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INTERIM MEASURE COMPLETION REPORT SOIL REMOVAL SOLID WASTE  
MANAGEMENT UNIT 38 (SWMU 38) ZONE A CNC CHARLESTON SC  
6/1/2002  
CH2M HILL

# INTERIM MEASURE COMPLETION REPORT

## Soil Removal SWMU 38, Zone A



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

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



Scan Date 5-21-09  
Operator AL  
Location Code BINDER 1181

PREPARED BY  
**CH2M-Jones**

June 2002

Revision 0  
Contract N62467-99-C-0960  
158814.ZA.PR.03

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North Charleston, South Carolina***



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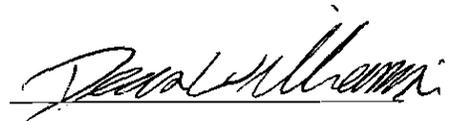
**Certification Page for Interim Measure Completion Report  
(Revision 0), SWMU 38, Zone A**

**Soil Removal**

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

South Carolina

Permit No. 21428



Dean Williamson, P.E.

6/10/2002  
Date



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June 13, 2002

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

Re: Interim Measure Completion Report (Revision 0) – SWMU 38, Zone A

Dear Mr. Scaturo:

Enclosed please find four copies of the Interim Measure Completion Report (Revision 0) for SWMU 38, in Zone A of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Jim Edens. Please contact him at 352/335-5877, extension 2491, if 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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# 1 Acronyms and Abbreviations

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2	CA	Corrective action
3	CNC	Charleston Naval Complex
4	EnSafe	EnSafe Inc.
5	EPA	U.S. Environmental Protection Agency
6	ft bls	Feet below land surface
7	IM	Interim measure
8	MCS	Media cleanup standard
9	µg/kg	Micrograms per kilogram
10	mg/kg	Milligram per kilogram
11	NAVBASE	Naval Base
12	NFA	No further action
13	RBC	Risk-based concentration
14	RCRA	Resource Conservation and Recovery Act
15	RFI	RCRA Facility Investigation
16	SCDHEC	South Carolina Department of Health and Environmental Control
17	SSL	soil screening level
18	SWMU	solid waste management unit
19	TCLP	toxicity characteristic leachate procedure
20	WMI	Waste Management Inc.
21	WP	Work plan

**Section 1.0**

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# 1.0 Introduction

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## 1.1 Background

As part of Corrective Action (CA) activities performed under the Resource Conservation and Recovery Act (RCRA), a RCRA Facility Investigation (RFI) was conducted in Zone A of the Charleston Naval Complex (CNC). The *Zone A RFI Report, Revision 0* (EnSafe Inc. [EnSafe], 1998) was finalized to present the results of the investigation. Zone A comprises the northern-most area of the main CNC facility. It is bounded by Noisette Creek to the south; the Cooper River to the east; and the CNC property boundary to the west and north.

Located along the northern boundary of Zone A, Solid Waste Management Unit (SWMU) 38 was used for storing a variety of materials which likely including paints, pain thinners, acid, plating solutions, transformers, solvents, cleaning compounds, oils, adhesives, and batteries. The site is located to the north of Building 1605, along the northern boundary of the CNC. Although little historical information is available on the site, it known to have been used as a storage yard, associated with Buildings 1605 and 1604, for approximately 50 years. Figure 1-1 is an aerial photograph taken in 1997 of the site.

In March 2002 an Interim Measure Work Plan (IM WP) was developed for removal of polychlorinated biphenyl (PCB)-impacted surface soil at SWMU 38 (CH2M-Jones, 2002). The IM WP reviewed site data that had been collected during several sampling events, and concluded that an IM would likely permit closure of the site with respect to PCBs in soil. A second IM (CH2M-Jones, 2001) is planned for SWMU 38 to address the presence of pesticides in groundwater.

The South Carolina Department of Health and Environmental Control (SCDHEC) reviewed the IM WP for removal of soil containing PCBs at SWMU 38 and issued comments on April 3, 2002. SCDHEC granted conditional approval of the IM WP, which was contingent upon the resolution of two issues: 1) the collection of one additional subsurface soil delineation/confirmation sample, and 2) the comparison of detected PCB concentrations in subsurface soil to the soil screening levels (SSLs) provided in the U.S. Environmental Protection Agency (EPA) Region III Risk-based Concentration (RBC) table (October 2000). CH2M-Jones agreed to these requests and issued a response to comments on April 18, 2002. A copy of the comments and responses regarding these two issues are included in Appendix A of this IM Completion Report.

1 The removal of surface soil containing PCBs above the target cleanup level of 1 milligram  
2 per kilogram (mg/kg), combined with the pending IM for pesticides in groundwater  
3 (CH2M-Jones, 2001), should enable closeout of SWMU 38 in a condition that is suitable for  
4 future unrestricted land use (i.e., with no land use controls). Accordingly, CH2M-Jones  
5 implemented the IM for the removal of PCB-impacted soil at SWMU 38. The IM was  
6 completed on May 17, 2002. The information contained herein summarizes this IM and its  
7 results.

## 8 **1.2 Organization of the IM Completion Report**

9 This IM Completion Report consists of the following sections, including this introductory  
10 section:

11 **1.0 Introduction** — Presents the purpose of the report and background information relating  
12 to the IM.

13 **2.0 Interim Measure Implementation** — Summarizes the excavation activities at SWMU 38.

14 **3.0 Interim Measure Outcome** — Provides a discussion of post-IM activities.

15 **4.0 Recommendations** — Provides recommendations for proceeding with site closure.

16 **5.0 References** — Lists the references used in this document.

17 **Appendix A** contains the responses to SCDHEC comments on the *Interim Measure, Soil*  
18 *Removal, SWMU 38, Zone A, Revision 0* (CH2M-Jones, 2002).

19 **Appendix B** contains the analytical data from the delineation/confirmation and waste  
20 characterization samples collected at SWMU 38.

21 **Appendix C** contains the data validation summary for the IM analytical data.

22 **Appendix D** contains the waste manifests from Waste Management Inc. for soil disposal.

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

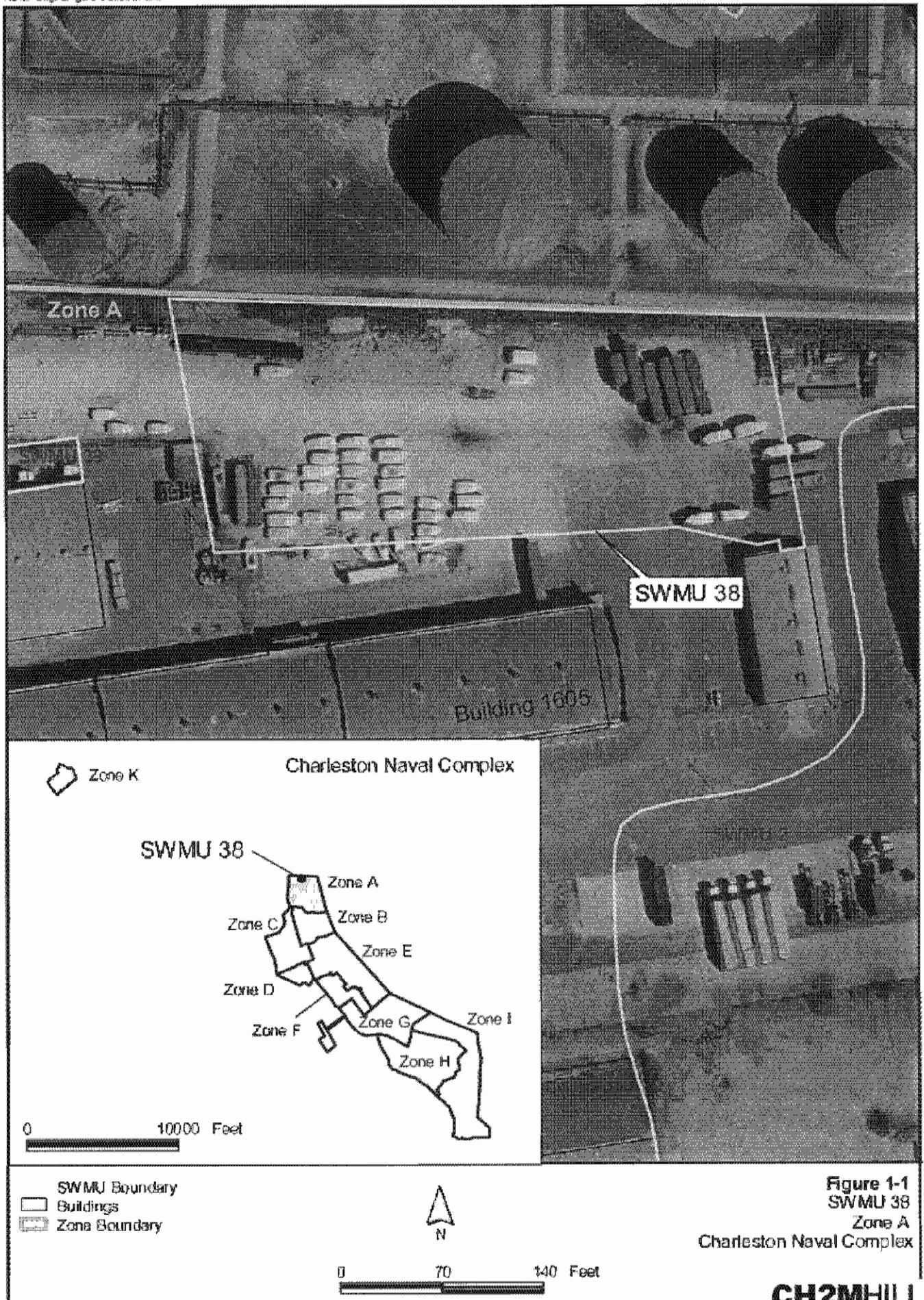


Figure 1-1  
SWMU 38  
Zone A  
Charleston Naval Complex



## 2.0 Interim Measure Implementation

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### 2.1 Delineation/Confirmation Sampling

Prior to implementation of the IM, CH2M-Jones collected six surface soil samples to the east and south of soil boring A038SB012 to evaluate the extent of PCBs detected above the target media cleanup standard (MCS) of 1 mg/kg in surface soil at SWMU 38. The surface soil samples were used to define the horizontal extent of PCB-impacted surface soil. The analytical results from these samples were discussed in the IM WP for PCBs (CH2M-Jones, 2002).

Because the six samples did not complete the delineation of the PCB-impacted soil at SWMU 38, five additional soil samples were collected. Three of these samples were subsurface soil samples collected from within the proposed excavation area. Two samples were surface soil samples, collected at previously sampled locations. Tables 2-1 and 2-2 present the compounds that were detected in surface and subsurface soil samples, respectively. Appendix B contains the complete analytical data tables for the samples collected, and Appendix C contains the data validation report for these samples as well as the laboratory chain of custody form.

The delineation samples from the perimeter and bottom of the resulting excavation were also intended to serve as confirmation samples. The locations of the delineation/confirmation samples are presented in Figure 2-1.

To determine the vertical extent of PCB-impacted soil, three delineation/confirmation soil samples (038SB02703, 038SB02803, and 038SB02903) from the 1 to 2 feet below land surface (ft bls) interval were collected at the locations of previous soil borings A038SB015, A038SB023, and A038SB024, respectively, where the highest levels of PCBs had been detected.

The PCB Aroclor-1260 was detected in one sample (038SB02903, 0.033 J mg/kg), which is below the SSL (0.205 mg/kg, based on a dilution attenuation factor [DAF] of 10) for PCBs from the EPA Region III RBC table (October 2000). As per SCDHEC's request, the SSL for PCBs was used as a surrogate for PCBs that do not have a specific SSL listed. PCBs were not detected in either of the other two lower interval samples. Based on these data, the vertical extent of PCB-impacted soil has been adequately defined and does not extend below 1 ft bls.

1 Because heptachlor epoxide was detected above its RBC (0.07 mg/kg) in surface soil sample  
2 038SB02301 (0.074 mg/kg), the three lower interval (1 to 2 ft bls) soil samples were also  
3 analyzed for pesticides to delineate the vertical extent of heptachlor epoxide. Two  
4 additional surface soil delineation/confirmation samples (A038SB030 and A038SB031) were  
5 also collected at previously sampled delineation borings A038SB025 and A038SB026  
6 (respectively) to ensure that heptachlor epoxide was not detected above its RBC (0.07  
7 mg/kg) at the excavation boundary. These samples were analyzed for pesticides only.

8 Nine pesticides were detected in the delineation/confirmation samples. Eight were detected  
9 in surface soil and seven were detected in subsurface soil. Detected concentrations were all  
10 below their respective SSLs and RBCs. Based on these data, the horizontal and vertical  
11 extent of pesticide-impacted soil was limited to a small area within the area of the PCB  
12 excavation.

13 To address SCDHEC's concern that subsurface soil at the excavation boundary had not  
14 been adequately characterized, one additional subsurface (1 to 2 ft bls) sample (038SB03203)  
15 was collected from the location of soil boring A038SB016 as agreed. The sample was  
16 analyzed for PBCs. No PCBs were detected in this sample.

17 Based on the analytical results, the area requiring soil removal was adequately defined in  
18 the IM WP and no modifications to the excavation area were made.

19 A waste characterization sample (038SB03301) was collected to determine appropriate  
20 disposal of the excavated soil. The waste characterization sample was submitted for toxicity  
21 characteristic leachate procedure (TCLP) analysis for pesticides. Detected PCB  
22 concentrations were all below levels that require RCRA- or Toxic Substances Control Act  
23 (TSCA)- approved disposal.

24 Results from the waste characterization sample (TCLP, 038SB03301) indicated that the  
25 excavated soil was suitable for Subtitle D landfill disposal as pesticides were not detected in  
26 the leachate. The results of the waste characterization sample analysis are provided in  
27 Appendix B.

## 28 **2.2 Excavation Activities**

29 On May 15, 2002, equipment and personnel were mobilized to SWMU 38 to begin preparing  
30 the site for removal activities in accordance with the IM WP (CH2M-Jones, 2002). All work  
31 was performed in accordance with the work plan.

1 As illustrated on Figure 2-1, the excavation area was defined by the fence line to the north  
2 and soil borings A038SB011, A038SB006, A038SB016, A038SB025, and A038SB026. The  
3 resulting excavation area measured approximately 115 ft long by 30 ft wide and 1 ft deep  
4 (3,450 cubic feet ~ 128 cubic yards). Groundwater was encountered at approximately 1 ft  
5 bls.

6 During the course of the excavation metal debris, railroad ties, and asphalt debris were  
7 observed within the excavation. Generally the debris was located within the upper six  
8 inches of the excavation.

9 Excavated soil was stockpiled on site prior to final loading and off-site disposal. Loading of  
10 contaminated soil and delivery of fill dirt was completed on May 16, 2002. Eleven loads of  
11 contaminated soil were removed and 11 loads of fill dirt were delivered.

12 The removed debris was disposed of along with the excavated soil. The soil and debris were  
13 disposed of by Waste Management Inc. (WMI) at the Oakridge Landfill, 2183 Highway 78,  
14 P.O. Box 145, Dorchester, SC 29437. Waste manifests and load tickets are included in  
15 Appendix D. The waste manifests from WMI indicate that a total of 208.63 tons of soil and  
16 debris were excavated from the site and disposed of offsite.

17 Following the removal of PCB-impacted soil, the excavation was backfilled with fill  
18 obtained from the Butler Ware Trucking Co. The backfill was compacted and graded to  
19 match the existing grade. Site rehabilitation was completed on May 17, 2002.

**TABLE 2-1**  
 Detected Compounds in Delineation/Confirmation Surface Soil Samples  
*Interim Measure Completion Report, SWMU 38, Zone A, Charleston Naval Complex*

Parameter	Sample Location	Sample ID	Concentration (µg/kg)	Qualifier	SSL (DAF=10) <sup>a</sup>	RBC (HI=0.1) <sup>b</sup>
Alpha-Chlordane <sup>c</sup>	A038SB030	038SB03001	4.1	J	5,000 (Chlordane)	1,800 (Chlordane)
	A038SB031	038SB03101	14	=		
Dieldrin <sup>c</sup>	A038SB031	038SB03101	0.86	J	2	40
Endrin Aldehyde <sup>c</sup>	A038SB030	038SB03001	4.1	J	500 (Endrin)	23 (Endrin)
Gamma-Chlordane <sup>c</sup>	A038SB031	038SB03101	12	J	5,000 (Chlordane)	1,800 (Chlordane)
Heptachlor Epoxide <sup>c</sup>	A038SB030	038SB03001	1.5	J	350	70
	A038SB031	038SB03101	2.7	J		
p,p'-DDD <sup>c</sup>	A038SB030	038SB03001	15	=	8,000	2,700
	A038SB031	038SB03101	1.8	J		
p,p'-DDE <sup>c</sup>	A038SB030	038SB03001	74	=	27,000	1,900
	A038SB031	038SB03101	13	=		
p,p'-DDT <sup>c</sup>	A038SB030	038SB03001	180	J	16,000	1,900
	A038SB031	038SB03101	7.4	J		

<sup>a</sup> Soil screening levels (SSLs) are from Table A-1 of the Soil Screening Guidance (EPA, 1996) adjusted to a dilution attenuation factor (DAF) of 10, unless otherwise indicated.

<sup>b</sup> Risk-based concentrations (RBCs) are from the U.S. EPA Region III RBC table (October 2000), adjusted to a hazard index (HI) of 0.1 for non-carcinogenic compounds (only compounds detected in surface samples were compared to RBCs).

<sup>c</sup> The RBC is based on a carcinogenic endpoint.

- ( ) The screening concentrations are based on the surrogate compound in parentheses.
- = The compound was detected, the reported concentration is equal to the measured concentration.
- J The compound was detected, the reported concentration is an estimated concentration.

µg/kg Micrograms per kilogram

**TABLE 2-2**  
 Detected Compounds in Delineation/Confirmation Subsurface Soil Samples  
*Interim Measure Completion Report, SWMU 38, Zone A, Charleston Naval Complex*

Parameter	Sample Location	Sample ID	Concentration (µg/kg)	Qualifier	SSL (DAF=10) <sup>a</sup>
Aldrin <sup>b</sup>	A038SB028	038SB02803	0.26	J	250
	A038SB029	038SB02903	0.25	J	
Alpha-Chlordane <sup>b</sup>	A038SB027	038SB02703	0.74	J	5,000 (Chlordane)
	A038SB028	038SB02803	0.7	J	
	A038SB029	038SB02903	3.6	=	
Dieldrin <sup>b</sup>	A038SB029	038SB02903	0.58	J	2
Gamma-Chlordane <sup>b</sup>	A038SB029	038SB02903	3.6	J	5,000 (Chlordane)
p,p'-DDD <sup>b</sup>	A038SB027	038SB02703	7	J	8,000
	A038SB028	038SB02803	1.9	J	
	A038SB029	038SB02903	11	J	
p,p'-DDE <sup>b</sup>	A038SB027	038SB02703	9.1	=	27,000
	A038SB028	038SB02803	5.6	=	
	A038SB029	038SB02903	12	=	
p,p'-DDT <sup>b</sup>	A038SB027	038SB02703	20	J	16,000
	A038SB028	038SB02803	19	J	
	A038SB029	038SB02903	12	J	
Aroclor -1260 <sup>c</sup>	A038SB029	038SB02903	33	J	205 <sup>c</sup>

<sup>a</sup> Soil screening levels (SSLs) are from Table A-1 of the Soil Screening Guidance (EPA, 1996) adjusted to a dilution attenuation factor (DAF) of 10, unless otherwise indicated.

<sup>b</sup> The RBC is based on a carcinogenic endpoint.

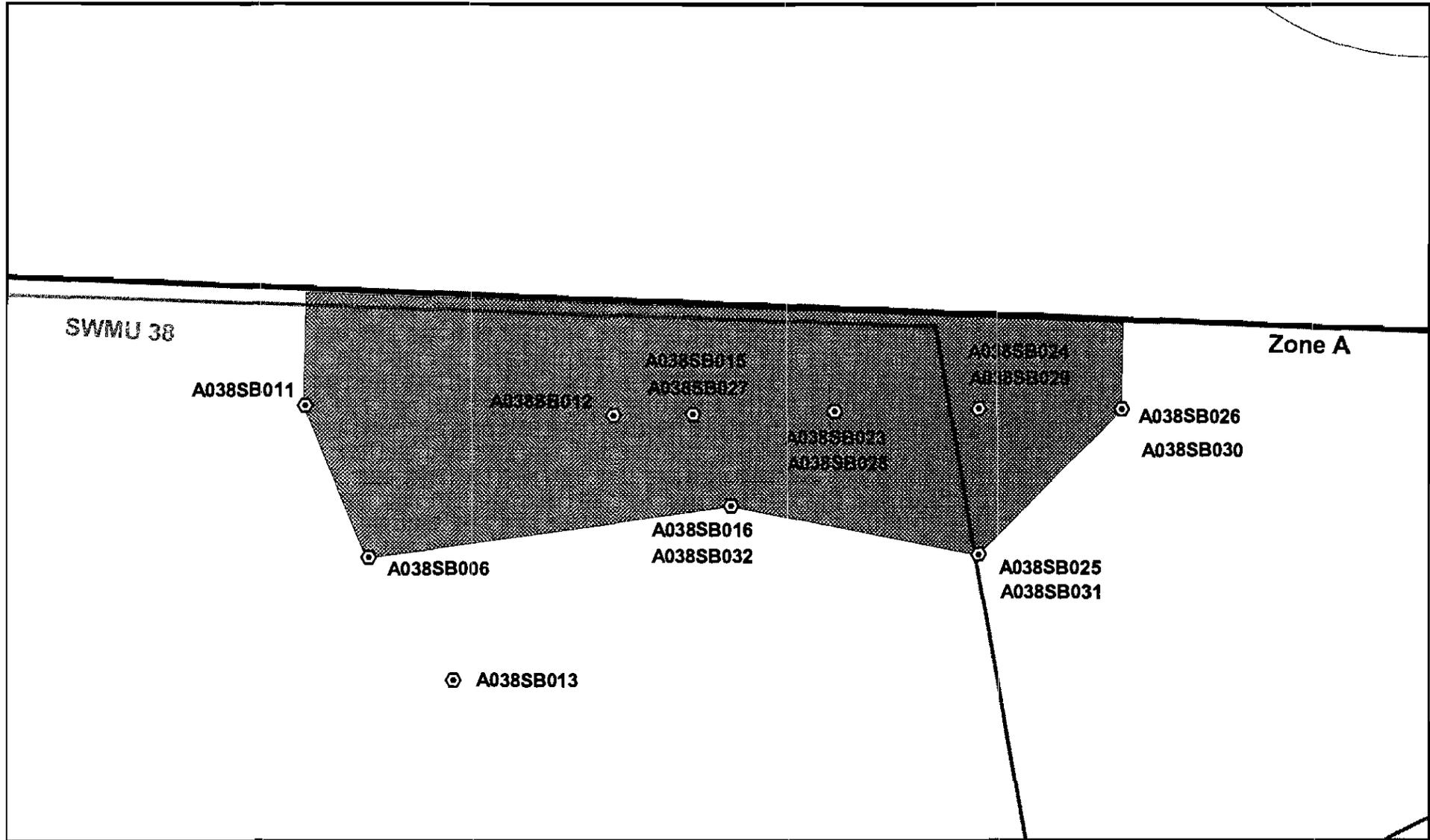
<sup>c</sup> The SSL for Aroclor-1260 is from the U.S. EPA Region III RBC table (October 2000).

( ) The screening concentrations are based on the surrogate compound in parentheses.

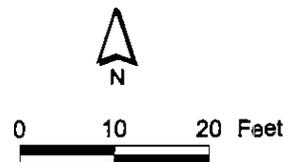
= The compound was detected, the reported concentration is equal to the measured concentration.

J The compound was detected, the reported concentration is an estimated concentration.

µg/kg Micrograms per kilogram



- ⊙ Delineation / Confirmation Locations
- ▨ Approximate Excavation Boundary
- ▭ SWMU Boundary
- ▭ Zone Boundary
- ∕ Surrounding Area



**Figure 2-1**  
 Delineation / Confirmation Sample Locations and Excavation Area  
 SWMU 38, Zone A  
 Charleston Naval Complex

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**Section 3.0**

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## 3.0 Interim Measure Outcome

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Tables 3-1 and 3-2 present the PCB data collected in surface and subsurface soil, respectively, in the vicinity of soil boring A038SB012, which had exhibited an elevated concentration of Aroclor-1260. As can be seen from the tables, two PCBs (Aroclor-1254 and Aroclor-1260) were detected in surface soil samples. Aroclor-1260 was the only PCB detected in the subsurface samples. Figures 3-1 and 3-2 illustrate concentrations of Aroclor-1254 and Aroclor-1260 in surface soil and subsurface soil, respectively.

Aroclor-1254 was detected in five of the 10 surface soil samples collected in the area of soil boring A038SB012. Three samples (038SB01501, 038SB02301, and 038SB02401) contained Aroclor-1254 at concentrations that exceed both the surface soil MCS of 1,000 µg/kg established in the IM WP and the SSL of 550 µg/kg presented in the EPA Region III RBC table (October 2000). All three of these sample locations were removed as part of the IM excavation. Aroclor-1254 was not detected above the MCS in the surface soil samples collected at the perimeter of the excavation nor was it detected in any subsurface sample. These data indicate that residual concentrations of Aroclor-1254 are below the MCS and SSL.

Aroclor-1260 was detected in eight of the 10 surface soil samples collected in the area of soil boring A038SB012 (including 038SB01201). Six samples (038SB00601, 038SB01101, 038SB01201, 038SB01501, 038SB02301, and 038SB02401) contained Aroclor-1260 at concentrations that exceed both the MCS of 1,000 µg/kg and the SSL of 205 µg/kg presented in the EPA Region III RBC table (October 2000). Four of these samples were removed during the IM excavation. Soil borings A038SB006 and A038SB011 were located at the boundary of the excavation. Aroclor-1260 was detected in these samples at concentrations that exceed the SSL, but were below the surface soil MCS. Based on these data, residual surface soil concentrations of Aroclor-1260 are below the MCS.

Subsurface concentrations of Aroclor-1260 in samples collected at SWMU 38 were generally below the detection limit. Aroclor-1260 was detected in a single subsurface sample (038SB02903) at a reported concentration of 33 J ug/kg. The reported concentration is estimated and near the detection limit (as indicated by the "J" qualifier). The subsurface samples collected to support the IM were collected between 1 and 2 ft bls. The depth was chosen to verify that PCB-contaminated soil was limited to the first foot of soil. The fact that PCBs were detected in the 0 to 1 ft bls soil interval at concentrations of several parts per

1 million, but not detected in the 1 to 2 ft bls soil interval or detected in the tens of parts per  
2 billion range, indicate that PCB contaminated soil was limited to the first foot of soil at the  
3 site. These data also show that PCBs are strongly sorbed to the surface soil and are resistant  
4 to downward migration. Subsurface soil samples were not collected at each soil boring, but  
5 where subsurface soils were sampled, the results were all below the SSL even at locations  
6 where surface soil PCB concentrations were above the MCS. These data indicate that  
7 residual PCB concentrations do not pose a threat to shallow groundwater at the site and  
8 that the goal of the IM has been met.

9 Based on these data, the remaining soil meets the target MCS of 1 mg/kg for PCBs in  
10 surface soil. Subsurface soil was found to contain PCBs at concentrations below the  
11 individual SSLs. These data indicate that PCB-impacted soil at SWMU 38 has been  
12 adequately remediated and no further investigative or remedial actions are warranted for  
13 soil at SWMU 38.

14 Heptachlor epoxide was detected above its RBC (0.07 mg/kg) in surface soil sample  
15 038SB02301 (0.074 J mg/kg). As a result the subsurface samples collected to delineate the  
16 vertical extent of PCBs were also analyzed for pesticides. Additionally, two surface soil  
17 samples collected at the boundary of the proposed excavation were re-sampled to verify the  
18 extent of heptachlor epoxide. Heptachlor epoxide was not detected above its RBC in the  
19 surface soil samples and was below the method detection limit in the subsurface soil  
20 samples. The location at which heptachlor epoxide was detected above its RBC was  
21 removed as part of the PCB IM excavation. These data indicate that pesticide-impacted soil  
22 has been adequately remediated and no further investigative or remedial actions are  
23 warranted for soil at SWMU 38.

**TABLE 3-1**  
 Polychlorinated Biphenyls (PCBs) in Surface Soil  
*Interim Measure Completion Report, SWMU 38, Zone A, Charleston Naval Complex*

Station ID	Sample ID	Date Collected	Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260
A038SB006	038SB00601	10/03/1995	16 U	500 =					
A038SB011	038SB01101	06/18/1996	14 U	720 =					
A038SB012	038SB01201	06/18/1996	15 U	<b>1,300 =</b>					
A038SB013	038SB01301	06/18/1996	17 U	18 =					
A038SB015	038SB01501	09/27/2001	400 U	<b>2,400 J</b>	840 J				
A038SB016	038SB01601	09/27/2001	40 U	81 U	81 U				
A038SB023	038SB02301	11/30/2001	370 U	<b>6,800 =</b>	750 U				
A038SB024	038SB02401	01/15/2002	4,140 U	<b>1,410 J</b>	840 J				
A038SB025	038SB02501	01/15/2002	190 U	49.2 J	31 J				
A038SB026	038SB02601	01/15/2002	194 U	64.2 J	53.7 J				

All values are in units of micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ).

Concentrations that are in bold text and outlined within the table represent exceedances of the appropriate screening criteria.

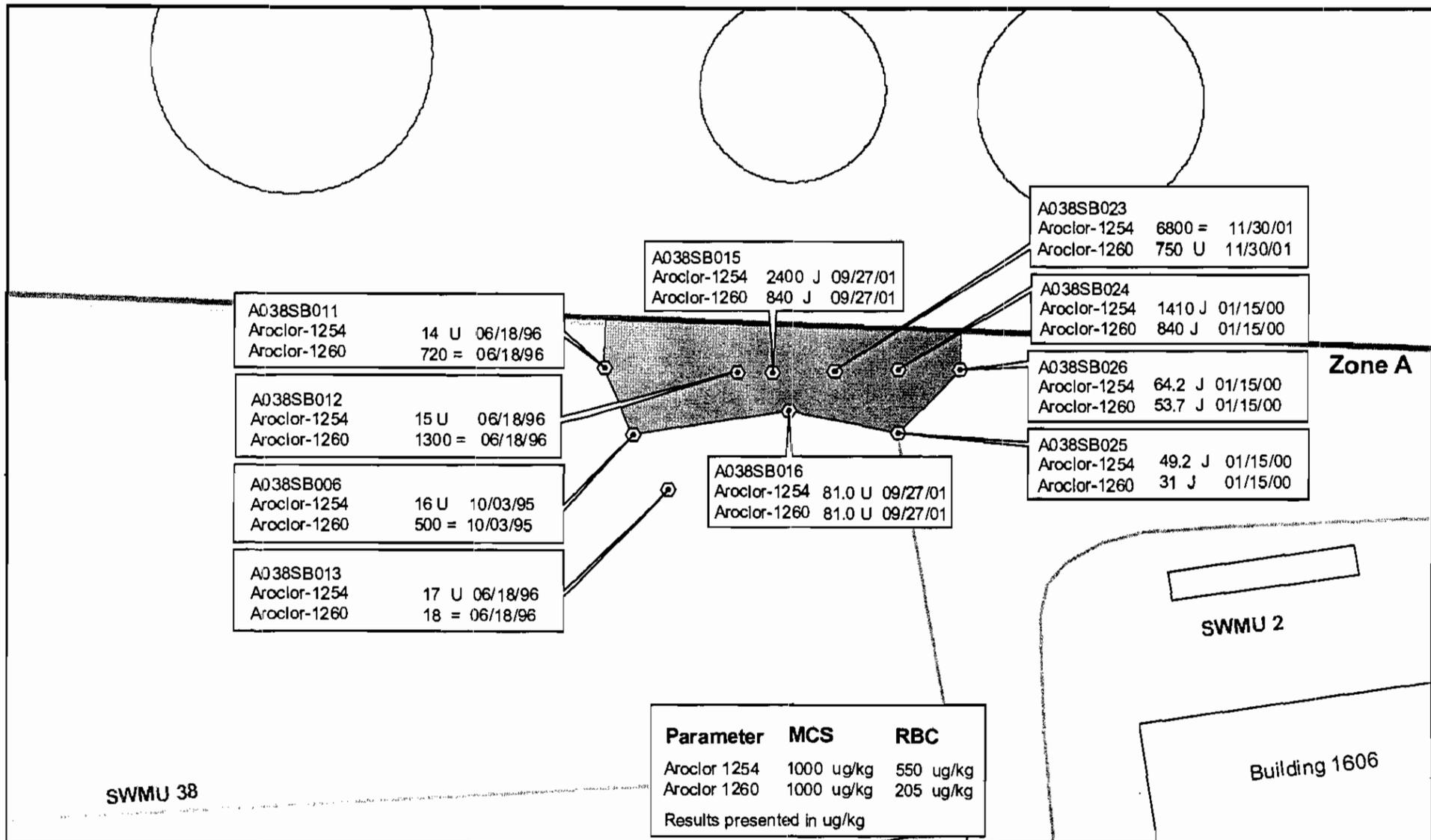
- = The compound was detected, the reported concentration is equal to the measured concentration.
- J The compound was detected, the reported concentration is an estimated concentration.
- U The compound was not detected, the reported concentration is the detection limit.
- UJ The compound was not detected, the reported concentration is an estimated detection limit.

**TABLE 3-2**  
 Polychlorinated Biphenyls (PCBs) in Subsurface Soil  
*Interim Measure Completion Report, SWMU 38, Zone A, Charleston Naval Complex*

Station ID	Sample ID	Date Collected	Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260
A038SB006	038SB00602	10/03/95	14 U						
A038SB027	038SB02703	03/26/02	44 U	89 U	89 UJ				
A038SB028	038SB02803	03/26/02	46 U	94 U	94 UJ				
A038SB029	038SB02903	03/26/02	44 U	89 U	33 J				
A038SB032	038SB03203	04/29/02	46 UJ	46 U	46 U	46 U	46 U	93 U	93 UJ

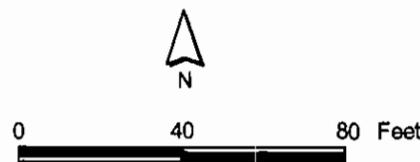
All values are in units of micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ).

- = The compound was detected, the reported concentration is equal to the measured concentration.
- J The compound was detected, the reported concentration is an estimated concentration.
- U The compound was not detected, the reported concentration is the detection limit.
- UJ The compound was not detected, the reported concentration is an estimated detection limit.

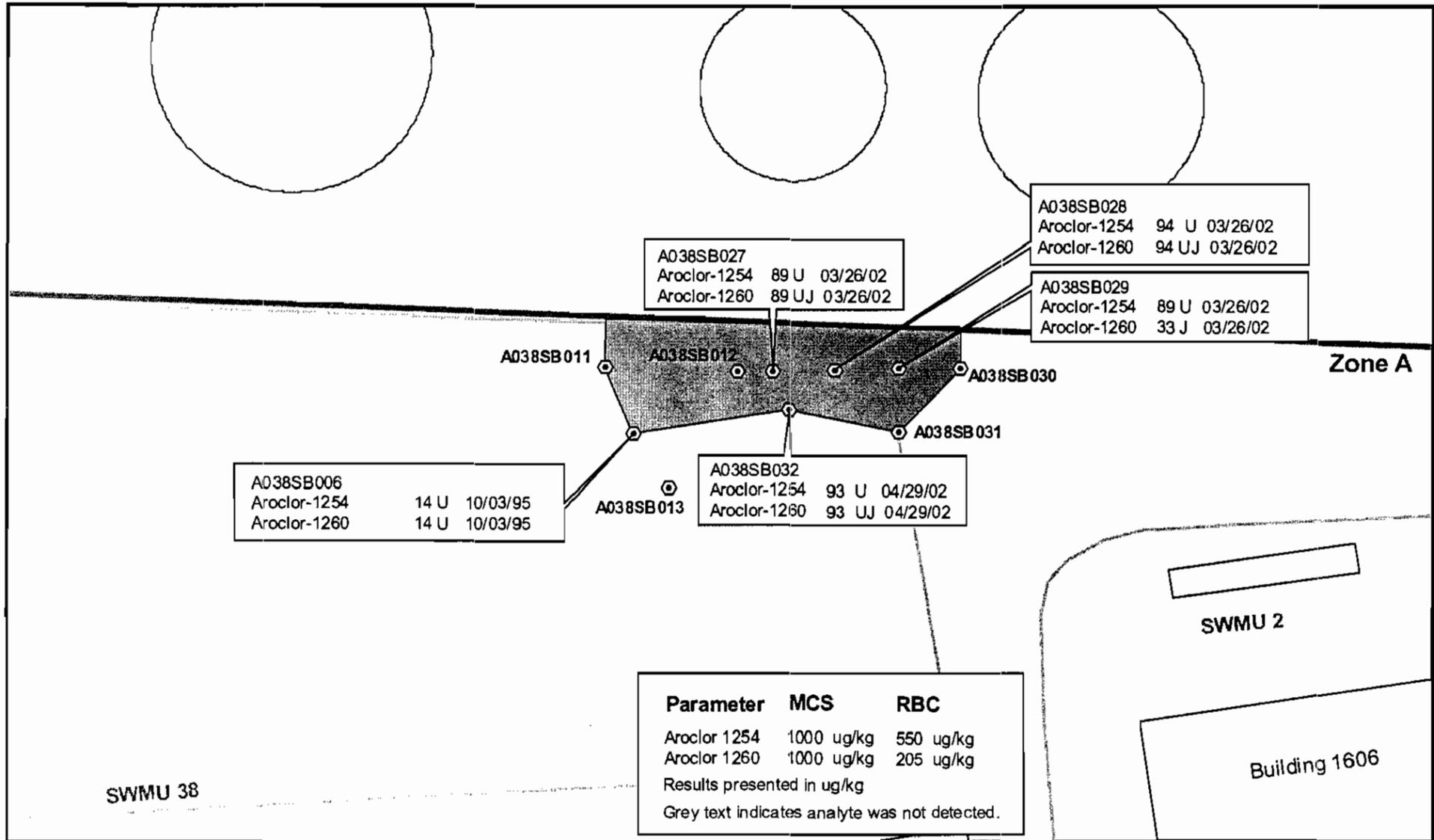


**Figure 3-1**  
 Surface Soil PCB Concentrations  
 SWMU 38, Zone A  
 Charleston Naval Complex

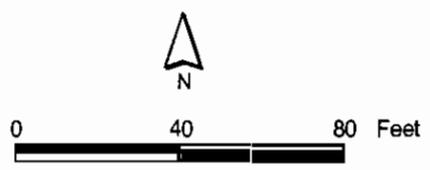
- ⊙ Surface Soil Delineation / Confirmation Locations
- ∨ Surrounding Area
- ▭ Buildings
- SWMU Boundary
- ▨ Approximate Excavation Boundary
- ▭ Zone Boundary



**CH2MHILL**



- ⊙ Surface Soil Delineation / Confirmation Locations
- ∩ Surrounding Area
- ▭ Buildings
- SWMU Boundary
- ▭ Approximate Excavation Boundary
- ▭ Zone Boundary



**Figure 3-2**  
Subsurface Soil PCB Concentrations  
SWMU 38, Zone E  
Charleston Naval Complex

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**Section 4.0**

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## 1 **4.0 Recommendations**

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- 2 Because the data presented support the conclusion that SWMU 38 soil has been adequately
- 3 remediated, this IM is expected to be the final remedial action for soil at SWMU 38.
- 4 Therefore, CH2M-Jones recommends No Further Action (NFA) status for soil at SWMU 38.

**Section 5.0**

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## 1 5.0 References

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- 2 CH2M-Jones Inc. *Interim Measure Work Plan – Soil Removal, SWMU 38, Zone A, Charleston*  
3 *Naval Complex*. Revision 0. March 2002.
- 4 CH2M-Jones Inc. *Interim Measure Work Plan – In-situ Chemical Oxidation of DDD in*  
5 *Groundwater, SWMU 38, Zone A, Charleston Naval Complex*. Revision 0. December 2001.
- 6 EnSafe Inc. *Zone A RCRA Facility Investigation Report, NAVBASE Charleston, North*  
7 *Charleston, South Carolina*. Revision 0. August 7, 1998.
- 8 U.S. Environmental Protection Agency. *EPA Soil Screening Guidance: Technical Background*  
9 *Document (Table A-1), EPA/540/R-95/128*. May 1996.
- 10 United States Environmental Protection Agency. *Region III RBC Table*.  
11 October 5, 2000.

**Appendix A**

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## Engineering Comments Prepared by Jerry Stamps

### SCDHEC Comment 1:

#### 1. General

The current plan is to excavate surface soils based upon the results of nine soil borings A038SB006, A038SB011, A038SB012, A038SB015, A038SB016, A038SB023, A038SB024, A038SB025, and A038SB026. The Department is concerned about the lack of data concerning the conditions of the subsurface soil within the area of the excavation. According to the GIS, A038SB006 was only subsurface soil sample collected within the vicinity of this area. The relatively low concentrations of PCBs in the surface soil do not necessarily indicate that the PCBs will not be present in the subsurface soils. This is substantiated by the investigation and subsequent removal action at AOC 633 conducted by the Detachment. In this case, PCBs in surface soil at location 633SB007 were non-detect; however, the subsurface soil at the same location indicated a concentration of Aroclor-1260 of 25,000 ppb. The Department acknowledges that CH2M-Jones plans to conduct subsurface soil samples at the three hottest spots (A038SB015, A038SB023, and A038SB024); however, the Department maintains that additional subsurface soil investigation is necessary along the perimeter of the excavation in addition to the three proposed samples. If the plan is to use these original samples as confirmation samples, then thorough delineation of this proposed excavation area is necessary to delineate the vertical extent of the excavation. Based upon a telephone conversation with Mr. Jim Edens and Mr. Tom Beisel of CH2M-Jones, one additional subsurface soil sample will be collected at sample location A038SB016. By doing so, the east, west, and south ends of the surface excavation will be represented by at least one subsurface soil sample at A038SB024, A038SB006, and A038SB016, respectively.

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

*CH2M-Jones agrees that the team needs to conduct adequate subsurface soil sampling to be confident that subsurface soil contamination is not present in the area discussed, although we do not believe the analogy of this site to AOC 633 is a particularly good one, given the different histories of these sites. However, as mentioned in the comment, CH2M-Jones has agreed to collect the additional subsurface soil sample at soil boring A038SB016, from the 1 to 3 feet below land surface (ft bls) interval. The collection of this sample is expected to address SCDHEC's concern regarding vertical delineation of PCBs at the excavation boundary, as agreed to during the telephone conversation between Mr. Jerry Stamps, Mr. Paul Bergstrand, Mr. Tom Beisel, and Mr. Jim Edens on Thursday, March 28, 2002. Please let us know if this is consistent with your expectations.*

### SCDHEC Comment 2:

#### 2. Section 4.3

This section states that the excavation will proceed to a depth of 1 foot bls. It is also stated that a site-specific SSL will be calculated if the subsurface soil samples exhibit a PCB concentration greater than 1 mg/kg. The Department maintains that the use of the 1 mg/kg cleanup level as set forth in 40CFR761.61 for screening purposes is not

appropriate. In the absence of generic SSLs in Table A-1 of the Soil Screening Guidance, the subsurface soil data should be screened against the generic SSLs presented in the October 2000 RBC tables. According to this table, a generic SSL of 0.54 mg/kg (DAF=10) exists for Aroclor-1254. Though a generic SSL does not exist specifically for Aroclor 1260, the SSL of 0.21 mg/kg (DAF=10) for Polychlorinated Biphenyls should be used to screen the data. If the data exceeds these criteria, a site-specific SSL must be calculated as proposed in this Interim Measure Work Plan. Furthermore, the Department understands that an addendum to this work plan will be submitted if site-specific SSLs are necessary.

**CH2M-Jones Response 2:**

*CH2M-Jones is not opposed to using SSLs presented in the EPA Region III RBC Table in the absence of generic SSLs in Table A-1 of the Soil Screening Guidance for subsurface soil screening criteria. It should be noted that the SSLs in the EPA Region III RBC Table are based on protection of groundwater to the RBC values (0.033 micrograms per liter [µg/L] for PCBs, EPA Region III RBC Table, October 2000) rather than MCLs (0.5 µg/L for PCBs, Drinking Water Standards and Health Advisories, EPA, Office of Water, Summer 2000). Therefore, use of the EPA Region III values is highly conservative.*

*CH2M-Jones will screen the subsurface soil results for PCBs as requested by SCDHEC. If exceedances of the SSLs are noted, a work plan addendum with a site-specific SSL calculation will be promptly prepared and submitted to SCDHEC for review. Based on the site-specific SSL value and data results, the team can determine whether any subsurface soil remediation is necessary.*

*We appreciate the expedited review of this IMWP by SCDHEC to allow this work to proceed quickly.*

**Appendix B**

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Analytical Data Summary

05/30/2002 3:47 PM

StationID	A038SB027		A038SB028		A038SB028		A038SB029		
SampleID	038SB02703 (3-5ft)		038CB02803 (3-5ft)		038SB02803 (3-5ft)		038SB02903 (3-5ft)		
DateCollected	3/26/2002		3/26/2002		3/26/2002		3/26/2002		
DateExtracted	3/28/2002		3/28/2002		3/28/2002		3/28/2002		
DateAnalyzed	3/29/2002		3/29/2002		3/29/2002		3/29/2002		
SDGNumber	CNC80		CNC80		CNC80		CNC80		
Parameter	Units								
PCB-1016 (Arochlor 1016)	ug/kg	44	U	42	U	46	U	44	U
PCB-1221 (Arochlor 1221)	ug/kg	44	U	42	U	46	U	44	U
PCB-1232 (Arochlor 1232)	ug/kg	44	U	42	U	46	U	44	U
PCB-1242 (Arochlor 1242)	ug/kg	44	U	42	U	46	U	44	U
PCB-1248 (Arochlor 1248)	ug/kg	44	U	42	U	46	U	44	U
PCB-1254 (Arochlor 1254)	ug/kg	89	U	85	U	94	U	89	U
PCB-1260 (Arochlor 1260)	ug/kg	89	UJ	85	UJ	94	UJ	33	J

Analytical Data Summary

05/30/2002 3:47 PM

<b>StationID</b>	A038SB032
<b>SampleID</b>	038SB03203 (3-5ft)
<b>DateCollected</b>	4/29/2002
<b>DateExtracted</b>	5/1/2002
<b>DateAnalyzed</b>	5/2/2002
<b>SDGNumber</b>	CNC101

<b>Parameter</b>	<b>Units</b>		
PCB-1016 (Arochlor 1016)	ug/kg	46	UJ
PCB-1221 (Arochlor 1221)	ug/kg	46	U
PCB-1232 (Arochlor 1232)	ug/kg	46	U
PCB-1242 (Arochlor 1242)	ug/kg	46	U
PCB-1248 (Arochlor 1248)	ug/kg	46	U
PCB-1254 (Arochlor 1254)	ug/kg	93	U
PCB-1260 (Arochlor 1260)	ug/kg	93	UJ

Analytical Data Summary

05/30/2002 3:47 PM

Parameter	Units	A038SB027		A038SB028		A038SB028	
		SampleID	DateCollected	SampleID	DateCollected	SampleID	DateCollected
		038SB02703 (3-5ft)	3/26/2002	038CB02803 (3-5ft)	3/26/2002	038SB02803 (3-5ft)	3/26/2002
			3/28/2002		3/28/2002		3/28/2002
			3/29/2002		3/29/2002		3/29/2002
		CNC80		CNC80		CNC80	
Aldrin	ug/kg	1.7	UJ	1.6	U	0.26	J
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/kg	1.7	UJ	1.6	U	1.8	U
Alpha-chlordane	ug/kg	0.74	J	1.6	U	0.7	J
Beta BHC (Beta Hexachlorocyclohexane)	ug/kg	1.7	UJ	1.6	U	1.8	U
Chlordane	ug/kg	17	U	16	U	18	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/kg	1.7	U	1.6	U	1.8	U
Dieldrin	ug/kg	3.3	U	3.2	U	3.5	U
Endosulfan I	ug/kg	1.7	U	1.6	U	1.8	U
Endosulfan II	ug/kg	3.3	U	3.2	U	3.5	U
Endosulfan Sulfate	ug/kg	3.3	U	3.2	U	3.5	U
Endrin	ug/kg	3.3	U	3.2	U	3.5	U
Endrin Aldehyde	ug/kg	3.3	U	3.2	U	3.5	U
Endrin Ketone	ug/kg	3.3	U	3.2	U	3.5	U
Gamma BHC (Lindane)	ug/kg	1.7	U	1.6	U	1.8	U
Gamma-chlordane	ug/kg	1.7	U	1.6	U	1.8	U
Heptachlor	ug/kg	1.7	UJ	1.6	U	1.8	U
Heptachlor Epoxide	ug/kg	1.7	U	1.6	U	1.8	U
Methoxychlor	ug/kg	17	UJ	16	UJ	18	UJ
p,p'-DDD	ug/kg	7	J	1.6	J	1.9	J
p,p'-DDE	ug/kg	9.1	=	1.5	J	5.6	=
p,p'-DDT	ug/kg	20	J	7	J	19	J
Toxaphene	ug/kg	110	U	100	U	120	U
Chlordane, TCLP	mg/l						
Endrin, TCLP	mg/l						
Gamma BHC (Lindane), TCLP	mg/l						
Heptachlor Epoxide, TCLP	mg/l						
Heptachlor, TCLP	mg/l						
Methoxychlor, TCLP	mg/l						
Toxaphene, TCLP	mg/l						

Analytical Data Summary

05/30/2002 3:47 PM

	StationID	A038SB029		A038SB030		A038SB031	
	SampleID	038SB02903 (3-5ft)		038SB03001 (0-1ft)		038SB03101 (0-1ft)	
	DateCollected	3/26/2002		3/26/2002		3/26/2002	
	DateExtracted	3/28/2002		3/28/2002		3/28/2002	
	DateAnalyzed	3/29/2002		4/1/2002		3/29/2002	
	SDGNumber	CNC80		CNC80		CNC80	
Parameter	Units						
Aldrin	ug/kg	0.25	J	5.9	U	1.6	U
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/kg	1.7	U	5.9	U	1.6	U
Alpha-chlordane	ug/kg	3.6	=	4.1	J	14	=
Beta BHC (Beta Hexachlorocyclohexane)	ug/kg	1.7	U	5.9	U	1.6	U
Chlordane	ug/kg	17	U	59	U	16	U
Delta BHC (Deita Hexachlorocyclohexane)	ug/kg	1.7	U	5.9	U	1.6	U
Dieldrin	ug/kg	0.58	J	11	U	0.86	J
Endosulfan I	ug/kg	1.7	U	5.9	U	1.6	U
Endosulfan II	ug/kg	3.3	U	11	U	3.1	U
Endosulfan Sulfate	ug/kg	3.3	U	11	U	3.1	U
Endrin	ug/kg	3.3	U	11	U	3.1	U
Endrin Aldehyde	ug/kg	3.3	U	4.1	J	3.1	U
Endrin Ketone	ug/kg	3.3	U	11	U	3.1	U
Gamma BHC (Lindane)	ug/kg	1.7	U	5.9	U	1.6	U
Gamma-chlordane	ug/kg	3.6	J	5.9	U	12	J
Heptachlor	ug/kg	1.7	U	5.9	U	1.6	U
Heptachlor Epoxide	ug/kg	1.7	U	1.5	J	2.7	J
Methoxychlor	ug/kg	17	UJ	59	UJ	16	UJ
p,p'-DDD	ug/kg	11	J	15	=	1.8	J
p,p'-DDE	ug/kg	12	=	74	=	13	=
p,p'-DDT	ug/kg	12	J	180	J	7.4	J
Toxaphene	ug/kg	110	U	380	U	100	U
Chlordane, TCLP	mg/l						
Endrin, TCLP	mg/l						
Gamma BHC (Lindane), TCLP	mg/l						
Heptachlor Epoxide, TCLP	mg/l						
Heptachlor, TCLP	mg/l						
Methoxychlor, TCLP	mg/l						
Toxaphene, TCLP	mg/l						

Analytical Data Summary

05/30/2002 3:47 PM

StationID A038SB033  
 SampleID 038SB03301 (0-1ft)  
 DateCollected 4/29/2002  
 DateExtracted 5/1/2002  
 DateAnalyzed 5/2/2002  
 SDGNumber CNC101

Parameter	Units		
Aldrin	ug/kg		
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/kg		
Alpha-chlordane	ug/kg		
Beta BHC (Beta Hexachlorocyclohexane)	ug/kg		
Chlordane	ug/kg		
Delta BHC (Delta Hexachlorocyclohexane)	ug/kg		
Dieldrin	ug/kg		
Endosulfan I	ug/kg		
Endosulfan II	ug/kg		
Endosulfan Sulfate	ug/kg		
Endrin	ug/kg		
Endrin Aldehyde	ug/kg		
Endrin Ketone	ug/kg		
Gamma BHC (Lindane)	ug/kg		
Gamma-chlordane	ug/kg		
Heptachlor	ug/kg		
Heptachlor Epoxide	ug/kg		
Methoxychlor	ug/kg		
p,p'-DDD	ug/kg		
p,p'-DDE	ug/kg		
p,p'-DDT	ug/kg		
Toxaphene	ug/kg		
Chlordane, TCLP	mg/l	0.02	U
Endrin, TCLP	mg/l	0.002	U
Gamma BHC (Lindane), TCLP	mg/l	0.002	U
Heptachlor Epoxide, TCLP	mg/l	0.002	U
Heptachlor, TCLP	mg/l	0.002	U
Methoxychlor, TCLP	mg/l	0.02	UJ
Toxaphene, TCLP	mg/l	0.1	U

**Appendix C**

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## Data Validation Summary - Charleston Naval Complex - Zone A, SWMU 38

TO: Jim Edens/CH2M HILL/GNA

FROM: Amy Juchem/CH2M HILL/GNA  
Herb Kelly/CH2M HILL/GNA

DATE: June 5, 2002

The purpose of this memorandum is to present the results of the data validation process for the samples collected in Zone A, SWMU 38. The samples were collected on the dates of March 26 and April 29, 2002.

The specific samples and analytical fractions reviewed are summarized below in [Table 1](#).

The Quality Control areas that were review and the resulting findings are documented within each subsection that follows. This data was 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 Severn Trent Services, STL Savannah Laboratories, Inc., in Savannah, Georgia for SW-846 8081 Organochlorine Pesticides and SW-846 8082 Polychlorinated Biphenyls (PCBs).

In addition, one sample was submitted for the Toxicity Characteristic Leaching Procedure (TCLP), prior to the Pesticide analysis.

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.
- [UJ] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.
- [R] Rejected. The data is 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**

**TABLE 1**  
 Chemical Analytical Methods – Field and Quality Control Samples  
 Charleston Naval Complex, Zone A, SWMU 38, Charleston, SC

SDG	Station ID	Sample ID	Lab Sample ID	Date Collected	Matrix	Sample Type	Upper Depth	Lower Depth	Pesticides SW8081A	TCLP Pesticides SW8081A	PCBs SW8082
CNC80	A038SB027	038SB02703	S242109A*1	03/26/02	SO	N	3	5	X		X
CNC80	A038SB028	038SB02803	S242109A*2	03/26/02	SO	N	3	5	X		X
CNC80	A038SB028	038CB02803	S242109A*3	03/26/02	SO	FD	3	5	X		X
CNC80	A038SB029	038SB02903	S242109A*4	03/26/02	SO	N	3	5	X		X
CNC80	A038SB030	038SB03001	S242109A*5	03/26/02	SO	N	0	1	X		
CNC80	A038SB031	038SB03101	S242109A*6	03/26/02	SO	N	0	1	X		
CNC80	LABQC	42109A7LB	S242109A*7		SQ	LB			X		X
CNC80	LABQC	42109A8BS	S242109A*8		SQ	BS			X		X
CNC80	FIELDQC	038EB027M4	S242109A*14	03/26/02	WQ	EB			X		X
CNC80	LABQC	42109A15LB	S242109A*15		WQ	LB			X		X
CNC80	LABQC	42109A16BS	S242109A*16		WQ	BS			X		X
CNC101	A038SB032	038SB03203	S242940*1	04/29/02	SO	N	3	5			X
CNC101	FIELDQC	038EB032M5	S242940*2	04/29/02	WQ	EB					X
CNC101	A038SB033	038SB03301	S242940*3	04/29/02	SO	N	0	1		X	
CNC101	LABQC	429404LB	S242940*4		SQ	LB					X
CNC101	LABQC	429405BS	S242940*5		SQ	BS					X
CNC101	LABQC	4294011LB	S242940*11		WQ	LB					X
CNC101	LABQC	4294012BS	S242940*12		WQ	BS					X
CNC101	LABQC	TCLP Extracti	S242940*18		WQ	LB				X	
CNC101	LABQC	4294019BS	S242940*19		WQ	BS				X	

**TABLE 1**  
 Chemical Analytical Methods – Field and Quality Control Samples  
 Charleston Naval Complex, Zone A, SWMU 38, Charleston, SC

SDG	Station ID	Sample ID	Lab Sample ID	Date Collected	Matrix	Sample Type	Upper Depth	Lower Depth	Pesticides SW8081A	TCLP Pesticides SW8081A	PCBs SW8082
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**MATRIX CODE**

SO – Soil  
 SQ – Soil QC Samples  
 WQ - Water QC Samples

**SAMPLE TYPE CODE**

EB - Equipment Blank  
 LB – Laboratory Blank  
 BS – Blank Spike  
 FD – Field Duplicate  
 N - Native Sample

**ANALYSIS CODE**

PCBs - Polychlorinated Biphenyls

# Organic Parameters

## Quality Control Review

The following list represents the QA/QC measures that were 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 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.
- **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.
- **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 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.

# Organochlorine Pesticide Analyses

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

## Recoveries - Surrogate, MS/MSD and LCS

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD) and Laboratory Control Sample (LCS) recoveries were within acceptable quality control limits, except as noted in **Table 2** below.

**TABLE 2**  
 Surrogate, MS/MSD and LCS Recoveries Out of QC Limits: Pesticides  
 Charleston Naval Complex, Zone A, SWMU 38, Charleston, SC

Site	Sample	Pesticide	Recovery	Recovery Limits	RPD	RPD Limits	Associated Samples	Flag
CNC80	S242109A*1 / 038SB02703	Tetrachloro-m-xylene	59*	60-150			S242109A*1	No Flags Applied
CNC80	S242109A*2 / 038SB02803	Tetrachloro-m-xylene	52*	60-150			S242109A*2	No Flags Applied
CNC80	S242109A*3 / 038CB02803	Tetrachloro-m-xylene	57*	60-150			S242109A*3	No Flags Applied
		Decachlorobiphenyl	57*	60-150				
CNC80	S242109A*1 MS/MSD	Alpha-BHC	70 / 43	22-101	48*	40	S242109A*1	Detects-J; Non-Detects-UJ
		Beta-BHC	52 / 82	12-120	44*	40		
		Heptachlor	80 / 54	35-130	37*	31		
		Aldrin	82 / 52	34-132	44*	43		
CNC80	0328O-JMB LCS	Alpha-BHC	109*	22-101			S242109A*1-5	Detects-J; Non-Detects-UJ
		Endrin Ketone	133*	29-112				
CNC80	0328P-JMB LCS	4,4'-DDT	23*	38-127			S242109A*14	No Flags Applied (Field QC)
		Methoxychlor	36*	60-155				
CNC101	S242940*1 / 038SB03203	Tetrachloro-m-xylene	43* / 43*	60-150			S242940*1	No Flags Applied
CNC101	S242940*2 / 038EB032M5	Decachlorobiphenyl	26* / 24*	60-150			S242940*2	No Flags Applied
CNC101	S242940*3 / 038SB03301	Tetrachloro-m-xylene	48* / 48*	60-150			S242940*3	No Flags Applied

\* - out of control limits

## Calibrations

All initial and continuing calibration criteria were met except as noted in **Table 3** below.

**TABLE 3**

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: Pesticides  
Charleston Naval Complex, Zone A, SWMU38, Charleston, SC

Performance/Calibration Data	Compound	Accuracy-Standard Deviation (%D)	Acceptance Standard
SGJECD1 #1 – CCAL – 03/30/02, 00:45	4,4'-DDD	39.1% high	S242109A*1-6, 14
	4,4'-DDT	57.4% low	
	Methoxychlor	54.1% low	
SGJECD2 #2 – CCAL – 03/30/02, 00:45	4,4'-DDD	38.5% high	S242109A*1-4, 6, 14
	4,4'-DDT	65.6% low	
	Methoxychlor	55.3% low	
	Heptachlor	23.8% low	
SGJECD2 #2 – CCAL – 04/01/02, 14:04	Heptachlor	17.2% low	S242109A*5
SGJECD1 #1 – CCAL – 04/01/02, 20:33	4,4'-DDT	24.7% low	S242109A*5
	Methoxychlor	24.8% low	
SGJECD2 #2 – CCAL – 04/01/02, 20:33	Heptachlor	16.6% low	S242109A*5
	4,4'-DDT	30.1% low	
	Endrin Aldehyde	15.4% low	
	Methoxychlor	31.0% low	
SGIECD2 #2 – CCAL – 05/02/02, 14:00	Heptachlor	28.8% high	S242940*3
SGIECD1 #1 – CCAL – 05/02/02, 22:26	Methoxychlor	50.0% low	S242940*3
SGIECD2 #2 – CCAL – 05/02/02, 22:26	Methoxychlor	51.7% low	S242940*3

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

- 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 (%D) was high in the continuing calibration standards, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.

## Second Column Confirmation

The second column confirmation percent difference (%D) for some detected parameters, exceeded the 40 %D criteria. Those results were flagged "J", as estimated. The laboratory reported the lower of the two concentrations. The individual samples and specific compounds that were flagged are listed in [Table 4](#) below.

**TABLE 4**  
Second Column Confirmation out of Criteria: Organochlorine Pesticides  
Charleston Naval Complex, Zone A, SWMU 38, Charleston, SC

SDG	Sample ID	Lab Sample ID	Parameter
CNC80	038SB02803	S242109A*2	4,4'-DDD
CNC80	038CB02803	S242109A*3	4,4'-DDE
CNC80	038SB02903	S242109A*4	Aldrin
			gamma-Chlordane
CNC80	038SB03001	S242109A*5	Endrin aldehyde
CNC80	038SB03101	S242109A*6	Heptachlor epoxide
			gamma-Chlordane
			Dieldrin
			4,4'-DDD
			4,4'-DDT

## Field Duplicate Samples

All Field Duplicate Samples were within acceptable quality control limits, except as noted in [Table 5](#) below. No flags are applied due to Field Duplicate precision.

**TABLE 5**  
Field Duplicate RPDs Out of QC Limits: Pesticides  
Charleston Naval Complex, Zone A, SWMU 38, Charleston, SC

SDG	Sample	Parameter	Native Concentration	Field Duplicate Concentration	RPD	RPD Limits
CNC80	S242109A*2 / S242109A*3	4,4'-DDE	5.6 ug/Kg	1.5 ug/Kg	115.5*	35
		4,4'-DDT	19.0 ug/Kg	7.0 ug/Kg	92.3*	35

\* - out of control limits

## Polychlorinated Biphenyls

The QA/QC parameters for the Polychlorinated Biphenyls analyses by method SW-846 8082 for all of the samples were within acceptable control limits, except as noted below.

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

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

**TABLE 6**

Surrogate and MS/MSD Recoveries Out of QC Limits: PCBs  
Charleston Naval Complex, Zone A, SWMU 38, Charleston, SC

SIC	Sample	Parameter	Recovery	Recovery Limit	Associated Samples	Flag
CNC80	S242109A*1 / 038SB02703	Tetrachloro-m-xylene	59*	60-150	S242109A*1	No Flags Applied
CNC80	S242109A*2 / 038SB02803	Tetrachloro-m-xylene	52*	60-150	S242109A*2	No Flags Applied
CNC80	S242109A*3 / 038CB02803	Tetrachloro-m-xylene	57*	60-150	S242109A*3	No Flags Applied
		Decachlorobiphenyl	57*	60-150		
CNC101	S242940*1 / 038SB03203	Tetrachloro-m-xylene	43* / 43*	60-150	S242940*1	No Flags Applied
CNC101	S242940*2 / 038EB032M5	Decachlorobiphenyl	26* / 24*	60-150	S242940*2	No Flags Applied
CNC101	S242940*3 / 038SB03301	Tetrachloro-m-xylene	48* / 48*	60-150	S242940*3	No Flags Applied
CNC101	S242940*1 MS/MSD	Aroclor-1016	54* / 54*	50-150	S242940*1	Detects-J; Non-Detects-UJ
		Aroclor-1260	56* / 56*	60-150		
* - out of control limits						

## Calibrations

All initial and continuing calibration criteria were met except as noted in [Table 7](#) below.

<b>TABLE 7</b>			
<b>Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: PCBs</b>			
<b>Charleston Naval Complex, Zone A, SWMU38, Charleston, SC</b>			
<b>Instrument/Calibration Event</b>	<b>Analyte</b>	<b>Relative Standard Deviation (%RSD) (CAL) or Difference (CON)</b>	<b>Associated Sample</b>
SGJECD2 #2 – ICAL – 03/13/02, 21:59	Aroclor-1260	R <sup>2</sup> = 0.987	CNC80 – All samples
SGJECD2 #2 – CCAL – 03/29/02, 06:28	Aroclor-1016	24.0% low	S242109A*1-4, 6, 14
SGJECD2 #2 – CCAL – 03/29/02, 23:29	Aroclor-1016	15.1% low	S242109A*1-6, 14
SGJECD2 #2 – CCAL – 04/01/02, 14:29	Aroclor-1016	38.7% low	S242109A*5
SGJECD1 #1 – CCAL – 04/01/02, 21:23	Aroclor-1260	19.5% low	S242109A*5
SGIECD2 #2 – CCAL – 05/02/02, 23:15	Aroclor-1260	15.6% low	S242940*1-2

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

- When the percent Relative Standard Deviation (%RSD) or correlation coefficient (R<sup>2</sup>) 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.

## Second Column Confirmation

The second column confirmation percent difference (%D) for some detected parameters, exceeded the 40 %D criteria. Those results were flagged "J", as estimated. The laboratory reported the lower of the two concentrations. The individual samples and specific compounds that were flagged are listed below.

- The second column percent difference exceeded acceptance criteria for Aroclor-1260 in sample S242109A\*4 / 038SB02903.

## Rejected Data

No data was rejected for this sampling event.

## Conclusion

A review of the analytical data submitted regarding the investigation of Zone A, SWMU 38 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 as discussed above, requiring minimal flagging. 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 A, SWMU 38 - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC80	038SB02703	S242109A*1	SO	PCB	SW8082	PCB-1260 (AROCHLOR 1260)	89	U	89	UJ	ug/kg	IC
CNC80	038SB02803	S242109A*2	SO	PCB	SW8082	PCB-1260 (AROCHLOR 1260)	94	U	94	UJ	ug/kg	IC
CNC80	038CB02803	S242109A*3	SO	PCB	SW8082	PCB-1260 (AROCHLOR 1260)	85	U	85	UJ	ug/kg	IC
CNC80	038SB02903	S242109A*4	SO	PCB	SW8082	PCB-1260 (AROCHLOR 1260)	33	JP	33	J	ug/kg	2C, IC
CNC80	038SB02703	S242109A*1	SO	PEST	SW8081A	ALDRIN	1.7	U	1.7	UJ	ug/kg	MD
CNC80	038SB02703	S242109A*1	SO	PEST	SW8081A	ALPHA BHC	1.7	U	1.7	UJ	ug/kg	MD
CNC80	038SB02703	S242109A*1	SO	PEST	SW8081A	BETA BHC	1.7	U	1.7	UJ	ug/kg	MD
CNC80	038SB02703	S242109A*1	SO	PEST	SW8081A	HEPTACHLOR	1.7	U	1.7	UJ	ug/kg	MD
CNC80	038SB02703	S242109A*1	SO	PEST	SW8081A	METHOXYCHLOR	17	U	17	UJ	ug/kg	CC
CNC80	038SB02703	S242109A*1	SO	PEST	SW8081A	p,p'-DDD	7	=	7	J	ug/kg	CC
CNC80	038SB02703	S242109A*1	SO	PEST	SW8081A	p,p'-DDT	20	=	20	J	ug/kg	CC
CNC80	038SB02803	S242109A*2	SO	PEST	SW8081A	METHOXYCHLOR	18	U	18	UJ	ug/kg	CC
CNC80	038SB02803	S242109A*2	SO	PEST	SW8081A	p,p'-DDD	1.9	JP	1.9	J	ug/kg	2C, CC
CNC80	038SB02803	S242109A*2	SO	PEST	SW8081A	p,p'-DDT	19	=	19	J	ug/kg	CC
CNC80	038CB02803	S242109A*3	SO	PEST	SW8081A	METHOXYCHLOR	16	U	16	UJ	ug/kg	CC
CNC80	038CB02803	S242109A*3	SO	PEST	SW8081A	p,p'-DDD	1.6	J	1.6	J	ug/kg	CC
CNC80	038CB02803	S242109A*3	SO	PEST	SW8081A	p,p'-DDE	1.5	JP	1.5	J	ug/kg	2C
CNC80	038CB02803	S242109A*3	SO	PEST	SW8081A	p,p'-DDT	7	=	7	J	ug/kg	CC
CNC80	038SB02903	S242109A*4	SO	PEST	SW8081A	ALDRIN	0.25	JP	0.25	J	ug/kg	2C
CNC80	038SB02903	S242109A*4	SO	PEST	SW8081A	GAMMA-CHLORDANE	3.6	P	3.6	J	ug/kg	2C
CNC80	038SB02903	S242109A*4	SO	PEST	SW8081A	METHOXYCHLOR	17	U	17	UJ	ug/kg	CC
CNC80	038SB02903	S242109A*4	SO	PEST	SW8081A	p,p'-DDD	11	=	11	J	ug/kg	CC
CNC80	038SB02903	S242109A*4	SO	PEST	SW8081A	p,p'-DDT	12	=	12	J	ug/kg	CC
CNC80	038SB03001	S242109A*5	SO	PEST	SW8081A	ENDRIN ALDEHYDE	4.1	JP	4.1	J	ug/kg	2C, CC
CNC80	038SB03001	S242109A*5	SO	PEST	SW8081A	METHOXYCHLOR	59	U	59	UJ	ug/kg	CC
CNC80	038SB03001	S242109A*5	SO	PEST	SW8081A	p,p'-DDT	180	=	180	J	ug/kg	CC
CNC80	038SB03101	S242109A*6	SO	PEST	SW8081A	DIELDRIN	0.86	JP	0.86	J	ug/kg	2C
CNC80	038SB03101	S242109A*6	SO	PEST	SW8081A	GAMMA-CHLORDANE	12	P	12	J	ug/kg	2C

Attachment 1 - Changed Qualifiers and Results  
 Zone A, SWMU 38 - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC80	038SB03101	S242109A*6	SO	PEST	SW8081A	HEPTACHLOR EPOXIDE	2.7	P	2.7	J	ug/kg	2C
CNC80	038SB03101	S242109A*6	SO	PEST	SW8081A	METHOXYCHLOR	16	U	16	UJ	ug/kg	CC
CNC80	038SB03101	S242109A*6	SO	PEST	SW8081A	p,p'-DDD	1.8	JP	1.8	J	ug/kg	2C, CC
CNC80	038SB03101	S242109A*6	SO	PEST	SW8081A	p,p'-DDT	7.4	P	7.4	J	ug/kg	2C, CC
CNC101	038SB03203	S242940*1	SO	PCB	SW8082	PCB-1016 (AROCHLOR 1016)	46	U	46	UJ	ug/kg	MS
CNC101	038SB03203	S242940*1	SO	PCB	SW8082	PCB-1260 (AROCHLOR 1260)	93	U	93	UJ	ug/kg	MS
CNC101	038SB03301	S242940*3	SO	PEST	SW8081A	METHOXYCHLOR, TCLP	0.02	U	0.02	UJ	mg/l	CC

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory: STL  
 Project Name: Charleston Navy Complex  
 Project Number: 158814.PM.04  
 Project Manager: Tom Beisel  
 Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605  
ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278  
 Send Report To: see last page of COC

Site Name: Zone A, SWMU 38  
 TAT: 14 day  
 QA Level: level 3  
 EDD: CNC format

Lab Batch/SDG:

Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	Pesticides/PCBs				Comments	
			Begin	End				1 - 4 ounce jar	1 - 4 ounce jar	2 - 1L amber			
038SB02703	A038SB027	resample A038SB015	1	2	3/26/02 0910	SO	1	X					
038SB02803	A038SB028	resample A038SB023	1	2	3/26/02 0930	SO	1	X					
038CB02803	A038SB028	resample A038SB023	1	2	3/26/02 0930	SO	1	X					
038SB02903	A038SB029	resample A038SB024	1	2	3/26/02 1055	SO	1	X					
038SB03001	A038SB030	resample A038SB025	0	1	3/26/02 0950	SO	1		X				
038SB03101	A038SB031	resample A038SB026	0	1	3/26/02 1055	SO	1		X				
038EB027M4	A038EB027				3/26/02 1000	SQ	2			X			EB

Sampled By: [Signature] Date/Time: 3/26/02 1100

Relinquished by: [Signature] Date/Time: 3/26/02

Additional Samplers: \_\_\_\_\_

1700

Received By Lab: [Signature] Date/Time: 3-27-02

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_ Date/Time: 9:06

Shipped Via: UPS FedEx Hand Other Tracking#: \_\_\_\_\_

Remarks: (52-42109)

Temperature: \_\_\_\_\_

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZA038-042502-01 page 1 of 2

Laboratory: STL

Project Name: Charleston Navy Complex Site Name: Zone A, SWMU 38

Project Number: 158814.PM.04 TAT: 10 day 7 day

Project Manager: Tom Beisel QA Level: level 3

Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605

ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278

Send Report To: see last page of COC EDD: CNC format

Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	1 - 4 ounce jar	1 - 4 ounce jar	2 - 1L amber	1 - 4 ounce jar	2 - 1L amber	1 - 4 ounce jar	Lab Batch/SDG:
			SW8081A/8082	SW8081A				SW8081A/8082	SW8082	SW8082	SW8081A			
038SB03203	A038SB032	subsurface of SB016	1	2	4-29-02/1340	SO	1				X			
038EB032M5	A038EB032				4-29-02/1420	SQ	1					X		EB
038SB03301	A038SB033	waste character.	0	1	4-29-02/1415	SO	1						X	
														<u>R.C.R.A</u>
														<u>SAMPLES COMPLETE</u>
														<u>7 DAY TURN AROUND PLEASE. Thanks RD</u>

**RUSH!**

Sampled By: ANDREW O'CONNOR; A. STOKES Date/Time: 4-29-02/

Relinquished by: [Signature] Date/Time: 4-29-02/1400

Additional Samplers: \_\_\_\_\_

Received By Lab: KConner Date/Time: 4/30/02 0955

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Receipt Exceptions: \_\_\_\_\_





OAKRIDGE LANDFILL  
2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2607 Fax 843-563-3375

*SWMU 38 - So. US*

**SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02**

*TRUCK # 21  
TIME: 0740  
LOM # 1*

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)

Tele Number: 770.604.9182

Contact: MARK HITCHCOCK

Generator Signature:

*[Signature]* *CHIZM-JONES*

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE

Truck # 21

Date: 5-16-02

Driver Signature: *[Signature]*

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: 985598

Tonnage: 19.39

Received by: RArnold

Date: 5/16/02



OAKRIDGE LANDFILL  
2183 Highway 78, Dorchester, SC 29427  
Tel 843-563-2607 Fax 843-563-3375

*SWMU 38*

SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02

*TRUCK # 19*

*Time 0810*

*LOAD # 2*

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)

Tele Number: 770.604.9182

Contact: MARK HITCHCOCK

Generator Signature:

*[Signature]* *CHZM JONES*

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE

Truck # *19*

Date: *5-16-02*

Driver Signature:

*[Signature]*

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: *9856002*

Tonnage: *19.78*

Received by: *[Signature]*

Date: *5/16/02*



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2607 Fax 843-563-3375

*SWMU 38 - Soil*

SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02

TRUCK # 18  
LOAD # 3  
Time: 0825

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)

Tele Number: 770.604.9182

Contact: MARK HITCHCOCK

Generator Signature:

*[Signature]* CHAZON JONES

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE

Truck # 18

Date: 5-16-02

Driver Signature: \_\_\_\_\_

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: 085007

Tonnage: 18.12

Received by: *[Signature]*

Date: 5/16/02



OAKRIDGE LANDFILL  
2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2607 Fax 843-563-3375

*SWMU 38*  
*TRUCK # 21*  
*Load # 4*  
*Time: 1025*

SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02

Generator: CHARLESTON NAVAL COMPLEX  
Account Number: 490-439  
Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)  
Tele Number: 770.604.9182 Contact: MARK HITCHCOCK  
Generator Signature:

*[Signature]* C. JONES

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE Truck # 21  
Date: 5-16-02 Driver Signature: *[Signature]*

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130  
Description of Waste: SOIL/CONTAMINATED SOIL  
Ticket Number: 985043 Tonnage: 20.03  
Received by: *[Signature]* Date: 5/16/02



OAKRIDGE LANDFILL  
2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2607 Fax 843-563-3375

*SWMU 38 - Soils*

**SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02**

*LOAD # 5  
Time: 1045*

Generator: CHARLESTON NAVAL COMPLEX  
Account Number: 490-439  
Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)  
Tele Number: 770.604.9182 Contact: MARK HITCHCOCK

Generator Signature:

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE Truck # 19

Date: 5/16/02 Driver Signature: \_\_\_\_\_

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130  
Description of Waste: SOIL/CONTAMINATED SOIL  
Ticket Number: 085446 Tonnage: 01.00

Received by: RA Date: 5/16/02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2607 Fax 843-563-3375

*SUNMU 38.50.15*

*LWD # 6*

*Time: 1105*

SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)

Tele Number: 770.604.9182

Contact: MARK HITCHCOCK

Generator Signature:

*[Handwritten Signature]* *CHEN*

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE

Truck # 18

Date: 5-16-02

Driver Signature: \_\_\_\_\_

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: 985660

Tonnage: 18.22

Received by: RA

Date: 5/16/02



OAKRIDGE LANDFILL  
2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2607 Fax 843-563-3375

*SWMU 38 - SWL*

*TRUCK #21*

*Lot # 7*

*Time 1235*

**SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02**

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)

Tele Number: 770.604.9182

Contact: MARK HITCHCOCK

Generator Signature:

*[Handwritten Signature]*

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE

Truck # 21

Date: 5-16-02

Driver Signature: Vion Craven

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: 985679

Tonnage: 19.96

Received by: ROA

Date: 5/16/02



OAKRIDGE LANDFILL  
2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2687 Fax 843-563-3375

*SUNMU 38 - 20.13*

**SPECIAL WASTE MANIFEST**  
**APPROVAL # OR0205009**  
**EXPIRATION 8/1/02**

*Time: 1245*

*LAD # 8*

*5-16-02*

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)

Tele Number: 770.604.9182

Contact: MARK HITCHCOCK

Generator Signature:

*[Signature]* *CH2M HILL*

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE

Truck # 19

Date: 5-16-02

Driver Signature: \_\_\_\_\_

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: 98528

Tonnage: 21.89

Received by: NA

Date: 5/14/02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2607 Fax 843-563-3375

SUNMU 38 - SOL

SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02

LOAD # 9  
Time: 1330

Generator: CHARLESTON NAVAL COMPLEX  
Account Number: 490-439  
Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)  
Tele Number: 770.604.9182 Contact: MARK HITCHCOCK  
Generator Signature:

*[Signature]* CH2M-JONES

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE Truck # 18

Date: 5-16-02 Driver Signature: \_\_\_\_\_

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130  
Description of Waste: SOIL/CONTAMINATED SOIL  
Ticket Number: 98 9190 Tonnage: 16.12

Received by: Kenned Date: 5/16/02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437  
Tel 843-563-2607 Fax 843-563-3375

*SUNMU 38-Soils*  
*TRUCK = 21*  
*TIME 1445*  
*LOAD # 10*

SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02

Generator: CHARLESTON NAVAL COMPLEX  
Account Number: 490-439  
Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)  
Tele Number: 770.604.9182 Contact: MARK HITCHCOCK

Generator Signature:  
*[Signature]* CH2M-JONES

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE Truck # 21  
Date: 5-16-02 Driver Signature: *[Signature]*

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130  
Description of Waste: SOIL/CONTAMINATED SOIL  
Ticket Number: 98 5710 Tonnage: 17.88  
Received by: KA Date: 5/16/02



843 740-2785

FAX #

OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29427  
Tel 843-563-2607 Fax 843-563-3375

SWMU 38 - 50.0

5-16-02

LOAD # 11

Time: 1500

SPECIAL WASTE MANIFEST  
APPROVAL # OR0205009  
EXPIRATION 8/1/02

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address : 115 PERIMETER CTR PL ATLANTA GA (99)

Tele Number: 770.604.9182

Contact: MARK HITCHCOCK

Generator Signature:

\*\*\*\*\* TO BE COMPLETED BY TRANSPORTER \*\*\*\*\*

Transporter of Waste: BUTLERWARE

Truck # 19

Date: 5-16-02

Driver Signature:

\*\*\*\*\* TO BE COMPLETED BY OAKRIDGE LANDFILL \*\*\*\*\*

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: 985716

Tonnage: 11.13

Received by:

Date: 5/16/02

Post-It® Fax Note	7871	Date	5-22-02	# of pages	2
To	Bryan Jones		From		
Co./Dept.			By	Butler Ware Tak	
Phone #			Phone #		
Fax #	843 740-2785		Fax #		