           | F613GW006 | 20-Oct-98    | 5.7                  | J         |         |                  |                   |
|           | F613GW007 | 19-Nov-99    | 6.4                  | J         |         |                  |                   |
|           | GFDSGW17A | 28-Jan-97    | 4.2                  | J         |         |                  |                   |
|           | GFDSGW17A | 17-Jun-97    | 1.1                  | J         |         |                  |                   |
|           | FFDSGW17A | 24-Apr-98    | 2.3                  | J         |         |                  |                   |
|           | GFDSGW17B | 28-Jan-97    | 4                    | J         |         |                  |                   |
|           | GFDSGW17B | 17-Jun-97    | 0.87                 | J         |         |                  |                   |
|           | FGELGW007 | 12-Nov-97    | 18.7                 | J         |         |                  |                   |
|           | FGELGW011 | 12-Nov-97    | 15                   | J         |         |                  |                   |
| GGELGW014 | 22-Apr-98 | 1.4          | J                    |           |         |                  |                   |
| Potassium | F240GW003 | 12-Nov-97    | 29,200               | =         | NL      | 8,820 - 12,200 * | 1,320 - 289,000 * |
|           | F613GW001 | 06-Nov-97    | 12,800               | J         |         |                  |                   |
|           | F613GW003 | 07-Nov-97    | 164,000              | =         |         |                  |                   |
|           | F613GW004 | 06-Nov-97    | 7,320                | =         |         |                  |                   |

**TABLE 4-6**

Metals Detected in Groundwater in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC       | Zone E BRC        |
|-----------|-----------|--------------|----------------------|-----------|---------|------------------|-------------------|
| Potassium | F613GW005 | 25-Nov-97    | 77,200               | =         | NL      | 8,820 - 12,200 * | 1,320 - 289,000 * |
|           | F613GW006 | 20-Oct-98    | 9,260                | =         |         |                  |                   |
|           | F613GW006 | 18-Jun-99    | 8,950                | =         |         |                  |                   |
|           | F613GW006 | 12-Oct-99    | 18,900               | J         |         |                  |                   |
|           | F613GW007 | 19-Nov-99    | 88,900               | =         |         |                  |                   |
|           | GFDSGW17A | 28-Jan-97    | 12,500               | =         |         |                  |                   |
|           | GFDSGW17A | 17-Jun-97    | 8,130                | =         |         |                  |                   |
|           | FFDSGW17A | 24-Apr-98    | 9,550                | =         |         |                  |                   |
|           | GFDSGW17A | 20-Oct-98    | 9,390                | =         |         |                  |                   |
|           | FFDSGW17A | 12-Oct-99    | 13,500               | J         |         |                  |                   |
|           | GFDSGW17B | 28-Jan-97    | 11,000               | =         |         |                  |                   |
|           | GFDSGW17B | 17-Jun-97    | 8,920                | =         |         |                  |                   |
|           | FFDSGW17B | 24-Apr-98    | 8,390                | =         |         |                  |                   |
|           | GFDSGW17B | 20-Oct-98    | 7,460                | =         |         |                  |                   |
|           | FFDSGW17B | 12-Oct-99    | 11,000               | J         |         |                  |                   |
|           | FGELGW005 | 12-Nov-97    | 28,600               | =         |         |                  |                   |
|           | FGELGW006 | 14-Nov-97    | 2,350                | J         |         |                  |                   |
|           | FGELGW007 | 12-Nov-97    | 12,300               | =         |         |                  |                   |
|           | FGELGW008 | 14-Nov-97    | 95,200               | =         |         |                  |                   |
|           | FGELGW011 | 12-Nov-97    | 46,100               | J         |         |                  |                   |
|           | FGELGW012 | 13-Nov-97    | 6,980                | =         |         |                  |                   |
|           | FGELGW013 | 14-Nov-97    | 56,400               | =         |         |                  |                   |
|           | FGELGW014 | 01-Dec-97    | 21,800               | =         |         |                  |                   |
|           | FGELGW014 | 20-Oct-98    | 25,400               | =         |         |                  |                   |
|           | GGELGW014 | 22-Apr-98    | 25,700               | =         |         |                  |                   |
|           | FGELGW014 | 12-Oct-99    | 39,000               | J         |         |                  |                   |
| F613GW02D | 07-Nov-97 | 42,000       | =                    |           |         | 5,930 - 6,660 *  | 1,720 - 351,000 * |
| Selenium  | F613GW006 | 12-Oct-99    | 2.1                  | J         | 50      | ND               | 3 - 5 *           |
| Sodium    | F240GW003 | 12-Nov-97    | 247,000              | =         | NL      | NA               | NA                |
|           | F613GW001 | 06-Nov-97    | 229,000              | J         |         |                  |                   |
|           | F613GW003 | 07-Nov-97    | 5,520,000            | =         |         |                  |                   |
|           | F613GW004 | 06-Nov-97    | 223,000              | =         |         |                  |                   |
|           | F613GW005 | 25-Nov-97    | 3,120,000            | =         |         |                  |                   |
|           | F613GW006 | 20-Oct-98    | 793,000              | =         |         |                  |                   |
|           | F613GW006 | 18-Jun-99    | 146,000              | =         |         |                  |                   |
|           | F613GW006 | 12-Oct-99    | 194,000              | J         |         |                  |                   |
|           | F613GW007 | 19-Nov-99    | 840,000              | =         |         |                  |                   |
|           | F613GW02D | 07-Nov-97    | 282,000              | =         |         |                  |                   |
|           | GFDSGW17A | 28-Jan-97    | 497,000              | =         |         |                  |                   |

**TABLE 4-6**  
 Metals Detected in Groundwater in RFI Addendum Samples  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC | Zone F BRC | Zone E BRC |
|-----------|-----------|--------------|----------------------|-----------|---------|------------|------------|
| Sodium    | GFDSGW17A | 17-Jun-97    | 351,000              | =         | NL      | NA         | NA         |
|           | FFDSGW17A | 24-Apr-98    | 367,000              | =         |         |            |            |
|           | GFDSGW17A | 20-Oct-98    | 343,000              | =         |         |            |            |
|           | FFDSGW17A | 12-Oct-99    | 234,000              | J         |         |            |            |
|           | GFDSGW17B | 28-Jan-97    | 310,000              | =         |         |            |            |
|           | GFDSGW17B | 17-Jun-97    | 280,000              | =         |         |            |            |
|           | FFDSGW17B | 24-Apr-98    | 246,000              | =         |         |            |            |
|           | GFDSGW17B | 20-Oct-98    | 240,000              | =         |         |            |            |
|           | FFDSGW17B | 12-Oct-99    | 181,000              | J         |         |            |            |
|           | FGELGW005 | 12-Nov-97    | 198,000              | =         |         |            |            |
|           | FGELGW006 | 14-Nov-97    | 148,000              | =         |         |            |            |
|           | FGELGW007 | 12-Nov-97    | 627,000              | =         |         |            |            |
|           | FGELGW008 | 14-Nov-97    | 1,810,000            | =         |         |            |            |
|           | FGELGW011 | 12-Nov-97    | 1,890,000            | =         |         |            |            |
|           | FGELGW012 | 13-Nov-97    | 562,000              | =         |         |            |            |
|           | FGELGW013 | 14-Nov-97    | 579,000              | =         |         |            |            |
|           | FGELGW014 | 01-Dec-97    | 169,000              | =         |         |            |            |
|           | FGELGW014 | 20-Oct-98    | 335,000              | =         |         |            |            |
|           | GGELGW014 | 22-Apr-98    | 156,000              | =         |         |            |            |
|           | FGELGW014 | 12-Oct-99    | 225,000              | J         |         |            |            |
| Thallium  | F613GW006 | 18-Jun-99    | 2.4                  | J         | 2       | 5.58       | 5.4        |
| Tin       | F613GW007 | 19-Nov-99    | 2.8                  | J         | 2,200   | ND         | 3 - 10 *   |
| Vanadium  | F240GW003 | 12-Nov-97    | 2.5                  | J         | 26      | 1.58       | 11.4       |
|           | F613GW001 | 06-Nov-97    | 1.4                  | J         |         |            |            |
|           | F613GW004 | 06-Nov-97    | 5.4                  | J         |         |            |            |
|           | F613GW005 | 25-Nov-97    | 3.8                  | J         |         |            |            |
|           | F613GW006 | 18-Jun-99    | 1.3                  | J         |         |            |            |
|           | F613GW006 | 12-Oct-99    | 1.6                  | J         |         |            |            |
|           | F613GW007 | 19-Nov-99    | 7.8                  | J         |         |            |            |
|           | GFDSGW17A | 28-Jan-97    | 1.2                  | J         |         |            |            |
|           | GFDSGW17A | 17-Jun-97    | 1.6                  | J         |         |            |            |
|           | FFDSGW17A | 24-Apr-98    | 10                   | J         |         |            |            |
|           | FFDSGW17A | 12-Oct-99    | 0.6                  | J         |         |            |            |
|           | GFDSGW17B | 28-Jan-97    | 1.6                  | J         |         |            |            |
|           | FFDSGW17B | 24-Apr-98    | 4.8                  | J         |         |            |            |
|           | FGELGW005 | 12-Nov-97    | 27.3                 | =         |         |            |            |
|           | FGELGW008 | 14-Nov-97    | 9.8                  | J         |         |            |            |
| FGELGW011 | 12-Nov-97 | 2.2          | J                    |           |         |            |            |
| FGELGW012 | 13-Nov-97 | 1.9          | J                    |           |         |            |            |
| FGELGW013 | 14-Nov-97 | 8.3          | J                    |           |         |            |            |

**TABLE 4-6**

Metals Detected in Groundwater in RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter | Sample ID | Date Sampled | Concentration (µg/L) | Qualifier | MCL/RBC      | Zone F BRC | Zone E BRC |
|-----------|-----------|--------------|----------------------|-----------|--------------|------------|------------|
| Vanadium  | FGELGW014 | 01-Dec-97    | 3.7                  | J         | <i>26</i>    | 1.58       | 11.4       |
|           | FGELGW014 | 12-Oct-99    | 2.1                  | J         |              |            |            |
|           | F613GW02D | 07-Nov-97    | 2.2                  | J         |              | 1.13       | 5.3        |
| Zinc      | F613GW006 | 18-Jun-99    | 69.7                 | =         | <i>1,100</i> | ND         | 27.3       |
|           | FFDSGW17A | 24-Apr-98    | 6.3                  | J         |              |            |            |
|           | FFDSGW17B | 24-Apr-98    | 2.8                  | J         |              |            |            |
|           | FGELGW014 | 01-Dec-97    | 97.4                 | =         |              |            |            |
|           | GGELGW014 | 22-Apr-98    | 39                   | =         |              |            |            |

\*RBCs are listed in italics where no primary MCL exists. RBCs are 1/10 of tap water RBC listed in EPA Region III RBC (October 2000) table for non-carcinogenic compounds (HI = 0.1).

Concentrations in bold type and outlined exceed MCL/RBC and BRC.

\* Range of grid sample concentrations; no BRC calculated.

NA = Not available

ND = No detections in grid samples

NL = No MCL or RBC listed

J = Estimated concentration

**TABLE 4-7**

Organic Compounds detected in Groundwater from RFI Addendum Samples  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter                  | Sample ID | Sampling Date | Concentration (µg/L) | Qualifier | MCL/RBC |
|----------------------------|-----------|---------------|----------------------|-----------|---------|
| 1,1-Dichloroethane         | F613GP008 | 13-Sep-96     | 15                   | =         | 80      |
|                            | F613GP037 | 30-Aug-96     | 6                    | =         |         |
|                            | F613GP042 | 03-Sep-96     | 34                   | =         |         |
|                            | F613GP043 | 09-Sep-96     | 4                    | J         |         |
| 1,1-Dichloroethene         | F613GP037 | 30-Aug-96     | 20                   | =         | 7       |
|                            | F613GP042 | 03-Sep-96     | 4                    | J         |         |
|                            | F613GP043 | 09-Sep-96     | 1                    | J         |         |
| 1,2-Dichloroethene (total) | F613GP002 | 13-Sep-96     | 10                   | =         | 70      |
|                            | F613GP008 | 13-Sep-96     | 29                   | =         |         |
|                            | F613GP033 | 28-Aug-96     | 3.0                  | J         |         |
|                            | F613GP039 | 29-Sep-96     | 1,700                | J         |         |
|                            | F613GP042 | 03-Sep-96     | 1.0                  | J         |         |
|                            | F613GP060 | 04-Sep-96     | 1.0                  | J         |         |
|                            | F613GW006 | 18-Jun-99     | 33                   | =         |         |
| 2,4-Dimethylphenol         | F613GP065 | 14-Oct-96     | 22                   | =         | 73      |
| 2-Methylnaphthalene        | F613GP006 | 04-Oct-96     | 2                    | J         | 12      |
|                            | F613GP013 | 07-Oct-96     | 17                   | =         |         |
|                            | F613GP035 | 16-Sep-96     | 7                    | J         |         |
|                            | F613GW006 | 20-Oct-98     | 14                   | =         |         |
|                            | F613GW006 | 18-Jun-99     | 36                   | =         |         |
|                            | F613GW006 | 12-Oct-99     | 31                   | =         |         |
|                            | GFDSGW17A | 20-Oct-98     | 1                    | J         |         |
|                            | FGELGW014 | 01-Dec-97     | 26                   | =         |         |
|                            | FGELGW014 | 20-Oct-98     | 3                    | J         |         |
|                            | GGELGW014 | 22-Apr-98     | 16                   | =         |         |
| 4-Methylphenol (p-Cresol)  | F613GP035 | 16-Sep-96     | 4                    | J         | 18      |
| Acenaphthene               | F613GP006 | 04-Oct-96     | 2                    | J         | 37      |
|                            | F613GP013 | 07-Oct-96     | 10                   | =         |         |
|                            | F613GP019 | 08-Oct-96     | 16                   | =         |         |
|                            | F613GP035 | 16-Sep-96     | 4                    | J         |         |
|                            | F613GW006 | 20-Oct-98     | 2                    | J         |         |
|                            | F613GW006 | 12-Oct-99     | 3                    | J         |         |
|                            | GFDSGW17A | 20-Oct-98     | 2                    | J         |         |
|                            | FGELGW014 | 01-Dec-97     | 6                    | J         |         |
|                            | FGELGW014 | 20-Oct-98     | 5                    | J         |         |
| Acetone                    | F613GP035 | 16-Sep-96     | 18                   | =         | 61      |
|                            | F613GP036 | 09-Sep-96     | 4                    | J         |         |

**TABLE 4-7**

Organic Compounds detected in Groundwater from RFI Addendum Samples  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter    | Sample ID                   | Sampling Date | Concentration (µg/L) | Qualifier | MCL/RBC |
|--------------|-----------------------------|---------------|----------------------|-----------|---------|
| Acetone      | F613GP038                   | 16-Sep-96     | 8                    | J         | 61      |
|              | F613GW006                   | 20-Oct-98     | 58                   | J         |         |
|              | F613GW006                   | 18-Jun-99     | 10                   | =         |         |
|              | F613GW007                   | 19-Nov-99     | 6                    | J         |         |
|              | F613GW008                   | 19-Nov-99     | 6                    | J         |         |
| Benzene      | F613GP013                   | 07-Oct-96     | 3                    | J         | 5       |
|              | F613GP022                   | 15-Sep-96     | 2                    | J         |         |
|              | F613GW006                   | 20-Oct-98     | 2                    | J         |         |
|              | F613GW006                   | 12-Oct-99     | 4                    | =         |         |
|              | FGELGW014                   | 01-Dec-97     | 3                    | J         |         |
| Benzoic acid | F613GP010                   | 02-Oct-96     | 1                    | J         | 15,000  |
|              | F613GP029                   | 28-Aug-96     | 4                    | J         |         |
|              | F613GP033                   | 28-Aug-96     | 2                    | J         |         |
|              | F613GP037                   | 30-Aug-96     | 3                    | J         |         |
|              | F613GP042                   | 03-Sep-96     | 3                    | J         |         |
|              | F613GP044                   | 27-Aug-96     | 2                    | J         |         |
|              | F613GP047                   | 08-Oct-96     | 2                    | J         |         |
|              | F613GP050                   | 04-Sep-96     | 5                    | J         |         |
|              | F613GP057                   | 30-Aug-96     | 4                    | J         |         |
|              | F613GP058                   | 30-Aug-96     | 4                    | J         |         |
|              | F613GP059                   | 03-Sep-96     | 4                    | J         |         |
|              | F613GP060                   | 04-Sep-96     | 3                    | J         |         |
|              | F613GP067                   | 12-Oct-96     | 1                    | J         |         |
|              | F613GW003                   | 07-Nov-97     | 2                    | J         |         |
|              | F613GW006                   | 18-Jun-99     | 10                   | J         |         |
|              | F613GW02D                   | 07-Nov-97     | 1                    | J         |         |
|              | GFDSGW17A                   | 17-Jun-97     | 1                    | J         |         |
|              | FGELGW008                   | 14-Nov-97     | 1                    | J         |         |
|              | FGELGW013                   | 14-Nov-97     | 2                    | J         |         |
|              | bis(2-Ethylhexyl) Phthalate | F613GP003     | 29-Aug-96            | 2         |         |
| F613GP025    |                             | 29-Aug-96     | 100                  | J         |         |
| F613GP033    |                             | 28-Aug-96     | 100                  | J         |         |
| F613GP035    |                             | 16-Sep-96     | 4                    | J         |         |
| F613GP037    |                             | 30-Aug-96     | 3                    | J         |         |
| F613GP042    |                             | 03-Sep-96     | 4                    | J         |         |
| F613GP050    |                             | 04-Sep-96     | 1                    | J         |         |
| F613GP057    |                             | 30-Aug-96     | 4                    | J         |         |
| F613GP058    |                             | 30-Aug-96     | 3                    | J         |         |
| F613GP059    |                             | 03-Sep-96     | 4                    | J         |         |

**TABLE 4-7**  
 Organic Compounds detected in Groundwater from RFI Addendum Samples  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Parameter                   | Sample ID | Sampling Date | Concentration (µg/L) | Qualifier | MCL/RBC |
|-----------------------------|-----------|---------------|----------------------|-----------|---------|
| bis(2-Ethylhexyl) Phthalate | F613GP060 | 04-Sep-96     | 4                    | J         | 6       |
|                             | F613GW006 | 20-Oct-98     | 4                    | J         |         |
|                             | GFDSGW17B | 20-Oct-98     | 10                   | J         |         |
|                             | FGELGW014 | 20-Oct-98     | 1                    | J         |         |
|                             | GGELGW014 | 22-Apr-98     | 7.7                  | J         |         |
| Carbon Disulfide            | F613GP009 | 29-Aug-96     | 4                    | J         | 100     |
|                             | F613GP010 | 02-Oct-96     | 7                    | =         |         |
|                             | F613GP020 | 12-Sep-96     | 4                    | J         |         |
|                             | F613GP021 | 29-Aug-96     | 2                    | J         |         |
|                             | F613GP022 | 15-Sep-96     | 15                   | =         |         |
|                             | F613GP025 | 29-Aug-96     | 24                   | =         |         |
|                             | F613GP039 | 29-Sep-96     | 2                    | J         |         |
|                             | F613GP049 | 09-Sep-96     | 2                    | J         |         |
|                             | F613GW006 | 20-Oct-98     | 6                    | =         |         |
|                             | F613GW007 | 19-Nov-99     | 2                    | J         |         |
| cis-1,2-Dichloroethene      | F613GW004 | 22-Jun-01     | 83.6                 | =         | 70      |
|                             | FGELGW012 | 22-Jun-01     | 1.8                  | J         |         |
| Dibenzofuran                | F613GP013 | 07-Oct-96     | 2                    | J         | 2.4     |
|                             | F613GP019 | 08-Oct-96     | 6                    | J         |         |
|                             | F613GP035 | 16-Sep-96     | 2                    | J         |         |
|                             | F613GW006 | 20-Oct-98     | 1                    | J         |         |
|                             | F613GW006 | 18-Jun-99     | 3                    | J         |         |
|                             | F613GW006 | 12-Oct-99     | 4                    | J         |         |
|                             | GFDSGW17A | 20-Oct-98     | 4                    | J         |         |
|                             | FGELGW014 | 01-Dec-97     | 4                    | J         |         |
|                             | FGELGW014 | 20-Oct-98     | 4                    | J         |         |
| Diethyl Phthalate           | GFDSGW17A | 17-Jun-97     | 1                    | J         | 2,900   |
|                             | GFDSGW17B | 17-Jun-97     | 1                    | J         |         |
| Di-n-butyl Phthalate        | F613GP060 | 04-Sep-96     | 1                    | J         | 370     |
|                             | GFDSGW17A | 28-Jan-97     | 1                    | J         |         |
|                             | GFDSGW17A | 17-Jun-97     | 2                    | J         |         |
| Di-n-octylphthalate         | F613GP065 | 14-Oct-96     | 1                    | J         | 73      |
| Ethylbenzene                | F613GP022 | 15-Sep-96     | 9                    | =         | 700     |
|                             | F613GP035 | 16-Sep-96     | 3                    | J         |         |
| Flouranthene                | F613GP010 | 02-Oct-96     | 2                    | J         | 150     |

**TABLE 4-7**

Organic Compounds detected in Groundwater from RFI Addendum Samples  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Parameter                 | Sample ID | Sampling Date | Concentration (µg/L) | Qualifier | MCL/RBC |
|---------------------------|-----------|---------------|----------------------|-----------|---------|
| Fluorene                  | F613GP006 | 04-Oct-96     | 4                    | J         | 24      |
|                           | F613GP013 | 07-Oct-96     | 1                    | J         |         |
|                           | F613GP019 | 08-Oct-96     | 8                    | J         |         |
|                           | F613GP035 | 16-Sep-96     | 2                    | J         |         |
|                           | F613GP046 | 09-Oct-96     | 2                    | J         |         |
|                           | F613GW006 | 20-Oct-98     | 2                    | J         |         |
|                           | F613GW006 | 18-Jun-99     | 4                    | J         |         |
|                           | F613GW006 | 12-Oct-99     | 6                    | =         |         |
|                           | GFDSGW17A | 20-Oct-98     | 4                    | J         |         |
|                           | FGELGW014 | 01-Dec-97     | 10                   | =         |         |
|                           | FGELGW014 | 20-Oct-98     | 10                   | =         |         |
|                           | GGELGW014 | 22-Apr-98     | 11                   | =         |         |
| Gamma BHC (Lindane)       | F613GW006 | 18-Jun-99     | 0.074                | J         | 0.2     |
| Isophorone                | F613GP065 | 14-Oct-96     | 2                    | J         | 7       |
| Methyl isobutyl ketone    | F613GP037 | 30-Aug-96     | 2                    | J         | 14      |
| Methylene Chloride        | FGELGW014 | 12-Oct-99     | 83                   | J         | 4.1     |
| Naphthalene               | F613GP035 | 16-Sep-96     | 40                   | =         | 0.65    |
|                           | F613GP065 | 14-Oct-96     | 3                    | J         |         |
|                           | F613GW006 | 20-Oct-98     | 5                    | =         |         |
|                           | F613GW006 | 12-Oct-99     | 2                    | J         |         |
| Phenanthrene              | F613GP006 | 04-Oct-96     | 6                    | J         | NL      |
|                           | F613GP013 | 07-Oct-96     | 2                    | J         |         |
|                           | F613GP019 | 08-Oct-96     | 4                    | J         |         |
|                           | F613GP035 | 16-Sep-96     | 1                    | J         |         |
|                           | F613GW006 | 20-Oct-98     | 1                    | J         |         |
|                           | F613GW006 | 18-Jun-99     | 4                    | J         |         |
|                           | F613GW006 | 12-Oct-99     | 4                    | J         |         |
|                           | FGELGW014 | 01-Dec-97     | 13                   | =         |         |
|                           | FGELGW014 | 20-Oct-98     | 2                    | J         |         |
| GGELGW014                 | 22-Apr-98 | 7.3           | J                    |           |         |
| Pyrene                    | F613GP010 | 02-Oct-96     | 1                    | J         | 18      |
| Tetrachloroethylene (PCE) | F613GP039 | 29-Sep-96     | 1,900                | J         | 5       |
|                           | F613GW004 | 22-Jun-01     | 0.35                 | J         |         |
| Toluene                   | F613GP025 | 29-Aug-96     | 7                    | =         | 1,000   |
|                           | F613GP035 | 16-Sep-96     | 5                    | J         |         |
|                           | F613GP066 | 13-Oct-96     | 2                    | J         |         |

**TABLE 4-7**

Organic Compounds detected in Groundwater from RFI Addendum Samples

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

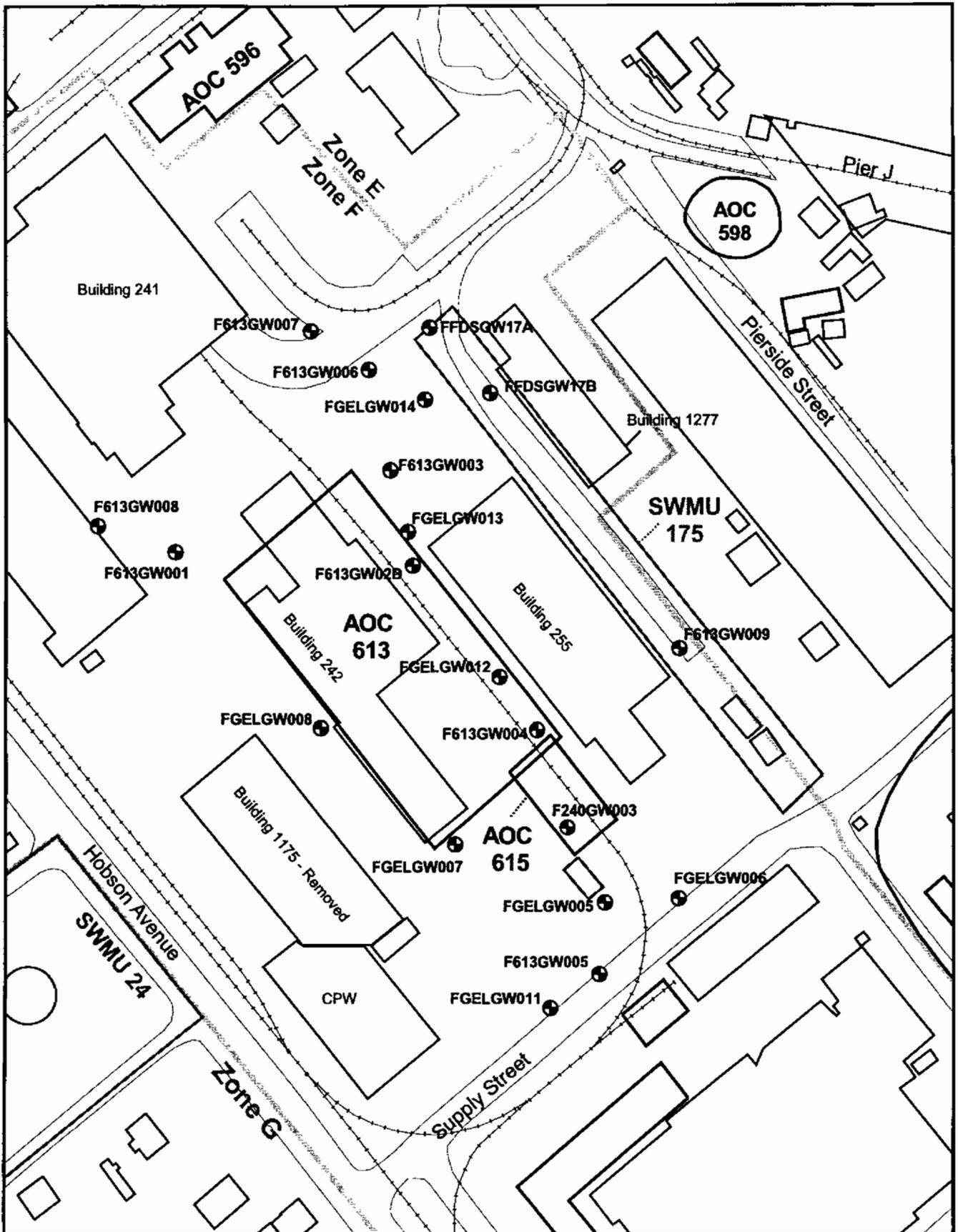
| Parameter                | Sample ID | Sampling Date | Concentration (µg/L) | Qualifier | MCL/RBC |
|--------------------------|-----------|---------------|----------------------|-----------|---------|
| Toluene                  | F613GW02D | 07-Nov-97     | 4                    | J         | 1,000   |
| trans-1,2-Dichloroethene | F613GW004 | 22-Jun-01     | 0.90                 | J         | 100     |
| Trichloroethylene (TCE)  | F613GP008 | 13-Sep-96     | 1                    | J         | 5       |
|                          | F613GP039 | 29-Sep-96     | <b>1,500</b>         | J         |         |
|                          | F613GP054 | 17-Sep-96     | 1                    | J         |         |
|                          | F613GW004 | 22-Jun-01     | 4.0                  | J         |         |
| Vinyl chloride           | F613GP002 | 13-Sep-96     | <b>4</b>             | J         | 2       |
|                          | F613GP008 | 13-Sep-96     | <b>5</b>             | J         |         |
|                          | F613GP039 | 29-Sep-96     | <b>38</b>            | =         |         |
|                          | F613GW004 | 22-Jun-01     | <b>10.8</b>          | =         |         |
| Xylenes, Total           | F613GP022 | 15-Sep-96     | 11                   | =         | 10,000  |
|                          | F613GP031 | 14-Sep-96     | 5                    | =         |         |

Concentrations in bold and outlined exceed MCL/RBC.

RBCs are listed in italics where no primary MCL exists.

RBCs are listed in the EPA Region III RBC (October 2000) table; HI = 0.1 for non-carcinogenic compounds (





- ⊕ Groundwater Wells
- ⚡ Railroads
- Roads
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings



0 100 200 Feet

**Figure 4-2**  
 RFI Groundwater Monitoring Well Locations  
 AOCs 613, 615, and SWMU 175, Zone F  
 Charleston Naval Complex



## 1 5.0 COPC/COC Refinement

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2 This section discusses chemicals that were identified in the *Zone F RFI Report, Revision 0*  
3 (EnSafe, 1999a) as COPCs, as presented in Section 2.0 of this RFI Report Addendum, and  
4 COPCs that were identified in subsequent sampling events, as presented in Section 4.0.  
5 Factors that determine whether a COPC meets the criteria for being a COC are discussed for  
6 each parameter. The chemicals that were detected in soil with concentrations above  
7 background and screening criteria, such as an RBC (HI=0.1), were included in a focused risk  
8 evaluation to determine if the site soils present unacceptable human health risk under  
9 unrestricted (residential) and industrial land use scenarios.

10 The *Zone F RFI Report, Revision 0* concluded that VOCs do not need further consideration in  
11 surface or subsurface soil at AOC 613/AOC 615/SWMU 175. This conclusion was based on  
12 the SSLs used at the time (based on a DAF=20). The BCT has agreed to re-screen VOC data  
13 for soils using a generic SSL based on a DAF=1. This re-evaluation is presented herein.

### 14 5.1 Surface and Subsurface Soil COPC Refinement

15 Surface and subsurface soil chemicals identified as COPCs in all of the sampling efforts to  
16 date are the following:

#### 17 Inorganic COPCs

- 18 • Aluminum
- 19 • Antimony
- 20 • Arsenic
- 21 • Beryllium
- 22 • Iron
- 23 • Lead
- 24 • Manganese
- 25 • Mercury
- 26 • Nickel
- 27 • Selenium
- 28 • Thallium
- 29 • Vanadium

30

1 **Organic COPCs (Non-VOCs)**

- 2 • Aroclor-1260
- 3 • BEQs
- 4 • Dibenzofuran
- 5 • Dieldrin
- 6 • 2-methylnaphthalene
- 7 • Gamma BHC (Lindane)
- 8 • Isophorone

9 **Organic COPCs (VOCs)**

- 10 • Benzene
- 11 • Methylene Chloride
- 12 • Naphthalene
- 13 • 1,1,2,2-Tetrachloroethane
- 14 • PCE
- 15 • TCE
- 16 • Vinyl Chloride

17 Data for each of these parameters are provided in Tables 5-1 through 5-8, and are discussed  
18 in the following subsections. Because the DPT soil samples for AOC 613 generally contained  
19 soil from 0 to 4 ft bls, the soil probe data are screened against surface soil criteria to consider  
20 both RBCs and SSLs, and consideration is given to subsurface soil background  
21 concentrations where appropriate. The DPT soil samples collected for the Zone L sites AOC  
22 699 and SWMU 37 (both investigations of buried sewers) within the AOC 613/AOC  
23 615/SWMU 175 investigative area, were composed of below-grade soil collected adjacent to  
24 the sewer lines, and therefore were screened only against subsurface soil COPC criteria.

25 BEQs and BEQ components were compared to CNC-wide BRCs for surface or subsurface  
26 soil, as appropriate.

27 Due to the large number of samples collected after the *Zone F RFI Report, Revision 0* (EnSafe  
28 1999a), and the identification of additional chemicals as COPCs, a focused risk assessment  
29 is conducted for soils at AOC 613/AOC 615/SWMU 175. This risk assessment addresses  
30 potential future unrestricted (residential) and industrial land uses at these sites. Results are  
31 included at the end of the soil screening evaluation section.

### 1 **5.1.1 Metals in Surface and Subsurface Soil**

2 Eleven metals were identified as COPCs in surface soil DPT (0 to 4 ft bls) and subsequent  
3 surface soil (0 to 1 ft bls) sampling events. Five metals were identified as COPCs in  
4 subsurface soil (3 to 5 ft bls). Comprehensive data for these metals are presented in Tables 5-  
5 1 and 5-2, and are discussed below. Surface soil inorganic COPCs were screened using the  
6 combined Zones E and F grid (background) sample data range. Surface soil and DPT data  
7 were compared to unrestricted (residential) land use and industrial land use RBCs from the  
8 EPA Region III RBC table (October 2000), adjusted for HI=0.1, as well as to generic SSLs  
9 adjusted for DAF=10 (except VOCs, which were adjusted for DAF=1). Subsurface soil  
10 inorganic COPCs were compared to subsurface grid samples from combined Zones E and F  
11 and to SSLs.

#### 12 **Aluminum**

13 Table 5-1 presents aluminum data from surface soil samples collected at AOC 613/AOC  
14 615/SWMU 175. Aluminum exceeded the combined background range for Zones E and F  
15 (261 to 20,500 mg/kg) in a total of 14 samples within the site. Considering that the DPT (0 to  
16 4 ft bls) soil samples include both surface and subsurface soil, and the industrial area is  
17 highly disturbed due to construction activities, it is appropriate to include subsurface soil  
18 background values for comparison. The subsurface soil aluminum concentrations for  
19 combined Zones E and F range from 1,220 mg/kg to 29,900 mg/kg. The maximum detected  
20 site concentration at AOC 613/AOC 615/SWMU 175 is 30,400 mg/kg, which is close to the  
21 range of subsurface soil aluminum background levels, less than half of the unrestricted  
22 (residential) land use RBC (HI=1.0) of 78,000 mg/kg, and less than one-tenth of the  
23 industrial land use RBC (HI=1.0) of 200,000 mg/kg. Aluminum is an abundantly occurring  
24 element that is particularly common in clayey soils. In other parts of the CNC, background  
25 concentrations of up to 55,500 mg/kg were recorded; all aluminum concentrations  
26 measured at AOC 613/AOC 615/SWMU 175, whether in surface soil or subsurface soil, are  
27 within the CNC-wide background ranges. Thus, aluminum is not considered a site-specific  
28 contaminant for this group of sites; however, it is included for further risk assessment as  
29 presented below.

#### 30 **Antimony**

31 Table 5-1 presents antimony data from surface soil samples collected at AOC 613/AOC  
32 615/SWMU 175. Antimony was detected in five of the 68 DPT samples and 21 out of the 26  
33 surface soil samples in concentrations ranging between 0.31 and 16 mg/kg, with only 7.8  
34 mg/kg as the maximum concentration detected in surface soil samples collected during the  
35 RFI addendum sampling effort. The detections appear to be sporadic across the site. All of

1 the detected concentrations are estimated (“J” values); two out of the 94 locations were  
2 identified with concentrations that exceeded the combined background range of  
3 concentrations for Zones E and F (0.50 to 7.4 mg/kg) and the SSL of 2.5 (DAF=10). These  
4 exceedance locations are shown in Figure 5-1. Locations F613SB019 (7.80 J mg/kg) and  
5 F613SP027 (15.6 J mg/kg) are not spatially related to one another (they are 300 ft apart); no  
6 antimony was detected in the ten samples located between them. The two elevated  
7 concentrations were higher than the unrestricted (residential) land use RBC adjusted for  
8 HI=0.1 (3.1 mg/kg), but below the unadjusted RBC of 31 mg/kg (HI=1.0), and less than  
9 one-fifth of the adjusted industrial land use RBC for soil of 82 mg/kg (HI=0.1).

10 Although antimony exceeded SSLs at these two isolated locations, it was not detected above  
11 screening criteria in subsurface soil, and no site groundwater concentrations exceeded the  
12 RBC for tap water. Therefore, leachability is not a concern for this metal.

13 For the reasons described above, antimony is not considered a site-related COC in surface  
14 or subsurface soil, and does not warrant further evaluation at AOC 613/AOC 615/SWMU  
15 175. However, a risk assessment was conducted to determine site-wide cumulative impacts  
16 from this and other COPCs, and results are presented at the end of this section.

## 17 **Arsenic**

18 As presented in Section 2.0 of this RFI Report Addendum, arsenic was identified as a  
19 surface soil COC in the HHRA for the future unrestricted (residential) land use scenario.  
20 Table 5-1 presents arsenic data from surface soil samples collected at AOC 613/AOC  
21 615/SWMU 175. From a total of 104 samples, arsenic at only a single sample location  
22 exceeded the range of background sample concentrations for combined Zones E and F (0.95  
23 to 67.5 mg/kg). The sample from location F613SP027, which is shown on Figure 5-1,  
24 contained arsenic at 69.9 J mg/kg, which is equivalent to the background maximum. The  
25 extent of arsenic around the maximum detected concentration has been determined, and  
26 samples surrounding this location are well within the background range of concentrations.  
27 Thus, the elevated arsenic concentration occurs only in a limited area.

28 Arsenic exceeded the maximum combined Zones E and F range for subsurface soil (0.83 to  
29 30 mg/kg) in five out of 41 subsurface soil samples. Table 5-2 presents arsenic data from  
30 subsurface soil samples collected at AOC 613/AOC 615/SWMU 175. Samples collected  
31 from F613SB021 (35.7 J mg/kg) and F613SB002 (36.2 mg/kg) are located near each other on  
32 the southwestern edge of Building 242, and samples from F613SB024 (31.9 J mg/kg) and  
33 F613SB012 (30.1 mg/kg) are located on the other side of the investigated area near the  
34 southeast corner of Building 1277. The fifth location, F613SP022 (31.5 mg/kg), is near the

1 northwest corner of Building 255, near the center of the investigated area. All subsurface  
2 soil arsenic concentrations were near the background range of concentrations for Zones E  
3 and F (0.83 to 30 mg/kg), and are well within the base-wide background concentration  
4 range (0.36 to 136 mg/kg).

5 The apparently ubiquitous occurrence of arsenic in soils in the CNC is believed to be either  
6 naturally occurring or from anthropogenic sources such as base-wide maintenance-related  
7 pesticide applications along the paved areas, buildings, railroad lines, etc. The patterns of  
8 arsenic in soil at AOC 613/AOC 615/SWMU 175 do not indicate that a site-specific  
9 operations-related release has occurred; rather, this indicates that arsenic is likely from non-  
10 RCRA related activities and is comparable to background concentrations. Therefore, arsenic  
11 is not considered a site-related COC in surface or subsurface soil at this site. However, it is  
12 included in the risk evaluation as a COPC, and is presented below.

### 13 **Beryllium**

14 Although the *Zone F RFI Report, Revision 0* listed beryllium as a surface soil COC, beryllium  
15 did not exceed its current unrestricted (residential) land use RBC (HI=0.1) of 16 mg/kg or  
16 its SSL (DAF=10) of 32 mg/kg at any location within the site. The maximum detected  
17 concentration was 1.8 mg/kg, which is more than an order of magnitude below the SSL  
18 (DAF=10) and the RBC. There were also no subsurface soil exceedances of the SSL for  
19 beryllium. Table 5-1 presents beryllium data from surface soil samples collected at AOC  
20 613/AOC 615/SWMU 175. Based on these facts, beryllium is not considered a COC in  
21 surface soil and does not warrant further evaluation at AOC 613/AOC 615/SWMU 175.  
22 Because beryllium was detected at concentrations below RBCs, it is not considered a COPC  
23 in the risk assessment.

### 24 **Iron**

25 Table 5-1 presents iron data from DPT (0 to 4 ft bls) and surface soil samples collected at  
26 AOC 613/AOC 615/SWMU 175. With the exception of ten samples, the exceedances were  
27 within the background concentration range detected in soils at Zones E and F for iron (1,050  
28 mg/kg to 30,600 mg/kg). Samples collected from seven surface soil locations along the  
29 north side and the northern half of the west side of Building 242, F613SP004 (36,200  
30 mg/kg), F613SB017 (31,000 mg/kg), F613SB027 (35,000 mg/kg), F613SB028 (39,600  
31 mg/kg), F613SP007 (35,400 mg/kg), F613SP014 (32,500 mg/kg) and F613SP024 (33,100  
32 mg/kg) marginally exceeded the combined Zones E and F maximum background surface  
33 soil concentration of 30,600 mg/kg. Two adjacent locations, F613SP052 (31,900 mg/kg) and  
34 F613SP068 (31,700 mg/kg) on the south side of Building 255, also contained marginal

1 exceedances. The remaining exceedance location, F613SP012 (34,500 mg/kg), is located to  
2 the north of Building 255. Because the site consists of highly disturbed soils and some of the  
3 DPT samples contain subsurface soil, the subsurface background maximum concentration  
4 for Zones E and F (35,800 mg/kg) is also used for comparison. Two out of 102 samples are  
5 above this maximum background concentration. Thus, the overall site iron concentrations  
6 are within naturally occurring iron levels across Zones E and F. Most of the iron  
7 concentrations are above the unrestricted (land use) RBC (2,300 mg/kg at HI=0.1), but no  
8 iron concentration exceeds the RBC (HI=0.1) for industrial land use of 61,000 mg/kg. Iron is  
9 a commonly occurring element and a major component of clay soils. Additionally, all of the  
10 detected iron concentrations are well within the base-wide surface soil background  
11 concentrations for iron of 841 to 48,700 mg/kg.

12 There is no SSL for iron because of low levels of health and ecological concerns (i.e., low  
13 toxicity), and detected concentrations are within base-wide background levels. Therefore,  
14 iron is not considered a COC in surface or subsurface soil and does not warrant further  
15 evaluation at AOC 613/AOC 615/SWMU 175.

## 16 **Lead**

17 As seen in Table 5-1, out of the 104 surface soil and DPT samples collected within the  
18 investigated area of AOC 613/AOC 615/SWMU 175, lead was not detected above its  
19 health-based screening concentration of 400 mg/kg or its range of background  
20 concentrations (3.5 to 400 mg/kg) in any sample except for F613SB002 (3,980 J mg/kg).  
21 Similarly, as shown in Table 5-2, out of 44 subsurface soil samples, only one subsurface soil  
22 location, F613SB026 (6,620 J mg/kg) had lead concentrations exceeding subsurface soil  
23 background values (2.4 to 322 mg/kg).

24 The two locations with elevated lead, which are shown on Figure 5-1, are spatially  
25 unrelated (475 ft apart) and do not appear to be related to any specific waste releases. The  
26 surface soil exceedance is located on the western side of Building 242, and is surrounded,  
27 both horizontally and vertically, by unimpacted soil (lead concentrations within the  
28 background range). The subsurface soil exceedance is located east of Building 1277, and  
29 likewise is surrounded by soil within the background range. In addition, subsurface soil  
30 within 1 ft of location F613SB026 contained lead at 139 mg/kg (F175SB037). Therefore, these  
31 two samples with elevated lead concentrations are considered anomalies and do not  
32 represent widespread contamination at AOC 613/AOC 615/SWMU 175.

33 There is no evidence that lead is leaching into groundwater at this site. The average  
34 concentration of lead for all site surface soil samples is 83 mg/kg, which is below the

1 screening level and assumed SSL of 400 mg/kg. The average concentration of lead in site  
2 subsurface soil is 202 mg/kg, which is also below the SSL. Therefore, although lead may be  
3 elevated above natural background concentration levels at two isolated locations, it is not a  
4 human exposure or leaching concern in the investigated area. Thus, lead is not considered a  
5 COC in surface and subsurface soil and does not warrant further evaluation at AOC  
6 613/AOC 615/SWMU 175.

## 7 **Manganese**

8 Table 5-1 presents manganese data from surface soil samples collected at AOC 613/AOC  
9 615/SWMU 175. Seven out of the 102 surface soil and DPT samples within the investigated  
10 area contained manganese at concentrations greater than the background range (0.93 to 508  
11 mg/kg), the unrestricted (residential) RBC (160 mg/kg, HI=0.1), and the SSL (DAF=10) of  
12 480 mg/kg. The maximum detected concentration, 755 mg/kg, is lower than the industrial  
13 land use RBC of 4,100 mg/kg, adjusted for HI=0.1. Three of the exceedances (at F613SB017,  
14 F613SP005, and F613SP012) are located directly north of Buildings 242 and 255, two  
15 exceedances (at F613SP020 and F613SP024) are located on the southwest side of Building  
16 242, and two (at F613SP052 and F613SP068) are located south of Building 255.

17 Because of the scattered locations of the slightly elevated manganese concentrations, it does  
18 not appear that they are caused by a release from site operations. Because site soils are  
19 highly disturbed, and the majority of the DPT samples were from soils that are 0 to 4 ft  
20 deep, manganese background levels for subsurface soils are appropriate for comparison  
21 with these data. The subsurface background manganese range of 4.9 to 1,120 mg/kg was  
22 not exceeded in any of the samples. In addition, all site concentrations are within the base-  
23 wide range of background concentrations, 0.93 to 1,200 mg/kg. Although there were some  
24 exceedances of the screening SSL in surface soil, no subsurface soil manganese  
25 concentrations exceeded the SSL. The average manganese concentration in surface soil and  
26 soil probe samples is 181 mg/kg, less than the SSL. Therefore, leaching to groundwater is  
27 not a concern.

28 Manganese is also a naturally occurring element, and is not considered very toxic to human  
29 health or to ecological receptors at concentrations similar to background levels. Manganese  
30 is not considered a COC in surface or subsurface soil and does not warrant further  
31 evaluation at AOC 613/AOC 615/SWMU 175.

## 32 **Mercury**

33 Mercury was detected in a majority of locations sampled in the AOC 613/AOC 615/SWMU  
34 175 investigative area (87 of 102 locations sampled). However, with the exception of one out

1 of 102 surface soil samples (shown in Figure 5-1), the detected concentrations were within  
2 the background concentration range in surface soils at Zones E and F for mercury (0.030 to  
3 2.7 mg/kg), and were below the RBC and SSL values of 2.3 mg/kg and 1.0 mg/kg,  
4 respectively. Table 5-1 presents mercury data from surface soil and soil probe samples  
5 collected at AOC 613/AOC 615/SWMU 175.

6 The sample collected from one location out of 102 samples (at LE504SB005, 5.1 mg/kg),  
7 exceeded the combined background concentration range. This sample was not near any of  
8 the three site operations. This sample location is located near the southern end of SWMU  
9 175, along the crane rails, and was sampled as part of the investigated railroad lines at AOC  
10 504. Other metals detected at this location were within the range of background  
11 concentrations. There is no known source for the mercury. None of the nearby samples have  
12 elevated mercury, and it is not representative of the AOC 613/AOC615/SWMU 175 site.  
13 Thus, mercury is not considered a COC in surface or subsurface soil and does not warrant  
14 further evaluation at AOC 613/AOC 615/SWMU 175. However, mercury is included in the  
15 risk assessment to ensure that overall site risks from COPCs meet acceptable risk criteria.

#### 16 **Nickel**

17 Table 5-1 presents nickel data from surface soil samples collected at AOC 613/AOC  
18 615/SWMU 175. Only one location (at F613SP027, 79.1 mg/kg) had a nickel concentration  
19 that marginally exceeded the combined Zones E and F background range of 0.60 to 72  
20 mg/kg. This location, shown in Figure 5-1, was also the sole exceedance of the SSL  
21 (DAF=10) of 65 mg/kg for nickel. This concentration is well below the RBCs (HI=0.1) for  
22 unrestricted (residential) and industrial soil of 160 and 4,100 mg/kg, respectively.

23 Nickel concentrations in subsurface soil are within the background range of concentrations.  
24 Based on the fact that only one marginal SSL exceedance occurred in extensive sampling,  
25 and the mean nickel concentration at AOC 613/AOC 615/SWMU 175 is approximately 10  
26 mg/kg (which is lower than the SSL), nickel is not considered a COC in surface soil and  
27 does not warrant further evaluation at AOC 613/AOC 615/SWMU 175.

#### 28 **Selenium**

29 Selenium was analyzed in 102 surface soil and soil boring (0 to 4 ft bls) locations. One soil  
30 probe sample (F613SP004) contained selenium at 2.6 mg/kg; selenium in all other soil probe  
31 samples was below the SSL. All surface soil, subsurface soil, and DPT samples contained  
32 selenium below the unrestricted (residential) land use RBC (HI=0.1) of 39 mg/kg.

33 Therefore, selenium is not a COC for surface soil.

1 Table 5-2 presents selenium data from subsurface soil samples collected at AOC 613/AOC  
2 615/SWMU 175. Selenium exceeded the SSL (DAF=10) of 2.5 mg/kg and combined Zones E  
3 and F background concentration range of 0.4 to 2.4 mg/kg in 14 out of 41 subsurface soil  
4 sample locations.

5 Selenium SSL exceedance locations were distributed uniformly throughout the investigative  
6 area. Subsurface soil selenium concentrations in the AOC 613/AOC 615/SWMU 175 area  
7 ranged uniformly from 0.3 to 3.5 mg/kg, and were compared to the CNC-wide range of  
8 background concentrations (0.34 to 3.9 mg/kg). The average selenium concentration in  
9 subsurface soil at AOC 613/AOC 615/SWMU 175 is calculated at 1.7 mg/kg, which is less  
10 than the SSL (DAF=10). Selenium has been sporadically detected in groundwater at AOC  
11 613/AOC 615/SWMU 175 at concentrations ranging from 0.8 to 5.9 µg/L, similar to Zone E  
12 grid sample concentrations, and it is not a COPC in groundwater. Therefore, although the  
13 SSL is exceeded in a few locations, the soil selenium is not contributing to groundwater. The  
14 detected selenium is likely naturally occurring and is not specific to activities related to  
15 AOC 613/AOC 615/SWMU 175. Based on these considerations, selenium is not considered  
16 a COC at this site.

### 17 **Thallium**

18 Thallium was detected in 27 of 101 surface soil and soil probe (0 to 4 ft bls) samples  
19 collected in the AOC 613/AOC 615/SWMU 175 investigative area. Table 5-1 presents  
20 thallium data from surface soil samples collected at AOC 613/AOC 615/SWMU 175. The  
21 highest detected concentration of thallium was 1.5 mg/kg, within the combined Zones E  
22 and F background range of 0.61 to 2.8 mg/kg.

23 Thallium was identified as a COPC in the *Zone F RFI Report, Revision 0* because  
24 concentrations were greater than the unrestricted (residential) land use RBC (HI=0.1) of 0.55  
25 mg/kg, and because of its absence in Zone F background samples. However, site  
26 concentrations are within the naturally occurring background range for the CNC, and are  
27 not a result of releases from AOC 613/AOC 615/SWMU 175. Based on these considerations,  
28 thallium is not considered a COC in surface soil, and does not warrant further evaluation at  
29 AOC 613/AOC 615/SWMU 175.

### 30 **Vanadium**

31 Vanadium was identified in all surface soil and soil probe samples in the AOC 613/AOC  
32 615/SWMU 175 investigative area at concentrations ranging between 3.8 and 83.9 mg/kg.  
33 Table 5-1 presents vanadium data from surface soil samples collected at AOC 613/AOC  
34 615/SWMU 175. There were 15 exceedances of the combined Zones E and F background

1 range of 1.1 to 60 mg/kg, and 17 exceedances of the unrestricted land use RBC of 55 mg/kg  
2 (HI=0.1). However, the exceedances were all marginal and none exceeded the SSL of 3,000  
3 mg/kg or the industrial land use RBC of 1,400 mg/kg (HI=0.1). In addition, vanadium  
4 concentrations were an order of magnitude less than the unrestricted (residential) land use  
5 RBC of 550 mg/kg (HI=1.0).

6 As shown in Figure 5-2, the elevated concentrations of vanadium are distributed around the  
7 investigated area, located away from the AOCs, and are not identified with a defined  
8 release area. Since the site is located within the heavily disturbed industrial area of CNC,  
9 and the DPT samples also represent subsurface soils (0 to 4 ft bls), subsurface background  
10 vanadium concentrations are appropriate for comparison. The maximum subsurface  
11 background concentration of 72 mg/kg was exceeded in five of the more than 100 samples,  
12 and the highest reported concentration (84 mg/kg) is similar to the background  
13 concentration. As shown in Table 5-1, the elevated vanadium concentrations are at locations  
14 associated with elevated aluminum and iron, which are likely indicative of natural minerals  
15 in the soils. Therefore, vanadium in surface soil at AOC 613/AOC 615/SWMU 175 does not  
16 present a significant risk and is not considered a COC. However, vanadium is included in  
17 the risk assessment as presented below.

18 Vanadium concentrations in subsurface soil do not exceed the combined Zones E and F  
19 background range of 1.6 to 72 mg/kg for subsurface soil, or the SSL (DAF=10) in any  
20 sample. Therefore, vanadium is not considered a COC in subsurface soil.

## 21 **5.1.2 VOCs in Surface and Subsurface Soil**

22 Seven VOCs were identified as COPCs in surface soil, subsurface soil, and soil probe  
23 samples during the RFI sampling events in the AOC 613/AOC 615/SWMU 175 area.  
24 Comprehensive data for the VOC COPCs are presented in Tables 5-3 and 5-4, and are  
25 discussed below. Surface soil and soil probe sample concentrations were compared to  
26 unrestricted (residential) land use and industrial land use RBCs from the EPA Region III  
27 RBC table (October 2000), adjusted for HI=0.1, and to generic SSLs with a DAF=1.0.  
28 Subsurface soil concentrations were compared to SSLs (DAF=1.0).

### 29 **1,1,2,2-Tetrachloroethane**

30 Table 5-3 presents 1,1,2,2-tetrachloroethane data from soil samples collected at AOC  
31 613/AOC 615/SWMU 175. This VOC was detected in only one sample out of 86 at an  
32 estimated concentration of 0.032 J mg/kg sampled in 1996, as shown in Figure 5-3. The  
33 location, F613SP031 is along the northeast side of Building 255, within the area designated  
34 as SWMU 175, in the path of the crane rail line. The concentration exceeds the SSL

1 (DAF=1.0) of 0.0002 mg/kg, but is below the unrestricted (residential) land use RBC of 3.2  
2 mg/kg. The co-located groundwater probe sample (F613GP031) did not report any  
3 detectable levels of this chemical, and the 1997 sample collected adjacent to this sample (at  
4 LE504SB003) did not have any detectable chlorinated compounds in soil in this vicinity.  
5 There have been no detections of 1,1,2,2-tetrachloroethane in groundwater samples  
6 collected on the site. Therefore, the single spurious low level detection of 1,1,2,2-  
7 tetrachloroethane does not appear to be representative of contamination in this area, and  
8 leaching from soil to groundwater is not a concern at the site. Based on these considerations,  
9 1,1,2,2-tetrachloroethane is not considered a COC in soil at this site.

## 10 **Benzene**

11 Benzene was detected in five of 86 samples collected in the AOC 613/AOC 615/SWMU 175  
12 investigative area. Concentrations exceeded the SSL (DAF=1.0) of 0.002 mg/kg at three  
13 locations, but none were reported greater than the unrestricted (residential) land use RBC of  
14 12 mg/kg. Table 5-3 presents benzene data from soil samples collected at AOC 613/AOC  
15 615/SWMU 175, and Figure 5-4 shows locations in which benzene exceeded the screening  
16 criteria. All of the detected benzene samples were from 1996, and subsequent samples did  
17 not have any detectable levels of benzene. Benzene has not been detected in groundwater in  
18 the southern half of the investigated area; therefore, leaching from the soil to groundwater  
19 is not a concern with these low-level sporadic detections. The more recent groundwater  
20 samples from monitoring wells located within the sites and near the soil detection locations  
21 did not have detectable levels of benzene. The only well with detectable levels of benzene  
22 (F613GW006) is located outside of the site, to the north of the general investigation area,  
23 and thus not spatially linked to soil benzene detections. Based on these considerations,  
24 benzene is not a COC in soil at this site.

## 25 **Methylene Chloride**

26 Table 5-3 presents methylene chloride data from 86 soil samples collected at AOC 613/AOC  
27 615/SWMU 175. Methylene chloride was detected in seven samples, with five samples  
28 having concentrations ranging from 0.001 J mg/kg to 0.004 J mg/kg, and two samples at  
29 0.05 mg/kg. These concentrations are all lower than the unrestricted land use RBC of 85  
30 mg/kg, but greater than the SSL (DAF=1.0) of 0.001 mg/kg. Most of these detections were  
31 identified in the northern half of the site, at random locations. The only detection of  
32 methylene chloride in a groundwater sample occurred at location FGELGW014, which is  
33 not in the vicinity of any of the locations in which it was detected in soil. Therefore,  
34 methylene chloride does not appear to be leaching from the soil. Methylene chloride is a  
35 common laboratory contaminant and not believed to be associated with the site operations

1 at the observed low-level concentrations. Based on these considerations, methylene chloride  
2 is not a COC in soil at this site.

### 3 **Naphthalene**

4 Table 5-4 presents naphthalene data from surface soil, subsurface soil, and DPT (0 to 4 ft  
5 bls) samples collected at AOC 613/AOC 615/SWMU 175. Naphthalene was detected in a  
6 total of six out of 129 samples, four of them at estimated concentrations near the detection  
7 limit (less than 1 mg/kg). Of all the detected concentrations, only one subsurface soil  
8 sample at F613SP022 (38 mg/kg) exceeded its SSL (DAF=1.0) of 4.0 mg/kg, but was below  
9 the unrestricted (residential) land use RBC of 1,600 mg/kg (HI=0.1). This sample location is  
10 shown in Figure 5-4. F613SP022 is located between Buildings 242 and 255, along the  
11 northeast side of the former location of AOC 613. This location was re-sampled in 1999,  
12 with no naphthalene detected in either surface or subsurface soil. There have been no  
13 exceedances of groundwater screening criteria for naphthalene in samples collected at the  
14 site and no other detections in soil or groundwater in the vicinity of F613SP022. Therefore,  
15 naphthalene in soil is not a leachability concern from the site soils. Based on these  
16 considerations, naphthalene is not a COC in soil at this site.

### 17 **PCE**

18 Table 5-3 presents PCE data from 86 soil samples collected at AOC 613/AOC 615/SWMU  
19 175. PCE was detected in only one sample collected from the subsurface (at LF037SP018)  
20 with a reported concentration of 0.0094 mg/kg, which was slightly above the SSL  
21 (DAF=1.0) of 0.0030 mg/kg. This sample location is shown in Figure 5-3. No surface soil  
22 samples were found to exceed the RBC or the SSL. The detected PCE was located west of  
23 Building 242. No other PCE was detected in soil or groundwater in the vicinity of this  
24 sample; therefore, soil leaching does not appear to be a concern for site-soil PCE. Based on  
25 these considerations, PCE is not considered a COC in soil at this site.

### 26 **TCE**

27 TCE was detected in eight out of 86 soil samples, as shown in Figure 5-3. No concentrations  
28 were reported greater than the unrestricted (residential) land use RBC of 58 mg/kg, but  
29 concentrations exceeded the SSL (DAF=1.0) of 0.003 mg/kg at three locations. Table 5-3  
30 presents TCE data from soil samples collected at AOC 613/AOC 615/SWMU 175. The soil  
31 concentrations range from 0.001 J mg/kg to 0.023 mg/kg, and were distributed randomly  
32 across the site. None of the soil samples collected in 1999 had detectable levels of TCE. The  
33 only MCL exceedance of TCE in groundwater occurred in a groundwater sample collected  
34 by DPT at location F613SP039. A groundwater monitoring well (F613GW004) located within

1 close proximity (25 to 40 ft) of this high detection had much lower TCE concentrations,  
2 below the MCL. TCE in soil is not considered a continuing source of the groundwater TCE,  
3 as TCE is found to occur in only one well at this time, and at concentrations below the MCL.  
4 The extent of TCE in groundwater and soil are well defined and are found to occur only in  
5 isolated areas of the site. Based on these considerations, TCE is not considered a COC in soil  
6 at this site.

### 7 **Vinyl Chloride**

8 Vinyl chloride was detected in one soil sample out of 86 in the investigated area, as shown  
9 in Figure 5-3. Table 5-3 presents vinyl chloride data from soil samples collected at AOC  
10 613/AOC 615/SWMU 175. Vinyl chloride was detected at F613SP034 (0.002 J mg/kg). The  
11 detected concentration is greater than the SSL (DAF=1.0) of 0.0007 mg/kg, but less than the  
12 unrestricted (residential) land use RBC of 0.43 mg/kg. No vinyl chloride was detected in  
13 groundwater at this location, indicating that it is not leaching from this location, and is  
14 likely a degradation product of other parent chlorinated solvents than a source itself.  
15 Because vinyl chloride was detected in only one sample (out of 86 samples) at very low  
16 concentrations, it does not appear representative of the site's soils, and is not considered a  
17 COC in soil at this site.

### 18 **5.1.3 SVOCs in Surface and Subsurface Soil**

19 BEQs were identified as COPCs in surface soil, subsurface soil, and soil probe samples  
20 within the AOC 613/AOC 615/SWMU 175 investigative area. Comprehensive tables of  
21 BEQ data are presented in Tables 5-5 and 5-6 for surface soil and subsurface soil,  
22 respectively, and are discussed below. Table 5-7 presents comprehensive data for the  
23 additional SVOCs, 2-methylnaphthalene, dibenzofuran, and isophorone, identified as  
24 COPCs in subsurface soil. BEQs were the only SVOCs identified as COPCs in surface soil.

25 Surface soil (0 to 1 ft bls) and AOC 613 soil probe (0 to 4 ft bls) sample concentrations were  
26 compared to unrestricted (residential) and industrial land use land use RBCs from the EPA  
27 Region III October 2000, adjusted for HI = 0.1, and to generic SSLs adjusted for DAF=10.  
28 BEQs and their components were also compared to base-wide reference concentrations.  
29 Subsurface soil concentrations were compared to generic SSLs; BEQs and their components  
30 were compared to base-wide reference concentrations.

### 31 **BEQs**

32 Tables 5-5 and 5-6 present BEQ data collected from surface soil, subsurface soil, and soil  
33 probe (0 to 4 ft bls) samples at each sample location within the sites AOC 613/AOC  
34 615/SWMU 175. BEQ concentrations exceed site-wide reference concentrations in six out of

1 a total of 131 samples at AOC 613/AOC 615/SWMU 175, as shown in Figure 5-5. Three of  
2 these locations are surface soil sample locations, two are subsurface soil sample locations,  
3 and one is a soil probe (0 to 4 ft bls) location. The site-wide reference concentration for  
4 surface soil is 1.304 mg/kg, and 1.4 mg/kg for subsurface soil. The surface soil exceedances  
5 are: F613SB001 (1.54 mg/kg), F613SB009 (2.04 mg/kg), F613SB022 (1.77 mg/kg) and soil  
6 probe location F613SP051 (1.78 mg/kg). The subsurface soil exceedance locations are  
7 F613SB005 (1.55 mg/kg) and F613SP022 (2.32 mg/kg).

8 Surface soil samples F613SB001 and F613SB022, are adjacent to each other and located  
9 beneath asphaltic pavement on the southwestern side of Building 242. Two additional soil  
10 borings, F613SB033 and F613SB034, which are located to the southwest of F613SB001 and  
11 F613SB022, were sampled in June 2001 to investigate a potential linkage to a fueling station  
12 west of AOC 613. Both of the samples collected from the additional borings contained  
13 concentrations of BEQs within the background range, indicating that the fueling station is  
14 not likely to be related to the exceedances. BEQs were not detected in subsurface soil  
15 samples from F613SB001 or F613SB022, indicating that the area is not a substantial source of  
16 contamination.

17 The BEQ at F613SB009, which is located east of SWMU 175 beneath the asphaltic pavement,  
18 was calculated at a concentration (2.04 mg/kg) that exceeds the reference concentration.  
19 However, as shown in Table 5-5, the only BEQ components that were detected in the  
20 sample (benzo[a]anthracene and chrysene) had concentrations lower than their specific  
21 SSLs and unrestricted (residential) land use RBCs. The elevated BEQ is calculated as a result  
22 of inclusion of non-detects for the other five BEQ constituents with slightly elevated  
23 detection limits. Therefore, the BEQ value at location F613SB009 is only marginally above  
24 background BEQs and does not warrant further action.

25 The soil probe (0 to 4 ft bls) sample from F613SP051, which is located southeast of AOC 615,  
26 contained a calculated BEQ of 1.78 mg/kg when sampled in 1996. However, as shown on  
27 Tables 5-5 and 5-6, this location was re-sampled in 1999, with the surface soil sample  
28 containing a BEQ of 0.496 mg/kg (within background values), and no BEQs were detected  
29 in the subsurface soil sample. Therefore, BEQs at this location do not warrant further action.

30 The subsurface soil exceedance locations are F613SB005 (1.55 mg/kg) and F613SP022 (2.32  
31 mg/kg), sampled in 1996. Location F613SP022 was re-sampled in 1999, with no BEQs  
32 detected. Therefore, BEQs at this location do not warrant further evaluation. The BEQ  
33 components at sample location F613SB005 included all of the seven constituents, but only  
34 benzo(a)anthracene (1.2 mg/kg) exceeded its SSL (DAF=10) of 0.8 mg/kg. The average

1 concentration of benzo(a)anthracene in the AOC 613/AOC 615/SWMU 175 investigated  
2 area is 0.45 mg/kg, less than the SSL. In addition, no benzo(a)anthracene has been detected  
3 in groundwater at AOC 613/AOC 615/SWMU 175. Therefore, the BEQs in subsurface soil  
4 do not appear to be leaching to groundwater, and do not warrant further consideration. The  
5 BEQs are included in the risk assessment to determine overall effects from all other site  
6 COPCs, as presented below.

7 The BEQ concentrations detected at the site are similar to the background levels typical of  
8 asphalt material. Additional background investigations along the railroad tracks and runoff  
9 areas from railroad tracks indicted elevated BEQs at about 3.4 mg/kg as a representative  
10 background value, and a maximum value at about 5.1 mg/kg. The observed BEQs in soils  
11 at this group of sites are well within background levels for the asphalt paved areas.  
12 Therefore, BEQs are not considered COCs at AOC 613/AOC 615/SWMU 175.

### 13 **2-Methylnaphthalene**

14 The PAH, 2-Methylnaphthalene, a constituent of petroleum fuel hydrocarbons, was  
15 detected at 17 out of 95 soil probe (0 to 4 ft bls) and subsurface soil samples. All  
16 concentrations were substantially less than the unrestricted (residential) land use RBC  
17 (HI=0.1) of 160 mg/kg. Two samples (shown on Figure 5-5) exceeded the SSL (DAF=10) of  
18 11 mg/kg. Table 5-7 presents 2-methylnaphthalene data from soil probe and subsurface soil  
19 samples collected at AOC 613/AOC 615/SWMU 175. The sample from location F613SB016  
20 (31 mg/kg) is near the buried fuel line north of the site, near two monitoring wells,  
21 F613GW006 and FGELGW014, that have had reported groundwater exceedances of 2-  
22 methylnaphthalene. The other exceedance location, F613SP022 (43 mg/kg) is not adjacent to  
23 the fuel line, and 2-methylnaphthalene has not been detected in groundwater in the vicinity  
24 of this soil probe. The 2-methylnaphthalene exceedance at location F613SB016 is related to  
25 potential releases from the fuel line, and is not related to AOC 613/AOC 615/SWMU 175  
26 activities. 2-methylnaphthalene will be addressed in groundwater as part of the fuel line  
27 release through the State's petroleum program. Thus, 2-methylnaphthalene is not a COC for  
28 AOC 613/AOC615/SWMU 175.

### 29 **Dibenzofuran**

30 Dibenzofuran was detected in eight out of 95 soil probe (0 to 4 ft bls) and subsurface soil  
31 samples. As shown in Table 5-7, one sample, F613SP022 (46 mg/kg), contained  
32 dibenzofuran at a concentration in excess of the SSL (DAF=10) of 3.9 mg/kg. The soil probe  
33 F613SP022 was originally sampled at 0 to 1 ft bls and 3 to 5 ft bls, as opposed to the other  
34 DPT soil samples collected in 1996. Dibenzofuran was not detected in the surface soil

1 sample from this probe in 1996; the detection occurred in the subsurface sample. This  
2 location was resampled in 1999 for the SPLP study with two (duplicate) samples;  
3 dibenzofuran was not detected in either surface or subsurface soil at that time. In addition,  
4 dibenzofuran has not been detected in groundwater in the vicinity of F613SP022. Estimating  
5 the non-detected data points at half of their reporting limits, the mean concentration of  
6 dibenzofuran among soil probes (0 to 4 ft bls) and subsurface soil samples (3 to 5 ft bls) is  
7 0.75 mg/kg, below the SSL. Therefore, the reported concentration is likely an anomaly, and  
8 dibenzofuran is not a concern at this site with regard to migration to groundwater, and is  
9 not a COC in soil at this site.

## 10 **Isophorone**

11 Isophorone was detected in only one location out of 94 soil probe (0 to 4 ft bls) and  
12 subsurface soil samples. Table 5-7 presents isophorone data from soil probe and subsurface  
13 soil samples collected at AOC 613/AOC 615/SWMU 175. Location F613SB021 had a  
14 reported concentration of 0.26 J mg/kg, exceeding the SSL (DAF=10) of 0.25 mg/kg. This  
15 was the only detection of isophorone in all the analyses for surface and subsurface soil.  
16 There were no RBC exceedances of isophorone in site groundwater samples, indicating  
17 leaching from soil does not appear to be a problem. The detection of isophorone at this site  
18 is rare and occurs in trace concentrations that are not an exposure or leachability concern.  
19 Based on these considerations isophorone is not considered a COC at this site.

## 20 **5.1.4 Pesticides and PCBs in Surface and Subsurface Soil**

21 Dieldrin and Aroclor-1260 were identified as COPCs in surface soil, and dieldrin and  
22 lindane were identified as COPCs in subsurface soil, based on analytical results from eight  
23 locations collected in association with the AOC 504 investigation (within SWMU 175), and  
24 in duplicate and SPLP samples collected within at AOC 613/AOC 615/SWMU 175. Table 5-  
25 8 presents comprehensive data for these compounds, and they are discussed below.

### 26 **Aroclor-1260**

27 Aroclor-1260 was detected in two surface soil samples: LE504SB001, with a concentration of  
28 0.34 mg/kg, which was similar to the unrestricted (residential) land use RBC of 0.32 mg/kg  
29 and lower than the industrial land use RBC of 2.9 mg/kg; and in F613SP027, at 0.072  
30 mg/kg. No SSL is listed for this PCB, however EPA Region III lists an SSL value at 0.54  
31 mg/kg (DAF=10) for PCB Aroclor-1254, which is not exceeded by the detections at the site.  
32 Table 5-8 presents Aroclor-1260 data from surface and subsurface soil samples collected in  
33 the AOC 613/AOC 615/SWMU 175 investigative area. The detected Aroclor-1260  
34 concentrations are isolated occurrences and are not specific to activities related to AOC

1 613/AOC 615/SWMU 175. Based on these considerations, Aroclor-1260 is not considered a  
2 COC at this site. However, Aroclor-1260 in surface soil is included as a COPC in the risk  
3 evaluation, as presented below.

#### 4 **Dieldrin**

5 Dieldrin is a chlorinated pesticide that was discontinued for routine maintenance  
6 application more than 30 years ago. It is very persistent and tends to remain bound to soil  
7 and organic matter in the soils. It was detected in two soil samples out of 16, one surface soil  
8 sample and one subsurface soil sample. Both detected concentrations were less than the  
9 unrestricted (residential) land use RBC of 0.04 mg/kg but exceeded the SSL of 0.0020  
10 mg/kg. One of the samples, LE504SB003, was a subsurface sample with a reported  
11 concentration of 0.0054 mg/kg, the other was a surface sample, LE504SB003, with a  
12 reported concentration of 0.0051 mg/kg. Both samples were located within SWMU 175  
13 along the paved areas which may have received past maintenance-related pesticide  
14 applications. The detected concentrations are near detection limits. Table 5-8 presents  
15 dieldrin data from surface and subsurface soil samples collected in the AOC 613/AOC  
16 615/SWMU 175 investigative area. Dieldrin has not been detected in site groundwater. The  
17 detected dieldrin is likely from historical land applications as part of the facility  
18 maintenance and is not specific to activities related to AOC 613/AOC 615/SWMU 175.  
19 Based on these considerations, dieldrin is not considered a COC at this site.

#### 20 **Gamma-BHC (Lindane)**

21 Lindane was detected in one out of 16 soil samples analyzed at the site. It was detected at  
22 LE504SB003 (0.0072 mg/kg), in the same subsurface soil sample in which dieldrin was  
23 detected. The lindane concentration was in excess of the SSL (DAF=10) of 0.0045 mg/kg.  
24 Table 5-8 presents lindane data from surface and subsurface soil samples collected in the  
25 AOC 613/AOC 615/SWMU 175 investigative area. Lindane has not been detected in  
26 groundwater within 300 ft of LE504SB003. The detected lindane is likely from historical  
27 land applications as part of the facility maintenance, and is not specific to activities related  
28 to AOC 613/AOC 615/SWMU 175. Based on these considerations, lindane is not considered  
29 a COC at this site.

### 30 **5.1.5 Focused Risk Assessment for Soil COPCs**

31 In order to provide a conservative evaluation of chemicals detected in surface media at  
32 AOC 613, a human health risk-based evaluation of detected chemicals was performed. The  
33 risk assessment was conducted in accordance with RAGS and EPA Region IV supplemental  
34 guidance (EPA, 1989; EPA, 1994).

## 1 **Selection of COPCs**

2 Sample results for surface soil (0 to 1 ft bls) and soil probe (0 to 4 ft bls) samples from AOC  
3 613 were screened for COPCs in this evaluation to provide a health-based evaluation of all  
4 soils at this site. Surface soil and soil probe samples were screened separately during the  
5 COPC identification step. Maximum detected concentrations for each chemical were  
6 screened against EPA Region III RBC values and Zones E and F background values. If a  
7 chemical exceeded the established background value and the RBC value (carcinogens at  
8 excessive lifetime cancer risk [ELCR]=1E-6 and non-carcinogens at HI=0.1) it was selected  
9 as a COPC.

10 Results of the COPC screening step are presented in Table 5-9. Nine chemicals were selected  
11 as COPCs for surface soil while twelve chemicals were selected as COPCs for soil probe  
12 samples. Iron and manganese exceeded background and RBC values but were not selected  
13 as COPCs, as they are naturally ubiquitous in soils. As described in Section 5.1.2, the three  
14 chemicals 1,1,2,2-tetrachloroethane, 1,1-dichloroethene, and vinyl chloride were not selected  
15 as COPCs.

16 The final list of COPCs carried forward in this HHRA are:

- 17 • Aluminum
- 18 • Antimony
- 19 • Arsenic
- 20 • BEQ
- 21 • Chromium, total
- 22 • Copper
- 23 • Lead
- 24 • Mercury
- 25 • PCB-1260
- 26 • Thallium
- 27 • Vanadium

## 28 **Toxicity Assessment**

29 Toxicity factors were obtained from the Integrated Risk Information System (IRIS) website  
30 or Health Effects Assessment Summary Tables (HEAST, 1997), as appropriate. Toxicity  
31 factors, weight-of-evidence classification, and oral-to-dermal adjustment factors are  
32 provided in Table 5-10. The toxicity factors for hexavalent chromium were used for total

1 chromium as conservative surrogate values in risk estimations. PAHs were evaluated as  
2 BEQs for carcinogenic PAHs in accordance with EPA Region IV policy. There are no  
3 toxicity factors available for lead; therefore, lead is addressed separately.

#### 4 **Exposure Assessment**

5 The site soils are evaluated for future unrestricted (residential) land use and future  
6 industrial land use under conservative exposures using default exposure assumptions  
7 provided by EPA guidance. Exposure pathways were assumed to be complete for a  
8 hypothetical industrial worker and hypothetical future residential adult and child. Routes  
9 of exposure include ingestion, dermal, and inhalation. Exposure factors are the default  
10 values from EPA guidance, and are provided in the risk calculation sheets in Appendix G of  
11 this RFI Report Addendum.

12 Combined surface soil and soil probe analytical results were used to estimate exposure  
13 point concentrations (EPC) for receptors at this site. EPCs are the 95<sup>th</sup> percent upper  
14 confidence limit on the mean (UCL<sub>95</sub>). The UCL<sub>95</sub> was estimated using statistical guidance  
15 adapted by EPA, which is based on the sample population distribution. Results of sample  
16 distribution testing and the estimated EPCs for COPCs used in the risk estimations are  
17 included in Table 5-11.

#### 18 **Risk Characterization**

19 Table 5-12 includes a summary of the ELCR and the HI per exposure route and receptor.  
20 The details of the per chemical ELCR and hazard quotients (HQs) and HI are presented in  
21 Appendix G.

22 The ELCR for a hypothetical industrial worker is estimated to be 4.2E-6. This is within the  
23 acceptable risk range of 1 to 100 in a million for carcinogenic effects. The HI to a worker is  
24 0.048, which is well below the target HI of 1.0 for non-carcinogenic effects.

25 The total ELCR for a future hypothetical residential adult is estimated at 3.7E-5, which is  
26 within the acceptable risk range. The total HI for a resident is 0.13, which is below the  
27 acceptable HI of 1.0. The non-carcinogenic HI for a future hypothetical residential child is  
28 1.3, which is slightly above a value of 1.0. However, no individual chemical exceeded a  
29 value of 1.0, and the target organ analysis indicated that cumulative effects to any one target  
30 organ are not above a value of 1.0, and slightly exceed the level deemed protective for non-  
31 carcinogenic effects. The risk summaries can be found in Table 5-12.

32 Approximately 84 percent of the risk is from arsenic at a site-wide UCL<sub>95</sub> level of 13 mg/kg,  
33 which is below the background level. Approximately 15 percent of the risk is from BEQs at

1 an EPC (=UCL<sub>95</sub>) of 0.484 mg/kg, which is also below the background level. Thus,  
2 estimated ELCRs are from arsenic and BEQs that are below background levels. No  
3 chemicals exceed an HQ of 1.0 for any target organ for any receptor in surface media at this  
4 site.

## 5 **Lead**

6 Maximum detected concentrations of lead exceeded the residential action level of 400  
7 mg/kg, but average site concentrations (84 mg/kg) were below the action level. Therefore,  
8 lead levels at these sites are not a human exposure concern even under unrestricted  
9 (residential) land use conditions. Therefore, lead is not a COC for soils.

## 10 **Leachability Evaluation Summary**

11 Due to the large number of samples available at this site, and the soil probe data  
12 representing true averages in soils, the site averages are compared with leachability-based  
13 criteria and summarized in Tables 5-13a and 5-13b. None of the COPC average  
14 concentrations exceeded the SSL.

## 15 **5.1.6 Summary of Soil COCs**

16 There are no COCs requiring further action in surface or subsurface soil at AOC 613/AOC  
17 615/SWMU 175 based on COPC-specific screening evaluation, HHRA, and leachability  
18 evaluations.

## 19 **5.2 Groundwater COPC Refinement**

20 The groundwater COPCs identified in *Zone F RFI Report, Revision 0* are:

- 21 • 1,2-DCE (total)
- 22 • Benzene
- 23 • PCE
- 24 • Toluene
- 25 • 2-Methylnaphthalene
- 26 • Acenaphthene
- 27 • Bis(2-ethylhexyl)phthalate
- 28 • Fluorene
- 29 • Phenanthrene
- 30 • Pyrene
- 31 • Aluminum
- 32 • Arsenic

- 1 • Beryllium
- 2 • Cadmium
- 3 • Chromium
- 4 • Manganese
- 5 • Thallium
- 6 • Vanadium
- 7 • Zinc

8 Additional COPCs identified in groundwater as part of Zone L investigations and DPT data  
9 from AOC 613 are:

- 10 • 1,1-DCE
- 11 • Methylene chloride
- 12 • Naphthalene
- 13 • TCE
- 14 • Vinyl chloride
- 15 • Dibenzofuran
- 16 • Iron

17 Tables 5-14, 5-15, and 5-16 present comprehensive data for each of the COPCs listed above.  
18 Comparison criteria are MCLs for all parameters and the Zones E and F BRCs for metals. If  
19 no primary MCL exists, tap water RBCs (HI=1.0) are used to evaluate COPCs. Combined  
20 background (grid) well data for Zones E and F are used because the AOC 613/AOC  
21 615/SWMU 175 sites are within an industrial use area similar to Zone E. In addition, Zone F  
22 had only one grid well, whereas Zone E had 31 wells (all which were monitored multiple  
23 times).

24 The potentiometric surface of the shallow groundwater at the site measured January 31,  
25 2002, is presented in Figure 5-6. The flow direction appears to be governed by a  
26 groundwater mound located southwest of AOC 613, a shallow trough trending north-south  
27 through AOC 613, and a groundwater sink between Buildings 241 and 1172.

### 28 **5.2.1 Metals in Groundwater**

29 Several metals were detected in groundwater at AOC 613/AOC 615/SWMU 175, with  
30 occasional concentrations that exceeded the MCL/RBC. Many of these metals that were  
31 measured at relatively high concentrations in the first RFI sampling event were detected at  
32 much reduced concentrations in the later monitoring events. Although turbidity data are  
33 not available for this first sampling event, it is expected that some of these elevated

1 concentrations may be attributed to suspended soil particles within the samples. Likewise,  
2 groundwater probe samples collected within the investigative area were not filtered and are  
3 expected to have contained particulates; therefore, their metals data are not considered in  
4 this data evaluation. Each metal identified as a COPC in groundwater is presented in Table  
5 5-14 and is discussed below. Table 5-14 also presents the Zone E BRC and the range of  
6 background data for each parameter within Zones E and F.

### 7 **Aluminum**

8 Table 5-14 presents aluminum data from groundwater samples collected at AOC 613/AOC  
9 615/SWMU 175. Aluminum concentrations ranged from 0.91 to 20,000 µg/L, compared to a  
10 background range of 19 to 16,100 µg/L. No groundwater sample exceeded the tap water  
11 RBC (37,000 µg/L) at HI=1.0 for aluminum; there is no primary MCL. Aluminum had been  
12 identified as a groundwater COPC based on an HI=0.1. There are no consistent trends to the  
13 aluminum concentrations in each monitoring well. Wells are screened in porous media that  
14 contains aluminum rich clays. Groundwater samples that are slightly turbid are likely to  
15 have high concentrations of aluminum reported even though the aluminum is likely bound  
16 to particles and not in a dissolved phase. Aluminum is the most abundant element in  
17 nature, is not very toxic, and the observed levels of aluminum at the site are likely from  
18 naturally occurring levels in the regional groundwater. Therefore, aluminum is not  
19 considered a COC in groundwater at AOC 613/AOC 615/SWMU 175.

### 20 **Arsenic**

21 Arsenic exceeded its MCL of 50 µg/L at four monitoring wells, as shown in Figure 5-7.  
22 Three of the wells, FDSGW17B, FGELGW014, and F613GW006, are located north of the sites  
23 being investigated, near the buried fuel line. These wells have consistently contained  
24 arsenic at elevated levels. Monitoring well FGELGW007, located south of Building 242, was  
25 the other well with a single elevated arsenic concentration (72 µg/L, measured in the first  
26 sampling event, and followed by samples with arsenic concentrations 23 µg/L or lower).  
27 All detected concentrations at the site were within the range of background values  
28 measured at Zones E and F (3 to 316 µg/L). Table 5-14 presents arsenic data from  
29 groundwater samples collected at AOC 613/AOC 615/SWMU 175.

30 The concentrations in samples collected from FFDSGW17B (also known as GFDSGW17B)  
31 ranged from 51.5 to 66 µg/L, and were all close to the MCL. Likewise, two samples from  
32 FGELGW014 contained arsenic concentrations of 60.7 and 60.6 µg/L. The two reported  
33 exceedances in samples collected from F613GW006 (207 and 211 µg/L) were higher than in  
34 FFDSGW17B. These wells are located in close proximity to the fuel line, and hydrocarbons

1 have been detected in both wells in the past. The significance of this fact, and the general  
2 geochemical behavior of arsenic are discussed below.

3 Elevated arsenic in groundwater at the CNC has previously been shown to be correlated  
4 with elevated iron concentrations in groundwater (see Technical Memorandum, CH2M-  
5 Jones, 2001c), due to natural geochemical processes involving iron-reducing bacteria. The  
6 concentrations of iron in groundwater samples for the wells exhibiting elevated arsenic  
7 were therefore reviewed to assess whether it appears that iron-reduction is occurring in the  
8 aquifer in or around these wells. Table 5-14 shows the concentrations of arsenic and iron in  
9 the wells. Iron concentrations in wells FDSGW17B, FGELGW014, and F613GW006 are all  
10 elevated and suggest that iron reduction is occurring in the local aquifer. The well with the  
11 greatest iron concentration of these three wells (F613GW006) also exhibits the greatest  
12 arsenic concentration. Thus these observed values are consistent with the premise that the  
13 arsenic is elevated in groundwater at these locations as a result of natural geochemical  
14 activity.

15 The *Zone F RFI Report, Revision 0* stated that some of the subsurface soil samples collected in  
16 this area exhibited an odor of fuel oil during sampling activities. A petroleum odor was also  
17 noted during the collection of subsequent subsurface soil samples. Fuel oil is comprised of  
18 long-chain diesel-range organic (DRO) compounds. These long-chain hydrocarbons are  
19 good substrates for a variety of microbes. With an abundance of the substrate, microbial  
20 populations responsible for the reduction of iron would be expected to grow substantially.  
21 Because iron-reducing bacteria contribute to increases in the concentrations of both iron and  
22 arsenic, it is probable that iron-reducing bacteria are responsible for the elevated  
23 concentrations of iron and arsenic. These data support the hypothesis that iron and arsenic  
24 concentrations at AOC 613/AOC 615/SWMU 175 are the result of microbial processes, and  
25 not site activities. Therefore, arsenic is not considered a COC at this site.

## 26 **Beryllium, Cadmium, and Chromium**

27 Beryllium, cadmium, and chromium have been infrequently detected in samples collected  
28 in wells at AOC 613/AOC 615/SWMU 175. No groundwater samples have exceeded the  
29 MCLs for these three metals (4 µg/L for beryllium, 5 µg/L for cadmium, and 100 µg/L for  
30 total chromium). Therefore, none of these three metals is considered a COC in groundwater  
31 at AOC 613/AOC 615/SWMU 175.

## 32 **Iron**

33 Table 5-14 presents iron data from groundwater samples collected at AOC 613/AOC  
34 615/SWMU 175. Groundwater concentrations ranging up to 52,600 µg/L at the site

1 frequently exceed the tap water RBC (11,000 µg/L) at HI=1.0 for iron. However, these  
2 concentrations of iron appear to be naturally occurring when compared to the Zones E and  
3 F range of background concentrations (144 to 76,600 µg/L) for shallow groundwater. Iron is  
4 within background levels, and not related to site operations. Therefore, iron is not  
5 considered a COC in groundwater at AOC 613/AOC 615/SWMU 175.

## 6 **Manganese**

7 Groundwater samples exceeded the RBC (HI=1.0) and Zone E BRC for shallow manganese  
8 groundwater (2,560 µg/L) at four locations in the investigative area. Table 5-14 presents  
9 manganese data from groundwater samples collected at AOC 613/AOC 615/SWMU 175.  
10 Single samples with elevated concentrations from both FGELGW007 and F613GW02D,  
11 compared to the wells' three other sampling events with concentrations below the BRCs,  
12 indicate that samples with elevated measurements most likely included particulates from  
13 the surrounding clayey soil. Samples from monitoring wells F613GW001, located near the  
14 northwest corner of AOC 613, contained manganese ranging from 51.5 J µg/L to 7940 µg/L,  
15 Samples from monitoring well F613GW003, located near the northeast corner of AOC 613 ,  
16 contained manganese ranging from 163 µg/L to 4,050 µg/L. These ranges are outside of the  
17 range of Zones E and F background values but within the Zone G background range of 149  
18 to 7,980 µg/L for shallow groundwater. Zone G is located near the site in a similar  
19 industrial environment. Manganese is naturally occurring in the minerals that compose the  
20 site soil. Therefore, manganese is not considered a COC in groundwater at AOC 613/AOC  
21 615/SWMU 175.

## 22 **Thallium**

23 Table 5-14 presents thallium data from groundwater samples collected at AOC 613/AOC  
24 615/SWMU 175. During the second RFI groundwater sampling event (April/May 1997),  
25 thallium was identified at estimated concentrations (ranging from 5.3 J to 9.5 J µg/L) in  
26 seven out of 14 samples collected at the site. Many of the detections were greater than the  
27 Zone E BRC of 5.4 µg/L and the Zones E and F background range of 3 to 6 µg/L. In six of  
28 these cases, it was the only time thallium had been identified from each well (i.e., it was not  
29 reproducible). No well has shown a consistent trend of thallium exceedances. Except for the  
30 anomalously elevated thallium concentrations, each collected during one sampling event,  
31 thallium is within background levels at this site. Therefore, thallium is not considered a  
32 COC in groundwater at AOC 613/AOC 615/SWMU 175.

## 1 **Vanadium and Zinc**

2 Vanadium and zinc were both listed as COCs in the *Zone F RFI Report, Revision 0* because  
3 one or more samples exceeded the tap water RBC at HI=0.1. Table 5-14 presents vanadium  
4 and zinc data from groundwater samples collected at AOC 613/AOC 615/SWMU 175. No  
5 groundwater sample concentration exceeded the tap water RBCs at HI=1.0 of 260 µg/L for  
6 vanadium, or 11,000 µg/L for zinc in any sample. Therefore, vanadium and zinc are not  
7 considered COCs in groundwater at AOC 613/AOC 615/SWMU 175.

## 8 **5.2.2 Organic Compounds in Groundwater**

9 Organic compounds identified as COPCs at this site generally are either related to  
10 chlorinated solvents and their by-products (1,1-DCE, 1,2-DCE, PCE, TCE, vinyl chloride,  
11 methylene chloride), or to petroleum hydrocarbons (2-methylnaphthalene, acenaphthene,  
12 dibenzofuran, fluorene, naphthalene, pyrene, phenanthrene, benzene, and toluene.) A  
13 constituent of plastics, and often associated with field or laboratory contamination, bis(2-  
14 ethylhexyl)phthalate was also identified as a COPC in groundwater. Comprehensive data  
15 for the petroleum hydrocarbon-related compounds are listed in Table 5-15, and  
16 comprehensive data for the chlorinated solvents and bis(2-ethylhexyl)phthalate are listed in  
17 Table 5-16. The organic COPCs are discussed in detail below.

### 18 **PCE, TCE, 1,2-DCE, and Vinyl Chloride**

19 Because of similarities in distribution in the site groundwater, PCE, TCE, and their  
20 degradation products 1,2- DCE and vinyl chloride, will be discussed collectively. Table 5-16  
21 presents data for chlorinated solvents analyzed in groundwater samples collected at AOC  
22 613/AOC 615/SWMU 175. Figures 5-8, 5-9, 5-10, and 5-11 show the areas with detected  
23 PCE, TCE, 1,2-DCE, and vinyl chloride concentrations. These chlorinated VOCs (CVOCs)  
24 are encountered in three localized areas of the site: near the southeast and the northwest  
25 corners of AOC 613, and south of AOC 613.

### 26 **PCE and TCE**

27 As seen in Figures 5-8 and 5-9, the screening DPT samples collected in 1996 contained  
28 moderate concentrations of PCE and TCE dissolved in groundwater collected from probe  
29 location F613GP039, which is near the southeast corner of AOC 613 (former building 1169),  
30 and trace concentrations (1 J µg/L) on the northwest side at screening location F613GP008.  
31 PCE and TCE were detected above the MCL of 5 µg/L only at DPT location F613GP039, at  
32 1,900 J µg/L and 1,500 J µg/L respectively. 1,2-DCE (1,700 J µg/L) and vinyl chloride (38  
33 µg/L) also exceeded their respective MCLs at F613GP039.

1 Monitoring well F613GW004 was installed in close proximity (25 ft downgradient) to  
2 investigate these relatively high CVOC detections at F613GP039, and data from the well  
3 indicated that TCE and PCE remains only at trace levels (4J  $\mu\text{g}/\text{L}$  and 0.35  $\mu\text{g}/\text{L}$ ,  
4 respectively), and 1,2 -DCE (84.5  $\mu\text{g}/\text{L}$ ) and vinyl chloride (10.8  $\mu\text{g}/\text{L}$ ) are the predominant  
5 residual degradation products at the site. Therefore, although relatively high concentrations  
6 of PCE and TCE were measured at F613SP039 in DPT samples, the groundwater in the  
7 adjacent monitoring well does not confirm the presence of these compounds above MCLs at  
8 this site. It is possible that past releases are undergoing natural attenuation with time, as  
9 indicted by the absence of parent solvents and detection of degradation products.

10 A trace detection of PCE in one 1997 groundwater sample from the deep well F613GW02D  
11 could indicate downward migration of CVOCs, although the absence of any CVOCs in any  
12 other sample from this stratum does not confirm that migration has occurred. In addition,  
13 as seen in Table 5-16 and Figure 5-8, PCE was detected in one 1997 sample at monitoring  
14 well FGELGW014, although no other CVOCs have been detected from that location in any  
15 other samples. Data from these two locations, FGELGW014 and F613GW02D, do not  
16 indicate CVOC contamination above MCLs in the northern geographic portion of the AOC  
17 613/AOC 615/SWMU 175 investigative area, or in the deeper groundwater.

18 Although TCE and PCE were well below MCLs in the last several sampling events  
19 conducted in all shallow and deep wells at these sites, it is possible that they may be  
20 detected during future sampling events, particularly if additional groundwater samples are  
21 collected in the vicinity of Geoprobe sample F613GP039. They are retained as potential  
22 COCs at AOC 613/AOC 615/SWMU 175.

### 23 **1,2-DCE and Vinyl Chloride**

24 1,2-DCE and vinyl chloride, daughter products of PCE and TCE, have been detected at the  
25 two locations identified with TCE, the southeast and northwest corners of AOC 613. Figure  
26 5-10 shows concentrations of total 1,2-DCE at screening locations F613GP008 and  
27 F613GP002, in the northwest corner of AOC 613, as high as 29  $\mu\text{g}/\text{L}$ , lower than the MCL of  
28 70  $\mu\text{g}/\text{L}$  (for cis-1,2-DCE). Figure 5-11 shows vinyl chloride in this area at 5 J  $\mu\text{g}/\text{L}$ , higher  
29 than the MCL of 2  $\mu\text{g}/\text{L}$ . These AOC 613 DPT screening samples were collected in 1996;  
30 CVOCs were not detected in adjacent sample L037GP031 collected in 1997 (see Table 5-16).  
31 In addition, CVOCs were not detected in monitoring well F613GW001, which is located 90  
32 ft from these DPT samples.

33 1,2-DCE and vinyl chloride have been measured at respective concentrations of 1,700 J  $\mu\text{g}/\text{L}$   
34 and 38  $\mu\text{g}/\text{L}$  in a DPT sample at screening location F613GP039, which is in the southeast

1 corner of AOC 613. As seen in Table 5-16 and Figures 5-10 and 5-11, these two compounds  
2 have also been detected at significantly lower concentrations in immediately adjacent DPT  
3 sample F613GP033, and in adjacent wells F613GW004 and FGELGW012. 1,2-DCE  
4 concentrations in F613GW004 have slightly increased from 24 µg/L to 84.5 µg/L from 1996  
5 to 2001. No trend is discernible for vinyl chloride with time; the two detections reported are  
6 near the detection limit of 10 µg/L.

7 A third area with detected concentrations of 1,2-DCE and VC is located at the southwest  
8 corner of AOC 613, defined by DPT screening sample locations F613GP060, F613GP042,  
9 LF037GP037, and monitoring well FGELGW007. The three DPT samples were collected to  
10 characterize possible releases from the sanitary sewer which drained from Building 1169.  
11 No CVOCs were detected in samples LF037GP036 or FGELGW011, which is located in the  
12 downgradient direction for the sewer. The highest concentration of 1,2-DCE in this area was  
13 measured at LF037GP037, at 13 µg/L, which is less than the MCL of 70 µg/L. The vinyl  
14 chloride in this area was reported at LF037GP037 at 17 µg/L in 1997, and this concentration  
15 is above the MCL of 2 µg/L. 1,2-DCE and VC are retained as COCs.

#### 16 **1,1-DCE and Methylene Chloride**

17 These compounds are also potential degradation products of TCE, PCE, or other CVOC  
18 parent solvents such as 1,1,1-trichloroethane and 1,1,2,2-tetrachloroethane. Isolated  
19 detections of these chlorinated solvents have occurred at several other locations on the site.  
20 As seen in Table 5-16, 1,1-DCE was detected in DPT samples only, and none of the  
21 monitoring wells had detectable 1,1-DCE. One MCL exceedance of 1,1-DCE occurred in a  
22 sample collected from screening location F613GP037 (20 µg/L, greater than the MCL of 7  
23 µg/L). However, 1,1-DCE was not detected in adjacent DPT sample LF699GP049, which  
24 was collected one year after F613GP037 was sampled, nor in any site monitoring wells.  
25 Therefore, the occurrence of 1,1-DCE is not consistent in the area in which it was detected,  
26 is not representative of AOC 613/AOC 615/SWMU 175, and as it is absent in several  
27 rounds of monitoring from the site wells, 1,1-DCE is not considered a COC at AOC  
28 613/AOC 615/SWMU 175.

29 Methylene chloride was detected in groundwater once at the site in the latest sampling  
30 event (at location FGELGW014, 83 µg/L); it had not been detected in the six previous  
31 sampling events at this well. Because this was the only detection of this compound  
32 anywhere at AOC 613/AOC 615/SWMU 175, it appears to be an anomaly, potentially  
33 caused by laboratory or field contamination. Therefore, methylene chloride is not  
34 considered a COC at AOC 613/AOC 615/SWMU 175.

1 **CVOC Discussion Summary**

2 The concentrations of these CVOCs suggests relatively old releases of solvents such as PCE  
3 and TCE in the area, based on a higher prevalence of their degradation products (such as  
4 1,2-DCE and vinyl chloride), compared to the parent compounds. The absence of parent  
5 solvents indicates that little or no residual source remains at the site, and natural  
6 attenuation processes are effective in reducing the CVOC concentrations in the area. The  
7 continued presence of degradation products such as 1,2-DCE and vinyl chloride at one  
8 location near monitoring well F613GW004 indicates a need for continued monitoring at this  
9 well, and the possible treatment of a potential small residual source area located near  
10 F613GP039. The presence of these CVOCs in a limited area indicates that these compounds  
11 are not migrating significantly.

12 **Benzene, Toluene, Naphthalene, and PAHs**

13 Because of their similar geographic distribution at AOC 613/AOC 615/SWMU 175, the  
14 petroleum fuel-related compounds benzene, toluene, naphthalene, and selected PAHs will  
15 be considered collectively. Figures 5-12 and 5-13 show the distribution of 2-  
16 methylnaphthalene and benzene, representative compounds identified in groundwater at  
17 the site. As shown on the figures and noted in Table 5-15, in the first sampling event at  
18 FGELGW014, concentrations of benzene, toluene, 2-methylnaphthalene, acenaphthene,  
19 fluorene, and pyrene, were found to exceed MCL/RBC values in concentrations indicative  
20 of undissolved product. In addition, phenanthrene was detected in the sample at an  
21 unusually high concentration (570,000 µg/L), although there is no MCL or RBC for this  
22 compound. This sample accounts for all MCL/RBC exceedances of petroleum fuel-related  
23 compounds that occurred in groundwater at AOC 613/AOC 615/SWMU 175. In  
24 subsequent sampling of this well, concentrations of these compounds are either no longer  
25 detected or present in greatly diminished concentrations. The four samples collected after  
26 August 1997 contained concentrations all within MCLs or RBCs.

27 Lower levels of these petroleum fuel-related compounds, also including dibenzofuran and  
28 naphthalene, have been detected in other samples collected in the vicinity of the buried fuel  
29 distribution line at FGELGW014, F613GW006, and screening locations F613GP013 and  
30 F613GP006. The data indicate that the apparent migration pattern was trending in an east-  
31 west direction, and not along the pipeline. The concentrations in samples surrounding  
32 FGELGW014 are all lower than the MCL or RBC (HI=1.0).

33 The fuel distribution line, Site 17, is being assessed under the SCDHEC petroleum program.  
34 The RFI data indicate that concentrations above regulatory or health-based criteria are no  
35 longer present at the site. Because these COPCs are not associated with AOC 613/AOC

1 615/SWMU 175 operations, the fuel line has been closed, and more recent groundwater  
2 samples indicate acceptable levels of dissolved petroleum hydrocarbons, these chemicals  
3 are not considered COCs in the groundwater at AOC 613/AOC 615/SWMU 175.

#### 4 **Bis(2-ethylhexyl)phthalate**

5 Bis(2-ethylhexyl)phthalate, which is a common artifact of sampling equipment, was  
6 detected at 100 J µg/L, in excess of its MCL (6 µg/L), in screening samples collected from  
7 two DPT locations along the railroad lines within AOC 613 (F613GP025 and F613GP033).  
8 However, it was not detected in monitoring wells located near these DPT samples. In  
9 addition, this compound was detected near the detection limit (10 J µg/L) in one sample  
10 from FFDSGW17B, but not in any of the other four samples from that location. Therefore, it  
11 appears that the concentrations reported in FFDSGW17B and the DPT samples may have  
12 been artifacts from sampling or laboratory procedures.

13 Bis(2-ethylhexyl)phthalate was also reported at 40,000 J µg/L in the November 1996  
14 sampling event at FGELGW014, along with the high concentrations of fuel components.  
15 This concentration seems unlikely, as this compound is relatively insoluble. This  
16 measurement may have been caused by contamination introduced in the laboratory after  
17 the sample had been diluted for analysis. The compound was reported at trace  
18 concentrations in subsequent samples from FGELGW014; all indications are that it is not  
19 present in groundwater. Therefore, bis(2-ethylhexyl)phthalate is not considered a COC at  
20 this site.

### 21 **5.2.3 Summary of Groundwater COCs**

22 No metals are identified as COCs in groundwater at AOC 613/AOC 615/SWMU 175.  
23 Chlorinated solvent and degradation products PCE, TCE, 1,2-DCE, and VC are considered  
24 COCs at AOC 613/AOC 615/SWMU 175. These compounds are identified as COCs in one  
25 area near monitoring well F613GW004, only.

26 Sampling results from the site wells indicate that petroleum constituents have decreased to  
27 concentrations below MCLs, and are not migrating off of the site. In source well  
28 FGELGW014, concentrations of chemicals are greatly diminished from their initial reported  
29 concentrations. Petroleum hydrocarbons are not considered COCs.

## 30 **5.3 Summary of COC Refinement**

31 No COCs are identified in soil at AOC 613/AOC 615/SWMU 175. Groundwater COCs  
32 (VOCs) were identified in three localized areas that may need further monitoring or other

- 1 corrective measures to ensure concentrations are continuing to reduce with time. A CMS
- 2 will be conducted to evaluate remediation alternatives for these compounds. The work plan
- 3 for the CMS is provided in Section 8.0 of this RFI Report Addendum.

**TABLE 5-1**  
 COPC Refinement; Metals in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|           | Units                                  | Aluminum<br>(mg/kg) | Antimony<br>(mg/kg) | Arsenic<br>(mg/kg) | Beryllium<br>(mg/kg) | Iron<br>(mg/kg) | Lead<br>(mg/kg) | Manganese<br>(mg/kg) | Mercury<br>(mg/kg) | Nickel<br>(mg/kg) | Thallium<br>(mg/kg) | Vanadium<br>(mg/kg) |
|-----------|----------------------------------------|---------------------|---------------------|--------------------|----------------------|-----------------|-----------------|----------------------|--------------------|-------------------|---------------------|---------------------|
|           | SSL (DAF = 10) <sup>a</sup>            | NL                  | 2.5                 | 15                 | 32                   | NL              | 400**           | 480 <sup>b</sup>     | 1                  | 65                | 0.35                | 3,000               |
|           | Unrestricted Land Use RBC <sup>*</sup> | 7,800               | 3.1                 | 0.43               | 16                   | 2,300           | 400**           | 160                  | 2.3                | 160               | 0.55                | 55                  |
|           | Industrial Land Use RBC <sup>*</sup>   | 200,000             | 82                  | 3.8                | 410                  | 61,000          | 1,000***        | 4,100                | 61                 | 4,100             | 14                  | 1,400               |
|           | Zones E & F Background Range           | 261 - 20,500        | 0.5 - 7.4           | 0.95 - 67.5        | 0.13 - 1.6           | 1,050 - 30,600  | 1.0 - 400       | 0.93 - 508           | 0.03 - 2.7         | 0.60 - 72         | 0.61 - 2.8          | 1.1 - 60            |
| Station   | Date                                   | Conc.               | Conc.               | Conc.              | Conc.                | Conc.           | Conc.           | Conc.                | Conc.              | Conc.             | Conc.               | Conc.               |
| F175SB035 | 07-Jun-2001                            | NA                  | NA                  | NA                 | NA                   | NA              | 55.0 =          | NA                   | NA                 | NA                | NA                  | NA                  |
| F175SB036 | 07-Jun-2001                            | NA                  | NA                  | NA                 | NA                   | NA              | 246 =           | NA                   | NA                 | NA                | NA                  | NA                  |
| F613SB001 | 13-Oct-1999                            | 4,480 =             | 1.6 J               | 8.6 =              | 0.16 J               | 6,750 =         | 36.2 J          | 39.6 =               | 0.05 =             | 5.5 =             | 0.24 UJ             | 15.4 =              |
| F613SB002 | 14-Oct-1999                            | 9,200 =             | 0.85 J              | 6.1 =              | 0.53 =               | 7,670 J         | 3,980 J         | 82.2 J               | 0.12 =             | 11.4 J            | 0.28 J              | 19.7 J              |
| F613SB003 | 14-Oct-1999                            | 16,400 =            | 0.60 J              | 5.9 =              | 0.56 =               | 15,200 J        | 37.3 J          | 61.0 J               | 0.17 =             | 7.6 J             | 0.24 U              | 33.3 J              |
| F613SB004 | 13-Oct-1999                            | 18,100 =            | 1.10 J              | 17.1 =             | 0.81 =               | 19,700 =        | 65.7 J          | 268 =                | 0.22 =             | 21.0 =            | 0.29 UJ             | 42.4 =              |
| F613SB005 | 13-Oct-1999                            | 20,000 =            | 0.55 J              | 14.7 =             | 0.74 =               | 20,900 =        | 49.5 J          | 326 =                | 0.26 =             | 17.6 =            | 1.8 UJ              | 54.5 =              |
| F613SB006 | 13-Oct-1999                            | 6,910 =             | 0.31 J              | 4.6 =              | 0.08 J               | 12,400 =        | 20.1 J          | 57.9 =               | 0.09 =             | 4.9 =             | 0.22 UJ             | 15.2 =              |
| F613SB007 | 13-Oct-1999                            | 1,960 =             | 0.41 J              | 3.2 =              | 0.09 U               | 3,710 =         | 13.9 J          | 224 =                | 0.05 U             | 9.7 =             | 2.4 UJ              | 6.4 =               |
| F613SB008 | 13-Oct-1999                            | 7,670 =             | 0.44 J              | 6.1 =              | 0.25 J               | 9,590 =         | 58.1 J          | 112 =                | 0.28 =             | 5.2 =             | 1.1 UJ              | 21.4 =              |
| F613SB009 | 13-Oct-1999                            | 12,600 =            | 0.92 J              | 9.8 =              | 0.71 =               | 15,800 =        | 32.6 J          | 403 =                | 0.10 =             | 11.6 =            | 1.3 UJ              | 32.8 =              |
| F613SB010 | 13-Oct-1999                            | 7,460 =             | 0.57 J              | 8.7 =              | 0.53 =               | 10,100 =        | 32.2 J          | 61.2 =               | 0.13 =             | 8.8 =             | 0.23 UJ             | 24.1 =              |
| F613SB011 | 15-Oct-1999                            | 14,700 =            | 1.10 UJ             | 9.5 =              | 0.38 J               | 17,700 J        | 56.3 J          | 164 J                | 0.18 =             | 10.3 J            | 0.22 UJ             | 35.0 J              |
| F613SB012 | 14-Oct-1999                            | 9,480 =             | 0.52 J              | 5.3 =              | 0.20 J               | 7,980 J         | 25.9 J          | 104 J                | 0.12 =             | 4.1 J             | 0.25 U              | 17.1 J              |
| F613SB013 | 14-Oct-1999                            | 12,900 =            | 1.20 J              | 39.5 =             | 0.95 =               | 16,900 J        | 99.3 J          | 161 J                | 0.32 =             | 19.6 J            | 0.24 U              | 37.8 J              |
| F613SB014 | 13-Oct-1999                            | 6,560 =             | 3.20 J              | 17.1 =             | 0.34 J               | 10,200 =        | 277 J           | 83.8 =               | 0.43 =             | 10.3 =            | 0.21 UJ             | 24.6 =              |
| F613SB016 | 13-Oct-1999                            | 3,350 =             | 0.42 J              | 3.8 =              | 0.09 U               | 4,360 =         | 9.2 =           | 264 =                | 0.04 U             | 13.0 =            | 2.5 UJ              | 10.0 =              |
| F613SB017 | 16-Nov-1999                            | 30,400 J            | R                   | 15.4 J             | 1.7 =                | 31,000 J        | 56.8 J          | 539 J                | 0.30 =             | 16.8 J            | 0.63 J              | 73.6 J              |
| F613SB018 | 16-Nov-1999                            | 24,800 J            | R                   | 15.8 J             | 1.5 =                | 30,600 J        | 37.8 J          | 255 J                | 0.30 =             | 14.3 J            | 0.31 U              | 66.0 J              |
| F613SB019 | 13-Oct-1999                            | 4,990 J             | 7.80 J              | 9.4 J              | 0.45 J               | 13,600 J        | 76.9 J          | 152 J                | 0.64 J             | 48.4 J            | 0.24 UJ             | 19.2 J              |
| F613SB020 | 13-Oct-1999                            | 4,580 J             | 0.93 J              | 5.9 J              | 0.14 J               | 7,710 J         | 87.7 J          | 419 J                | 0.08 J             | 36.1 J            | 0.24 UJ             | 12.5 J              |
| F613SB021 | 13-Oct-1999                            | 7,940 J             | 0.43 J              | 4.9 J              | 0.15 J               | 8,970 J         | 9.2 J           | 43.6 J               | 0.05 J             | 3.3 J             | 0.20 UJ             | 20.2 J              |
| F613SB022 | 13-Oct-1999                            | 5,560 J             | 1.60 J              | 10.8 J             | 0.63 =               | 10,000 J        | 353 J           | 128 J                | 0.31 J             | 39.7 J            | 0.20 UJ             | 20.2 J              |

**TABLE 5-1**  
 COPC Refinement; Metals in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|           | Units                                  | Aluminum<br>(mg/kg) | Antimony<br>(mg/kg) | Arsenic<br>(mg/kg) | Beryllium<br>(mg/kg) | Iron<br>(mg/kg) | Lead<br>(mg/kg) | Manganese<br>(mg/kg) | Mercury<br>(mg/kg) | Nickel<br>(mg/kg) | Thallium<br>(mg/kg) | Vanadium<br>(mg/kg) |
|-----------|----------------------------------------|---------------------|---------------------|--------------------|----------------------|-----------------|-----------------|----------------------|--------------------|-------------------|---------------------|---------------------|
|           | SSL (DAF = 10) <sup>a</sup>            | NL                  | 2.5                 | 15                 | 32                   | NL              | 400**           | 480 <sup>b</sup>     | 1                  | 65                | 0.35                | 3,000               |
|           | Unrestricted Land Use RBC <sup>c</sup> | 7,800               | 3.1                 | 0.43               | 16                   | 2,300           | 400**           | 160                  | 2.3                | 160               | 0.55                | 55                  |
|           | Industrial Land Use RBC <sup>c</sup>   | 200,000             | 82                  | 3.8                | 410                  | 61,000          | 1,000***        | 4,100                | 61                 | 4,100             | 14                  | 1,400               |
|           | Zones E & F Background Range           | 261 – 20,500        | 0.5 - 7.4           | 0.95 - 67.5        | 0.13 - 1.6           | 1,050– 30,600   | 1.0 - 400       | 0.93 - 508           | 0.03 - 2.7         | 0.60 - 72         | 0.61 - 2.8          | 1.1 - 60            |
| Station   | Date                                   | Conc.               | Conc.               | Conc.              | Conc.                | Conc.           | Conc.           | Conc.                | Conc.              | Conc.             | Conc.               | Conc.               |
| F613SB023 | 16-Nov-1999                            | 11,700 J            | R                   | 14.0 J             | 0.82 =               | 16,000 J        | 51.2 J          | 240 J                | 0.30 =             | 7.8 J             | 0.27 U              | 28.1 J              |
| F613SB024 | 16-Nov-1999                            | 18,800 J            | R                   | 17.2 J             | 1.1 =                | 20,700 J        | 92.6 J          | 234 J                | 0.64 =             | 10.6 J            | 0.25 U              | 44.3 J              |
| F613SB025 | 16-Nov-1999                            | 17,600 J            | R                   | 11.3 J             | 1.1 =                | 18,200 J        | 81.0 J          | 223 J                | 0.63 J             | 15.3 J            | 0.97 J              | 42.8 J              |
| F613SB026 | 16-Nov-1999                            | 22,500 J            | R                   | 12.7 J             | 1.2 =                | 25,700 J        | 52.8 J          | 263 J                | 0.28 J             | 13.0 J            | 0.25 UJ             | 56.3 J              |
| F613SB027 | 16-Nov-1999                            | 28,300 J            | R                   | 23.1 J             | 1.6 =                | 35,000 J        | 47.5 J          | 350 J                | 0.34 J             | 16.4 J            | 0.25 UJ             | 72.6 J              |
| F613SB028 | 16-Nov-1999                            | 30,700 J            | R                   | 24.1 J             | 1.8 =                | 39,600 J        | 64.4 J          | 467 J                | 0.50 J             | 17.9 J            | 0.47 J              | 83.9 J              |
| F613SB029 | 01-Dec-1999                            | 3,790 J             | 0.38 J              | 1.9 =              | 0.07 UJ              | 2,250 J         | 5.7 J           | 39.5 J               | 0.05 U             | 2.4 J             | 0.20 UJ             | 5.7 J               |
| F613SB030 | 01-Dec-1999                            | 17,400 J            | 0.72 J              | 12.0 =             | 0.92 =               | 22,700 J        | 28.8 J          | 167 J                | 0.17 =             | 9.2 J             | 0.26 UJ             | 53.6 J              |
| F613SB031 | 07-Jun-2001                            | NA                  | NA                  | 8.7 =              | NA                   | NA              | NA              | NA                   | NA                 | NA                | NA                  | NA                  |
| F613SB032 | 07-Jun-2001                            | NA                  | NA                  | 8.2 =              | NA                   | NA              | NA              | NA                   | NA                 | NA                | NA                  | NA                  |
| F613SP001 | 12-Sep-1996                            | 18,200 =            | 0.49 U              | 8.2 =              | 0.56 =               | 23,800 =        | 10.2 =          | 49.1 =               | 0.11 =             | 6.3 =             | 0.96 J              | 49.9 =              |
| F613SP002 | 13-Sep-1996                            | 9,460 =             | 0.37 U              | 5.7 =              | 0.57 =               | 8,110 =         | 14.4 =          | 43.3 =               | 0.07 =             | 5.2 =             | 0.42 U              | 19.7 =              |
| F613SP003 | 29-Aug-1996                            | 8,620 =             | 0.37 U              | 4.3 =              | 0.70 =               | 12,200 =        | 5.1 =           | 55.3 =               | 0.04 U             | 9.5 =             | 0.53 J              | 20.8 =              |
| F613SP004 | 02-Oct-1996                            | 23,200 =            | 0.48 U              | 17.4 =             | 1.5 =                | 36,200 =        | 60.5 =          | 414 =                | 0.37 =             | 13.8 =            | 0.55 U              | 80.6 =              |
| F613SP005 | 03-Oct-1996                            | 18,600 =            | 0.53 U              | 17.5 =             | 1.3 =                | 27,700 =        | 60.9 =          | 650 =                | 0.48 =             | 14.3 =            | 0.60 U              | 60.5 =              |
| F613SP006 | 04-Oct-1996                            | 8,650 =             | 0.46 U              | 8.7 =              | 0.65 =               | 13,300 =        | 12.2 =          | 95.6 =               | 0.07 =             | 4.4 J             | 0.52 UJ             | 38.4 J              |
| F613SP007 | 12-Sep-1996                            | 24,800 =            | 0.44 U              | 21.5 =             | 1.7 =                | 35,400 =        | 52.8 =          | 344 =                | 0.28 =             | 10.3 =            | 0.73 J              | 72.4 =              |
| F613SP008 | 13-Sep-1996                            | 25,400 =            | 0.51 U              | 20.2 =             | 1.5 =                | 26,600 =        | 54.6 =          | 234 =                | 0.34 =             | 13.9 =            | 0.58 U              | 63.9 =              |
| F613SP009 | 29-Aug-1996                            | 8,030 =             | 0.35 U              | 4.0 =              | 0.19 J               | 6,630 =         | 11.2 =          | 87.8 =               | 0.06 =             | 3.6 J             | 0.39 U              | 13.3 J              |
| F613SP010 | 02-Oct-1996                            | 15,100 =            | 0.48 U              | 15.6 =             | 0.94 =               | 20,900 =        | 38.3 =          | 370 =                | 0.30 =             | 10.4 =            | 0.54 U              | 44.8 =              |
| F613SP012 | 10-Oct-1996                            | 27,300 =            | 0.63 UJ             | 34.1 J             | 1.6 =                | 34,500 =        | 46.0 =          | 544 =                | 0.14 J             | 15.1 =            | 0.72 U              | 77.1 =              |
| F613SP013 | 07-Oct-1996                            | 9,350 =             | 0.37 U              | 10.2 =             | 0.66 =               | 13,400 =        | 27.2 =          | 114 =                | 0.12 =             | 5.0 =             | 0.42 UJ             | 31.3 =              |

**TABLE 5-1**  
 COPC Refinement; Metals in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                              | Units       | Aluminum<br>(mg/kg) | Antimony<br>(mg/kg) | Arsenic<br>(mg/kg) | Beryllium<br>(mg/kg) | Iron<br>(mg/kg) | Lead<br>(mg/kg) | Manganese<br>(mg/kg) | Mercury<br>(mg/kg) | Nickel<br>(mg/kg) | Thallium<br>(mg/kg) | Vanadium<br>(mg/kg) |
|------------------------------|-------------|---------------------|---------------------|--------------------|----------------------|-----------------|-----------------|----------------------|--------------------|-------------------|---------------------|---------------------|
| SSL (DAF = 10) *             | NL          |                     | 2.5                 | 15                 | 32                   | NL              | 400**           | 480 <sup>b</sup>     | 1                  | 65                | 0.35                | 3,000               |
| Unrestricted Land Use RBC *  |             | 7,800               | 3.1                 | 0.43               | 16                   | 2,300           | 400**           | 160                  | 2.3                | 160               | 0.55                | 55                  |
| Industrial Land Use RBC *    |             | 200,000             | 82                  | 3.8                | 410                  | 61,000          | 1,000***        | 4,100                | 61                 | 4,100             | 14                  | 1,400               |
| Zones E & F Background Range |             | 261 - 20,500        | 0.5 - 7.4           | 0.95 - 67.5        | 0.13 - 1.6           | 1,050- 30,600   | 1.0 - 400       | 0.93 - 508           | 0.03 - 2.7         | 0.60 - 72         | 0.61 - 2.8          | 1.1 - 60            |
| Station                      | Date        | Conc.               | Conc.               | Conc.              | Conc.                | Conc.           | Conc.           | Conc.                | Conc.              | Conc.             | Conc.               | Conc.               |
| F613SP014                    | 12-Sep-1996 | 21,300 =            | 0.51 U              | 21.3 =             | 1.4 =                | 32,500 =        | 45.8 =          | 433 =                | 0.26 =             | 14.3 =            | 0.58 U              | 68.4 =              |
| F613SP017                    | 03-Oct-1996 | 8,180 =             | 0.37 U              | 8.9 =              | 0.35 =               | 14,500 =        | 37.9 =          | 90.7 =               | 0.13 =             | 2.9 J             | 0.42 U              | 30.6 J              |
| F613SP018                    | 04-Oct-1996 | 2,570 =             | 0.33 U              | 2.9 =              | 0.21 U               | 4,990 =         | 6.6 =           | 109 =                | 0.05 =             | 3.9 J             | 0.38 UJ             | 6.0 J               |
| F613SP019                    | 07-Oct-1996 | 9,200 =             | 0.37 U              | 4.0 =              | 0.21 U               | 7,890 =         | 4.3 =           | 11.6 =               | 0.04 U             | 1.6 U             | 0.42 UJ             | 33.4 U              |
| F613SP020                    | 11-Sep-1996 | 17,200 =            | 0.51 U              | 19.4 =             | 1.0 =                | 23,800 =        | 86.8 =          | 556 =                | 0.98 =             | 15.0 =            | 0.85 J              | 48.0 =              |
| F613SP021                    | 29-Aug-1996 | 7,210 =             | 0.35 U              | 2.0 =              | 0.14 J               | 3,300 =         | 5.5 =           | 12.4 =               | 0.04 U             | 2.2 J             | 0.40 U              | 12.1 J              |
| F613SP022                    | 15-Sep-1996 | 10,600 =            | 0.43 U              | 6.0 =              | 0.71 =               | 22,300 =        | 9.1 =           | 77.9 =               | 0.20 =             | 2.2 J             | 0.93 J              | 26.9 J              |
| F613SP022                    | 13-Oct-1999 | 5,620 =             | 0.31 J              | 3.8 =              | 0.12 J               | 5,720 =         | 13.1 J          | 153 =                | 0.06 =             | 9.3 =             | 2.4 UJ              | 14.0 =              |
| F613SP023                    | 14-Sep-1996 | 5,380 =             | 0.35 U              | 2.8 =              | 0.13 U               | 6,450 =         | 4.5 =           | 12.8 =               | 0.05 =             | 1.1 J             | 0.40 U              | 17.0 J              |
| F613SP024                    | 11-Sep-1996 | 17,500 =            | 0.50 U              | 44.8 =             | 1.2 =                | 33,100 =        | 52.5 =          | 755 =                | 0.19 =             | 12.9 =            | 0.70 J              | 71.3 =              |
| F613SP025                    | 28-Aug-1996 | 7,640 =             | 0.34 U              | 2.3 =              | 0.14 J               | 4,830 =         | 6.8 =           | 15.2 =               | 0.16 =             | 2.5 J             | 0.52 J              | 12.6 J              |
| F613SP026                    | 15-Sep-1996 | 9,290 =             | 0.47 U              | 8.5 =              | 0.60 =               | 11,500 =        | 23.2 =          | 137 =                | 0.19 =             | 6.8 =             | 0.53 U              | 29.5 =              |
| F613SP027                    | 14-Sep-1996 | 8,020 =             | 0.36 U              | 4.5 =              | 0.19 U               | 11,500 =        | 5.5 =           | 12.1 =               | 0.05 =             | 1.6 J             | 0.41 U              | 27.6 J              |
| F613SP027                    | 14-Oct-1999 | 8,780 =             | 15.6 J              | 69.9 J             | 1.2 =                | 15,400 =        | 395 =           | 149 =                | 1.10 =             | 79.1 =            | R                   | 24.1 =              |
| F613SP028                    | 11-Sep-1996 | 11,900 =            | 0.45 U              | 11.6 =             | 0.76 =               | 18,800 =        | 34.4 =          | 149 =                | 0.57 =             | 6.8 =             | 0.51 U              | 42.0 =              |
| F613SP029                    | 28-Aug-1996 | 7,830 =             | 0.34 U              | 2.2 =              | 0.13 J               | 5,770 =         | 6.2 =           | 16.8 =               | 0.17 =             | 2.1 J             | 0.47 J              | 14.5 J              |
| F613SP030                    | 28-Sep-1996 | 18,800 =            | 0.54 U              | 10.2 =             | 0.70 =               | 24,000 =        | 16.4 =          | 73.9 =               | 0.08 =             | 8.0 =             | 0.61 U              | 50.7 =              |
| F613SP031                    | 14-Sep-1996 | 11,100 =            | 0.44 U              | 8.5 =              | 0.51 =               | 15,300 =        | 19.2 =          | 142 =                | 0.09 =             | 6.0 =             | 0.50 U              | 36.7 =              |
| F613SP032                    | 10-Sep-1996 | 11,000 =            | 0.37 U              | 4.2 =              | 0.27 =               | 14,700 =        | 8.0 =           | 19.7 =               | 0.04 U             | 2.6 J             | 0.42 U              | 33.6 J              |
| F613SP033                    | 28-Aug-1996 | 7,890 =             | 0.34 U              | 1.8 =              | 0.11 J               | 4,340 =         | 4.3 =           | 8.4 =                | 0.04 =             | 1.8 J             | 0.39 U              | 13.4 J              |
| F613SP034                    | 28-Sep-1996 | 11,800 =            | 0.46 U              | 7.6 =              | 0.30 J               | 21,900 =        | 8.6 =           | 26.5 =               | 0.05 U             | 2.6 J             | 0.52 U              | 42.9 J              |
| F613SP035                    | 16-Sep-1996 | 8,070 =             | 0.38 U              | 6.3 =              | 0.32 U               | 9,250 =         | 9.4 =           | 45.4 =               | 0.10 =             | 3.3 J             | 0.43 U              | 25.3 J              |
| F613SP036                    | 09-Sep-1996 | 12,800 =            | 0.38 U              | 6.8 =              | 0.33 =               | 20,200 =        | 8.6 =           | 21.7 =               | 0.08 =             | 3.1 J             | 1.2 J               | 42.1 J              |

**TABLE 5-1**  
 COPC Refinement; Metals in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                              | Units       | Aluminum<br>(mg/kg) | Antimony<br>(mg/kg) | Arsenic<br>(mg/kg) | Beryllium<br>(mg/kg) | Iron<br>(mg/kg) | Lead<br>(mg/kg) | Manganese<br>(mg/kg) | Mercury<br>(mg/kg) | Nickel<br>(mg/kg) | Thallium<br>(mg/kg) | Vanadium<br>(mg/kg) |
|------------------------------|-------------|---------------------|---------------------|--------------------|----------------------|-----------------|-----------------|----------------------|--------------------|-------------------|---------------------|---------------------|
| SSL (DAF = 10) *             | NL          | NL                  | 2.5                 | 15                 | 32                   | NL              | 400**           | 480 <sup>b</sup>     | 1                  | 65                | 0.35                | 3,000               |
| Unrestricted Land Use RBC *  |             | 7,800               | 3.1                 | 0.43               | 16                   | 2,300           | 400**           | 160                  | 2.3                | 160               | 0.55                | 55                  |
| Industrial Land Use RBC *    |             | 200,000             | 82                  | 3.8                | 410                  | 61,000          | 1,000***        | 4,100                | 61                 | 4,100             | 14                  | 1,400               |
| Zones E & F Background Range |             | 261 – 20,500        | 0.5 - 7.4           | 0.95 - 67.5        | 0.13 - 1.6           | 1,050– 30,600   | 1.0 - 400       | 0.93 - 508           | 0.03 - 2.7         | 0.60 - 72         | 0.61 - 2.8          | 1.1 - 60            |
| Station                      | Date        | Conc.               | Conc.               | Conc.              | Conc.                | Conc.           | Conc.           | Conc.                | Conc.              | Conc.             | Conc.               | Conc.               |
| F613SP037                    | 30-Aug-1996 | 11,300 =            | 0.37 U              | 5.0 =              | 0.26 =               | 19,800 =        | 7.1 =           | 24.9 =               | 0.09 =             | 3.4 J             | 0.76 J              | 26.4 J              |
| F613SP038                    | 28-Aug-1996 | 7,400 =             | 0.35 U              | 2.1 =              | 0.13 J               | 5,700 =         | 3.5 =           | 8.5 =                | 0.04 =             | 1.9 J             | 0.39 U              | 14.5 J              |
| F613SP039                    | 29-Sep-1996 | 3,400 =             | 0.32 U              | 1.0 J              | 0.12 J               | 3,120 =         | 1.5 =           | 13.0 =               | 0.04 U             | 1.0 U             | 0.36 U              | 5.3 U               |
| F613SP040                    | 13-Sep-1996 | 14,400 =            | 0.38 U              | 6.3 =              | 0.68 =               | 15,500 =        | 20.5 =          | 131 =                | 0.14 =             | 6.3 =             | 0.43 U              | 36.6 =              |
| F613SP041                    | 10-Sep-1996 | 4,670 =             | 0.33 U              | 3.2 =              | 0.23 =               | 3,860 =         | 10.2 =          | 17.7 =               | 0.04 U             | 2.1 J             | 0.37 U              | 8.5 J               |
| F613SP042                    | 03-Sep-1996 | 8,550 =             | 0.37 U              | 5.6 =              | 0.25 =               | 16,800 =        | 6.6 =           | 194 =                | 0.04 U             | 3.2 J             | 0.62 J              | 25.0 J              |
| F613SP043                    | 09-Sep-1996 | 6,300 =             | 0.36 U              | 2.4 =              | 0.18 J               | 7,070 =         | 6.4 =           | 22.0 =               | 0.06 =             | 1.8 J             | 0.48 J              | 13.0 J              |
| F613SP044                    | 27-Aug-1996 | 11,900 =            | 0.54 J              | 18.9 =             | 0.87 =               | 21,500 =        | 29.5 =          | 221 =                | 0.04 U             | 7.4 =             | 1.5 =               | 43.5 =              |
| F613SP045                    | 29-Sep-1996 | 13,800 =            | 0.61 U              | 11.0 =             | 0.96 =               | 14,800 =        | 66.7 =          | 291 =                | 0.63 =             | 13.9 =            | 0.69 U              | 34.2 =              |
| F613SP046                    | 09-Oct-1996 | 9,190 =             | 0.49 UJ             | 9.0 J              | 0.55 =               | 11,400 =        | 17.7 =          | 165 =                | 0.23 J             | 7.3 =             | 0.56 U              | 26.2 =              |
| F613SP047                    | 08-Oct-1996 | 10,600 =            | 0.38 U              | 7.8 =              | 0.45 =               | 14,200 =        | 26.8 =          | 124 =                | 0.06 =             | 4.9 =             | 0.43 UJ             | 29.9 =              |
| F613SP048                    | 10-Sep-1996 | 5,890 =             | 0.33 U              | 0.7 J              | 0.14 J               | 1,750 =         | 3.0 =           | 7.4 =                | 0.04 U             | 1.9 J             | 0.38 U              | 3.8 J               |
| F613SP049                    | 09-Sep-1996 | 4,940 =             | 0.35 U              | 3.5 =              | 0.23 J               | 6,890 =         | 11.6 =          | 38.2 =               | 0.06 =             | 2.9 J             | 0.87 J              | 12.2 J              |
| F613SP050                    | 04-Sep-1996 | 14,600 =            | 0.56 U              | 17.4 =             | 1.0 =                | 21,000 =        | 37.1 =          | 215 =                | 0.20 =             | 8.4 =             | 1.4 J               | 51.1 =              |
| F613SP051                    | 27-Aug-1996 | 4,340 =             | 1.10 J              | 6.1 =              | 0.18 J               | 7,740 =         | 103.0 =         | 40.3 =               | 0.10 =             | 5.2 =             | 0.55 J              | 13.1 =              |
| F613SP051                    | 15-Oct-1999 | <b>22,600</b> =     | 1.30 UJ             | 16.2 =             | 0.69 =               | 21,900 J        | 33.8 J          | 206 J                | 0.09 =             | 13.4 J            | 0.29 UJ             | 52.2 J              |
| F613SP052                    | 09-Oct-1996 | <b>21,000</b> =     | 0.59 UJ             | 21.9 J             | 1.4 =                | 31,900 =        | 65.1 =          | <b>530</b> =         | 0.54 J             | 13.7 =            | 0.67 U              | <b>80.4</b> =       |
| F613SP053                    | 17-Sep-1996 | 19,500 =            | 0.53 J              | 17.6 =             | 1.2 =                | 27,800 =        | 78.6 =          | 380 =                | 0.22 =             | 15.5 =            | 0.58 U              | <b>64.2</b> =       |
| F613SP054                    | 17-Sep-1996 | 7,870 =             | 0.37 U              | 3.5 =              | 0.44 =               | 12,000 =        | 17.0 =          | 118 =                | 0.04 U             | 4.1 J             | 0.42 U              | 21.4 J              |
| F613SP055                    | 13-Sep-1996 | 17,100 =            | 0.41 U              | 6.4 =              | 0.71 =               | 18,300 =        | 25.3 =          | 233 =                | 0.12 =             | 7.2 =             | 0.46 U              | 39.9 =              |
| F613SP056                    | 03-Sep-1996 | <b>26,700</b> =     | 0.53 U              | 15.2 =             | 1.4 =                | 26,900 =        | 32.0 =          | 301 =                | 0.12 =             | 15.9 =            | 0.95 J              | 59.4 =              |
| F613SP057                    | 30-Aug-1996 | 13,100 =            | 0.45 U              | 14.4 =             | 0.85 =               | 20,100 =        | 45.5 =          | 189 =                | 0.30 =             | 8.3 =             | 0.90 J              | 39.2 =              |
| F613SP058                    | 30-Aug-1996 | 9,310 =             | 0.36 U              | 7.2 =              | 0.34 =               | 25,000 =        | 7.5 =           | 45.8 =               | 0.04 U             | 3.0 J             | 0.90 J              | 30.5 J              |

**TABLE 5-1**  
 COPC Refinement; Metals in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                                        | Units        | Aluminum<br>(mg/kg) | Antimony<br>(mg/kg) | Arsenic<br>(mg/kg) | Beryllium<br>(mg/kg) | Iron<br>(mg/kg)      | Lead<br>(mg/kg)   | Manganese<br>(mg/kg) | Mercury<br>(mg/kg) | Nickel<br>(mg/kg) | Thallium<br>(mg/kg) | Vanadium<br>(mg/kg) |
|----------------------------------------|--------------|---------------------|---------------------|--------------------|----------------------|----------------------|-------------------|----------------------|--------------------|-------------------|---------------------|---------------------|
| SSL (DAF = 10) <sup>a</sup>            | NL           |                     | 2.5                 | 15                 | 32                   | NL                   | 400 <sup>**</sup> | 480 <sup>b</sup>     | 1                  | 65                | 0.35                | 3,000               |
| Unrestricted Land Use RBC <sup>*</sup> | 7,800        | 3.1                 | 0.43                | 16                 | 2,300                | 400 <sup>**</sup>    | 160               | 2.3                  | 160                | 0.55              | 55                  |                     |
| Industrial Land Use RBC <sup>*</sup>   | 200,000      | 82                  | 3.8                 | 410                | 61,000               | 1,000 <sup>***</sup> | 4,100             | 61                   | 4,100              | 14                | 1,400               |                     |
| Zones E & F Background Range           | 261 – 20,500 | 0.5 - 7.4           | 0.95 - 67.5         | 0.13 - 1.6         | 1,050– 30,600        | 1.0 - 400            | 0.93 - 508        | 0.03 - 2.7           | 0.60 - 72          | 0.61 - 2.8        | 1.1 - 60            |                     |
| Station                                | Date         | Conc.               | Conc.               | Conc.              | Conc.                | Conc.                | Conc.             | Conc.                | Conc.              | Conc.             | Conc.               | Conc.               |
| F613SP059                              | 03-Sep-1996  | 17,000 =            | 0.37 U              | 8.1 =              | 0.35 =               | 25,400 =             | 9.4 =             | 33.4 =               | 0.04 U             | 4.9 =             | 1.30 J              | 51.3 =              |
| F613SP060                              | 03-Sep-1996  | 9,840 =             | 0.39 U              | 4.7 =              | 0.37 =               | 17,000 =             | 21.2 =            | 37.2 =               | 0.04 =             | 3.5 J             | 0.44 UJ             | 29.1 J              |
| F613SP061                              | 16-Sep-1996  | 6,060 =             | 0.34 U              | 5.0 =              | 0.35 =               | 7,890 =              | 28.5 =            | 65.5 =               | 0.12 =             | 4.1 J             | 0.39 U              | 17.4 J              |
| F613SP062                              | 16-Sep-1996  | 16,900 =            | 0.44 U              | 20.9 =             | 1.2 =                | 28,300 =             | 60.9 =            | 479 =                | 0.45 =             | 12.4 =            | 1.1 J               | <b>64.9</b> =       |
| F613SP063                              | 16-Oct-1996  | 12,200 =            | 0.38 U              | 6.8 =              | 0.52 =               | 14,400 =             | 20.2 =            | 274 =                | 0.10 =             | 5.5 =             | 0.52 J              | 29.3 =              |
| F613SP064                              | 15-Oct-1996  | 10,900 J            | 0.27 UJ             | 6.9 J              | 0.69 =               | 10,400 J             | 16.6 J            | 157 J                | 0.06 J             | 7.1 J             | 0.34 U              | 24.1 J              |
| F613SP065                              | 14-Oct-1996  | 18,800 J            | 0.34 UJ             | 12.9 J             | 0.91 =               | 19,900 J             | 54.3 J            | 311 J                | 0.19 J             | 12.2 J            | 0.44 U              | 44.9 J              |
| F613SP066                              | 13-Oct-1996  | 17,000 J            | 0.30 UJ             | 11.6 J             | 0.66 =               | 18,500 J             | 30.3 J            | 273 J                | 0.13 J             | 7.4 J             | 0.89 J              | 38.7 J              |
| F613SP067                              | 11-Oct-1996  | 15,500 =            | 0.50 UJ             | 19.5 J             | 0.99 =               | 21,000 =             | 47.1 =            | 354 =                | 0.21 J             | 10.3 =            | 0.56 U              | 52.2 =              |
| F613SP068                              | 10-Oct-1996  | <b>23,400</b> =     | 0.60 UJ             | 27.4 J             | 1.4 =                | <b>31,700</b> =      | 58.9 =            | <b>588</b> =         | 0.45 J             | 13.4 =            | 0.68 U              | <b>74.0</b> =       |
| LE504SB001                             | 08-Jul-1997  | 6,520 =             | 2.40 U              | 4.6 =              | 0.25 U               | 13,800 =             | 30.3 =            | 107 J                | 0.14 =             | 5.9 =             | 0.98 U              | 18.2 =              |
| LE504SB002                             | 08-Jul-1997  | 5,230 =             | 4.90 J              | 43.5 =             | 0.53 U               | 10,700 =             | 83.0 =            | 156 =                | 0.26 =             | 16.2 =            | 0.54 U              | 17.7 =              |
| LE504SB003                             | 08-Jul-1997  | 4,380 =             | 2.80 U              | 17.3 =             | 0.42 U               | 8,540 =              | 96.8 =            | 106 =                | 0.16 =             | 9.7 =             | 0.61 U              | 12.2 =              |
| LE504SB004                             | 09-Jul-1997  | 9,980 =             | 0.48 U              | 15.2 =             | 0.54 U               | 15,000 =             | 36.1 =            | 120 =                | 0.05 =             | 7.0 =             | 1.2 U               | 29.8 =              |
| LE504SB005                             | 09-Jul-1997  | 11,600 =            | 1.10 U              | 14.9 =             | 0.84 U               | 21,200 =             | 84.5 =            | 174 =                | <b>5.10</b> =      | 16.3 =            | 1.6 U               | 46.8 =              |
| Mean Concentration ****                |              |                     | 0.69                | 11.6               |                      |                      | 83.4              |                      | 0.242              | 9.83              |                     |                     |

Bolded and outlined values are exceedences of the combined Zone F and G maximum background concentration and RBC or SSL (DAF =10)

- <sup>a</sup> SSL from USEPA Soil Screening Guidance Appendix A, 1996
- <sup>b</sup> SSL from US EPA Region III Table 10/05/2000
- <sup>\*</sup> RBC from US EPA Region III Table 10/05/2000; adjusted for HI = 0.1
- <sup>\*\*</sup> Assumed Unrestricted Land Use RBC and SSL for lead = 400 mg/kg
- <sup>\*\*\*</sup> Assumed Industrial Land Use RBC for lead = 1000 mg/kg
- <sup>\*\*\*\*</sup> Mean calculated using one-half the reported detection limit for non-detected data
- NA Analyte was not analyzed in the sample.
- NL Not listed.
- = Analyte was detected; the reported value is equal to the sample concentration.
- J Analyte was detected; the reported value is an estimated concentration.

**TABLE 5-1**  
 COPC Refinement; Metals in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                                         | Aluminum                                                                      | Antimony         | Arsenic            | Beryllium         | Iron                 | Lead             | Manganese         | Mercury           | Nickel           | Thallium          | Vanadium        |
|-----------------------------------------|-------------------------------------------------------------------------------|------------------|--------------------|-------------------|----------------------|------------------|-------------------|-------------------|------------------|-------------------|-----------------|
| Units                                   | (mg/kg)                                                                       | (mg/kg)          | (mg/kg)            | (mg/kg)           | (mg/kg)              | (mg/kg)          | (mg/kg)           | (mg/kg)           | (mg/kg)          | (mg/kg)           | (mg/kg)         |
| SSL (DAF = 10) <sup>a</sup>             | NL                                                                            | 2.5              | 15                 | 32                | NL                   | 400**            | 480 <sup>b</sup>  | 1                 | 65               | 0.35              | 3,000           |
| Unrestricted Land Use RBC *             | 7,800                                                                         | 3.1              | 0.43               | 16                | 2,300                | 400**            | 160               | 2.3               | 160              | 0.55              | 55              |
| Industrial Land Use RBC *               | 200,000                                                                       | 82               | 3.8                | 410               | 61,000               | 1,000***         | 4,100             | 61                | 4,100            | 14                | 1,400           |
| <b>Zones E &amp; F Background Range</b> | <b>261 – 20,500</b>                                                           | <b>0.5 - 7.4</b> | <b>0.95 - 67.5</b> | <b>0.13 - 1.6</b> | <b>1,050– 30,600</b> | <b>1.0 - 400</b> | <b>0.93 - 508</b> | <b>0.03 - 2.7</b> | <b>0.60 - 72</b> | <b>0.61 - 2.8</b> | <b>1.1 - 60</b> |
| Station                                 | Date                                                                          | Conc.            | Conc.              | Conc.             | Conc.                | Conc.            | Conc.             | Conc.             | Conc.            | Conc.             | Conc.           |
| U                                       | Analyte was not detected; the reported value is the detection limit.          |                  |                    |                   |                      |                  |                   |                   |                  |                   |                 |
| UJ                                      | Analyte was not detected; the reported value is an estimated detection limit. |                  |                    |                   |                      |                  |                   |                   |                  |                   |                 |
| R                                       | Data Rejected                                                                 |                  |                    |                   |                      |                  |                   |                   |                  |                   |                 |

**TABLE 5-2**  
 COPC Refinement; Metals in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station                                 | Date      | Arsenic                     |                  | Lead             |         | Selenium         |         |
|-----------------------------------------|-----------|-----------------------------|------------------|------------------|---------|------------------|---------|
|                                         |           | Units                       | (mg/Kg)          | (mg/Kg)          | (mg/Kg) | (mg/Kg)          | (mg/Kg) |
|                                         |           | SSL (DAF = 10) <sup>a</sup> | 15               | 400 <sup>b</sup> |         | 2.5              |         |
| <b>Zones E &amp; F Background Range</b> |           |                             | <b>0.83 - 30</b> | <b>1.8 - 322</b> |         | <b>0.4 - 2.4</b> |         |
| Station                                 | Date      | Conc.                       |                  | Conc.            |         | Conc.            |         |
| F175SB035                               | 7-Jun-01  | NA                          |                  | 22.3             | =       | NA               |         |
| F175SB036                               | 7-Jun-01  | NA                          |                  | 218              | =       | NA               |         |
| F175SB037                               | 7-Jun-01  | NA                          |                  | 139              | =       | NA               |         |
| F613SB001                               | 13-Oct-99 | 18.0                        | =                | 56.3             | J       | 2.7              | =       |
| F613SB002                               | 14-Oct-99 | 36.2                        | =                | 94.1             | J       | 3.3              | =       |
| F613SB003                               | 14-Oct-99 | 22.3                        | =                | 55.3             | J       | 2.7              | =       |
| F613SB004                               | 13-Oct-99 | 26.9                        | =                | 55.0             | J       | 3.0              | =       |
| F613SB005                               | 13-Oct-99 | 12.4                        | =                | 67.1             | J       | 1.1              | J       |
| F613SB006                               | 13-Oct-99 | 13.2                        | =                | 79.0             | J       | 1.5              | =       |
| F613SB007                               | 13-Oct-99 | 26.0                        | =                | 52.3             | J       | 2.8              | =       |
| F613SB008                               | 13-Oct-99 | 17.7                        | =                | 61.5             | J       | 2.6              | =       |
| F613SB009                               | 13-Oct-99 | 19.6                        | =                | 44.2             | J       | 2.0              | =       |
| F613SB010                               | 13-Oct-99 | 21.5                        | =                | 39.6             | J       | 2.1              | =       |
| F613SB011                               | 15-Oct-99 | 7.2                         | =                | 37.4             | J       | 1.2              | =       |
| F613SB012                               | 14-Oct-99 | 30.1                        | =                | 98.7             | J       | 3.3              | =       |
| F613SB013                               | 14-Oct-99 | 15.0                        | =                | 149              | J       | 1.9              | =       |
| F613SB014                               | 13-Oct-99 | 10.2                        | =                | 11.4             | J       | 1.9              | =       |
| F613SB016                               | 13-Oct-99 | 24.6                        | =                | 56.7             | =       | 3.5              | =       |
| F613SB017                               | 16-Nov-99 | 7.4                         | J                | 14.3             | J       | 0.62             | J       |
| F613SB018                               | 16-Nov-99 | 2.1                         | J                | 4.9              | J       | 0.58             | J       |
| F613SB019                               | 13-Oct-99 | 2.5                         | J                | 5.1              | J       | 0.45             | U       |
| F613SB020                               | 13-Oct-99 | 22.7                        | J                | 46.6             | J       | 2.9              | =       |
| F613SB021                               | 13-Oct-99 | 35.7                        | J                | 61.5             | J       | 3.1              | =       |
| F613SB022                               | 13-Oct-99 | 21.9                        | J                | 90.2             | J       | 2.6              | =       |
| F613SB023                               | 16-Nov-99 | 21.9                        | J                | 54.2             | J       | 1.6              | J       |
| F613SB024                               | 16-Nov-99 | 31.9                        | J                | 53.9             | J       | 2.6              | J       |
| F613SB026                               | 17-Nov-99 | 21.1                        | J                | 6,620            | J       | 1.7              | J       |
| F613SB027                               | 16-Nov-99 | 2.1                         | J                | 5.0              | J       | 0.42             | J       |
| F613SB028                               | 16-Nov-99 | 2.5                         | J                | 4.1              | J       | 0.82             | J       |

**TABLE 5-2**  
 COPC Refinement; Metals in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                               |           |             |   |            |   |             |   |
|-------------------------------|-----------|-------------|---|------------|---|-------------|---|
| F613SB029                     | 1-Dec-99  | 3.5         | = | 4.1        | J | 0.34        | J |
| F613SB030                     | 1-Dec-99  | 12.5        | = | 46.2       | J | 2.1         | J |
| F613SP022                     | 15-Sep-96 | 13.0        | = | 31.9       | = | 1.0         | = |
| F613SP022                     | 13-Oct-99 | <b>31.5</b> | = | 52.5       | J | <b>2.9</b>  | = |
| F613SP027                     | 14-Oct-99 | 9.3         | J | 42.7       | = | 1.7         | = |
| F613SP051                     | 15-Oct-99 | 20.1        | = | 68.6       | J | <b>3.0</b>  | = |
| L037SP048                     | 1-Jul-97  | 5.8         | = | 38.4       | = | 0.58        | U |
| LF037SP018                    | 4-Jun-97  | 1.8         | = | 10.4       | = | 0.58        | U |
| LF037SP022                    | 9-Jun-97  | 4.0         | = | 10.0       | = | 1.1         | = |
| LF037SP023                    | 9-Jun-97  | 15.1        | = | 62.4       | = | 1.5         | = |
| LF037SP027                    | 9-Jun-97  | 7.5         | = | 36.7       | = | 0.86        | = |
| LF504SB005                    | 8-Jul-97  | 14.0        | = | 64.3       | = | 0.78        | = |
| LF504SB005                    | 8-Jul-97  | 17.6        | = | 61.8       | = | 0.46        | J |
| LF504SB005                    | 9-Jul-97  | 6.3         | = | 9.3        | = | 1.0         | = |
| LF504SB005                    | 9-Jul-97  | 24.0        | = | 49.1       | = | 0.87        | = |
| <b>Mean Concentration ***</b> |           |             |   | <b>202</b> |   | <b>1.73</b> |   |

Bolded and outlined values are exceedances of Zone F maximum background concentration and SSL (DAF =10).

- <sup>a</sup> SSL from USEPA Soil Screening Guidance Appendix A, 1996
- <sup>b</sup> Assumed SSL for lead = 400 mg/kg
- = Analyte was detected; the reported value is equal to the sample concentration.
- J Analyte was detected; the reported value is an estimated concentration.
- NA Analyte was not analyzed in the sample.
- U Analyte was not detected; the reported value is the detection limit.
- \*\*\* Mean calculated using one-half the reported detection limit for non-detected data

**TABLE 5-3**  
 COPC Refinement; VOCs in Surface and Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                             | Units       | 1,1,2-Tetrachloroethane (mg/kg) | Benzene (mg/kg) | Methylene Chloride (mg/kg) | Tetrachloroethene (PCE) (mg/kg) | Trichloroethene (TCE) (mg/kg) | Vinyl Chloride (mg/kg) |
|-----------------------------|-------------|---------------------------------|-----------------|----------------------------|---------------------------------|-------------------------------|------------------------|
| SSL (DAF = 1) *             |             | 0.0002                          | 0.002           | 0.001                      | 0.003                           | 0.003                         | 0.0007                 |
| Unrestricted Land Use RBC * |             | 3.2                             | 12              | 85                         | 12                              | 58                            | 0.43                   |
| Industrial Land Use RBC *   |             | 29                              | 100             | 760                        | 110                             | 520                           | 3.8                    |
| Station                     | Date        | Conc.                           | Conc.           | Conc.                      | Conc.                           | Conc.                         | Conc.                  |
| F613SP001                   | 12-Sep-1996 | 0.008 U                         | 0.008 U         | 0.008 U                    | 0.008 U                         | 0.008 U                       | 0.016 U                |
| F613SP002                   | 13-Sep-1996 | 0.006 U                         | 0.006 U         | 0.001 J                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP003                   | 29-Aug-1996 | 0.006 U                         | 0.006 U         | 0.012 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP004                   | 02-Oct-1996 | 0.008 U                         | 0.008 U         | 0.008 U                    | 0.008 U                         | 0.008 U                       | 0.016 U                |
| F613SP005                   | 03-Oct-1996 | 0.009 U                         | 0.009 U         | 0.009 U                    | 0.009 U                         | 0.009 U                       | 0.018 U                |
| F613SP006                   | 04-Oct-1996 | 0.008 U                         | 0.008 U         | 0.008 U                    | 0.008 U                         | 0.008 U                       | 0.015 U                |
| F613SP007                   | 12-Sep-1996 | 0.015 U                         | 0.015 U         | 0.029 U                    | 0.015 U                         | 0.015 U                       | 0.029 U                |
| F613SP008                   | 13-Sep-1996 | 0.008 U                         | 0.008 U         | 0.017 U                    | 0.008 U                         | 0.008 U                       | 0.017 U                |
| F613SP009                   | 29-Aug-1996 | 0.006 U                         | 0.006 U         | 0.010 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP010                   | 02-Oct-1996 | 0.008 U                         | 0.008 U         | 0.008 U                    | 0.008 U                         | 0.008 =                       | 0.016 U                |
| F613SP012                   | 10-Oct-1996 | 0.010 U                         | 0.010 U         | 0.033 U                    | 0.010 U                         | 0.01 U                        | 0.021 U                |
| F613SP013                   | 07-Oct-1996 | 0.006 U                         | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP014                   | 12-Sep-1996 | 0.008 U                         | 0.008 U         | 0.002 J                    | 0.008 U                         | 0.008 U                       | 0.017 U                |
| F613SP017                   | 03-Oct-1996 | 0.006 U                         | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP018                   | 04-Oct-1996 | 0.006 U                         | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.011 U                |
| F613SP019                   | 07-Oct-1996 | 0.006 U                         | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.023 =                       | 0.012 U                |
| F613SP020                   | 11-Sep-1996 | 0.008 U                         | 0.008 U         | 0.002 J                    | 0.008 U                         | 0.008 U                       | 0.017 U                |
| F613SP021                   | 29-Aug-1996 | 0.006 U                         | 0.006 U         | 0.011 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP022 (surface)         | 15-Sep-1996 | 0.007 U                         | 0.007 U         | 0.006 U                    | 0.007 U                         | 0.007 U                       | 0.014 U                |
| F613SP022 (subsurface)      |             | 0.008 U                         | 0.008 U         | 0.006 U                    | 0.008 UJ                        | 0.008 U                       | 0.017 U                |
| F613SP022 (surface)         | 13-Oct-1999 | 0.003 UJ                        | 0.003 UJ        | 0.01 UJ                    | 0.003 UJ                        | 0.003 UJ                      | 0.003 UJ               |
| F613SP022 (subsurface)      |             | 0.008 U                         | 0.008 U         | 0.014 U                    | 0.008 U                         | 0.008 U                       | 0.008 U                |
| F613SP023                   | 14-Sep-1996 | 0.006 U                         | 0.006 U         | 0.050 J                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP024                   | 11-Sep-1996 | 0.008 U                         | 0.008 U         | 0.008 U                    | 0.008 U                         | 0.008 U                       | 0.017 U                |
| F613SP025                   | 28-Aug-1996 | 0.006 U                         | 0.006 U         | 0.005 U                    | 0.006 U                         | 0.006 U                       | 0.011 U                |
| F613SP026                   | 15-Sep-1996 | 0.008 U                         | 0.008 U         | 0.050 J                    | 0.008 U                         | 0.008 U                       | 0.016 U                |

TABLE 5-3

COPC Refinement; VOCs in Surface and Subsurface Soil

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                             | Units       | 1,1,2-Tetrachloroethane (mg/kg) | Benzene (mg/kg) | Methylene Chloride (mg/kg) | Tetrachloroethene (PCE) (mg/kg) | Trichloroethene (TCE) (mg/kg) | Vinyl Chloride (mg/kg) |
|-----------------------------|-------------|---------------------------------|-----------------|----------------------------|---------------------------------|-------------------------------|------------------------|
| SSL (DAF = 1) *             |             | 0.0002                          | 0.002           | 0.001                      | 0.003                           | 0.003                         | 0.0007                 |
| Unrestricted Land Use RBC * |             | 3.2                             | 12              | 85                         | 12                              | 58                            | 0.43                   |
| Industrial Land Use RBC *   |             | 29                              | 100             | 760                        | 110                             | 520                           | 3.8                    |
| Station                     | Date        | Conc.                           | Conc.           | Conc.                      | Conc.                           | Conc.                         | Conc.                  |
| F613SP027                   | 14-Sep-1996 | 0.006 U                         | 0.006 U         | 0.003 J                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP027 (surface)         | 14-Oct-1999 | 0.004 UJ                        | 0.004 UJ        | 0.024 UJ                   | 0.004 UJ                        | 0.004 UJ                      | 0.004 UJ               |
| F613SP027 (subsurface)      |             | 0.004 UJ                        | 0.004 U         | 0.010 U                    | 0.004 U                         | 0.004 U                       | 0.004 U                |
| F613SP028                   | 11-Sep-1996 | 0.007 U                         | 0.007 U         | 0.002 U                    | 0.007 U                         | 0.007 U                       | 0.015 U                |
| F613SP029                   | 28-Aug-1996 | 0.006 U                         | 0.006 U         | 0.005 U                    | 0.006 U                         | 0.006 U                       | 0.011 U                |
| F613SP030                   | 28-Sep-1996 | 0.009 U                         | 0.009 U         | 0.009 U                    | 0.009 UJ                        | 0.009 U                       | 0.018 U                |
| F613SP031                   | 14-Sep-1996 | 0.032 J                         | 0.037 U         | 0.074 U                    | 0.037 U                         | 0.037 U                       | 0.074 U                |
| F613SP032                   | 10-Sep-1996 | 0.006 U                         | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP033                   | 28-Aug-1996 | 0.006 U                         | 0.006 U         | 0.005 U                    | 0.006 U                         | 0.006 U                       | 0.011 U                |
| F613SP034                   | 28-Sep-1996 | 0.008 U                         | 0.008 U         | 0.008 U                    | 0.008 U                         | 0.008 U                       | 0.002 J                |
| F613SP035                   | 16-Sep-1996 | 0.032 U                         | 0.032 U         | 0.063 U                    | 0.032 U                         | 0.032 U                       | 0.063 U                |
| F613SP036                   | 09-Sep-1996 | 0.006 U                         | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.013 U                |
| F613SP037                   | 30-Aug-1996 | 0.006 U                         | 0.006 U         | 0.007 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP038                   | 28-Aug-1996 | 0.006 U                         | 0.006 U         | 0.005 U                    | 0.006 U                         | 0.006 U                       | 0.011 U                |
| F613SP039                   | 29-Sep-1996 | 0.005 U                         | 0.005 U         | 0.005 U                    | 0.058 U                         | 0.004 J                       | 0.011 U                |
| F613SP040                   | 13-Sep-1996 | 0.007 U                         | 0.007 U         | 0.005 U                    | 0.007 U                         | 0.007 U                       | 0.014 U                |
| F613SP041                   | 10-Sep-1996 | 0.005 U                         | 0.005 U         | 0.005 U                    | 0.005 U                         | 0.005 U                       | 0.011 U                |
| F613SP042                   | 03-Sep-1996 | 0.006 U                         | 0.011 =         | 0.012 U                    | 0.006 U                         | 0.002 J                       | 0.012 U                |
| F613SP043                   | 09-Sep-1996 | 0.006 U                         | 0.006 U         | 0.012 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP044                   | 27-Aug-1996 | 0.006 UJ                        | 0.006 UJ        | 0.005 U                    | 0.006 UJ                        | 0.006 UJ                      | 0.013 U                |
| F613SP045                   | 29-Sep-1996 | 0.010 U                         | 0.01 U          | 0.01 U                     | 0.010 U                         | 0.010 U                       | 0.02 U                 |
| F613SP046                   | 09-Oct-1996 | 0.008 U                         | 0.003 J         | 0.033 U                    | 0.008 U                         | 0.003 J                       | 0.016 U                |
| F613SP047                   | 08-Oct-1996 | 0.006 U                         | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.013 U                |
| F613SP048                   | 10-Sep-1996 | 0.006 U                         | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.011 U                |
| F613SP049                   | 09-Sep-1996 | 0.006 U                         | 0.006 U         | 0.012 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP050                   | 04-Sep-1996 | 0.009 U                         | 0.009 U         | 0.018 U                    | 0.009 U                         | 0.009 U                       | 0.018 U                |
| F613SP051                   | 27-Aug-1996 | 0.006 U                         | 0.002 J         | 0.004 J                    | 0.006 U                         | 0.002 J                       | 0.012 U                |

**TABLE 5-3**  
 COPC Refinement; VOCs in Surface and Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                             | Units       | 1,1,2,2-Tetrachloroethane (mg/kg) | Benzene (mg/kg) | Methylene Chloride (mg/kg) | Tetrachloroethene (PCE) (mg/kg) | Trichloroethene (TCE) (mg/kg) | Vinyl Chloride (mg/kg) |
|-----------------------------|-------------|-----------------------------------|-----------------|----------------------------|---------------------------------|-------------------------------|------------------------|
| SSL (DAF = 1) *             |             | 0.0002                            | 0.002           | 0.001                      | 0.003                           | 0.003                         | 0.0007                 |
| Unrestricted Land Use RBC * |             | 3.2                               | 12              | 85                         | 12                              | 58                            | 0.43                   |
| Industrial Land Use RBC *   |             | 29                                | 100             | 760                        | 110                             | 520                           | 3.8                    |
| Station                     | Date        | Conc.                             | Conc.           | Conc.                      | Conc.                           | Conc.                         | Conc.                  |
| F613SP051 (surface)         | 15-Oct-1999 | 0.005 UJ                          | 0.005 U         | 0.013 U                    | 0.005 U                         | 0.005 U                       | 0.005 U                |
| F613SP051 (subsurface)      |             | 0.010 U                           | 0.010 U         | 0.025 U                    | 0.010 U                         | 0.010 U                       | 0.010 U                |
| F613SP052                   | 09-Oct-1996 | 0.01 U                            | 0.01 U          | 0.032 U                    | 0.010 U                         | 0.01 U                        | 0.02 U                 |
| F613SP053                   | 17-Sep-1996 | 0.009 U                           | 0.009 U         | 0.011 U                    | 0.009 U                         | 0.009 U                       | 0.017 U                |
| F613SP054                   | 17-Sep-1996 | 0.006 U                           | 0.006 U         | 0.007 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP055                   | 13-Sep-1996 | 0.007 U                           | 0.007 U         | 0.005 U                    | 0.007 U                         | 0.007 U                       | 0.014 U                |
| F613SP056                   | 03-Sep-1996 | 0.009 U                           | 0.009 U         | 0.009 U                    | 0.009 U                         | 0.009 U                       | 0.018 U                |
| F613SP057                   | 30-Aug-1996 | 0.008 U                           | 0.008 U         | 0.008 U                    | 0.008 U                         | 0.008 U                       | 0.015 U                |
| F613SP058                   | 30-Aug-1996 | 0.006 U                           | 0.006 U         | 0.007 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP059                   | 03-Sep-1996 | 0.006 U                           | 0.004 J         | 0.012 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| F613SP060                   | 03-Sep-1996 | 0.006 U                           | 0.006 U         | 0.013 U                    | 0.006 U                         | 0.006 U                       | 0.013 U                |
| F613SP061                   | 16-Sep-1996 | 0.006 U                           | 0.002 J         | 0.005 U                    | 0.006 U                         | 0.001 J                       | 0.011 U                |
| F613SP062                   | 16-Sep-1996 | 0.007 U                           | 0.007 U         | 0.008 U                    | 0.007 U                         | 0.007 U                       | 0.015 U                |
| F613SP063                   | 16-Oct-1996 | 0.006 U                           | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.013 U                |
| F613SP064                   | 15-Oct-1996 | 0.006 U                           | 0.006 U         | 0.006 U                    | 0.006 U                         | 0.006 U                       | 0.013 U                |
| F613SP065                   | 14-Oct-1996 | 0.008 U                           | 0.008 U         | 0.008 U                    | 0.008 U                         | 0.008 U                       | 0.016 U                |
| F613SP066                   | 13-Oct-1996 | 0.007 U                           | 0.007 U         | 0.018 U                    | 0.007 U                         | 0.007 U                       | 0.014 U                |
| F613SP067                   | 11-Oct-1996 | 0.008 U                           | 0.008 U         | 0.013 U                    | 0.008 U                         | 0.003 J                       | 0.016 U                |
| F613SP068                   | 10-Oct-1996 | 0.01 U                            | 0.01 U          | 0.01 U                     | 0.01 U                          | 0.01 U                        | 0.02 U                 |
| LE504SB001 (surface)        | 08-Jul-1997 | 0.006 U                           | 0.006 U         | 0.024 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |
| LE504SB002 (surface)        | 08-Jul-1997 | 0.006 U                           | 0.006 U         | 0.02 UJ                    | 0.006 UJ                        | 0.006 UJ                      | 0.012 U                |
| LE504SB002 (subsurface)     |             | 0.007 U                           | 0.007 U         | 0.028 UJ                   | 0.007 UJ                        | 0.007 UJ                      | 0.014 U                |
| LE504SB003 (surface)        | 08-Jul-1997 | 0.006 U                           | 0.006 U         | 0.018 UJ                   | 0.006 UJ                        | 0.006 UJ                      | 0.011 U                |
| LE504SB003 (subsurface)     |             | 0.006 U                           | 0.006 U         | 0.005 U                    | 0.006 U                         | 0.006 U                       | 0.013 U                |
| LE504SB004 (surface)        | 09-Jul-1997 | 0.006 U                           | 0.006 U         | 0.007 U                    | 0.006 U                         | 0.006 U                       | 0.012 U                |

**TABLE 5-4**  
 COPC Refinement; Naphthalene in Surface and Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|           |              | Naphthalene                 |                               |                          |
|-----------|--------------|-----------------------------|-------------------------------|--------------------------|
|           |              | Units                       | (mg/Kg)                       |                          |
|           |              | SSL (DAF = 1) <sup>a</sup>  | 4.0                           |                          |
|           |              | Unrestricted Land Use RBC * | 1,600                         |                          |
|           |              | Industrial Land Use RBC *   | 41,000                        |                          |
|           |              | Surface Soil Concentration  | Subsurface Soil Concentration | Soil Probe Concentration |
| Station   | Date Sampled | (0 – 1 ft bls)              | (3 – 5 ft bls)                | (0 – 4 ft bls)           |
| F613SB001 | 13-Oct-99    | 0.80 U                      | 0.62 U                        |                          |
| F613SB002 | 14-Oct-99    | 0.40 U                      | 0.79 U                        |                          |
| F613SB003 | 14-Oct-99    | 0.39 U                      | 0.54 U                        |                          |
| F613SB004 | 13-Oct-99    | 0.46 U                      | 0.41 J                        |                          |
| F613SB005 | 13-Oct-99    | 0.53 U                      | 0.53 U                        |                          |
| F613SB006 | 13-Oct-99    | 0.41 U                      | 0.54 U                        |                          |
| F613SB007 | 13-Oct-99    | 0.37 U                      | 0.69 U                        |                          |
| F613SB008 | 13-Oct-99    | 0.23 J                      | 0.67 U                        |                          |
| F613SB009 | 13-Oct-99    | 2.40 =                      | 0.53 U                        |                          |
| F613SB010 | 13-Oct-99    | 0.42 U                      | 0.54 U                        |                          |
| F613SB011 | 15-Oct-99    | 0.41 U                      | 1.60 U                        |                          |
| F613SB012 | 14-Oct-99    | 0.40 U                      | 0.62 U                        |                          |
| F613SB013 | 14-Oct-99    | 0.40 U                      | 0.45 U                        |                          |
| F613SB014 | 13-Oct-99    | 3.90 U                      | 0.41 U                        |                          |
| F613SB016 | 13-Oct-99    | 0.39 U                      | 0.62 U                        |                          |
| F613SB021 | 16-Nov-99    | 0.38 U                      | 0.62 U                        |                          |
| F613SB022 | 16-Nov-99    | 0.38 U                      | 0.56 U                        |                          |
| F613SB023 | 16-Nov-99    | 0.43 U                      | 0.56 U                        |                          |
| F613SB024 | 16-Nov-99    | 0.45 U                      | 0.71 U                        |                          |
| F613SB025 | 16-Nov-99    | 0.11 J                      |                               |                          |
| F613SB026 | 16-Nov-99    | 0.49 U                      | 0.53 U                        |                          |
| F613SB027 | 16-Nov-99    | 0.51 U                      | 0.36 U                        |                          |
| F613SB028 | 16-Nov-99    | 0.53 U                      | 0.37 U                        |                          |
| F613SB029 | 1-Dec-99     | 0.37 U                      | 0.36 U                        |                          |
| F613SB030 | 1-Dec-99     | 0.44 U                      | 0.63 U                        |                          |
| F613SP001 | 12-Sep-96    |                             |                               | 0.53 U                   |
| F613SP002 | 13-Sep-96    |                             |                               | 0.40 U                   |
| F613SP003 | 29-Aug-96    |                             |                               | 0.40 U                   |

**TABLE 5-4**  
 COPC Refinement; Naphthalene in Surface and Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                |                     | <b>Naphthalene</b>                            |                                                                |                       |
|----------------|---------------------|-----------------------------------------------|----------------------------------------------------------------|-----------------------|
|                |                     | <b>Units</b>                                  | <b>(mg/Kg)</b>                                                 |                       |
|                |                     | <b>SSL (DAF = 1) <sup>a</sup></b>             | <b>4.0</b>                                                     |                       |
|                |                     | <b>Unrestricted Land Use RBC <sup>*</sup></b> | <b>1,600</b>                                                   |                       |
|                |                     | <b>Industrial Land Use RBC <sup>*</sup></b>   | <b>41,000</b>                                                  |                       |
|                |                     | <b>Surface Soil</b>                           | <b>Subsurface Soil</b>                                         | <b>Soil Probe</b>     |
|                |                     | <b>Concentration</b>                          | <b>Concentration</b>                                           | <b>Concentration</b>  |
| <b>Station</b> | <b>Date Sampled</b> | <b>(0 – 1 ft bls)</b>                         | <b>(3 – 5 ft bls)</b>                                          | <b>(0 – 4 ft bls)</b> |
| F613SP004      | 2-Oct-96            |                                               |                                                                | 0.53 U                |
| F613SP005      | 3-Oct-96            |                                               |                                                                | 0.59 U                |
| F613SP006      | 4-Oct-96            |                                               |                                                                | 0.50 U                |
| F613SP007      | 12-Sep-96           |                                               |                                                                | 0.015 U               |
| F613SP008      | 13-Sep-96           |                                               |                                                                | 0.56 U                |
| F613SP009      | 29-Aug-96           |                                               |                                                                | 0.38 U                |
| F613SP010      | 2-Oct-96            |                                               |                                                                | 0.52 U                |
| F613SP012      | 10-Oct-96           |                                               |                                                                | 0.70 U                |
| F613SP013      | 7-Oct-96            |                                               |                                                                | 0.40 U                |
| F613SP014      | 12-Sep-96           |                                               |                                                                | 0.56 U                |
| F613SP017      | 3-Oct-96            |                                               |                                                                | 0.41 U                |
| F613SP018      | 4-Oct-96            |                                               |                                                                | 0.37 U                |
| F613SP019      | 7-Oct-96            |                                               |                                                                | 0.41 U                |
| F613SP020      | 11-Sep-96           |                                               |                                                                | 0.54 U                |
| F613SP021      | 29-Aug-96           |                                               |                                                                | 0.38 U                |
| F613SP022      | 15-Sep-96           | 0.48 U                                        | <span style="border: 1px solid black; padding: 2px;">38</span> |                       |
| F613SP022      | 13-Oct-99           | 0.37 U                                        | 0.62 U                                                         |                       |
| F613SP023      | 14-Sep-96           |                                               |                                                                | 0.39 U                |
| F613SP024      | 11-Sep-96           |                                               |                                                                | 0.56 U                |
| F613SP025      | 28-Aug-96           |                                               |                                                                | 0.38 U                |
| F613SP026      | 15-Sep-96           |                                               |                                                                | 0.53 U                |
| F613SP027      | 14-Sep-96           |                                               |                                                                | 0.40 U                |
| F613SP027      | 14-Oct-99           | 0.39 U                                        | 0.38 U                                                         |                       |
| F613SP028      | 11-Sep-96           |                                               |                                                                | 0.48 U                |
| F613SP029      | 28-Aug-96           |                                               |                                                                | 0.38 U                |
| F613SP030      | 28-Sep-96           |                                               |                                                                | 0.59 U                |
| F613SP031      | 14-Sep-96           |                                               |                                                                | 0.48 U                |
| F613SP032      | 10-Sep-96           |                                               |                                                                | 0.40 U                |

**TABLE 5-4**  
 COPC Refinement; Naphthalene in Surface and Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                               |                     | <b>Naphthalene</b>                 |                                      |                                 |
|-------------------------------|---------------------|------------------------------------|--------------------------------------|---------------------------------|
|                               |                     | <b>Units</b>                       | <b>(mg/Kg)</b>                       |                                 |
|                               |                     | <b>SSL (DAF = 1) <sup>a</sup></b>  | <b>4.0</b>                           |                                 |
|                               |                     | <b>Unrestricted Land Use RBC *</b> | <b>1,600</b>                         |                                 |
|                               |                     | <b>Industrial Land Use RBC *</b>   | <b>41,000</b>                        |                                 |
|                               |                     | <b>Surface Soil Concentration</b>  | <b>Subsurface Soil Concentration</b> | <b>Soil Probe Concentration</b> |
| <b>Station</b>                | <b>Date Sampled</b> | <b>(0 – 1 ft bls)</b>              | <b>(3 – 5 ft bls)</b>                | <b>(0 – 4 ft bls)</b>           |
| F613SP061                     | 16-Sep-96           |                                    |                                      | 0.38 U                          |
| F613SP062                     | 16-Sep-96           |                                    |                                      | 0.48 U                          |
| F613SP063                     | 16-Oct-96           |                                    |                                      | 0.42 U                          |
| F613SP064                     | 15-Oct-96           |                                    |                                      | 0.42 U                          |
| F613SP065                     | 14-Oct-96           |                                    |                                      | 0.54 U                          |
| F613SP066                     | 13-Oct-96           |                                    |                                      | 0.48 U                          |
| F613SP067                     | 11-Oct-96           |                                    |                                      | 0.54 U                          |
| F613SP068                     | 10-Oct-96           |                                    |                                      | 0.66 U                          |
| LE504SB001                    | 8-Jul-97            | 0.39 U                             |                                      |                                 |
| LE504SB002                    | 8-Jul-97            | 0.39 U                             | 0.47 U                               |                                 |
| LE504SB003                    | 8-Jul-97            | 0.37 U                             | 0.42 U                               |                                 |
| LE504SB004                    | 9-Jul-97            | 0.39 U                             | 0.43 U                               |                                 |
| LE504SB005                    | 9-Jul-97            | 0.42 U                             | 0.55 U                               |                                 |
| <b>Mean Concentration ***</b> |                     | <b>0.33</b>                        | <b>1.47</b>                          | <b>0.23</b>                     |

Bolded and outlined values are exceedences of the SSL (DAF = 1.0).

\* RBC from US EPA Region III Table 10/05/2000; adjusted for HI = 0.1

\*\*\* Mean calculated using one-half the reported detected limit for non-detected data

<sup>a</sup> SSL from USEPA Soil Screening Guidance Appendix A, 1996

= Analyte was detected; the reported value is equal to the sample concentration.

J Analyte was detected; the reported value is an estimated concentration.

U Analyte was not detected; the reported value is the detection limit.

**TABLE 5-5**  
 COPC Refinement; BEQs in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                                        | Units       | BEQs    | Benzo(a)<br>anthracene | Benzo(a)<br>pyrene | Benzo(b)<br>fluoranthene | Benzo(k)<br>fluoranthene | Chrysene | Dibenz(a,h)<br>anthracene | Indeno(1,2,3-<br>c,d)pyrene |
|----------------------------------------|-------------|---------|------------------------|--------------------|--------------------------|--------------------------|----------|---------------------------|-----------------------------|
|                                        | (mg/kg)     | (mg/kg) | (mg/kg)                | (mg/kg)            | (mg/kg)                  | (mg/kg)                  | (mg/kg)  | (mg/kg)                   | (mg/kg)                     |
| SSL (DAF = 10) <sup>a</sup>            | NL          | 0.80    | 0.80                   | 4.0                | 2.0                      | 20                       | 80       | 0.80                      | 7.0                         |
| Unrestricted Land Use RBC <sup>*</sup> |             | 0.087   | 0.87                   | 0.087              | 0.87                     | 8.7                      | 87       | 0.087                     | 0.87                        |
| Industrial Land Use RBC <sup>*</sup>   |             | 0.78    | 7.8                    | 0.78               | 7.8                      | 78                       | 780      | 0.78                      | 7.8                         |
| Background <sup>**</sup>               |             | 1.304   | 0.616                  | 0.598              | 0.608                    | 0.596                    | 0.620    | 0.525                     | 0.525                       |
| Station                                | Date        | Conc.   | Conc.                  | Conc.              | Conc.                    | Conc.                    | Conc.    | Conc.                     | Conc.                       |
| F613SB001                              | 13-Oct-1999 | 1.54 =  | 0.92 J                 | 0.91 J             | 0.83 J                   | 0.92 J                   | 0.94 J   | 0.80 UJ                   | 0.44 J                      |
| F613SB002                              | 14-Oct-1999 | 0.462 U | 0.40 U                 | 0.40 U             | 0.40 U                   | 0.40 U                   | 0.40 U   | 0.40 U                    | 0.40 U                      |
| F613SB003                              | 14-Oct-1999 | 1.05 =  | 0.75 =                 | 0.70 J             | 0.71 J                   | 0.77 J                   | 0.87 =   | 0.17 J                    | 0.28 J                      |
| F613SB004                              | 13-Oct-1999 | 0.511 = | 0.24 J                 | 0.22 J             | 0.24 J                   | 0.22 J                   | 0.27 J   | 0.46 U                    | 0.11 J                      |
| F613SB005                              | 13-Oct-1999 | 0.454 = | 0.53 U                 | 0.12 J             | 0.13 J                   | 0.53 U                   | 0.11 J   | 0.53 U                    | 0.53 U                      |
| F613SB006                              | 13-Oct-1999 | 0.474 U | 0.41 U                 | 0.41 U             | 0.41 U                   | 0.41 U                   | 0.41 U   | 0.41 U                    | 0.41 U                      |
| F613SB007                              | 13-Oct-1999 | 0.428 U | 0.37 U                 | 0.37 U             | 0.37 U                   | 0.37 U                   | 0.37 U   | 0.37 U                    | 0.37 U                      |
| F613SB008                              | 13-Oct-1999 | 0.466 = | 0.24 J                 | 0.40 UJ            | 0.40 UJ                  | 0.40 UJ                  | 0.36 J   | 0.40 UJ                   | 0.40 UJ                     |
| F613SB009                              | 13-Oct-1999 | 2.04 =  | 0.52 J                 | 1.8 UJ             | 1.8 UJ                   | 1.8 UJ                   | 1.0 J    | 1.8 UJ                    | 1.8 UJ                      |
| F613SB010                              | 13-Oct-1999 | 0.341 = | 0.12 J                 | 0.087 J            | 0.10 J                   | 0.10 J                   | 0.15 J   | 0.42 U                    | 0.42 U                      |
| F613SB011                              | 15-Oct-1999 | 0.350 = | 0.41 U                 | 0.092 J            | 0.11 J                   | 0.10 J                   | 0.11 J   | 0.41 U                    | 0.41 U                      |
| F613SB012                              | 14-Oct-1999 | 0.326 = | 0.090 J                | 0.084 J            | 0.11 J                   | 0.40 U                   | 0.10 J   | 0.40 U                    | 0.40 U                      |
| F613SB013                              | 14-Oct-1999 | 0.371 = | 0.14 J                 | 0.12 J             | 0.15 J                   | 0.15 J                   | 0.16 J   | 0.40 U                    | 0.40 U                      |
| F613SB014                              | 13-Oct-1999 | 4.51 U  | 3.9 U                  | 3.9 U              | 3.9 U                    | 3.9 U                    | 3.9 U    | 3.9 U                     | 3.9 U                       |
| F613SB016                              | 13-Oct-1999 | 0.451 U | 0.39 U                 | 0.39 U             | 0.39 U                   | 0.39 U                   | 0.39 U   | 0.39 U                    | 0.39 U                      |
| F613SB021                              | 16-Nov-1999 | 0.364 = | 0.12 J                 | 0.13 J             | 0.12 J                   | 0.13 J                   | 0.13 J   | 0.38 UJ                   | 0.38 UJ                     |
| F613SB022                              | 16-Nov-1999 | 1.77 =  | 1.2 =                  | 1.2 J              | 1.5 J                    | 1.2 J                    | 1.3 =    | 0.24 J                    | 0.49 J                      |
| F613SB023                              | 16-Nov-1999 | 0.367 = | 0.43 U                 | 0.10 J             | 0.13 J                   | 0.086 J                  | 0.12 J   | 0.43 U                    | 0.43 U                      |

**TABLE 5-5**

COPC Refinement; BEQs in Surface Soil

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|           |                             | BEQs    | Benzo(a)<br>anthracene | Benzo(a)<br>pyrene | Benzo(b)<br>fluoranthene | Benzo(k)<br>fluoranthene | Chrysene | Dibenz(a,h)<br>anthracene | Indeno(1,2,3-<br>c,d)pyrene |
|-----------|-----------------------------|---------|------------------------|--------------------|--------------------------|--------------------------|----------|---------------------------|-----------------------------|
|           | Units                       | (mg/kg) | (mg/kg)                | (mg/kg)            | (mg/kg)                  | (mg/kg)                  | (mg/kg)  | (mg/kg)                   | (mg/kg)                     |
|           | SSL (DAF = 10) *            | NL      | 0.80                   | 4.0                | 2.0                      | 20                       | 80       | 0.80                      | 7.0                         |
|           | Unrestricted Land Use RBC * | 0.087   | 0.87                   | 0.087              | 0.87                     | 8.7                      | 87       | 0.087                     | 0.87                        |
|           | Industrial Land Use RBC *   | 0.78    | 7.8                    | 0.78               | 7.8                      | 78                       | 780      | 0.78                      | 7.8                         |
|           | Background **               | 1.304   | 0.616                  | 0.598              | 0.608                    | 0.596                    | 0.620    | 0.525                     | 0.525                       |
| Station   | Date                        | Conc.   | Conc.                  | Conc.              | Conc.                    | Conc.                    | Conc.    | Conc.                     | Conc.                       |
| F613SB024 | 16-Nov-1999                 | 0.385 = | 0.13 J                 | 0.11 J             | 0.13 J                   | 0.10 J                   | 0.14 J   | 0.45 U                    | 0.45 U                      |
| F613SB025 | 16-Nov-1999                 | 0.555 U | 0.48 U                 | 0.48 U             | 0.48 U                   | 0.48 U                   | 0.48 U   | 0.48 U                    | 0.48 U                      |
| F613SB026 | 16-Nov-1999                 | 0.566 U | 0.49 U                 | 0.49 U             | 0.49 U                   | 0.49 U                   | 0.49 U   | 0.49 U                    | 0.49 U                      |
| F613SB027 | 16-Nov-1999                 | 0.589 U | 0.51 U                 | 0.51 UJ            | 0.51 UJ                  | 0.51 UJ                  | 0.51 U   | 0.51 UJ                   | 0.51 UJ                     |
| F613SB028 | 16-Nov-1999                 | 0.612 U | 0.53 U                 | 0.53 U             | 0.53 U                   | 0.53 U                   | 0.53 U   | 0.53 U                    | 0.53 U                      |
| F613SB029 | 01-Dec-1999                 | 0.428 U | 0.37 U                 | 0.37 U             | 0.37 U                   | 0.37 U                   | 0.37 U   | 0.37 U                    | 0.37 U                      |
| F613SB030 | 01-Dec-1999                 | 0.508 U | 0.44 U                 | 0.44 U             | 0.44 U                   | 0.44 U                   | 0.44 U   | 0.44 U                    | 0.44 U                      |
| F613SB033 | 07-Jun-2001                 | 0.289 = | 0.194 =                | 0.196 =            | 0.418 J                  | 0.170 J                  | 0.220 =  | 0.0404 U                  | 0.0990 =                    |
| F613SB034 | 07-Jun-2001                 | 0.259 = | 0.188 =                | 0.165 =            | 0.471 J                  | 0.0421 U                 | 0.200 =  | 0.0421 U                  | 0.0706 =                    |
| F613SP001 | 12-Sep-1996                 | 0.612 U | 0.53 U                 | 0.53 U             | 0.53 U                   | 0.53 U                   | 0.53 U   | 0.53 U                    | 0.53 U                      |
| F613SP002 | 13-Sep-1996                 | 0.462 U | 0.40 U                 | 0.40 U             | 0.40 U                   | 0.40 U                   | 0.40 U   | 0.40 U                    | 0.40 U                      |
| F613SP003 | 29-Aug-1996                 | 0.462 U | 0.40 U                 | 0.40 U             | 0.40 U                   | 0.40 U                   | 0.40 U   | 0.40 U                    | 0.40 U                      |
| F613SP004 | 02-Oct-1996                 | 0.612 U | 0.53 U                 | 0.53 U             | 0.53 U                   | 0.53 U                   | 0.53 U   | 0.53 U                    | 0.53 U                      |
| F613SP005 | 03-Oct-1996                 | 0.682 U | 0.59 U                 | 0.59 U             | 0.59 U                   | 0.59 U                   | 0.59 U   | 0.59 U                    | 0.59 U                      |
| F613SP006 | 04-Oct-1996                 | 0.578 U | 0.50 U                 | 0.50 U             | 0.50 U                   | 0.50 U                   | 0.50 U   | 0.50 U                    | 0.50 U                      |
| F613SP007 | 12-Sep-1996                 | 0.017 U | 0.02 U                 | 0.015 U            | 0.015 U                  | 0.015 U                  | 0.015 U  | 0.015 U                   | 0.015 U                     |
| F613SP008 | 13-Sep-1996                 | 0.647 U | 0.56 U                 | 0.56 U             | 0.56 U                   | 0.56 U                   | 0.56 U   | 0.56 U                    | 0.56 U                      |
| F613SP009 | 29-Aug-1996                 | 0.416 = | 0.16 J                 | 0.18 J             | 0.18 J                   | 0.20 J                   | 0.23 J   | 0.38 U                    | 0.10 J                      |
| F613SP010 | 02-Oct-1996                 | 0.392 = | 0.10 J                 | 0.09 J             | 0.079 J                  | 0.084 J                  | 0.12 J   | 0.52 U                    | 0.52 U                      |

**TABLE 5-5**  
 COPC Refinement; BEQs in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                                        |             | BEQs<br>(mg/kg) | Benzo(a)<br>anthracene<br>(mg/kg) | Benzo(a)<br>pyrene<br>(mg/kg) | Benzo(b)<br>fluoranthene<br>(mg/kg) | Benzo(k)<br>fluoranthene<br>(mg/kg) | Chrysene<br>(mg/kg) | Dibenz(a,h)<br>anthracene<br>(mg/kg) | Indeno(1,2,3-<br>c,d)pyrene<br>(mg/kg) |
|----------------------------------------|-------------|-----------------|-----------------------------------|-------------------------------|-------------------------------------|-------------------------------------|---------------------|--------------------------------------|----------------------------------------|
| Units                                  |             |                 |                                   |                               |                                     |                                     |                     |                                      |                                        |
| SSL (DAF = 10) <sup>a</sup>            | NL          | 0.80            | 4.0                               | 2.0                           | 20                                  | 80                                  | 0.80                | 7.0                                  |                                        |
| Unrestricted Land Use RBC <sup>*</sup> |             | 0.087           | 0.87                              | 0.087                         | 0.87                                | 8.7                                 | 87                  | 0.087                                | 0.87                                   |
| Industrial Land Use RBC <sup>*</sup>   |             | 0.78            | 7.8                               | 0.78                          | 7.8                                 | 78                                  | 780                 | 0.78                                 | 7.8                                    |
| Background <sup>**</sup>               |             | 1.304           | 0.616                             | 0.598                         | 0.608                               | 0.596                               | 0.620               | 0.525                                | 0.525                                  |
| Station                                | Date        | Conc.           | Conc.                             | Conc.                         | Conc.                               | Conc.                               | Conc.               | Conc.                                | Conc.                                  |
| F613SP012                              | 10-Oct-1996 | 0.809 U         | 0.70 U                            | 0.70 U                        | 0.70 U                              | 0.70 U                              | 0.70 U              | 0.70 U                               | 0.70 U                                 |
| F613SP013                              | 07-Oct-1996 | 0.462 U         | 0.40 U                            | 0.40 U                        | 0.40 U                              | 0.40 U                              | 0.40 U              | 0.40 U                               | 0.40 U                                 |
| F613SP014                              | 12-Sep-1996 | 0.647 U         | 0.56 U                            | 0.56 U                        | 0.56 U                              | 0.56 U                              | 0.56 U              | 0.56 U                               | 0.56 U                                 |
| F613SP017                              | 03-Oct-1996 | 0.474 U         | 0.41 U                            | 0.41 U                        | 0.41 U                              | 0.41 U                              | 0.41 U              | 0.41 U                               | 0.41 U                                 |
| F613SP018                              | 04-Oct-1996 | 0.428 U         | 0.37 U                            | 0.37 U                        | 0.37 U                              | 0.37 U                              | 0.37 U              | 0.37 U                               | 0.37 U                                 |
| F613SP019                              | 07-Oct-1996 | 0.474 U         | 0.41 U                            | 0.41 U                        | 0.41 U                              | 0.41 U                              | 0.41 U              | 0.41 U                               | 0.41 U                                 |
| F613SP020                              | 11-Sep-1996 | 0.624 U         | 0.54 U                            | 0.54 U                        | 0.54 U                              | 0.54 U                              | 0.54 U              | 0.54 U                               | 0.54 U                                 |
| F613SP021                              | 29-Aug-1996 | 1.09 =          | 0.86 =                            | 0.74 =                        | 0.95 =                              | 0.64 =                              | 3.0 =               | 0.13 J                               | 0.26 J                                 |
| F613SP022                              | 15-Sep-1996 | 0.306 =         | 0.20 J                            | 0.19 J                        | 0.20 J                              | 0.076 J                             | 0.17 J              | 0.064 J                              | 0.11 J                                 |
| F613SP022                              | 13-Oct-1999 | 0.318 =         | 0.37 U                            | 0.076 J                       | 0.37 U                              | 0.37 U                              | 0.088 J             | 0.37 U                               | 0.37 U                                 |
| F613SP023                              | 14-Sep-1996 | 0.451 U         | 0.39 U                            | 0.39 U                        | 0.39 U                              | 0.39 U                              | 0.39 U              | 0.39 U                               | 0.39 U                                 |
| F613SP024                              | 11-Sep-1996 | 0.416 =         | 0.07 J                            | 0.092 J                       | 0.083 J                             | 0.084 J                             | 0.090 J             | 0.56 U                               | 0.56 U                                 |
| F613SP025                              | 28-Aug-1996 | 0.439 U         | 0.38 U                            | 0.38 U                        | 0.38 U                              | 0.38 U                              | 0.38 U              | 0.38 U                               | 0.38 U                                 |
| F613SP026                              | 15-Sep-1996 | 0.612 U         | 0.53 U                            | 0.53 U                        | 0.53 U                              | 0.53 U                              | 0.53 U              | 0.53 U                               | 0.53 U                                 |
| F613SP027                              | 14-Sep-1996 | 0.462 U         | 0.40 U                            | 0.40 U                        | 0.40 U                              | 0.40 U                              | 0.40 U              | 0.40 U                               | 0.40 U                                 |
| F613SP027                              | 14-Oct-1999 | 0.352 =         | 0.10 J                            | 0.11 J                        | 0.16 J                              | 0.12 J                              | 0.14 J              | 0.39 UJ                              | 0.39 UJ                                |
| F613SP028                              | 11-Sep-1996 | 0.555 U         | 0.48 U                            | 0.48 U                        | 0.48 U                              | 0.48 U                              | 0.48 U              | 0.48 U                               | 0.48 U                                 |
| F613SP029                              | 28-Aug-1996 | 0.755 =         | 0.38 =                            | 0.44 =                        | 0.58 =                              | 0.42 =                              | 0.58 =              | 0.38 U                               | 0.24 J                                 |
| F613SP030                              | 28-Sep-1996 | 0.682 U         | 0.59 U                            | 0.59 U                        | 0.59 U                              | 0.59 U                              | 0.59 U              | 0.59 U                               | 0.59 U                                 |

**TABLE 5-5**

COPC Refinement; BEQs in Surface Soil

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|           |                             | BEQs    | Benzo(a)   | Benzo(a) | Benzo(b)     | Benzo(k)     | Chrysene | Dibenz(a,h) | Indeno(1,2,3- |
|-----------|-----------------------------|---------|------------|----------|--------------|--------------|----------|-------------|---------------|
|           | Units                       | (mg/kg) | anthracene | pyrene   | fluoranthene | fluoranthene | (mg/kg)  | anthracene  | c,d)pyrene    |
|           | SSL (DAF = 10) <sup>a</sup> | NL      | (mg/kg)    | (mg/kg)  | (mg/kg)      | (mg/kg)      | (mg/kg)  | (mg/kg)     | (mg/kg)       |
|           | Unrestricted Land Use RBC * | 0.087   | 0.87       | 0.087    | 0.87         | 8.7          | 87       | 0.087       | 0.87          |
|           | Industrial Land Use RBC *   | 0.78    | 7.8        | 0.78     | 7.8          | 78           | 780      | 0.78        | 7.8           |
|           | Background **               | 1.304   | 0.616      | 0.598    | 0.608        | 0.596        | 0.620    | 0.525       | 0.525         |
| Station   | Date                        | Conc.   | Conc.      | Conc.    | Conc.        | Conc.        | Conc.    | Conc.       | Conc.         |
| F613SP031 | 14-Sep-1996                 | 0.536 = | 0.48 U     | 0.48 U   | 0.48 U       | 0.48 U       | 0.48 =   | 0.48 U      | 0.055 J       |
| F613SP032 | 10-Sep-1996                 | 0.302 = | 0.070 J    | 0.069 J  | 0.053 J      | 0.066 J      | 0.073 J  | 0.40 U      | 0.40 U        |
| F613SP033 | 28-Aug-1996                 | 0.439 U | 0.38 U     | 0.38 U   | 0.38 U       | 0.38 U       | 0.38 U   | 0.38 U      | 0.38 U        |
| F613SP034 | 28-Sep-1996                 | 0.362 = | 0.075 J    | 0.071 J  | 0.07 J       | 0.078 J      | 0.091 J  | 0.50 U      | 0.50 U        |
| F613SP035 | 16-Sep-1996                 | 0.336 = | 0.11 J     | 0.071 J  | 0.42 U       | 0.42 U       | 0.16 J   | 0.42 U      | 0.42 U        |
| F613SP036 | 09-Sep-1996                 | 0.485 U | 0.42 U     | 0.42 U   | 0.42 U       | 0.42 U       | 0.42 U   | 0.42 U      | 0.42 U        |
| F613SP037 | 30-Aug-1996                 | 0.462 U | 0.40 U     | 0.40 U   | 0.40 U       | 0.40 U       | 0.40 U   | 0.40 U      | 0.40 U        |
| F613SP038 | 28-Aug-1996                 | 0.439 U | 0.38 U     | 0.38 U   | 0.38 U       | 0.38 U       | 0.38 U   | 0.38 U      | 0.38 U        |
| F613SP039 | 29-Sep-1996                 | 0.404 U | 0.35 U     | 0.35 U   | 0.35 U       | 0.35 U       | 0.35 U   | 0.35 U      | 0.35 U        |
| F613SP040 | 13-Sep-1996                 | 0.543 U | 0.47 U     | 0.47 U   | 0.47 U       | 0.47 U       | 0.47 U   | 0.47 U      | 0.47 U        |
| F613SP041 | 10-Sep-1996                 | 0.416 U | 0.36 U     | 0.36 U   | 0.36 U       | 0.36 U       | 0.36 U   | 0.36 U      | 0.36 U        |
| F613SP042 | 03-Sep-1996                 | 0.462 U | 0.40 U     | 0.40 U   | 0.40 U       | 0.40 U       | 0.40 U   | 0.40 U      | 0.40 U        |
| F613SP043 | 09-Sep-1996                 | 0.451 U | 0.39 U     | 0.39 U   | 0.39 U       | 0.39 U       | 0.39 U   | 0.39 U      | 0.39 U        |
| F613SP044 | 27-Aug-1996                 | 0.334 = | 0.42 U     | 0.059 J  | 0.42 U       | 0.42 U       | 0.42 U   | 0.42 U      | 0.42 U        |
| F613SP045 | 29-Sep-1996                 | 0.774 U | 0.67 U     | 0.67 U   | 0.67 U       | 0.67 U       | 0.67 U   | 0.67 U      | 0.67 U        |
| F613SP046 | 09-Oct-1996                 | 0.624 U | 0.54 U     | 0.54 U   | 0.54 U       | 0.54 U       | 0.54 U   | 0.54 U      | 0.54 U        |
| F613SP048 | 10-Sep-1996                 | 0.428 U | 0.37 U     | 0.37 U   | 0.37 U       | 0.37 U       | 0.37 U   | 0.37 U      | 0.37 U        |
| F613SP049 | 09-Sep-1996                 | 0.451 U | 0.39 U     | 0.39 U   | 0.39 U       | 0.39 U       | 0.39 U   | 0.39 U      | 0.39 U        |
| F613SP050 | 04-Sep-1996                 | 0.497 = | 0.61 U     | 0.10 J   | 0.61 U       | 0.61 U       | 0.61 U   | 0.61 U      | 0.61 U        |

**TABLE 5-5**  
 COPC Refinement; BEQs in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|           | Units                                  | BEQs<br>(mg/kg) | Benzo(a)<br>anthracene<br>(mg/kg) | Benzo(a)<br>pyrene<br>(mg/kg) | Benzo(b)<br>fluoranthene<br>(mg/kg) | Benzo(k)<br>fluoranthene<br>(mg/kg) | Chrysene<br>(mg/kg) | Dibenz(a,h)<br>anthracene<br>(mg/kg) | Indeno(1,2,3-<br>c,d)pyrene<br>(mg/kg) |
|-----------|----------------------------------------|-----------------|-----------------------------------|-------------------------------|-------------------------------------|-------------------------------------|---------------------|--------------------------------------|----------------------------------------|
|           | SSL (DAF = 10) <sup>a</sup>            | NL              | 0.80                              | 4.0                           | 2.0                                 | 20                                  | 80                  | 0.80                                 | 7.0                                    |
|           | Unrestricted Land Use RBC <sup>*</sup> | 0.087           | 0.87                              | 0.087                         | 0.87                                | 8.7                                 | 87                  | 0.087                                | 0.87                                   |
|           | Industrial Land Use RBC <sup>*</sup>   | 0.78            | 7.8                               | 0.78                          | 7.8                                 | 78                                  | 780                 | 0.78                                 | 7.8                                    |
|           | Background <sup>**</sup>               | 1.304           | 0.616                             | 0.598                         | 0.608                               | 0.596                               | 0.620               | 0.525                                | 0.525                                  |
| Station   | Date                                   | Conc.           | Conc.                             | Conc.                         | Conc.                               | Conc.                               | Conc.               | Conc.                                | Conc.                                  |
| F613SP051 | 27-Aug-1996                            | 1.78 =          | 2.40 =                            | 1.20 J                        | 1.80 J                              | 1.50 J                              | 2.3 =               | 0.11 J                               | 0.28 J                                 |
| F613SP051 | 15-Oct-1999                            | 0.496 =         | 0.44 U                            | 0.44 UJ                       | 0.11 J                              | 0.11 J                              | 0.10 J              | 0.44 UJ                              | 0.44 UJ                                |
| F613SP052 | 09-Oct-1996                            | 0.726 =         | 0.65 U                            | 0.65 U                        | 0.078 J                             | 0.65 U                              | 0.65 U              | 0.65 U                               | 0.65 U                                 |
| F613SP053 | 17-Sep-1996                            | 0.529 =         | 0.22 J                            | 0.19 J                        | 0.18 J                              | 0.16 J                              | 0.22 J              | 0.57 U                               | 0.12 J                                 |
| F613SP054 | 17-Sep-1996                            | 0.282 =         | 0.043 J                           | 0.047 J                       | 0.046 J                             | 0.045 J                             | 0.045 J             | 0.41 U                               | 0.41 U                                 |
| F613SP055 | 13-Sep-1996                            | 0.508 U         | 0.44 U                            | 0.44 U                        | 0.44 U                              | 0.44 U                              | 0.44 U              | 0.44 U                               | 0.44 U                                 |
| F613SP056 | 03-Sep-1996                            | 0.670 U         | 0.58 U                            | 0.58 U                        | 0.58 U                              | 0.58 U                              | 0.58 U              | 0.58 U                               | 0.58 U                                 |
| F613SP057 | 30-Aug-1996                            | 0.578 U         | 0.50 U                            | 0.50 U                        | 0.50 U                              | 0.50 U                              | 0.50 U              | 0.50 U                               | 0.50 U                                 |
| F613SP058 | 30-Aug-1996                            | 0.451 U         | 0.39 U                            | 0.39 U                        | 0.39 U                              | 0.39 U                              | 0.39 U              | 0.39 U                               | 0.39 U                                 |
| F613SP059 | 03-Sep-1996                            | 0.462 U         | 0.40 U                            | 0.40 U                        | 0.40 U                              | 0.40 U                              | 0.40 U              | 0.40 U                               | 0.40 U                                 |
| F613SP060 | 03-Sep-1996                            | 0.373 =         | 0.42 U                            | 0.10 J                        | 0.42 U                              | 0.42 U                              | 0.42 U              | 0.42 U                               | 0.42 U                                 |
| F613SP061 | 16-Sep-1996                            | 0.239 =         | 0.28 J                            | 0.13 J                        | 0.26 J                              | 0.091 J                             | 0.26 J              | 0.046 J                              | 0.083 J                                |
| F613SP062 | 16-Sep-1996                            | 0.360 =         | 0.06 J                            | 0.065 J                       | 0.48 U                              | 0.094 J                             | 0.064 J             | 0.48 U                               | 0.48 U                                 |
| F613SP063 | 16-Oct-1996                            | 0.485 U         | 0.42 U                            | 0.42 U                        | 0.42 U                              | 0.42 U                              | 0.42 U              | 0.42 U                               | 0.42 U                                 |
| F613SP064 | 15-Oct-1996                            | 0.375 =         | 0.42 U                            | 0.10 J                        | 0.42 U                              | 0.42 U                              | 0.42 U              | 0.42 U                               | 0.42 U                                 |
| F613SP065 | 14-Oct-1996                            | 0.386 =         | 0.09 J                            | 0.072 J                       | 0.08 J                              | 0.076 J                             | 0.12 J              | 0.54 U                               | 0.54 U                                 |
| F613SP066 | 13-Oct-1996                            | 0.555 U         | 0.48 U                            | 0.48 U                        | 0.48 U                              | 0.48 U                              | 0.48 U              | 0.48 U                               | 0.48 U                                 |
| F613SP067 | 11-Oct-1996                            | 0.624 U         | 0.54 U                            | 0.54 U                        | 0.54 U                              | 0.54 U                              | 0.54 U              | 0.54 U                               | 0.54 U                                 |

**TABLE 5-5**  
 COPC Refinement; BEQs in Surface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|                                        | Units       | BEQs<br>(mg/kg) | Benzo(a)<br>anthracene<br>(mg/kg) | Benzo(a)<br>pyrene<br>(mg/kg) | Benzo(b)<br>fluoranthene<br>(mg/kg) | Benzo(k)<br>fluoranthene<br>(mg/kg) | Chrysene<br>(mg/kg) | Dibenz(a,h)<br>anthracene<br>(mg/kg) | Indeno(1,2,3-<br>c,d)pyrene<br>(mg/kg) |
|----------------------------------------|-------------|-----------------|-----------------------------------|-------------------------------|-------------------------------------|-------------------------------------|---------------------|--------------------------------------|----------------------------------------|
| SSL (DAF = 10) <sup>a</sup>            | NL          |                 | <b>0.80</b>                       | 4.0                           | 2.0                                 | 20                                  | 80                  | <b>0.80</b>                          | 7.0                                    |
| Unrestricted Land Use RBC <sup>*</sup> |             | <b>0.087</b>    | <b>0.87</b>                       | <b>0.087</b>                  | <b>0.87</b>                         | <b>8.7</b>                          | <b>87</b>           | <b>0.087</b>                         | <b>0.87</b>                            |
| Industrial Land Use RBC <sup>*</sup>   |             | <b>0.78</b>     | <b>7.8</b>                        | <b>0.78</b>                   | <b>7.8</b>                          | <b>78</b>                           | <b>780</b>          | <b>0.78</b>                          | <b>7.8</b>                             |
| Background <sup>**</sup>               |             | <b>1.304</b>    | <b>0.616</b>                      | <b>0.598</b>                  | <b>0.608</b>                        | <b>0.596</b>                        | <b>0.620</b>        | <b>0.525</b>                         | <b>0.525</b>                           |
| Station                                | Date        | Conc.           | Conc.                             | Conc.                         | Conc.                               | Conc.                               | Conc.               | Conc.                                | Conc.                                  |
| F613SP068                              | 10-Oct-1996 | 0.739 =         | 0.66 U                            | 0.66 U                        | 0.10 J                              | 0.66 U                              | 0.072 J             | 0.66 U                               | 0.66 U                                 |
| LE504SB003                             | 08-Jul-1997 | 0.413 =         | 0.17 J                            | 0.18 J                        | 0.13 J                              | 0.19 J                              | 0.24 J              | 0.37 UJ                              | 0.16 J                                 |
| LE504SB004                             | 09-Jul-1997 | 0.449 =         | 0.39 U                            | 0.39 U                        | 0.39 U                              | 0.041 J                             | 0.39 U              | 0.39 U                               | 0.39 U                                 |
| LE504SB005                             | 09-Jul-1997 | 0.485 U         | 0.42 U                            | 0.42 U                        | 0.42 U                              | 0.42 U                              | 0.42 U              | 0.42 U                               | 0.42 U                                 |
| Mean Concentration <sup>***</sup>      |             |                 | 0.280                             |                               |                                     |                                     |                     |                                      |                                        |

Bolded and outlined values are exceedences of Zone F maximum background concentration and RBC or SSL and SSL (DAF =10).

- <sup>a</sup> SSL from USEPA Soil Screening Guidance Appendix A, 1996
- <sup>\*</sup> RBC from US EPA Region III Table 10/05/2000; adjusted for HI = 0.1
- <sup>\*\*</sup> Background value from *Background PAHs Study Report, February 2001*
- <sup>\*\*\*</sup> Mean calculated using one-half the reported detection limit for non-detected data
- = Analyte was detected; the reported value is equal to the sample concentration.
- J Analyte was detected; the reported value is an estimated concentration.
- NL No limit.
- U Analyte was not detected; the reported value is the detection limit.
- UJ Analyte was not detected; the reported value is an estimated detection limit.

**TABLE 5-6**  
 COPC Refinement; BEQs in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | Units                       | BEQs    | Benzo(a)   | Benzo(a) | Benzo(b)     | Benzo(k)     | Chrysene | Dibenz(a,h) | Indeno(1,2,3- |
|-----------|-----------|-----------------------------|---------|------------|----------|--------------|--------------|----------|-------------|---------------|
|           |           | SSL (DAF = 10) <sup>a</sup> | (mg/kg) | anthracene | pyrene   | fluoranthene | fluoranthene | (mg/kg)  | anthracene  | c,d)pyrene    |
|           |           | Background <sup>**</sup>    | NL      | (mg/kg)    | (mg/kg)  | (mg/kg)      | (mg/kg)      | (mg/kg)  | (mg/kg)     | (mg/kg)       |
|           |           |                             | 1.400   | 0.80       | 4.0      | 2.0          | 20           | 80       | 0.80        | 7.0           |
|           |           |                             | 1.400   | 0.627      | 0.623    | 0.631        | 0.609        | 0.616    | 0.586       | 0.592         |
| Station   | Date      | Conc.                       | Conc.   | Conc.      | Conc.    | Conc.        | Conc.        | Conc.    | Conc.       | Conc.         |
| F613SB001 | 13-Oct-99 | 0.716 U                     | 0.62 U  | 0.62 U     | 0.62 U   | 0.62 U       | 0.62 U       | 0.62 U   | 0.62 U      | 0.62 U        |
| F613SB002 | 14-Oct-99 | 0.913 U                     | 0.79 U  | 0.79 U     | 0.79 U   | 0.79 U       | 0.79 U       | 0.79 U   | 0.79 U      | 0.79 U        |
| F613SB003 | 14-Oct-99 | 0.624 U                     | 0.54 U  | 0.54 U     | 0.54 U   | 0.54 U       | 0.54 U       | 0.54 U   | 0.54 U      | 0.54 U        |
| F613SB004 | 13-Oct-99 | 0.740 =                     | 0.33 J  | 0.32 J     | 0.29 J   | 0.36 J       | 0.36 J       | 0.36 J   | 0.68 U      | 0.14 J        |
| F613SB005 | 13-Oct-99 | 1.55 =                      | 1.2 =   | 1.0 =      | 1.1 =    | 0.87 =       | 1.2 =        | 0.26 J   | 0.46 J      |               |
| F613SB006 | 13-Oct-99 | 0.515 =                     | 0.17 J  | 0.19 J     | 0.22 J   | 0.21 J       | 0.23 J       | 0.54 U   | 0.14 J      |               |
| F613SB007 | 13-Oct-99 | 0.797 U                     | 0.69 U  | 0.69 U     | 0.69 U   | 0.69 U       | 0.69 U       | 0.69 U   | 0.69 U      | 0.69 U        |
| F613SB008 | 13-Oct-99 | 0.548 =                     | 0.14 J  | 0.15 J     | 0.14 J   | 0.15 J       | 0.17 J       | 0.67 U   | 0.67 U      |               |
| F613SB009 | 13-Oct-99 | 0.439 =                     | 0.13 J  | 0.12 J     | 0.12 J   | 0.53 U       | 0.15 J       | 0.53 U   | 0.53 U      |               |
| F613SB010 | 13-Oct-99 | 0.548 =                     | 0.18 J  | 0.21 J     | 0.21 J   | 0.19 J       | 0.21 J       | 0.54 U   | 0.54 U      |               |
| F613SB011 | 15-Oct-99 | 1.85 U                      | 1.6 UJ  | 1.6 UJ     | 1.6 UJ   | 1.6 UJ       | 1.6 UJ       | 1.6 UJ   | 1.6 UJ      | 1.6 UJ        |
| F613SB012 | 14-Oct-99 | 0.716 U                     | 0.62 U  | 0.62 U     | 0.62 U   | 0.62 U       | 0.62 U       | 0.62 U   | 0.62 U      | 0.62 U        |
| F613SB013 | 14-Oct-99 | 0.408 =                     | 0.14 J  | 0.13 J     | 0.15 J   | 0.13 J       | 0.16 J       | 0.45 U   | 0.45 U      |               |
| F613SB014 | 13-Oct-99 | 0.474 U                     | 0.41 U  | 0.41 U     | 0.41 U   | 0.41 U       | 0.41 U       | 0.41 U   | 0.41 U      | 0.41 U        |
| F613SB016 | 13-Oct-99 | 0.609 =                     | 0.29 J  | 0.21 J     | 0.26 J   | 0.24 J       | 0.31 J       | 0.62 U   | 0.62 U      |               |
| F613SB021 | 16-Nov-99 | 0.716 U                     | 0.62 U  | 0.62 UJ    | 0.62 UJ  | 0.62 UJ      | 0.62 U       | 0.62 UJ  | 0.62 UJ     | 0.62 UJ       |
| F613SB022 | 16-Nov-99 | 0.647 U                     | 0.56 U  | 0.56 U     | 0.56 U   | 0.56 U       | 0.56 U       | 0.56 U   | 0.56 U      | 0.56 U        |
| F613SB023 | 16-Nov-99 | 0.647 U                     | 0.56 U  | 0.56 U     | 0.56 U   | 0.56 U       | 0.56 U       | 0.56 U   | 0.56 U      | 0.56 U        |
| F613SB024 | 16-Nov-99 | 0.820 U                     | 0.71 U  | 0.71 U     | 0.71 U   | 0.71 U       | 0.71 U       | 0.71 U   | 0.71 U      | 0.71 U        |
| F613SB026 | 17-Nov-99 | 0.485 =                     | 0.19 J  | 0.16 J     | 0.13 J   | 0.15 J       | 0.19 J       | 0.53 U   | 0.53 U      |               |

**TABLE 5-6**  
 COPC Refinement; BEQs in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station                       | Date      | Units                       | BEQs         | Benzo(a)    | Benzo(a)     | Benzo(b)     | Benzo(k)     | Chrysene | Dibenz(a,h) | Indeno(1,2,3- |
|-------------------------------|-----------|-----------------------------|--------------|-------------|--------------|--------------|--------------|----------|-------------|---------------|
|                               |           | SSL (DAF = 10) <sup>a</sup> | (mg/kg)      | anthracene  | pyrene       | fluoranthene | fluoranthene | (mg/kg)  | anthracene  | c,d)pyrene    |
|                               |           | Background **               | NL           | (mg/kg)     | (mg/kg)      | (mg/kg)      | (mg/kg)      | (mg/kg)  | (mg/kg)     | (mg/kg)       |
|                               |           |                             | 1.400        | 0.80        | 4.0          | 2.0          | 20           | 80       | 0.80        | 7.0           |
|                               |           |                             | 0.627        | 0.623       | 0.631        | 0.609        | 0.616        | 0.586    | 0.592       |               |
|                               |           | Conc.                       | Conc.        | Conc.       | Conc.        | Conc.        | Conc.        | Conc.    | Conc.       | Conc.         |
| F613SB027                     | 16-Nov-99 | 0.416 U                     | 0.36 U       | 0.36 U      | 0.36 U       | 0.36 U       | 0.36 U       | 0.36 U   | 0.36 U      | 0.36 U        |
| F613SB028                     | 16-Nov-99 | 0.428 U                     | 0.37 U       | 0.37 U      | 0.37 U       | 0.37 U       | 0.37 U       | 0.37 U   | 0.37 U      | 0.37 U        |
| F613SB029                     | 1-Dec-99  | 0.416 U                     | 0.36 U       | 0.36 U      | 0.36 U       | 0.36 U       | 0.36 U       | 0.36 U   | 0.36 U      | 0.36 U        |
| F613SB030                     | 1-Dec-99  | 0.728 U                     | 0.63 U       | 0.63 U      | 0.63 U       | 0.63 U       | 0.63 U       | 0.63 U   | 0.63 U      | 0.63 U        |
| F613SP022                     | 15-Sep-96 | <b>2.32</b> =               | <b>5.3</b> = | 1.2 J       | <b>2.7</b> = | 0.55 U       | 3.3 =        | 0.27 J   | 0.45 J      |               |
| F613SP022                     | 13-Oct-99 | 0.716 U                     | 0.62 U       | 0.62 U      | 0.62 U       | 0.62 U       | 0.62 U       | 0.62 U   | 0.62 U      | 0.62 U        |
| F613SP027                     | 14-Oct-99 | 0.438 =                     | 0.38 U       | 0.38 UJ     | 0.38 UJ      | 0.094 J      | 0.38 U       | 0.38 UJ  | 0.38 UJ     | 0.38 UJ       |
| F613SP051                     | 15-Oct-99 | 0.740 U                     | 0.64 U       | 0.64 U      | 0.64 U       | 0.64 U       | 0.64 U       | 0.64 U   | 0.64 U      | 0.64 U        |
| LE504SB002                    | 8-Jul-97  | 0.506 =                     | 0.21 J       | 0.22 J      | 0.15 J       | 0.11 J       | 0.33 J       | 0.47 UJ  | 0.14 J      |               |
| LE504SB003                    | 8-Jul-97  | 0.455 =                     | 0.070 J      | 0.42 UJ     | 0.066 J      | 0.051 J      | 0.13 J       | 0.42 UJ  | 0.42 UJ     |               |
| LE504SB004                    | 9-Jul-97  | 0.497 U                     | 0.43 U       | 0.43 U      | 0.43 U       | 0.43 U       | 0.43 U       | 0.43 U   | 0.43 U      |               |
| LE504SB005                    | 9-Jul-97  | 0.636 U                     | 0.55 U       | 0.55 U      | 0.55 U       | 0.55 U       | 0.55 U       | 0.55 U   | 0.55 U      |               |
| <b>Mean Concentration ***</b> |           |                             | <b>0.45</b>  | <b>0.36</b> |              |              |              |          |             |               |

Bolded and outlined values are exceedences of the generic SSL (DAF =10) and background concentration.

- <sup>a</sup> SSL from USEPA Soil Screening Guidance Appendix A, 1996
- \*\* Background value from *Background PAHs Study Report, February 2001*
- \*\*\* Mean calculated using one-half the reported detection limit for non-detected data
- = Analyte was detected; the reported value is equal to the sample concentration.
- J Analyte was detected; the reported value is an estimated concentration.
- NL No limit.
- U Analyte was not detected; the reported value is the detection limit.
- UJ Analyte was not detected; the reported value is an estimated detection limit.

**TABLE 5-7**  
 COPC Refinement; SVOCs in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Units<br>SSL (DAF = 10)<br>Date | 2-Methylnaphthalene<br>(mg/kg)<br>11* |   | Isophorone<br>(mg/kg)<br>0.25** |   | Dibenzofuran<br>(mg/kg)<br>3.9 * |   |
|-----------|---------------------------------|---------------------------------------|---|---------------------------------|---|----------------------------------|---|
|           |                                 | Concentration                         |   | Concentration                   |   | Concentration                    |   |
| F613SP001 | 12-Sep-96                       | 0.53                                  | U | 0.53                            | U | 0.53                             | U |
| F613SP002 | 13-Sep-96                       | 0.40                                  | U | 0.40                            | U | 0.40                             | U |
| F613SP003 | 29-Aug-96                       | 0.40                                  | U | 0.40                            | U | 0.40                             | U |
| F613SP004 | 02-Oct-96                       | 0.53                                  | U | 0.53                            | U | 0.53                             | U |
| F613SP005 | 03-Oct-96                       | 3.0                                   | = | 0.59                            | U | 0.16                             | J |
| F613SP006 | 04-Oct-96                       | 0.48                                  | J | 0.50                            | U | 0.11                             | J |
| F613SP007 | 12-Sep-96                       | 0.015                                 | U | 0.02                            | U | 0.02                             | U |
| F613SP008 | 13-Sep-96                       | 0.56                                  | U | 0.56                            | U | 0.56                             | U |
| F613SP009 | 29-Aug-96                       | 0.38                                  | U | 0.38                            | U | 0.38                             | U |
| F613SP010 | 02-Oct-96                       | 0.52                                  | U | 0.52                            | U | 0.52                             | U |
| F613SP012 | 10-Oct-96                       | 0.70                                  | U | 0.70                            | U | 0.70                             | U |
| F613SP013 | 07-Oct-96                       | 0.40                                  | U | 0.40                            | U | 0.40                             | U |
| F613SP014 | 12-Sep-96                       | 0.56                                  | U | 0.56                            | U | 0.56                             | U |
| F613SP017 | 03-Oct-96                       | 0.41                                  | U | 0.41                            | U | 0.41                             | U |
| F613SP018 | 04-Oct-96                       | 0.37                                  | U | 0.37                            | U | 0.37                             | U |
| F613SP019 | 07-Oct-96                       | 0.41                                  | U | 0.41                            | U | 0.41                             | U |
| F613SP020 | 11-Sep-96                       | 0.54                                  | U | 0.54                            | U | 0.54                             | U |
| F613SP021 | 29-Aug-96                       | 0.38                                  | U | 0.38                            | U | 0.38                             | U |
| F613SP022 | 15-Sep-96                       | 43                                    | = | 0.55                            | U | 46.0                             | = |
| F613SP022 | 13-Oct-99                       | 0.62                                  | U | 0.62                            | U | 0.62                             | U |

**TABLE 5-7**  
 COPC Refinement; SVOCs in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | 2-Methylnaphthalene     |                | Isophorone        |                  | Dibenzofuran  |               |   |
|-----------|-----------|-------------------------|----------------|-------------------|------------------|---------------|---------------|---|
|           |           | Units<br>SSL (DAF = 10) | (mg/kg)<br>11* | (mg/kg)<br>0.25** | (mg/kg)<br>3.9 * | Concentration | Concentration |   |
| F613SP023 | 14-Sep-96 |                         | 0.39           | U                 | 0.39             | U             | 0.39          | U |
| F613SP024 | 11-Sep-96 |                         | 0.56           | U                 | 0.56             | U             | 0.56          | U |
| F613SP025 | 28-Aug-96 |                         | 0.38           | U                 | 0.38             | U             | 0.38          | U |
| F613SP026 | 15-Sep-96 |                         | 0.53           | U                 | 0.53             | U             | 0.53          | U |
| F613SP027 | 14-Sep-96 |                         | 0.40           | U                 | 0.40             | U             | 0.40          | U |
| F613SP027 | 14-Oct-99 |                         | 0.38           | U                 | 0.38             | U             | 0.38          | U |
| F613SP028 | 11-Sep-96 |                         | 0.48           | U                 | 0.48             | U             | 0.48          | U |
| F613SP029 | 28-Aug-96 |                         | 0.38           | U                 | 0.38             | U             | 0.38          | U |
| F613SP030 | 28-Sep-96 |                         | 0.59           | U                 | 0.59             | U             | 0.59          | U |
| F613SP031 | 14-Sep-96 |                         | 6.80           | =                 | 0.48             | U             | 0.47          | J |
| F613SP032 | 10-Sep-96 |                         | 0.40           | U                 | 0.40             | U             | 0.40          | U |
| F613SP033 | 28-Aug-96 |                         | 0.38           | U                 | 0.38             | U             | 0.38          | U |
| F613SP034 | 28-Sep-96 |                         | 0.50           | U                 | 0.50             | U             | 0.50          | U |
| F613SP035 | 16-Sep-96 |                         | 0.74           | =                 | 0.42             | U             | 0.42          | U |
| F613SP036 | 09-Sep-96 |                         | 0.42           | U                 | 0.42             | U             | 0.42          | U |
| F613SP037 | 30-Aug-96 |                         | 0.40           | U                 | 0.40             | U             | 0.40          | U |
| F613SP038 | 28-Aug-96 |                         | 0.38           | U                 | 0.38             | U             | 0.38          | U |
| F613SP039 | 29-Sep-96 |                         | 0.35           | U                 | 0.35             | U             | 0.35          | U |
| F613SP040 | 13-Sep-96 |                         | 0.23           | J                 | 0.47             | U             | 0.47          | U |
| F613SP041 | 10-Sep-96 |                         | 0.36           | U                 | 0.36             | U             | 0.36          | U |

**TABLE 5-7**  
 COPC Refinement; SVOCs in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | 2-Methylnaphthalene     |                | Isophorone        |                  | Dibenzofuran  |               |   |
|-----------|-----------|-------------------------|----------------|-------------------|------------------|---------------|---------------|---|
|           |           | Units<br>SSL (DAF = 10) | (mg/kg)<br>11* | (mg/kg)<br>0.25** | (mg/kg)<br>3.9 * | Concentration | Concentration |   |
| F613SP042 | 03-Sep-96 |                         | 0.40           | U                 | 0.40             | U             | 0.40          | U |
| F613SP043 | 09-Sep-96 |                         | 0.09           | J                 | 0.39             | U             | 0.39          | U |
| F613SP044 | 27-Aug-96 |                         | 0.38           | J                 | 0.42             | U             | 0.42          | U |
| F613SP045 | 29-Sep-96 |                         | 0.07           | J                 | 0.67             | U             | 0.67          | U |
| F613SP046 | 09-Oct-96 |                         | 0.28           | J                 | 0.54             | U             | 0.54          | U |
| F613SP048 | 10-Sep-96 |                         | 0.37           | U                 | 0.37             | U             | 0.37          | U |
| F613SP049 | 09-Sep-96 |                         | 0.39           | U                 | 0.39             | U             | 0.39          | U |
| F613SP050 | 04-Sep-96 |                         | 0.61           | U                 | 0.61             | U             | 0.61          | U |
| F613SP051 | 27-Aug-96 |                         | 0.07           | J                 | 0.38             | U             | 0.33          | J |
| F613SP051 | 15-Oct-99 |                         | 0.64           | U                 | 0.64             | U             | 0.64          | U |
| F613SP052 | 09-Oct-96 |                         | 0.65           | U                 | 0.65             | U             | 0.65          | U |
| F613SP053 | 17-Sep-96 |                         | 0.57           | U                 | 0.57             | U             | 0.57          | U |
| F613SP054 | 17-Sep-96 |                         | 0.41           | U                 | 0.41             | U             | 0.41          | U |
| F613SP055 | 13-Sep-96 |                         | 0.44           | U                 | 0.44             | U             | 0.44          | U |
| F613SP056 | 03-Sep-96 |                         | 0.58           | U                 | 0.58             | U             | 0.58          | U |
| F613SP057 | 30-Aug-96 |                         | 0.50           | U                 | 0.50             | U             | 0.50          | U |
| F613SP058 | 30-Aug-96 |                         | 0.39           | U                 | 0.39             | U             | 0.39          | U |
| F613SP059 | 03-Sep-96 |                         | 0.40           | U                 | 0.40             | U             | 0.40          | U |
| F613SP060 | 03-Sep-96 |                         | 0.42           | U                 | 0.42             | U             | 0.42          | U |

**TABLE 5-7**  
 COPC Refinement; SVOCs in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | 2-Methylnaphthalene     |                | Isophorone        |                  | Dibenzofuran  |               |   |
|-----------|-----------|-------------------------|----------------|-------------------|------------------|---------------|---------------|---|
|           |           | Units<br>SSL (DAF = 10) | (mg/kg)<br>11* | (mg/kg)<br>0.25** | (mg/kg)<br>3.9 * | Concentration | Concentration |   |
| F613SP061 | 16-Sep-96 |                         | 0.38           | U                 | 0.38             | U             | 0.064         | J |
| F613SP062 | 16-Sep-96 |                         | 0.48           | U                 | 0.48             | U             | 0.48          | U |
| F613SP063 | 16-Oct-96 |                         | 0.42           | U                 | 0.42             | U             | 0.42          | U |
| F613SP064 | 15-Oct-96 |                         | 0.42           | U                 | 0.42             | U             | 0.42          | U |
| F613SP065 | 14-Oct-96 |                         | 0.54           | U                 | 0.54             | U             | 0.10          | J |
| F613SP066 | 13-Oct-96 |                         | 0.48           | U                 | 0.48             | U             | 0.48          | U |
| F613SP067 | 11-Oct-96 |                         | 0.54           | U                 | 0.54             | U             | 0.54          | U |
| F613SP068 | 10-Oct-96 |                         | 0.66           | U                 | 0.66             | U             | 0.66          | U |
| F613SB001 | 13-Oct-99 |                         | 0.62           | U                 | 0.62             | U             | 0.62          | U |
| F613SB002 | 14-Oct-99 |                         | 0.79           | U                 | 0.79             | U             | 0.79          | U |
| F613SB003 | 14-Oct-99 |                         | 0.54           | U                 | 0.54             | U             | 0.54          | U |
| F613SB004 | 13-Oct-99 |                         | 0.68           | U                 | 0.68             | U             | 0.68          | U |
| F613SB005 | 13-Oct-99 |                         | 0.53           | U                 | 0.53             | U             | 0.53          | U |
| F613SB006 | 13-Oct-99 |                         | 0.54           | U                 | 0.54             | U             | 0.54          | U |
| F613SB007 | 13-Oct-99 |                         | 0.69           | U                 | 0.69             | U             | 0.69          | U |
| F613SB008 | 13-Oct-99 |                         | 0.24           | J                 | 0.67             | U             | 0.67          | U |
| F613SB009 | 13-Oct-99 |                         | 0.12           | J                 | 0.53             | U             | 0.53          | U |
| F613SB010 | 13-Oct-99 |                         | 0.54           | U                 | 0.54             | U             | 0.54          | U |
| F613SB011 | 15-Oct-99 |                         | 0.40           | J                 | 1.60             | U             | 1.60          | U |
| F613SB012 | 14-Oct-99 |                         | 0.62           | U                 | 0.62             | U             | 0.62          | U |

**TABLE 5-7**  
 COPC Refinement; SVOCs in Subsurface Soil  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station                      | Date      | 2-Methylnaphthalene     |                | Isophorone        |                  | Dibenzofuran  |             |    |
|------------------------------|-----------|-------------------------|----------------|-------------------|------------------|---------------|-------------|----|
|                              |           | Units<br>SSL (DAF = 10) | (mg/kg)<br>11* | (mg/kg)<br>0.25** | (mg/kg)<br>3.9 * | Concentration |             |    |
| F613SB013                    | 14-Oct-99 |                         | 0.45           | U                 | 0.45             | U             | 0.45        | U  |
| F613SB014                    | 13-Oct-99 |                         | 0.54           | =                 | 0.41             | U             | 0.41        | U  |
| F613SB016                    | 13-Oct-99 |                         | <b>31</b>      | =                 | 0.62             | U             | 1.40        | J  |
| F613SB021                    | 16-Nov-99 |                         | 0.62           | U                 | <b>0.26</b>      | J             | 0.62        | U  |
| F613SB022                    | 16-Nov-99 |                         | 0.56           | U                 | 0.56             | U             | 0.56        | U  |
| F613SB023                    | 16-Nov-99 |                         | 0.56           | U                 | 0.56             | U             | 0.56        | U  |
| F613SB024                    | 16-Nov-99 |                         | 0.71           | U                 | 0.71             | U             | 0.71        | U  |
| F613SB026                    | 17-Nov-99 |                         | 0.53           | U                 | 0.53             | U             | 0.53        | U  |
| F613SB027                    | 16-Nov-99 |                         | 0.36           | U                 | 0.36             | U             | 0.36        | U  |
| F613SB028                    | 16-Nov-99 |                         | 0.37           | U                 | 0.37             | U             | 0.37        | U  |
| F613SB029                    | 01-Dec-99 |                         | 0.36           | U                 | 0.36             | U             | 0.36        | U  |
| F613SB030                    | 01-Dec-99 |                         | 0.63           | U                 | 0.63             | U             | 0.63        | U  |
| LE504SB002                   | 08-Jul-97 |                         | 0.47           | U                 | 0.47             | U             | 0.47        | UJ |
| LE504SB003                   | 08-Jul-97 |                         | 0.42           | U                 | 0.42             | U             | 0.42        | U  |
| LE504SB004                   | 09-Jul-97 |                         | 0.43           | U                 | 0.43             | U             | 0.43        | U  |
| LE504SB005                   | 09-Jul-97 |                         | 0.55           | U                 | 0.55             | U             | 0.55        | U  |
| <b>Mean Concentration***</b> |           |                         |                |                   |                  |               | <b>0.75</b> |    |

Bolded and outlined values are exceedences of the generic SSL (DAF = 10).

\* SSL obtained from US EPA Region III Table 10/05/2000.

\*\* SSL from USEPA Soil Screening Guidance Appendix A, 1996

\*\*\* Mean calculated using one-half the reported detection limit for non-detected data

= Analyte was detected; the reported value is equal to the sample concentration.

J Analyte was detected; the reported value is an estimated concentration.

U Analyte was not detected; the reported value is the detection limit.

**TABLE 5-8**

COPC Refinement; Pesticides and PCBs in Surface and Subsurface Soil

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station      | Date      | Aroclor-1260                           |         | Dieldrin      |         | Lindane       |         |
|--------------|-----------|----------------------------------------|---------|---------------|---------|---------------|---------|
|              |           | Units                                  | (mg/kg) | (mg/kg)       | (mg/kg) | (mg/kg)       | (mg/kg) |
|              |           | SSL (DAF = 10) <sup>a</sup>            | NL      | 0.002         |         | 0.0045        |         |
|              |           | Unrestricted Land Use RBC <sup>*</sup> | 0.32    | 0.040         |         | 0.49          |         |
|              |           | Industrial Land Use RBC <sup>*</sup>   | 2.9     | 0.360         |         | 4.4           |         |
| Station      | Date      | Conc.                                  |         | Conc.         |         | Conc.         |         |
| F613SP001 #  | 12-Sep-96 | 0.080                                  | U       | 0.003         | U       | 0.0015        | U       |
| F613SP022    | 13-Oct-99 | 0.037                                  | U       | 0.0037        | U       | 0.0019        | U       |
| (surface)    |           |                                        |         |               |         |               |         |
| F613SP022    | 13-Oct-99 | 0.0610                                 | U       | 0.0061        | U       | 0.0031        | U       |
| (subsurface) |           |                                        |         |               |         |               |         |
| F613SP027    | 14-Oct-99 | 0.072                                  | =       | 0.0038        | U       | 0.002         | U       |
| (surface)    |           |                                        |         |               |         |               |         |
| F613SP027    | 14-Oct-99 | 0.038                                  | U       | 0.0038        | U       | 0.0019        | U       |
| (subsurface) |           |                                        |         |               |         |               |         |
| F613SP051    | 15-Oct-99 | 0.043                                  | U       | 0.0043        | U       | 0.0022        | U       |
| (surface)    |           |                                        |         |               |         |               |         |
| F613SP051    | 15-Oct-99 | 0.063                                  | U       | 0.0063        | U       | 0.0033        | U       |
| (subsurface) |           |                                        |         |               |         |               |         |
| LE504SB001   | 8-Jul-97  | <b>0.34</b>                            | =       | <b>0.0051</b> | J       | 0.0015        | U       |
| (surface)    |           |                                        |         |               |         |               |         |
| LE504SB002   | 8-Jul-97  | 0.079                                  | U       | 0.0029        | U       | 0.0015        | U       |
| (surface)    |           |                                        |         |               |         |               |         |
| LE504SB002   | 8-Jul-97  | 0.096                                  | U       | 0.0036        | U       | 0.0018        | U       |
| (subsurface) |           |                                        |         |               |         |               |         |
| LE504SB003   | 8-Jul-97  | 0.074                                  | U       | 0.0028        | U       | 0.0014        | U       |
| (surface)    |           |                                        |         |               |         |               |         |
| LE504SB003   | 8-Jul-97  | 0.085                                  | U       | <b>0.0054</b> | =       | <b>0.0072</b> | J       |
| (subsurface) |           |                                        |         |               |         |               |         |
| LE504SB004   | 9-Jul-97  | 0.080                                  | U       | 0.0030        | UJ      | 0.0015        | U       |
| (surface)    |           |                                        |         |               |         |               |         |
| LE504SB004   | 9-Jul-97  | 0.087                                  | U       | 0.0032        | U       | 0.0017        | U       |
| (subsurface) |           |                                        |         |               |         |               |         |
| LE504SB005   | 9-Jul-97  | 0.085                                  | U       | 0.0032        | U       | 0.0016        | U       |
| (surface)    |           |                                        |         |               |         |               |         |
| LE504SB005   | 9-Jul-97  | 0.110                                  | U       | 0.0042        | U       | 0.0022        | U       |
| (subsurface) |           |                                        |         |               |         |               |         |

Bolded and outlined values are exceedences of the RBC or SSL (DAF =10).

- \* RBC from US EPA Region III Table 10/05/2000; adjusted for HI = 0.1
- <sup>a</sup> SSL from USEPA Soil Screening Guidance Appendix A, 1996
- = Analyte was detected; the reported value is equal to the sample concentration.
- J Analyte was detected; the reported value is an estimated concentration.
- U Analyte was not detected; the reported value is the detection limit.
- UJ Analyte was not detected; the reported value is an estimated detection limit.
- # Value from duplicate sample

TABLE 5-9  
 COPC Selection Tables  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Chemical                          | CASRN    | No. of Samples | No. of Detects | No. of Non-Detects | FOD  | Minimum Detected Conc. (mg/kg) | Maximum Detected Conc. (mg/kg) | Average Detection Conc. (mg/kg) | Mean   | Minimum Non-Detect | Maximum Non-Detect | EPA Region III Residential Land Use RBC | Zone F Background Conc. | Exceeds Criteria? (True/False) | COPC? (True/False) | Basis |
|-----------------------------------|----------|----------------|----------------|--------------------|------|--------------------------------|--------------------------------|---------------------------------|--------|--------------------|--------------------|-----------------------------------------|-------------------------|--------------------------------|--------------------|-------|
| <b>Surface Soil</b>               |          |                |                |                    |      |                                |                                |                                 |        |                    |                    |                                         |                         |                                |                    |       |
| Aluminum                          | 7429905  | 34             | 34             | 0                  | 100% | 1,960                          | 30,700                         | 12,310                          | 12,310 | 0                  | 0                  | 7,821                                   | 18,500                  | True                           | True               | EC    |
| Antimony                          | 7440360  | 26             | 21             | 5                  | 81%  | 0.31                           | 7.8                            | 1.4                             | 1.3    | 0.24               | 1.4                | 3.1                                     | 0.79                    | True                           | True               | EC    |
| Arsenic                           | 7440382  | 36             | 36             | 0                  | 100% | 1.9                            | 44                             | 13                              | 13     | 0                  | 0                  | 0.43                                    | 20                      | True                           | True               | EC    |
| BEQ                               | --       | 32             | 20             | 12                 | 63%  | 0.26                           | 2.0                            | 0.65                            | 0.57   | 0.21               | 2.3                | 0.087                                   | 1.3                     | True                           | True               | EC    |
| Iron                              | 7439896  | 34             | 34             | 0                  | 100% | 2,250                          | 39,600                         | 15,595                          | 15,595 | 0                  | 0                  | 2,346                                   | --                      | True                           | False              | NUT   |
| Lead                              | 7439921  | 35             | 35             | 0                  | 100% | 5.7                            | 3,980                          | 183                             | 183    | 0                  | 0                  | 40                                      | 180                     | True                           | True               | EC    |
| Manganese                         | 7439965  | 34             | 34             | 0                  | 100% | 40                             | 539                            | 194                             | 194    | 0                  | 0                  | 156                                     | 307                     | True                           | False              | NUT   |
| Mercury                           | 7439976  | 34             | 31             | 3                  | 91%  | 0.050                          | 5.1                            | 0.41                            | 0.38   | 0.020              | 0.025              | 2.3                                     | 0.62                    | True                           | True               | EC    |
| PCB-1260 (Aroclor 1260)           | 11096825 | 5              | 1              | 4                  | 20%  | 0.34                           | 0.34                           | 0.34                            | 0.100  | 0.037              | 0.043              | 0.32                                    | --                      | True                           | True               | EC    |
| Thallium                          | 7440280  | 34             | 4              | 30                 | 12%  | 0.28                           | 0.97                           | 0.59                            | 0.35   | 0.10               | 1.3                | 0.55                                    | --                      | True                           | True               | EC    |
| Vanadium                          | 7440622  | 34             | 34             | 0                  | 100% | 5.7                            | 84                             | 33                              | 33     | 0                  | 0                  | 55                                      | 49                      | True                           | True               | EC    |
| <b>Soil Probe (1 to 4 ft bls)</b> |          |                |                |                    |      |                                |                                |                                 |        |                    |                    |                                         |                         |                                |                    |       |
| 1,1,2,2-Tetrachloroethane         | 79345    | 68             | 1              | 67                 | 1%   | 0.032                          | 0.032                          | 0.032                           | 0.0041 | 0.0015             | 0.016              | 3.2                                     | --                      | False                          | False              | BC    |
| 1,1-Dichloroethene                | 75354    | 68             | 1              | 67                 | 1%   | 0.0030                         | 0.0030                         | 0.0030                          | 0.0039 | 0.0015             | 0.019              | 1.1                                     | --                      | False                          | False              | BC    |
| Aluminum                          | 7429905  | 68             | 68             | 0                  | 100% | 2,570                          | 27,300                         | 12,536                          | 12,536 | 0                  | 0                  | 7,821                                   | 18,500                  | True                           | True               | EC    |
| Antimony                          | 7440360  | 68             | 5              | 63                 | 7%   | 0.31                           | 16                             | 3.6                             | 0.47   | 0.14               | 0.65               | 3.1                                     | 0.79                    | True                           | True               | EC    |
| Arsenic                           | 7440382  | 68             | 68             | 0                  | 100% | 0.71                           | 70                             | 11                              | 11     | 0                  | 0                  | 0.43                                    | 20                      | True                           | True               | EC    |
| Benzene                           | 71432    | 68             | 5              | 63                 | 7%   | 0.0020                         | 0.011                          | 0.0044                          | 0.0040 | 0.0015             | 0.019              | 12                                      | --                      | False                          | False              | BC    |
| BEQ                               | --       | 67             | 25             | 42                 | 37%  | 0.24                           | 1.8                            | 0.51                            | 0.35   | 0.0087             | 0.40               | 0.087                                   | 1.3                     | True                           | True               | EC    |
| Chromium, Total                   | 7440473  | 68             | 68             | 0                  | 100% | 4.5                            | 48                             | 23                              | 23     | 0                  | 0                  | 210                                     | 35                      | True                           | True               | EC    |
| Copper                            | 7440508  | 68             | 52             | 16                 | 76%  | 0.92                           | 325                            | 25                              | 19     | 0.29               | 7.9                | 313                                     | 48                      | True                           | True               | EC    |
| Iron                              | 7439896  | 68             | 68             | 0                  | 100% | 1,750                          | 36,200                         | 16,769                          | 16,769 | 0                  | 0                  | 2,346                                   | --                      | True                           | False              | NUT   |
| Lead                              | 7439921  | 68             | 68             | 0                  | 100% | 1.5                            | 395                            | 32                              | 32     | 0                  | 0                  | 40                                      | 180                     | True                           | True               | EC    |
| Manganese                         | 7439965  | 68             | 68             | 0                  | 100% | 7.4                            | 755                            | 178                             | 178    | 0                  | 0                  | 156                                     | 307                     | True                           | False              | NUT   |
| Methylene Chloride                | 75092    | 68             | 7              | 61                 | 10%  | 0.0010                         | 0.050                          | 0.016                           | 0.0071 | 0.0010             | 0.037              | 85                                      | --                      | False                          | False              | BC    |
| Thallium                          | 7440280  | 67             | 23             | 44                 | 34%  | 0.47                           | 1.5                            | 0.85                            | 0.46   | 0.15               | 1.2                | 0.55                                    | --                      | True                           | True               | EC    |
| Trichloroethylene (TCE)           | 79016    | 68             | 8              | 60                 | 12%  | 0.0010                         | 0.023                          | 0.0058                          | 0.0042 | 0.0015             | 0.019              | 58                                      | --                      | False                          | False              | BC    |

**TABLE 5-9**  
 COPC Selection Tables  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Chemical       | CASRN   | No. of Samples | No. of Detects | No. of Non-Detects | FOD  | Minimum Detected Conc. (mg/kg) | Maximum Detected Conc. (mg/kg) | Average Detection Conc. (mg/kg) | Mean   | Minimum Non-Detect | Maximum Non-Detect | EPA Region III Residential Land Use RBC | Zone F Background Conc. | Exceeds Criteria? (True/False) | COPC? (True/False) | Basis |
|----------------|---------|----------------|----------------|--------------------|------|--------------------------------|--------------------------------|---------------------------------|--------|--------------------|--------------------|-----------------------------------------|-------------------------|--------------------------------|--------------------|-------|
| Vanadium       | 7440622 | 68             | 68             | 0                  | 100% | 3.8                            | 81                             | 36                              | 36     | 0                  | 0                  | 55                                      | 49                      | True                           | True               | EC    |
| Vinyl chloride | 75014   | 68             | 1              | 67                 | 1%   | 0.0020                         | 0.0020                         | 0.0020                          | 0.0077 | 0.0015             | 0.037              | 0.34                                    | --                      | False                          | False              | BC    |

CASRN Chemical Abstract Service Registry Number  
 COPC Chemical of Potential Concern  
 EC Exceeds Criteria  
 FOD Frequency of Detection  
 LFD Low Frequency of Detection (<5%)  
 NUT Nutritionally Essential Chemical

**TABLE 5-10**  
 Toxicity Factors  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Chemical                     | WOE | Oral SF<br>kg-day/mg | Inhalation SF<br>kg-day/mg | C Oral RfD<br>mg/kg-day | C Inhalation<br>RfD<br>mg/kg-day | HI Target<br>Organ |
|------------------------------|-----|----------------------|----------------------------|-------------------------|----------------------------------|--------------------|
| Aluminum                     |     |                      |                            | 1.00E+00                |                                  |                    |
| Antimony                     |     |                      |                            | 4.00E-04                |                                  |                    |
| Arsenic                      | A   | 1.50E+00             | 1.51E+01                   | 3.00E-04                |                                  |                    |
| BEQ <sup>a</sup>             | B2  | 7.30E+00             | 3.10E+00                   |                         |                                  |                    |
| Chromium, Total <sup>b</sup> | A-D |                      | 4.20E+01                   | 3.00E-03                | 2.86E-05                         |                    |
| Copper                       |     |                      |                            | 3.70E-02                |                                  |                    |
| Lead                         | B2  |                      |                            |                         |                                  |                    |
| Mercury                      |     |                      | 8.60E-05                   |                         |                                  |                    |
| PCB-1260 (Aroclor 1260)      | B2  | 2.00E+00             |                            | 2.00E-05                |                                  |                    |
| Thallium                     |     |                      |                            | 6.60E-05                |                                  |                    |
| Vanadium                     |     |                      |                            | 7.00E-03                |                                  |                    |

<sup>a</sup> Benzo(a)pyrene toxicity factors used as surrogate values

<sup>b</sup> Chromium IV toxicity values used as surrogate values

HI Hazard Index

mg/kg Milligrams per kilogram

**TABLE 5-11**  
 Exposure Point Concentrations  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Chemical                | Samples | Detects | Max Detect | Mean <sup>a</sup> | Distribution <sup>b</sup> | UCL <sub>95</sub> | Basis     | EPC    |
|-------------------------|---------|---------|------------|-------------------|---------------------------|-------------------|-----------|--------|
| Aluminum                | 102     | 102     | 30,700     | 12,461            | Lognormal                 | 14,090            | H-UCL     | 14,090 |
| Antimony                | 94      | 26      | 16         | 0.69              | Nonparametric             | 1.0               | Bootstrap | 1.0    |
| Arsenic                 | 104     | 104     | 70         | 12                | Nonparametric             | 13                | Bootstrap | 13     |
| BEQ                     | 99      | 45      | 2.0        | 0.42              | Nonparametric             | 0.48              | Bootstrap | 0.48   |
| Chromium, Total         | 102     | 102     | 136        | 26                | Nonparametric             | 28                | Bootstrap | 28     |
| Copper                  | 102     | 86      | 325        | 24                | Nonparametric             | 31                | Bootstrap | 31     |
| Lead                    | 103     | 103     | 3,980      | 84                | Nonparametric             | 145               | Bootstrap | 145    |
| Mercury                 | 102     | 86      | 5.1        | 0.24              | Nonparametric             | 0.33              | Bootstrap | 0.33   |
| PCB-1260 (Aroclor-1260) | 8       | 2       | 0.34       | 0.076             | Lognormal                 | 0.21              | H-UCL     | 0.21   |
| Thallium                | 101     | 27      | 1.5        | 0.42              | Nonparametric             | 0.48              | Bootstrap | 0.48   |
| Vanadium                | 102     | 102     | 84         | 35                | Nonparametric             | 38                | Bootstrap | 38     |

Table includes combined surface soil and soil probe data.

<sup>a</sup> Mean calculated using ½ Detection Limit for Non-detects.

<sup>b</sup> Distribution tested at 5 percent significance level using the Lillifore's or Shapiro-Wilk Test for Normality as appropriate.

EPC Exposure Point Concentration

UCL<sub>95</sub> 95-percent Upper Confidence Limit on Mean

**TABLE 5-12**  
 Risk Summary  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Charleston Naval Complex*

| <b>Receptor</b>   | <b>Route</b>                   | <b>ELCR</b>     | <b>HI</b>    |
|-------------------|--------------------------------|-----------------|--------------|
| Industrial Worker | Ingestion                      | 4.16E-06        | 0.046        |
|                   | Dermal                         | 3.91E-08        | 0.0011       |
|                   | Inhalation                     | 1.85E-08        | 1.47E-04     |
| <b>Total</b>      |                                | <b>4.22E-06</b> | <b>0.047</b> |
| Residential Adult | Ingestion                      | 3.69E-05        | 0.13         |
|                   | Dermal                         | 2.34E-07        | 0.0051       |
|                   | Inhalation                     | 2.08E-07        | 2.06E-04     |
| <b>Total</b>      |                                | <b>3.73E-05</b> | <b>0.13</b>  |
| Residential Child | Ingestion                      |                 | 1.2          |
|                   | Dermal                         |                 | 0.050        |
|                   | Inhalation                     |                 | 0.0007       |
| <b>Total</b>      |                                |                 | <b>1.3</b>   |
| ELCR              | Excessive Lifetime Cancer Risk |                 |              |
| HI                | Hazard Index                   |                 |              |

TABLE 5-13a  
 A Data Summary of All Detected Chemicals' Average Concentrations Compared Against SSL at AOC 613/615/SWMU175 - Surface Soil Data  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC615/SWMU 175, Zone F, Charleston Naval Complex

| <b>Surface Soil (0-1 ft)</b>     |         |         |         |            |      |            |            |            |        |                  |                 |                 |                 | Detected in |  |
|----------------------------------|---------|---------|---------|------------|------|------------|------------|------------|--------|------------------|-----------------|-----------------|-----------------|-------------|--|
| Chemical                         | CASRN   | Samples | Detects | NonDetects | FOD  | Min Detect | Max Detect | Avg Detect | Mean   | SSL <sup>1</sup> | Max Exceeds SSL | Max Exceeds SSL | SSL GW>Criteria | Soil COC    |  |
| 2-Methylnaphthalene              | 91576   | 30      | 3       | 27         | 10%  | 0.20       | 11         | 4.0        | 0.66   | --               | FALSE           | FALSE           | No              | No          |  |
| Acenaphthene                     | 83329   | 32      | 8       | 24         | 25%  | 0.017      | 1.1        | 0.26       | 0.29   | 290              | FALSE           | FALSE           | No              | No          |  |
| Acenaphthylene                   | 208968  | 32      | 1       | 31         | 3%   | 0.0052     | 0.0052     | 0.0052     | 0.28   | --               | FALSE           | FALSE           | No              | No          |  |
| Alpha-chlordane                  | 5103719 | 5       | 2       | 3          | 40%  | 0.0023     | 0.0086     | 0.0055     | 0.0026 | 5.0              | FALSE           | FALSE           | No              | No          |  |
| Aluminum                         | 7429905 | 34      | 34      | 0          | 100% | 1,960      | 30,700     | 12,310     | 12,310 | --               | FALSE           | FALSE           | No              | No          |  |
| Anthracene                       | 120127  | 32      | 10      | 22         | 31%  | 0.032      | 1.0        | 0.26       | 0.29   | 5,900            | FALSE           | FALSE           | No              | No          |  |
| Antimony                         | 7440360 | 26      | 21      | 5          | 81%  | 0.31       | 7.8        | 1.4        | 1.3    | 3.0              | TRUE            | FALSE           | No              | No          |  |
| Arsenic                          | 7440382 | 36      | 36      | 0          | 100% | 1.9        | 44         | 13         | 13     | 15               | TRUE            | FALSE           | No              | No          |  |
| Barium                           | 7440393 | 34      | 34      | 0          | 100% | 11         | 89         | 33         | 33     | 820              | FALSE           | FALSE           | No              | No          |  |
| Benzo(a)Anthracene               | 56553   | 32      | 16      | 16         | 50%  | 0.090      | 1.2        | 0.36       | 0.35   | 0.80             | TRUE            | FALSE           | No              | No          |  |
| Benzo(a)Pyrene                   | 50328   | 32      | 17      | 15         | 53%  | 0.084      | 1.2        | 0.31       | 0.34   | 4.0              | FALSE           | FALSE           | No              | No          |  |
| Benzo(b)Fluoranthene             | 205992  | 32      | 17      | 15         | 53%  | 0.099      | 1.5        | 0.35       | 0.36   | 2.0              | FALSE           | FALSE           | No              | No          |  |
| Benzo(g,h,i)Perylene             | 191242  | 32      | 9       | 23         | 28%  | 0.086      | 0.46       | 0.23       | 0.29   | --               | FALSE           | FALSE           | No              | No          |  |
| Benzo(k)Fluoranthene             | 207089  | 32      | 15      | 17         | 47%  | 0.041      | 1.2        | 0.33       | 0.34   | 20               | FALSE           | FALSE           | No              | No          |  |
| Benzoic acid                     | 65850   | 30      | 3       | 27         | 10%  | 0.097      | 0.11       | 0.11       | 1.4    | 200              | FALSE           | FALSE           | No              | No          |  |
| Benzyl Butyl Phthalate           | 85687   | 30      | 4       | 26         | 13%  | 0.064      | 0.10       | 0.083      | 0.28   | 8,100            | FALSE           | FALSE           | No              | No          |  |
| BEQ                              | --      | 32      | 20      | 12         | 63%  | 0.26       | 2.0        | 0.65       | 0.57   | 4.0              | FALSE           | FALSE           | No              | No          |  |
| Beryllium                        | 7440417 | 34      | 26      | 8          | 76%  | 0.080      | 1.8        | 0.74       | 0.61   | 30               | FALSE           | FALSE           | No              | No          |  |
| bis(2-Ethylhexyl) Phthalate      | 117817  | 30      | 3       | 27         | 10%  | 0.12       | 0.88       | 0.38       | 0.33   | 1,800            | FALSE           | FALSE           | No              | No          |  |
| Cadmium                          | 7440439 | 34      | 14      | 20         | 41%  | 0.070      | 3.2        | 0.65       | 0.28   | 4.0              | FALSE           | FALSE           | No              | No          |  |
| Calcium                          | 7440702 | 34      | 34      | 0          | 100% | 1,570      | 307,000    | 46,199     | 46,199 | --               | FALSE           | FALSE           | No              | No          |  |
| Carbon Disulfide                 | 75150   | 5       | 2       | 3          | 40%  | 0.0020     | 0.0020     | 0.0020     | 0.0026 | 20               | FALSE           | FALSE           | No              | No          |  |
| Chromium, Total                  | 7440473 | 34      | 34      | 0          | 100% | 5.5        | 136        | 31         | 31     | 20               | TRUE            | TRUE            | No              | No          |  |
| Chrysene                         | 218019  | 32      | 19      | 13         | 59%  | 0.10       | 1.3        | 0.38       | 0.37   | 80               | FALSE           | FALSE           | No              | No          |  |
| Cobalt                           | 7440484 | 34      | 34      | 0          | 100% | 1.3        | 15         | 6.4        | 6.4    | --               | FALSE           | FALSE           | No              | No          |  |
| Copper                           | 7440508 | 34      | 34      | 0          | 100% | 1.7        | 195        | 35         | 35     | --               | FALSE           | FALSE           | No              | No          |  |
| Cyanide                          | 57125   | 5       | 5       | 0          | 100% | 0.12       | 0.24       | 0.17       | 0.17   | --               | FALSE           | FALSE           | No              | No          |  |
| Dibenz(a,h)anthracene            | 53703   | 32      | 3       | 29         | 9%   | 0.14       | 0.24       | 0.18       | 0.28   | 0.80             | FALSE           | FALSE           | No              | No          |  |
| Dibenzofuran                     | 132649  | 30      | 4       | 26         | 13%  | 0.052      | 0.76       | 0.27       | 0.28   | --               | FALSE           | FALSE           | No              | No          |  |
| Dieldrin                         | 60571   | 5       | 1       | 4          | 20%  | 0.0051     | 0.0051     | 0.0051     | 0.0022 | 0.0020           | TRUE            | TRUE            | No              | No          |  |
| Di-n-butyl Phthalate             | 84742   | 30      | 3       | 27         | 10%  | 0.17       | 1.5        | 0.64       | 0.34   | 2,700            | FALSE           | FALSE           | No              | No          |  |
| Endrin Aldehyde                  | 7421934 | 5       | 1       | 4          | 20%  | 0.014      | 0.014      | 0.014      | 0.0040 | 0.50             | FALSE           | FALSE           | No              | No          |  |
| Flouranthene                     | 206440  | 32      | 23      | 9          | 72%  | 0.043      | 2.4        | 0.56       | 0.46   | 2,100            | FALSE           | FALSE           | No              | No          |  |
| Fluorene                         | 86737   | 32      | 7       | 25         | 22%  | 0.0082     | 2.2        | 0.41       | 0.32   | 280              | FALSE           | FALSE           | No              | No          |  |
| Gamma-chlordane                  | 5103742 | 5       | 4       | 1          | 80%  | 0.0020     | 0.012      | 0.0072     | 0.0059 | 5.0              | FALSE           | FALSE           | No              | No          |  |
| Heptachlor                       | 76448   | 5       | 1       | 4          | 20%  | 0.0021     | 0.0021     | 0.0021     | 0.0010 | 10               | FALSE           | FALSE           | No              | No          |  |
| Indeno(1,2,3-c,d)pyrene          | 193395  | 32      | 9       | 23         | 28%  | 0.071      | 0.49       | 0.23       | 0.29   | 7.0              | FALSE           | FALSE           | No              | No          |  |
| Iron                             | 7439896 | 34      | 34      | 0          | 100% | 2,250      | 39,600     | 15,595     | 15,595 | --               | FALSE           | FALSE           | No              | No          |  |
| Isophorone                       | 78591   | 30      | 1       | 29         | 3%   | 0.18       | 0.18       | 0.18       | 0.30   | 0.30             | FALSE           | FALSE           | No              | No          |  |
| Lead                             | 7439921 | 35      | 35      | 0          | 100% | 5.7        | 3,980      | 183        | 183    | 400              | TRUE            | FALSE           | No              | No          |  |
| Magnesium                        | 7439954 | 34      | 34      | 0          | 100% | 357        | 6,340      | 2,211      | 2,211  | --               | FALSE           | FALSE           | No              | No          |  |
| Manganese                        | 7439965 | 34      | 34      | 0          | 100% | 40         | 539        | 194        | 194    | --               | FALSE           | FALSE           | No              | No          |  |
| Mercury                          | 7439975 | 34      | 31      | 3          | 91%  | 0.050      | 5.1        | 0.41       | 0.38   | --               | FALSE           | FALSE           | No              | No          |  |
| Methyl ethyl ketone (2-Butanone) | 78933   | 5       | 3       | 2          | 60%  | 0.0070     | 0.020      | 0.015      | 0.011  | --               | FALSE           | FALSE           | No              | No          |  |

TABLE 5-13a  
 A Data Summary of All Detected Chemicals' Average Concentrations Compared Against SSL at AOC 613/615/SWMU175 - Surface Soil Data  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC615/SWMU 175, Zone F, Charleston Naval Complex

| Surface Soil (0-1 ft)    |          |         |         |            |      |            |            |            |        |                  |                 |                 |                 | Detected in |     |
|--------------------------|----------|---------|---------|------------|------|------------|------------|------------|--------|------------------|-----------------|-----------------|-----------------|-------------|-----|
| Chemical                 | CASRN    | Samples | Detects | NonDetects | FOD  | Min Detect | Max Detect | Avg Detect | Mean   | SSL <sup>1</sup> | Max Exceeds SSL | Max Exceeds SSL | SSL GW>Criteria | Soil        | COC |
| Naphthalene              | 91203    | 32      | 3       | 29         | 9%   | 0.11       | 2.4        | 0.91       | 0.32   | 40               | FALSE           | FALSE           | No              | No          |     |
| Nickel                   | 7440020  | 34      | 34      | 0          | 100% | 2.4        | 48         | 14         | 14     | 70               | FALSE           | FALSE           | No              | No          |     |
| p,p'-DDD                 | 72548    | 4       | 4       | 0          | 100% | 0.0062     | 0.023      | 0.016      | 0.016  | 8.0              | FALSE           | FALSE           | No              | No          |     |
| p,p'-DDE                 | 72559    | 4       | 3       | 1          | 75%  | 0.0031     | 0.015      | 0.0094     | 0.0074 | 30               | FALSE           | FALSE           | No              | No          |     |
| p,p'-DDT                 | 50293    | 5       | 1       | 4          | 20%  | 0.022      | 0.022      | 0.022      | 0.0056 | 20               | FALSE           | FALSE           | No              | No          |     |
| PCB-1260 (Arochlor 1260) | 11096825 | 5       | 1       | 4          | 20%  | 0.34       | 0.34       | 0.34       | 0.100  | 1.0              | FALSE           | FALSE           | No              | No          |     |
| Phenanthrene             | 85018    | 32      | 17      | 15         | 53%  | 0.086      | 5.0        | 0.68       | 0.52   | --               | FALSE           | FALSE           | No              | No          |     |
| Potassium                | 7440097  | 34      | 34      | 0          | 100% | 173        | 3,310      | 1,162      | 1,162  | --               | FALSE           | FALSE           | No              | No          |     |
| Pyrene                   | 129000   | 32      | 22      | 10         | 69%  | 0.044      | 2.7        | 0.71       | 0.56   | 2,100            | FALSE           | FALSE           | No              | No          |     |
| Selenium                 | 7782492  | 34      | 29      | 5          | 85%  | 0.24       | 2.3        | 1.1        | 1.0    | 3.0              | FALSE           | FALSE           | No              | No          |     |
| Silver                   | 7440224  | 34      | 4       | 30         | 12%  | 0.050      | 2.1        | 0.91       | 0.14   | 20               | FALSE           | FALSE           | No              | No          |     |
| Sodium                   | 7440235  | 34      | 34      | 0          | 100% | 96         | 1,460      | 487        | 487    | --               | FALSE           | FALSE           | No              | No          |     |
| Thallium                 | 7440280  | 34      | 4       | 30         | 12%  | 0.28       | 0.97       | 0.59       | 0.35   | 0.40             | TRUE            | FALSE           | No              | No          |     |
| Tin (Sn)                 | 7440315  | 34      | 7       | 27         | 21%  | 2.1        | 25         | 7.9        | 4.0    | --               | FALSE           | FALSE           | No              | No          |     |
| Vanadium                 | 7440622  | 34      | 34      | 0          | 100% | 5.7        | 84         | 33         | 33     | 3,000            | FALSE           | FALSE           | No              | No          |     |
| Zinc                     | 7440686  | 34      | 34      | 0          | 100% | 10         | 498        | 132        | 132    | 6,200            | FALSE           | FALSE           | No              | No          |     |

<sup>1</sup> DAF = 1 for VOCs; DAF = 10 for SVOCs and Inorganics

Most of the metals exceeding SSL values are within background levels for the area

\* - Exceedence of SSL is based on a 1 detect only

\*\* - See the text for further explanation in COC identification

TABLE 5-13b  
 A Data Summary of All Detected Chemicals' Average Concentrations Compared Against SSL at AOC 613/615/SWMU175 - Soil Boring Data  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Soil Probe (0-4 ft)         |         |         |         |            |      |            |            |            |        |                  |            |                         |          |
|-----------------------------|---------|---------|---------|------------|------|------------|------------|------------|--------|------------------|------------|-------------------------|----------|
| Chemical                    | CASRN   | Samples | Detects | NonDetects | FOD  | Min Detect | Max Detect | Avg Detect | Mean   | SSL <sup>1</sup> | Exceed SSL | Detected in GW>Criteria | Soil COC |
| 1,1,2,2-Tetrachloroethane   | 79345   | 68      | 1       | 67         | 1%   | 0.032      | 0.032      | 0.032      | 0.0041 | 2.00E-04         | TRUE       | No                      | No*      |
| 1,1-Dichloroethane          | 75343   | 68      | 2       | 66         | 3%   | 0.0010     | 0.0020     | 0.0015     | 0.0038 | 1.0              | FALSE      | No                      | No       |
| 1,1-Dichloroethene          | 75354   | 68      | 1       | 67         | 1%   | 0.0030     | 0.0030     | 0.0030     | 0.0039 | 0.0030           | TRUE       | No                      | No*      |
| 1,2-Dichloroethene (total)  | 540590  | 68      | 2       | 66         | 3%   | 0.013      | 0.014      | 0.014      | 0.0042 | 0.020            | FALSE      | Yes                     | No       |
| 2-Hexanone                  | 591786  | 68      | 1       | 67         | 1%   | 0.018      | 0.018      | 0.018      | 0.0079 | --               | FALSE      | No                      | No       |
| 2-Methylnaphthalene         | 91576   | 67      | 10      | 57         | 15%  | 0.066      | 6.8        | 1.2        | 0.37   | --               | FALSE      | No                      | No       |
| Acenaphthene                | 83329   | 67      | 9       | 58         | 13%  | 0.058      | 0.59       | 0.23       | 0.23   | 290              | FALSE      | No                      | No       |
| Acenaphthylene              | 208968  | 67      | 1       | 66         | 1%   | 0.12       | 0.12       | 0.12       | 0.23   | --               | FALSE      | No                      | No       |
| Acetone                     | 67641   | 68      | 4       | 64         | 6%   | 0.019      | 0.17       | 0.10       | 0.067  | 0.80             | FALSE      | No                      | No       |
| Alpha-chlordane             | 5103719 | 3       | 2       | 1          | 67%  | 0.0054     | 0.014      | 0.0097     | 0.0068 | 5.0              | FALSE      | No                      | No       |
| Aluminum                    | 7429905 | 68      | 68      | 0          | 100% | 2.570      | 27,300     | 12,536     | 12,536 | --               | FALSE      | No                      | No       |
| Anthracene                  | 120127  | 67      | 9       | 58         | 13%  | 0.086      | 3.8        | 0.74       | 0.30   | 5,900            | FALSE      | No                      | No       |
| Antimony                    | 7440360 | 68      | 5       | 63         | 7%   | 0.31       | 16         | 3.6        | 0.47   | 3.0              | FALSE      | No                      | No       |
| Arsenic                     | 7440382 | 68      | 68      | 0          | 100% | 0.71       | 70         | 11         | 11     | 15               | FALSE      | No                      | No       |
| Barium                      | 7440393 | 68      | 68      | 0          | 100% | 7.3        | 61         | 23         | 23     | 820              | FALSE      | No                      | No       |
| Benzene                     | 71432   | 68      | 5       | 63         | 7%   | 0.0020     | 0.011      | 0.0044     | 0.0040 | 0.0020           | TRUE       | No                      | No       |
| Benzo(a)Anthracene          | 56553   | 67      | 16      | 51         | 24%  | 0.043      | 2.4        | 0.33       | 0.25   | 0.80             | FALSE      | No                      | No       |
| Benzo(a)Pyrene              | 50328   | 67      | 21      | 46         | 31%  | 0.047      | 1.2        | 0.20       | 0.22   | 4.0              | FALSE      | No                      | No       |
| Benzo(b)Fluoranthene        | 205992  | 67      | 17      | 50         | 25%  | 0.046      | 1.8        | 0.29       | 0.24   | 2.0              | FALSE      | No                      | No       |
| Benzo(g,h,i)Perylene        | 191242  | 67      | 10      | 57         | 15%  | 0.054      | 0.25       | 0.13       | 0.22   | --               | FALSE      | No                      | No       |
| Benzo(k)Fluoranthene        | 207089  | 67      | 16      | 51         | 24%  | 0.045      | 1.5        | 0.24       | 0.23   | 20               | FALSE      | No                      | No       |
| Benzoic acid                | 65850   | 64      | 9       | 55         | 14%  | 0.053      | 0.10       | 0.071      | 0.96   | 200              | FALSE      | No                      | No       |
| BEQ                         | --      | 67      | 25      | 42         | 37%  | 0.24       | 1.8        | 0.51       | 0.35   | 4.0              | FALSE      | No                      | No       |
| Beryllium                   | 7440417 | 68      | 63      | 5          | 93%  | 0.11       | 1.7        | 0.68       | 0.63   | 30               | FALSE      | No                      | No       |
| bis(2-Ethylhexyl) Phthalate | 117817  | 67      | 19      | 48         | 28%  | 0.041      | 0.38       | 0.12       | 0.19   | 1,800            | FALSE      | No                      | No       |
| Cadmium                     | 7440439 | 68      | 40      | 28         | 59%  | 0.040      | 1.5        | 0.28       | 0.18   | 4.0              | FALSE      | No                      | No       |
| Calcium                     | 7440702 | 68      | 68      | 0          | 100% | 441        | 346,000    | 20,017     | 20,017 | --               | FALSE      | No                      | No       |
| Carbon Disulfide            | 75150   | 68      | 14      | 54         | 21%  | 0.0020     | 0.11       | 0.012      | 0.0055 | 20               | FALSE      | No                      | No       |
| Chromium, Total             | 7440473 | 68      | 68      | 0          | 100% | 4.5        | 48         | 23         | 23     | 20               | TRUE       | No                      | No       |
| Chrysene                    | 218019  | 67      | 20      | 47         | 30%  | 0.045      | 3.0        | 0.42       | 0.29   | 80               | FALSE      | No                      | No       |
| Cobalt                      | 7440484 | 68      | 68      | 0          | 100% | 0.35       | 17         | 3.5        | 3.5    | --               | FALSE      | No                      | No       |
| Copper                      | 7440508 | 68      | 52      | 16         | 76%  | 0.92       | 325        | 25         | 19     | --               | FALSE      | No                      | No       |
| Dibenz(a,h)anthracene       | 53703   | 67      | 4       | 63         | 6%   | 0.046      | 0.13       | 0.088      | 0.22   | 0.80             | FALSE      | No                      | No       |
| Dibenzofuran                | 132649  | 67      | 6       | 61         | 9%   | 0.064      | 0.47       | 0.21       | 0.23   | --               | FALSE      | No                      | No       |
| Ethylbenzene                | 100414  | 68      | 2       | 66         | 3%   | 0.0010     | 0.030      | 0.016      | 0.0041 | 7.0              | FALSE      | No                      | No       |
| Flouranthene                | 206440  | 67      | 24      | 43         | 36%  | 0.062      | 4.5        | 0.45       | 0.31   | 2,100            | FALSE      | No                      | No       |
| Fluorene                    | 86737   | 67      | 12      | 55         | 18%  | 0.059      | 1.1        | 0.32       | 0.25   | 280              | FALSE      | No                      | No       |
| Gamma-chlordane             | 5103742 | 3       | 2       | 1          | 67%  | 0.0063     | 0.099      | 0.053      | 0.035  | 5.0              | FALSE      | No                      | No       |
| Indeno(1,2,3-c,d)pyrene     | 193395  | 67      | 8       | 59         | 12%  | 0.055      | 0.28       | 0.16       | 0.22   | 7.0              | FALSE      | No                      | No       |
| Iron                        | 7439896 | 68      | 68      | 0          | 100% | 1,750      | 36,200     | 16,769     | 16,769 | --               | FALSE      | No                      | No       |
| Lead                        | 7439921 | 68      | 68      | 0          | 100% | 1.5        | 395        | 32         | 32     | 400              | FALSE      | No                      | No       |
| Magnesium                   | 7439954 | 68      | 68      | 0          | 100% | 157        | 6,090      | 2,191      | 2,191  | --               | FALSE      | No                      | No       |
| Manganese                   | 7439965 | 68      | 68      | 0          | 100% | 7.4        | 75         | 178        | 178    | --               | FALSE      | No                      | No       |
| Mercury                     | 7439976 | 68      | 55      | 13         | 81%  | 0.040      | 1.1        | 0.21       | 0.18   | --               | FALSE      | No                      | No       |

TABLE 5-13b  
 A Data Summary of All Detected Chemicals' Average Concentrations Compared Against SSL at AOC 613/615/SWMU175 - Soil Boring Data  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Chemical                    | CASRN    | Samples | Detects | NonDetect |      | FOD    | Min Detect | Max Detect | Avg Detect | Mean     | SSL <sup>1</sup> | Exceed SSL | Detected in |          |
|-----------------------------|----------|---------|---------|-----------|------|--------|------------|------------|------------|----------|------------------|------------|-------------|----------|
|                             |          |         |         | s         |      |        |            |            |            |          |                  |            | a           | Soil COC |
| Methyl ethyl ketone (2-Buta | 78933    | 68      | 22      | 46        | 32%  | 0.0030 | 0.055      | 0.014      | 0.015      | 0.015    | --               | FALSE      | No          | No       |
| Methylene Chloride          | 75092    | 68      | 7       | 61        | 10%  | 0.0010 | 0.050      | 0.016      | 0.0071     | 0.0071   | 0.0010           | TRUE       | No          | No       |
| Naphthalene                 | 91203    | 67      | 1       | 66        | 1%   | 0.081  | 0.081      | 0.081      | 0.23       | 40       | 40               | FALSE      | No          | No       |
| Nickel                      | 7440020  | 68      | 66      | 2         | 97%  | 1.1    | 79         | 8.1        | 7.9        | 70       | 70               | FALSE      | No          | No       |
| p,p'-DDD                    | 72548    | 3       | 2       | 1         | 67%  | 0.0078 | 1.6        | 0.80       | 0.54       | 8.0      | 8.0              | FALSE      | No          | No       |
| p,p'-DDE                    | 72559    | 3       | 1       | 2         | 33%  | 1.4    | 1.4        | 1.4        | 0.47       | 30       | 30               | FALSE      | No          | No       |
| p,p'-DDT                    | 50293    | 3       | 1       | 2         | 33%  | 0.021  | 0.021      | 0.021      | 0.0083     | 20       | 20               | FALSE      | No          | No       |
| PCB-1260 (Arochlor 1260)    | 11096825 | 3       | 1       | 2         | 33%  | 0.072  | 0.072      | 0.072      | 0.037      | 1.0      | 1.0              | FALSE      | No          | No       |
| Phenanthrene                | 85018    | 67      | 23      | 44        | 34%  | 0.044  | 3.1        | 0.48       | 0.32       | --       | --               | FALSE      | No          | No       |
| Potassium                   | 7440097  | 68      | 58      | 10        | 85%  | 239    | 3,290      | 1,248      | 1,081      | --       | --               | FALSE      | No          | No       |
| Pyrene                      | 129000   | 67      | 31      | 36        | 46%  | 0.048  | 8.5        | 0.54       | 0.36       | 2,100    | 2,100            | FALSE      | No          | No       |
| Selenium                    | 7782492  | 68      | 53      | 15        | 78%  | 0.22   | 2.6        | 1.1        | 0.88       | 3.0      | 3.0              | FALSE      | No          | No       |
| Silver                      | 7440224  | 68      | 2       | 66        | 3%   | 0.12   | 0.27       | 0.20       | 0.14       | 20       | 20               | FALSE      | No          | No       |
| Sodium                      | 7440235  | 68      | 54      | 14        | 79%  | 166    | 6,950      | 1,225      | 1,051      | --       | --               | FALSE      | No          | No       |
| Thallium                    | 7440280  | 67      | 23      | 44        | 34%  | 0.47   | 1.5        | 0.85       | 0.46       | 0.40     | 0.40             | TRUE       | No          | No       |
| Tin (Sn)                    | 7440315  | 68      | 1       | 67        | 1%   | 61     | 61         | 61         | 2.0        | --       | --               | FALSE      | No          | No       |
| Toluene                     | 108883   | 68      | 6       | 62        | 9%   | 0.0030 | 0.026      | 0.011      | 0.0046     | 0.60     | 0.60             | FALSE      | No          | No       |
| Trichloroethylene (TCE)     | 79016    | 68      | 8       | 60        | 12%  | 0.0010 | 0.023      | 0.0058     | 0.0042     | 0.0030   | 0.0030           | TRUE       | No          | No       |
| Vanadium                    | 7440622  | 68      | 68      | 0         | 100% | 3.8    | 81         | 36         | 36         | 3,000    | 3,000            | FALSE      | No          | No       |
| Vinyl chloride              | 75014    | 68      | 1       | 67        | 1%   | 0.0020 | 0.0020     | 0.0020     | 0.0077     | 7.00E-04 | 7.00E-04         | TRUE       | Yes         | No*      |
| Xylenes, Total              | 1330207  | 68      | 4       | 64        | 6%   | 0.0040 | 0.12       | 0.036      | 0.0056     | 90       | 90               | FALSE      | No          | No       |
| Zinc                        | 7440666  | 68      | 63      | 5         | 93%  | 5.9    | 1,100      | 74         | 69         | 6,200    | 6,200            | FALSE      | No          | No       |

<sup>1</sup> DAF = 1 for VOCs; DAF = 10 for SVOCs and Inorganics

Most of the metals exceeding SSL values are within background levels for the area

\* - Exceedence of SSL is based on a 1 detect only

\*\* - See the text for further explanation in COC identification

**TABLE 5-14**  
 COPC Refinement; Metals in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|           |                                                  | Aluminum           | Arsenic        | Beryllium        | Cadmium           | Chromium,<br>Total | Iron                | Manganese          | Thallium         | Vanadium         | Zinc             |
|-----------|--------------------------------------------------|--------------------|----------------|------------------|-------------------|--------------------|---------------------|--------------------|------------------|------------------|------------------|
|           | Units                                            | (µg/L)             | (µg/L)         | (µg/L)           | (µg/L)            | (µg/L)             | (µg/L)              | (µg/L)             | (µg/L)           | (µg/L)           | (µg/L)           |
|           | <b>MCL/RBC*</b>                                  | <b>37,000*</b>     | <b>50</b>      | <b>4</b>         | <b>5</b>          | <b>100</b>         | <b>11,000*</b>      | <b>730*</b>        | <b>2</b>         | <b>260*</b>      | <b>11,000*</b>   |
|           | <b>Zone E BRC, shallow</b>                       | <b>2,810</b>       | <b>18.7</b>    | <b>0.43</b>      | <b>0.82</b>       | <b>12.3</b>        | <b>NL</b>           | <b>2,560</b>       | <b>5.4</b>       | <b>11.4</b>      | <b>27.3</b>      |
|           | <b>Zones E &amp; F background range, shallow</b> | <b>19 - 16,100</b> | <b>3 - 316</b> | <b>0.3 - .09</b> | <b>0.6 - 4.4</b>  | <b>0.8 - 31</b>    | <b>144 - 76,600</b> | <b>2.0 - 2,650</b> | <b>3.0 - 6.0</b> | <b>0.6 - 26</b>  | <b>5.0 - 141</b> |
|           | <b>Zone E BRC, deep</b>                          | <b>319</b>         | <b>16.4</b>    | <b>1.2</b>       | <b>0.77</b>       | <b>15.5</b>        | <b>NL</b>           | <b>869</b>         | <b>6.5</b>       | <b>5.3</b>       | <b>11.8</b>      |
|           | <b>Zones E &amp; F background range, deep</b>    | <b>19 - 461</b>    | <b>3 - 132</b> | <b>0.2 - 1.3</b> | <b>0.46 - 0.6</b> | <b>0.8 - 27</b>    | <b>19 - 26,000</b>  | <b>869 - 4,820</b> | <b>3.0 - 7.0</b> | <b>0.5 - 8.0</b> | <b>4.0 - 21</b>  |
| Station   | Date                                             | Conc.              | Conc.          | Conc.            | Conc.             | Conc.              | Conc.               | Conc.              | Conc.            | Conc.            | Conc.            |
| F240GW003 | 18-Nov-96                                        | 803 =              | 7.8 J          | 0.30 U           | 0.50 U            | 0.80 U             | 20,500 =            | 179 =              | 5.8 U            | 2.0 U            | 13.6 U           |
|           | 6-May-97                                         | 30.1 U             | 9.4 J          | 0.25 U           | 0.30 U            | 1.0 U              | 26,200 =            | 196 =              | 8.6 J            | 1.1 U            | 11.0 U           |
|           | 19-Aug-97                                        | 158 =              | 22.4 U         | 0.20 U           | 0.30 U            | 1.0 U              | 17,000 =            | 156 =              | 5.0 U            | 1.3 J            | 5.8 U            |
|           | 12-Nov-97                                        | 561 J              | 9.5 J          | 0.21 U           | 0.30 U            | 1.2 J              | 17,600 =            | 131 =              | 5.0 U            | 2.5 J            | 21.4 U           |
| F613GW001 | 20-Nov-96                                        | 3,730 =            | 2.5 U          | 2.0 J            | 1.3 J             | 0.80 U             | 52,600 J            | 6,050 =            | 6.2 U            | 0.5 U            | 104 =            |
|           | 29-Apr-97                                        | 2,060 =            | 2.1 U          | 2.0 J            | 1.8 J             | 1.0 U              | 52,500 =            | 6,240 =            | 9.5 J            | 1.9 J            | 91.7 =           |
|           | 4-Sep-97                                         | 2,040 =            | 2.1 U          | 2.0 J            | 1.8 J             | 1.0 U              | 51,000 =            | 7,940 =            | 4.6 U            | 2.8 J            | 110 =            |
|           | 6-Nov-97                                         | 64.4 J             | 2.1 U          | 0.20 U           | 0.30 U            | 1.0 U              | 62.1 U              | 51.5 J             | 5.0 U            | 1.4 J            | 5.8 U            |
| F613GW003 | 18-Nov-96                                        | 472 =              | 5.8 J          | 0.30 U           | 0.50 U            | 1.7 J              | 42,100 =            | 4,050 =            | 6.0 U            | 2.7 U            | 6.2 U            |
|           | 29-Apr-97                                        | 35.8 U             | 3.9 J          | 0.41 U           | 0.31 J            | 1.2 J              | 13,300 =            | 1,390 =            | 5.0 U            | 1.9 J            | 9.0 J            |
|           | 18-Aug-97                                        | 161 =              | 16.2 U         | 0.20 U           | 0.30 U            | 1.0 U              | 25,200 =            | 3,010 =            | 5.0 U            | 5.1 J            | 5.8 U            |
|           | 7-Nov-97                                         | 8.0 U              | 2.1 U          | 1.10 J           | 0.30 U            | 1.2 U              | 20.0 U              | 163 =              | 5.0 U            | 1.1 U            | 5.8 U            |
| F613GW004 | 12-Nov-96                                        | 3,640 J            | 3.3 J          | 0.39 U           | 0.50 U            | 6.0 J              | 5,960 J             | 428 J              | 3.2 U            | 8.2 J            | 16.9 J           |
|           | 30-Apr-97                                        | 267 =              | 3.3 J          | 0.40 U           | 0.30 U            | 1.3 J              | 7,460 =             | 405 =              | 7.6 J            | 1.3 J            | 8.5 U            |
|           | 22-Aug-97                                        | 15.3 U             | 2.1 UJ         | 0.20 U           | 0.30 U            | 1.0 U              | 7,670 J             | 351 J              | 5.0 U            | 1.1 U            | 8.9 J            |
|           | 6-Nov-97                                         | 637 =              | 10.5 =         | 0.24 J           | 0.30 U            | 2.6 U              | 577 =               | 26.8 =             | 5.0 U            | 5.4 J            | 10.8 U           |
| F613GW005 | 20-Nov-96                                        | 549 =              | 9.9 J          | 0.30 U           | 0.50 U            | 1.4 J              | 38,600 J            | 672 =              | 7.5 U            | 0.5 U            | 25.2 U           |
|           | 5-May-97                                         | 322 =              | 27.1 =         | 0.42 U           | 0.35 J            | 1.9 J              | 35,500 =            | 404 =              | 6.6 J            | 1.1 J            | 13.6 J           |
|           | 19-Aug-97                                        | 404 =              | 44.7 =         | 0.43 J           | 0.46 J            | 1.0 U              | 47,400 =            | 415 =              | 5.0 U            | 1.2 J            | 6.9 U            |
|           | 25-Nov-97                                        | 226 =              | 34.4 =         | 0.52 U           | 0.30 U            | 1.0 U              | 30,000 =            | 336 =              | 5.0 U            | 3.8 J            | 5.8 U            |

**TABLE 5-14**  
 COPC Refinement; Metals in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station                            | Date                                             | Aluminum           | Arsenic        | Beryllium        | Cadmium           | Chromium,<br>Total | Iron                | Manganese          | Thallium         | Vanadium         | Zinc             |
|------------------------------------|--------------------------------------------------|--------------------|----------------|------------------|-------------------|--------------------|---------------------|--------------------|------------------|------------------|------------------|
|                                    |                                                  | (µg/L)             | (µg/L)         | (µg/L)           | (µg/L)            | (µg/L)             | (µg/L)              | (µg/L)             | (µg/L)           | (µg/L)           | (µg/L)           |
|                                    | <b>Units</b>                                     | <b>37,000*</b>     | <b>50</b>      | <b>4</b>         | <b>5</b>          | <b>100</b>         | <b>11,000*</b>      | <b>730*</b>        | <b>2</b>         | <b>260*</b>      | <b>11,000*</b>   |
|                                    | <b>MCL/RBC*</b>                                  | <b>37,000*</b>     | <b>50</b>      | <b>4</b>         | <b>5</b>          | <b>100</b>         | <b>11,000*</b>      | <b>730*</b>        | <b>2</b>         | <b>260*</b>      | <b>11,000*</b>   |
|                                    | <b>Zone E BRC, shallow</b>                       | <b>2,810</b>       | <b>18.7</b>    | <b>0.43</b>      | <b>0.82</b>       | <b>12.3</b>        | <b>NL</b>           | <b>2,560</b>       | <b>5.4</b>       | <b>11.4</b>      | <b>27.3</b>      |
|                                    | <b>Zones E &amp; F background range, shallow</b> | <b>19 - 16,100</b> | <b>3 - 316</b> | <b>0.3 - .09</b> | <b>0.6 - 4.4</b>  | <b>0.8 - 31</b>    | <b>144 - 76,600</b> | <b>2.0 - 2,650</b> | <b>3.0 - 6.0</b> | <b>0.6 - 26</b>  | <b>5.0 - 141</b> |
|                                    | <b>Zone E BRC, deep</b>                          | <b>319</b>         | <b>16.4</b>    | <b>1.2</b>       | <b>0.77</b>       | <b>15.5</b>        | <b>NL</b>           | <b>869</b>         | <b>6.5</b>       | <b>5.3</b>       | <b>11.8</b>      |
|                                    | <b>Zones E &amp; F background range, deep</b>    | <b>19 - 461</b>    | <b>3 - 132</b> | <b>0.2 - 1.3</b> | <b>0.46 - 0.6</b> | <b>0.8 - 27</b>    | <b>19 - 26,000</b>  | <b>869 - 4,820</b> | <b>3.0 - 7.0</b> | <b>0.5 - 8.0</b> | <b>4.0 - 21</b>  |
| Station                            | Date                                             | Conc.              | Conc.          | Conc.            | Conc.             | Conc.              | Conc.               | Conc.              | Conc.            | Conc.            | Conc.            |
| F613GW006                          | 20-Oct-98                                        | 2,690 =            | 27.3 =         | 0.30 U           | 1.6 U             | 5.8 U              | 42,200 =            | 689 =              | 1.6 UJ           | 11.6 U           | 27.1 U           |
|                                    | 18-Jun-99                                        | 32.1 U             | 207 =          | 0.30 U           | 0.30 U            | 0.50 U             | 44,900 =            | 535 =              | 2.4 J            | 1.3 J            | 69.7 =           |
|                                    | 12-Oct-99                                        | 58.7 UJ            | 211 =          | 0.90 U           | 0.30 U            | 0.60 UJ            | 35,200 =            | 464 =              | 2.4 U            | 1.6 J            | 2.3 U            |
| F613GW007                          | 19-Nov-99                                        | 66.6 J             | 4.3 U          | 0.90 U           | 0.30 U            | 0.60 J             | 38.0 U              | 181 =              | 2.4 UJ           | 7.8 J            | 4.1 U            |
| F613GW02D<br>(Deep<br>Groundwater) | 21-Nov-96                                        | 465 =              | 4.7 J          | 0.77 J           | 0.50 U            | 3.4 J              | 738 J               | 267 =              | 4.0 U            | 4.2 J            | 5.3 U            |
|                                    | 30-Apr-97                                        | 8.0 U              | 2.1 UJ         | 0.77 U           | 0.30 U            | 2.1 J              | 20.0 U              | 175 =              | 5.5 J            | 1.3 J            | 5.8 U            |
|                                    | 19-Aug-97                                        | 8.0 U              | 5.7 U          | 1.6 J            | 0.30 U            | 1.3 J              | 20.0 U              | 162 =              | 5.0 U            | 1.1 U            | 5.8 U            |
|                                    | 7-Nov-97                                         | 57.6 J             | 7.9 J          | 0.20 U           | 0.30 U            | 1.0 U              | 25,100 =            | 2,930 =            | 5.0 U            | 2.2 J            | 19.6 U           |
| FFDSGW17A                          | 28-Jan-97                                        | 249 =              | 2.5 U          | 0.33 U           | 0.50 U            | 1.2 J              | 2,960 J             | 130 J              | 2.7 U            | 1.2 J            | 9.7 U            |
|                                    | 17-Jun-97                                        | 218 =              | 5.5 J          | 0.26 U           | 0.30 U            | 1.0 U              | 5,500 =             | 69.4 =             | 5.6 U            | 1.6 J            | 7.7 U            |
|                                    | 24-Apr-98                                        | 4,290 =            | 7.4 J          | 0.37 U           | 0.30 U            | 7.7 J              | 7,070 =             | 90.7 =             | 5.5 U            | 10.0 J           | 6.3 J            |
|                                    | 20-Oct-98                                        | 161 J              | 12.3 =         | 0.30 U           | 1.6 U             | 5.8 U              | 6,110 =             | 154 =              | 1.6 UJ           | 4.4 U            | 5.9 U            |
|                                    | 12-Oct-99                                        | 58.7 UJ            | 12.9 =         | 0.90 U           | 0.30 U            | 0.60 UJ            | 4,850 =             | 133 =              | 2.4 U            | 0.6 J            | 3.5 U            |
| FFDSGW17B                          | 28-Jan-97                                        | 205 =              | 51.5 =         | 0.44 U           | 0.50 U            | 1.7 J              | 2,890 J             | 88.2 J             | 2.7 U            | 1.6 J            | 33.6 U           |
|                                    | 17-Jun-97                                        | 85.8 J             | 58.0 =         | 0.32 U           | 0.30 U            | 1.0 U              | 6,070 =             | 66.0 =             | 5.4 U            | 1.1 U            | 5.8 U            |
|                                    | 24-Apr-98                                        | 2,580 =            | 58.5 =         | 0.32 U           | 0.30 U            | 6.1 J              | 7,130 =             | 62.6 =             | 5.5 U            | 4.8 J            | 2.8 J            |
|                                    | 20-Oct-98                                        | 68.0 U             | 63.8 =         | 0.30 U           | 1.6 J             | 5.8 U              | 4,350 =             | 49.5 =             | 1.6 UJ           | 3.2 U            | 6.0 U            |
|                                    | 15-Jan-99                                        | NA                 | 62.1 J         | 0.10 U           | NA                | 1.0 J              | NA                  | NA                 | 3.1 U            | NA               | NA               |
|                                    | 12-Oct-99                                        | 58.7 UJ            | 66.0 =         | 0.90 U           | 0.30 U            | 0.60 UJ            | 4,990 =             | 57.9 =             | 2.4 U            | 0.5 U            | 4.6 U            |
| FGELGW005                          | 11-Nov-96                                        | 6,500 =            | 23.1 =         | 0.82 U           | 0.50 U            | 11.9 =             | 12,500 =            | 274 =              | 2.7 U            | 23.6 =           | 19.6 U           |
|                                    | 5-May-97                                         | 316 =              | 3.1 J          | 0.39 U           | 0.30 U            | 1.9 J              | 551 =               | 302 =              | 5.0 U            | 8.7 J            | 11.0 U           |

**TABLE 5-14**  
 COPC Refinement; Metals in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | Aluminum                              | Arsenic     | Beryllium | Cadmium   | Chromium,<br>Total | Iron     | Manganese    | Thallium    | Vanadium  | Zinc      |           |
|-----------|-----------|---------------------------------------|-------------|-----------|-----------|--------------------|----------|--------------|-------------|-----------|-----------|-----------|
|           |           | Units<br>(µg/L)                       | (µg/L)      | (µg/L)    | (µg/L)    | (µg/L)             | (µg/L)   | (µg/L)       | (µg/L)      | (µg/L)    | (µg/L)    |           |
|           |           | MCL/RBC*                              | 37,000*     | 50        | 4         | 5                  | 100      | 11,000*      | 730*        | 2         | 260*      | 11,000*   |
|           |           | Zone E BRC, shallow                   | 2,810       | 18.7      | 0.43      | 0.82               | 12.3     | NL           | 2,560       | 5.4       | 11.4      | 27.3      |
|           |           | Zones E & F background range, shallow | 19 - 16,100 | 3 - 316   | 0.3 - .09 | 0.6 - 4.4          | 0.8 - 31 | 144 - 76,600 | 2.0 - 2,650 | 3.0 - 6.0 | 0.6 - 26  | 5.0 - 141 |
|           |           | Zone E BRC, deep                      | 319         | 16.4      | 1.2       | 0.77               | 15.5     | NL           | 869         | 6.5       | 5.3       | 11.8      |
|           |           | Zones E & F background range, deep    | 19 - 461    | 3 - 132   | 0.2 - 1.3 | 0.46 - 0.6         | 0.8 - 27 | 19 - 26,000  | 869 - 4,820 | 3.0 - 7.0 | 0.5 - 8.0 | 4.0 - 21  |
| Station   | Date      | Conc.                                 | Conc.       | Conc.     | Conc.     | Conc.              | Conc.    | Conc.        | Conc.       | Conc.     | Conc.     |           |
| FGELGW005 | 28-Aug-97 | 2,180 =                               | 2.1 UJ      | 0.20 U    | 0.30 U    | 5.5 J              | 2,270 J  | 304 J        | 5.0 U       | 15.8 J    | 22.8 =    |           |
|           | 12-Nov-97 | 5,500 J                               | 8.0 U       | 0.62 U    | 0.30 U    | 9.4 J              | 7,450 =  | 493 =        | 5.0 U       | 27.3 =    | 38.7 U    |           |
| FGELGW006 | 12-Nov-96 | 831 J                                 | 2.5 UJ      | 0.34 U    | 0.50 U    | 2.2 U              | 3,100 J  | 51.2 J       | 2.7 U       | 2.0 J     | 12.8 J    |           |
|           | 6-May-97  | 198 =                                 | 2.1 U       | 0.39 U    | 0.30 U    | 1.0 U              | 2,940 =  | 40.0 =       | 5.3 J       | 1.1 U     | 11.0 U    |           |
|           | 25-Aug-97 | 107 =                                 | 2.1 UJ      | 0.20 U    | 0.30 U    | 1.0 U              | 3,110 J  | 69.7 J       | 5.0 U       | 1.1 U     | 8.6 J     |           |
|           | 14-Nov-97 | 130 U                                 | 2.1 U       | 0.41 U    | 0.30 U    | 1.0 U              | 2,930 =  | 43.0 U       | 5.0 U       | 1.1 U     | 7.1 U     |           |
| FGELGW007 | 10-Nov-96 | 2,590 =                               | 72 =        | 0.52 U    | 0.50 U    | 4.5 J              | 20,400 = | 827 =        | 4.4 J       | 5.6 J     | 15.8 U    |           |
|           | 7-May-97  | 15.2 U                                | 23 =        | 0.25 U    | 0.35 J    | 1.0 U              | 13,100 = | 1,430 =      | 8.1 J       | 1.2 J     | 11.0 U    |           |
|           | 25-Aug-97 | 14.5 U                                | 9.7 J       | 0.20 U    | 1.20 J    | 1.0 U              | 26,200 J | 4,040 J      | 5.0 U       | 1.1 U     | 26.4 =    |           |
|           | 12-Nov-97 | 71.8 U                                | 7.1 J       | 0.36 U    | 0.83 J    | 1.0 U              | 6,020 =  | 1,710 =      | 5.0 U       | 1.1 U     | 61.4 U    |           |
| FGELGW008 | 10-Nov-96 | 20,000 =                              | 20.3 =      | 1.8 J     | 0.50 U    | 42.7 =             | 40,200 = | 2,120 =      | 6.9 J       | 68.3 =    | 65.0 =    |           |
|           | 7-May-97  | 289 =                                 | 2.1 U       | 0.26 U    | 0.30 U    | 3.6 J              | 18,500 = | 2,020 =      | 5.0 U       | 3.2 J     | 11.0 U    |           |
|           | 26-Aug-97 | 14.0 U                                | 2.1 UJ      | 0.20 U    | 0.30 U    | 1.50 J             | 4,050 J  | 1,760 J      | 5.0 U       | 11.1 J    | 9.5 J     |           |
|           | 14-Nov-97 | 60.4 U                                | 9.7 J       | 0.49 U    | 0.30 U    | 1.0 U              | 3,400 =  | 833 =        | 5.0 U       | 9.8 J     | 17.0 U    |           |
| FGELGW011 | 12-Nov-96 | 17,000 J                              | 14.3 J      | 1.6 U     | 2.7 J     | 32.3 =             | 48,300 J | 1,300 J      | 4.3 U       | 30.0 =    | 1,440 =   |           |
|           | 8-May-97  | 58.3 J                                | 4.7 J       | 0.29 J    | 0.40 J    | 2.0 J              | 31,100 = | 1,290 =      | 8.0 U       | 1.1 U     | 36.4 U    |           |
|           | 26-Aug-97 | 77.4 U                                | 4.0 J       | 0.20 U    | 0.30 U    | 1.0 J              | 24,100 J | 1,060 J      | 5.0 U       | 1.1 U     | 35.7 =    |           |
|           | 12-Nov-97 | 323 J                                 | 4.9 J       | 0.56 U    | 0.30 U    | 1.0 U              | 23,900 = | 1,080 =      | 5.0 U       | 2.2 J     | 45.0 U    |           |
| FGELGW012 | 12-Nov-96 | 238 J                                 | 2.8 J       | 0.46 U    | 0.50 U    | 1.4 U              | 9,320 J  | 189 J        | 2.7 U       | 0.5 U     | 14.6 J    |           |
|           | 8-May-97  | 147 J                                 | 2.1 U       | 0.23 J    | 0.30 U    | 1.0 U              | 8,640 =  | 183 =        | 5.0 U       | 1.1 U     | 10.1 U    |           |
|           | 27-Aug-97 | 375 J                                 | 2.1 UJ      | 0.20 U    | 0.30 U    | 1.2 J              | 10,800 J | 254 J        | 5.0 U       | 1.1 J     | 18.0 J    |           |
|           | 13-Nov-97 | 439 J                                 | 2.1 U       | 0.37 U    | 0.30 U    | 1.0 U              | 11,000 = | 251 =        | 5.0 U       | 1.9 J     | 16.0 U    |           |

**TABLE 5-14**  
 COPC Refinement; Metals in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

|           |                                       | Aluminum    | Arsenic       | Beryllium | Cadmium    | Chromium,<br>Total | Iron            | Manganese    | Thallium  | Vanadium  | Zinc      |
|-----------|---------------------------------------|-------------|---------------|-----------|------------|--------------------|-----------------|--------------|-----------|-----------|-----------|
|           | Units                                 | (µg/L)      | (µg/L)        | (µg/L)    | (µg/L)     | (µg/L)             | (µg/L)          | (µg/L)       | (µg/L)    | (µg/L)    | (µg/L)    |
|           | MCL/RBC*                              | 37,000*     | 50            | 4         | 5          | 100                | 11,000*         | 730*         | 2         | 260*      | 11,000*   |
|           | Zone E BRC, shallow                   | 2,810       | 18.7          | 0.43      | 0.82       | 12.3               | NL              | 2,560        | 5.4       | 11.4      | 27.3      |
|           | Zones E & F background range, shallow | 19 - 16,100 | 3 - 316       | 0.3 - .09 | 0.6 - 4.4  | 0.8 - 31           | 144 - 76,600    | 2.0 - 2,650  | 3.0 - 6.0 | 0.6 - 26  | 5.0 - 141 |
|           | Zone E BRC, deep                      | 319         | 16.4          | 1.2       | 0.77       | 15.5               | NL              | 869          | 6.5       | 5.3       | 11.8      |
|           | Zones E & F background range, deep    | 19 - 461    | 3 - 132       | 0.2 - 1.3 | 0.46 - 0.6 | 0.8 - 27           | 19 - 26,000     | 869 - 4,820  | 3.0 - 7.0 | 0.5 - 8.0 | 4.0 - 21  |
| Station   | Date                                  | Conc.       | Conc.         | Conc.     | Conc.      | Conc.              | Conc.           | Conc.        | Conc.     | Conc.     | Conc.     |
| FGELGW013 | 12-Nov-96                             | 2,190 J     | 13.2 J        | 0.76 U    | 0.50 U     | 5.0 U              | <b>18,000</b> J | 923 J        | 4.1 U     | 11.1 J    | 15.0 J    |
|           | 9-May-97                              | 379 =       | 10.5 =        | 0.26 J    | 0.30 U     | 2.4 J              | <b>11,300</b> = | 962 =        | 5.0 U     | 5.9 J     | 5.8 U     |
|           | 29-Aug-97                             | 129 =       | 12.4 J        | 0.20 U    | 0.30 U     | 1.1 J              | <b>7,520</b> J  | <b>745</b> J | 5.0 U     | 6.5 J     | 20.4 =    |
|           | 14-Nov-97                             | 213 J       | 11.1 =        | 0.41 U    | 0.30 U     | 1.0 U              | 5,400 =         | 832 =        | 5.0 U     | 8.3 J     | 5.8 U     |
| FGELGW014 | 12-Nov-96                             | 0.910 J     | 1.3 =         | 0.01 U    | 0.30 =     | 0.27 =             | 16.6 =          | 0.070 J      | 0.070 U   | 5.2 =     | 7.0 =     |
|           | 9-May-97                              | 391 =       | <b>60.7</b> = | 0.20 U    | 0.68 J     | 2.3 J              | <b>20,600</b> = | 282 =        | 5.0 U     | 4.3 J     | 18.7 U    |
|           | 27-Aug-97                             | 43.5 U      | <b>60.6</b> = | 0.20 U    | 0.30 U     | 1.4 J              | <b>18,200</b> J | 235 J        | 5.0 U     | 4.2 J     | 21.2 =    |
|           | 1-Dec-97                              | 89.1 =      | 47.4 =        | 0.39 U    | 1.9 J      | 1.5 J              | <b>25,300</b> = | 426 =        | 5.0 U     | 3.7 J     | 97.4 =    |
|           | 22-Apr-98                             | 1,970 =     | 41.8 =        | 0.36 U    | 1.3 J      | 5.4 J              | <b>33,300</b> = | 689 =        | 5.5 U     | 5.7 U     | 39.0 =    |
|           | 20-Oct-98                             | 68.0 U      | 36.9 =        | 0.30 U    | 1.6 U      | 5.8 U              | <b>23,200</b> = | 356 =        | 1.6 UJ    | 5.1 U     | 8.9 U     |
|           | 12-Oct-99                             | 58.7 UJ     | 18.0 =        | 0.90 U    | 0.30 J     | 0.60 UJ            | <b>29,000</b> = | 469 =        | 2.4 U     | 2.1 J     | 16.4 U    |

Bolded and outlined values are exceedences of background reference concentrations (BRCs) and MCLs/RBCs (RBC used when MCL data is not available).

Iron concentrations shown in bold type exceed the RBC but not the background range.

Shallow groundwater BRC used for all sampling locations except 613GW02D, where deep groundwater BRC is applied

MCL Maximum Contaminant Level obtained from US EPA National Primary Drinking Water Standards March 2001

\* RBC obtained from US EPA Region III (Noncarcinogen HI = 1.0) October 2000, where no MCL exists

= Analyte was detected; the reported value is equal to the sample concentration.

J Analyte was detected; the reported value is an estimated concentration.

NA Data not available or analyte was not analyzed in the sample.

NL Not listed.

U Analyte was not detected; the reported value is the detection limit.

UJ Analyte was not detected; the reported value is an estimated detection limit.

**TABLE 5-15**  
 COPC Refinement; Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | 2-Methyl-naphthalene |             | Acenaphthene |            | Dibenzofuran |             | Fluorene    |           | Naphthalene |              | Pyrene |   | Phenanthrene |   | Benzene |   | Toluene |   |
|-----------|-----------|----------------------|-------------|--------------|------------|--------------|-------------|-------------|-----------|-------------|--------------|--------|---|--------------|---|---------|---|---------|---|
|           |           | Units MCL/RBC*       | (µg/L) 120* | (µg/L) 370*  | (µg/L) 24* | (µg/L) 240*  | (µg/L) 6.5* | (µg/L) 180* | (µg/L) NA | (µg/L) 5    | (µg/L) 1,000 |        |   |              |   |         |   |         |   |
|           |           | Conc.                |             | Conc.        |            | Conc.        |             | Conc.       |           | Conc.       |              | Conc.  |   | Conc.        |   | Conc.   |   | Conc.   |   |
| F613GP001 | 12-Sep-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
| F613GP002 | 13-Sep-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
| F613GP003 | 29-Aug-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP004 | 2-Oct-96  | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP005 | 3-Oct-96  | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP006 | 4-Oct-96  | 2.0                  | J           | 2.0          | J          | 10           | U           | 4.0         | J         | 10          | U            | 10     | U | 6.0          | J | NA      |   | NA      |   |
| F613GP007 | 12-Sep-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
| F613GP008 | 13-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP009 | 29-Aug-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP010 | 2-Oct-96  | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP012 | 10-Oct-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP013 | 7-Oct-96  | 17                   | =           | 10           | =          | 2.0          | J           | 1.0         | J         | 10          | U            | 10     | U | 2.0          | J | 3.0     | J | 5.0     | U |
| F613GP017 | 3-Oct-96  | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP019 | 8-Oct-96  | 10                   | U           | 16           | =          | 6.0          | J           | 8.0         | J         | 10          | U            | 10     | U | 4.0          | J | 5.0     | U | 5.0     | U |
| F613GP020 | 12-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP021 | 29-Aug-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP022 | 15-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 2.0     | J | 5.0     | U |
| F613GP024 | 11-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP025 | 29-Aug-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0     | U | 7.0     | = |
| F613GP026 | 15-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP027 | 15-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
| F613GP028 | 11-Sep-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0     | U | 5.0     | U |

**TABLE 5-15**  
 COPC Refinement; Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | 2-Methyl-naphthalene |             | Acenaphthene |            | Dibenzofuran |             | Fluorene    |           | Naphthalene |              | Pyrene |   | Phenanthrene |    | Benzene |   | Toluene |   |
|-----------|-----------|----------------------|-------------|--------------|------------|--------------|-------------|-------------|-----------|-------------|--------------|--------|---|--------------|----|---------|---|---------|---|
|           |           | Units MCL/RBC*       | (µg/L) 120* | (µg/L) 370*  | (µg/L) 24* | (µg/L) 240*  | (µg/L) 6.5* | (µg/L) 180* | (µg/L) NA | (µg/L) 5    | (µg/L) 1,000 |        |   |              |    |         |   |         |   |
|           |           | Conc.                |             | Conc.        |            | Conc.        |             | Conc.       |           | Conc.       |              | Conc.  |   | Conc.        |    | Conc.   |   | Conc.   |   |
| F613GP029 | 28-Aug-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP030 | 18-Sep-96 | 10                   | U           | 10           | UJ         | 10           | UJ          | 10          | UJ        | 10          | U            | 10     | U | 10           | UJ | 5.0     | U | 5.0     | U |
| F613GP031 | 14-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |    | 5.0     | U | 5.0     | U |
| F613GP032 | 10-Sep-96 | 10.0                 | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP033 | 28-Aug-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP034 | 28-Sep-96 | 10                   | U           | 10           | UJ         | 10           | UJ          | 10          | UJ        | 10          | U            | 10     | U | 10           | UJ | 5.0     | U | 5.0     | U |
| F613GP035 | 16-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |    | 5.0     | U | 5.0     | J |
| F613GP036 | 9-Sep-96  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP037 | 30-Aug-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP038 | 16-Sep-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP039 | 29-Sep-96 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |    | 5.0     | U | 5.0     | U |
| F613GP040 | 13-Sep-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP041 | 10-Sep-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP042 | 3-Sep-96  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP043 | 9-Sep-96  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP044 | 27-Aug-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP046 | 9-Oct-96  | 10                   | U           | 10           | U          | 10           | U           | 2.0         | J         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP047 | 8-Oct-96  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP048 | 10-Sep-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP049 | 9-Sep-96  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP050 | 4-Sep-96  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |
| F613GP051 | 27-Aug-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U  | 5.0     | U | 5.0     | U |

**TABLE 5-15**  
 COPC Refinement; Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station    | Units<br>MCL/RBC* | 2-Methyl-<br>naphthalene |                | Acenaphthene  |                | Dibenzofuran   |                | Fluorene     |             | Naphthalene     |       | Pyrene |       | Phenanthrene |       | Benzene |       | Toluene |       |
|------------|-------------------|--------------------------|----------------|---------------|----------------|----------------|----------------|--------------|-------------|-----------------|-------|--------|-------|--------------|-------|---------|-------|---------|-------|
|            |                   | (µg/L)<br>120*           | (µg/L)<br>370* | (µg/L)<br>24* | (µg/L)<br>240* | (µg/L)<br>6.5* | (µg/L)<br>180* | (µg/L)<br>NA | (µg/L)<br>5 | (µg/L)<br>1,000 |       |        |       |              |       |         |       |         |       |
| Date       | Conc.             | Conc.                    | Conc.          | Conc.         | Conc.          | Conc.          | Conc.          | Conc.        | Conc.       | Conc.           | Conc. | Conc.  | Conc. | Conc.        | Conc. | Conc.   | Conc. | Conc.   | Conc. |
| F613GP052  | 9-Oct-96          | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 10              | U     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| F613GP053  | 17-Sep-96         | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| F613GP054  | 17-Sep-96         | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| F613GP056  | 3-Sep-96          | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 25      | U     | 25      | U     |
| F613GP057  | 30-Aug-96         | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 10              | U     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| F613GP058  | 30-Aug-96         | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 10              | U     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| F613GP059  | 3-Sep-96          | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 10              | U     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| F613GP060  | 4-Sep-96          | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 10              | U     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| F613GP063  | 16-Oct-96         | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 10              | U     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| F613GP064  | 15-Oct-96         | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| F613GP065  | 14-Oct-96         | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 3.0             | J     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| F613GP066  | 13-Oct-96         | 17                       | U              | 17            | U              | 17             | U              | 17           | U           | 17              | U     | 17     | U     | 17           | U     | 5.0     | U     | 2.0     | J     |
| F613GP067  | 12-Oct-96         | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 10              | U     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| F613GP068  | 11-Oct-96         | 10                       | U              | 10            | U              | 10             | U              | 10           | U           | 10              | U     | 10     | U     | 10           | U     | 5.0     | U     | 5.0     | U     |
| LF037GP023 | 9-Jun-97          | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| LF037GP025 | 8-Jun-97          | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| LF037GP026 | 9-Jun-97          | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| LF037GP031 | 9-Jun-97          | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| LF037GP036 | 10-Jun-97         | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| LF037GP037 | 10-Jun-97         | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| LF037GP038 | 10-Jun-97         | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |
| LF037GP065 | 1-Jul-97          | NA                       |                | NA            |                | NA             |                | NA           |             | NA              |       | NA     |       | NA           |       | 5.0     | U     | 5.0     | U     |

**TABLE 5-15**  
 COPC Refinement; Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station    | Date      | 2-Methyl-naphthalene |             | Acenaphthene |            | Dibenzofuran |             | Fluorene    |           | Naphthalene |              | Pyrene |   | Phenanthrene |   | Benzene |   | Toluene |   |
|------------|-----------|----------------------|-------------|--------------|------------|--------------|-------------|-------------|-----------|-------------|--------------|--------|---|--------------|---|---------|---|---------|---|
|            |           | Units MCL/RBC*       | (µg/L) 120* | (µg/L) 370*  | (µg/L) 24* | (µg/L) 240*  | (µg/L) 6.5* | (µg/L) 180* | (µg/L) NA | (µg/L) 5    | (µg/L) 1,000 |        |   |              |   |         |   |         |   |
|            |           | Conc.                |             | Conc.        |            | Conc.        |             | Conc.       |           | Conc.       |              | Conc.  |   | Conc.        |   | Conc.   |   | Conc.   |   |
| LF037GP066 | 1-Jul-97  | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0 U   |   | 5.0 U   |   |
| LF699GP049 | 12-Aug-97 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 5.0 U   |   | 5.0 U   |   |
| F240GW003  | 18-Nov-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 6-May-97  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 19-Aug-97 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 12-Nov-97 | 11                   | U           | 11           | U          | 11           | U           | 11          | U         | 11          | U            | 11     | U | 11           | U | 5.0 U   |   | 5.0 U   |   |
| F613GW001  | 20-Nov-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 29-Apr-97 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 2           | J            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 4-Sep-97  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 6-Nov-97  | 12                   | U           | 12           | U          | 12           | U           | 12          | U         | 12          | U            | 12     | U | 12           | U | 5.0 U   |   | 5.0 U   |   |
|            | 12-Oct-99 | NA                   |             | NA           |            | NA           |             | NA          |           | NA          |              | NA     |   | NA           |   | 3.0 U   |   | 3.0 U   |   |
| F613GW003  | 18-Nov-96 | 10                   | U           | 10           | U          | 10           | U           | 1.0         | J         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 29-Apr-97 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 18-Aug-97 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 7-Nov-97  | 11                   | U           | 11           | U          | 11           | U           | 11          | U         | 11          | U            | 11     | U | 11           | U | 5.0 U   |   | 5.0 U   |   |
| F613GW004  | 12-Nov-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 30-Apr-97 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 22-Aug-97 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 6-Nov-97  | 11                   | U           | 11           | U          | 11           | U           | 11          | U         | 11          | U            | 11     | U | 11           | U | 5.0 U   |   | 5.0 U   |   |
| F613GW005  | 20-Nov-96 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 5-May-97  | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 19-Aug-97 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
|            | 25-Nov-97 | 10                   | U           | 10           | U          | 10           | U           | 10          | U         | 10          | U            | 10     | U | 10           | U | 5.0 U   |   | 5.0 U   |   |
| F613GW006  | 20-Oct-98 | 14                   | =           | 2.0          | J          | 1            | J           | 2.0         | J         | 5.0         | =            | 5.0    | U | 1.0          | J | 2.0     | J | 5.0     | U |

**TABLE 5-15**  
 COPC Refinement; Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | 2-Methyl-naphthalene |                | Acenaphthene   |               | Dibenzofuran   |                | Fluorene       |              | Naphthalene |                 | Pyrene |       | Phenanthrene |       | Benzene |       | Toluene |       |
|-----------|-----------|----------------------|----------------|----------------|---------------|----------------|----------------|----------------|--------------|-------------|-----------------|--------|-------|--------------|-------|---------|-------|---------|-------|
|           |           | Units<br>MCL/RBC*    | (µg/L)<br>120* | (µg/L)<br>370* | (µg/L)<br>24* | (µg/L)<br>240* | (µg/L)<br>6.5* | (µg/L)<br>180* | (µg/L)<br>NA | (µg/L)<br>5 | (µg/L)<br>1,000 | Conc.  | Conc. | Conc.        | Conc. | Conc.   | Conc. | Conc.   | Conc. |
|           | 18-Jun-99 |                      | 36 =           | 10 U           | 3 J           | 4.0 J          | 10 U           | 10 U           | 4.0 J        | 5.0 U       | 4.0 J           | 5.0 U  | 5.0 U | 5.0 U        | 5.0 U | 5.0 U   | 5.0 U | 5.0 U   | 5.0 U |
|           | 12-Oct-99 |                      | 31 =           | 3.0 J          | 4 J           | 6.0 =          | 2.0 J          | 5.0 U          | 4.0 J        | 4.0 =       | 3.0 U           |        |       |              |       |         |       |         |       |
| F613GW007 | 19-Nov-99 |                      | 5.0 U          | 5.0 U          | 5 U           | 5.0 U          | 5.0 U          | 5.0 U          | 5.0 U        | 5.0 U       | 5.0 U           | 5.0 U  | 5.0 U | 3.0 U        | 3.0 U |         |       |         |       |
| F613GW008 | 19-Nov-99 |                      | NA             | NA             | NA            | NA             | NA             | NA             | NA           | NA          | NA              | NA     | NA    | 3.0 U        | 3.0 U |         |       |         |       |
| F613GW02D | 21-Nov-96 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 24 =  |         |       |         |       |
|           | 30-Apr-97 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 11 =  |         |       |         |       |
|           | 19-Aug-97 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 9.0 = |         |       |         |       |
|           | 7-Nov-97  |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 4.0 J |         |       |         |       |
| FFDSGW17A | 28-Jan-97 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 5.0 U |         |       |         |       |
|           | 17-Jun-97 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 5.0 U |         |       |         |       |
|           | 24-Apr-98 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 1.0 U        | 1.0 U |         |       |         |       |
|           | 20-Oct-98 |                      | 1.0 J          | 2.0 J          | 4 J           | 4.0 J          | 5.0 U          | 5.0 U          | 5.0 U        | 5.0 U       | 5.0 U           | 5.0 U  | 5.0 U | 5.0 U        | 5.0 U |         |       |         |       |
|           | 12-Oct-99 |                      | 5.0 U          | 5.0 U          | 5 U           | 5.0 U          | 5.0 U          | 5.0 U          | 5.0 U        | 5.0 U       | 5.0 U           | 5.0 U  | 5.0 U | 3.0 U        | 3.0 U |         |       |         |       |
| FFDSGW17B | 28-Jan-97 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 5.0 U |         |       |         |       |
|           | 17-Jun-97 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 5.0 U |         |       |         |       |
|           | 24-Apr-98 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 1.0 U        | 1.0 U |         |       |         |       |
|           | 20-Oct-98 |                      | 5.0 U          | 5.0 U          | 5 U           | 5.0 U          | 5.0 U          | 5.0 U          | 5.0 U        | 5.0 U       | 5.0 U           | 5.0 U  | 5.0 U | 5.0 U        | 5.0 U |         |       |         |       |
|           | 12-Oct-99 |                      | 6.0 U          | 6.0 U          | 6 U           | 6.0 U          | 6.0 U          | 6.0 U          | 6.0 U        | 6.0 U       | 6.0 U           | 6.0 U  | 6.0 U | 3.0 U        | 3.0 U |         |       |         |       |
| FGELGW005 | 11-Nov-96 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 3 J            | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 5.0 U |         |       |         |       |
|           | 5-May-97  |                      | 4.0 J          | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 5.0 U |         |       |         |       |
|           | 28-Aug-97 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 0.60 J      | 10 U            | 10 U   | 10 U  | 5.0 U        | 5.0 U |         |       |         |       |
|           | 12-Nov-97 |                      | 11 U           | 11 U           | 11 U          | 11 U           | 11 U           | 11 U           | 11 U         | 11 U        | 11 U            | 11 U   | 11 U  | 5.0 U        | 5.0 U |         |       |         |       |
| FGELGW006 | 12-Nov-96 |                      | 10 U           | 10 U           | 10 U          | 10 U           | 10 U           | 10 U           | 10 U         | 10 U        | 10 U            | 10 U   | 10 U  | 5.0 U        | 5.0 U |         |       |         |       |

**TABLE 5-15**  
 COPC Refinement; Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Date      | 2-Methyl-naphthalene |                | Acenaphthene   |               | Dibenzofuran   |                | Fluorene       |              | Naphthalene |                 | Pyrene |   | Phenanthrene |   | Benzene |   | Toluene |   |
|-----------|-----------|----------------------|----------------|----------------|---------------|----------------|----------------|----------------|--------------|-------------|-----------------|--------|---|--------------|---|---------|---|---------|---|
|           |           | Units<br>MCL/RBC*    | (µg/L)<br>120* | (µg/L)<br>370* | (µg/L)<br>24* | (µg/L)<br>240* | (µg/L)<br>6.5* | (µg/L)<br>180* | (µg/L)<br>NA | (µg/L)<br>5 | (µg/L)<br>1,000 |        |   |              |   |         |   |         |   |
|           |           | Conc.                |                | Conc.          |               | Conc.          |                | Conc.          |              | Conc.       |                 | Conc.  |   | Conc.        |   | Conc.   |   | Conc.   |   |
|           | 6-May-97  | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 25-Aug-97 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 14-Nov-97 | 11                   | U              | 11             | U             | 11             | U              | 11             | U            | 11          | U               | 11     | U | 11           | U | 5.0     | U | 5.0     | U |
| FGELGW007 | 10-Nov-96 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 7-May-97  | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 25-Aug-97 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 12-Nov-97 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
| FGELGW008 | 10-Nov-96 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 7-May-97  | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 26-Aug-97 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 14-Nov-97 | 11                   | U              | 11             | U             | 11             | U              | 11             | U            | 11          | U               | 11     | U | 11           | U | 5.0     | U | 5.0     | U |
| FGELGW011 | 12-Nov-96 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 1.0     | J |
|           | 8-May-97  | NA                   |                | NA             |               | NA             |                | NA             |              | NA          |                 | NA     |   | NA           |   | 5.0     | U | 5.0     | U |
|           | 26-Aug-97 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 12-Nov-97 | 11                   | U              | 11             | U             | 11             | U              | 11             | U            | 11          | U               | 11     | U | 11           | U | 5.0     | U | 5.0     | U |
| FGELGW012 | 12-Nov-96 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 8-May-97  | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 27-Aug-97 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 13-Nov-97 | 11                   | U              | 11             | U             | 11             | U              | 11             | U            | 11          | U               | 11     | U | 11           | U | 5.0     | U | 5.0     | U |
| FGELGW013 | 12-Nov-96 | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 9-May-97  | 10                   | U              | 10             | U             | 10             | U              | 10             | U            | 10          | U               | 10     | U | 10           | U | 5.0     | U | 5.0     | U |
|           | 29-Aug-97 | 10                   | U              | 2.0            | J             | 10             | U              | 10             | U            | 10          | U               | 1.0    | J | 10           | U | 5.0     | U | 5.0     | U |
|           | 14-Nov-97 | 11                   | U              | 11             | U             | 11             | U              | 11             | U            | 11          | U               | 11.0   | U | 11           | U | 5.0     | U | 5.0     | U |
| FGELGW014 | 12-Nov-96 | 2,400,000            | =              | 210,000        | =             | 200,000        | U              | 340,000        | =            | 200,000     | U               | 24,000 | J | 570,000      | = | 3,800   | J | 4,900   | J |
|           | 9-May-97  | 44                   | =              | 10             | U             | 4              | J              | 8.0            | J            | 10          | U               | 10     | U | 11           | = | 2.0     | J | 5.0     | U |
|           | 27-Aug-97 | 590                  | =              | 83             | J             | 100            | U              | 140            | =            | 100         | U               | 100    | U | 210          | = | 4.0     | J | 5.0     | U |
| FGELGW014 | 1-Dec-97  | 26                   | =              | 6.0            | J             | 4              | J              | 10             | =            | 10          | U               | 10     | U | 13           | = | 3.0     | J | 5.0     | U |

**TABLE 5-15**

COPC Refinement; Fuel Related Organic Compounds in Groundwater

*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| Station  | Date      | 2-Methyl-naphthalene |        | Acenaphthene |        | Dibenzofuran |        | Fluorene |        | Naphthalene |        | Pyrene |        | Phenanthrene |        | Benzene |        | Toluene |        |        |  |  |  |  |  |  |  |  |  |
|----------|-----------|----------------------|--------|--------------|--------|--------------|--------|----------|--------|-------------|--------|--------|--------|--------------|--------|---------|--------|---------|--------|--------|--|--|--|--|--|--|--|--|--|
|          |           | Units                | (µg/L) | (µg/L)       | (µg/L) | (µg/L)       | (µg/L) | (µg/L)   | (µg/L) | (µg/L)      | (µg/L) | (µg/L) | (µg/L) | (µg/L)       | (µg/L) | (µg/L)  | (µg/L) | (µg/L)  | (µg/L) | (µg/L) |  |  |  |  |  |  |  |  |  |
| MCL/RBC* |           | 120*                 | 370*   | 24*          | 240*   | 6.5*         | NA     | 5        | 1,000  |             |        |        |        |              |        |         |        |         |        |        |  |  |  |  |  |  |  |  |  |
| Conc.    |           | Conc.                | Conc.  | Conc.        | Conc.  | Conc.        | Conc.  | Conc.    | Conc.  | Conc.       | Conc.  | Conc.  | Conc.  | Conc.        | Conc.  | Conc.   | Conc.  | Conc.   | Conc.  |        |  |  |  |  |  |  |  |  |  |
|          | 22-Apr-98 | 16                   | =      | 10           | U      | 10           | U      | 11       | =      | 10          | U      | 10     | U      | 7.3          | J      | 1.0     | U      | 1.0     | U      |        |  |  |  |  |  |  |  |  |  |
|          | 20-Oct-98 | 3.0                  | J      | 5.0          | J      | 4            | J      | 10       | =      | 5.0         | U      | 5.0    | U      | 2.0          | J      | 5.0     | U      | 5.0     | U      |        |  |  |  |  |  |  |  |  |  |
|          | 12-Oct-99 | NA                   |        | NA           |        | NA           |        | NA       |        | NA          |        | NA     |        | NA           |        | 150     | U      | 150     | U      |        |  |  |  |  |  |  |  |  |  |

Bolded and outlined values are exceedences of MCL/RBC (RBC used when MCL data is not available).

\* RBC obtained from US EPA Region III (Noncarcinogen HI = 1.0) October 2000, where no MCL exists.

MCL Maximum Contaminant Level obtained from US EPA National Primary Drinking Water Standards March 2001

= Analyte was detected; the reported value is equal to the sample concentration.

J Analyte was detected; the reported value is an estimated concentration.

NA Data not available or analyte was not analyzed in the sample.

U Analyte was not detected; the reported value is the detection limit.

UJ Analyte was not detected; the reported value is an estimated detection limit.

**TABLE 5-16**  
 COPC Refinement; Non-Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Units<br>MCL/RBC* | Date      | 1,1-Dichloroethene<br>(µg/L)<br>7 |   | 1,2-Dichloroethene<br>(total)<br>(µg/L)<br>70 * |   | Tetrachloroethene<br>(PCE)<br>(µg/L)<br>5 |   | Trichloroethene<br>(TCE)<br>(µg/L)<br>5 |   | Vinyl Chloride<br>(µg/L)<br>2 |   | bis(2-ethylhexyl)<br>phthalate<br>(µg/L)<br>6 |   | Methylene<br>Chloride<br>(µg/L)<br>4.1* |   |
|-----------|-------------------|-----------|-----------------------------------|---|-------------------------------------------------|---|-------------------------------------------|---|-----------------------------------------|---|-------------------------------|---|-----------------------------------------------|---|-----------------------------------------|---|
|           |                   |           | Conc.                             |   | Conc.                                           |   | Conc.                                     |   | Conc.                                   |   | Conc.                         |   | Conc.                                         |   | Conc.                                   |   |
| F613GP001 |                   | 12-Sep-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
| F613GP002 |                   | 13-Sep-96 | 5.0                               | U | 10                                              | = | 5.0                                       | U | 5.0                                     | U | 4.0                           | J | 10                                            | U | 5.0                                     | U |
| F613GP003 |                   | 29-Aug-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP004 |                   | 2-Oct-96  | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP005 |                   | 3-Oct-96  | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP006 |                   | 4-Oct-96  | NA                                |   | NA                                              |   | NA                                        |   | NA                                      |   | NA                            |   | 10                                            | U | NA                                      |   |
| F613GP007 |                   | 12-Sep-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
| F613GP008 |                   | 13-Sep-96 | 5.0                               | U | 29                                              | = | 5.0                                       | U | 1.0                                     | J | 5.0                           | J | NA                                            |   | 5.0                                     | U |
| F613GP009 |                   | 29-Aug-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP010 |                   | 2-Oct-96  | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP012 |                   | 10-Oct-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 11.0                                    | U |
| F613GP013 |                   | 7-Oct-96  | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
| F613GP017 |                   | 3-Oct-96  | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP019 |                   | 8-Oct-96  | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
| F613GP020 |                   | 12-Sep-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP021 |                   | 29-Aug-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP022 |                   | 15-Sep-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP024 |                   | 11-Sep-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |
| F613GP025 |                   | 29-Aug-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 100                                           | J | 5.0                                     | U |
| F613GP026 |                   | 15-Sep-96 | 5.0                               | U | 5.0                                             | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | 5.0                                     | U |

**TABLE 5-16**  
 COPC Refinement; Non-Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Units<br>MCL/RBC* | 1,1-Dichloroethene |       | 1,2-Dichloroethene (total) |       | Tetrachloroethene (PCE) |       | Trichloroethene (TCE) |       | Vinyl Chloride |       | bis(2-ethylhexyl) phthalate |       | Methylene Chloride |   |
|-----------|-------------------|--------------------|-------|----------------------------|-------|-------------------------|-------|-----------------------|-------|----------------|-------|-----------------------------|-------|--------------------|---|
|           |                   | (µg/L)<br>7        |       | (µg/L)<br>70 *             |       | (µg/L)<br>5             |       | (µg/L)<br>5           |       | (µg/L)<br>2    |       | (µg/L)<br>6                 |       | (µg/L)<br>4.1*     |   |
| Date      | Conc.             | Conc.              | Conc. | Conc.                      | Conc. | Conc.                   | Conc. | Conc.                 | Conc. | Conc.          | Conc. | Conc.                       | Conc. | Conc.              |   |
| F613GP027 | 15-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | NA                          |       | 5.0                | U |
| F613GP028 | 11-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP029 | 28-Aug-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP030 | 18-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP031 | 14-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | NA                          |       | 5.0                | U |
| F613GP032 | 10-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP033 | 28-Aug-96         | 5.0                | U     | 3.0                        | J     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 100                         | J     | 5.0                | U |
| F613GP034 | 28-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP035 | 16-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | NA                          |       | 5.0                | U |
| F613GP036 | 9-Sep-96          | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 13                          | U     | 5.0                | U |
| F613GP037 | 30-Aug-96         | 20.0               | =     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 3.0                         | J     | 5.0                | U |
| F613GP038 | 16-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP039 | 29-Sep-96         | 5.0                | U     | 1,700                      | J     | 1,900                   | J     | 1,500                 | J     | 38.0           | =     | NA                          |       | 5.0                | U |
| F613GP040 | 13-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP041 | 10-Sep-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP042 | 3-Sep-96          | 4.0                | J     | 1.0                        | J     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 4.0                         | J     | 5.0                | U |
| F613GP043 | 9-Sep-96          | 1.0                | J     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 10.0               | U |
| F613GP044 | 27-Aug-96         | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP046 | 9-Oct-96          | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |
| F613GP047 | 8-Oct-96          | 5.0                | U     | 5.0                        | U     | 5.0                     | U     | 5.0                   | U     | 10.0           | U     | 10                          | U     | 5.0                | U |

**TABLE 5-16**  
 COPC Refinement; Non-Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station    | Date      | Units    |        | 1,1-Dichloroethene |   | 1,2-Dichloroethene (total) |      | Tetrachloroethene (PCE) |   | Trichloroethene (TCE) |   | Vinyl Chloride |   | bis(2-ethylhexyl) phthalate |   | Methylene Chloride |      |
|------------|-----------|----------|--------|--------------------|---|----------------------------|------|-------------------------|---|-----------------------|---|----------------|---|-----------------------------|---|--------------------|------|
|            |           | MCL/RBC* | Conc.  | (µg/L)             | 7 | (µg/L)                     | 70 * | (µg/L)                  | 5 | (µg/L)                | 5 | (µg/L)         | 2 | (µg/L)                      | 6 | (µg/L)             | 4.1* |
| F613GP048  | 10-Sep-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U    |
| F613GP049  | 9-Sep-96  |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 86                          | U | 10.0               | U    |
| F613GP050  | 4-Sep-96  |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 1.0                         | J | 5.0                | U    |
| F613GP051  | 27-Aug-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 11                          | U | 5.0                | U    |
| F613GP052  | 9-Oct-96  |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U    |
| F613GP053  | 17-Sep-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | NA                          |   | 5.0                | U    |
| F613GP054  | 17-Sep-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 1.0                   | J | 10.0           | U | NA                          |   | 5.0                | U    |
| F613GP056  | 3-Sep-96  |          | 25.0 U | 25.0               | U | 25                         | U    | 25                      | U | 25.0                  | U | 50.0           | U | NA                          |   | 50.0               | U    |
| F613GP057  | 30-Aug-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 4.0                         | J | 5.0                | U    |
| F613GP058  | 30-Aug-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 3.0                         | J | 5.0                | U    |
| F613GP059  | 3-Sep-96  |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 4.0                         | J | 5.0                | U    |
| F613GP060  | 4-Sep-96  |          | 5.0 U  | 5.0                | U | 1.0                        | J    | 5.0                     | U | 5.0                   | U | 10.0           | U | 4.0                         | J | 5.0                | U    |
| F613GP063  | 16-Oct-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U    |
| F613GP064  | 15-Oct-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | NA                          |   | 5.0                | U    |
| F613GP065  | 14-Oct-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 12                          | U | 5.0                | U    |
| F613GP066  | 13-Oct-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 17                          | U | 5.0                | U    |
| F613GP067  | 12-Oct-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U    |
| F613GP068  | 11-Oct-96 |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 10.0           | U | 13                          | U | 17.0               | U    |
| LF037GP023 | 9-Jun-97  |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 5.0            | U | NA                          |   | 5.0                | U    |
| LF037GP025 | 8-Jun-97  |          | 5.0 U  | 5.0                | U | 5.0                        | U    | 5.0                     | U | 5.0                   | U | 5.0            | U | NA                          |   | 5.0                | U    |

**TABLE 5-16**  
 COPC Refinement; Non-Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station    | Units<br>MCL/RBC*<br>Date | 1,1-Dichloroethene<br>(µg/L)<br>7 |   | 1,2-Dichloroethene<br>(total)<br>(µg/L)<br>70 <sup>a</sup> |   | Tetrachloroethene<br>(PCE)<br>(µg/L)<br>5 |   | Trichloroethene<br>(TCE)<br>(µg/L)<br>5 |   | Vinyl Chloride<br>(µg/L)<br>2 |   | bis(2-ethylhexyl)<br>phthalate<br>(µg/L)<br>6 |   | Methylene<br>Chloride<br>(µg/L)<br>4.1* |   |
|------------|---------------------------|-----------------------------------|---|------------------------------------------------------------|---|-------------------------------------------|---|-----------------------------------------|---|-------------------------------|---|-----------------------------------------------|---|-----------------------------------------|---|
|            |                           | Conc.                             |   | Conc.                                                      |   | Conc.                                     |   | Conc.                                   |   | Conc.                         |   | Conc.                                         |   | Conc.                                   |   |
| LF037GP026 | 9-Jun-97                  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | NA                                            |   | 5.0                                     | U |
| LF037GP031 | 9-Jun-97                  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | NA                                            |   | 5.0                                     | U |
| LF037GP036 | 10-Jun-97                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | NA                                            |   | 5.0                                     | U |
| LF037GP037 | 10-Jun-97                 | 5.0                               | U | 13.3 <sup>b</sup>                                          | = | 5.0                                       | U | 5.0                                     | U | 17.1                          | = | NA                                            |   | 5.0                                     | U |
| LF037GP038 | 10-Jun-97                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | NA                                            |   | 5.0                                     | U |
| LF037GP065 | 1-Jul-97                  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | NA                                            |   | 5.0                                     | U |
| LF037GP066 | 1-Jul-97                  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | NA                                            |   | 5.0                                     | U |
| LF699GP049 | 12-Aug-97                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | NA                                            |   | 5.0                                     | U |
| F240GW003  | 18-Nov-96                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 7.0                                     | U |
|            | 6-May-97                  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|            | 19-Aug-97                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 6.0                                     | U |
|            | 12-Nov-97                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 11                                            | U | 5.0                                     | U |
| F613GW001  | 20-Nov-96                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 7.0                                     | U |
|            | 29-Apr-97                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|            | 4-Sep-97                  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|            | 6-Nov-97                  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 12                                            | U | 5.0                                     | U |
|            | 12-Oct-99                 | 3.0                               | U | 3.0                                                        | U | 3.0                                       | U | 3.0                                     | U | 3.0                           | U | NA                                            |   | 3.0                                     | U |
| F613GW003  | 18-Nov-96                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 7.0                                     | U |
|            | 29-Apr-97                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|            | 18-Aug-97                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|            | 7-Nov-97                  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 11                                            | U | 5.0                                     | U |
|            | 22-Jun-01                 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | NA                                      |   |

**TABLE 5-16**

COPC Refinement; Non-Fuel Related Organic Compounds in Groundwater

RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Units<br>MCL/RBC* | Date      | 1,1-Dichloroethene<br>(µg/L)<br>7 |   | 1,2-Dichloroethene<br>(total)<br>(µg/L)<br>70 <sup>a</sup> |   | Tetrachloroethene<br>(PCE)<br>(µg/L)<br>5 |   | Trichloroethene<br>(TCE)<br>(µg/L)<br>5 |   | Vinyl Chloride<br>(µg/L)<br>2 |   | bis(2-ethylhexyl)<br>phthalate<br>(µg/L)<br>6 |   | Methylene<br>Chloride<br>(µg/L)<br>4.1* |   |
|-----------|-------------------|-----------|-----------------------------------|---|------------------------------------------------------------|---|-------------------------------------------|---|-----------------------------------------|---|-------------------------------|---|-----------------------------------------------|---|-----------------------------------------|---|
|           |                   |           | Conc.                             |   | Conc.                                                      |   | Conc.                                     |   | Conc.                                   |   | Conc.                         |   | Conc.                                         |   | Conc.                                   |   |
| F613GW004 |                   | 12-Nov-96 | 5.0                               | U | 24                                                         | = | 2.0                                       | J | 3.0                                     | J | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|           |                   | 30-Apr-97 | 5.0                               | U | 39                                                         | = | 3.0                                       | J | 3.0                                     | J | 7.0                           | J | 10                                            | U | 5.0                                     | U |
|           |                   | 22-Aug-97 | 5.0                               | U | 35                                                         | = | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|           |                   | 6-Nov-97  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 11                                            | U | 5.0                                     | U |
|           |                   | 22-Jun-01 | 5.0                               | U | 84.5 <sup>b</sup>                                          | = | 0.35                                      | J | 4.0                                     | J | 10.8                          | = | NA                                            |   | NA                                      |   |
| F613GW005 |                   | 20-Nov-96 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 8.0                                     | U |
|           |                   | 5-May-97  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|           |                   | 19-Aug-97 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|           |                   | 25-Nov-97 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | 10                                            | U | 5.0                                     | U |
| F613GW006 |                   | 20-Oct-98 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | 4.0                                           | J | 5.0                                     | U |
|           |                   | 18-Jun-99 | 5.0                               | U | 33                                                         | = | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | 10                                            | U | 5.0                                     | U |
|           |                   | 12-Oct-99 | 3.0                               | U | 3.0                                                        | U | 3.0                                       | U | 3.0                                     | U | 3.0                           | U | 5.0                                           | U | 3.0                                     | U |
| F613GW007 |                   | 19-Nov-99 | 3.0                               | U | 3.0                                                        | U | 3.0                                       | U | 3.0                                     | U | 3.0                           | U | 5.0                                           | U | 3.0                                     | U |
| F613GW008 |                   | 19-Nov-99 | 3.0                               | U | 3.0                                                        | U | 3.0                                       | U | 3.0                                     | U | 3.0                           | U | NA                                            |   | 3.0                                     | U |
| F613GW009 |                   | 22-Jun-01 | 5.0                               | U | 5                                                          | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | NA                                            |   | NA                                      |   |
| F613GW02D |                   | 21-Nov-96 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|           |                   | 30-Apr-97 | 5.0                               | U | 5.0                                                        | U | 2.0                                       | J | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|           |                   | 19-Aug-97 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 6.0                                     | U |
|           |                   | 7-Nov-97  | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
| FFDSGW17A |                   | 28-Jan-97 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|           |                   | 17-Jun-97 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 10.0                          | U | 10                                            | U | 5.0                                     | U |
|           |                   | 24-Apr-98 | 1.0                               | U | 1.0                                                        | U | 1.0                                       | U | 1.0                                     | U | 1.0                           | U | 10                                            | U | 5.0                                     | U |
|           |                   | 20-Oct-98 | 5.0                               | U | 5.0                                                        | U | 5.0                                       | U | 5.0                                     | U | 5.0                           | U | 5.0                                           | U | 5.0                                     | U |
|           |                   | 12-Oct-99 | 3.0                               | U | 3.0                                                        | U | 3.0                                       | U | 3.0                                     | U | 3.0                           | U | 5.0                                           | U | 3.0                                     | U |

**TABLE 5-16**  
 COPC Refinement; Non-Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Units<br>MCL/RBC* | 1,1-Dichloroethene |   | 1,2-Dichloroethene (total) |   | Tetrachloroethene (PCE) |   | Trichloroethene (TCE) |   | Vinyl Chloride |   | bis(2-ethylhexyl) phthalate |   | Methylene Chloride |   |
|-----------|-------------------|--------------------|---|----------------------------|---|-------------------------|---|-----------------------|---|----------------|---|-----------------------------|---|--------------------|---|
|           |                   | (µg/L)<br>7        |   | (µg/L)<br>70 *             |   | (µg/L)<br>5             |   | (µg/L)<br>5           |   | (µg/L)<br>2    |   | (µg/L)<br>6                 |   | (µg/L)<br>4.1*     |   |
| Station   | Date              | Conc.              |   | Conc.                      |   | Conc.                   |   | Conc.                 |   | Conc.          |   | Conc.                       |   | Conc.              |   |
| FFDSGW17B | 28-Jan-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 17-Jun-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 24-Apr-98         | 1.0                | U | 1.0                        | U | 1.0                     | U | 1.0                   | U | 1.0            | U | 10                          | U | 5.0                | U |
|           | 20-Oct-98         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 5.0            | U | 10                          | J | 5.0                | U |
|           | 12-Oct-99         | 3.0                | U | 3.0                        | U | 3.0                     | U | 3.0                   | U | 3.0            | U | 8.0                         | U | 3.0                | U |
| FGELGW005 | 11-Nov-96         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 5-May-97          | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 28-Aug-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 35                          | U | 5.0                | U |
|           | 12-Nov-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 11                          | U | 5.0                | U |
| FGELGW006 | 12-Nov-96         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 6-May-97          | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 25-Aug-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 14-Nov-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 11                          | U | 5.0                | U |
| FGELGW007 | 10-Nov-96         | 5.0                | U | 3.0                        | J | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 7-May-97          | 5.0                | U | 3.0                        | J | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 25-Aug-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 12-Nov-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
| FGELGW008 | 10-Nov-96         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 7-May-97          | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 26-Aug-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 14-Nov-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 11                          | U | 5.0                | U |
| FGELGW011 | 12-Nov-96         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 8-May-97          | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | NA                          |   | 5.0                | U |
|           | 26-Aug-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |

**TABLE 5-16**  
 COPC Refinement; Non-Fuel Related Organic Compounds in Groundwater  
 RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Station   | Units<br>MCL/RBC* | 1,1-Dichloroethene |   | 1,2-Dichloroethene (total) |   | Tetrachloroethene (PCE) |   | Trichloroethene (TCE) |   | Vinyl Chloride |   | bis(2-ethylhexyl) phthalate |   | Methylene Chloride |   |
|-----------|-------------------|--------------------|---|----------------------------|---|-------------------------|---|-----------------------|---|----------------|---|-----------------------------|---|--------------------|---|
|           |                   | (µg/L)<br>7        |   | (µg/L)<br>70 <sup>a</sup>  |   | (µg/L)<br>5             |   | (µg/L)<br>5           |   | (µg/L)<br>2    |   | (µg/L)<br>6                 |   | (µg/L)<br>4.1*     |   |
|           | Date              | Conc.              |   | Conc.                      |   | Conc.                   |   | Conc.                 |   | Conc.          |   | Conc.                       |   | Conc.              |   |
|           | 12-Nov-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | NA                          |   | 5.0                | U |
| FGELGW012 | 12-Nov-96         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 8-May-97          | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 27-Aug-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 13-Nov-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 11                          | U | 5.0                | U |
|           | 22-Jun-01         | 5.0                | U | 1.8 <sup>b</sup>           | J | 5.0                     | U | 5.0                   | U | 10.0           | U | NA                          |   | NA                 |   |
| FGELGW013 | 12-Nov-96         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 9-May-97          | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 29-Aug-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 14-Nov-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | 12                          | U | 5.0                | U |
| FGELGW014 | 12-Nov-96         | 6,000.0            | U | 6,000                      | U | 6,000                   | U | 6,000.0               | U | 12,000         | U | <b>40,000</b>               | J | 6,000.0            | U |
|           | 9-May-97          | 5.0                | U | 5.0                        | U | 5.0                     | = | 5.0                   | U | 10.0           | U | 10                          | U | 5.0                | U |
|           | 27-Aug-97         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 10.0           | U | <b>75</b>                   | J | 5.0                | U |
|           | 1-Dec-97          | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 5.0            | U | NA                          |   | 5.0                | U |
|           | 22-Apr-98         | 1.0                | U | 1.0                        | U | 1.0                     | U | 1.0                   | U | 1.0            | U | <b>7.7</b>                  | J | 5.0                | U |
|           | 20-Oct-98         | 5.0                | U | 5.0                        | U | 5.0                     | U | 5.0                   | U | 5.0            | U | 1.0                         | J | 5.0                | U |
|           | 12-Oct-99         | 150.0              | U | 150                        | U | 150                     | U | 150.0                 | U | 150.0          | U | NA                          |   | <b>83.0</b>        | J |

Bolded and outlined values are exceedences of background reference concentrations (BRCs) and MCLs/RBCs (RBC used when MCL data is not available).

\* RBC obtained from US EPA Region III (Noncarcinogen HI = 1.0) October 2000, where no MCL exists

MCL Maximum Contaminant Level obtained from US EPA National Primary Drinking Water Standards March 2001

<sup>a</sup> MCL for cis-1,2-Dichloroethene used; MCL for trans-1,2-Dichloroethene = 100 µg/L

<sup>b</sup> Value is sum of separate reported values for cis-1,2-dichloroethene and trans-1,2-dichloroethene

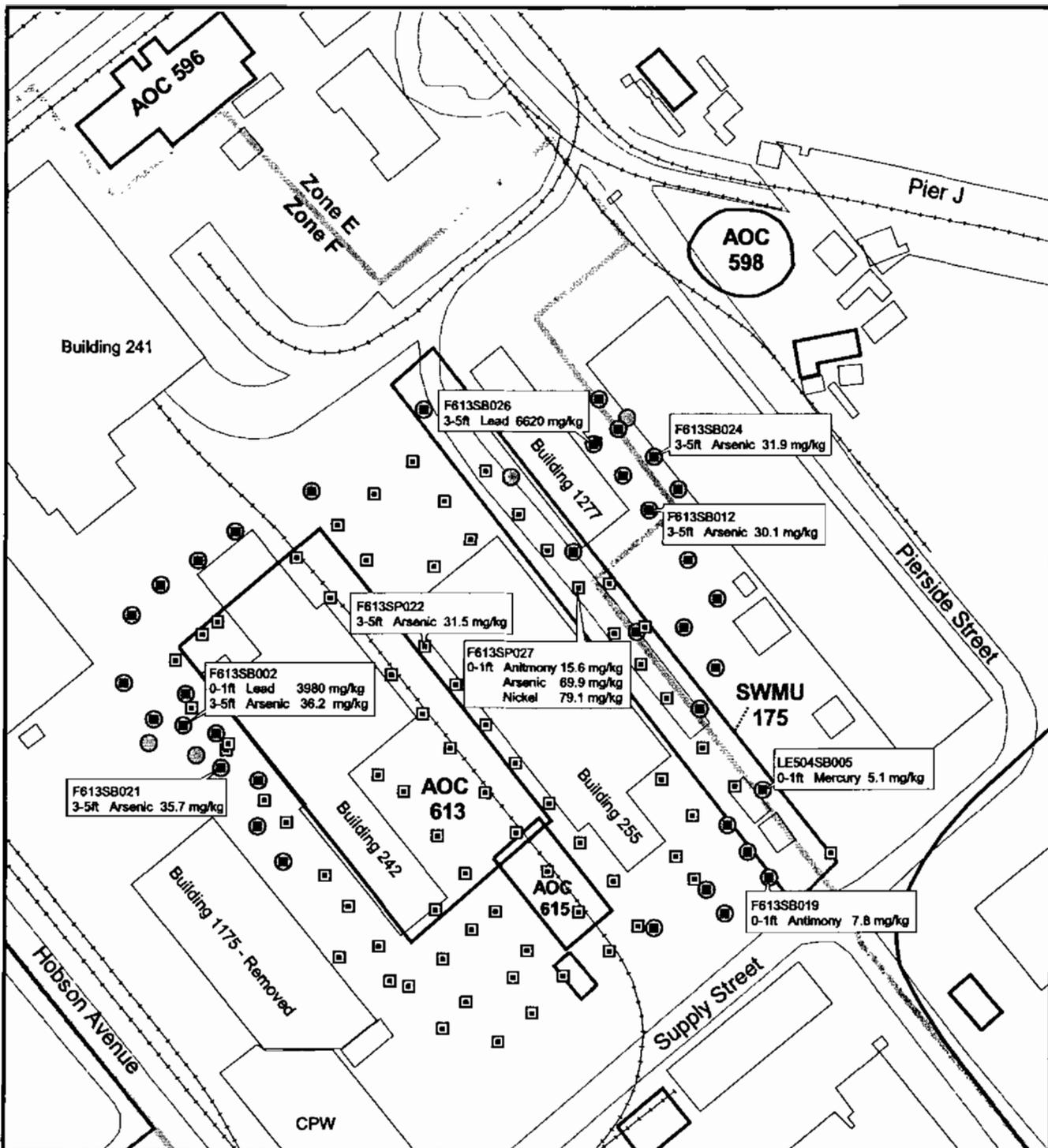
= Analyte was detected; the reported value is equal to the sample concentration.

J Analyte was detected; the reported value is an estimated concentration.

NA Data not available or analyte was not analyzed in the sample.

U Analyte was not detected; the reported value is the detection limit.

UJ Analyte was not detected; the reported value is an estimated detection limit.



Note: Almost all soil probes (0 to 4 ft bls unless otherwise noted), surface soil (0 to 1 ft bls) and subsurface soil (3 to 5 ft bls) samples shown were analyzed for metals. Only the concentrations exceeding background ranges are presented.

**Zones E and F Background Ranges, mg/kg**

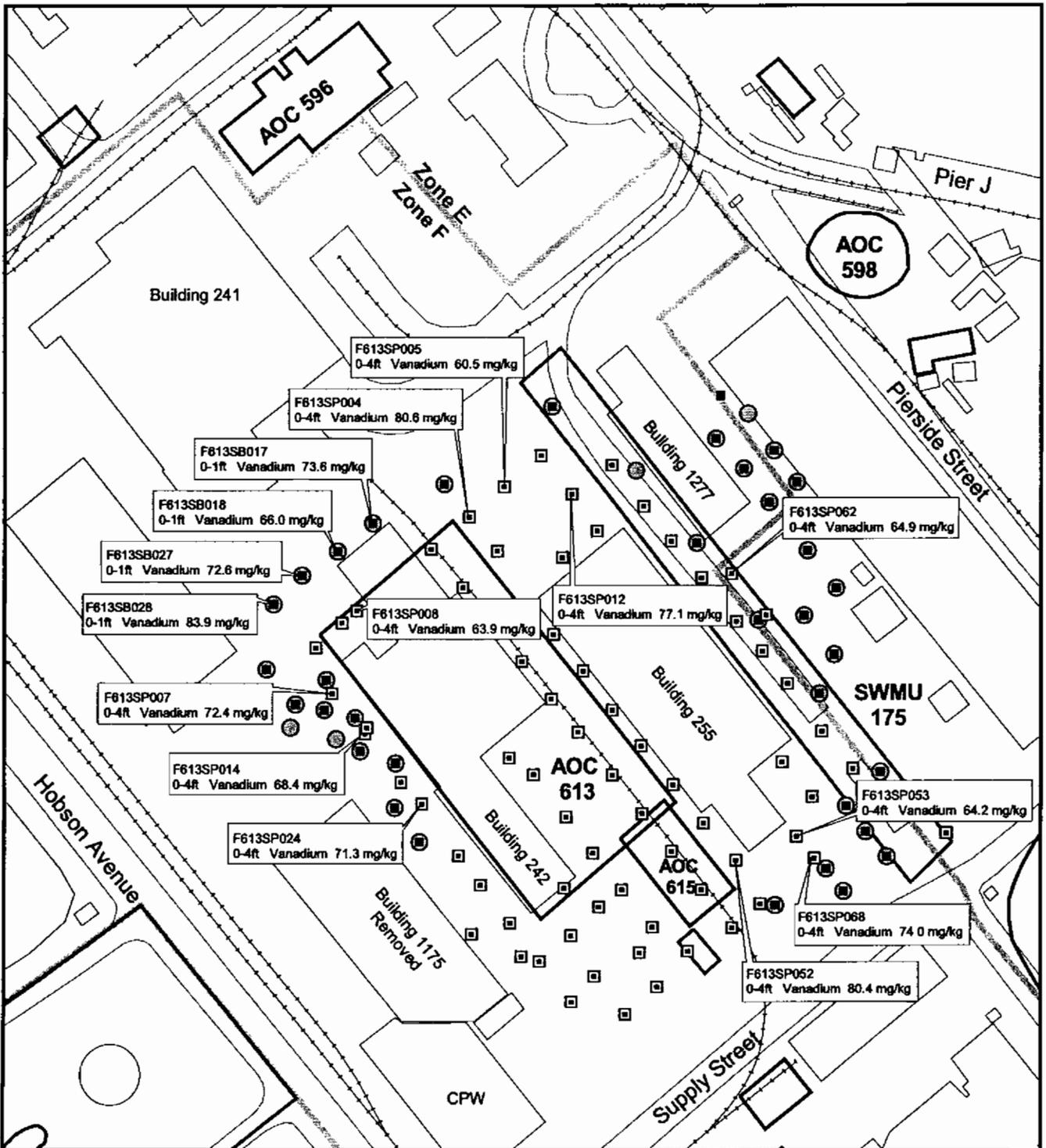
|          | Surface   | Subsurface | RBC  | SSL (DAF = 10) |
|----------|-----------|------------|------|----------------|
| Antimony | 0.5-7.4   | 0.52-1.6   | 3.1  | 2.5            |
| Arsenic  | 0.95-67.5 | 0.83-30    | 0.43 | 15             |
| Lead     | 1.0-400   | 1.8-322    | 400  | 400            |
| Mercury  | 0.03-2.7  | 0.04-0.90  | 2.3  | 1.0            |
| Nickel   | 0.60-72   | 0.85-20    | 160  | 65             |

- Soil Probe Samples
- Subsurface Soil Samples
- Surface Soil Samples
- ⚡ Roads
- ⚡ Railroads
- ▭ Buildings
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Zone Boundary



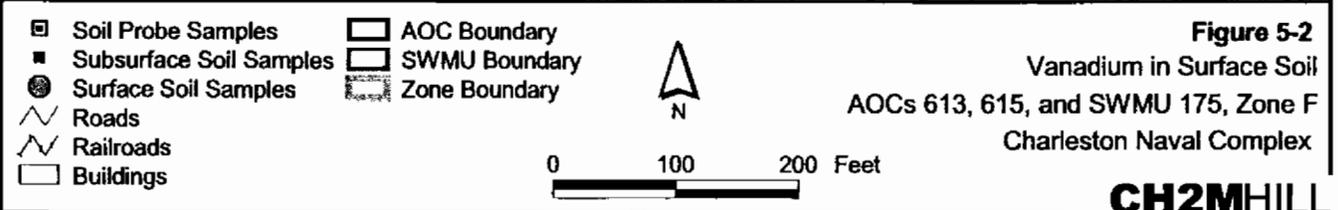
0 100 200 Feet

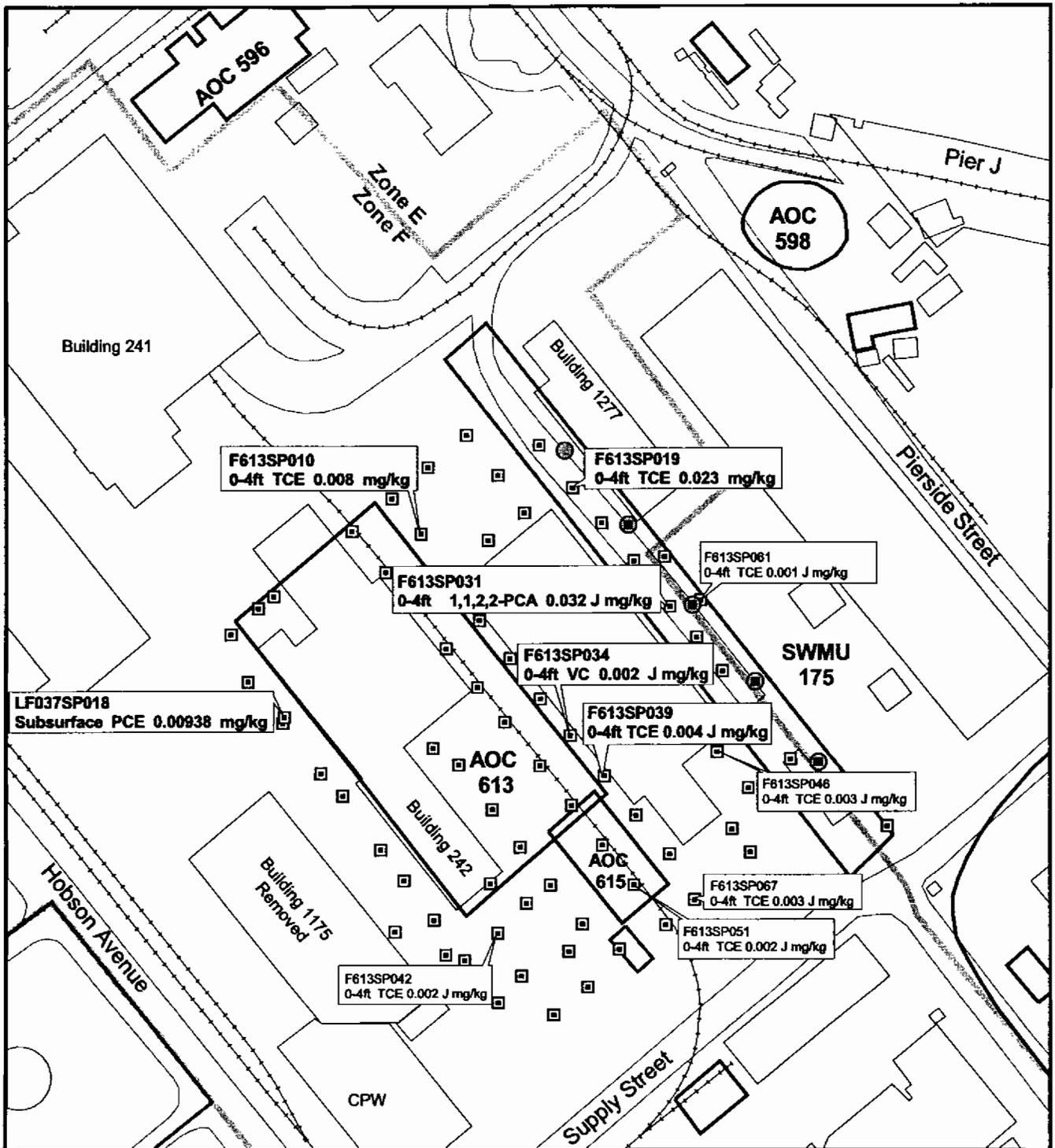
**Figure 5-1**  
 Selected COPC Metals in Surface and Subsurface Soil; Antimony, Arsenic, Lead, Mercury, and Nickel  
 AOCs 613, 615, and SWMU 175, Zone F  
 Charleston Naval Complex



Note: Almost all soil probes (0 to 4 ft bls unless otherwise noted), surface soil (0 to 1 ft bls) and subsurface soil (3 to 5 ft bls) samples shown were analyzed for vanadium. Only the vanadium concentrations exceeding the surface soil background ranges are presented. Subsurface soil concentrations did not exceed subsurface soil background range.

Vanadium Zones E and F Background Range = 1.1 - 60 mg/kg  
 Unrestricted Land Use RBC = 55 mg/kg  
 SSL (DAF = 10) = 3000 mg/kg





Note: All samples shown were analyzed for VOCs. All detections of TCE, PCE, 1,1,2,2-PCA, and VC are shown. Concentrations that exceed screening SSLs (DAF = 1.0) are shown in bold type. No concentrations were detected exceeding RBCs.

|                                         | RBC  | SSL (DAF = 1.0) |
|-----------------------------------------|------|-----------------|
| Trichloroethene (TCE)                   | 58   | 0.003 mg/kg     |
| Tetrachloroethene (PCE)                 | 12   | 0.003 mg/kg     |
| 1,1,2,2-tetrachloroethane (1,1,2,2-PCA) | 3.2  | 0.0002 mg/kg    |
| Vinyl Chloride (VC)                     | 0.43 | 0.0007 mg/kg    |

J = Estimated Concentration

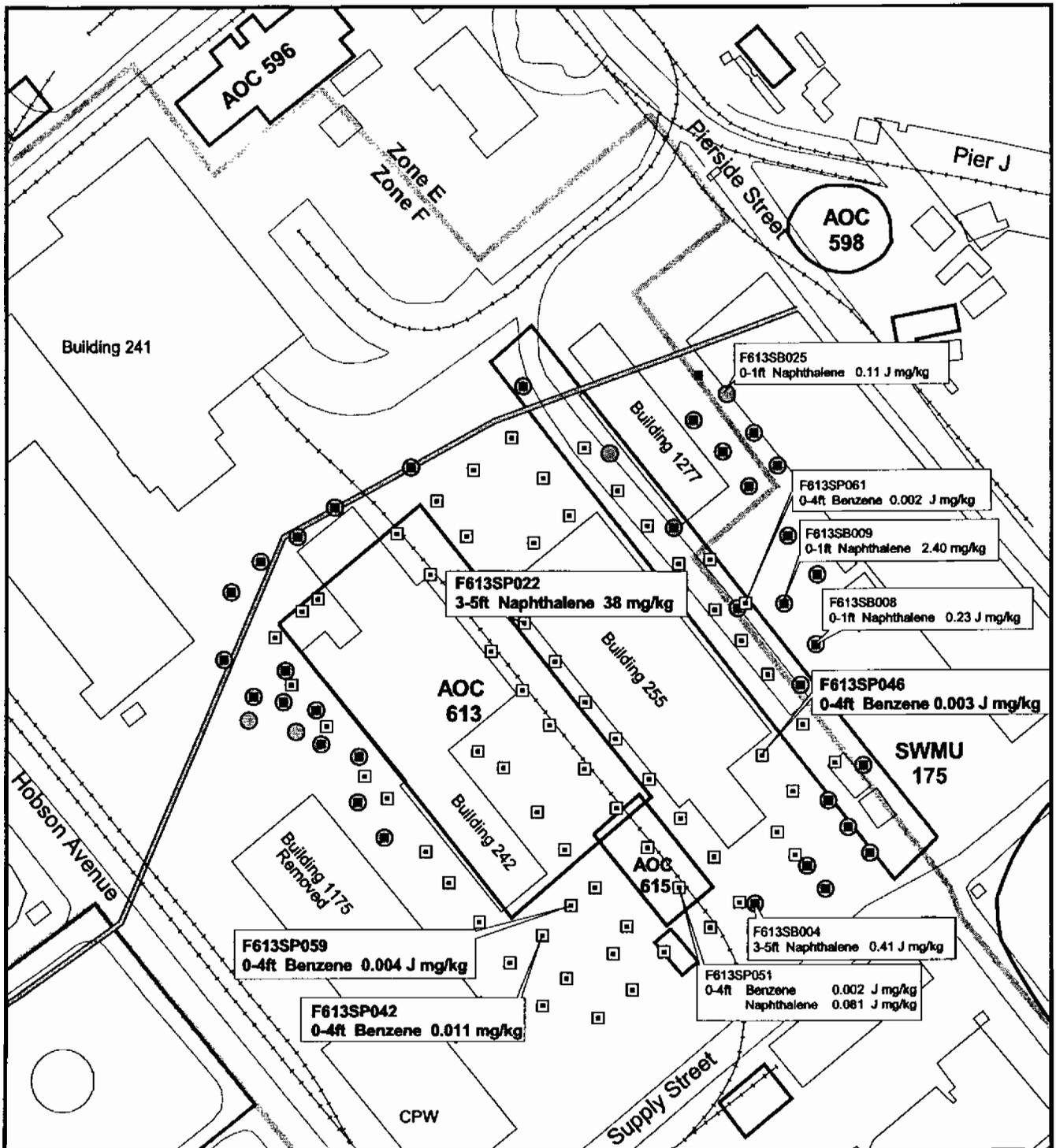
|                           |                 |
|---------------------------|-----------------|
| ■ Subsurface Soil Samples | □ AOC Boundary  |
| ● Surface Soil Samples    | □ SWMU Boundary |
| □ Soil Probe Samples      | □ Zone Boundary |
| ~ Roads                   |                 |
| ~ Railroads               |                 |
| □ Buildings               |                 |

N

0      100      200 Feet

**Figure 5-3**  
Chlorinated Solvents Detected in Soil  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex

**CH2MHILL**



Note: Almost all soil probes (0 to 4 ft bls unless otherwise noted), surface soil (0 to 1 ft bls) and subsurface soil (3 to 5 ft bls) samples shown were analyzed for naphthalene. All AOC 613 soil probe samples, and AOC 504 surface and subsurface soil samples were analyzed for benzene. All detections of naphthalene and benzene are shown. Concentrations that exceed screening SSLs (DAF = 1.0) are shown in bold type. No concentrations detected exceed RBCs.

|             | RBC  | SSL (DAF = 1.0) |
|-------------|------|-----------------|
| Naphthalene | 1600 | 4.0 mg/kg       |
| Benzene     | 12   | 0.002 mg/kg     |

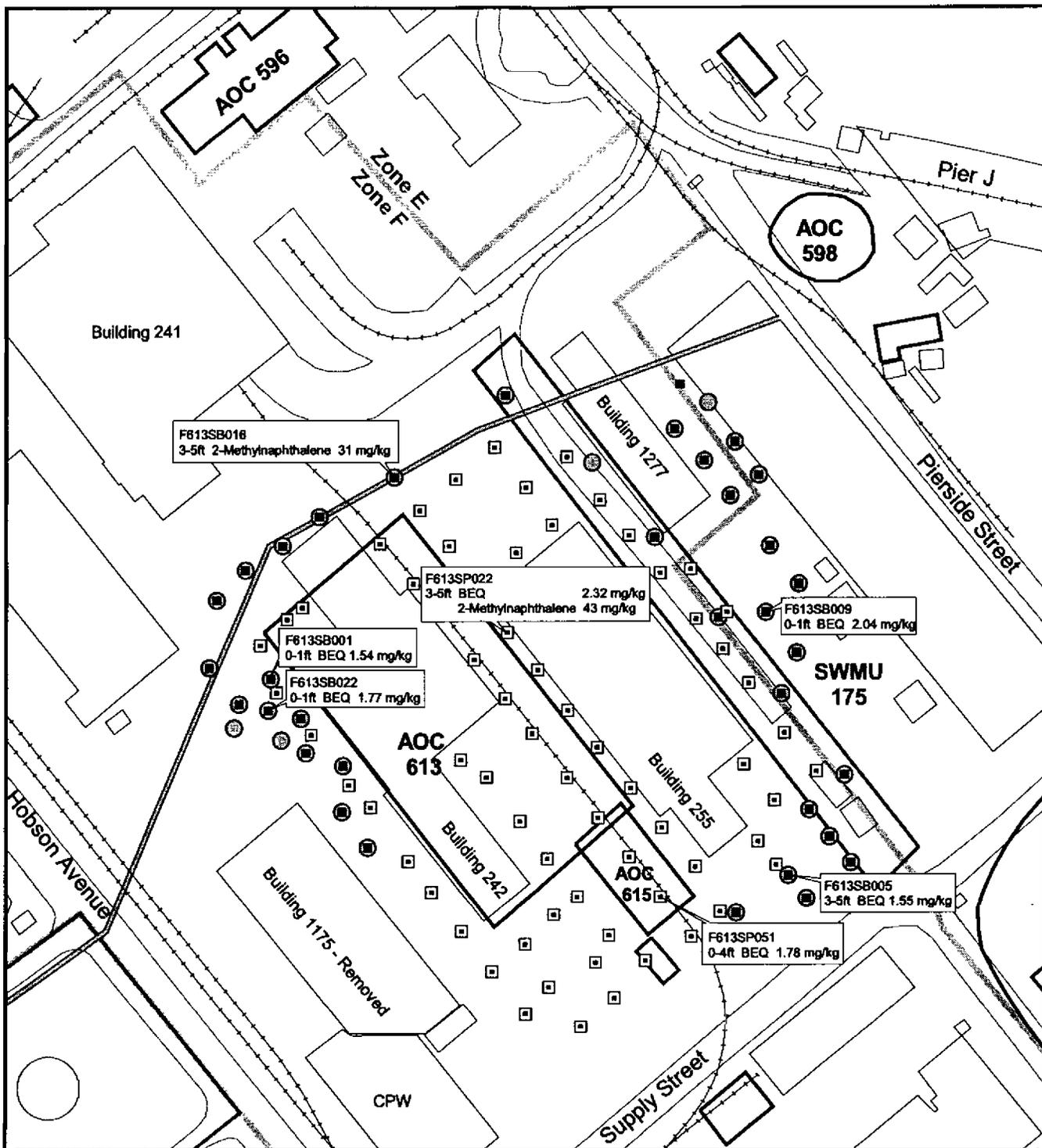
J = Estimated Concentration

- Soil Probe Samples
- Subsurface Soil Samples
- Surface Soil Samples
- Roads
- Railroads
- Fuel Line
- Buildings
- AOC Boundary
- SWMU Boundary
- Zone Boundary



0 100 200 Feet

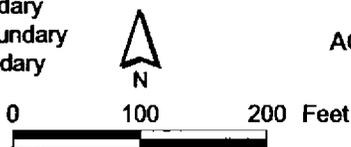
**Figure 5-4**  
Benzene and Naphthalene Detected in Soil  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex



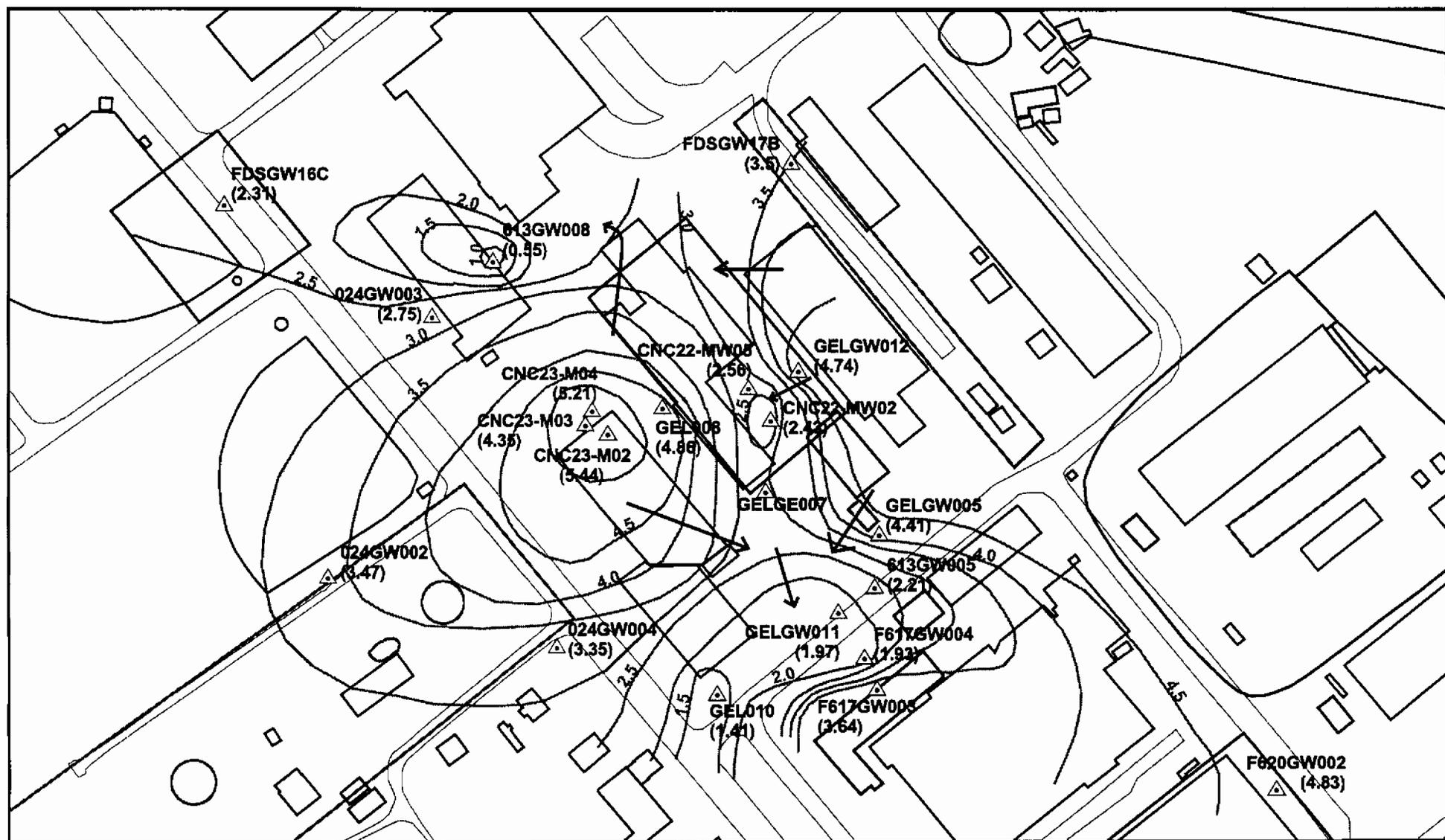
Note: Almost all soil probe, surface, and subsurface soil samples shown were analyzed for SVOCs. BEQ concentrations that exceed background concentrations, and 2-methylnaphthalene concentrations that exceed screening SSLs (DAF = 10) are shown. 2-methylnaphthalene was not detected above RBCs.

Surface Soil CNC-wide background, BEQ = 1.304 mg/kg  
 Subsurface Soil CNC-wide background, BEQ = 1.40 mg/kg  
 SSL (DAF = 10) 2-methylnaphthalene = 11 mg/kg

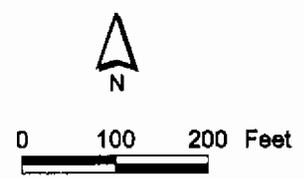
- Soil Probe Samples
- Subsurface Soil Samples
- Surface Soil Samples
- Roads
- Railroads
- Fuel Line
- ▭ Buildings
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Zone Boundary



**Figure 5-5**  
 BEQs and 2-Methylnaphthalene in Soil  
 AOCs 613, 615, and SWMU 175, Zone F  
 Charleston Naval Complex

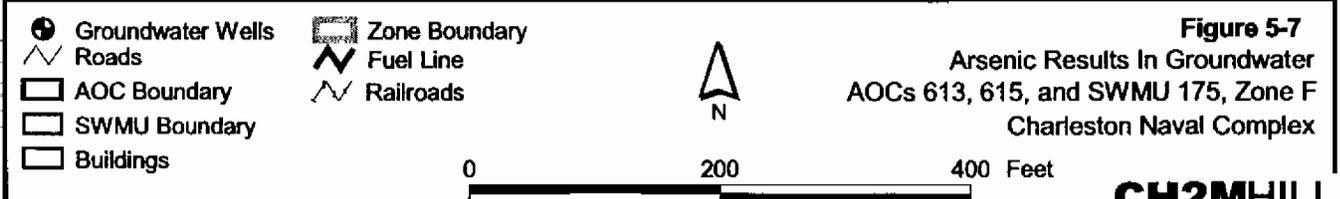
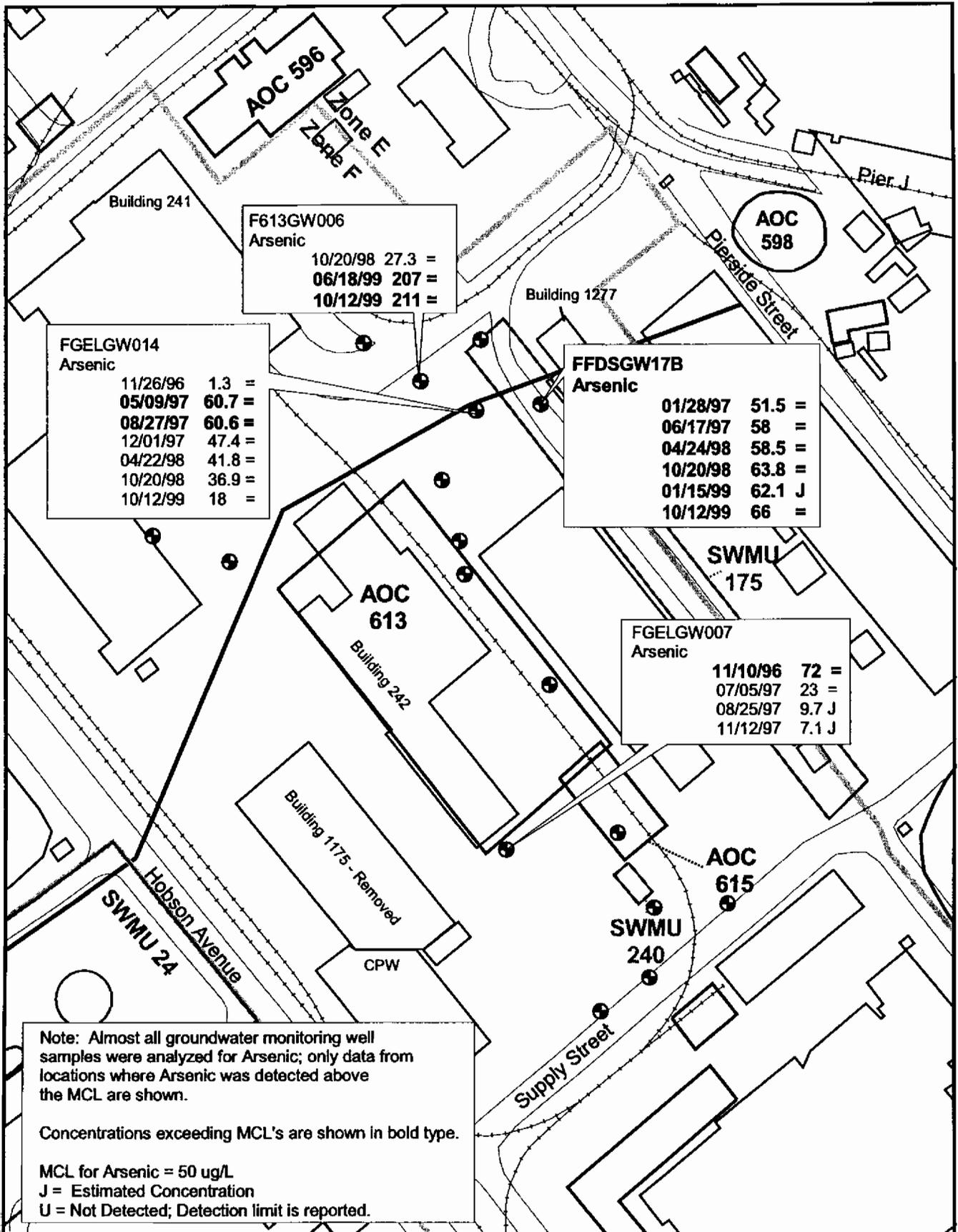


- ▲ Groundwater Survey Wells
- AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- Roads
- ~ Groundwater Potentiometric Surface Contour (ft msl)
- Groundwater Flow Direction

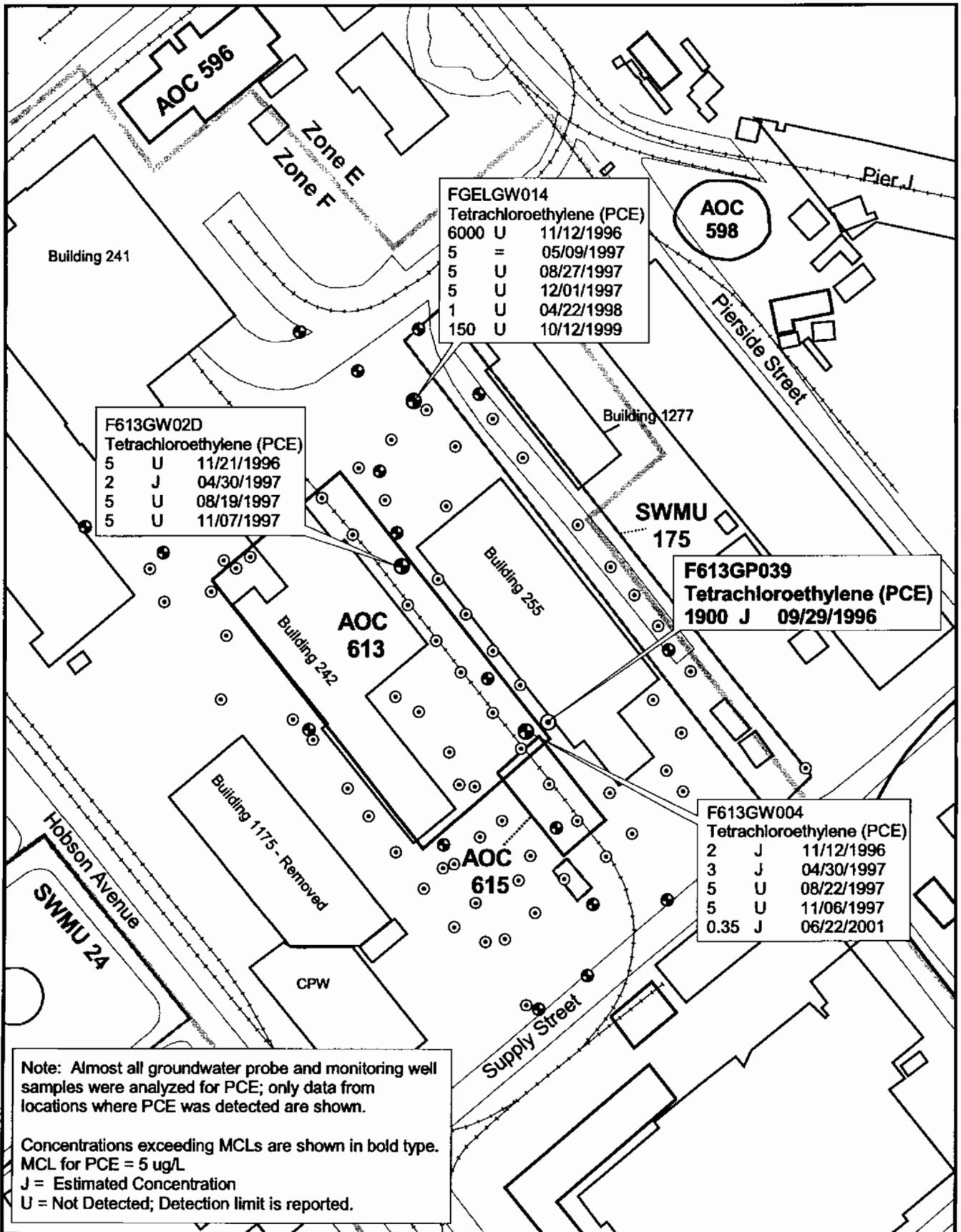


**Figure 5-6**  
 Potentiometric Surface Map of Shallow Groundwater  
 December 31, 2001  
 AOC 613/615/AWMU 175  
 Charleston Naval Complex

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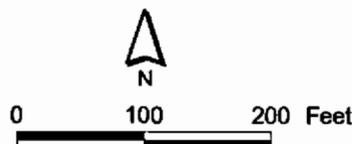


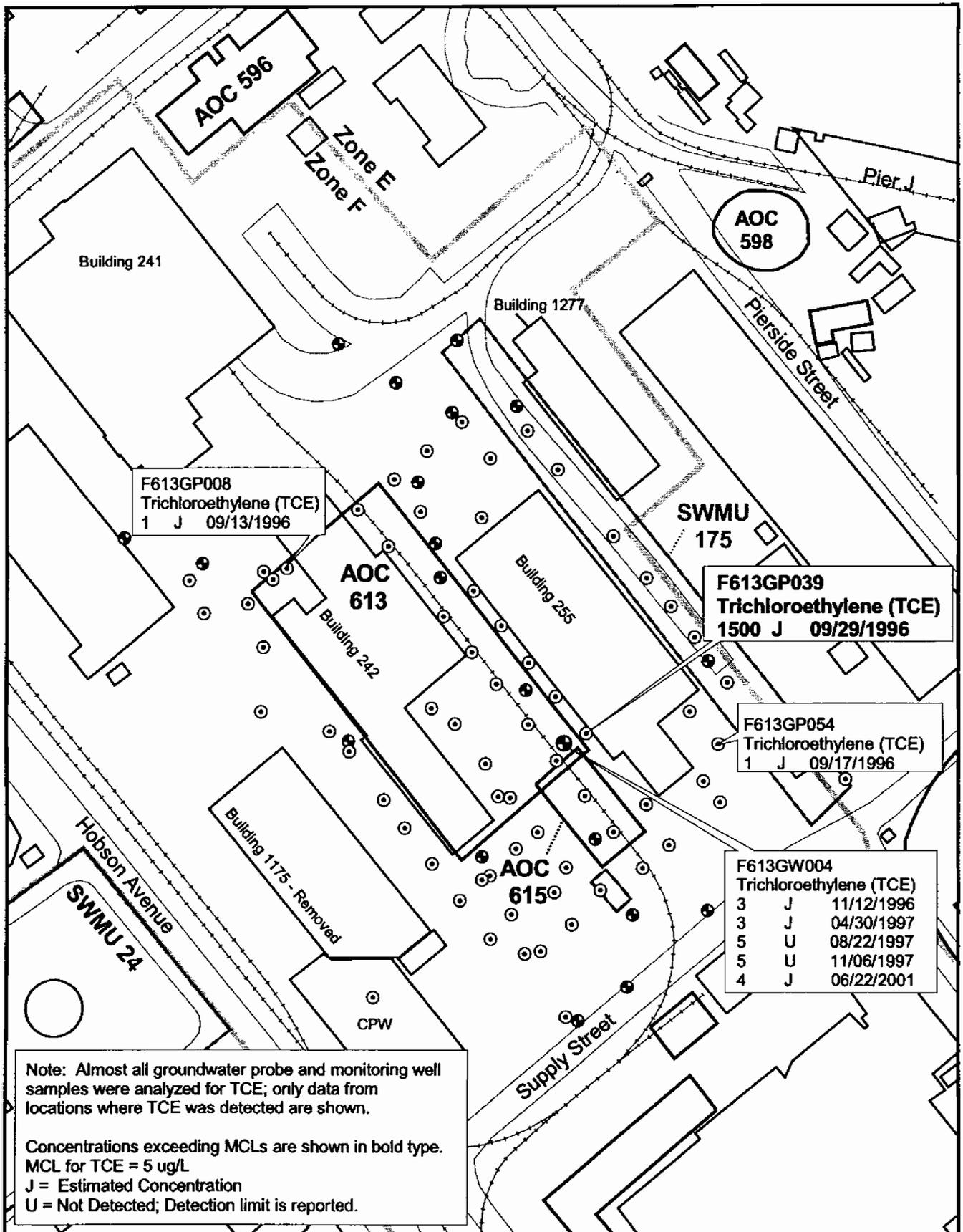
**Figure 5-7**  
 Arsenic Results In Groundwater  
 AOCs 613, 615, and SWMU 175, Zone F  
 Charleston Naval Complex



**Figure 5-8**  
PCE Detected in Groundwater  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex

- ⊕ Groundwater Well
- ⊙ Groundwater Probe
- Roads
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary
- ⚡ Railroads

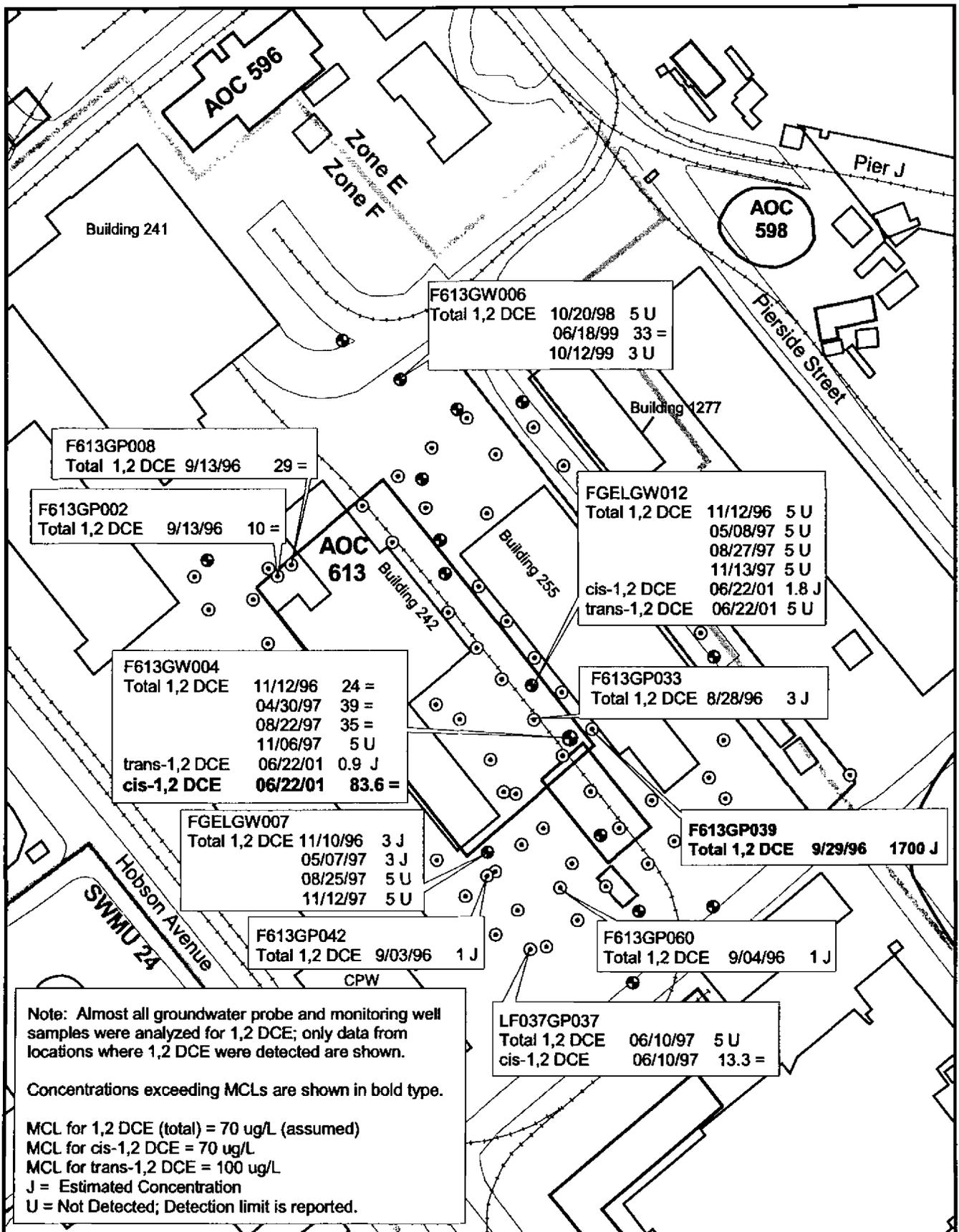




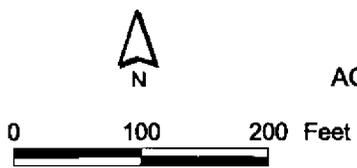
- ⊕ Groundwater Well
- ⊙ Groundwater Probe
- Roads
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary
- ≡ Railroads



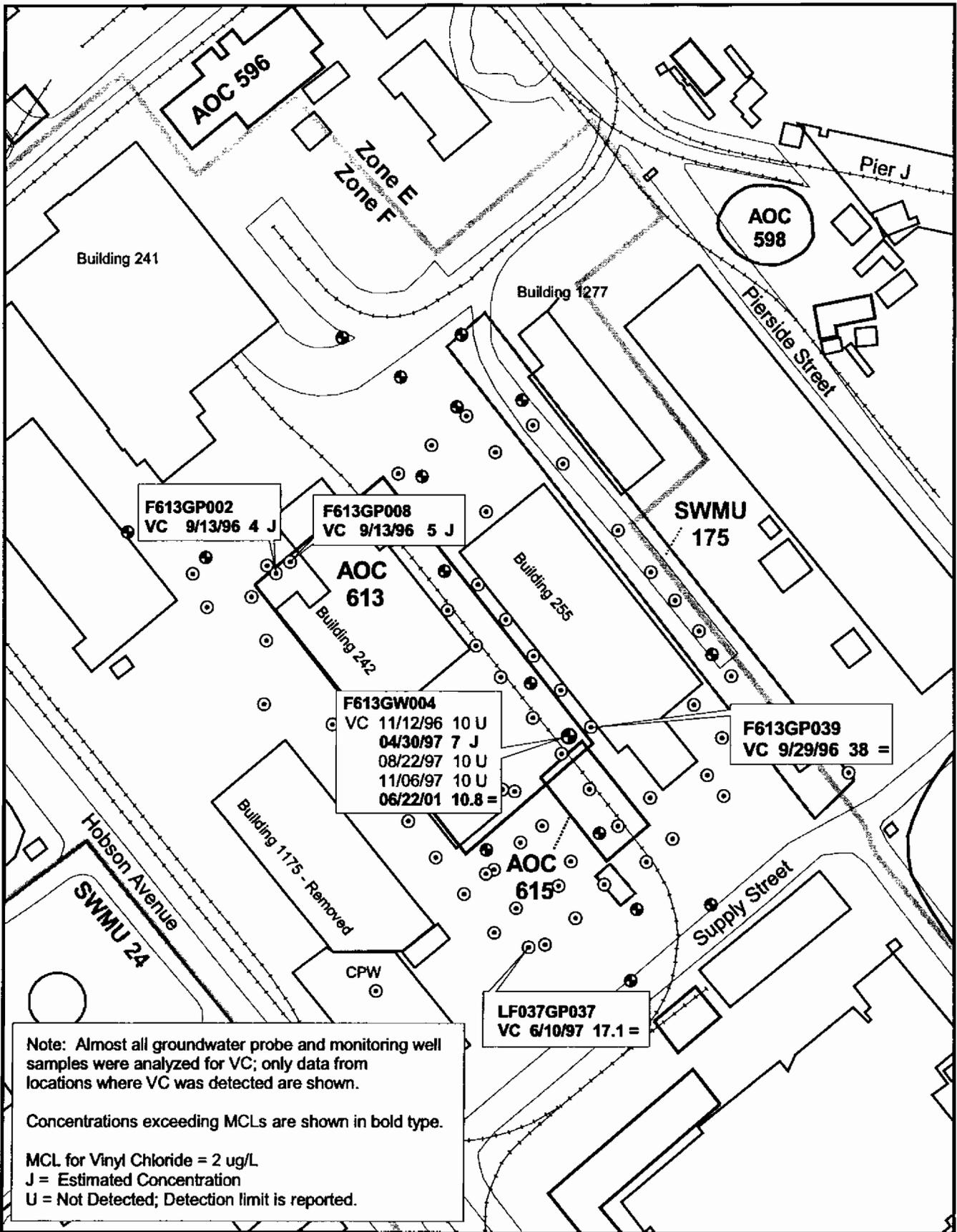
**Figure 5-9**  
TCE Detections in Groundwater  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex



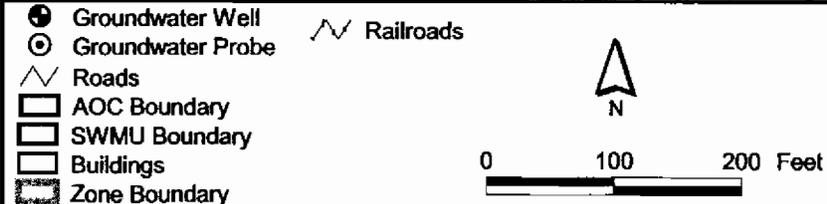
- Groundwater Well
- Groundwater Probe
- Roads
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary
- ≡ Railroads

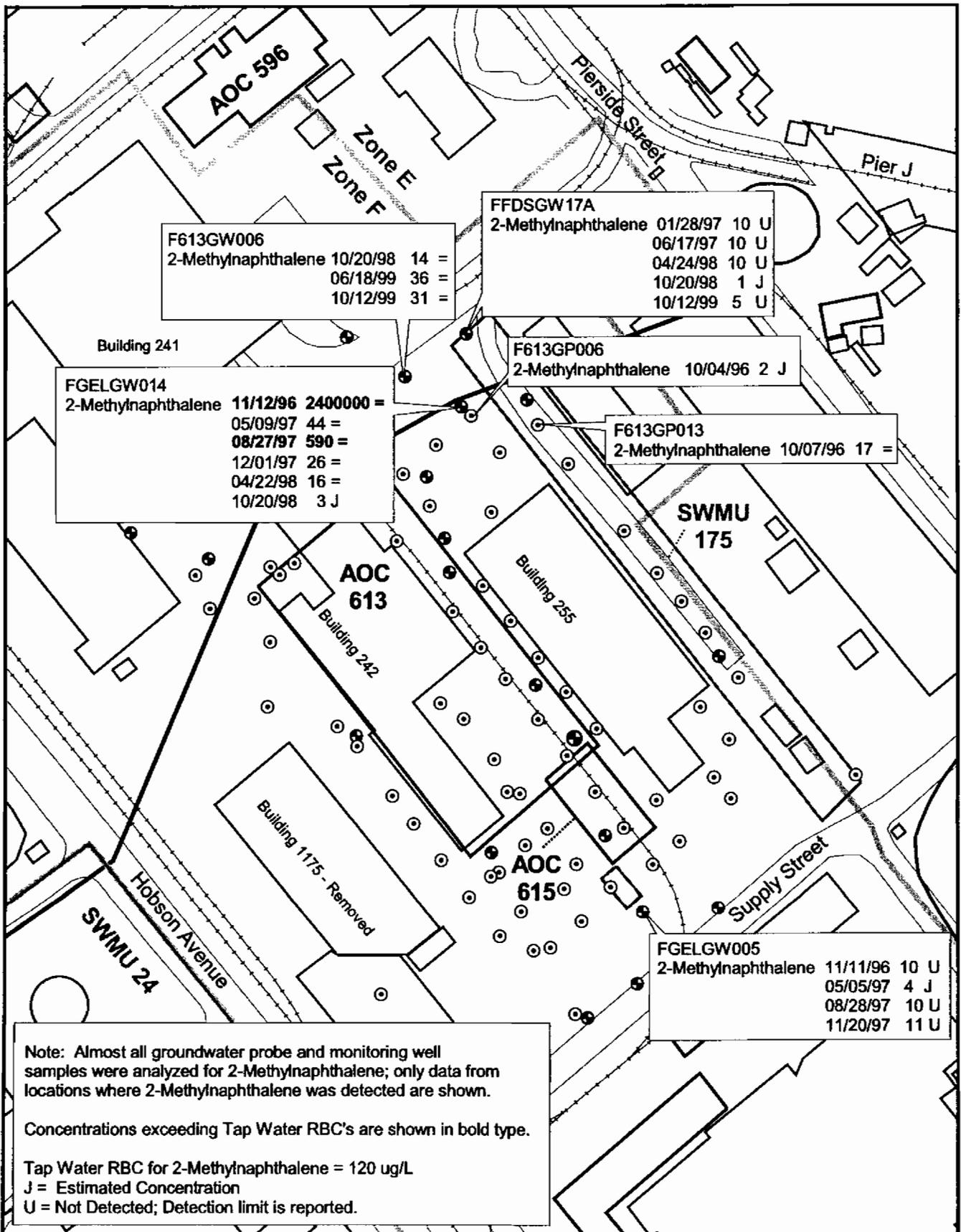


**Figure 5-10**  
1,2-DCE Detections in Groundwater  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex

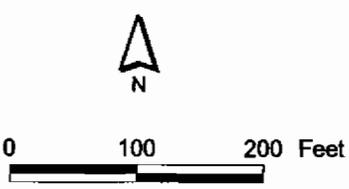


**Figure 5-11**  
 Vinyl Chloride Detections in Groundwater  
 AOCs 613, 615, and SWMU 175, Zone F  
 Charleston Naval Complex

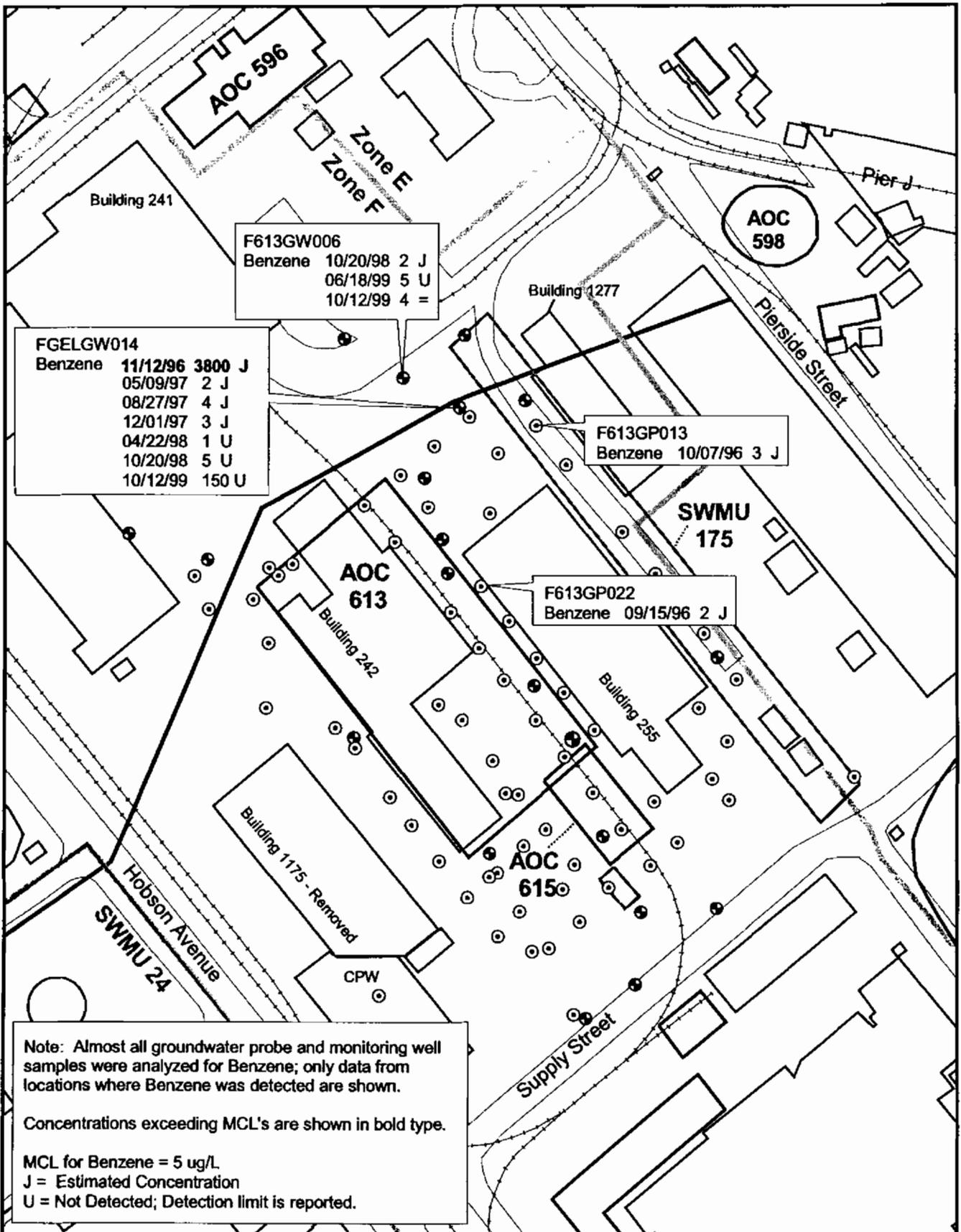




- ⊕ Groundwater Well
- ⊙ Groundwater Probe
- Roads
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary
- FDS Pipeline
- Railroads



**Figure 5-12**  
2-Methylnaphthalene in Groundwater  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex



**Figure 5-13**  
Benzene in Groundwater  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex

● Groundwater Well    FDS Pipeline  
 ⊙ Groundwater Probe    Railroads  
 ▽ Roads  
 □ AOC Boundary  
 ▭ SWMU Boundary  
 ▭ Buildings  
 ▭ Zone Boundary

0 100 200 Feet

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## 6.0 Summary of Information Related to Site Closeout Issues

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

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

Information regarding these issues is provided in this RFI Report Addendum to expedite evaluation of closure of the site after the CMS and any remedial action has been completed.

### 6.1 RFI Status

The *Zone F RFI Report, Revision 0* (EnSafe, 1999a) addressed SWMUs/AOCs within the CNC, including AOC 613/AOC 615/SWMU 175. The subsequent *Zone F RFI Work Plan Addendum* (EnSafe, 1999b) presented sampling and testing to address data gaps at the site. The samples were collected in 1999, and the results are reported in Section 4.0 of this RFI Report Addendum. Additional data gaps were identified and sampling was conducted as presented in the *Zone F RFI Work Plan Addendum, Revision 1* (CH2M-Jones, 2001a).

Comments and responses made by SCDHEC following the *Zone F RFI Report, Revision 0* confirmed that additional sampling was necessary. A copy of the Navy/EnSafe responses to SCDHEC comments on the *Zone F RFI Report, Revision 0* for this site, as well as CH2M-Jones responses to comments on the RFI report are provided in Appendix F.

Based upon the original field activities conducted as part of the RFI and subsequent sampling and analysis as presented in Section 4.0 of this RFI Report Addendum, the nature and extent of contamination at this site has been adequately characterized and the RFI is considered complete. A CMS will be conducted to address COCs identified in this RFI

1 Report Addendum. Further sampling within the site may be conducted within the CMS  
2 process.

3 The remaining subsections address issues which the BCT agreed to evaluate prior to site  
4 closeout. Some of these issues may be addressed as part of the corrective measures  
5 implementation.

## 6 **6.2 Presence of Inorganics in Groundwater**

7 For the purpose of site closeout documentation, the inorganics in groundwater issue refers  
8 to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and  
9 antimony) in groundwater at concentrations above the applicable MCL, preceded or  
10 followed by detections of these same metals below the MCL or below the practicable  
11 quantitation limit. These metals have been detected in site groundwater. Arsenic and iron  
12 that are naturally occurring in the soil and groundwater, and are not a result of metals  
13 releases from the site are not considered COCs. Metals that exceed screening criteria are  
14 discussed in detail in Section 5.0 of this RFI Report Addendum.

## 15 **6.3 Potential Linkage to SWMU 37, Investigated Sanitary** 16 **Sewers at the CNC**

17 Figure 6-1 shows sanitary and storm sewers in the AOC 613/AOC 615/SWMU 175 vicinity,  
18 along with the groundwater monitoring data for these areas. The southern area identified  
19 with COCs in groundwater is in the vicinity of the sanitary sewer. Sanitary sewers are not  
20 associated with any other areas of groundwater investigations in the northern and  
21 southeastern portions of the site.

22 Concentrations of chemicals in the southern area are relatively low, and any inflow into the  
23 sewer would be diluted to such an extent that it would have negligible effect on the sewer  
24 and treatment plant operation. Groundwater samples collected in the downstream direction  
25 along the sewer line indicate that the contaminated groundwater is not migrating along the  
26 outside of the sewer and impacting other areas of CNC. Therefore, groundwater migration  
27 outside of the AOC 613/AOC 615/SWMU 175 area along the sanitary sewer is not a  
28 concern, and contamination near the sewer within the site is addressed in this RFI Report  
29 Addendum.

## 1    **6.4 Potential Linkage to AOC 699, Investigated Storm Sewers** 2    **at the CNC**

3    Potential linkage of a SWMU or AOC to a storm sewer refers to the possibility of a  
4    groundwater plume at a SWMU or AOC migrating into a storm sewer, from which it would  
5    subsequently migrate to the water bodies around the CNC, or to the presence of a cross  
6    connection between the sanitary sewer and storm sewer. As shown in Figure 6-1, storm  
7    sewers are located within the southeastern groundwater contamination area. Though  
8    detected chemical concentrations are relatively low, as discussed in Section 5.0, infiltration  
9    of contaminants into the storm sewer main at this location, and its potential for impacting  
10   the media at the sewer outfall, will be evaluated as part of the CMS.

## 11   **6.5 Potential Linkage to AOC 504, Investigated Railroad Lines** 12   **at the CNC**

13   Several railroad lines traversed the AOC 613/AOC 615/SWMU 175 investigated area; some  
14   of the detected site PAHs, arsenic, and other pesticides in soil may be related to the general  
15   operations associated with railroad and crane lines, as previously discussed in Section 5.0.  
16   AOC 504 samples were collected along the crane rail identified as SWMU 175. The  
17   maintenance practices along the crane rail may have been similar to that of railroad lines, as  
18   evidenced by the presence of pesticides in the AOC 504 samples collected within SWMU  
19   175. These compounds are not reflective of crane-painting activities. Chemicals detected  
20   along the crane rail are discussed in Section 5.0 of this RFI Report Addendum ; further  
21   evaluation of this issue is not warranted.

## 22   **6.6 Potential Migration Pathways to Surface Water Bodies at** 23   **the CNC**

24   Surface water migration from this site is through stormwater runoff and the storm sewer  
25   system. Because the site is paved and there are no soil COCs, further evaluation of this issue  
26   is not warranted.

## 27   **6.7 Potential Contamination in Oil/Water Separators**

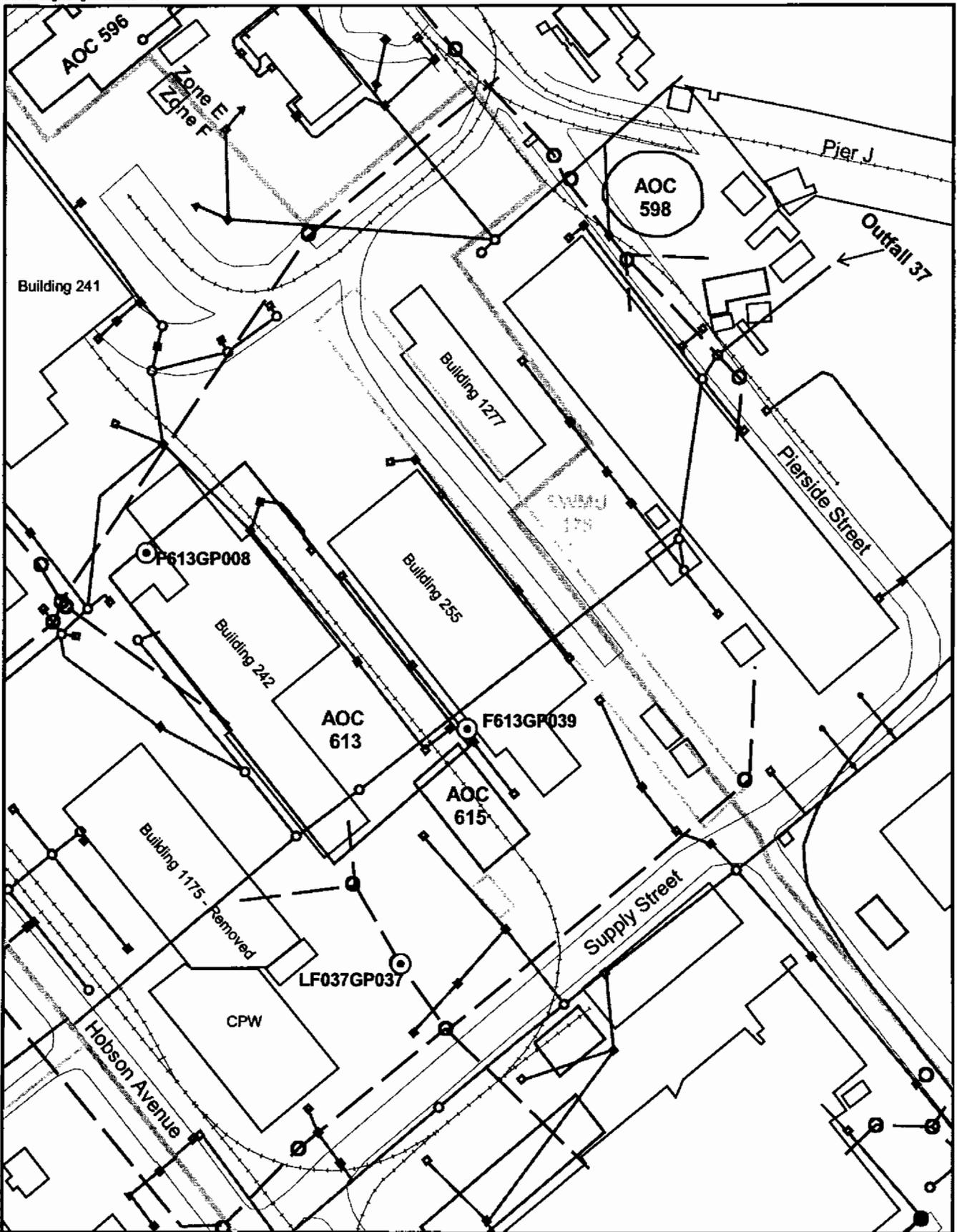
28   The issue of potential contamination of OWSs refers to the possible presence of an OWS that  
29   has not yet been investigated at a SWMU or AOC as part of the RCRA or UST process.  
30   OWSs within the investigated area are identified as AOCs 712, 714, and 717 and are

1 discussed in Section 3.0 of this RFI Report Addendum. Investigations of the soil and  
2 groundwater in the vicinity of these OWSs is ongoing, and these units will be addressed  
3 separately in the future.

## 4 **6.8 Land Use Control Management Plan**

5 There have been no COCs identified in soil at this site, based on unrestricted (residential)  
6 land use criteria, which are conservative for this industrial area. No site-related COCs are  
7 identified in soils that would require site-specific LUCs for this group of sites. Corrective  
8 measures are anticipated for the groundwater at this site, and the need for LUCs may be  
9 considered after evaluating the remedial options. The site is located in the industrial area  
10 currently planned for industrial land use restrictions.

NOTE: Original figure created in color



- ⊙ Geoprobe Samples
- Drain Line
- Sewer Line / Manhole
- Roads
- Railroads

- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary



0 100 200 Feet

**Figure 6-1**  
Sewer and Storm Drainage Lines  
AOCs 613, 615, and SWMU 175, Zone F  
Charleston Naval Complex

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## 1 **7.0 RFI Conclusions and Recommendations**

---

2 AOC 613 is the site of the former Locomotive Repair Shop, Building 1169, and is currently  
3 occupied by a vehicle maintenance facility, Building 242. AOC 615 is the site of former  
4 Building 1391, the Chain Locker, where anchor chain was serviced and stored. AOC 615 is  
5 located at the southeast corner of AOC 613. A vehicle wash facility, Building 240, is located  
6 at the southwest corner of AOC 615. The AOC 613/AOC 615/SWMU 175 investigative area  
7 encompassed all three of these operations.

8 East of AOC 613 is SWMU 175, the site of the former crane-painting area. This area was  
9 separated from Building 1169 by a former machine shop, which occupied the current  
10 location of Building 255. The AOC 613/AOC 615/SWMU 175 investigative area extended  
11 on the west and east sides of SWMU 175, up to Building 1174 in Zone E.

12 Three former USTs were located within the AOC 613/AOC 615/SWMU 175 investigative  
13 area. Three OWSs are in the area. A closed buried pipeline for the FDS crosses the northern  
14 part of the AOC 613 area. A release from the FDS pipeline was remediated in 1997.

15 As a result of soil samples collected at more than 100 locations within the investigative area,  
16 it has been concluded that no COCs exist in the soil at this site that are related to site  
17 operations based on sample-specific screening, HHRA and leachability evaluations.

18 Twenty groundwater monitoring wells have been sampled an average of four times for the  
19 RFI, and 66 DPT screening groundwater samples were collected within the investigative  
20 area. Data from these groundwater sampling events were evaluated to derive the following  
21 conclusions:

- 22 • Fuel product was detected in the northern portion of AOC 613. This was removed  
23 during an IM on the FDS pipeline. No petroleum hydrocarbon COCs have been  
24 identified relating to AOC 613/AOC 615/SWMU 175 operations. Future petroleum  
25 hydrocarbon releases from the FDS will be managed under the State's petroleum  
26 program.
- 27 • The chlorinated VOCs PCE and TCE were detected historically in DPT samples located  
28 at the southeast corner of AOC 613. These concentrations were not confirmed in an  
29 adjacent monitoring well that was sampled five times. However, because of the  
30 potential to detect them during subsequent sampling activities, they are retained as  
31 COCs.

- 1 • The chlorinated VOCs 1,2-DCE and vinyl chloride, degradation products of PCE and  
2 TCE, were detected in three localized areas of AOC 613. Because concentrations exceed  
3 MCLs, these compounds are considered COCs at AOC 613. Methylene chloride, which  
4 may be an artifact and was detected in the latest sampling event at one well  
5 (FGELGW014), is not considered a COC but will be monitored to determine significance  
6 of its detection in the last sampling event.

7 This RFI Report Addendum recommends that a CMS be undertaken to address 1,2-DCE  
8 and vinyl chloride in groundwater at AOC 613. A work plan for conducting the CMS is  
9 provided in Section 8.0 of this RFI Report Addendum.



## 1 **8.0 Focused CMS Work Plan**

---

2 A focused CMS will be conducted for AOC 613. The medium to be addressed in the CMS  
3 will be shallow groundwater in the vicinity of the southeast, southwest, and northwest  
4 corners of the former location of AOC 613. The CMS will evaluate remedial actions  
5 regarding PCE, TCE, 1,2-DCE, and vinyl chloride in groundwater at AOC 613.

### 6 **8.1 Remedial Action Objectives**

7 Remedial Action Objectives (RAOs) are medium-specific goals that the remedial actions are  
8 designed to accomplish in order to protect human health and the environment by  
9 preventing or reducing exposures under current and future land use conditions. The RAOs  
10 identified for groundwater at AOC 613 are 1) to prevent ingestion and direct/dermal  
11 contact with groundwater having unacceptable carcinogenic or noncarcinogenic risk, and 2)  
12 to restore the aquifer to beneficial use. No remedial actions are required for surface or  
13 subsurface soil at AOC 613.

### 14 **8.2 Remedial Goal Options and Proposed Media Cleanup** 15 **Standards**

16 Throughout the process of remediating a hazardous waste site, a risk manager uses a  
17 progression of increasingly acceptable site-specific media levels in considering remedial  
18 alternatives. Remedial goal options (RGOs) and MCSs under RCRA are developed at the  
19 end of the risk assessment in the RFI/Remedial Investigation/State programs.

20 RGOs can be based on a variety of criteria, such as specific ILCR levels (e.g., 1E-04, 1E-05, or  
21 1E-06), HI levels (e.g., 0.1, 1.0, 3.0), regulatory limits, or site background concentrations. For  
22 a particular RGO, specific MCSs can be determined as target concentration values.

23 Achieving these MCSs is accepted as demonstrating that RGOs and RAOs have been  
24 achieved. Achieving these goals should promote the protection of human health and the  
25 environment, while achieving compliance with applicable state and federal standards. It is  
26 also important to specify the assumed land use and exposure conditions in the RGOs.

27 The exposure medium of concern for AOC 613 is groundwater containing chlorinated  
28 organic solvents. Because AOC 613 is located within a highly developed area of the CNC,

1 and there are no surface water bodies adjacent to the site, ecological exposures were not  
2 considered necessary for evaluation.

3 Chlorinated solvents and daughter products (PCE, TCE, 1,2-DCE, and vinyl chloride) were  
4 identified as COCs in groundwater. Preliminary MCSs and RGOs were selected from  
5 National Primary Drinking Water Regulations. Table 8-1 presents the site concentrations  
6 and the MCL values, which are also the RGOs and MCSs, for the chlorinated solvents.

## 7 **8.3 Corrective Measure Technology Focused Evaluation**

8 Once MCSs have been determined for each COC, a focused CMS will be conducted that will  
9 evaluate the potential of LUCs, monitoring for natural attenuation, source area treatment, or  
10 other technologies if needed. Additional alternatives may be evaluated as found necessary.

### 11 **8.3.1 Land Use Controls**

12 LUCs, such as deed restrictions, could be implemented to restrict the installation of  
13 drinking water wells at AOC 613.

### 14 **8.3.2 Natural Attenuation**

15 1,2-DCE and vinyl chloride occur in groundwater at three isolated locations in the vicinity  
16 of the former location of AOC 613. The presence of chlorinated solvent daughter products  
17 (1,2-DCE and vinyl chloride), and the absence of the parent compounds (PCE and TCE) in  
18 two of the locations, demonstrates that degradation of the solvents is taking place.

19 The distribution of daughter products within the groundwater plume at the site is  
20 indicative of strongly reducing conditions resulting from biologically mediated reductive  
21 dechlorination (RD). The behavior of the AOC 613 plume is typical of "Type I" plume  
22 behavior, as described in the *Technical Protocol for Evaluating Natural Attenuation of*  
23 *Chlorinated Solvents in Groundwater* (EPA, September, 1998). Evidence of Type I plume  
24 behavior includes the prevalence of vinyl chloride, which is extremely short-lived under  
25 oxidizing conditions.

26 The areas of affected groundwater are limited in size, have not mobilized off site, and show  
27 no likelihood of doing so. However, continued monitoring of selected wells will be used to  
28 monitor chlorinated solvent concentrations.

### 29 **8.3.3 Enhanced Biodegradation**

30 Although the site data suggest that natural biodegradation processes are currently  
31 degrading the VOCs, it may be possible to enhance the degree to which this process is

1 effective by adding additional electron donors or nutrients. Also, some sites with  
2 chlorinated solvent plumes have shown a significant improvement in natural  
3 biodegradation processes by the addition of specific bacterial cultures, such as the  
4 bacterium KB-1, which is a bacterium that uses chlorinated solvents as its exclusive electron  
5 acceptor. The potential to improve natural biodegradation processes will be evaluated in  
6 the CMS.

### 7 **8.3.4 Source Area Treatment**

8 Because the potential VOC source area in the vicinity of Geoprobe sample F613GP039  
9 appears to be relatively limited in size, one of the more easily implemented corrective  
10 measures could be the use of an in-situ remediation technology, such as in-situ oxidation or  
11 in-situ reduction, to remediate the source of solvents in groundwater. This alternative will  
12 evaluate a few of the in-situ remedies that have been proven to be effective at the  
13 Charleston Naval Shipyard, such as in-situ oxidation.

## 14 **8.4 Focused Corrective Measures Study Approach**

15 The focused CMS will consist of the following tasks:

- 16 1. Additional groundwater evaluation at each of the three COC locations, as described  
17 below.
- 18 2. The corrective measure alternatives described above will be screened using several  
19 criteria and decision factors. Other corrective measures alternatives may also be  
20 evaluated in the CMS.
- 21 3. A preferred corrective measure alternative will be selected.
- 22 4. The CMS and preferred corrective measure alternative will be documented in the CMS  
23 report.

## 24 **8.5 Groundwater Evaluation**

25 Because data at the northwestern and southern locations were collected no more recently  
26 than 1996 or 1997, and were collected from DPT samples used for screening, it is prudent to  
27 evaluate the current site conditions within the shallow aquifer. If current CVOC  
28 concentrations within the aquifer are below MCLs, then biodegradation will be considered  
29 effective at those locations, requiring no further action. Monitoring wells will be installed at  
30 the locations of F613GP008 and LF037GP037 to measure the CVOC concentrations. In

1 addition, existing monitoring well FGELGW011, downgradient of LF037GP037, will be  
2 sampled for CVOCs.

3 Samples were most recently collected at the southeastern location in 2001, and data  
4 indicated ongoing dechlorination. Monitoring wells F613GW004, FGELGW012, and  
5 CNC22-MW02 and CNC-MW07D (both installed for a UST investigation downgradient of  
6 the southeastern CVOC area) will be sampled to evaluate more recent trends on the CVOCs.

7 In addition, vertical profile samples will be collected in the vicinity of F613GP039 to further  
8 evaluate the elevated concentrations of CVOCs detected at that location. Profile samples  
9 will be collected at several locations northwest and southeast of F613GP039 to a depth of 40  
10 ft (or until it is verified that the clay aquitard has effectively limited vertical contaminant  
11 migration). A brief sampling plan describing these locations in more detail will be  
12 submitted for review.

13 Figure 8-1 shows the preliminary proposed monitoring well locations and existing wells to  
14 be sampled, and the vertical profile sample locations. Additional sampling locations may be  
15 added, as the field sampling plan is finalized.

16 On the basis of the results of these analyses, an evaluation will be made as to the current  
17 status of the COCs in groundwater and their processes of degradation.

## 18 **8.6 Approach to Evaluating Corrective Measure Alternatives**

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

- 21 1. Protect human health and the environment.
- 22 2. Attain MCSs.
- 23 3. Control the source of releases to minimize future releases that may pose a threat to  
24 human health and the environment.
- 25 4. Comply with applicable standards for the management of wastes generated by remedial  
26 activities.
- 27 5. Other factors include (a) long-term reliability and effectiveness; (b) reduction in toxicity,  
28 mobility, or volume of wastes; (c) short-term effectiveness;  
29 (d) implementability; and (e) cost.

30 Each of the five criteria is defined in more detail below:

- 1    **1. Protect human health and the environment.** The alternatives will be evaluated on the  
2    basis of their ability to protect human health and the environment. The ability of an  
3    alternative to achieve this standard may or may not be independent on its ability to  
4    achieve the other standards. For example, an alternative may be protective of human  
5    health, but may not be able to attain the media cleanup standards if the media cleanup  
6    standards are not directly tied to protecting human health.
  
- 7    **2. Attain MCSs.** The alternatives will be evaluated on the basis of their ability to achieve  
8    the MCSs defined in this work plan. Another aspect of this criterion is the time frame to  
9    achieve the MCSs. Estimates of the time frame for the alternatives to achieve MCSs will  
10   be provided.
  
- 11   **3. Control the source of releases.** This criterion deals with the control of releases of  
12   contamination from the source (the area in which the contamination originated).
  
- 13   **4. Comply with applicable standards for management of wastes.** This standard deals  
14   with the management of wastes derived from implementing the alternatives; for  
15   example, treatment or disposal of excavated material. The remedial alternative will be  
16   designed to comply with all standards for management of wastes generated by the  
17   remedial action.
  
- 18   **5. Other factors.** Five other criteria are to be considered if an alternative is found to meet  
19   the four standards described above. These other factors are as follows:
  - 20       5a.    Long-term reliability and effectiveness  
21       The alternatives will be evaluated on the basis of their reliability, and the potential  
22       impact should the alternative fail. In other words, a qualitative assessment will be  
23       made as to the chance of the alternative's failing and the consequences of that  
24       failure.
  
  - 25       5b.    Reduction in the toxicity, mobility, or volume of wastes  
26       Alternatives with technologies that reduce the toxicity, mobility, or volume of the  
27       contamination will be generally favored over those that do not. Consequently, a  
28       qualitative assessment of this factor will be performed for each alternative.
  
  - 29       5c.    Short-term effectiveness  
30       Alternatives will be evaluated on the basis of the risk they create during the  
31       implementation of the remedy. Factors that may be considered include fire,  
32       explosion, and exposure of workers to hazardous substances.

1           5d.    Implementability

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

6           5e.    Cost

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

14        **8.7    Focused Corrective Measures Study Report**

15        The focused CMS report will be prepared to present the identification, development, and  
16        evaluation of potential corrective measures for AOC 613. A proposed outline of the report,  
17        as shown in Table 8-2, provides an example of the report format and content organization.

**TABLE 8-1**  
 Groundwater – MCSs/RGOs for AOC 613  
 RFI Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex

| Chemical                                | Detected Concentration Range<br>(µg/L) | MCL/MCS<br>(mg/kg) |
|-----------------------------------------|----------------------------------------|--------------------|
| Tetrachloroethene (PCE)                 | < 1 – 1,900                            | 5.0                |
| Trichloroethene (TCE)                   | < 1 – 1,500                            | 5.0                |
| 1,2-Dichloroethene (total) <sup>a</sup> | < 1 – 1,700 <sup>b</sup>               | 70 <sup>a</sup>    |
| Vinyl Chloride (VC)                     | < 1 – 38.0 <sup>b</sup>                | 2.0                |

<sup>a</sup> Maximum contaminant level (MCL) is for cis-1,2-DCE. MCL for trans-1,2-DCE is 100 µg/L.

<sup>b</sup> The maximum detected concentrations occurred at one groundwater probe location (F613GP039). Subsequent groundwater samples collected from nearby permanent wells located on the southeastern side of the former location of AOC 613 have shown only trace concentrations of chlorinated solvent and daughter products to be present.

µg/L Microgram per kilogram

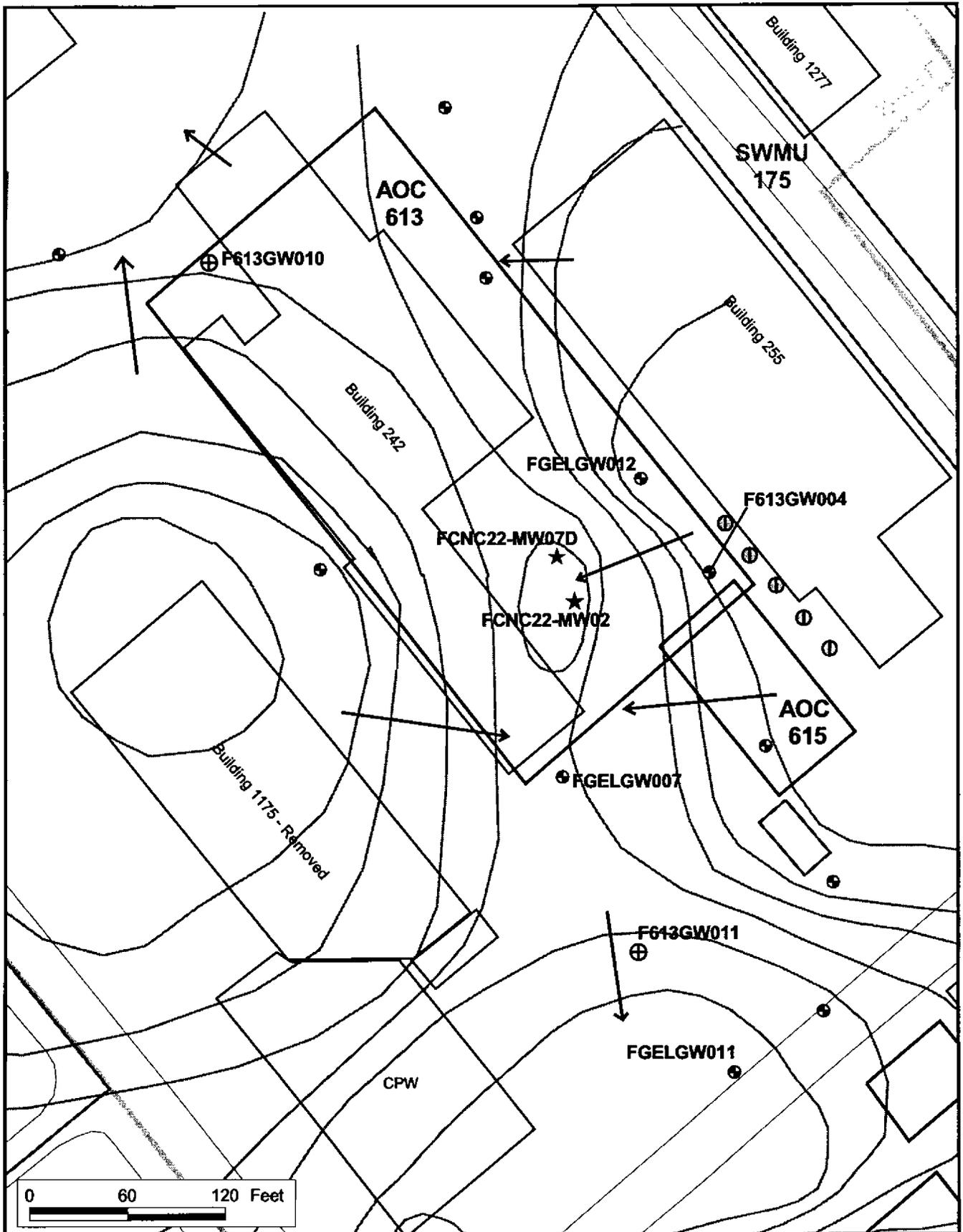
MCS Media Cleanup Standard

mg/kg Milligram per kilogram

**TABLE 8-2**  
 Outline of Focused CMS Report for AOC 613  
*RFI Report Addendum & CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Complex*

| <b>Section No.</b>            | <b>Section Title</b>                                                |
|-------------------------------|---------------------------------------------------------------------|
| <b>1.0</b>                    | <b>Introduction</b>                                                 |
| 1.1                           | Corrective Measures Study Purpose and Scope                         |
| 1.2                           | Report Organization                                                 |
| 1.3                           | Background Information                                              |
| 1.3.1                         | Facility Description                                                |
| 1.3.2                         | Site History and Background                                         |
| 1.3.3                         | Summary of Chemicals of Concern                                     |
| 1.3.4                         | Summary of Conclusions and Recommendations from the RFI RA & CMS WP |
| <b>2.0</b>                    | <b>Results of CMS Testing</b>                                       |
| 2.1                           | Northwest Corner of AOC 613                                         |
| 2.2                           | Southern Corner of AOC 613                                          |
| 2.3                           | Southeast Corner of AOC 613                                         |
| <b>3.0</b>                    | <b>Remedial Goal Objectives</b>                                     |
| 3.1                           | Remedial Action Objectives                                          |
| 3.2                           | Media Cleanup Standard                                              |
| <b>4.0</b>                    | <b>Detailed Analysis of Focused Alternatives</b>                    |
| 4.1                           | Approach                                                            |
| 4.2                           | Evaluation Criteria                                                 |
| 4.3                           | Initial Screening of Corrective Measure Alternatives                |
| 4.3.1                         | Alternative 1                                                       |
| 4.3.2                         | Alternative 2                                                       |
| 4.4                           | Detailed Analysis of Alternatives                                   |
| 4.4.1                         | Alternative 1                                                       |
| 4.4.2                         | Alternative 2                                                       |
| 4.5                           | Comparative Analysis of Alternatives                                |
| <b>5.0</b>                    | <b>Recommended Corrective Measure Alternative</b>                   |
| <b>Appendix A<sup>a</sup></b> | <b>Data Summary Tables from CMS Testing</b>                         |
| <b>Appendix B</b>             | <b>Monitoring Well Construction Diagrams</b>                        |
| <b>Appendix C</b>             | <b>Data Validation Reports</b>                                      |
| <b>Appendix D</b>             | <b>Corrective Measure Alternative Cost Estimates</b>                |
|                               | List of Tables                                                      |
|                               | List of Figures                                                     |

<sup>a</sup> Additional appendices will be added, if necessary.



- |                                      |                                              |
|--------------------------------------|----------------------------------------------|
| ① Proposed Vertical Profiler Samples | ▭ Buildings                                  |
| ★ UST Investigation Wells            | ∧ Roads                                      |
| ⊕ Proposed Monitoring Wells          | ∧ Groundwater Potentiometric Surface Contour |
| ⊙ Groundwater Monitoring Wells       | ▭ Zone Boundary                              |
| ▭ AOC Boundary                       | ▭ SWMU Boundary                              |
|                                      | ↗ Groundwater Flow Direction                 |



**Figure 8-1**  
Proposed CMS Sampling Locations  
AOC 613/615/SWMU 175  
Charleston Naval Complex



## 1 9.0 References

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