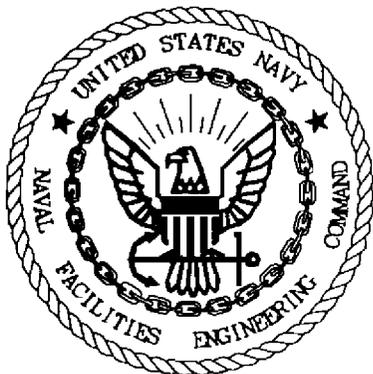


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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION WORK  
PLAN ADDENDUM ZONE G CNC CHARLESTON SC  
1/17/2000  
ENSAFE

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY  
CHARLESTON NAVAL COMPLEX  
NORTH CHARLESTON, SOUTH CAROLINA  
CTO-029**



**ZONE G  
RCRA FACILITY INVESTIGATION  
WORK PLAN ADDENDUM**

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SOUTHERN DIVISION  
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## Acronym List

AOCs	Area of Concern
BEQs	Benzo(a)pyrene equivalents
bgs	below ground surface
CLEAN	Comprehensive Long-Term Environmental Action Navy
CMCOCs	Contaminant Migration Contaminant of Concern
CNC	Charleston Naval Complex
COPCs	Contamination of Potential Concern
CSI	Confirmatory Sampling Investigation
DET	Environmental Detachment Charleston
DPT	Direct Push Technology
DQO	Data Quality Objective
FDS	Fuel Distribution System
IM	Interim Measure
MCLs	Maximum concentration Limits
PCB	polychlorinated biphenyls
QA/QC	Quality Assurance/Quality Control
RBCs	Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SPLP	Synthetic Precipitation Leaching Procedure
SSLs	Soil Screening Levels
SVOCs	Semivolatile Organic Compounds
SWMUs	Solid Waste Measurement Units
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
VOCs	Volatile Organic Compounds

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## 1.0 INTRODUCTION 1

As part of the U.S. Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) 2  
Program, this Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) 3  
Work Plan Addendum has been prepared for Zone G at Charleston Naval Complex (CNC). This 4  
addendum addresses sampling and analysis requirements specific to sites within Zone G and is 5  
intended to be used in conjunction with the *Final Comprehensive RFI Work Plan* (EnSafe/Allen 6  
& Hoshall, 1994) and the *Final Zones D, F, and G RFI Work Plan* (EnSafe/Allen & Hoshall, 7  
1996) prepared for CNC. The Solid Waste Management Units (SWMUs) and Areas of Concern 8  
(AOCs) within Zone G requiring further investigation are presented in Section 2.0. 9

This Work Plan Addendum describes the proposed level of effort deemed necessary to complete 10  
the delineation of contaminants of potential concern (COPCs) identified at 10 of the sites (or site 11  
groupings) discussed in the *Draft Zone G RCRA Facility Investigation Report* (EnSafe, 1998) and 12  
its March 31, 1999 addendum. Figure 1.1 shows the SWMU and AOC locations in Zone G, along 13  
with those in adjacent zones from which data will be used to help in the Zone G site 14  
characterization. This addendum presents the rationale for installation of soil borings and 15  
monitoring wells specifically designed to delineate the extent of chemical impact that exceeded 16  
screening criteria and produced data gaps at several AOCs and SWMUs. If the proposed sampling 17  
efforts do not achieve this goal, sampling will continue until the extent of chemical impact is 18  
determined, defined as the horizontal and vertical dimensions of the area in which COPC 19  
concentrations are above either risk-based concentrations (RBCs), soil screening levels (SSLs), 20  
maximum concentration limits (MCLs), or background concentrations. 21

Additional soil samples will be collected at several Zone G locations with no monitoring wells 22  
where contaminants exceed SSLs. These locations will be sampled and analyzed for total organic 23  
carbon (TOC) and contaminants that exceed their SSLs according to the Synthetic Precipitation 24

Leaching Procedure (SPLP). TOC and SPLP analytical results will be used to calculate site-specific SSLs and to determine whether additional monitoring wells will be needed.

Soil boring and monitoring well locations proposed for each site are based on existing boring and well locations, data gaps, subsurface features such as utilities and building foundations, and surface features such as overhead obstructions and electrical wires. Site-specific figures also include contingency sample locations, which will be sampled if the initial locations cannot define the extent of impact. All samples will be collected in accordance with the procedures outlined in the *Final Comprehensive RFI Work Plan* and *Final Zones D, F and G RFI Work Plan*.

**2.0 AOCs/SWMUs REQUIRING ADDITIONAL INVESTIGATION**

**2.1 AOC 628, Sandblasting Area, Southeast of Building 68**

AOC 628, a fenced area southeast of Building 68, is a Confirmatory Sampling Investigation (CSI) site that was used from 1962 to 1967 for abrasive blasting of large metal parts, including ship parts. Figure 1.1 shows site locations and Figure 2.1 shows site features. Materials that could have been released, stored, or disposed include spent blasting material, paint and metallic residues, organic solvent wastes, and petroleum products. The sandblasting material is thought to be crushed slag, marketed under the trade name "Black Beauty." Please refer to Section 10.1 of the *Draft Zone G RCRA Facility Investigation Report* for additional information.

**2.1.1 Previous Investigative Activities**

**Soil**

Five soil borings were installed as illustrated on Figure 2.1. Soil samples were collected in both the upper and lower sampling intervals (0 to 1 foot and 3 to 5 feet below ground surface [bgs], respectively) in four borings, while at boring 628SB004 samples were collected in the upper interval only. Attempts to sample the lower interval were abandoned either because the borehole was obstructed or because the water table was too shallow. In accordance with the *Final RFI Work Plan*, soil samples from AOC 628 were analyzed for metals, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The soil data, summarized in Section 10.1.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified during this review are discussed in Section 2.1.2 below.

**Groundwater**

No groundwater monitoring wells have been installed in the immediate vicinity of AOC 628, but two monitoring wells in AOC 620 (Zone F), close to AOC 628, were sampled between November 1996 and February 1998. Four to five sets of groundwater quality data from

wells 620GW001 and 620GW002 were analyzed for metals, VOCs and SVOCs, in accordance with the *Final RFI Work Plan*.

### 2.1.2 Data Gaps

#### Surface Soil

Benzo(a)pyrene and dibenzo(a,h)anthracene exceeded their RBCs in surface soil samples from soil boring 628SB004. Arsenic and chromium were detected above the greater of either their RBCs or their background concentrations.

The extent of contamination at AOC 628 has been delineated to the north and west by soil borings at SWMU 36, AOC 619, and AOC 620 in Zone F. However, the extent of contamination has not been defined south and east of 628SB004.

#### Subsurface Soil

Several organic compounds exceeded their SSLs in subsurface soil at the following locations: benzo(a)anthracene at 628SB001 and 628SB003; benzo(b)fluroanthene at 628SB001, 628SB003, and 628SB005; naphthalene at 628SB003; and dibenzo(a,h)anthracene at 628SB004.

Several metals also exceeded their SSLs in subsurface soil: arsenic, manganese, and selenium at 628SB005, mercury at 628SB002, and antimony at 628SB001 and 628SB002.

Several locations where constituents exceeded SSLs will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified

and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for contaminant migration contaminant of concern (CMCOC) will be presented in the *Final Zone G RFI Report*.

### 2.1.3 Sampling and Analysis Plan

Two soil borings are proposed at AOC 628 south and east of 628SB004 to delineate the extent of benzo(a)pyrene equivalents (BEQs), arsenic, and chromium (Table 2.1). Two samples each from the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be analyzed for SVOCs and metals at Data Quality Objective (DQO) Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at AOC 628. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*. Sampling locations are shown in Figure 2.1.

**Table 2.1**  
**AOC 628**  
**Sampling and Analysis Plan**

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
628SB006 628SB007	Soil (0-1' bgs)	2	SVOCs, Metals	Delineate BEQs, arsenic, and chromium south and east of 628SB004
628SB006 628SB007	Soil (3-5' bgs)	2	SVOCs, Metals	Delineate BEQs, arsenic, and chromium south and east of 628SB004

**Notes:**

BEQs = Benzo(a)pyrene equivalents

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include quality assurance/quality control (QA/QC) samples.

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## **2.2 AOC 633, Substation, Building 451C**

AOC 633, near Building 451C, is a CSI site where an electrical substation was built in 1943. The building is a block structure with a concrete roof and floor, several steel enclosures on concrete slabs, and foundations from previous buildings. Figure 1.1 shows site locations and Figure 2.2 shows site features. Several high-voltage switches, breakers, and transformers are located in the two-room block structure. Several large polychlorinated biphenyl (PCB) releases have been documented from this site. Please refer to Section 10.2 of the *Draft Zone G RCRA Facility Investigation Report* for additional information.

### **2.2.1 Previous Investigative Activities**

#### **Soil**

Soil samples were collected in three rounds at AOC 633 as indicated on Figure 2.2. Seven soil borings were installed during the initial sampling event, five of which were sampled in both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs). However, only the upper interval was sampled in the other two borings because obstructions in the borehole or a shallow water table prevented lower interval sampling. In accordance with the *Final RFI Work Plan*, all first-round soil samples from AOC 633 were analyzed for pesticides and PCBs.

Three second-round soil borings were advanced to delineate PCB exceedances identified in the initial sampling round. Upper and lower interval samples were collected at all three borings and analyzed for pesticides and PCBs. First and second round soil data, summarized in Section 10.2.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified during this review are discussed in Section 2.2.2 below.

A third round of soil sampling was conducted in July 1999 to determine the source of pesticides and metals found in previous sediment samples from AOC 633. Nine soil borings were installed

with nine upper and eight lower interval samples collected. Sample analyses for pesticides, PCBs, and metals will be included in the final Zone G report.

### **Sediment**

Six sediment samples were collected from drainage courses south of and downstream from AOC 633. Sediment sample analyses for VOCs, SVOCs, metals, pesticides and PCBs are detailed in Section 10.2.4 and Appendix D of the *Draft Zone G RFI Report*.

### **2.2.2 Data Gaps**

#### **Surface Soil**

Aroclor-1260 was detected in surface soil above its RBC at 633SB001. The area south of this boring should be investigated for the presence of Aroclor-1260. No other data gaps at AOC 633 have been identified.

#### **Subsurface Soil**

Aroclor-1260 was also reported in the subsurface soil sample from 633SB007 at a concentration of 25,000 mg/kg, exceeding its SSL (Table 2.2). However, this soil sample is surrounded by other sample locations that are either below the SSL or nondetect for Aroclor-1260.

### **2.2.3 Sampling and Analysis Plan**

One soil boring is proposed at AOC 633 south of 633SB001 to delineate the extent of Aroclor-1260. One sample from the upper interval (0 to 1 foot bgs) will be analyzed for PCBs at DQO Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at AOC 633. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*. Sampling locations are shown in Figure 2.2.

**Table 2.2**  
**AOC 633**  
**Sampling and Analysis Plan**

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
633SB021	Soil (0-1' bgs)	1	PCBs	Delineate Aroclor-1260 south of 633SB001
633SB021	Soil (3-5' bgs)	1	PCBs	Delineate Aroclor-1260 south of 633SB001

*Note:*

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

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**2.3 AOC 638, Former Torpedo Workshop, Building 132**

AOC 638, the former torpedo workshop at Building 132, is a CSI site that was used from 1944 until 1991. Building 132 is on the northeast corner of the intersection of Brumby Street and Hobson Avenue. Figure 1.1 shows site locations and Figure 2.3 shows site features. The building was used from 1991 to 1995 by the Public Works Department for equipment and parts storage, but is now vacant. Please refer to Section 10.4 of the *Draft Zone G RCRA Facility Investigation Report* for additional information.

**2.3.1 Previous Investigative Activities**

**Soil**

Four soil borings were drilled within AOC 638 as illustrated on Figure 2.3. Soil samples were collected in both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) in three of the borings, but only the upper interval was sampled in boring 638SB002 because the borehole was obstructed. Soil samples were analyzed for metals, pesticides/PCBs, SVOCs, and VOCs, and one sample was also analyzed for cyanide. In addition, one upper interval duplicate soil sample was collected for Appendix IX analyses. The soil data, summarized in Section 10.4.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified during this review are discussed in Section 2.3.2 below.

**Groundwater**

Shallow monitoring well NBCG638001 was installed close to AOC 638 (Figure 2.3). The sample from this well was analyzed for metals, pesticides/PCBs, SVOCs, VOCs, and cyanide. Groundwater data are detailed in Section 10.4.4.1 and Appendix D of the *Draft Zone G RFI Report*.

### 2.3.2 Data Gaps

#### Surface Soil

The upper interval soil sample from boring 638SB001 exceeded the residential RBC and background concentration for copper and the RBC for benzo(a)pyrene. The extent of copper and benzo(a)pyrene needs to be investigated north and northeast of this boring. No other data gaps at AOC 638 have been identified.

#### Subsurface Soil

Several metals exceeded their SSLs in subsurface soil: copper and cadmium at boring 638SB003, and manganese and selenium at 638SB004. Several of these locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*.

#### Groundwater

No data gaps in groundwater quality are evident at AOC 638, and thus no additional monitoring wells are recommended.

### 2.3.3 Sampling and Analysis Plan

Two soil borings are proposed at AOC 638 north and northeast of 638SB001 to delineate the extent of BEQs and copper (Table 2.3). Two samples each from the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be analyzed for SVOCs and metals at DQO Level III.

Additional soil samples will be collected at the contingency sampling locations if necessary to 1  
establish the horizontal extent of chemical impact at AOC 638. Sampling will be conducted 2  
according to procedures in the *Final Comprehensive RFI Work Plan*. Sampling locations are shown 3  
in Figure 2.3. 4

**Table 2.3**  
**AOC 638**  
**Sampling and Analysis Plan**

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
638SB005 638SB006	Soil (0-1' bgs)	2	SVOCs, Metals	Delineate BEQs and copper, north and northeast of 638SB001
638SB005 638SB006	Soil (3-5' bgs)	2	SVOCs, Metals	Delineate BEQs and copper, north and northeast of 638SB001

**Notes:**

BEQs = Benzo(a)pyrene equivalents

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

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**2.4 SWMU 8, Oil Sludge Pit; AOC 636, Torpedo Magazine, Building 161 Area** 1

These sites were combined into one investigation due to their close proximity and their potential 2  
for similar COPCs. The *Final RFI Work Plan* included AOC 637 in this combined 3  
SWMU 8/AOC 636 investigation, but it is not included here because subsurface conditions are 4  
different at AOC 637. SWMU 8 (an RFI site) and AOC 636 (a CSI site) are located in an area 5  
bound by Hobson Avenue on the north, Dyess Avenue on the south, Brumby Street on the west, 6  
and the Building X-10 compound (AOC 642) on the east. Figure 1.1 shows site locations and 7  
Figure 2.4 shows site features. The SWMU 8 area contained three unlined pits where oil sludge 8  
was disposed between 1944 and 1977. The pits have since been filled, and the area is currently 9  
a gravel parking area. AOC 636 is the former torpedo magazine where unused torpedoes and 10  
munitions were allegedly buried prior to 1944. The AOC 636 area consisted primarily of 11  
marshlands at that time. 12

A series of interim measures (IM) were conducted by the Navy Detachment in 1996 and 1997. 13  
The IM included removal of the oil sludge pit (SWMU 8), partial removal of soil at AOC 636, and 14  
installation of a product recovery system. Currently, the AOC 636 area contains Building 161 and 15  
an asphalt parking lot. Please refer to Section 10.6 of the *Draft Zone G RCRA Facility* 16  
*Investigation Report* and the *Interim Measure for SWMU 8 Completion Report* (Environmental 17  
Enterprise Group, November 1999) for additional information. 18

**2.4.1 Previous Investigative Activities** 19

**Soil** 20

Thirty-one soil borings were installed in 1993 in the SWMU 8 area prior to initial RFI activities. 21  
In accordance with the *Final RFI Work Plan*, three additional borings were drilled in the SWMU 8 22  
area and nine were drilled in the AOC 636 area to investigate environmental impact. These 23  
borings are shown on Figure 2.4. At SWMU 8, soil samples were collected from the upper 24  
interval only (0 to 1 foot bgs) for analysis. Nine soil borings were drilled at AOC 636. Soil 25

1 samples were collected from both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs)  
2 in five of the borings, while four included the upper sampling interval only due to shallow water  
3 table conditions. The SWMU 8 and AOC 636 first-round soil samples were analyzed for metals,  
4 pesticides/PCBs, SVOCs, VOCs, and propellants/explosives. Additionally, one upper interval  
5 duplicate sample was collected at AOC 636 for Appendix IX analyses at DQO Level IV.

6 During the second-round sampling, five additional borings were advanced at AOC 636 to further  
7 delineate the extent of SVOCs, BEQs, VOCs, and subsurface metals identified in the first  
8 sampling round. Two AOC 636 second-round borings included both upper and lower sampling  
9 intervals, while three borings included the upper interval only. Second-round samples were  
10 analyzed for metals, pesticides/PCBs, and SVOCs. The soil data, summarized in Section 10.6.3.1  
11 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the  
12 RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified  
13 during this review are discussed in Section 2.4.2 below.

## **Groundwater**

14  
15 The *Final RFI Work Plan* proposed installation and sampling of one shallow monitoring well at  
16 AOC 636 and redevelopment and sampling of six shallow monitoring wells previously installed  
17 at SWMU 8 (Figure 2.4). During the field investigation, the six existing wells were redeveloped  
18 and sampled. In accordance with the approved *Final RFI Work Plan*, groundwater samples were  
19 analyzed for metals, pesticides/PCBs, SVOCs and VOCs. The AOC 636 well was also sampled  
20 for explosives and propellants. Groundwater data are detailed in Section 10.6.4.1 and Appendix D  
21 of the *Draft Zone G RFI Report*.

## **2.4.2 Data Gaps**

### **Surface Soil**

Seventeen of 33 surface soil samples exceeded the RBC for BEQs at SWMU 8 and AOC 636. However, most of SWMU 8 has been excavated by the Environmental Detachment Charleston (DET) to the point where no further actions are necessary to establish nature or extent of contamination. Thallium was also detected above its RBC and background concentration in surface soil at AOC 636. Data gaps associated with AOC 636 are BEQs to the north and west, and metals to the west, northwest, and northeast.

### **Subsurface Soil**

Several metals exceeded their SSLs in subsurface soil. Several locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*.

### **Shallow Groundwater**

No data gaps in groundwater quality are evident at this site, and thus no additional monitoring wells are recommended.

## **2.4.3 Sampling and Analysis Plan**

Six soil borings are proposed west, northwest, and northeast of AOC 636 (Figure 2.4 and Table 2.4). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for SVOCs, metals, and hydrazine at DQO Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent

of chemical impact at AOC 636. No further actions are proposed for SWMU 8. Sampling will  
 be conducted according to procedures in the *Final Comprehensive RFI Work Plan*.

Table 2.4  
 SWMU 8/AOC 636  
 Sampling and Analysis Plan

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
636SB015 636SB016	Soil (0-1' bgs)	2	Metals	Delineate metals west and northwest of 636SB012.
636SB015 636SB016	Soil (3-5' bgs)	2	Metals	Delineate metals west and northwest of 636SB012.
636SB017	Soil (0-1' bgs)	1	SVOCs	Delineate BEQs north of 636SB001
636SB017	Soil (3-5' bgs)	1	SVOCs	Delineate BEQs north of 636SB001
636SB018 636SB019	Soil (0-1' bgs)	2	SVOCs	Delineate BEQs west of 636SB011
636SB018 636SB019	Soil (3-5' bgs)	2	SVOCs	Delineate BEQs west of 636SB011
636SB020	Soil (0-1' bgs)	1	Metals	Delineate metals northeast of 626SB003
636SB020	Soil (3-5' bgs)	1	Metals	Delineate metals northeast of 626SB003

**Notes:**

BEQs = Benzo(a)pyrene equivalents

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

**2.5 SWMU 11, Caustic Pond**

SWMU 11 is an RFI site near the interchange formed by the junction of Bainbridge Avenue and Viaduct Road. It is currently an open space landscaped with grass. Figure 1.1 shows site locations and Figure 2.5 shows site features. From the early 1940s to the early 1970s the site was a settling pond used for the disposal of calcium hydroxide, a byproduct of acetylene gas production. Unknown quantities of water saturated with calcium hydroxide were discharged into the pond, which discharged supernatant into Shipyard Creek. Soil borings sampled during initial assessments found sludge one foot deep. Groundwater samples from the site perimeter indicated a neutral pH. A Confirmation Study (Geraghty and Miller, 1982) indicated that groundwater pH ranged from 6.3 to 7.3, and that calcium, chloride, and specific conductance were slightly elevated. It was assumed that naturally occurring acidic soil at the site neutralized the relatively high pH of the caustic water seeping from the pond. Site surface runoff currently flows through drainage culverts to a wetland area south of Bainbridge Avenue.

The DET conducted trenching operations to further delineate the vertical and horizontal extent of contaminants in the former pond. An IM conducted by the DET in November 1997 involved excavating and disposing of soil near the ditch and drainage culvert, where the calcium hydroxide was now visible due to erosion. Please refer to Section 10.8 of the *Draft Zone G RCRA Facility Investigation Report* and the *Interim/Stabilization Measure for SWMU 11 Completion Report (Environmental Detachment Charleston, February 1999)* for additional information.

**2.5.1 Previous Investigative Activities**

**Soil**

A Direct Push Technology (DPT) screening program was conducted to supplement the original SWMU 11 soil investigation, define the areal extent and thickness of residual sludge, and further assess pH in the unsaturated and saturated zones. Eight DPT samples were collected at SWMU 11 and analyzed for metals and pH. Six locations included upper and lower interval sampling (0 to

1 foot and 3 to 5 feet bgs), and two included the upper interval only. An additional deeper soil sample was collected at two locations. Boring locations are illustrated on Figure 2.5.

Five soil borings were installed in the SWMU 11 area during the field investigation, as proposed in the *Final RFI Work Plan*, to determine chemical impact at this site (Figure 2.5). Both the upper and lower intervals were sampled at three of the borings. However, only the upper interval was sampled at the other two borings because obstructions in the borehole or a shallow water table prevented lower interval sampling. All soil samples were analyzed for metals and pH, and several were also analyzed for cyanide. Additionally, one upper interval duplicate sample was collected at SWMU 11 for Appendix IX analyses at DQO Level IV. Soil data, summarized in Sections 10.8.3.1, 10.8.4.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified during this review are discussed in Section 2.5.2 below.

### Groundwater

During the field investigation, three shallow monitoring wells were installed at this site (Figure 2.5). Groundwater samples were analyzed for metals and pH. Groundwater data are detailed in Section 10.8.6.1 and Appendix D of the *Draft Zone G RFI Report*.

### 2.5.2 Data Gaps

#### Surface Soil

Lead exceeded its RBC in the surface soil sample from boring 011SB001 on the northern end of SWMU 11. Additional soil borings to the north will be required to establish the lateral extent of lead in this area. No other data gaps have been identified in surface soil at SWMU 11.

**Subsurface Soil** 1

Several metals exceeded their SSLs in subsurface soil. Several locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*. 2  
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**Shallow Groundwater** 9

No data gaps in groundwater quality are apparent for SWMU 11, and thus no additional monitoring wells are recommended. 10  
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**2.5.3 Sampling and Analysis Plan** 12

Two soil borings are proposed north and northeast of boring 011SB001 (Figure 2.5 and Table 2.5). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for metals. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at SWMU 11. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*. 13  
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Table 2.5  
SWMU 11  
Sampling and Analysis Plan

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
011SB006 - 011SB007	Soil (0-1' bgs)	2	Metals	Delineate lead north and northeast of 011SB001
011SB006 - 011SB007	Soil (3-5' bgs)	2	Metals	Delineate lead north and northeast of 011SB001

**Note:**

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

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**2.6 SWMU 120, Pier M Laydown Area**

SWMU 120 is an RFI site consisting of the Pier M laydown area and the adjacent former Building AS-40-1. Figure 1.1 shows site locations and Figure 2.6 shows site features. Palletized lead bricks and shielding were stored at the site, and paint, grease, and solvent stains had been seen there previously. Materials released, stored, or disposed of at the site include lead bricks and shielding, paint/thinner wastes, and greases. Please refer to Section 10.9 of the *Draft Zone G RCRA Facility Investigation Report* for additional information.

**2.6.1 Previous Investigative Activities**

**Soil**

Six soil borings were installed in the SWMU 120 area during the field investigation, as proposed in the *Final RFI Work Plan*, to determine chemical impact at this site (Figure 2.6). Both the upper and lower intervals were sampled at two of the borings. However, only the upper interval was sampled at the other four borings because the water table was too shallow to sample the lower interval. All soil samples were analyzed for metals, pesticides/PCBs, SVOCs, and VOCs, and several were also analyzed for cyanide. Soil data, summarized in Section 10.9.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified during this review are discussed in Section 2.6.2 below.

**Sediment**

The *Final RFI Work Plan* also proposed two sediment samples to assess site impact on the storm sewer system. One sample was collected from 120M0001 during the investigation (Figure 2.6), but the second location (120M0002) contained insufficient sediment to collect a sample. Sediment at SWMU 120 was analyzed for metals, pesticides/PCBs, SVOCs, and VOCs at DQO Level III. Sediment data are summarized in Section 10.9.4.1 and Appendix D of the *Draft Zone G RFI Report*.

## Groundwater

Three shallow monitoring wells were installed at this site during the investigation. Groundwater samples were analyzed for metals, pesticides/PCBs, SVOCs, and VOCs at DQO Level III. Groundwater data are detailed in Section 10.9.5.1 and Appendix D of the *Draft Zone G RFI Report*.

### 2.6.2 Data Gaps

#### Surface Soil

Metals and SVOCs exceeded their RBCs at SWMU 120, particularly north of borings 120SB001 and 120SB002. Antimony, chromium, and benzo(a)pyrene were detected at concentrations exceeding their RBCs and background concentrations for Zone G surface soil. Additional soil borings will be required to delineate the areal extent of metals and SVOCs north of SWMU 120.

#### Subsurface Soil

Several metals exceeded their SSLs in subsurface soil at SWMU 120. Several locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*.

#### Shallow Groundwater

No data gaps in groundwater quality are apparent for SWMU 120, and thus no additional monitoring wells are recommended.

### 2.6.3 Sampling and Analysis Plan 1

Three soil borings are proposed north, northeast and northwest of borings 120SB001 and 120SB002 (Figure 2.6 and Table 2.6). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for SVOCs and metals at DQO Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at SWMU 120. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*. 2  
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**Table 2.6  
SWMU 120  
Sampling and Analysis Plan**

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
120SB007 120SB012	Soil (0-1' bgs)	2	SVOCs, Metals	Delineate BEQs, antimony north and northeast of 120SB002 and northeast of 120SB001
120SB007 120SB012	Soil (3-5' bgs)	2	SVOCs, Metals	Delineate BEQs, antimony north and northeast of 120SB002 and northeast of 120SB001
120SB008	Soil (0-1' bgs)	1	SVOCs, Metals	Delineate BEQs, antimony, and chromium northwest of 120SB001
120SB008	Soil (3-5' bgs)	1	SVOCs, Metals	Delineate BEQs, antimony, and chromium northwest of 120SB001

**Notes:**

BEQs = Benzo(a)pyrene equivalents

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

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**2.7 AOC 643, Substation, Building 125**

AOC 643, a CSI site, is the electrical substation at Building 125, which lies on the north side of Hobson Avenue near the entrance to Pier N. Figure 1.1 shows site locations and Figure 2.7 shows site features. At one time PCB transformers, inactive DC generators, switches, and circuit breakers were stored in a wooden shed adjacent to Building 125. A dielectric fluid spill and cleanup was documented, and stains were noted on the concrete in this area. Please refer to Section 10.10 of the *Draft Zone G RCRA Facility Investigation Report* for additional information.

**2.7.1 Previous Investigative Activities**

**Soil**

The *Final RFI Work Plan* proposed advancing seven soil borings around AOC 643 to determine chemical impact. Twelve borings were advanced in two phases of the field investigation (Figure 2.7). Seven borings were sampled in the initial phase from the upper and lower intervals. All first-round soil samples were analyzed for pesticides/PCBs, SVOCs, and VOCs, and six of these were also analyzed for metals.

Five second-round soil borings were advanced to delineate SVOC and pesticide/PCB exceedances identified during the first sampling round. Upper and lower interval samples were collected at all five locations and analyzed for pesticides/PCBs and SVOCs. Soil data, summarized in Section 10.10.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified during this review are discussed in Section 2.7.2 below.

**Sediment**

The approved *Final RFI Work Plan* proposed collecting one sediment sample to identify potential contaminants from AOC 643 that had been introduced into the storm sewer system. One sediment sample was collected during the field investigation (Figure 2.7) and analyzed for pesticides/PCBs,

SVOCs, and VOCs. Sediment data are summarized in Section 10.10.4.1 and Appendix D of the *Draft Zone G RFI Report*.

### 2.7.2 Data Gaps

#### Surface Soil

Arsenic, chromium, and vanadium exceeded their RBCs and background concentrations for Zone G surface soil. Several BEQs and Aroclor-1260 also exceeded their RBCs in surface soil samples. Data gaps around the perimeter of AOC 643 need to be addressed to define the areal extent of BEQs, PCBs, and metals.

#### Subsurface Soil

Several metals exceeded their SSLs in subsurface soil at AOC 643. Several locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*.

### 2.7.3 Sampling and Analysis Plan

Ten soil borings are proposed around the perimeter of AOC 643 (Figure 2.7 and Table 2.7). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for SVOCs, PCBs, and metals. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at AOC 643. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*.

**Table 2.7**  
**AOC 643**  
**Sampling and Analysis Plan**

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
643SB014 - 643SB023	Soil (0-1' bgs)	10	SVOCs, Metals, PCBs	Delineate BEQs, metals, Aroclor-1260 around the perimeter of AOC 643
643SB014 - 643SB023	Soil (3-5' bgs)	10	SVOCs, Metals, PCBs	Delineate BEQs, metals, Aroclor-1260 around the perimeter of AOC 643

*Notes:*

BEQs = Benzo(a)pyrene equivalents

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

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## **2.8 SWMU 3, Pesticide Mixing Area**

SWMU 3, an approximately 50 by 30 foot RFI site, is the location of former Building 42-A. Figure 1.1 shows site locations and Figure 2.8 shows site features. The building was a shed where pesticides were mixed prior to 1971. Spraying and pesticide-mixing equipment was reportedly rinsed outside on the ground and the rinsate was allowed to infiltrate the soil.

The 1982 Geraghty and Miller Confirmation Study found part of the area around the Building 42-A slab devoid of vegetation. This area is now covered with grass. The northwest wall of Building 249 was later built on part of the SWMU 3 area. Soil and groundwater samples from the Confirmation Study revealed low concentrations of the various pesticides used there and their degradation products. These pesticides included DDT and metabolites, Heptachlor, and beta/delta benzene hexachloride (Lindane [BHC]). Groundwater sample results were below detection limits for pesticides, herbicides, PCBs, and arsenic.

An IM conducted by the DET in 1998 included removal of approximately 22 cubic yards of pesticide-contaminated soil. Please refer to Section 10.11 of the *Draft Zone G RCRA Facility Investigation Report* and the *Interim/Stabilization Measure for SWMU 3 Completion Report* (Environmental Detachment Charleston, September 1998) for additional information.

### **2.8.1 Previous Investigative Activities**

#### **Soil**

Ten soil borings were installed in the SWMU 3 area during the field investigation, as proposed in the *Final RFI Work Plan*, to determine any potential contamination at this site (Figure 2.8). The upper and lower intervals were sampled at nine borings, while only the upper interval was sampled at the other boring because the borehole was obstructed. SWMU 3 soil samples were analyzed for metals and pesticides/PCBs at DQO Level III, as well as OP-pesticides. Several samples were also analyzed for cyanide and pH, and the upper and lower interval samples from

one boring were analyzed for SVOCs. Additionally, one upper interval duplicate soil sample was collected for Appendix IX parameter analyses at DQO Level IV. Soil data, summarized in Section 10.11.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination.

Additional soil samples were collected in July 1999 at four locations (003SB011 - 003SB014) and analyzed for pesticides and PCBs to further delineate the area surrounding SWMU 3 (Bldg 249). Data will be presented in the final Zone G report. Soil data gaps identified during this review are discussed in Section 2.8.2 below.

### **Groundwater**

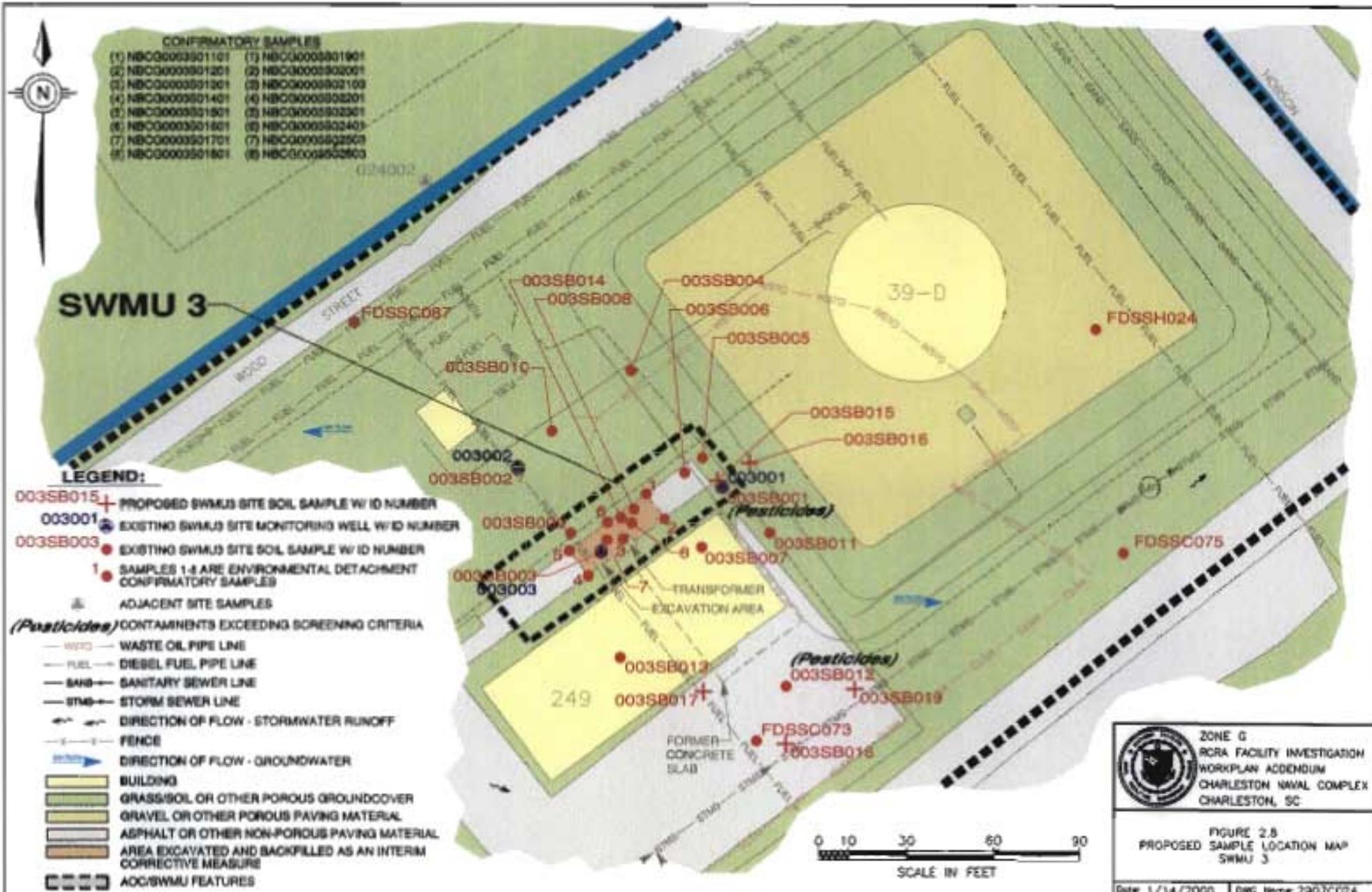
Three shallow monitoring wells were installed and sampled four times during the investigation to assess groundwater quality. Groundwater samples were submitted for analysis of metals, pesticides/PCBs, and OP-pesticides. Additionally, one duplicate groundwater sample was collected for Appendix IX parameter analyses at DQO Level IV. Monitoring well 003GW003 was plugged and abandoned during DET interim measures in September 1998. Groundwater data are detailed in Section 10.11.4 and Appendix D of the *Draft Zone G RFI Report*.

### **2.8.2 Data Gaps**

#### **Surface Soil**

Pesticides (alpha-chlordane, gamma-chlordane, 4,4-DDE), Aroclor-1248, and aluminum exceeded their RBCs in surface soil at boring 003SB003. Heptachlor was detected at soil borings 003SB001 and 003SB008 above its residential RBC, and 4,4-DDD and 4,4-DDT exceeded their RBCs at 003SB012.

An area 10 feet wide, 30 feet long and 2 feet deep excavated by the DET included the vicinity of borings 003SB003 and 003SB008 (Figure 2.8). The DET's September 4, 1998, completion report



documented the removal of 22 cubic yards of non-hazardous waste that was transported to a Subtitle D disposal facility. DET confirmation sampling showed that PCB levels were less than 1 ppm, which was the target concentration of the interim/stabilization measure program for SWMU 3. This area will require no further action, although data gaps still exist northeast and northwest of 003SB001 and east, west, and south of 003SB012.

### **Subsurface Soil**

Pesticides (4,4-DDD and 4,4-DDT) exceeded their RBCs in subsurface soil at 003SB012. Data gaps exist east, west, and south of 003SB012.

### **Groundwater**

No data gaps in groundwater quality are apparent for SWMU 3, and thus no additional monitoring wells are recommended.

### **2.8.3 Sampling and Analysis Plan**

Two additional soil borings are proposed northeast and northwest of boring 003SB001, and three are proposed east, west, and south of 003SB012 (Figure 2.8 and Table 2.8). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for pesticides at DQO Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at SWMU 3. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*.

**Table 2.8**  
**SWMU 3**  
**Sampling and Analysis Plan**

<b>Proposed Sample Locations</b>	<b>Matrix</b>	<b>Quantity</b>	<b>Analysis</b>	<b>Rationale</b>
003SB015 003SB016	Soil (0-1' bgs)	2	Pesticides	Delineate pesticides northeast and northwest of 003SB001
003SB0015 003SB016	Soil (3-5' bgs)	2	Pesticides	Delineate pesticides northeast and northwest of 003SB001
003SB017 - 003SB019	Soil (0-1' bgs)	3	Pesticides	Delineate pesticides east, west, and south of 003SB012
003SB017 - 003SB019	Soil (3-5' bgs)	3	Pesticides	Delineate pesticides east, west, and south of 003SB012

**Note:**

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

## **2.9 AOC 646, Operational Storage, Building 3906Q**

AOC 646 is a CSI site at Building 3906Q, the operational storage building for the Chicora Tank Farm. Figure 1.1 shows site locations and Figure 2.9 shows site features. Building 3906Q is a single-story block structure with a flat concrete roof and concrete floor. It was built in 1943 to house a boiler that heated residential fuel oil stored at the tank farm. The boiler was removed in 1971, and the building converted to a storage facility. Until recently, the building was used to store absorbent materials along with pumps and compressors used to operate the fuel terminal. A flammable storage locker in the southeast corner of the structure stored small quantities of paints, lubricants, kerosene, and gasoline. Please refer to Section 10.13 of the *Draft Zone G RCRA Facility Investigation Report* for additional information.

### **2.9.1 Previous Investigative Activities**

#### **Soil**

Four soil borings were advanced during the field investigation, as proposed in the *Final RFI Work Plan*, in the AOC 646 area to determine chemical impact at this site (Figure 2.9). Upper and lower interval soil samples (0 to 1 foot and 3 to 5 feet bgs) were collected from each boring and analyzed for metals, PCBs, SVOCs, PAHs, and VOCs. Additionally, four upper interval and three lower interval duplicate samples were collected for Appendix IX analyses at DQO Level IV. Soil data, summarized in Section 10.13.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified during this review are discussed in Section 2.9.2 below.

### **2.9.2 Data Gaps**

#### **Surface Soil**

Benzo(a)pyrene exceeded its RBC in surface soil at 646SB002. Additional soil borings are recommended on the northeast side of AOC 646 to delineate the areal extent of SVOCs.

**Subsurface Soil**

Several metals exceeded their SSLs in subsurface soil at AOC 646. Several locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*.

**2.9.3 Sampling and Analysis Plan**

Two soil borings are proposed in the vicinity of 646SB002 (Figure 2.9 and Table 2.9). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for SVOCs at DQO Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at AOC 646. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*.

**Table 2.9**  
**AOC 646**  
**Sampling and Analysis Plan**

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
646SB005 - 646SB006	Soil (0-1' bgs)	2	SVOCs	Delineate BEQs northwest and southeast of 646SB002
646SB005 - 646SB006	Soil (3-5' bgs)	2	SVOCs	Delineate BEQs northwest and southeast of 646SB002

*Notes:*  
 BEQs = Benzo(a)pyrene equivalents

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

documented the removal of 22 cubic yards of non-hazardous waste that was transported to a Subtitle D disposal facility. DET confirmation sampling showed that PCB levels were less than 1 ppm, which was the target concentration of the interim/stabilization measure program for SWMU 3. This area will require no further action, although data gaps still exist northeast and northwest of 003SB001 and east, west, and south of 003SB012.

### **Subsurface Soil**

Pesticides (4,4-DDD and 4,4-DDT) exceeded their RBCs in subsurface soil at 003SB012. Data gaps exist east, west, and south of 003SB012.

### **Groundwater**

No data gaps in groundwater quality are apparent for SWMU 3, and thus no additional monitoring wells are recommended.

### **2.8.3 Sampling and Analysis Plan**

Two additional soil borings are proposed northeast and northwest of boring 003SB001, and three are proposed east, west, and south of 003SB012 (Figure 2.8 and Table 2.8). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for pesticides at DQO Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at SWMU 3. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*.

**Table 2.8**  
**SWMU 3**  
**Sampling and Analysis Plan**

<b>Proposed Sample Locations</b>	<b>Matrix</b>	<b>Quantity</b>	<b>Analysis</b>	<b>Rationale</b>
003SB015 003SB016	Soil (0-1' bgs)	2	Pesticides	Delineate pesticides northeast and northwest of 003SB001
003SB0015 003SB016	Soil (3-5' bgs)	2	Pesticides	Delineate pesticides northeast and northwest of 003SB001
003SB017 - 003SB019	Soil (0-1' bgs)	3	Pesticides	Delineate pesticides east, west, and south of 003SB012
003SB017 - 003SB019	Soil (3-5' bgs)	3	Pesticides	Delineate pesticides east, west, and south of 003SB012

**Note:**

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

**2.9 AOC 646, Operational Storage, Building 3906Q**

AOC 646 is a CSI site at Building 3906Q, the operational storage building for the Chicora Tank Farm. Figure 1.1 shows site locations and Figure 2.9 shows site features. Building 3906Q is a single-story block structure with a flat concrete roof and concrete floor. It was built in 1943 to house a boiler that heated residential fuel oil stored at the tank farm. The boiler was removed in 1971, and the building converted to a storage facility. Until recently, the building was used to store absorbent materials along with pumps and compressors used to operate the fuel terminal. A flammable storage locker in the southeast corner of the structure stored small quantities of paints, lubricants, kerosene, and gasoline. Please refer to Section 10.13 of the *Draft Zone G RCRA Facility Investigation Report* for additional information.

**2.9.1 Previous Investigative Activities**

**Soil**

Four soil borings were advanced during the field investigation, as proposed in the *Final RFI Work Plan*, in the AOC 646 area to determine chemical impact at this site (Figure 2.9). Upper and lower interval soil samples (0 to 1 foot and 3 to 5 feet bgs) were collected from each boring and analyzed for metals, PCBs, SVOCs, PAHs, and VOCs. Additionally, four upper interval and three lower interval duplicate samples were collected for Appendix IX analyses at DQO Level IV. Soil data, summarized in Section 10.13.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination. Soil data gaps identified during this review are discussed in Section 2.9.2 below.

**2.9.2 Data Gaps**

**Surface Soil**

Benzo(a)pyrene exceeded its RBC in surface soil at 646SB002. Additional soil borings are recommended on the northeast side of AOC 646 to delineate the areal extent of SVOCs.

## Subsurface Soil

Several metals exceeded their SSLs in subsurface soil at AOC 646. Several locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*.

### 2.9.3 Sampling and Analysis Plan

Two soil borings are proposed in the vicinity of 646SB002 (Figure 2.9 and Table 2.9). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for SVOCs at DQO Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at AOC 646. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*.

Table 2.9  
 AOC 646  
 Sampling and Analysis Plan

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
646SB005 - 646SB006	Soil (0-1' bgs)	2	SVOCs	Delineate BEQs northwest and southeast of 646SB002
646SB005 - 646SB006	Soil (3-5' bgs)	2	SVOCs	Delineate BEQs northwest and southeast of 646SB002

**Notes:**

BEQs = Benzo(a)pyrene equivalents

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

## **2.10 AOC 706, Behind Building 246**

AOC 706 is an RFI site behind Building 246, the former Hazardous Waste Storage and Transit Facility. Figure 1.1 shows site locations and Figure 2.10 shows site features. Building 246 and the surrounding paved area were constructed in 1986, before which the parcel appears to have been an open lot surrounded by trees, accessed from Bainbridge Avenue. Previous investigations revealed Aroclor-1260 in surface soil above its detection limits, but all concentrations were below USEPA Region III RBCs (USEPA, April 1996). Please refer to Section 10.14 of the *Draft Zone G RCRA Facility Investigation Report* for additional information.

### **2.10.1 Previous Investigative Activities**

#### **Soil**

Ten soil borings were advanced in the AOC 706 area during the field investigation, as proposed in the *Final RFI Work Plan*, to determine chemical impact at this site (Figure 2.10). Upper and lower interval soil samples (0 to 1 foot and 3 to 5 feet bgs) were collected from seven borings, while three borings included the upper interval only due to the shallow water table. Soil samples were analyzed for metals, pesticides/PCBs, SVOCs, and VOCs. In addition, one upper interval duplicate sample was collected for Appendix IX analyses at DQO Level IV. Soil data, summarized in Section 10.14.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination.

Additional soil samples were collected in July 1999 from two borings installed to further delineate metals detected in the initial round of sampling. These analytical results will be presented in the final Zone G report. Soil data gaps identified during this review are discussed in Section 2.10.2 below.

## Groundwater

Although the work plan did not propose any monitoring wells for AOC 706, results from the initial soil sampling event revealed elevated metals concentrations which might be of concern at this site. Therefore, a shallow well (706GW001) was installed to assess potential leaching of inorganic substances to groundwater. The groundwater sample was analyzed for metals and SVOCs. Groundwater data are detailed in Section 10.14.4.1 and Appendix D of the *Draft Zone G RFI Report*.

### 2.10.2 Data Gaps

#### Surface Soil

Antimony and cadmium exceeded both their RBCs and background concentrations for Zone G surface soil in both rounds of sampling. Additional soil borings are recommended on the north side of AOC 706 to define the extent of metals in that area.

#### Subsurface Soil

Several metals exceeded their SSLs in subsurface soil at AOC 706. Several locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for metals according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*.

#### Groundwater

No data gaps in groundwater quality are apparent for AOC 706, and thus no additional monitoring wells are recommended.

### 2.10.3 Sampling and Analysis Plan 1

Three soil borings are proposed northeast of boring 706SB002 and north-northwest of 706SB011 2  
 (Figure 2.10 and Table 2.10). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) 3  
 will be sampled and analyzed for metals. Additional soil samples will be collected at the 4  
 contingency sampling locations if necessary to establish the horizontal extent of chemical impact 5  
 at AOC 706. Sampling will be conducted according to procedures in the *Final Comprehensive RFI* 6  
*Work Plan*. 7

**Table 2.10**  
**AOC 706**  
**Sampling and Analysis Plan**

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
706SB018	Soil (0-1' bgs)	1	Metals	Delineate metals northeast of 706SB002
706SB018	Soil (3-5' bgs)	1	Metals	Delineate metals northeast of 706SB002
706SB021 - 706SB022	Soil (0-1' bgs)	2	Metals	Delineate metals north and northwest of 706SB011
706SB021 - 706SB022	Soil (3-5' bgs)	2	Metals	Delineate metals north and northwest of 706SB011

**Note:**

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

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## **2.11 SWMU 24, Waste Oil Reclamation Facility**

SWMU 24 is the waste oil reclamation facility for the CNC consisting of Tanks 39-A and 39-D. This area is located south of Hobson Avenue and east of Wood Street. Figure 1.1 shows site locations and Figure 2.11 shows site features. Included in this area is SWMU 3, the pesticide mixing area, which is discussed in Section 10.11 of the *Draft Zone G RFI Report*.

SWMU 24 was originally investigated under the petroleum program as part of the Fuel Distribution System (FDS) but was returned to the RCRA program to assess inorganics detected in area groundwater. Tanks 39-A and 39-D operated as settling tanks where waste oil, containing water and presumably other impurities, was delivered via the pipeline system. The tanks were used to separate and store both the water- and oil-phase liquids, and the wastewater was subsequently discharged to the sanitary sewer system. Fluids stored and potentially released include waste oil and other petroleum products. Please refer to Section 10.15 of the *Draft Zone G RFI Report* for additional information.

### **2.11.1 Previous Investigative Activities**

#### **Soil**

The *Final RFI Work Plan* proposed screening the fuel distribution pipeline system to detect probable areas that may require additional study to achieve investigation objectives. Ten DPT and four hand auger soil borings were installed during the screening investigation of the FDS in the SWMU 24 area. The hand auger samples were collected from 0 to 1 foot bgs, and the DPT samples were collected at depths approximating the burial depth of pipelines, approximately 4 to 11 feet bgs. All samples were analyzed for total petroleum hydrocarbons (TPH), and samples that exhibited an odor or elevated TPH were also analyzed for VOCs, SVOCs, pesticides/PCBs, and metals at DQO Level III. The soil data, summarized in Section 10.15.3.1 and Appendix D of the *Draft Zone G RFI Report*, were reviewed to determine if they satisfy the RFI requirement for delineating the nature and extent of contamination.

Four additional hand auger borings were installed in July 1999 to further delineate the areas west, south, and southeast of Tank 39-A. Samples were analyzed for VOCs, SVOCs, pesticides/PCBs, and metals. These analytical results will be presented in the final Zone G report. Soil data gaps identified during this review are discussed in Section 2.11.2 below.

### **Groundwater**

Six monitoring wells were installed within, or adjacent to, SWMU 24. These include two wells designated as part of SWMU 3 and four installed expressly for SWMU 24. Groundwater samples were analyzed for VOCs, SVOCs, and metals at DQO Level III. The groundwater data are detailed in Section 10.15.4 and Appendix D of the *Draft Zone G RFI Report*.

### **2.11.2 Data Gaps**

#### **Surface Soil**

Several BEQs exceeded their respective RBCs at locations FDSSH026, FDSSH029, FDSSH030, and FDSSH031. Data gaps in the vicinity of Tank 39-A are primarily due to elevated PAH and possibly gasoline constituents (detected as gasoline range organics in previous soil samples).

#### **Subsurface Soil**

Several BEQs exceeded their SSLs in subsurface soil at SWMU 24. Several locations will be selected for soil sampling from the upper and lower intervals to obtain the data needed to calculate site-specific SSLs (per the USEPA Soil Screening Guidance [USEPA, 1996]) and to determine the need for additional monitoring wells. The soil samples will be analyzed for TOC, and for SVOCs according to the SPLP method. After calculation of the site-specific SSLs, additional data gaps may be identified and additional sampling required. Results of the site-specific SSL calculation and the subsequent screening results for CMCOCs will be presented in the *Final Zone G RFI Report*.

**Groundwater**

No data gaps in groundwater quality are evident at SWMU 24, and thus no additional monitoring wells are recommended.

**2.11.3 Sampling and Analysis Plan**

Eight soil borings are proposed around Tank 39-A (Figure 2.11 and Table 2.11). Both the upper and lower intervals (0 to 1 foot and 3 to 5 feet bgs) will be sampled and analyzed for SVOCs at DQO Level III. Additional soil samples will be collected at the contingency sampling locations if necessary to establish the horizontal extent of chemical impact at SWMU 24. Sampling will be conducted according to procedures in the *Final Comprehensive RFI Work Plan*.

**Table 2.11  
SWMU 24  
Sampling and Analysis Plan**

Proposed Sample Locations	Matrix	Quantity	Analysis	Rationale
024SB001 - 024SB008	Soil (0-1' bgs)	8	SVOCs	Delineate BEQs north, south, east, and west of FDSSH026, FDSSH029, FDSSH030
024SB001 - 024SB008	Soil (3-5' bgs)	8	SVOCs	Delineate BEQs north, south, east, and west of FDSSH026, FDSSH029, FDSSH030

*Notes:*

BEQs = Benzo(a)pyrene equivalents

All analyses will be performed per SW-846, except where other methods are specified. DQO Level III analyses will be performed as specified in the *Final Comprehensive RFI Work Plan*, with a minimum of 10% duplicates. The sample quantities presented do not include QA/QC samples.

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