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INTERIM MEASURE WORK PLAN SOIL REMOVAL SOLID WASTE MANAGEMENT UNIT 38 (SWMU 38) ZONE A WITH TRANSMITTAL CNC CHARLESTON SC
3/11/2002
CH2M HILL

INTERIM MEASURE WORK PLAN

Soil Removal
SWMU 38, Zone A

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

March 2002

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

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CH2MHILL

March 11, 2002

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

Re: Interim Measure Work Plan (Revision 0) – SWMU 38, Zone A

Dear Mr. Scaturo:

Enclosed please find four copies of the Interim Measure Work Plan (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

Certification Page for Interim Measure Work Plan (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

P.E. No. 21428

Dean Williamson, P.E.

3/6/2002

Date

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Acronyms and Abbreviations

BRAC	Base Realignment and Closure Act
CA	corrective action
CFR	*Code of Federal Regulations*
CMS	Corrective Measures Study
CNC	Charleston Naval Complex
COC	chemical of concern
CSAP	Comprehensive Sampling and Analysis Plan
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethene
DDT	Dichlorodiphenyltrichloroethane
DET	Environmental Detachment Charleston
DMP	Data Management Plan
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
ft bls	feet below land surface
IDW	investigation-derived waste
ILCR	Incremental Lifetime Cancer Risk
IM	interim measure
LUC	land use control
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
NAVBASE	Naval Base
QAP	Quality Assurance Plan
PCB	polychlorinated biphenyl
PPE	personal protective equipment
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act

Acronyms and Abbreviations, Continued

RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SSL	soil screening level
SWMU	Solid Waste Management Unit
TCLP	toxicity characteristic leachate procedure
TSCA	Toxic Substances Control Act

Section 1.0

1.0 Introduction

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

CNC Corrective Action (CA) activities are being conducted under the Resource Conservation and Recovery Act (RCRA); the South Carolina Department of Health and Environmental Control (SCDHEC) is the lead agency for CA activities at the site. 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 CNC. This submittal has been prepared by CH2M-Jones to document the basis for an Interim Measure (IM) Work Plan at Solid Waste Management Unit (SWMU) 38 in Zone A of the CNC.

1.1 Purpose of the Interim Measure

This IM Work Plan presents a technical approach to remove surface soils containing polychlorinated biphenyls (PCBs), which are identified along the fence between the CNC and the Hess Oil property. Removal of the surface soils exceeding the remediation goal of 1 mg/kg for PCBs (as presented in Title 40 *Code of Federal Regulations* [CFR] Part 761.61 [40 CFR 761.61], *PCB Remediation Waste* [2000]) should enable site closeout without requiring land use controls (LUCs). This soil excavation will be performed, documented, and reported in a manner consistent with the investigative and CA goals and requirements of the existing RCRA permit for the facility.

1.2 Site Background and Setting

SWMU 38 is used for the storage of a variety of materials including paints, paint thinners, acids, 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 regarding the site, it has been used as a storage yard, associated with Buildings 1605 and 1604, for approximately 50 years. The site was more recently used for storage of empty drums.

PCBs were detected in one surface soil sample collected at SWMU 38 above 1 mg/kg. Subsequently, additional surface soil samples that were collected indicated that the extent of surface soil that contained concentrations of PCBs above 1 mg/kg was greater than originally expected.

This IM will remove surface soil that contains PCBs at concentrations above 1 milligram per kilogram (mg/kg). The remediation of the PCB-impacted surface soil is not necessarily expected to be the final remedy for surface soil at SWMU 38. However, if additional remedial measures are necessary, the activities conducted as part of this IM will be compatible with the final remedy that is selected for SWMU 38. This final remedy selection will be conducted according to the RCRA Corrective Measures Study (CMS) process.

1.3 Organization of the Interim Measure Work Plan

This IM Work Plan consists of the following sections, including this introductory section:

1.0 Introduction — Presents the purpose of the IM Work Plan and background information regarding the site.

2.0 Summary of Previous Investigations — Provides a brief description of previous investigations conducted at SWMU 38.

3.0 Review of Site Data — Provides a brief description of the analytical results for the PCB and pesticides at SWMU 38.

4.0 Technical Approach — Provides a brief description of the technical approach for completing the soil removal and soil disposal.

5.0 Investigation-Derived Waste — Describes the procedures to be implemented for management of the investigation-derived wastes (IDW).

6.0 References — Lists the references used in this document.

Appendix A contains the analytical data summaries for the additional sampling conducted at the site.

Appendix B contains the data validation reports for the additional sampling conducted at the site.

Section 2.0

2.0 Summary of Previous Investigations

The *Zone A RFI Report, Revision 0* (EnSafe Inc. [EnSafe], 1998) concluded that surface soil COCs at SWMU 38 included several metals, a PCB (Aroclor-1260), and chlorinated pesticides (DDD, DDE, and DDT). No COCs were identified for subsurface soil at SWMU 38. Metals and chlorinated pesticides were identified as COCs in groundwater in the *Zone A RFI Report, Revision 0.*

In 1998, an IM was conducted by the Environmental Detachment Charleston (DET) at SWMU 38. It was intended to remove pesticide-contaminated soil from the site. The target removal of this IM was soil containing DDT and DDE concentrations above 6.5 mg/kg, and soil with DDD concentrations greater than 9.2 mg/kg. A subsequent IM will conducted by CH2M-Jones using chemical oxidation (Fenton's reagent) for remediation of pesticides in groundwater at the site (see *Interim Measure Work Plan, In-Situ Oxidation of DDD in Groundwater, SWMU 38, Zone A, Revision 0* [CH2M-Jones, 2001b]).

CH2M-Jones re-evaluated the site data (see *Corrective Measures Study Work Plan, Rationale for No Further Action, SWMU 38, Zone A, Revision 0* [CH2M-Jones, 2001a]) and concluded that the presence of Aroclor-1260 above the remediation goal of 1 mg/kg at a single sampling location (A038SB012, 1.3 mg/kg) was not a significant contribution to the overall site risk (Incremental Lifetime Cancer Risk [ILCR] < 5E-6). Three other sample locations (A038SB006, A038SB011, and A038SB013) were located within a radius of 45 feet from A038SB012. PCBs were either not detected, or detected at concentrations below 1 mg/kg, indicating a limited area of impacted soil. Based on this information, PCBs were not considered COCs at SWMU 38. SCDHEC expressed concern that the extent of PCB contamination had not been adequately addressed in the area of soil boring A038SB012. CH2M-Jones agreed to collect additional samples in the area of that soil boring.

CH2M-Jones conducted additional field activities to further evaluate the extent of PCBs in surface soil at SWMU 38. Six additional surface soil samples were collected and analyzed for PCBs to the east and south of soil boring A038SB012. The analytical results from these samples are discussed in Section 3.0 of this IM Work Plan.

Section 3.0

3.0 Review of Site Data

This section provides a brief description of the PCB and pesticide analytical results for SWMU 38. Figure 3-1 illustrates the locations of the soil samples used in this IM Work Plan. One sample (038SB02301) was also analyzed for pesticides; the results from this sample are also discussed herein. A summary of the detected compounds from the delineation samples is presented in Table 3-1.

3.1 PCBs

Aroclor-1260 was detected in six of 14 surface soil samples that were collected during the RFI at SWMU 38 and analyzed for PCBs. No other PCBs were detected in the RFI samples, and PCBs were not detected in any subsurface soil sample. Of the six PCB detections, one surface soil sample (038SB01201, 1.3 mg/kg) had a reported concentration of Aroclor-1260 above the remediation goal for high occupancy areas of 1 mg/kg, as presented in Title 40 CFR Part 761.61 (40 CFR 761.61), *PCB Remediation Waste* (2000). A summary of the surface soil PCB analytical results is presented in Table 3-2. This table includes samples collected during the RFI that were used to define the extent of PCBs in surface soil.

Six surface soil samples (A038SB015, A038SB016, and A038SB023 through A038SB026) were collected by CH2M-Jones to delineate PCBs in surface soil near A038SB012. Aroclor-1260 was detected in four samples, and Aroclor-1254 was detected in five samples. PCBs were not detected in the sample collected at soil boring A038SB016. Three surface soil samples contained PCBs at concentrations that exceed the remediation goal of 1 mg/kg. The analytical data from this collection are presented in Appendix A. The data validation reports for the samples collected are presented in Appendix B.

The samples with reported PCB concentrations above 1 mg/kg are all continuous and located within approximately 20 ft of the fence line that separates the CNC from the Hess Oil property. Soil samples to the west, east, and south of the area impacted by PCBs contain PCBs at concentrations below 1 mg/kg. Based on the analytical results, the area containing PCBs above the remediation goal has been adequately delineated.

3.2 Pesticides

Four pesticides (γ-chlordane, heptachlor epoxide, DDE, and DDT) were detected in sample 038SB02301. Of these, only heptachlor epoxide (0.074 J mg/kg) was detected above its risk-based concentration (RBC) of 0.07 mg/kg. The detected concentration is estimated, as indicated by the "J" qualifier, and only marginally exceeds the RBC. A summary of detected compounds is presented in Table 3-1. Values in bold and outlined within the table indicate exceedances of the screening criteria. The analytical data from this collection are presented in Appendix A. The data validation report for the sample collected is presented in Appendix B.

The location of this sample will be removed as part of the IM excavation. To ensure that the area containing heptachlor epoxide above its RBC is included in the excavation, the locations used to define the horizontal extent of PCBs (A038SB024, A038SB025, and A038SB026) will be re-sampled and analyzed for pesticides prior to commencement of excavation activities. The three samples proposed to delineate the vertical extent of PCBs will also be analyzed for pesticides. Heptachlor epoxide was not detected in samples 038SB00601, 038SB01101, 038SB01201, or 038SB01301, some of which were used to define the western and southern limits of the PCB-impacted soil excavation area.

In the event that the analytical results indicate that pesticides require further delineation, additional samples will be considered and an addendum to this IM Work Plan will submitted if necessary.

3.3 Summary

PCBs were detected in surface soil at concentrations that exceed the remediation goal for high occupancy areas of 1 mg/kg. Because of the detection of elevated PCB concentrations in surface soil at SWMU 38, CH2M-Jones is proposing a focused soil excavation IM to remove the PCB-impacted surface soil.

Subsurface soil samples, collected as part of the SWMU 38 investigation, did not indicate that PCBs are present in subsurface soil. Based on this information, subsurface soil does not require remediation at SWMU 38.

The pesticide heptachlor epoxide was detected above its RBC in a sample collected within the interior of the proposed excavation. Additional samples will be collected and analyzed for pesticides to verify that the excavation will include pesticide-impacted soil above applicable screening criteria.

TABLE 3-1
Summary of Detected Compounds in Delineation/Confirmation Samples
Interim Measure Work Plan, SWMU 38, Zone A, Charleston Naval Complex

Parameter	Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	RBC (mg/kg)	Preliminary Remediation Goal (mg/kg)
			PCBs				
Aroclor-1254	A038SB015	038SB01501	27-Sep-01	**2.4**	J	0.32	1
	A038SB023	038SB02301	30-Nov-01	**6.8**	=		
	A038SB024	038SB02401	15-Jan-02	**1.41**	J		
	A038SB025	038SB02501		0.0492	J		
	A038SB026	038SB02601		0.0642	J		
Aroclor-1260	A038SB015	038SB01501	27-Sep-01	0.84	J	0.32	1
	A038SB024	038SB02401	15-Jan-02	0.84	J		
	A038SB025	038SB02501		0.031	J		
	A038SB026	038SB02601		0.0537	J		
			Pesticides				
Gamma-chlordane	A038SB023	038SB02301	30-Nov-01	0.016	J	1.8	NA
Heptachlor Epoxide				**0.074**	J	0.07	NA
p,p'-DDE				0.13	J	1.9	NA
p,p'-DDT				0.5	J	1.9	NA

Values in bold and outlined within the table indicate exceedances of the risk-based concentration (RBC) and remediation goal (Title 40 CFR Part 761.61, *PCB Remediation Waste* [2000]), where applicable.

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

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

mg/kg Milligrams per kilogram

NA Not applicable

TABLE 3-2
Summary of Concentrations of Aroclor-1254 and Aroclor-1260 in Surface Soil
Interim Measure Work Plan, SWMU 38, Zone A, Charleston Naval Complex

Station ID	Sample ID	Aroclor-1254 (µg/kg)	Qualifier	Aroclor-1260 (µg/kg)	Qualifier
A038SB003	038SB00301	16	U	16	U
A038SB005	038SB00501	16	U	16	U
A038SB005	038SB00502	25	U	25	U
A038SB006	038SB00601	16	U	500	=
A038SB006	038SB00602	14	U	14	U
A038SB011	038SB01101	14	U	720	=
A038SB012	038SB01201	15	U	**1,300**	=
A038SB013	038SB01301	17	U	18	=
A038SB015	038SB01501	**2,400**	J	840	J
A038SB016	038SB01601	81	U	81	U
A038SB023	038SB02301	**6,800**	=	750	U
A038SB024	038SB02401	**1,410**	J	840	J
A038SB025	038SB02501	49.2	J	31	J
A038SB026	038SB02601	64.2	J	53.7	J

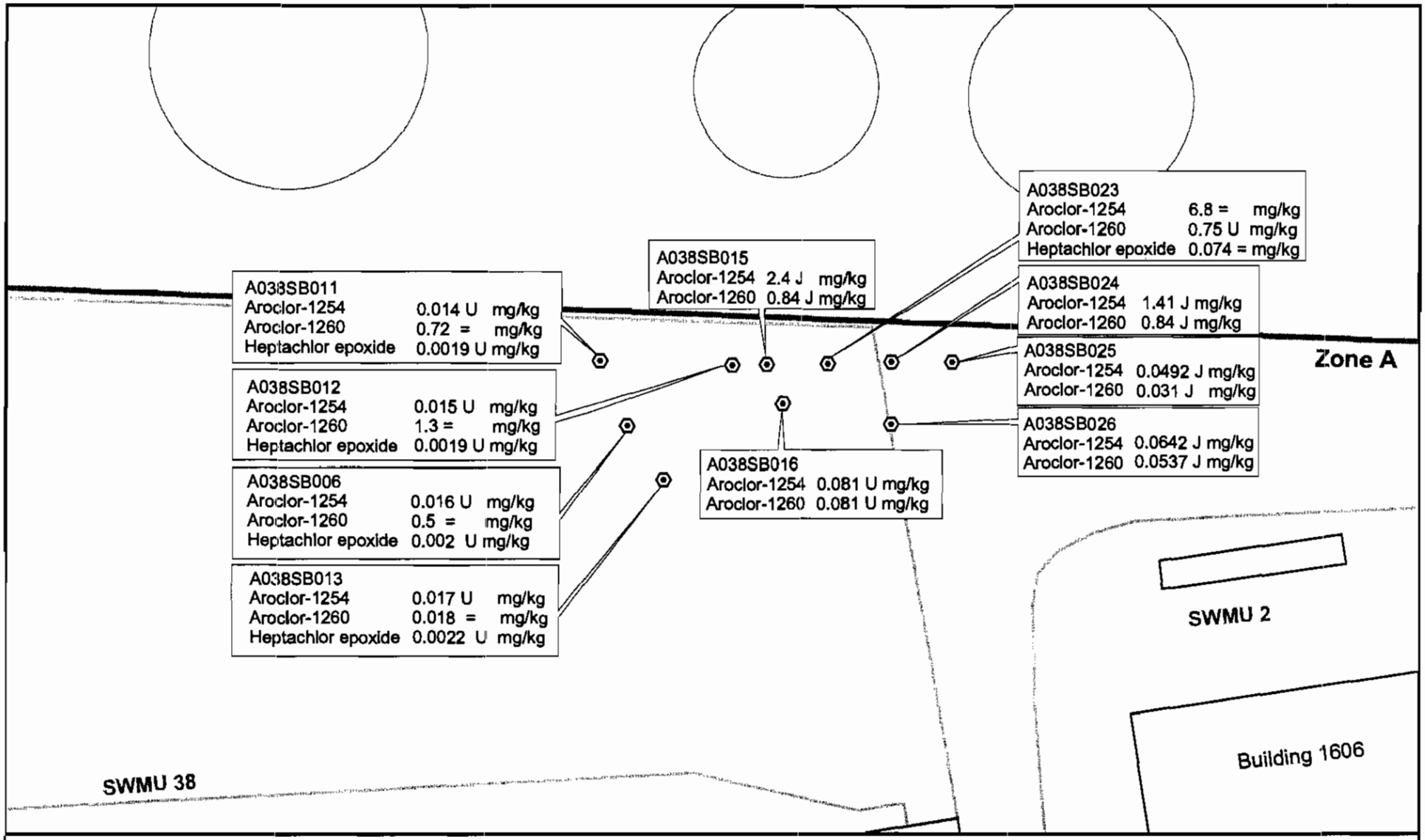
Values that are bold and outlined within the table exceeded the remediation goal as presented in Title 40 CFR Part 761.61 (40 CFR 761.61), *PCB Remediation Waste* (2000) of 1 mg/kg.

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

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

µg/kg Micrograms per kilogram

U Analyte was detected; the reported value is the detection limit.



Surface Soil Delineation / Confirmation Locations
SWMU Boundary
Buildings
Zone Boundary
Surrounding Area

N

0 40 80 Feet

Figure 3-1
Delineation Sample Locations
SWMU 38, Zone A
Charleston Naval Complex

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File Path: C:\18gis\Projects\Zone_A\swmu_38\aprs\swmu_38.apr, Date: 04 Mar 2002 13:13, User: AHOLECEK, Figure 3-1 - Figure 3-1 Delineation Sample Locations

Section 4.0

4.0 Technical Approach

This section outlines the technical approach for the removal of PCB-impacted surface soil above the target cleanup level of 1 mg/kg. The overall strategy for the work will be to excavate, transport, and dispose of, off site, the PCB-impacted surface soil. The anticipated excavation area is illustrated on Figure 4-1.

4.1 Cleanup Criteria

As described in Section 3.0 of this IM Work Plan, the PCB target cleanup level is the remediation goal for high occupancy areas of 1 mg/kg, as presented in Title 40 CFR Part 761.61 (40 CFR 761.61), *PCB Remediation Waste* (2000).

4.2 Delineation/Confirmation Samples

Samples from nine soil borings (A038SB006, A038SB011, A038SB012, A038SB015, A038SB016, A038SB023, A038SB024, A038SB025, and A038SB026) have been used to determine the areal extent of the excavation at SWMU 38. Because these samples have been, or will be, collected from the boundary of the excavation, the delineation samples will also serve as confirmation samples. The excavation will be backfilled immediately following removal of the contaminated soil.

Prior to commencement of removal activities, underground utilities will be located and three confirmatory soil samples will be collected (at a depth interval of 1 to 2 feet below land surface [ft bls]) to verify the vertical extent of PCB-impacted soil, and to verify the absence of heptachlor epoxide. Therefore, these samples will be analyzed for PCBs and pesticides. The lower interval samples will be collected at the locations of soil borings A038SB015, A038SB023, and A038SB024. Surface soil samples will also be collected at previously sampled delineation borings A038SB025 and A038SB026 to ensure that the pesticide heptachlor epoxide is not detected above its RBC (0.07 mg/kg) at the excavation boundary.

4.3 Soil Removal

Figure 4-1 presents the approximate areal extent of PCB-impacted surface soil above 1 mg/kg. The proposed excavation boundary is based on analytical results from samples

collected during the Zone A RFI and recent PCB delineation sampling. The proposed excavation area measures approximately 30 by 130 ft.

The removal of surface soil will be accomplished with a backhoe or similar equipment to an expected depth of approximately 1 ft bls. In the event that the three confirmatory soil samples exhibit PCB concentrations above 1 mg/kg, a site-specific soil screening level (SSL) will be calculated to determine if additional soil will need to be excavated. This information will be submitted in an addendum to this IM Work Plan.

Excavated soils will be transferred immediately to a covered disposal container (e.g., a roll-off box or similar container) and subsequently transported off site for disposal.

4.4 Waste Characterization Sample Collection

In addition to the collection of the delineation/confirmation samples collected prior to the excavation, waste characterization samples will be collected from the disposal containers. These samples will be analyzed for toxicity characteristic leachate procedure (TCLP) criteria for pesticides. The analytical results will be used to determine the appropriate disposal of the soil.

Unless the disposal facility requires analysis, waste characterization samples will not be collected for PCBs. Current data indicate that PCBs are present at concentrations below those that require disposal at a RCRA- or Toxic Substances Control Act (TSCA)-approved facility. Therefore, the excavated soil is suitable for disposal at a Subtitle D landfill with respect to PCBs. The transported waste will be covered with a tarp to minimize airborne transfer of soil particulates.

4.5 Soil Sample Analysis

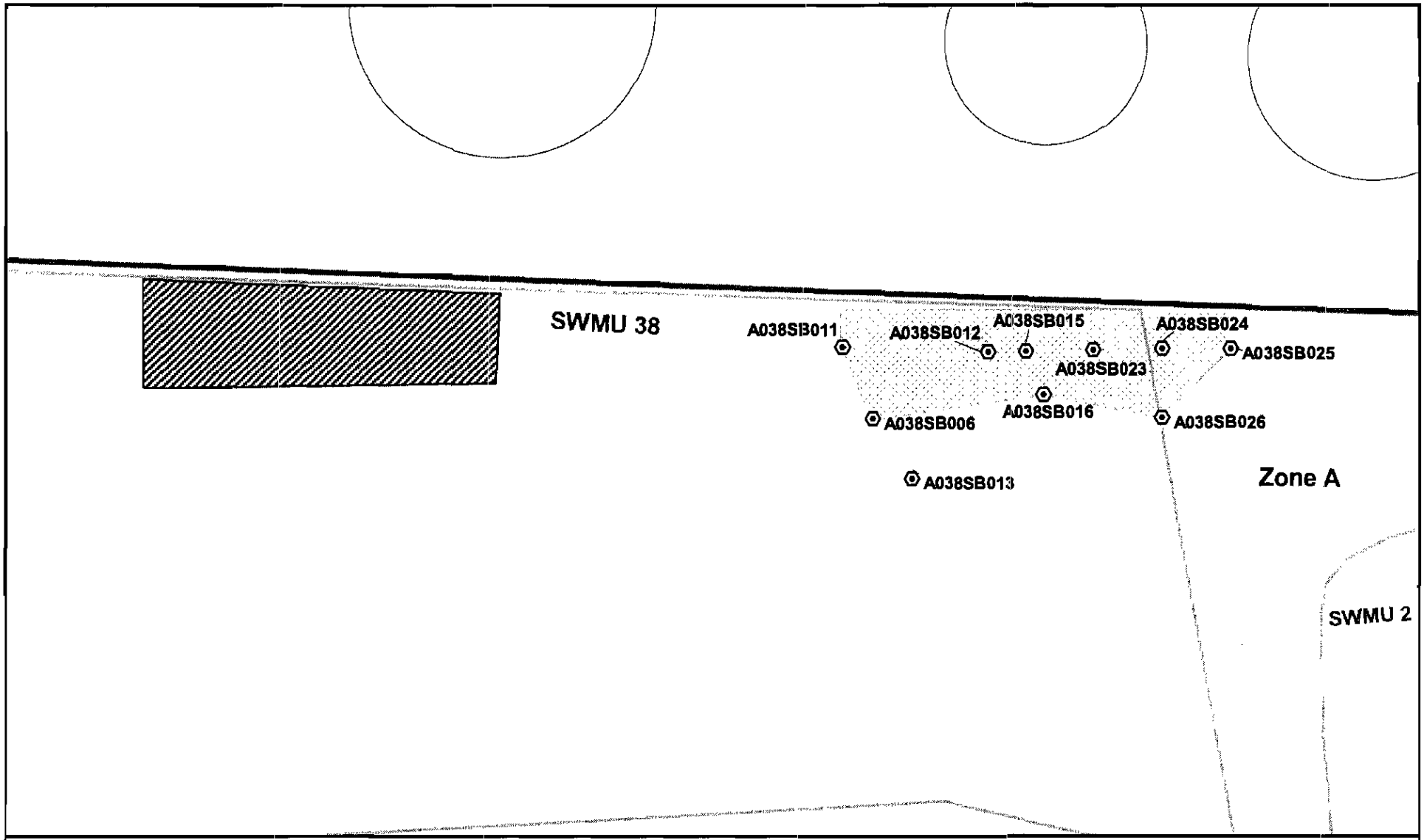
Soil samples will be delivered or sent via overnight carrier to an offsite laboratory, where they will be analyzed for PCBs by U.S. Environmental Protection Agency (EPA) Method SW846-8082. Pesticides will be analyzed using EPA Method SW-846-8080. The soil analysis will follow the procedures provided in the approved Comprehensive Sampling and Analysis Plan (CSAP) portion of the *Final Comprehensive RFI Work Plan* (EnSafe/Allen & Hoshall, 1994). The CSAP outlines all monitoring procedures to be performed during the investigation to characterize the environmental setting, source, and releases of hazardous constituents. In addition, the CSAP includes the Quality Assurance Plan (QAP) and Data Management Plan (DMP) to verify that all information and data are valid and properly documented. Sample analysis will be conducted in accordance with the guidance in EPA's

Test Methods for Evaluating Solid Waste, SW-846, 3rd Ed., Office of Solid Waste and Emergency Response (SW846) (1997), and in the EPA Environmental Services Division *Laboratory Operations and Quality Control Manual* (ESDLOQCM) (1996).

The results of the IM will be summarized in an IM Completion Report. The IM Completion Report will document the field activities and provide the analytical results from the confirmation samples collected at the site.

4.6 Site Restoration

Following the removal of contaminated soil at SWMU 38, the excavation will be backfilled with clean fill and graded to match pre-excavation grade. Any removed asphalt or concrete will be replaced.



Surface Soil Delineation / Confirmation Locations
Proposed Excavation Boundary
DET's IM Excavation (1998)
Zone Boundary
SWMU Boundary
Surrounding Area

N

0 30 60 Feet

Figure 4-1
Proposed Excavation Area
SWMU 38, Zone A
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_A\swmu_38\aprs\swmu_38.apr, Date: 04 Mar 2002 15:11, User: AHOLECEK, Figure 4-1 - Figure 4-1 Proposed Excavation Area

Section 5.0

5.0 Investigation-Derived Waste

Three waste streams will be generated as part of this IM: excavated soils, decontamination wastes, and personal protective equipment (PPE). Hazardous wastes are not expected to be generated as a result of this IM. Excavated soils will be disposed of in accordance with all applicable regulations and permits. Non-hazardous soil will be sent to a subtitle D landfill. Decontamination wastes and PPE also will be disposed of in accordance with regulations.

Offsite transportation and disposal will be performed by properly permitted and licensed subcontractors. Materials designated for offsite disposal will be documented, tracked, and their disposition verified. This information will be reported in the IM Completion Report.

Section 6.0

6.0 References

40 CFR 761.61. Title 40 Code of Federal Regulations Part 761.61, *PCB Remediation Waste*. July 1, 2000.

40 CFR 268 Subpart D. Title 40 Code of Federal Regulations Part 268.48, *Universal Treatment Standards*. February 25, 2002.

CH2M-Jones, *Corrective Measures Work Plan, Rationale for No Further Action, Solid Waste Management Unit 38, Zone A, Charleston Naval Complex, Charleston, SC*. February 2001a.

CH2M-Jones, *Interim Measure Work Plan, In-Situ Chemical Oxidation of DDD in Groundwater, SWMU 38, Zone A, Charleston Naval Complex, Charleston, SC*. December 2001b.

EnSafe Inc./Allen & Hoshall. *Final Comprehensive RFI Work Plan*. May 31, 1994.

EnSafe Inc. *Zone A RCRA Facility Investigation Report, NAVBASE Charleston, North Charleston, South Carolina*. Revision 0. August 7, 1998.

U.S. Environmental Protection Agency. *Test Methods for Evaluating Solid Waste*. Office of Solid Waste and Emergency Response. EPA-SW-846, 3rd Revision. 1997.

U.S. Environmental Protection Agency. *Laboratory Operating Procedures and Quality Assurance Manual* (ESDSOPQAM). Environmental Services Division. 1996.

Appendix A

	StationID	A038SB015		A038SB016		A038SB016		A038SB023	
	SampleID	038SB01501 (0-1ft)		038CB01601 (0-1ft)		038SB01601 (0-1ft)		038SB02301 (0-1ft)	
	DateCollected	9/27/2001 13:50		9/27/2001 0:00		9/27/2001 13:55		11/30/2001 0:00	
	DateAnalyzed	10/03/2001		10/03/2001		10/03/2001		12/10/2001	
	SDGNumber	CNC33		CNC33		CNC33		CNC56	
Parameter	**Units**								
PCB-1016 (Arochlor 1016)	ug/kg	400	U	40	U	40	U	370	U
PCB-1221 (Arochlor 1221)	ug/kg	400	U	40	U	40	U	370	U
PCB-1232 (Arochlor 1232)	ug/kg	400	U	40	U	40	U	370	U
PCB-1242 (Arochlor 1242)	ug/kg	400	U	40	U	40	U	370	U
PCB-1248 (Arochlor 1248)	ug/kg	400	U	40	U	40	U	370	U
PCB-1254 (Arochlor 1254)	ug/kg	2400	J	82	U	81	U	6800	=
PCB-1260 (Arochlor 1260)	ug/kg	840	J	82	U	81	U	750	U

	StationID	A038SB023	
	SampleID	038SB02301 (0-1ft)	
	DateCollected	11/30/2001 0:00	
	DateAnalyzed	12/10/2001	
	SDGNumber	CNC56	
Parameter	**Units**		
Aldrin	ug/kg	15	UJ
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/kg	15	UJ
Alpha-chlordane	ug/kg	15	UJ
Beta BHC (Beta Hexachlorocyclohexane)	ug/kg	15	U
Chlordane	ug/kg	150	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/kg	15	UJ
Dieldrin	ug/kg	28	U
Endosulfan I	ug/kg	15	U
Endosulfan II	ug/kg	28	U
Endosulfan Sulfate	ug/kg	28	U
Endrin Aldehyde	ug/kg	28	U
Endrin Ketone	ug/kg	28	U
Endrin	ug/kg	28	U
Gamma BHC (Lindane)	ug/kg	15	UJ
Gamma-chlordane	ug/kg	16	J
Heptachlor Epoxide	ug/kg	74	J
Heptachlor	ug/kg	15	UJ
Methoxychlor	ug/kg	150	U
p,p'-DDD	ug/kg	28	U
p,p'-DDE	ug/kg	130	J
p,p'-DDT	ug/kg	500	J
Toxaphene	ug/kg	930	U

Appendix B

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: March 7, 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 between the dates of November 30, 2001, and January 15, 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).

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for SW-846 8082 Polychlorinated Biphenyls (PCBs).

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.

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

Site	Station ID	Sample ID	Date Collected	Matrix	Lab Sample ID	Sample Type	Upper Depth	Lower Depth	Pest SW8081	PCBs SW8082
CNC56	A038SB023	038SB02301	11/30/01	SO	S117781*1	N	0	1	X	
CNC56	A038SB023	038SB02301	11/30/01	SO	S117781A*1	N	0	1		X
CNC56	FIELDQC	038EB023L1	11/30/01	WQ	S117781*2	EB			X	
CNC56	FIELDQC	038EB023L1	11/30/01	WQ	S117781A*2	EB				X
54582	A038SB024	038SB02401	01/15/02	SO	54582001	N	0	1		X
54582	A038SB025	038SB02501	01/15/02	SO	54582002	N	0	1		X
54582	A038SB026	038SB02601	01/15/02	SO	54582003	N	0	1		X
54583	FIELDQC	038EB024M1	01/15/02	WQ	54583001	EB				X

MATRIX CODE

SO - Soil
WQ - Water QC Samples

SAMPLE TYPE CODE

EB - Equipment Blank
N - Native Sample

ANALYSIS CODE

Pest - Pesticides
PCBs - Polychlorinated Biphenyls

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:

Blanks

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

TABLE 2
Equipment Blank Contamination: Pesticides
Charleston Naval Complex, Zone A, SWMU38, Charleston, SC

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CNC56	1209P-MMB	1209P-MMB	MB	Gamma-BHC	0.057	µg/Kg	<0.29 µg/Kg

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.

No results were qualified due to blank contamination. Sample concentrations were greater than the flagging concentration.

Laboratory Control Sample and Laboratory Control Sample Duplicate Recoveries

All Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries were within acceptable quality control limits, except for the recovery of delta-BHC in LCS 12055-MMB. The recovery was 140 percent, just above the upper control limit of 137 percent. No flags were applied since this recovery only pertained to sample CNC56-#2, an equipment blank.

Calibrations

All initial and continuing calibration criteria were met except as noted in Table 3 below. In addition, the second column confirmation percent difference (%D) for some detected parameters, exceeded the 40 %D criteria in selected samples. Those results were flagged "J", as estimated.

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.

Surrogate Recoveries

All surrogate recoveries were within acceptable quality control limits, except as noted in Table 4.

TABLE 4
Surrogate Recoveries Out of QC Limits: PCBs
Charleston Naval Complex, Zone A, SWMU 38, Charleston, SC

[illegible]	Sample	Parameter	Recovery	Recovery Limits	Associated Samples	Flag
CNC56	#2 / 038EB023L1	Decachlorobiphenyl	40*	60-150	#2 / 038EB023L1	No Flags Applied (Field QC)
* - out of control limits						

Calibrations

All initial and continuing calibration criteria were met except as noted in Table 5 below.

TABLE 5
Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: PCBs
Charleston Naval Complex, Zone A, SWMU38, Charleston, SC

[illegible] Date	Analyte	[illegible]	[illegible]
SGIECD1 – CCAL, 12/10/01, 13:02	Arochlor 1016	20.4% high	CNC56 – 1,2
	Arochlor 1260	34.5% high	
SGIECD2 – CCAL, 10/03/01, 15:50	Arochlor 1016	62.1% high	CNC56 – 1,2
SGIECD1 – CCAL, 10/02/01, 23:36	Arochlor 1260	27.7% high	CNC56 – 1,2
SGIECD2 – CCAL, 10/03/01, 15:50	Arochlor 1016	17.0% low	CNC56 – 1,2

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
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	ALDRIN	15	U	15	UJ	ug/kg	CC
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	ALPHA BHC	15	U	15	UJ	ug/kg	CC
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	ALPHA-CHLORDANE	15	U	15	UJ	ug/kg	CC
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	DELTA BHC	15	U	15	UJ	ug/kg	CC
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	GAMMA BHC (LINDANE)	15	U	15	UJ	ug/kg	CC
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	GAMMA-CHLORDANE	16	=	16	J	ug/kg	2C
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	HEPTACHLOR	15	U	15	UJ	ug/kg	CC
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	HEPTACHLOR EPOXIDE	74	=	74	J	ug/kg	CC, 2C
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	p,p'-DDE	130	=	130	J	ug/kg	CC, 2C
CNC56	038SB02301	S117781*1	SO	PEST	SW8081	p,p'-DDT	500	=	500	J	ug/kg	2C