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CORRECTIVE MEASURES STUDY INVESTIGATION REPORT ADDENDUM SOLID WASTE  
MANAGEMENT UNIT 159 (SWMU 159) AREA OF CONCERN 653 (AOC 653) ZONE H CNC  
CHARLESTON SC  
8/8/2001  
CH2M HILL

# CMS INVESTIGATION REPORT ADDENDUM

## SWMU 159/AOC 653, Zone H



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

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

*CH2M-Jones*

*August 2001*

*Contract N62467-99-C-0960*



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August 8, 2001

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 - Phase II (Revision 0), Zone H and CMS Investigation  
Report Addendum - SWMU 159/AOC 653 (Revision 0), Zone H

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum (Revision 0), Zone H and four copies of the CMS Investigation Report Addendum - SWMU 159/AOC 653 (Revision 0), Zone H 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 these reports is Sam Naik. Please do not hesitate to contact him at (770) 604-9095 should you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

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

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## **SWMU 159/AOC 653, Zone H**



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

SUBMITTED TO  
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PREPARED BY  
***CH2M-Jones***

*August 2001*

*Revision 0  
Contract N62467-99-C-0960  
158814.ZH.PR.12*

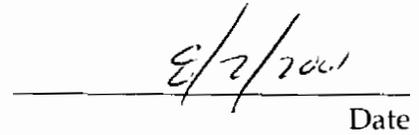
# Certification Page for CMS Investigation Report Addendum (Revision 0) – SWMU 159/AOC 653, Zone H

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.

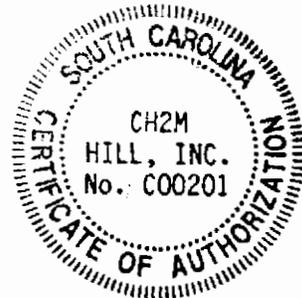
South Carolina  
Temporary Permit No. T2000342



Dean Williamson, P.E.



Date



# 1 Contents

2 Section	Page
3 <b>Acronyms and Abbreviations</b> .....	vi
4 <b>1.0 Introduction</b> .....	1-1
5     1.1 Background .....	1-1
6     1.2 Purpose of the CMS Investigation Report Addendum.....	1-1
7     1.3 Report Organization .....	1-2
8 <b>Figure 1-1 Map of Zone H within the CNC</b> .....	1-3
9 <b>Figure 1-2 Sites Included in CMSI Report Addendum</b> .....	1-4
10 <b>2.0 SWMU 159</b> .....	2-1
11     2.1 Introduction.....	2-1
12     2.2 Previous Investigations .....	2-1
13         2.2.1 RFI.....	2-1
14         2.2.2 CMS Investigation.....	2-2
15         2.2.3 Recommendations of the CMS Report.....	2-3
16     2.3 Supplemental CMS Investigation .....	2-3
17     2.4 Closeout Issues .....	2-4
18         2.4.1 Relevance or Need for Land Use Controls at the Site.....	2-4
19     2.5 Recommendations .....	2-5
20 <b>Figure 2-1 Site Location of SWMU 159, Zone H</b> .....	2-6
21 <b>Figure 2-2 SWMU 159 RFI/CMS Sampling Locations</b> .....	2-7
22 <b>3.0 AOC 653</b> .....	3-1
23     3.1 Introduction.....	3-1
24     3.2 Previous Investigations .....	3-1
25         3.2.1 RFI.....	3-1
26         3.2.2 ISM by the Navy DET (1996).....	3-2
27         3.2.3 CMS Investigation.....	3-2
28         3.2.4 Recommendations of the CMS Report.....	3-3
29     3.3 Closeout Issues .....	3-3
30         3.3.1 Relevance or Need for Land Use Controls at the Site.....	3-4
31     3.4 Recommendations .....	3-4
32 <b>Figure 3-1 Site Location of AOC 653, Zone H</b> .....	3-5
33 <b>Figure 3-2 AOC 653 RFI/CMS Sampling Locations</b> .....	3-6

1 **4.0 References..... 4-1**

2

3 **Appendices**

4 **A Responses to SCDHEC and EPA Comments on the *Zone H AOC 653 Report and***  
5 ***SWMU 159 CMS Report (EnSafe, 2000b)***

6 **B Analytical Data and Data Validation Summary Reports**

# 1 Acronyms and Abbreviations

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2	AOC	Area of Concern
3	AST	aboveground storage tank
4	BCT	BRAC Cleanup Team
5	BEQ	benzo(a)pyrene equivalent
6	BRAC	Base Realignment and Closure Act
7	BRC	background reference concentration
8	BTEX	benzene, toluene, ethylbenzene, and xylene
9	CA	Corrective Action
10	CMS	Corrective Measures Study
11	CNC	Charleston Naval Complex
12	COC	chemical of concern
13	DET	U.S. Navy Environmental Detachment
14	EBS	Environmental Baseline Survey
15	EnSafe	EnSafe Inc.
16	EPA	U.S. Environmental Protection Agency
17	ft <sup>2</sup>	square foot
18	ft bls	feet below land surface
19	ISM	Interim Stabilization Measure
20	NAVBASE	Naval Base
21	NFA	no further action
22	µg/kg	microgram per kilogram
23	MCL	maximum contaminant level
24	OWS	oil/water separator
25	PAH	polycyclic aromatic hydrocarbon
26	PCB	polychlorinated biphenyl
27	RBC	risk-based concentration
28	RCRA	Resource Conservation and Recovery Act

1	RFA	RCRA Facility Assessment
2	RFI	RCRA Facility Investigation
3	SAA	Satellite Accumulation Area
4	SCDHEC	South Carolina Department of Health and Environmental Control
5	SDG	sample data group
6	SSL	soil-screening level
7	SWMU	Solid Waste Management Unit
8	TCE	trichloroethene
9	TPH	total petroleum hydrocarbon
10	VOC	volatile organic compound
11	y <sup>3</sup>	cubic yard



# 1.0 Introduction

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## 1.1 Background

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 Corrective Measures Study (CMS) Investigation for Solid Waste Management Unit (SWMU) 159 and Area of Concern (AOC) 653 in Zone H of the CNC. These sites are being recommended for No Further Action (NFA). Figure 1-1 shows the locations of the various zones within CNC, and Figure 1-2 shows the locations of these sites within Zone H.

A RCRA Facility Investigation (RFI) was initially conducted by EnSafe Inc. (EnSafe), and the *Zone H RFI Report, Revision 0* was prepared and submitted during 1996 with revisions made in 1998 (EnSafe, 1998). Regulatory review of the RFI report required additional investigations at SWMU 159 and AOC 653. The additional investigations were conducted as part of a CMS and were described in the *Zone H AOC 653 CMS Report and SWMU 159 CMS Report*, prepared and submitted by EnSafe during May 2000 (EnSafe, 2000b).

## 1.2 Purpose of the CMS Investigation Report Addendum

The purpose of this CMS Investigation Report Addendum is to provide a brief background of previous RFI and CMS investigations conducted by EnSafe at SWMU 159 and AOC 653, as well as to provide details and analytical results of supplemental investigations conducted by CH2M-Jones at SWMU 159, according to agreements made during the Zone H RFI comment resolution and scoping meetings.

## 1 **1.3 Report Organization**

2 This CMS Investigation Report Addendum consists of the following sections, including this  
3 introductory section:

4 **1.0 Introduction** — Presents the purpose of the report and background information relating  
5 to the CMS Investigation Report Addendum.

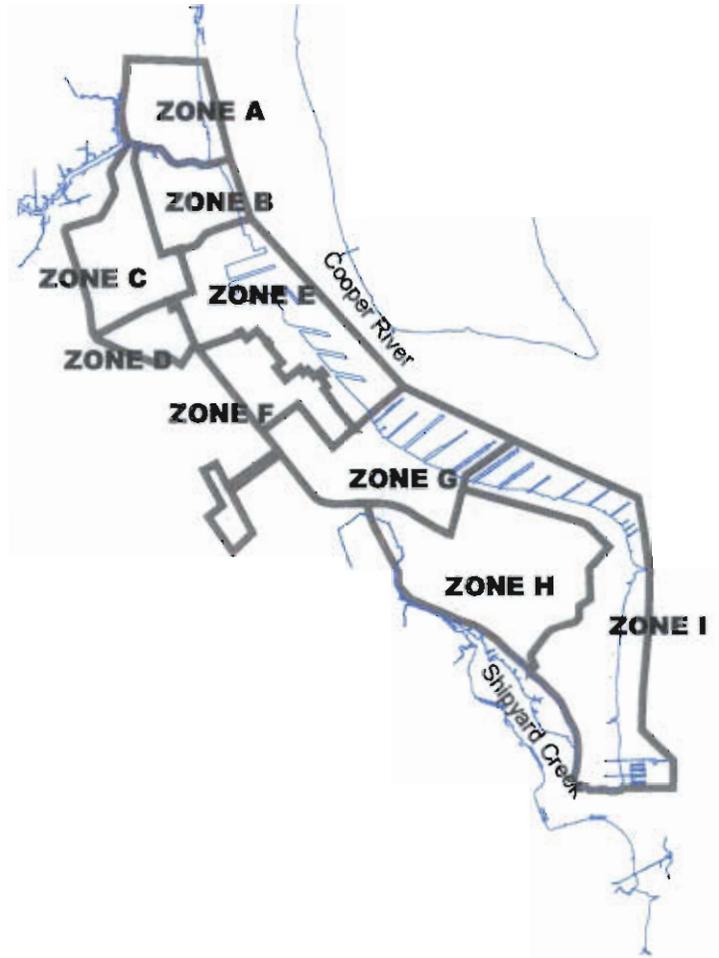
6 **2.0 SWMU 159** — Summarizes the previous RFI and CMS investigations, as well as the  
7 conclusions from the CMS investigations and the CH2M-Jones supplemental investigation;  
8 discusses the relevance of land use controls and the recommendation of NFA for SWMU  
9 159.

10 **3.0 AOC 653** — Summarizes the previous RFI and CMS investigations, as well as the  
11 conclusions from the CMS investigations and the CH2M-Jones supplemental investigation;  
12 discusses the relevance of land use controls and the recommendation of NFA for AOC 653.

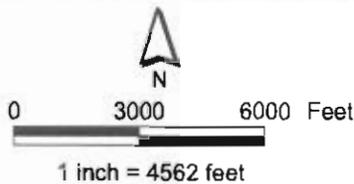
13 **4.0 References** — Lists the references used in this document.

14 **Appendix A** contains a copy of the responses to comments received from SCDHEC and the  
15 U.S. Environmental Protection Agency (EPA) on the *Zone H AOC 653 CMS Report and*  
16 *SWMU 159 CMS Report* (EnSafe, 2000b), and minutes of the Zone H RFI Addendum scoping  
17 meeting held between SCDHEC and CH2M-Jones during January 2001.

18 **Appendix B** contains copies of validated analytical results and data validation reports for  
19 supplemental RFI sampling conducted by CH2M-Jones at the sites included in this  
20 submittal. The analytical results and data validation reports are grouped by the sample data  
21 group (SDG) numbers assigned by the laboratory which conducted the sample analyses.

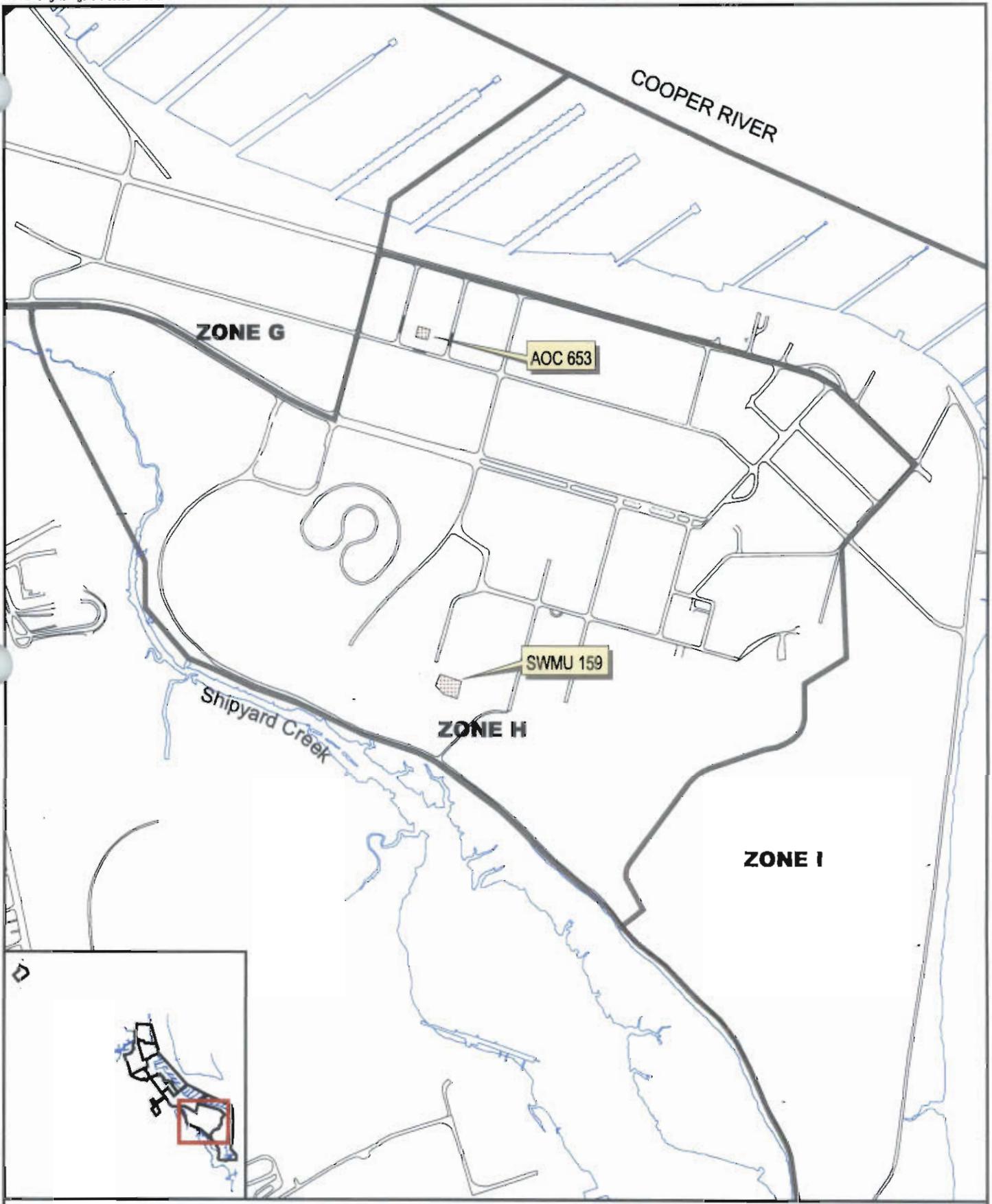


 Shoreline  
 Zone Boundary



**Figure 1-1**  
Zone Map  
Charleston Naval Complex

NOTE: Original figure created in color



- Zone H Sites Included in this Report
- Roads - Lines
- Shoreline
- Zone Boundary



1 inch = 855 feet

**Figure 1-2**  
Sites Included in CMSI Report Addendum  
Zone H  
Charleston Naval Complex



## 1    **2.0 SWMU 159**

---

### 2    **2.1 Introduction**

3    SWMU 159 is a former Satellite Accumulation Area (SAA) near the southwest corner of  
4    Building 665, the former base package store. The SAA was established in March 1994, and  
5    was used for approximately one year to temporarily store and accumulate hazardous  
6    materials such as batteries, aerosol cans, and paint waste. It consisted of an 8 x 6 x 6-foot  
7    metal structure lined with plastic. The area surrounding the SAA was used for recycling. A  
8    diesel fuel aboveground storage tank (AST), a hydraulic can crusher, and two small debris  
9    piles were also in place at the site.

10    Building 665 is currently being used by Omni-Cube, which is a laundry facility that uses  
11    only detergents and wash water, and no solvents. Figure 2-1 shows site features. The site is  
12    in a mostly unpaved area.

13    This section of the CMS Investigation Report Addendum has been prepared by CH2M-  
14    Jones to summarize previous investigations conducted at SWMU 159 and to provide the  
15    basis for a recommendation of NFA for SWMU 159.

### 16    **2.2 Previous Investigations**

#### 17    **2.2.1    RFI**

18    The initial RFI conducted in 1998 by EnSafe included investigation of surface soil,  
19    subsurface soil, sediment, surface water, and groundwater. Sampling was conducted to  
20    encompass all areas at the site that potentially could have been impacted by past activities  
21    at the site. Samples were targeted in the SAA and AST areas, the debris pile areas, the  
22    surface water runoff ditch near the can crusher, and the areas near the outfall of the  
23    drainage ditch and a stormwater outfall pipe. Soil samples were collected from 16 locations.  
24    Two sediment samples and one surface water sample were also collected. Figure 2-2 shows  
25    the RFI sampling locations.

26    The initial RFI risk assessment identified benzo(a)pyrene equivalents (BEQs) in soil as the  
27    primary site risk due to an exceedance of the benzo(a)pyrene concentration in one surface  
28    soil sample (at location 159SB011) above the residential risk-based concentration (RBC) of 88  
29    micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ). Additionally, the presence of total petroleum

1 hydrocarbons (TPH) in significant concentrations (ranging from 29,000 milligrams per  
2 kilogram [mg/kg] to 170,000 mg/kg) warranted further corrective action. The RFI risk  
3 assessment did not identify chemicals of concern (COCs) in sediment or surface water.

4 Soil boring location 159SB011 and areas where TPH was detected were removed as part of  
5 an Interim Stabilization Measure (ISM) conducted by the Navy Environmental Detachment  
6 (DET) during September 1996, subsequent to the RFI sampling effort. This ISM effort is  
7 briefly described below.

8 The DET's ISM was conducted in an effort to eliminate sources of contamination and limit  
9 the spread of contaminants. The presence of indeterminate lubricating oils in the soil  
10 samples collected during the RFI also prompted the ISM, which included soil excavation  
11 and offsite disposal. As part of the ISM, an estimated 16 cubic yards (y<sup>3</sup>) of soil and  
12 sediments were removed from three areas in which contaminants showed exceedance of the  
13 SCDHEC petroleum cleanup criteria and EPA Region III RBCs. The excavations were  
14 conducted in the SAA, a sediment area associated with the stormwater outfall and the  
15 drainage ditch near the can crusher. Twenty-four confirmation samples were collected from  
16 the floor and sidewalls of the excavation to ensure compliance with the cleanup criteria and  
17 analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX), naphthalene, and  
18 polycyclic aromatic hydrocarbons (PAHs). There were no detections of these compounds  
19 above their RBCs.

20 The RFI soil boring location 159SB011 where benzo(a)pyrene was detected was also  
21 excavated and disposed off site during the ISM, thereby removing the source of the surface  
22 soil risk. The site excavation was backfilled with clean soil.

23 Details of the ISM, including figures illustrating the extent of excavation conducted during  
24 the ISM, are provided in the CMS Report (EnSafe, 2000b).

## 25 **2.2.2 CMS Investigation**

26 This project team was concerned about the detections of trichloroethene (TCE) in several  
27 soil samples (mostly in the upper interval of 0-1 foot below land surface [ft bls]). Although  
28 these were low-level detections below the residential RBC, the project team was concerned  
29 about the potential for TCE to migrate from soil into groundwater. Therefore, it was  
30 decided to investigate the presence of TCE in groundwater at the site.

31 The additional investigation was termed a CMS. However, this CMS effort included only a  
32 field investigation and was similar to an RFI effort rather than a typical CMS effort under  
33 the RCRA CA process.

1 Two monitoring wells, 159GW001 and 159GW002, were installed at locations where TCE  
2 was most likely to be present. Three groundwater sampling events were conducted, and no  
3 TCE was detected in either well during any of the three sampling events. The only  
4 compounds detected in the groundwater were acetone and methylene chloride, which were  
5 later evaluated and determined to be laboratory artifacts.

6 The CMS effort included derivation of site-specific soil screening levels (SSLs) for TCE to  
7 investigate the threat to groundwater from the possible presence of TCE in the soil. These  
8 SSLs were derived using a calculated site-specific dilution attenuation factor (DAF) of 2.2,  
9 and TCE concentrations detected in the soils at SWMU 159 did not exceed the site-specific  
10 SSL for TCE (EnSafe, 2000). The CMS investigation effort is described in the *Zone H AOC*  
11 *653 CMS Report and SWMU 159 CMS Report* (EnSafe, 2000b).

### 12 **2.2.3 Recommendations of the CMS Report**

13 The CMS Report recommended NFA for SWMU 159 based on the absence of TCE in soil  
14 above the residential RBC and the site-specific SSL, and the absence of TCE in groundwater  
15 above its maximum contaminant level (MCL). No other site constituents had been  
16 identified during the RFI as a COC at the site.

## 17 **2.3 Supplemental CMS Investigation**

18 Based on a review of the CMS Report, SCDHEC provided comments on this document  
19 during September 2000. The comments required additional soil and groundwater sampling  
20 on the southern side of SWMU 159 to cover areas that had not been sampled during the  
21 initial RFI or supplemental CMS investigation efforts.

22 CH2M-Jones prepared and submitted responses to these comments. During the comment  
23 resolution and scoping meeting held between SCDHEC and CH2M-Jones during January  
24 2001, it was decided that soil samples would be collected from three locations on the  
25 downgradient (southern ) side of the site. Two of the soil samples were to be collected from  
26 soil borings and the third from the well boring during the installation of a new monitoring  
27 well, which was to be installed on the downgradient (southern) side of the site.

28 The two soil borings were introduced, and surface and subsurface soil samples were  
29 collected by CH2M-Jones during May 2001 and analyzed for volatile organic compounds  
30 (VOCs). These sample locations are identified in Figure 2-2 as 159SB017 and 159SB019.

31 The third soil sample which was to be collected from the new well boring could not be  
32 collected due to the water table being less than 1 ft bls. Additionally, the proposed

1 groundwater monitoring well could not be installed at this location due to the shallow  
2 depth of the water table. This location was found to be in the wetland area south of SWMU  
3 159, making it unsuitable for installation of the well as the well would likely be submerged  
4 often during a rain event or due to tidal fluctuations of the water table.

5 Copies of the comment responses for the *Zone H RFI Report, RFI Addendum* (EnSafe, 2000a)  
6 and minutes of the scoping and comment resolution meeting are included in Appendix A.  
7 Copies of the analytical results and data validation report are included in Appendix B  
8 under SDG no. 41029.

9 TCE was not detected above the laboratory detection limits in the two soil samples. No  
10 other VOCs were detected above the residential RBC or SSLs in these samples.

## 11 **2.4 Closeout Issues**

12 Prior to changing the status of any site to NFA in the CNC RCRA CA permit, the BRAC  
13 Clean-Up Team (BCT) agreed that the following issues should be addressed:

- 14 • Status of the RFI
- 15 • Presence of metals (inorganics) in groundwater
- 16 • Potential linkage of SWMU/AOC to SWMU 37 (investigated sanitary sewers)
- 17 • Potential linkage of SWMU/AOC to AOC 699 (investigated stormwater sewers)
- 18 • Potential linkage of SWMU/AOC to AOC 504 (investigated railroad lines)
- 19 • Potential migration pathways to surface water bodies (Zone J)
- 20 • Potential contamination associated with Oil/Water Separators (OWSs)
- 21 • Relevance or need for land use controls at the site

22 All the closeout issues listed above, except the relevance or need for land use controls at the  
23 site, were discussed in the *Zone H RFI Work Plan Addendum* prepared and submitted by  
24 CH2M-Jones during June 2001 (CH2M Jones, 2001).

### 25 **2.4.1 Relevance or Need for Land Use Controls at the Site**

26 At the end of the initial RFI and CMS investigation conducted by EnSafe and the ISM  
27 conducted by the DET, no COCs were identified in soil or groundwater at the site.

28 The possibility of TCE presence in soils was investigated during supplemental sampling  
29 conducted by CH2M-Jones during May 2001. No TCE detections were found above  
30 laboratory detection limits in the surface and subsurface soils during this supplemental  
31 investigation, thereby indicating that TCE does not pose a threat to groundwater at the site.  
32 Based on these observations, no land use controls are warranted at this site.

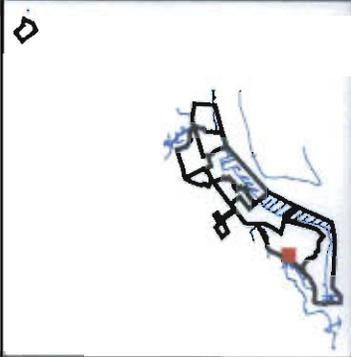
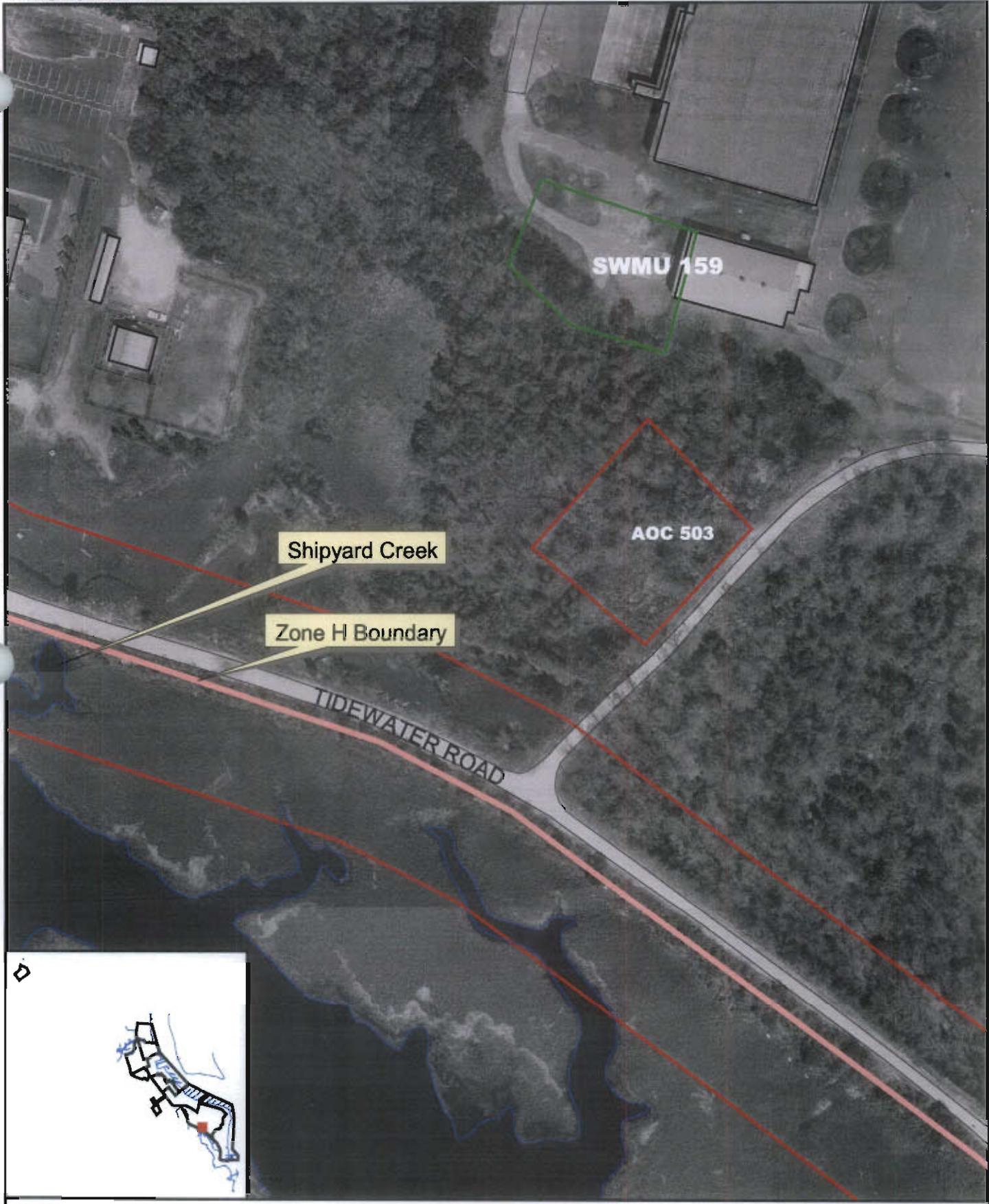
## 1 **2.5 Recommendations**

2 SWMU 159 was investigated as part of the RFI and supplemental CMS investigations  
3 conducted by EnSafe. These investigations did not identify any COCs at this site.  
4 Supplemental investigations conducted during April 2001 by CH2M-Jones to verify the  
5 presence of TCE in surface and subsurface soils did not indicate the presence of TCE in soils  
6 above laboratory detection limits or above screening criteria, such as the Region III  
7 residential RBCs or site-specific SSLs. These investigations indicate that the levels of site  
8 constituents detected during the investigations are protective of human health and the  
9 environment.

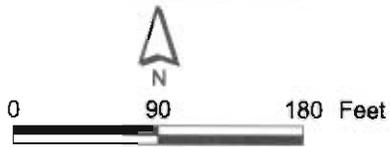
10 Based on the above observations, no further investigative or corrective action is necessary at  
11 SWMU159, and NFA status under the RCRA CA permit is recommended for this site.

12 Provided that the information presented in this report and the *Zone H RFI Work Plan*  
13 *Addendum* is adequate to address RFI completion and site closeout issues, it is expected that  
14 the BCT will concur that NFA is appropriate for SWMU 159. After BCT concurrence for  
15 NFA, a Statement of Basis will be prepared and made available for public comment to allow  
16 for public participation in the final remedy selection, in accordance with SCDHEC policy.

NOTE: Aerial Photo Date is 1997  
NOTE: Original figure created in color



-  Shoreline
-  AOC Boundary
-  SWMU Boundary
-  Zone Boundary



**Figure 2-1**  
Site Location  
SWMU 159, Zone H  
Charleston Naval Complex



## 3.0 AOC 653

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### 3.1 Introduction

AOC 653 is the site of a former leaking underground hydraulic fluid storage tank at the west end of Building 1508, one of the four buildings that made up the automotive hobby shop complex in the northern portion of Zone H at the CNC. According to the RCRA Facility Assessment (RFA) (EnSafe, 1995) and Environmental Baseline Survey (EBS) (EnSafe, 1996), typical hobby shop activities included minor automotive maintenance, repair, painting, and washing. Based on these activities, various paints, solvents, thinners, and petroleum products may likely have been used and stored on site. Other structures in the complex include Buildings 636, 1347, 1493, and 1508. Building 1508 is currently occupied by the United States Coast Guard.

In 1972, the approximately 1,500-square foot (ft<sup>2</sup>) automobile hobby shop was constructed on fill material (dredge spoils) covered by soil or some other unconsolidated material. Based on a 1939 aerial photograph, the area was a marsh before being filled in. In 1974, the surface area was paved and auto lifts were added to the west end of Building 1508. The use of the underground hydraulic fluid storage tank was initially discontinued due to suspected leakage, as reported in the EBS. Approximately 100 gallons of hydraulic fluid are reported to have leaked from this steel tank during its 22 years of service. The DET removed the tank from the site during an ISM. Numerous stains and petroleum odors were noted near the hobby shop during the EBS. Two other 40-gallon aboveground hydraulic fluid storage tanks were located on the site as well. However, neither is known to have released any product. Figure 3-1 shows the site location.

### 3.2 Previous Investigations

#### 3.2.1 RFI

The RFI included investigation of soil and groundwater. Based on identified site uses, sampling locations were targeted at the areas that would have had the most impact from spills and related site activities. Soil samples were also collected from an expanded area along the site perimeter to provide adequate spatial coverage. Two groundwater monitoring wells were installed at the site in an area most likely to have been impacted by site activities. Figure 3-2 shows the RFI soil and groundwater sampling locations.

1 The RFI stated that lead was detected in one sample location at 561 mg/kg above the  
2 residential target cleanup goal of 400 mg/kg. TPH was detected at 400 to 42,000 mg/kg.  
3 These sampling locations were later excavated during an ISM by the DET. No other site  
4 constituents were detected above the residential RBC.

5 In groundwater, arsenic was detected in one well slightly above the MCL of 50 µg/L at 54.1  
6 µg/L.

7 The RFI recommended a CMS for soil due to TPH concentrations above 100 mg/kg, and  
8 due to risk from arsenic in shallow groundwater.

### 9 **3.2.2 ISM by the Navy DET (1996)**

10 In an effort to eliminate the source of TPH contamination, the DET removed the hydraulic  
11 lift and associated appurtenances, along with approximately 700 y<sup>3</sup> of soil from areas  
12 contaminated with petroleum compounds. Additionally, 4,500 ft<sup>2</sup> of asphalt and 1,000 ft<sup>2</sup> of  
13 concrete from a pad were removed and disposed. All excavated soil was characterized and  
14 disposed at an offsite disposal facility. One sample location (653SB001) which contributed to  
15 the soil risk during the RFI stage due to the presence of BEQs and polychlorinated  
16 biphenyls (PCBs) was part of this excavation.

17 A total of 16 confirmatory soil samples were collected during the ISM from the excavated  
18 area and analyzed for BTEX, PAHs, RCRA metals, and TPH. There was one detection of  
19 benzo(a)pyrene at 285 µg/kg above the RBC and arsenic at 38.2 mg/kg above the Zone H  
20 background reference concentration (BRC) in these samples. Arsenic concentrations did not  
21 exceed screening criteria in any surrounding samples. Site risk prior to the ISM was below  
22 1E-06. Figures depicting the excavation boundaries and excavation confirmatory sampling  
23 locations can be found in the CMS Report for AOC 653 (EnSafe, 2000b).

### 24 **3.2.3 CMS Investigation**

25 The project team expressed concerns about the potential for arsenic to leach into  
26 groundwater from soil based on arsenic detections in soil and one detection in groundwater  
27 above the MCL during the third groundwater sampling event. Therefore, an additional  
28 groundwater monitoring well H653GW003 was installed and sampled twice during the  
29 CMS investigation. Additionally, two shallow and deep grid well pairs  
30 (HGDHGW003/03D, HGDHGW006/06D) were sampled and the arsenic results compared.  
31 Results from all five wells showed arsenic concentrations below the MCL. NFA for  
32 groundwater was recommended by the RFI due to arsenic in groundwater being present  
33 below its MCL and due to a lack of arsenic source at the site (EnSafe, 2000b).

### 3.2.4 Recommendations of the CMS Report

The CMS effort conducted by EnSafe was more characteristic of an RFI addendum than a typical CMS conducted under the RCRA CA process. The *Zone H AOC 653 CMS Report and SWMU 159 CMS Report* (EnSafe, 2000b) was prepared and submitted to SCDHEC summarizing the RFI and supplemental CMS sampling, supplemental fate and transport analysis, and risk assessment.

The CMS Report recommended NFA for AOC 653 based on the absence of any COCs at the site. SCDHEC required that site closeout issues pertaining to the linkage between the site and nearby sewers, surface water bodies, OWSs, and inorganics in groundwater be addressed. Additionally, the Navy was directed to review Figures 3 and 4 of the Draft CMS Report to verify that information from the Navy DET IM was properly included in this CMS Report. During the comment resolution and scoping meetings held between SCDHEC and CH2M-Jones during November 2000 and January 2001, a copy of the Completion Report from the Navy DET's IM effort was reviewed with SCDHEC to confirm the accuracy of Figures 3 and 4 of the CMS Report.

## 3.3 Closeout Issues

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

- Status of the RFI
- Presence of metals (inorganics) in groundwater
- Potential linkage of SWMU/AOC to SWMU 37 (investigated sanitary sewers)
- Potential linkage of SWMU/AOC to AOC 699 (investigated stormwater sewers)
- Potential linkage of SWMU/AOC to AOC 504 (investigated railroad lines)
- Potential migration pathways to surface water bodies (Zone J)
- Potential contamination associated with OWSs
- Relevance or need for land use controls at the site

All the closeout issues listed above, except the relevance or need for land-use controls at the site, were discussed in the *Zone H RFI Work Plan Addendum* prepared and submitted by CH2M-Jones during June 2001 (CH2M-Jones, 2001).

### 3.3.1 Relevance or Need for Land Use Controls at the Site

At the end of the initial RFI and CMS investigation conducted by EnSafe, no COCs were identified at the site. Additionally, the ISM conducted by the DET removed contaminated soils and backfilled the excavations with uncontaminated soils.

Based on these observations, land use controls are not warranted at this site.

## 3.4 Recommendations

The EnSafe RFI, supplemental CMS sampling and risk assessment, and the results of the DET ISM effort showed that no constituents were found in the soil or groundwater during these activities that warrant further action at this site.

The conclusions of the CMS Report are that, based on the concentrations of site constituents in soil and groundwater, AOC 653 has no COCs and therefore warrants NFA. SCDHEC's review of the Draft CMS Report required site closeout issues to be addressed prior to acceptance of NFA status for this site. These closeout issues were addressed in the *Zone H RFI Work Plan Addendum* (CH2M-Jones, 2001). No land use controls are warranted at this site since no COCs were identified above screening criteria for unrestricted land use.

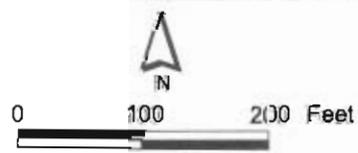
Therefore, AOC 653 is recommended for NFA status in the RCRA CA Permit for the CNC.

Provided that the information presented in this report and the *Zone H RFI Work Plan Addendum* is adequate to address RFI completion and site closeout issues, it is expected that the BCT will concur that NFA is appropriate for AOC 653. After BCT concurrence for NFA, a Statement of Basis will be prepared and made available for public comment to allow for public participation in the final remedy selection, in accordance with SCDHEC policy.

NOTE: Aerial Photo Date is 1997  
NOTE: Original figure created in color



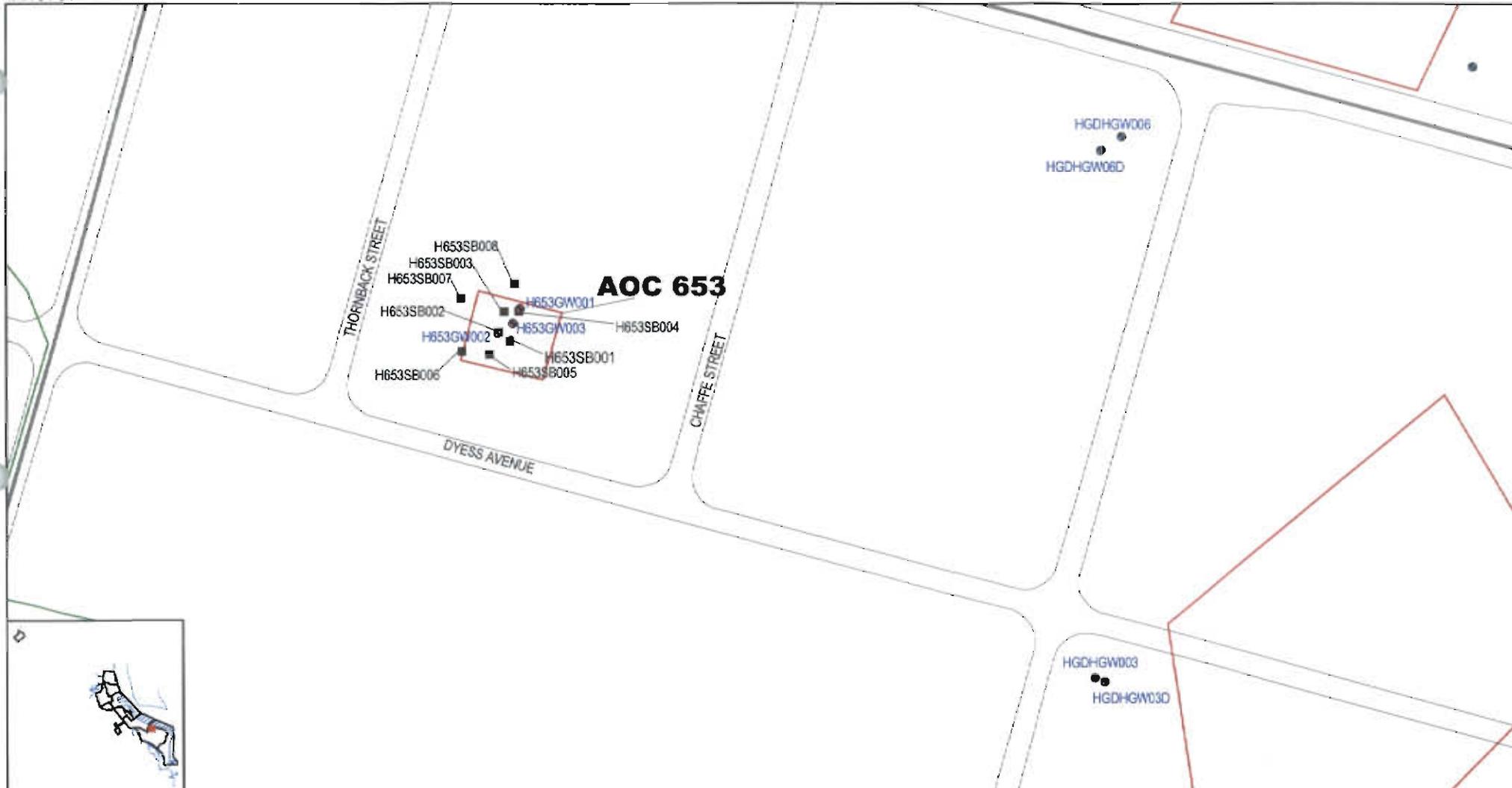
- AOC Boundary
- SWMU Boundary
- Zone Boundary



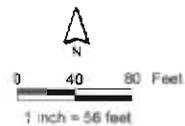
1 inch = 150 feet

**Figure 3-1**  
Site Location  
AOC 653, Zone H  
Charleston Naval Complex

H278: Original Sperry created by nlsb



- Soil Boring Location
- Groundwater Monitor Well
- ~ Roads - Lines
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings



**Figure 3-2**  
RFI/CMS Sampling Locations  
AOC 653, Zone H  
Charleston Naval Complex



## 1 4.0 References

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- 2 EnSafe Inc. *Zone H RCRA Facility Investigation Report, NAVBASE Charleston*. July 1996 with  
3 updates of June 24, 1997 and June 18, 1998.
- 4 EnSafe Inc. *Zone H RCRA Facility Investigation Report, RFI Addendum, NAVBASE Charleston*.  
5 May 5, 2000a.
- 6 EnSafe Inc. *Zone H AOC 653 CMS Report and SWMU 159 CMS Report, NAVBASE Charleston*.  
7 May 23, 2000b.
- 8 CH2M-Jones. *Zone H RCRA Facility Investigation Work Plan Addendum*. Revision 1.  
9 Charleston Naval Complex. June 2001.

## Zone H RFI Comment Resolution and Scoping Meeting

**ATTENDEES:** Paul Bergstrand, SCDHEC  
Mike Danielsen, SCDHEC  
Elizabeth Frady, SCDHEC  
Mihir Mehta, SCDHEC  
Tom Beisel, CH2M-Jones  
Sam Naik, CH2M-Jones

**COPIES:** Tony Hunt, Navy  
Dann Spariosu, USEPA  
Gary Foster, CH2M-Jones  
Dean Williamson, CH2M-Jones

**FROM:** Sam Naik

**DATE:** January 15, 2001

The Zone H RFI Addendum Comment Resolution and Scoping Meeting was held on January 12, 2001 at the SCDHEC offices in Columbia, SC. The meeting was held between 9 AM and 4:30 PM. Paul Bergstrand and Mihir Mehta also participated briefly during the afternoon session of the meeting.

Discussions were held on the November 2000 CH2M-Jones responses to SCDHEC comments on the Zone H RFI Addendum Report and Draft CMS Report for SWMU 159 and AOC 653 (issued by SCDHEC during September 2000) as well as the RFI Addendum Work Plan Scoping Package provided by CH2M-Jones to SCDHEC during December 2000 (the 'scoping package' referred hereafter in this meeting summary).

The following items were discussed pertaining to the different sites under consideration and are listed on a site-by-site basis:

### General

SCDHEC indicated that the CH2M-Jones responses (Rev. 0) to SCDHEC comments were satisfactory overall and that some responses needed further discussion in the meeting. These comments are highlighted in the following sections under each site. It was agreed that CH2M-Jones would re-issue the responses to comments and scoping packages in final form based on the resolutions of this meeting. It was also agreed that the scoping package would be revised based on the meeting resolutions and would serve as the basis for preparing the RFI Work Plan Addendum for those sites requiring RFI completion and closeout. CH2M-Jones proposed that the closeout issues would be addressed in the RFI Work Plan Addendum document.

With regard to the format of the final RFI document (whether errata pages and updated text pages to the RFI Addendum prepared by Ensafe in May 2000 would be sufficient), SCDHEC indicated that this issue will be given further consideration and will be discussed between SCDHEC and CH2M-Jones. CH2M-Jones indicated that the updates to the text and figures which will be required as a result of the comment resolution and additional sampling, would be minimal and would not warrant a reproduction of the entire Zone H RFI

Addendum Report (originally prepared by Ensafe), and that insertion of errata pages and updated text and tables where necessary should fulfill the requirement for a complete self-contained RFI Addendum document.

1. **AOC 653:** SCDHEC indicated that comment responses were satisfactory. It was agreed by SCDHEC that AOC 653 is a candidate for No Further Action (NFA). Since the Draft CMS Report was prepared by Ensafe, SCDHEC prefers to have CH2M-Jones resubmit the AOC 653 report as a Revision 1 CMS Report to satisfy the requirements of RFI completion. This document is to be followed by a CMS Work Plan – Rationale for No Further Action document which would include a discussion of the close-out issues pertaining to the relevance of inorganics in groundwater, Zone L and Zone J investigations as well as linkages with oil-water separators.
  
2. **SWMU 159:** SCDHEC indicated that comment responses were satisfactory. The proposed locations of the three additional soil borings to verify the presence of trichloroethene (TCE) in soil was agreeable to SCDHEC. In addition, it was agreed that a permanent shallow monitoring well would be installed instead of one of the three proposed soil borings (159SB018 ) and soil samples would be collected from this location during well installation. SCDHEC suggested reviewing the SSL calculations for the site to ensure that the SSL adopted by the RFI was sufficiently protective of groundwater.
  
3. **SWMU 136/AOC 663:** SCDHEC indicated that comment responses were satisfactory. CH2M-Jones will clarify in the RFI Addendum Work Plan what screening criteria were used for soil and groundwater in the Rapid Assessment Reports conducted at the site by Tetra Tech NUS subsequent to the Navy DET's ISM at AOC 663. CH2M-Jones will clarify in the RFI Work Plan if the Navy DET removed all UST pipeline during the UST removal at AOC 663, and an estimate of the volume of soil removed during the DET if such information is available.  
The scoping package had proposed two rounds of groundwater sampling at existing monitoring well NBCH663001, NBCH663002 and NBCH136001 for VOCs. It was agreed that only one round of sampling for BTEX will be necessary at only one well NBCH663002, in order to confirm the absence of benzene at this well.  
The scoping package also proposed two additional soil borings to verify arsenic concentrations in the surface and subsurface soil. These proposed locations and sampling are acceptable to SCDHEC.  
  
It was agreed that after the additional soil and groundwater sampling was performed as per the resolutions of this meeting, AOC 663 was a candidate for transfer to the Subtitle I UST program.
  
4. **AOC 666:** SCDHEC indicated that comment responses were satisfactory. The scoping package proposed sampling the contents of the oil-water separator at this site for VOCs, SVOCs, metals and PCBs. It was agreed that the present contents of the oil-water separator would be checked to see if there was more than one matrix present in the oil-water separator (i.e., solid/sludge/oil/water). Sampling will be done according to the findings of the nature of the contents in the oil-water separator.

The scoping package proposes the installation of a permanent shallow monitoring well east of AOC 666 but west of the stormwater sewer line to be sampled for VOC/SVOC/metals. The proposed location and sampling parameters for this well were acceptable to SCDHEC. A contingency plan to install a deep well at this location will be considered and discussed should the samples from this proposed shallow well show significantly high contamination.

5. **SWMU 138/AOC 667:** SCDHEC indicated that comment responses were satisfactory. It was agreed that sampling of the contents of the existing oil-water separator would be added to the scoping package to verify if the oil-water separator may be the source of the low-level chloroethane detected in an early round of groundwater sampling. SCDHEC requires that the oil-water separator be sampled for VOCs, SVOCs, metals and PCBs. CH2M-Jones will indicate the location of the oil-water separator in Figure 3 of the scoping package.

The scoping package proposes the installation of an additional shallow groundwater monitoring well downgradient of the site. The location of the well installation was acceptable to SCDHEC. This well will be sampled for VOCs/SVOCs/metals.

A discussion was conducted on a comment from Susan Byrd, SCDHEC on the RFI Addendum that a drainage ditch outside the site fence observed by SCDHEC during an August 7, 2000 site visit which contained flowing water should be evaluated. It was agreed that CH2M-Jones would conduct a sitewalk to identify this ditch in the field, and discuss the need to evaluate overland surface runoff, the potential for contaminated soil transport and groundwater-to-surface water discharge to this drainage feature which SCDHEC has requested.

6. **SWMU 196:** SCDHEC indicated that comment responses were satisfactory. Comment no. 32 on this site from Mike Danielsen, SCDHEC requested additional information on the site geology and hydrogeology. CH2M-Jones' response to this comment was that similar information has been provided in Appendix A of the SWMU 196 Interim Measure Work Plan for Source Area Delineation. Mike will review this document to determine if the information in the IM Work Plan is sufficient to satisfy this comment. Mike requested CH2M-Jones to verify if the temporary wells installed during the RFI at this site were abandoned with concrete mixed into the bentonite slurry or if it was only bentonite in the slurry. CH2M-Jones will verify this with Ensaf and provide the information to SCDHEC in the revised response to comments. It was agreed that the number of soil and groundwater sampling locations installed at the site during the RFI Addendum (Ensaf, 2000) and the Interim Measure for Source Area Delineation (CH2M-Jones, 2000) were adequate to cover the contaminated areas for nature and extent determinations.

SCDHEC had indicated that the past uses of the concrete pads found across Shipyard Creek towards SWMU 9 should be checked into. CH2M-Jones indicated that this was being done and a search of the Navy map archives for this area will be done, and if any information is available from this search, SCDHEC will be appraised of it.

It was agreed that no additional sampling for soil, surface water or sediment is needed at this site, and that the findings of the source area delineation work from the Interim Measure conducted during Dec 2000-Jan 2001 will be incorporated into the RFI Work

Plan Addendum. The scoping package will not need revision, except to remove references to SWMU 20 investigations in the scoping package and the RFI Work Plan Addendum.

7. **SWMU 17:** SCDHEC indicated that comment responses were satisfactory. Response to comment no. 56 from Mike Danielsen will be changed to say that monitoring well 017002 which showed contamination historically will be considered in the Corrective Measures Study for evaluation. The original response to this comment had indicated that well 017002 would be sampled before completion of the RFI Addendum. Figures 2.5.33, 2.5.35, 2.5.38, 2.5.39, 2.5.45, 2.5.49, 2.5.51, 2.5.55, 2.5.56, 2.5.61 will be corrected to close open-ended contours as indicated in the response to comments originally. Item 6 of the scoping package proposed re-sampling well 017002 for SVOCs to address an implied data gap for 1,2,4-trichlorobenzene. This will be deleted in the revised scoping package. Instead, the scoping package will include one round of sampling from well 017004 (to be sampled for SVOCs to verify the levels of benzidine) and one round of sampling for VOCs from well 017009 to provide a third data point at this well for verification of the absence of methylene chloride. The sampling for benzidine and methylene chloride are being performed to verify if they are only laboratory contaminants based on a one-time occurrence among several rounds of sampling, and their absence at other wells at this site and basewide at CNC.

It was agreed that two soil boring locations where visual observations were used will be resampled. These were the former locations of soil borings 017SWB02 and 017SWT02.

It was agreed that the possibility of the presence of a UST under Room 2-167 (Diesel Lab) of Building FBM 61 will be investigated during the CMS effort. The presence or absence of such UST has not been confirmed either in the RFI Addendum or in the EBSL Building Phase I survey.

SCDHEC agreed that the minimal additional sampling agreed upon during this meeting would complete the determination of the nature and extent of contamination at the site.

## General Comments

### Comment:

1. Site Close-out strategies to support NFA recommendation.

At the May, 2000 meeting, the team discussed the need to include/evaluate Oil Water Separators, Zone J, Zone L, inorganics in groundwater, and indoor air quality issues when closing out a SWMU (recommending an NFA). As currently written, the Navy does not evaluate these issues to support their NFA recommendation. The Department will not concur with an NFA recommendation until these issues are addressed.

### Response:

*Oil/water separators (OWS) and inorganics in groundwater are being addressed at this time. The locations of the OWSs have been incorporated into the Geographic Information System (GIS). The relationship of inorganics in groundwater to the various sites and their overall distribution and occurrence are being addressed at the site-specific level as well as on a base-wide level. The relationship of Zone L to the Zone H sites will be evaluated. Zone J evaluation is currently being addressed by EnSafe/Allen & Hoshall, and any connections to the Zone H sites will be evaluated.*

### Comment:

2. DET reports

The Navy has used the completion of Interim Stabilization Measure (ISM) reports to support their RFI addendum recommendations. An example of this is SWMU 159 and AOC 653. The Navy must

- a. Provide a copy of the ISM report to the Department
- b. Incorporate, as deemed appropriate, the necessary information from the ISM report to support the RFI addendum recommendations.

The Department is unable to concur with any recommendations until the Navy provides this information.

### Response:

*The ISM reports have been provided to SCDHEC under separate cover.*

*Information from the ISM reports will be incorporated into the RFI reports as deemed appropriate.*

### Comment:

3. Changes in SWMUs/ AOCs due to an ISM

The Navy has included figures in the RFI addendum report for SWMUs/ AOCs 136, 663, 666, 138, 667, 197, and 17 that did not represent the current conditions they claimed to represent. An example of this was AOC 666 at which the Charleston DET conducted an ISM. Due to the discrepancies found in that document, the Department requests that the Navy review Figure 4 for AOC 653 and Figure 4 for SWMU 159 to determine if the figures are truly accurate. This report should illustrate pre- and post-ISM conditions of the SWMU/ AOC to support the proposed recommendation.

**Response:**

Figure 3 for AOC 159 represents pre-ISM conditions, showing the sample locations from the 1996 initial RFI; Figure 4 for AOC 159 represents post-ISM conditions. A comparison between Figure 4 and Figure B-1A of the Completion Report for Interim Measure–SWMU 159, dated January 1997, prepared by the Navy DET, indicates that Figure 4 is accurate.

Similar verification was provided for AOC 653 to confirm that Figure 3 represents pre-ISM conditions and that Figure 4 represents post-ISM conditions.

**Specific Comments, per SWMU/AOC**

**SWMU 653**

**Navy recommends an NFA**

Based on the information provided in the report, the Department is unable to concur with the Navy's recommendation. The following comment(s) support this decision:

**Comment:**

4. Close-out strategies

The Navy has not addressed the close-out strategies (see General comments).

**Response:**

*Please see response to Comment 1.*

**Comment:**

5. DET reports

The soil sampled during the initial RFI contained hits of BEQs, and Aroclors 1248 and 1260, which yielded a human health risk of 9.1E-07. Thus the purpose of the ISM was to excavate petroleum-impacted soil, rather than decrease a human health risk value. Nonetheless, the Department still requires particular information in order to make a determination on the Navy's NFA recommendation. Please refer to General Comment #3.

**Response:**

*Appropriate information will be included in the report to address the concerns.*

**SWMU 159**

**Navy recommends an NFA**

Based on the information provided in the report, the Department is unable to concur with the Navy's recommendation. The following comment(s) support this decision:

**Comment:**

6. Close-out strategies

The Navy has not addressed the close-out strategies (see General comments).

**Response:**

*Please see response to Comment 1.*

**Comment:**

7. Ecological concerns of the adjacent marsh

The Navy has responded to the Department's June 1999 comment about the lack of discussion on an adjacent marsh area. The Navy responded by saying that the Zone J work plan will be revised to meet the requirements of the new ERA Process document. The Navy further responded by stating that it believes that this evaluation will adequately address any potential ecological concerns for the adjacent wetlands. The Department is stating this information as a reminder, since this addresses one of the close-out strategies.

**Response:**

*Comment noted. Please see response to Comment 1.*

**Comment:**

8. Revised risk values

The Navy claimed that the soil and sediment that contributed to the human health and ecological risk values has been excavated and removed via an ISM conducted by the DET. The Navy has not provided the Department with information to support this claim. The Department requires this information, which would likely include a table showing the results of the confirmatory sampling, and revised human health and ecological risk values, if applicable.

**Response:**

*The Navy DET's Interim Measure Completion Report will be provided to SCDHEC along with analytical reports of confirmatory soil sampling. Section 5 includes a supplemental risk calculation for the methylene chloride detected in groundwater. However, Appendix C includes the common lab contaminants (see Attachment 1) methylene chloride, and acetone analytical data for site samples and the QA/QC samples (field and lab blanks). The 1998 sampling result used for risk calculations was 24 µg/L for methylene chloride. The field blanks from that batch of data had a maximum field blank methylene chloride detection of 26 µg/L. As per guidance, unless 260 µg/L or higher is detected in the site samples, it is not considered site-related (Page 5-16 of Attachment 1). Therefore, there are no COPCs in the site groundwater at SWMU 159, and the risk assessment is overly conservative.*

## General Comments

### Comment:

1. The document appears to be well prepared, with satisfactory illustrations and maps. Revision of some might be required. Please see specific comments.

### Response:

*Comment noted.*

### Comment:

2. This report as presented was supposed to address the CMS activities plus the ISM (Interim Stabilization Measure) in terms of final remedy. Based on the attached document, justification towards an NFA (No Further Action) is not fulfilled. The Department would like to see more soil and groundwater sampling to make sure no risk is posed on human health or the environment.

### Response:

*As summarized on page 3-9, before implementation of the ISM, soil and groundwater at the site did not pose a significant risk to human health or the ecology. Health risks were less than 1 in 1 million. The risks estimated for groundwater were based on arsenic detection below the maximum contaminant level (MCL) but above the risk-based concentration (RBC). Arsenic was detected at similar levels in the grid wells (background), indicating natural conditions*

### Comment:

3. In referring to other relative documents, this document does not bring in some of the important information regarding the geological and hydrogeological settings of the area in concern. This document failed to build a comprehensive correlation with data from adjacent SWMUs and AOCs, and therefore creates data gaps that make it impossible to come to a conclusion. Please revise and include all neighboring SWMUs and AOCs, and any oil-water separators, plus the pertinent hydrogeological data.

### Response:

*The figures in the report will be updated to include the boundaries of neighboring SWMUs/AOCs, direction of stormwater flow, locations of existing USTs/ASTs in the vicinity of this site.*

### Comment:

4. This documents does not relate to the unfinished work in Zone L and Zone J. It does not concur with proposed NFA.

### Response:

*The relationship of Zone L studies to Zone H sites will be evaluated. Zone J evaluation is currently being addressed by EnSafe/Allen & Hoshall. Further details will be added to the report if a relationship is established between Zone J and Zone L studies to the nature of contamination at the site.*

### Comment:

5. Evaluation of the fate and transport potential of the Arsenic as from soil-to-groundwater is insufficient to support the claim that "Arsenic did not have the potential to migrate from soil to groundwater". It is evident that in the subsurface soil concentration of Arsenic exceeds that of the surface soil as proved throughout the current work and the

background correlation reported. For the Department to consider an NFA, the soil-to-groundwater pathway for Arsenic and VOCs must be extensively studied.

**Response:**

*The text on page 1-1 of this report used this argument while drawing a comparison with similar conditions at AOC 663/SWMU 136 within Zone H. The text on Page 1-1 of the document will be revised to exclude this argument in order to clarify the site-specific nature and extent of arsenic contamination.*

**Comment:**

6. The lack of information related to the locations and settings of the oil-water separators form a data gap for present and future evaluation of this site. The Department recommends that the Navy must include OWS (Oil Water Separators) data linkages to all SWMUs and AOCs to help enhance the quality of evaluation and assessment.

**Response:**

*The issue of oil/water separators (OWS) is being addressed. The locations of the OWSs have been incorporated into the Geographic Information System (GIS).*

## **Zone H, AOC 653**

**Comment:**

7. Fig 2 failed to show correlation with associated SWMUs and AOCs, and OWS as it should. Building 1508 is associated with SWMU 124; the Satellite Accumulation Area. Building 1347 is associated with SWMUS 92,93 and 115. Building 636 is associated with SWMUs 122, 123, SAA and PSWMUs 92, 93 and 115. None of the information cited, is included on the figures nor commented on, throughout the text. Please revise and include comments on correlations.

**Response:**

*Figure 3 will be updated to show the existing AOCs and SWMUs in the vicinity of AOC 653.*

**Comment:**

8. AST 640 and UST 640B are in the range of 250-300 ft east of AOC 635. Although groundwater flow direction is generally northeast, a correlation might be useful in predicting source and extent of the contaminants in concern. Please check and include relative information.

**Response:**

*The nature and extent of contamination at this site does not indicate a relationship between this site and neighboring SWMUs/AOCs. However, Figure 3 of the report will be updated to include the site features surrounding it.*

**Comment:**

9. Table 3.3 on page 3.6 shows the TPH as non detect out of one round of sampling RFI (1996), while in Section 3.2 Navy DET (Environmental Detachment) ISM stated TPH was detected in all soil samples with a high of 42,000 mg/kg and also exceeded its 100 mg/kg screening level. Please clarify.

**Response:**

*A review of the analytical result reports for soil samples collected during the 1996 RFI effort indicates detections of TPH ranging from 400 to 42,000 mg/kg. Please refer to Table 3.1 Organic Compounds in Soil which reflects the TPH concentrations detected during the RFI prior to soil removal by the Navy DET. An additional table with residual concentrations will be included to reflect current site conditions.*

**Comment:**

10. Section 6.2, 2nd line, SWMU 136/AOC 663 never appeared in any of the maps and figures throughout the document. However, the text has used them for correlation. Please revise and include relative information.

**Response:**

*Section 6.0 is a summary of the discussions from earlier sections. Appropriate figures presented in the earlier sections will be referenced.*

**Comment:**

11. Section 4.1 2nd paragraph, last line. "Fig 3 shows..." Please be advised that wells NBCHGRD003/03D and BCHGRD006/06D were not indicated anywhere in the figure mentioned. Please check and include wells with their relevant parameters.

**Response:**

*Figure 3 includes two background wells identified with slightly different ID numbers, GDH003 and GDH006. These station IDs will be synchronized in the database and GIS figures, and the deep wells referenced in the text will be included in Figure 3.*

**Comment:**

12. All of the figures presented lack information related to the wells parameters. Please revise well locations, depths, groundwater levels and any relevant hydrogeological data.

**Response**

*Appropriate revisions to the figures will be made. Figure 5 shows groundwater elevations and groundwater elevation contours.*

## **Zone H, SWMU 159**

**Comment:**

13. Fig 6 shows TCE concentration values in soil as increasing downgradient (9, 13, 15, 21) mg/kg. In order to thoroughly investigate what is beyond that, the Department believes it is necessary to conduct more sampling downgradient both for the surface and subsurface intervals.

**Response:**

*Downgradient sediment samples 159M0001 and 159M0002 show values of non-detect and 17.0 µg/kg (parts per billion [ppb]), respectively. The apparent increases in the detections of TCE do not show a significant change in the downgradient direction to point to a pattern of migration in the downgradient direction. However, in order to fill a gap in the locations of soil borings, two additional soil borings will be introduced in locations as shown in attached Figure 1. Surface soil samples will*

be collected at these two locations. Subsurface soil samples will also be collected at these three locations if the groundwater elevation is below the subsurface soil sampling interval of 3-5 feet below land surface. Should the elevation of the groundwater at any of these proposed boring locations have caused the saturation of the subsurface interval, no samples will be collected from that particular boring location. If the analytical results from these soil boring samples show TCE contamination above screening levels, additional samples will be collected until the extent of TCE contamination above the screening level is delineated at this site. Additionally, a permanent groundwater monitoring well will be installed in the location shown in Figure 3 – SWMU 159 and soil samples will be collected during the well installation from the upper and lower intervals and analyzed for VOCs.

**Comment:**

14. Fig 3: Sediment sample locations are not indicated in the legend. Please revise and include the information on the figure.

**Response:**

Sediment sampling was performed at the two locations shown on Figure 3. Sample 159M0001 was performed at the end of the storm sewer pipe outfall northwest of SWMU 159, and sample 159M0002 was performed at the end of the ditch leading from the former can crusher on the southwest side of Building 665. The legend for Figure 3 will be updated to include sediment sampling location symbols to complete the illustration.

**Comment:**

15. In order to support the claim that TCE has no potential to migrate from soil to groundwater, the Navy must complete more extensive data research/sampling and include better interpretations to support conclusion.

**Response:**

Comment noted. Additional text describing fate and transport properties of TCE will be included in the revised report.

**Comment:**

16. Section 4.2.1.1, Line 8: The document points out that reviewing archived soil data for three confirmation sample points at AOC 653 were reviewed to help evaluate SWMU 159. Please be advised that no figure throughout the documents ever ties the two sites together. The results of the evaluation are nowhere to be found in the text. For better correlation, please revise and include an illustrating figure connecting the two locations with pertinent hydrological data. Also include the evaluation referenced.

**Response:**

The two sites are located far apart within Zone H. Figure 2.1 from the RFI Addendum will be added to the revised report to clarify their locations.

Analytical Data Summary

08/02/2001 10:24 AM

Zone H, SWMU 159

CMS Investigation Addendum

StationID	H159SB017	H159SB017	H159SB019
SampleID	159SB01701 (0-1 ft)	159SB01702 (3-5 ft)	159SB01901 (0-1 ft)
DateCollected	04/19/2001	04/19/2001	04/19/2001
DateAnalyzed	4/24/01	4/24/01	4/24/01
SDGNumber	41029	41029	41029

VOCs by SW8260B (Soil)

Parameter	Units	H159SB017		H159SB017		H159SB019	
Chloromethane	ug/Kg	20.5	UJ	24.2	UJ	18.5	UJ
Vinyl chloride	ug/Kg	20.5	U	24.2	U	18.5	U
Bromomethane	ug/Kg	20.5	U	24.2	U	18.5	U
Chloroethane	ug/Kg	20.5	U	24.2	U	18.5	U
1,1-Dichloroethene	ug/Kg	10.2	U	12.1	U	9.2	U
Acetone	ug/Kg	20.5	U	24.2	U	18.5	U
Carbon Disulfide	ug/Kg	10.2	UJ	12.1	UJ	9.2	UJ
Methylene Chloride	ug/Kg	10.2	U	12.1	U	9.2	U
trans-1,2-Dichloroethene	ug/Kg	10.2	U	12.1	U	9.2	U
1,1-Dichloroethane	ug/Kg	10.2	UJ	12.1	U	9.2	UJ
Vinyl acetate	ug/Kg	20.5	U	24.2	U	18.5	U
Methyl ethyl ketone (2-Butanone)	ug/Kg	20.5	U	24.2	U	18.5	U
cis-1,2-Dichloroethylene	ug/Kg	10.2	U	12.1	U	9.2	U
1,2-Dichloroethene (total)	ug/Kg	10.2	U	12.1	U	9.2	U
Chloroform	ug/Kg	10.2	U	12.1	U	9.2	U
1,1,1-Trichloroethane	ug/Kg	10.2	U	12.1	U	9.2	U
Carbon Tetrachloride	ug/Kg	10.2	U	12.1	UJ	9.2	U
1,2-Dichloroethane	ug/Kg	10.2	UJ	12.1	UJ	9.2	UJ
Benzene	ug/Kg	10.2	U	12.1	U	9.2	U
Trichloroethylene (TCE)	ug/Kg	10.2	U	12.1	U	9.2	U
1,2-Dichloropropane	ug/Kg	10.2	U	12.1	U	9.2	U
Bromodichloromethane	ug/Kg	10.2	U	12.1	U	9.2	U
2-Chloroethyl vinyl ether	ug/Kg	20.5	UJ	24.2	UJ	18.5	UJ
cis-1,3-Dichloropropene	ug/Kg	10.2	UJ	12.1	UJ	9.2	UJ
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg	20.5	U	24.2	U	18.5	U
Toluene	ug/Kg	1.4	J	1.5	J	1	J
trans-1,3-Dichloropropene	ug/Kg	10.2	U	12.1	U	9.2	U
1,1,2-Trichloroethane	ug/Kg	10.2	U	12.1	U	9.2	U
2-Hexanone	ug/Kg	20.5	U	24.2	U	18.5	U
Tetrachloroethylene (PCE)	ug/Kg	10.2	UJ	12.1	UJ	9.2	UJ
Dibromochloromethane	ug/Kg	10.2	U	12.1	U	9.2	U

Analytical Data Summary

08/02/2001 7:24 AM

Zone H, SWMU 159

CMS Investigation Addendum

VOCs by SW8260B (Soil)

	StationID	H159SB017		H159SB017		H159SB019	
	SampleID	159SB01701 (0-1 ft)		159SB01702 (3-5 ft)		159SB01901 (0-1 ft)	
	DateCollected	04/19/2001		04/19/2001		04/19/2001	
	DateAnalyzed	4/24/01		4/24/01		4/24/01	
	SDGNumber	41029		41029		41029	
Parameter	Units						
Chlorobenzene	ug/Kg	10.2	U	12.1	U	9.2	U
Ethylbenzene	ug/Kg	10.2	U	12.1	U	9.2	U
m+p Xylene	ug/Kg	10.2	U	12.1	U	9.2	U
o-Xylene	ug/Kg	10.2	UJ	12.1	UJ	9.2	UJ
Xylenes, Total	ug/Kg	10.2	UJ	12.1	UJ	9.2	UJ
Styrene	ug/Kg	10.2	U	12.1	U	9.2	U
Bromoform	ug/Kg	10.2	U	12.1	U	9.2	U
1,1,2,2-Tetrachloroethane	ug/Kg	10.2	U	12.1	U	9.2	U

**Analytical Data Summary**

08/02/2001 10:24 AM

**Zone H, SWMU 159**

**CMS Investigation Addendum**

**StationID H159SB019**

**SampleID 159SB01902 (3-5 ft)**

**DateCollected 04/19/2001**

**DateAnalyzed 4/24/01**

**SDGNumber 41029**

**VOCs by SW8260B (Soil)**

<b>Parameter</b>	<b>Units</b>		
Chloromethane	ug/Kg	18.2	UJ
Vinyl chloride	ug/Kg	18.2	U
Bromomethane	ug/Kg	18.2	U
Chloroethane	ug/Kg	18.2	U
1,1-Dichloroethene	ug/Kg	9.1	U
Acetone	ug/Kg	18.2	U
Carbon Disulfide	ug/Kg	9.1	UJ
Methylene Chloride	ug/Kg	9.1	U
trans-1,2-Dichloroethene	ug/Kg	9.1	U
1,1-Dichloroethane	ug/Kg	9.1	UJ
Vinyl acetate	ug/Kg	18.2	U
Methyl ethyl ketone (2-Butanone)	ug/Kg	2.6	J
cis-1,2-Dichloroethylene	ug/Kg	9.1	U
1,2-Dichloroethene (total)	ug/Kg	9.1	U
Chloroform	ug/Kg	9.1	U
1,1,1-Trichloroethane	ug/Kg	9.1	U
Carbon Tetrachloride	ug/Kg	9.1	U
1,2-Dichloroethane	ug/Kg	9.1	UJ
Benzene	ug/Kg	9.1	U
Trichloroethylene (TCE)	ug/Kg	9.1	U
1,2-Dichloropropane	ug/Kg	9.1	U
Bromodichloromethane	ug/Kg	9.1	U
2-Chloroethyl vinyl ether	ug/Kg	18.2	UJ
cis-1,3-Dichloropropene	ug/Kg	9.1	UJ
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg	18.2	U
Toluene	ug/Kg	1.8	J
trans-1,3-Dichloropropene	ug/Kg	9.1	U
1,1,2-Trichloroethane	ug/Kg	9.1	U
2-Hexanone	ug/Kg	18.2	U
Tetrachloroethylene (PCE)	ug/Kg	9.1	UJ
Dibromochloromethane	ug/Kg	9.1	U

Analytical Data Summary

Zone H, SWMU 159

08/02/2001 7:24 AM

CMS Investigation Addendum

StationID H159SB019

SampleID 159SB01902 (3-5 ft)

DateCollected 04/19/2001

DateAnalyzed 4/24/01

SDGNumber 41029

VOCs by SW8260B (Soil)

Parameter	Units		
Chlorobenzene	ug/Kg	9.1	U
Ethylbenzene	ug/Kg	9.1	U
m+p Xylene	ug/Kg	9.1	U
o-Xylene	ug/Kg	9.1	UJ
Xylenes, Total	ug/Kg	9.1	UJ
Styrene	ug/Kg	9.1	U
Bromoform	ug/Kg	9.1	U
1,1,2,2-Tetrachloroethane	ug/Kg	9.1	U

## Data Validation Summary - Charleston Naval Complex - Zone H

TO: Sam Naik/CH2M HILL/ATL  
FROM: Herb Kelly/CH2M HILL/GNA  
DATE: August 4, 2001

The purpose of this memorandum is to present the results of the data validation process for the samples collected at the following sites in Zone H: SWMU 017, SWMU 159, SWMU 136/AOC 663, AOC 666, and SWMU138/AOC 667. The samples were collected between the dates of April 17 and July 5, 2001.

The specific samples and analytical fractions reviewed are summarized below in Table 1.

The Quality Control areas that were reviewed and related findings are documented within each subsection that follows. These data were validated for compliance with the analytical method requirements. This process also included a review of the data to assess the accuracy, precision, and completeness based upon procedures described in the guidance documents such as the Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 1994) and *National Functional Guidelines for Organic Data Review* (EPA, 1999). Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for the following analyses: SW-846 8260 Volatile Organic Compounds (VOC), SW-846 8270 Semivolatile Organic Compounds (SVOC), SW-846 8081 Organochlorine Pesticides, SW-846 8082 Polychlorinated Biphenyls, and Metals following SW-846 6010/7000 Series methodology.

Some samples were submitted to Severn Trent Services, STL Savannah Laboratories, Inc., in Savannah, Georgia for the following analyses: SW-846 8270 SVOCs and Metals following SW-846 6010/7000 Series methodology.

Sample results that were not within the acceptance limits were appended with a qualifying flag, which consisted of a single- or double-letter code that indicated a possible problem with the data. The qualifying flags originated during the data review and validation processes. These also include the secondary, or the two-digit "sub-qualifier" flags. The secondary qualifiers provide the reasoning behind the assignment of a qualifier flag to the data. The secondary qualifiers are presented and defined below.

Attachment 1 lists the changes in data qualifiers, due to the validation process.

The following primary flags were used to qualify the data:

- [=] Detected. The analyte was analyzed for and detected at the concentration shown.
- [J] Estimated. The analyte was present but the reported value may not be accurate or precise.
- [U] Undetected. The analyte was analyzed for but not detected above the method detection limit.
- [U]] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.
- [R] Rejected. The data were not useable.

### Secondary Data Validation Qualifiers

<u>Code</u>	<u>Definition</u>
2S	Second Source
BL	Blank
BD	Blank Spike/Blank Spike Duplicate or (LCS/LCSD) Precision
BS	Blank Spike/LCS
CC	Continuing Calibration Verification
DL	Dilution
FD	Field Duplicate
HT	Holding Time
IB	In-Between (metals - B's → J's )
IC	Initial Calibration
IS	Internal Standard
LD	Lab Duplicate
LR	Concentration exceeded Linear Range
MD	MS/MSD or LCS/LCSD Precision
MS	Matrix Spike/Matrix Spike Duplicate
OT	Other (see DV worksheet)
PD	Pesticide Degradation
PS	Post Spike
RE	Re-extraction/Re-analysis
SD	Serial Dilution
SS	Spiked Surrogate
TN	Tune

**Table 1 - Chemical Analytical Methods – Field and Quality Control Samples**

SDG Number	Site ID	Station ID	Sample ID	Date Collected	Matrix	Lab Sample ID	Sample Type	Metals SW6010 SW7000 Series	Pest/PCB SW8081	PCBs SW8082	VOC SW8260	SVOC SW8270
41029	017	H017SWB02	017CWB0202	04/19/01	SO	41029003	N				X	X
41029	017	H017SWB02	017SWB0201	04/19/01	SO	41029001	N				X	X
41029	017	H017SWB02	017SWB0202	04/19/01	SO	41029002	N				X	X
41029	017	H017SWT02	017SWT0201	04/19/01	SO	41029004	N				X	X
41029	017	H017SWT02	017SWT0202	04/19/01	SO	41029005	N				X	X
41029	159	H159SB017	159SB01701	04/19/01	SO	41029006	N				X	
41029	159	H159SB017	159SB01702	04/19/01	SO	41029007	N				X	
41029	159	H159SB019	159SB01901	04/19/01	SO	41029008	N				X	
41029	159	H159SB019	159SB01902	04/19/01	SO	41029009	N				X	
41081	663	H663GW001	663GW001L2	04/18/01	WG	41081001	N				X	
41083	663	H663GW002	663GW002L2	04/18/01	WG	41083001	N				X	
41084	017	H017EWT02	017EWT0201	04/19/01	WG	41084004	N				X	X
41084	017	H017GW005	017GW005L2	04/18/01	WG	41084001	N				X	X
41084	017	H017GW009	017GW009L2	04/18/01	WG	41084005	N				X	
41084	017	H017GW005	017HW005L2	04/18/01	WG	41084002	FD				X	X
41084	017	H01EWB02	01EWB02L2	04/18/01	WG	41084003	N				X	X
41084	017	H01TWB02	01TWB02L2	04/17/01	WG	41084006	N				X	
41084	666	H666EWS001	666EWS001L2	04/19/01	WG	41084008	N	X	X		X	X
41084	666	H666OWS001	666OWS001L2	04/18/01	WG	41084009	N	X	X		X	X

SDG Number	Site ID	Station ID	Sample ID	Date Collected	Matrix	Lab Sample ID	Sample Type	Metals SW6010 SW7000 Series	Pest/PCB SW8081	PCBs SW8082	VOC SW8260	SVOC SW8270
41084	666	H666OWS001	666OWS001L2LR	04/18/01	WG	41084009	LR		X			X
41084	666	H666TWS001	666TWS001L2	04/17/01	WG	41084007	N				X	
41084	666	H666OWS001	666YWS001L2	04/18/01	WG	41084010	N	X	X		X	X
41084	666	H666OWS001	666YWS001L2LR	04/18/01	WG	41084010	LR		X			X
41084	667	H667OWS001	667OWS001L2	04/19/01	WG	41084011	N	X	X		X	X
42353	017	H017SWB02	017SWB0201	04/19/01	SO	42353001	N			X		
42353	017	H017SWB02	017SWB0202	04/19/01	SO	42353002	N			X		
42353	017	H017SWT02	017SWT0201	04/19/01	SO	42353003	N			X		
42353	017	H017SWT02	017SWT0202	04/19/01	SO	42353004	N			X		
44758	666	FIELDQC	666EW003L2	06/26/01	WQ	44758004	EB				X	
44758	666	H666GW003	666GW003L2	06/26/01	WG	44758001	N				X	
44758	666	FIELDQC	666TW003L2	06/26/01	WQ	44758005	TB				X	
44758	667	H667GW003	667GW003L2	06/26/01	WG	44758002	N				X	
44758	666	H666GW003	667HW003L2	06/26/01	WG	44758003	FD				X	
CNC24	666	FIELDQC	666EW003L2	07/05/01	WQ	S114264*4	EB	X				X
CNC24	666	H666GW003	666GW003L2	07/05/01	WG	S114264*1	N	X				X
CNC24	667	H667GW003	667GW003L2	07/05/01	WG	S114264*2	N	X				X
CNC24	666	H666GW003	667HW003L2	07/05/01	WG	S114264*3	FD	X				X

SDG Number	Site ID	Station ID	Sample ID	Date Collected	Matrix	Lab Sample ID	Sample Type	Metals SW6010 SW7000 Series	Pest/PCB SW8081	PCBs SW8082	VOC SW8260	SVOC SW8270
<p><b>MATRIX CODE</b></p> <p>SO - Soil  WG - Groundwater  WQ - Water QC Samples</p> <p><b>SAMPLE TYPE CODE</b></p> <p>EB - Equipment Blank  FD - Field Duplicate  N - Native Sample  TB - Trip Blank  LR - Laboratory Replicate</p> <p><b>ANALYSIS CODE</b></p> <p>Pest - Pesticides  PCBs - Polychlorinated Biphenyls  VOC - Volatile Organic Compounds  SVOC - Semivolatile Organic Compounds</p>												

# Organic Parameters

## Quality Control Review

The following list represents the QA/QC measures that are typically reviewed during the data quality evaluation procedure for organic data.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Method blanks, equipment blanks, and trip blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Surrogate Recoveries** – Surrogate Compounds are added to each sample and the recoveries are used to monitor lab performance and possible matrix interference.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", either laboratory reagent water or Ottawa sand, in which target compounds have been added prior to extraction/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **GC/MS Tuning** – The mass spectrum of the tuning compound is evaluated for method compliance. The criteria are established to verify the proper mass assignment and mass resolution.
- **Initial Calibration** – The initial calibration ensures that the instrument is capable of producing acceptable qualitative and quantitative data for the compounds of interest.
- **Continuing Calibration** – The continuing calibration checks satisfactory performance of the instrument and its predicted response to the target compounds.
- **Internal Standards** – The internal standards (retention time and response) are evaluated for method compliance. The internal standards are used in quantitation of the target parameters and monitor the instrument sensitivity and response for stability during each analysis.
- **Confirmation** – If GCMS methodology is not initially used for analysis, SW-846 method 8000 requires confirmation when the composition of samples is not well characterized.

Therefore, even when the identification has been confirmed on a dissimilar column or detector, the agreement of the quantitative results on both columns is evaluated. For Pesticide and PCB analyses covered in this report, confirmation was performed using a dissimilar analytical column. The laboratory analyzed samples with a gas chromatograph (GC) utilizing simultaneous primary and confirmation data acquisition. Per SW-86 method 8000, 40% RPD criteria was used as the acceptance limit.

## Volatile Organic Compounds (VOC) Analyses

The QA/QC parameters for VOC analyses for all of the samples were within acceptable control limits, except as noted below:

### Blanks

The VOC target parameters detected in blank samples are listed in Table 2.

**TABLE 2**

Equipment Blank Contamination: VOCs  
Charleston Naval Complex, Zone H, Charleston, SC

SDG	Lab Sample ID	Sample ID	Sample Type	Parameter	Lab Result	Units	Flag Concentrations
41029	VBLK01	1200002835	MB	Methylene Chloride	0.52	µg/Kg	<5.2 µg/L or µg/Kg
41084	41084003	01EWB02L2	EB	Acetone	1.3	µg/L	<13 µg/L or µg/Kg
	41084004	017EWT0201	EB	Acetone	1.6	µg/L	<16 µg/L or µg/Kg
	41084008	666EWS001L2	EB	Acetone	1.6	µg/L	<16 µg/L or µg/Kg
44758	VBLK01	1200028877	MB	Toluene	0.25	µg/L	<1.3 µg/L
	44758004	666EW003L2	EB	Acetone	1.9	µg/L	<19 µg/L
	44758005	666TW003L2	TB	Acetone	1.7	µg/L	<17 µg/L

If a target parameter determined to be a common contaminant was reported in a field sample, and the concentration was below the level determined to be due to blank contamination, the following actions were taken:

- If the concentration was above the reporting limit, the numeric result was unchanged, but it was flagged "U", as undetected.
- If the concentration was below the reporting limit, the numeric result was changed to the value of the reporting limit, and it was flagged "U", as undetected.

The results qualified due to blank contamination are listed in Attachment 1.

### Recoveries - Surrogate, MS/MSD and LCS/LCSD

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), Laboratory Control Sample (LCS) and Laboratory Control Duplicate Sample (LCSD) recoveries were within acceptable quality control limits, except as noted in Table 3 below.

**TABLE 3**  
 Surrogate, MS/MSD and LCS/LCSD Recoveries Out of QC Limits: VOCs  
 Charleston Naval Complex, Zone H, Charleston, SC

SDG	Sample	Parameter	Recovery	Recovery Limits	Associated Samples	Flag
41081	#1 / 663GW001L2	Bromofluorobenzene	75*	86-115	#1	Detects-J, non-detects-UJ
44758	#2 / 667GW003L2	Toluene-d8	113*	88-110	#2	Detects-J.
		Bromofluorobenzene	117*	86-115	#2	(No detects - no flags applied.)
	#3 / 667HW003L2	Toluene-d8	111*	88-110	#3	

\* - out of control limits

- In addition to the samples listed in the Table above, the recoveries of Bromofluorobenzene for several samples in SDG 41084 ranged from 71 to 78 percent. Although these recoveries were slightly below the QAPP limits of 86 -115 percent, they were within the laboratory control limits of 58 -137. As the recoveries of the other surrogates were all greater than 89 percent, no flags were applied.

### Calibrations

All initial and continuing calibration criteria were met except as noted in Table 4 below.

**TABLE 4**  
 Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: VOCs  
 Charleston Naval Complex, Zone H, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation (ICAL)/ %Difference (CCAL)	Associated Samples
VOA1-CCAL-4/24, 1100	Xylenes (total)	28.0 low	41029 - 1-9
	Chloromethane	22.2 low	
	Carbon disulfide	21.8 low	
	1,1-Dichloroethane	21.6 low	
	1,2-Dichloroethane	21.1 low	
	2-chloroethylvinyl ether	45.7 low	
	cis-1,3-Dichloropropylene	20.2 low	
	Tetrachloroethylene	20.7 low	
	o-Xylene	21.6 low	
VOA2-CCAL-4/30, 1104	Vinyl Acetate	54.7 high	41084 - 1-6

**TABLE 4**

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: VOCs  
 Charleston Naval Complex, Zone H, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation (ICAL)/ %Difference (CCAL)	Associated Samples
	1,2-Dichloroethane	24.0 low	
	trans-1,3-Dichloropropene	21.3 low	
	1,1,2-Trichloroethane	21.1 low	
	1,1,2,2-Tetrachloroethane	23.1 low	
VOA2-CCAL-5/1, 0856	Chloromethane	22.0 high	41084 - 7-11, 1, 1MS, 1MSD
	Acetone	22.6 low	
	Vinyl Acetate	72.1 high	
VOA2-CCAL-5/2, 2206	Dichlorodifluoromethane	40.0 high	41084 - 11MS, 11MSD
	Acetone	41.2 low	
	Vinyl Acetate	47.5 high	
	2-Butanone	22.1 low	
	2-Chloroethylvinyl ether	50.0 high	
	2-Hexanone	23.6 low	
	1,1,2,2-Tetrachloroethane	23.2 low	
VOA1-CCAL-6/7, 0819	Acetone	24.3 low	44758 - 1-5
	2-Chloroethylvinyl ether	20.1 low	

Flags were applied to the compounds in the associated samples in the following manner:

- When the percent Relative Standard Deviation (%RSD) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference was high, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.

### Semivolatile Organic Compounds (SVOC) Analyses

The QA/QC parameters for the SVOC analyses for all of the samples were within acceptable control limits, except as noted below.

## Holding Times

All holding times were met except for samples 41084009 / 666OWS001L2 and 41084010 / 666YWS001L2. These samples were re-extracted 4 days beyond holding time due to low acid surrogate recoveries.

## Blanks

The SVOC target parameters detected in blank samples are listed in Table 5.

**TABLE 5**

Equipment Blank Contamination: SVOCs  
Charleston Naval Complex, Zone H, Charleston, SC

SDG	Lab Sample ID	Sample ID	Sample Type	Parameter	Lab Result	Units	Flag Concentrations
41029	SBLK01	1000187232	MB	Fluoranthene	3.8	µg /Kg	<19 µg/Kg
				Benzo(a)anthracene	24.4	µg /Kg	<122 µg/Kg
				Chrysene	26	µg /Kg	<130 µg/Kg
				Benzo(b)fluoranthene	26	µg /Kg	<130 µg/Kg
				Benzo(k)fluoranthene	22.8	µg /Kg	<114 µg/Kg
				Benzo(a)Pyrene	23.7	µg /Kg	<119 µg/Kg
				Indeno(1,2,3-cd)Pyrene	121	µg /Kg	<605 µg/Kg
				Benzo(g,h,i)perylene	18.8	µg /Kg	<94 µg/Kg
CNC24	14264-4	666EW003L2	EB	Diethylphthalate	1.2	µg /L	<12 µg/L
				Di-n-butyl phthalate	0.46	µg /L	<4.6 µg/L

If a target parameter determined to be a common contaminant was reported in a field sample, and the concentration was below the level determined to be due to blank contamination, the following actions were taken:

- If the concentration was above the reporting limit, the numeric result was unchanged, but it was flagged "U", as undetected.
- If the concentration was below the reporting limit, the numeric result was changed to the value of the reporting limit, and it was flagged "U", as undetected.

The results qualified due to blank contamination are listed in Attachment 1.

## Recoveries - Surrogate, MS/MSD and LCS/LCSD

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), Laboratory Control Sample (LCS) and Laboratory Control Duplicate Sample (LCSD) recoveries were within acceptable quality control limits, except as noted in Table 6 below.

**TABLE 6**  
Surrogate, MS/MSD and LCS/LCSD Recoveries Out of QC Limits: SVOCs  
Charleston Naval Complex, Zone H, Charleston, SC

SDG	Sample	Parameter	Recovery	Recovery Limits	Associated Samples	Flag
41029	#4 / 017SWT0201	p-Terphenyl-d14	144*	18-137	#4	Detects-J
	#4 - MS/MSD	Pyrene	145*/131	35-142	#4	No Flags
	#4 - MS/MSD	Hexachlorocyclopentadiene	42*/28*	70-130	#4	Detects-J, non-detects- UJ
	#4 - MS/MSD	3,3'-Dichlorobenzidine	43*/29*	70-130	#4	
	SBLK01LCS	4-Chloroaniline	44*	70-130	41029-1-5	Detects-J, non-detects- UJ
41084	#9 - 666OWS001L2	2-Fluorophenol	0*	21-110	#9	Flag all Acid Compounds "R" - Rejected
		Phenol-d5	0*	10-110	#9	
		2,4,6-Tribromophenol	0*	10-123	#9	
	#10-666YWS001L2	2-Fluorophenol	0*	21-110	#10	
		Phenol-d5	0*	10-110	#10	
		2,4,6-Tribromophenol	0*	10-123	#10	
CNC24	0706B-GMBLCS	4-Nitrophenol	93*	10-80	#1, 3, 4	Detects-J. (No detects - no flags applied.)

\* - out of control limits

- SDG 41084 - As noted in the Table above, the recoveries of the acid surrogates for samples 41084009 and 41084010 were initially out of QC limits. These samples were re-extracted with the surrogate recoveries within QC limits.

### Calibrations

All initial and continuing calibration criteria were met except as noted in Table 7 below.

**TABLE 7**  
Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOCs  
Charleston Naval Complex, Zone H, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation (ICALY) %Difference (CCAL)	Associated Samples
MSD7-CCAL-4/27, 0855	Bis(2-chloroethyl)ether	25.3 low	41029-5
	Bis(2-chloroisopropyl)ether	35 low	

**TABLE 7**

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOCs  
 Charleston Naval Complex, Zone H, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation (ICAL)/ %Difference (CCAL)	Associated Samples
	Nitrobenzene	24.9 low	
	Isophorone	22.4 low	
	2,4-Dimethylphenol	21.4 low	
	Bis(2-chloroethoxy)methane	22.6 low	
	Benzoic Acid	23.6 low	
	Pyrene	21.2 high	
	Butylbenzylphthalate	22.9 high	
	o-Nitroaniline	28.5 low	
	3,3'-Dichlorobenzidine	46.4 high	
	4-Nitrophenol	45.7 low	
MSD5-CCAL-4/30, 1829	Benzyl Alcohol	41.0 high	41029-2,3,4,4MS, 4MSD
	Pyrene	23.4 high	
	Butylbenzylphthalate	23.8 high	
MSD7-CCAL-5/01, 2139	Bis(2-chloroisopropyl)ether	25.5 low	41029-5
	Benzoic Acid	29.7 high	
	Hexachlorocyclopentadiene	21.0 low	
	Pyrene	23.6 high	
	Butylbenzylphthalate	28.0 high	
	Benzo(a)anthracene	24.0 high	
	Bis(2-ethylhexyl)phthalate	28.3 high	
	o-Nitroaniline	23.9 low	
MSG5973-ICAL-7/3	Benzoic Acid	28.2	CNC24 - #1-4
	3,3'-Dichlorobenzidine	0.989	
MSG5973-CCAL-7/9, 0959	2,4-Dinitrophenol	52.6 low	CNC24 - #1, 3, 4
	3,3'-Dichlorobenzidine	24.2 low	
	Indeno(1,2,3-cd)pyrene	44.1 low	
MSG5973-CCAL-7/13, 1653	2,4-Dinitrophenol	52.6 low	CNC24 - #2
	Pyrene	42.4 high	
	Benzo(k)fluoranthene	24.3 high	

**TABLE 7**

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOCs  
Charleston Naval Complex, Zone H, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation (ICAL)/ %Difference (CCAL)	Associated Samples
	Indeno(1,2,3-cd)pyrene	429.1 low	

Flags were applied to the compounds in the associated samples in the following manner:

- When the percent Relative Standard Deviation (%RSD) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference was high, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.

### Internal Standard Area

All internal standard areas were within QC limits except as noted in Table 8 below.

**TABLE 8**

Internal Standard Area out of Criteria: SVOCs  
Charleston Naval Complex, Zone H, Charleston, SC

SDG	Sample	Internal Standards	Flags applied to compounds associated with IS out
41029	#4	IS#5-48.8%	Detects-J
41084	#9 RE	IS#4-6.2%, IS#5-4.6 %	"R" - Rejected
	#10 RE	IS#4-6.9%, IS#5-4.1%, IS#6-0.9%	"R" - Rejected

### Organochlorine Pesticide / Polychlorinated Biphenyls (PCBs) Analyses

The QA/QC parameters for the Organochlorine Pesticide/PCB analyses by method SW-846 8081 for all of the samples were within acceptable control limits, except as noted below:

#### Recoveries - Surrogate, MS/MSD and LCS/LCSD

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), Laboratory Control Sample (LCS) and Laboratory Control Duplicate Sample (LCSD) recoveries were within acceptable quality control limits, except as noted below.

- The recoveries for decachlorobiphenyl in sample 41084009 were slightly below QC limits of 60 - 130 percent recovery, at 51 and 49 percent on the primary and secondary

analytical columns respectively. The recoveries of Tetrachloro-m-xylene were within QC limits, therefore no flags were applied.

## Calibrations

All initial and continuing calibration criteria were met except as noted in Table 9 below.

**TABLE 9**

Initial and Continuing Calibration Criteria Exceptions: Organochlorine Pesticides/PCBs  
Charleston Naval Complex, Zone H, Charleston, SC

Instrument/ Calibration Date	Analyte	% Difference Col#1 / Col#2	Flag
ECD7a-5/3-0621 closing	Endosulfan Sulfate	15.5 / 15.5 low	Flagged UJ in samples 4018408 - 11
	4,4'-DDT	38.5 / 44.0 low	
	Methoxychlor	23.4 / 28.7 low	
ECD7a-5/9-2153 closing	Toxaphene	26.5 / 23.5 low	Flagged sample 41084010R "J"
ECD7a-5/11-1146 closing	Toxaphene	19.5 / 25.5 low	Flagged sample 41084011R "J"

Flags were applied to the compounds in the associated samples in the following manner:

- When the percent Relative Standard Deviation (%RSD) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference was high, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.

## Polychlorinated Biphenyls (PCBs) Analyses

The QA/QC parameters for the Polychlorinated Biphenyl (PCBs) analyses by method SW-846 8082 for all of the samples were within acceptable control limits.

## Inorganic Parameters

### Quality Control Review

The following list represents the QA/QC measures that are typically reviewed during the data quality evaluation procedure for inorganic parameters.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Sample preparation, initial calibration blanks/continuing calibration blanks, and equipment blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", in which target parameters have been added prior to digestion/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **Pre/Post Digestion Spike (MS/MSD)** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **ICP Interference Check Sample** – This sample verifies the lab's interelement and background correction factors.
- **Initial Calibration Verification** – This parameter ensures that the instrument is capable of producing acceptable quantitative data for the target analyte list to be measured.
- **Continuing Calibration Verification** – This one-point, mid-range parameter establishes that the initial calibration is still valid by checking the performance of the instrument on a continual basis.
- **ICP Serial Dilution** – The serial dilution of samples quantitated by ICP determines whether or not significant physical or chemical interferences exist due to the sample matrix.

### Metals Analyses

The QA/QC parameters for the Metals analyses for all of the samples were within acceptable control limits, except as noted below.

### Blanks

The Metals target parameters detected in blank samples are listed in Table 10.

**TABLE 10**  
Equipment Blank Contamination: Metals  
Charleston Naval Complex, Zone H, Charleston, SC

SDG	Lab Sample ID	Sample ID	Sample Type	Parameter	Lab Result	Units	Flag	Concentrations
41084	VBLK01	1200002759	MB	Barium	0.902	µg/L		<4.51 µg/L
			MB	Silver	0.237	µg/Kg		<1.19 µg/L
CNC24	CCB		CCB	Antimony	4.67	µg/L		<2.34 µg/L
	CCB		CCB	Iron	2.2	µg/L		<11 µg/L
	MB		MB	Mercury	0.075	µg/L		<0.375 µg/L
	14264-4	666EW003L2	EB	Barium	17	µg/L		<85 µg/L

If a target parameter was reported in a field sample, and the concentration was below the level determined to be due to blank contamination (5 times the concentration in the associated QC blank samples), it was flagged as "U", not detected. Initial and continuing calibration blanks were also evaluated for possible contamination.

The results qualified due to blank contamination are listed in Attachment 1.

## Rejected Data

The majority of rejected data were associated with re-runs and dilutions (you can only have a single valid result per sample per target). However, there were selected results qualified as "R", rejected, due to associated QC parameters out of criteria. The rejected data are summarized in Table 11 below.

**TABLE 11**  
Data Qualification Summary: Rejected Data  
Charleston Naval Complex, Zone H, Charleston, SC

SDG	Sample ID	Parameter Class	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reason
41084	666OWS001L2LR	SVOA	2,4-DINITROPHENOL	62.5	U	62.5	R	µg/L	IS
41084	666OWS001L2LR	SVOA	4,6-DINITRO-2-METHYLPHENOL	62.5	U	62.5	R	µg/L	IS
41084	666OWS001L2LR	SVOA	4-NITROPHENOL	62.5	U	62.5	R	µg/L	IS
41084	666OWS001L2LR	SVOA	PENTACHLOROPHENOL	62.5	U	62.5	R	µg/L	IS
41084	666YWS001L2LR	SVOA	2,4-DINITROPHENOL	62.5	U	62.5	R	µg/L	IS
41084	666YWS001L2LR	SVOA	4,6-DINITRO-2-METHYLPHENOL	62.5	U	62.5	R	µg/L	IS
41084	666YWS001L2LR	SVOA	4-NITROPHENOL	62.5	U	62.5	R	µg/L	IS
41084	666YWS001L2LR	SVOA	PENTACHLOROPHENOL	62.5	U	62.5	R	µg/L	IS

- All of the rejected data are associated with low internal standard areas for two samples, as discussed previously.

## Conclusion

A review of the analytical data submitted regarding the investigation of selected sites in Zone H at the Charleston Naval Complex, Charleston, South Carolina by CH2M HILL has been completed. An overall evaluation of the data indicates that the sample handling, shipment, and analytical procedures have been adequately completed, and that the analytical results should be considered usable as qualified.

The analytical data had minor QC concerns, with regards to selected data being rejected that affected data usability for those parameters. However, the validation review demonstrated that the analytical systems were generally in control and the data results can be used in the decision making process.

Attachment 1 - Changed Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
41029	017SWB0201	41029001	SO	VOA	SW8260	1,1-DICHLOROETHANE	6.8	U	6.8	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	VOA	SW8260	ACETONE	12.8	J	13.7	U	ug/Kg	BL
41029	017SWB0201	41029001	SO	VOA	SW8260	1,2-DICHLOROETHANE	6.8	U	6.8	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	VOA	SW8260	2-Chloroethyl vinyl ether	13.7	U	13.7	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	VOA	SW8260	CHLOROMETHANE	13.7	U	13.7	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	6.8	U	6.8	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	VOA	SW8260	o-Xylene	6.8	U	6.8	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	6.8	U	6.8	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	VOA	SW8260	XYLENES, TOTAL	6.8	U	6.8	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	ACETONE	7.3	J	11.9	U	ug/Kg	BL
41029	017SWB0202	41029002	SO	VOA	SW8260	1,1-DICHLOROETHANE	6	U	6	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	1,2-DICHLOROETHANE	6	U	6	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	2-Chloroethyl vinyl ether	11.9	U	11.9	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	CARBON DISULFIDE	6	U	6	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	CHLOROMETHANE	11.9	U	11.9	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	6	U	6	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	o-Xylene	6	U	6	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	6	U	6	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	VOA	SW8260	XYLENES, TOTAL	6	U	6	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	1,1-DICHLOROETHANE	5.3	U	5.3	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	1,2-DICHLOROETHANE	5.3	U	5.3	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	2-Chloroethyl vinyl ether	10.6	U	10.6	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	CARBON DISULFIDE	5.3	U	5.3	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	CHLOROMETHANE	10.6	U	10.6	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	5.3	U	5.3	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	o-Xylene	5.3	U	5.3	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	5.3	U	5.3	UJ	ug/Kg	CC
41029	017CWB0202	41029003	SO	VOA	SW8260	XYLENES, TOTAL	5.3	U	5.3	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	ACETONE	1.9	J	10.6	U	ug/Kg	BL
41029	017SWT0201	41029004	SO	VOA	SW8260	1,1-DICHLOROETHANE	5.3	U	5.3	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	1,2-DICHLOROETHANE	5.3	U	5.3	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	2-Chloroethyl vinyl ether	10.6	U	10.6	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	CARBON DISULFIDE	5.3	U	5.3	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	CHLOROMETHANE	10.6	U	10.6	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	5.3	U	5.3	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	o-Xylene	5.3	U	5.3	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	5.3	U	5.3	UJ	ug/Kg	CC
41029	017SWT0201	41029004	SO	VOA	SW8260	XYLENES, TOTAL	5.3	U	5.3	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	VOA	SW8260	1,1-DICHLOROETHANE	5.8	U	5.8	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	VOA	SW8260	1,2-DICHLOROETHANE	5.8	U	5.8	UJ	ug/Kg	CC

Attachment 1 - Changed Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
41029	017SWT0202	41029005	SO	VOA	SW8260	2-Chloroethyl vinyl ether	11.6	U	11.6	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	VOA	SW8260	CARBON DISULFIDE	5.8	U	5.8	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	VOA	SW8260	CHLOROMETHANE	11.6	U	11.6	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	5.8	U	5.8	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	VOA	SW8260	o-Xylene	5.8	U	5.8	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	5.8	U	5.8	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	VOA	SW8260	XYLENES, TOTAL	5.8	U	5.8	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	ACETONE	3.6	J	20.5	U	ug/Kg	BL
41029	159SB01701	41029006	SO	VOA	SW8260	1,1-DICHLOROETHANE	10.2	U	10.2	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	1,2-DICHLOROETHANE	10.2	U	10.2	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	2-Chloroethyl vinyl ether	20.5	U	20.5	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	CARBON DISULFIDE	10.2	U	10.2	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	CHLOROMETHANE	20.5	U	20.5	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	10.2	U	10.2	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	o-Xylene	10.2	U	10.2	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	10.2	U	10.2	UJ	ug/Kg	CC
41029	159SB01701	41029006	SO	VOA	SW8260	XYLENES, TOTAL	10.2	U	10.2	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	ACETONE	4.3	J	24.2	U	ug/Kg	BL
41029	159SB01702	41029007	SO	VOA	SW8260	1,1-DICHLOROETHANE	12.1	U	12.1	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	1,2-DICHLOROETHANE	12.1	U	12.1	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	2-Chloroethyl vinyl ether	24.2	U	24.2	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	CARBON DISULFIDE	12.1	U	12.1	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	CHLOROMETHANE	24.2	U	24.2	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	12.1	U	12.1	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	o-Xylene	12.1	U	12.1	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	12.1	U	12.1	UJ	ug/Kg	CC
41029	159SB01702	41029007	SO	VOA	SW8260	XYLENES, TOTAL	12.1	U	12.1	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	1,1-DICHLOROETHANE	9.2	U	9.2	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	1,2-DICHLOROETHANE	9.2	U	9.2	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	2-Chloroethyl vinyl ether	18.5	U	18.5	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	CARBON DISULFIDE	9.2	U	9.2	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	CHLOROMETHANE	18.5	U	18.5	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	9.2	U	9.2	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	o-Xylene	9.2	U	9.2	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	9.2	U	9.2	UJ	ug/Kg	CC
41029	159SB01901	41029008	SO	VOA	SW8260	XYLENES, TOTAL	9.2	U	9.2	UJ	ug/Kg	CC
41029	159SB01902	41029009	SO	VOA	SW8260	ACETONE	9.8	J	18.2	U	ug/Kg	BL
41029	159SB01902	41029009	SO	VOA	SW8260	METHYLENE CHLORIDE	1	J	9.1	U	ug/Kg	BL
41029	159SB01902	41029009	SO	VOA	SW8260	1,1-DICHLOROETHANE	9.1	U	9.1	UJ	ug/Kg	CC
41029	159SB01902	41029009	SO	VOA	SW8260	1,2-DICHLOROETHANE	9.1	U	9.1	UJ	ug/Kg	CC

Attachment 1 - Change Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
41029	159SB01902	41029009	SO	VOA	SW8260	2-Chloroethyl vinyl ether	18.2	U	18.2	UJ	ug/Kg	CC
41029	159SB01902	41029009	SO	VOA	SW8260	CARBON DISULFIDE	9.1	U	9.1	UJ	ug/Kg	CC
41029	159SB01902	41029009	SO	VOA	SW8260	CHLOROMETHANE	18.2	U	18.2	UJ	ug/Kg	CC
41029	159SB01902	41029009	SO	VOA	SW8260	cis-1,3-DICHLOROPROPENE	9.1	U	9.1	UJ	ug/Kg	CC
41029	159SB01902	41029009	SO	VOA	SW8260	o-Xylene	9.1	U	9.1	UJ	ug/Kg	CC
41029	159SB01902	41029009	SO	VOA	SW8260	TETRACHLOROETHYLENE(PCE)	9.1	U	9.1	UJ	ug/Kg	CC
41029	159SB01902	41029009	SO	VOA	SW8260	XYLENES, TOTAL	9.1	U	9.1	UJ	ug/Kg	CC
41081	663GW001L2	41081001	WG	VOA	SW8260	BENZENE	5	U	5	UJ	ug/L	SS
41081	663GW001L2	41081001	WG	VOA	SW8260	NAPHTHALENE	5	U	5	UJ	ug/l	SS
41084	017GW005L2	41084001	WG	VOA	SW8260	ACETONE	0.85	J	10	U	ug/L	BL
41084	017GW005L2	41084001	WG	VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017GW005L2	41084001	WG	VOA	SW8260	1,1,2-TRICHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017GW005L2	41084001	WG	VOA	SW8260	1,2-DICHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017GW005L2	41084001	WG	VOA	SW8260	trans-1,3-DICHLOROPROPENE	5	U	5	UJ	ug/L	CC
41084	017HW005L2	41084002	WG	VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017HW005L2	41084002	WG	VOA	SW8260	1,1,2-TRICHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017HW005L2	41084002	WG	VOA	SW8260	1,2-DICHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017HW005L2	41084002	WG	VOA	SW8260	trans-1,3-DICHLOROPROPENE	5	U	5	UJ	ug/L	CC
41084	017GW009L2	41084005	WG	VOA	SW8260	ACETONE	1	J	10	U	ug/L	BL
41084	017GW009L2	41084005	WG	VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017GW009L2	41084005	WG	VOA	SW8260	1,1,2-TRICHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017GW009L2	41084005	WG	VOA	SW8260	1,2-DICHLOROETHANE	5	U	5	UJ	ug/L	CC
41084	017GW009L2	41084005	WG	VOA	SW8260	trans-1,3-DICHLOROPROPENE	5	U	5	UJ	ug/L	CC
41084	666OWS001L2	41084009	WG	VOA	SW8260	ACETONE	4.8	J	10	UJ	ug/L	BL, CC
41084	666YWS001L2	41084010	WG	VOA	SW8260	ACETONE	4.3	J	10	UJ	ug/L	BL, CC
41084	667OWS001L2	41084011	WG	VOA	SW8260	ACETONE	1.5	J	10	UJ	ug/L	BL, CC
44758	666GW0036L2	44758001	WG	VOA	SW8260	ACETONE	2.8	=	10	UJ	ug/L	BL, CC
44758	666GW0036L2	44758001	WG	VOA	SW8260	2-Chloroethyl vinyl ether	10	U	10	UJ	ug/L	CC
44758	667GW003L2	44758002	WG	VOA	SW8260	ACETONE	1.8	=	10	UJ	ug/L	BL, CC
44758	667GW003L2	44758002	WG	VOA	SW8260	2-Chloroethyl vinyl ether	10	U	10	UJ	ug/L	CC
44758	667HW003L2	44758003	WG	VOA	SW8260	ACETONE	1.6	=	10	UJ	ug/L	BL, CC
44758	667HW003L2	44758003	WG	VOA	SW8260	2-Chloroethyl vinyl ether	10	U	10	UJ	ug/L	CC
41029	017SWB0201	41029001	SO	SVOA	SW8270	BENZO(a)ANTHRACENE	112	J	1480	U	ug/Kg	BL
41029	017SWB0201	41029001	SO	SVOA	SW8270	BENZO(a)PYRENE	76.8	J	1480	U	ug/Kg	BL
41029	017SWB0201	41029001	SO	SVOA	SW8270	BENZO(b)FLUORANTHENE	91.8	J	1480	U	ug/Kg	BL
41029	017SWB0201	41029001	SO	SVOA	SW8270	BENZO(g,h,i)PERYLENE	65.3	J	1480	U	ug/Kg	BL
41029	017SWB0201	41029001	SO	SVOA	SW8270	BENZO(k)FLUORANTHENE	101	J	1480	U	ug/Kg	BL
41029	017SWB0201	41029001	SO	SVOA	SW8270	CHRYSENE	112	J	1480	U	ug/Kg	BL
41029	017SWB0201	41029001	SO	SVOA	SW8270	INDENO(1,2,3-c,d)PYRENE	526	J	1480	U	ug/Kg	BL
41029	017SWB0201	41029001	SO	SVOA	SW8270	4-CHLOROANILINE	1480	U	1480	UJ	ug/Kg	BS

Attachment 1 - Changed Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
41029	017SWB0201	41029001	SO	SVOA	SW8270	2-NITROANILINE	7180	U	7180	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	SVOA	SW8270	bis(2-CHLOROETHYL) ETHER	1480	U	1480	UJ	ug/Kg	CC
41029	017SWB0201	41029001	SO	SVOA	SW8270	HEXACHLOROCYCLOPENTADIENE	1480	U	1480	UJ	ug/Kg	CC
41029	017SWB0202	41029002	SO	SVOA	SW8270	4-CHLOROANILINE	402	U	402	UJ	ug/Kg	BS
41029	017CWB0202	41029003	SO	SVOA	SW8270	4-CHLOROANILINE	406	U	406	UJ	ug/Kg	BS
41029	017SWT0201	41029004	SO	SVOA	SW8270	BENZO(a)ANTHRACENE	70.3	J	364	U	ug/Kg	BL
41029	017SWT0201	41029004	SO	SVOA	SW8270	BENZO(a)PYRENE	76.4	J	365	U	ug/Kg	BL
41029	017SWT0201	41029004	SO	SVOA	SW8270	BENZO(b)FLUORANTHENE	51.4	J	366	U	ug/Kg	BL
41029	017SWT0201	41029004	SO	SVOA	SW8270	BENZO(k)FLUORANTHENE	62.7	J	367	U	ug/Kg	BL
41029	017SWT0201	41029004	SO	SVOA	SW8270	CHRYSENE	79.3	J	368	U	ug/Kg	BL
41029	017SWT0201	41029004	SO	SVOA	SW8270	4-CHLOROANILINE	363	U	363	UJ	ug/Kg	BS
41029	017SWT0201	41029004	SO	SVOA	SW8270	3,3'-DICHLOROBENZIDINE	725	U	725	UJ	ug/Kg	MS
41029	017SWT0201	41029004	SO	SVOA	SW8270	HEXACHLOROCYCLOPENTADIENE	363	U	363	UJ	ug/Kg	MS
41029	017SWT0201	41029004	SO	SVOA	SW8270	ACENAPHTHENE	10.4	J	10.4	J	ug/Kg	SS
41029	017SWT0201	41029004	SO	SVOA	SW8270	ANTHRACENE	16.2	J	16.2	J	ug/Kg	SS
41029	017SWT0201	41029004	SO	SVOA	SW8270	CARBAZOLE	10.6	J	10.6	J	ug/Kg	SS
41029	017SWT0201	41029004	SO	SVOA	SW8270	FLUORANTHENE	105	J	105	J	ug/Kg	SS
41029	017SWT0201	41029004	SO	SVOA	SW8270	FLUORENE	7.9	J	7.9	J	ug/Kg	SS
41029	017SWT0201	41029004	SO	SVOA	SW8270	PHENANTHRENE	82.5	J	82.5	J	ug/Kg	SS
41029	017SWT0201	41029004	SO	SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	324	J	324	J	ug/Kg	SS, IS
41029	017SWT0201	41029004	SO	SVOA	SW8270	PYRENE	162	J	162	J	ug/Kg	SS, IS, MS
41029	017SWT0202	41029005	SO	SVOA	SW8270	FLUORANTHENE	6.6	J	392	U	ug/Kg	BL
41029	017SWT0202	41029005	SO	SVOA	SW8270	4-CHLOROANILINE	392	U	392	UJ	ug/Kg	BS
41029	017SWT0202	41029005	SO	SVOA	SW8270	2,4-DIMETHYLPHENOL	392	U	392	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	2-NITROANILINE	1900	U	1900	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	3,3'-DICHLOROBENZIDINE	783	U	783	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	Benzoic acid	1900	U	1900	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	BENZYL BUTYL PHTHALATE	392	U	392	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	bis(2-CHLOROETHOXY) METHANE	392	U	392	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	bis(2-CHLOROETHYL) ETHER	392	U	392	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	bis(2-CHLOROISOPROPYL)ETHER	392	U	392	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	40.3	J	40.3	J	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	ISOPHORONE	392	U	392	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	NITROBENZENE	392	U	392	UJ	ug/Kg	CC
41029	017SWT0202	41029005	SO	SVOA	SW8270	PYRENE	392	U	392	UJ	ug/Kg	CC
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2,4,5-TRICHLOROPHENOL	62.5	U	62.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2,4,6-TRICHLOROPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2,4-DICHLOROPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2,4-DIMETHYLPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2-CHLOROPHENOL	12.5	U	12.5	UJ	ug/L	HT

Attachment 1 - Change Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2-METHYLPHENOL (o-CRESOL)	12.5	U	12.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2-NITROPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	4-CHLORO-3-METHYLPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	Benzole acid	62.5	U	62.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	m,p-Cresols	12.5	U	12.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	PHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2,4-DINITROPHENOL	62.5	U	62.5	R	ug/L	IS
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	62.5	U	62.5	R	ug/L	IS
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	4-NITROPHENOL	62.5	U	62.5	R	ug/L	IS
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	PENTACHLOROPHENOL	62.5	U	62.5	R	ug/L	IS
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	1,2,4-TRICHLOROBENZENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	1,2-DICHLOROBENZENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	1,3-DICHLOROBENZENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	1,4-DICHLOROBENZENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2,2'-OXYBIS(1-CHLORO)PROPANE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2,4-DINITROTOLUENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2,6-DINITROTOLUENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2-CHLORONAPHTHALENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2-METHYLNAPHTHALENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	2-NITROANILINE	62.5	U	62.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	3,3'-DICHLOROBENZIDINE	25	U	25	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	3-NITROANILINE	62.5	U	62.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	4-BROMOPHENYL PHENYL ETHER	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	4-CHLOROANILINE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	4-CHLOROPHENYL PHENYL ETHER	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	4-NITROANILINE	62.5	U	62.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	ACENAPHTHENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	ACENAPHTHYLENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	ANTHRACENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	BENZO(a)ANTHRACENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	BENZO(a)PYRENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	BENZO(b)FLUORANTHENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	BENZO(g,h,i)PERYLENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	BENZO(k)FLUORANTHENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	Benzyl alcohol	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	BENZYL BUTYL PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	bis(2-CHLOROETHOXY) METHANE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	bis(2-CHLOROETHYL) ETHER	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	CARBAZOLE	12.5	U	12.5	R	ug/L	RE

Attachment 1 - Changed Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	CHRYSENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	DIBENZ(a,h)ANTHRACENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	DIBENZOFURAN	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	DIETHYL PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	DIMETHYL PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	DI-n-BUTYL PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	DI-n-OCTYLPHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	Diphenylamine	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	FLUORANTHENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	FLUORENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	HEXACHLOROBENZENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	HEXACHLOROBUTADIENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	HEXACHLOROCYCLOPENTADIENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	HEXACHLOROETHANE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	INDENO(1,2,3-c,d)PYRENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	ISOPHORONE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	NAPHTHALENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	NITROBENZENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	N-NITROSODIPHENYLAMINE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	PHENANTHRENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2LR	41084009	WG	SVOA	SW8270	PYRENE	12.5	U	12.5	R	ug/L	RE
41084	666OWS001L2	41084009	WG	SVOA	SW8270	2,4,5-TRICHLOROPHENOL	51	U	51	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	2,4,6-TRICHLOROPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	2,4-DICHLOROPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	2,4-DIMETHYLPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	2,4-DINITROPHENOL	51	U	51	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	2-CHLOROPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	2-METHYLPHENOL (o-CRESOL)	10.2	U	10.2	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	2-NITROPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	51	U	51	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	4-CHLORO-3-METHYLPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	4-NITROPHENOL	51	U	51	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	Benzoic acid	51	U	51	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	m,p-Cresols	10.2	U	10.2	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	PENTACHLOROPHENOL	51	U	51	R	ug/L	SS
41084	666OWS001L2	41084009	WG	SVOA	SW8270	PHENOL	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2,4,5-TRICHLOROPHENOL	62.5	U	62.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2,4,6-TRICHLOROPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2,4-DICHLOROPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2,4-DIMETHYLPHENOL	12.5	U	12.5	UJ	ug/L	HT

Attachment 1 - Chan... Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2-CHLOROPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2-METHYLPHENOL (o-CRESOL)	12.5	U	12.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2-NITROPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	4-CHLORO-3-METHYLPHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	Benzoic acid	62.5	U	62.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	m,p-Cresols	12.5	U	12.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	PHENOL	12.5	U	12.5	UJ	ug/L	HT
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2,4-DINITROPHENOL	62.5	U	62.5	R	ug/L	IS
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	62.5	U	62.5	R	ug/L	IS
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	4-NITROPHENOL	62.5	U	62.5	R	ug/L	IS
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	PENTACHLOROPHENOL	62.5	U	62.5	R	ug/L	IS
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	1,2,4-TRICHLOROENZENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	1,2-DICHLOROENZENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	1,3-DICHLOROENZENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	1,4-DICHLOROENZENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2,2'-OXYBIS(1-CHLORO)PROPANE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2,4-DINITROTOLUENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2,6-DINITROTOLUENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2-CHLORONAPHTHALENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2-METHYLNAPHTHALENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	2-NITROANILINE	62.5	U	62.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	3,3'-DICHLOROENZIDINE	25	U	25	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	3-NITROANILINE	62.5	U	62.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	4-BROMOPHENYL PHENYL ETHER	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	4-CHLOROANILINE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	4-CHLOROPHENYL PHENYL ETHER	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	4-NITROANILINE	62.5	U	62.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	ACENAPHTHENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	ACENAPHTHYLENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	ANTHRACENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	BENZO(a)ANTHRACENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	BENZO(a)PYRENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	BENZO(b)FLUORANTHENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	BENZO(g,h,i)PERYLENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	BENZO(k)FLUORANTHENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	Benzyl alcohol	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	BENZYL BUTYL PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	bis(2-CHLOROETHOXY) METHANE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	bis(2-CHLOROETHYL) ETHER	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	12.5	U	12.5	R	ug/L	RE

Attachment 1 - Changed Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	CARBAZOLE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	CHRYSENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	DIBENZ(a,h)ANTHRACENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	DIBENZOFURAN	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	DIETHYL PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	DIMETHYL PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	DI-n-BUTYL PHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	DI-n-OCTYLPHTHALATE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	Diphenylamine	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	FLUORANTHENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	FLUORENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	HEXACHLOROENZENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	HEXACHLOROBUTADIENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	HEXACHLOROCYCLOPENTADIENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	HEXACHLOROETHANE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	INDENO(1,2,3-c,d)PYRENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	ISOPHORONE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	NAPHTHALENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	NITROBENZENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	N-NITROSODIPHENYLAMINE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	PHENANTHRENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2LR	41084010	WG	SVOA	SW8270	PYRENE	12.5	U	12.5	R	ug/L	RE
41084	666YWS001L2	41084010	WG	SVOA	SW8270	2,4,5-TRICHLOROPHENOL	51	U	51	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	2,4,6-TRICHLOROPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	2,4-DICHLOROPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	2,4-DIMETHYLPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	2,4-DINITROPHENOL	51	U	51	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	2-CHLOROPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	2-METHYLPHENOL (o-CRESOL)	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	2-NITROPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	51	U	51	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	4-CHLORO-3-METHYLPHENOL	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	4-NITROPHENOL	51	U	51	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	Benzoic acid	51	U	51	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	m,p-Cresols	10.2	U	10.2	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	PENTACHLOROPHENOL	51	U	51	R	ug/L	SS
41084	666YWS001L2	41084010	WG	SVOA	SW8270	PHENOL	10.2	U	10.2	R	ug/L	SS
CNC24	666GW003L2	S114264*	WG	SVOA	SW8270	DI-n-BUTYL PHTHALATE	0.46	J	10	U	ug/L	BL
CNC24	666GW003L2	S114264*	WG	SVOA	SW8270	2,4-DINITROPHENOL	50	U	50	UJ	ug/L	CC
CNC24	666GW003L2	S114264*	WG	SVOA	SW8270	Benzoic acid	50	U	50	UJ	ug/L	IC

Attachment 1 - Change Log Qualifiers and Results  
Zone H - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC24	666GW003L2	S114264*	WG	SVOA	SW8270	3,3'-DICHLOROBENZIDINE	20	U	20	UJ	ug/L	IC, CC
CNC24	667GW003L2	S114264*	WG	SVOA	SW8270	2,4-DINITROPHENOL	50	U	50	UJ	ug/L	CC
CNC24	667GW003L2	S114264*	WG	SVOA	SW8270	3,3'-DICHLOROBENZIDINE	20	U	20	UJ	ug/L	IC
CNC24	667GW003L2	S114264*	WG	SVOA	SW8270	Benzoic acid	50	U	50	UJ	ug/L	IC
CNC24	667HW003L2	S114264*	WG	SVOA	SW8270	2,4-DINITROPHENOL	50	U	50	UJ	ug/L	CC
CNC24	667HW003L2	S114264*	WG	SVOA	SW8270	Benzoic acid	50	U	50	UJ	ug/L	IC
CNC24	667HW003L2	S114264*	WG	SVOA	SW8270	3,3'-DICHLOROBENZIDINE	20	U	20	UJ	ug/L	IC, CC
41084	666OWS001L2LR	41084009	WG	PEST	SW8081	TOXAPHENE	75	=	75	J	ug/L	2C, CC
41084	666OWS001L2	41084009	WG	PEST	SW8081	ENDOSULFAN SULFATE	0.42	U	0.42	UJ	ug/L	CC
41084	666OWS001L2	41084009	WG	PEST	SW8081	METHOXYCHLOR	2	U	2	UJ	ug/L	CC
41084	666OWS001L2	41084009	WG	PEST	SW8081	p,p'-DDT	0.42	U	0.42	UJ	ug/L	CC
41084	666YWS001L2LR	41084010	WG	PEST	SW8081	TOXAPHENE	66.4	=	66.4	J	ug/L	2C, CC
41084	666YWS001L2	41084010	WG	PEST	SW8081	ENDOSULFAN SULFATE	0.84	U	0.84	UJ	ug/L	CC
41084	666YWS001L2	41084010	WG	PEST	SW8081	METHOXYCHLOR	4	U	4	UJ	ug/L	CC
41084	666YWS001L2	41084010	WG	PEST	SW8081	p,p'-DDT	0.84	U	0.84	UJ	ug/L	CC
41084	667OWS001L2	41084011	WG	PEST	SW8081	ENDOSULFAN SULFATE	0.42	U	0.42	UJ	ug/L	CC
41084	667OWS001L2	41084011	WG	PEST	SW8081	METHOXYCHLOR	2	U	2	UJ	ug/L	CC
41084	667OWS001L2	41084011	WG	PEST	SW8081	p,p'-DDT	0.42	U	0.42	UJ	ug/L	CC
41084	666OWS001L2	41084009	WG	METAL	SW6010	SILVER	4.2	=	4.2	J	ug/L	IB
41084	666YWS001L2	41084010	WG	METAL	SW6010	SILVER	0.32	J	0.32	U	ug/L	BL
41084	667OWS001L2	41084011	WG	METAL	SW6010	SILVER	6.71	=	6.71	J	ug/L	IB
CNC24	666GW003L2	S114264*	WG	METAL	SW6010	BARIUM	0.012	J	0.012	U	mg/L	BL
CNC24	667GW003L2	S114264*	WG	METAL	SW6010	BARIUM	0.039	J	0.039	U	mg/L	BL
CNC24	667GW003L2	S114264*	WG	METAL	SW6010	LEAD	0.0019	J	0.0019	U	mg/L	BL
CNC24	667HW003L2	S114264*	WG	METAL	SW6010	ARSENIC	0.0055	J	0.0055	U	mg/L	BL
CNC24	667HW003L2	S114264*	WG	METAL	SW6010	BARIUM	0.037	J	0.037	U	mg/L	BL
CNC24	667HW003L2	S114264*	WG	METAL	SW6010	LEAD	0.0017	J	0.0017	U	mg/L	BL