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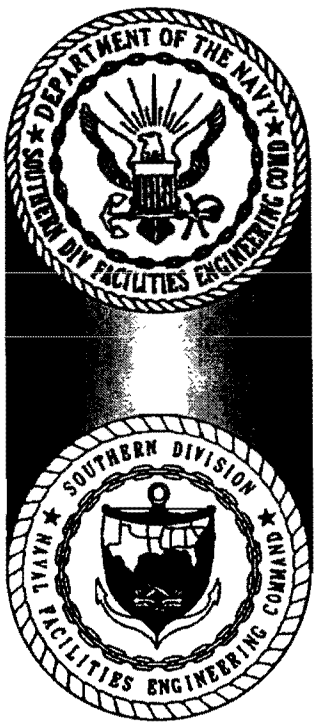
INTERIM MEASURE WORK PLAN DRMO STORAGE AND LEAD CONTAMINATION AREA SOLID WASTE MANAGEMENT UNIT 2 (SWMU 2) ZONE A WITH TRANSMITTAL CNC CHARLESTON SC

1/22/2002

CH2M HILL

INTERIM MEASURE COMPLETION REPORT

DRMO Storage and Lead Contamination Area SWMU 2, Zone A



Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

January 2002

Revision 0
Contract N62467-99-C-0960
158814.ZA.PR.02

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January 22, 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 Completion Report (Revision 0) – SWMU 2, DRMO Storage and Lead Contamination Area, Zone A

Dear Mr. Scaturo:

Enclosed please find four copies of the Interim Measure Completion Report (Revision 0) for SWMU 2, DRMO Storage and Lead Contamination Area in Zone A of the Charleston Naval Complex. 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

INTERIM MEASURE COMPLETION REPORT

DRMO Storage and Lead Contamination Area SWMU 2, Zone A

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
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Contract N62467-99-C-0960
158814.ZA.PR.02

Certification Page for Interim Measure Completion Report (Revision 0) – SWMU 2, DRMO Storage and Lead Contamination Area, Zone A

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.

1/14/2002

Date

Contents

Acronyms and Abbreviations

AOC	area of concern
BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure Act
CA	corrective action
CMS	corrective measures study
CNC	Charleston Naval Complex
COC	chemical of concern
DET	Environmental Detachment Charleston
EnSafe	Ensafe Inc.
EPA	U.S. Environmental Protection Agency
ft bls	feet below land surface
mg/kg	milligram per kilogram
NAVBASE	Naval Base
NFA	no further action
OWS	oil/water separator
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SPLP	synthetic precipitation leaching procedure
SSL	soil screening level
SWMU	solid waste management unit
TCLP	toxicity characteristic leachate procedure
WMI	Waste Management Inc.

Section 1.0

1.0 Introduction

1.1 Background

As part of the Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) activities, a RCRA Facility Investigation (RFI) report was finalized for Zone A (EnSafe Inc. [EnSafe], 1998). Zone A is the northern-most area of the Charleston Naval Complex (CNC). 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 in the northeast corner of Zone A, Solid Waste Management Unit (SWMU) 2 consists of salvage bin No. 3 and the adjacent paved ground surface at the Defense Reutilization Marketing Office (DRMO). The area was formerly used to store recovered lead from lead-acid submarine batteries from the mid-1960s until 1984. SWMU 1 is located completely within the SWMU 2 boundary, and the two sites have been investigated together.

In June 2001, a Corrective Measures Study (CMS) Work Plan (WP) was developed for SWMUs 1 and 2 (CH2M-Jones, 2001a). The CMS WP reviewed site data collected during several sampling events, as well as the results of an Interim Measure (IM) conducted by the Environmental Detachment Charleston (DET). Review of the historical data for these sites indicated that contaminants were not present in environmental media at SWMUs 1 and 2 at concentrations that pose excessive risk to future site residents. As a result, SWMUs 1 and 2 were recommended for No Further Action (NFA).

The South Carolina Department of Health and Environmental Control (SCDHEC) reviewed the CMS WP for SWMUs 1 and 2, and issued comments on September 28, 2001. SCDHEC granted conditional approval of the CMS WP. Approval was conditioned on the removal of a small area of surface soil in the immediate vicinity of soil boring A002SB020. Surface soil at this boring exhibited an elevated lead concentration of 3,870 milligrams per kilogram (mg/kg).

In October 2001, an IM WP was developed to remove lead-impacted surface soil in the vicinity of this soil boring (CH2M-Jones, 2001b). Soil samples were collected to delineate the areal extent of lead-impacted surface soil above the target cleanup level of 400 mg/kg. The analytical results of these samples indicated that the areal extent of lead-impacted soil above the target cleanup level was identified.

Removal of surface soil containing lead above the U.S. Environmental Protection Agency (EPA) cleanup level of 400 mg/kg should enable closeout of SWMUs 1 and 2 in a condition that is suitable for future unrestricted use (i.e., with no land-use controls). Accordingly, CH2M-Jones implemented the IM for the removal of lead-impacted soil at SWMU 2. The IM was completed on January 7, 2002. This IM Completion Report summarizes this IM.

1.2 Report Organization

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

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

2.0 Interim Measure Implementation — Summarizes the excavation activities at SWMU 2.

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

4.0 Recommendations — Provides recommendations for proceeding with site closure.

5.0 References — Lists the references used in this document.

Appendix A contains the analytical data from the delineation/confirmation and waste characterization samples collected at SWMU 2.

Appendix B contains the data validation summary for the IM analytical data.

Appendix C contains the waste manifests from Waste Management Inc. (WMI) for soil disposal.

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

Section 20

2.0 Interim Measure Implementation

2.1 Delineation/Confirmation Sampling

In accordance with the SWMU 2 IM WP, eight surface and ten subsurface soil samples were collected to determine the horizontal and vertical extent of soil containing lead above the media cleanup standard (MCS) of 400 mg/kg. Two additional surface soil samples (002SB04201 and 002SB04301) were collected to confirm the earlier lead results at RFI soil borings A002SB020 (3,870 mg/kg) and A002SB021 (584 mg/kg). A composite waste characterization sample was collected from three randomly chosen locations from within the expected excavation area. The waste characterization sample was submitted for toxicity characteristic leachate procedure (TCLP) analysis.

Three boring locations (A002SB048, A002SB049, and A002SB050) along the northern boundary of the expected excavation area had to be cored through a concrete slab in order to collect the samples at these locations. The edge of the concrete extended approximately 3 feet (ft) south of the cored locations. Figure 2-1 shows the locations of these borings.

Because the excavation was intended to include soil that exceeds the MCS, 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. Summaries of the analytical results from the delineation samples collected during the IM, and the TCLP data, are presented in Tables 2-1 and 2-2, respectively. Appendix A contains the complete data set for the IM samples; Appendix B contains the data validation report.

Analytical results from the locations (A002SB020 and A002SB021) that exhibited elevated lead concentrations during the RFI were found to contain lead at lower concentrations during the sampling conducted as part of CH2M-Jones' IM. Surface soil at A002SB020 and A002SB021 was re-sampled (boring IDs A002SB042 and A002SB043 respectively), and found to contain lead at concentrations of 1,370 mg/kg and 211 mg/kg respectively.

The reported lead concentrations from the delineation samples were below the cleanup levels established in the IM WP except for one surface soil sample (002SB04701). Analytical results for surface soil sample 002SB04701 were reported at 417 mg/kg. The location of this sample is approximately 9 ft from RFI soil boring A002SB020 and 6 ft from the boundary of the DET's IM excavation.

Based on the analytical results, the area requiring soil removal was adequately defined in the IM WP. The only modification to the excavation area is that soil boring A002SB047 was excavated. Additionally, no subsurface samples collected had a reported lead concentration above its cleanup level. The absence of subsurface concentrations of lead above its cleanup level indicated that excavation of soil below 3 feet below land surface (ft bls) was not necessary. The resulting excavation area measured approximately 36 ft long by 11 ft wide and 3 ft deep (1,188 cubic feet [ft^3] ~ 44 cubic yards [yd^3]).

Results from the waste characterization sample (TCLP, 002SB05401) indicated that the excavated soil was suitable for Subtitle D landfill disposal as the reported leachate concentrations of the eight RCRA metals were all reported at concentrations below their respective regulatory levels (40 *Code of Federal Regulations* [CFR] 261).

2.2 Excavation Activities

On January 3, 2002, equipment and personnel were mobilized to SWMU 2 to begin preparing the site for removal activities in accordance with the SWMU 2 IM WP. All work was performed in general accordance with the WP.

Delineation sample results indicated that the lead concentration (417 mg/kg) in surface soil at soil boring A002SB047 exceeded the target cleanup level of 400 mg/kg. The eastern boundary of the excavation was extended approximately 6 ft to remove the lead-impacted surface soil at this location. As a result, the eastern boundary of the SWMU 2 excavation coincides approximately with the boundary of the IM conducted by the DET in 1999.The proposed excavation (CH2M-Jones, 2001b) and the approximate final excavation boundary are presented on Figure 2-1.

The concrete slab that was encountered during the delineation sampling was saw-cut along the excavation boundary and removed. The removed concrete was disposed of along with the excavated soil. A variety of metal debris was encountered in the 1 to 2 ft bls interval. The metal debris was also disposed of along with the excavated soil. The metal debris was encountered near the center of the excavation, which is also near soil boring A002SB020.

The soil, concrete, and debris were disposed of by WMI at the Oakridge Landfill, 2183 Highway 78, PO Box 145, Dorchester, SC 29437. Waste manifests and load tickets are included in Appendix C. The waste manifests (see Appendix C) from Waste Management Inc. (WMI) indicate that a total of 102.08 tons of soil and debris were excavated from the site and disposed of off site.

TABLE 2-1
Delineation/Confirmation Sample Results for Lead
IM Completion Report, SWMU 2, Zone A, Charleston Naval Complex

Interval	Location ID	Sample ID	Collection Date	Concentration (mg/kg)
Surface	A002SB042	002SB04201	12/10/2001	**1,370**
	A002SB043	002SB04301	12/10/2001	211
	A002SB044	002SB04401	11/07/2001	258
	A002SB045	002SB04501	11/07/2001	188
	A002SB046	002SB04601	11/07/2001	62.4
	A002SB047	002SB04701	11/07/2001	**417**
	A002SB048	002SB04801	11/07/2001	4.51
	A002SB049	002SB04901	11/07/2001	13.3
	A002SB050	002SB05001	11/07/2001	5.91
	A002SB051	002SB05101	11/07/2001	50.9
Subsurface	A002SB042	002SB04202	12/10/2001	28.6
	A002SB043	002SB04302	12/10/2001	12.1
	A002SB044	002SB04402	11/07/2001	7.66
	A002SB045	002SB04502	11/07/2001	3.15
	A002SB046	002SB04602	11/07/2001	12.7
	A002SB047	002SB04702	11/07/2001	4.06
	A002SB048	002SB04802	11/07/2001	9.09
	A002SB049	002SB04902	11/07/2001	10.1
	A002SB050	002SB05002	11/07/2001	10.8
	A002SB051	002SB05102	11/07/2001	6.97

mg/kg Milligrams per kilogram

TABLE 2-2
TCLP Results
IM Completion Report, SWMU 2, Zone A, Charleston Naval Complex

Location ID	Sample ID	Collection Date	Parameter	Concentration (µg/L)	Maximum Concentration*
Composite	002SB05401	12/10/2001	Arsenic	ND	5,000
			Barium	556 J	100,000
			Cadmium	40.5 J	1,000
			Chromium	10.9 J	5,000
			Lead	1540	5,000
			Mercury	ND	200
			Selenium	ND	1,000
			Silver	ND	5,000

* Maximum concentration of contaminants for the Toxicity Characteristic (40 CFR 261, µg/L).

µg/L Micrograms per liter

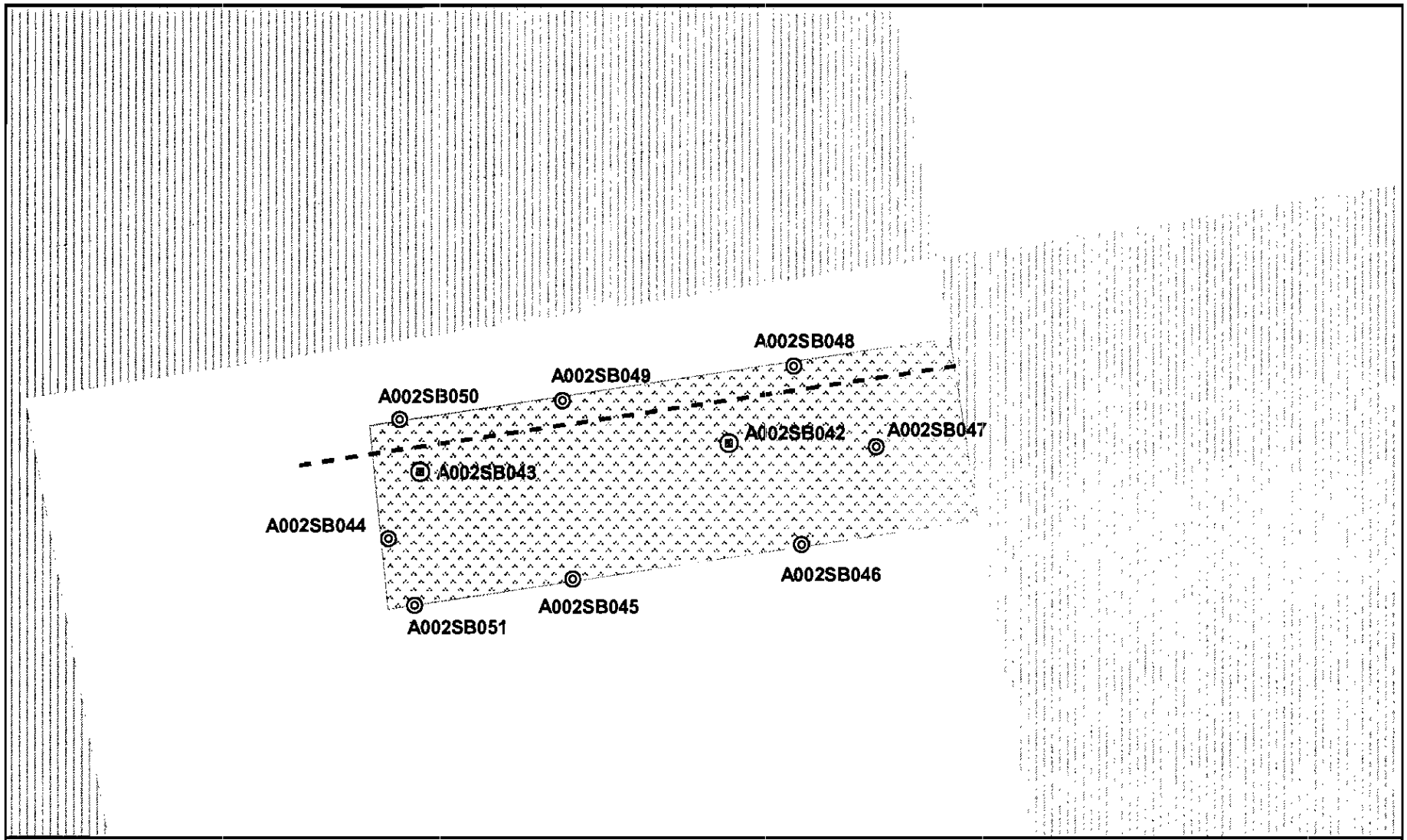

Figure 2-1
IM Excavation Area
SWMU 2, Zone A
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_A\Swmu_2\Aprs\swmu_2.apr, Date: 08 Jan 2002 11:26, User: ASWINFOR, Updated Excavation Boundary - Figure 2-1 IM Excavation Area

Section 10

3.0 Interim Measure Outcome

Prior to excavation, a total of ten confirmation samples were collected at a depth of 3 ft bls and submitted for lead analysis. The depth was chosen to coincide with the floor of the excavation. These samples adequately defined the vertical extent of soil containing lead above the target cleanup level of 400 mg/kg. Additionally, eight surface soil samples were collected to determine the horizontal extent of soil containing lead above the target cleanup level. One sample (002SB04701, 417 mg/kg) exhibited a lead concentration above the cleanup level and was removed during the excavation. The locations of the confirmation samples are presented on Figure 2-1. A summary of the analytical results is presented in Table 2-1; the complete data are provided in Appendix A.

Based on these data, remaining soil meets the cleanup criteria for lead (400 mg/kg). Lead concentrations in residual samples ranged from 3.5 mg/kg (in sample 002SB04502) to 258 mg/kg (in sample 002SB04401).

These data indicate that lead-impacted soil at SWMU 2 has been adequately remediated and no further investigative or remedial actions are warranted at SWMU 2.

Following the removal of lead-impacted soil, the excavation was backfilled with fill obtained from the Butler Ware Trucking Co. The backfill was compacted and graded to match the existing grade.

Section 4.0

4.0 Recommendations

The CMS WP (Revision 0) for SWMUs 1 and 2 was submitted on June 13, 2001, by CH2M-Jones. SCDHEC granted conditional approval of the WP on September 28, 2001. Approval was conditioned on removal of lead-impacted surface soil in the vicinity of RFI soil boring A002SB020. An IM WP was prepared and issued by CH2M-Jones in October 2001 to address the lead-impacted surface soil at RFI soil boring A002SB020.

This IM Completion Report documents the IM conducted at SWMU 2 and presents the analytical data collected to support it.

All of SCDHEC's comments have been addressed completely in this IM Completion Report or in previously submitted reports.

Because the data supports the conclusion that SWMU 2 has been adequately remediated, this IM is expected to be the final remedial action at SWMU 2. Therefore, CH2M-Jones recommends that the status of the site be changed to NFA.

Section 5.0

5.0 References

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

CH2M-Jones Inc. *Corrective Measures Study Work Plan Rationale for No Further Action– DRMO Storage and Lead Contamination Areas, SWMUs 1 & 2, Zone A, Charleston Naval Complex.* Revision 0. June 2001a.

CH2M-Jones Inc. *Interim Measure Work Plan – DRMO Storage and Lead Contamination Area SWMU 2, Charleston Naval Complex.* Revision 0. October 2001b.

U.S. EPA, *Soil Screening Guidance: Technical Background Document. Office of Solid Waste and Emergency Response*, May 1996.

40 CFR 761.125(c)(4)(v) *Requirements for PCB Spill Cleanup.* Revised July 1, 2000.

Appendix A

	StationID	A002SB042		A002SB042		A002SB043		A002SB043	
	SampleID	002SB04201 (0-1ft)		002SB04202 (3-5ft)		002SB04301 (0-1ft)		002SB04302 (3-5ft)	
	DateCollected	12/10/2001 12:00 AM		12/10/2001 12:00 AM		12/10/2001 12:00 AM		12/10/2001 12:00 AM	
	DateAnalyzed	12/11/2001		12/11/2001		12/11/2001		12/11/2001	
	SDGNumber	53215		53215		53215		53215	
Parameter	Units								
Arsenic, TCLP	ug/L								
Barium, TCLP	ug/L								
Cadmium, TCLP	ug/L								
Chromium, TCLP	ug/L								
Lead, TCLP	ug/L								
Mercury, TCLP	ug/L								
Selenium, TCLP	ug/L								
Silver, TCLP	ug/L								

	StationID	A002SB044		A002SB044		A002SB045		A002SB045	
	SampleID	002SB04401 (0-1ft)		002SB04402 (3-5ft)		002SB04501 (0-1ft)		002SB04502 (3-5ft)	
	DateCollected	11/7/2001 12:00 AM		11/7/2001 12:00 AM		11/7/2001 12:00 AM		11/7/2001 12:00 AM	
	DateAnalyzed	11/14/2001		11/14/2001		11/14/2001		11/14/2001	
	SDGNumber	51695		51695		51695		51695	
Parameter	**Units**								
Arsenic, TCLP	ug/L								
Barium, TCLP	ug/L								
Cadmium, TCLP	ug/L								
Chromium, TCLP	ug/L								
Lead, TCLP	ug/L								
Mercury, TCLP	ug/L								
Selenium, TCLP	ug/L								
Silver, TCLP	ug/L								

	StationID	A002SB046		A002SB046		A002SB047		A002SB047	
	SampleID	002SB04601 (0-1ft)		002SB04602 (3-5ft)		002SB04701 (0-1ft)		002SB04702 (3-5ft)	
	DateCollected	11/7/2001 12:00 AM		11/7/2001 12:00 AM		11/7/2001 12:00 AM		11/7/2001 12:00 AM	
	DateAnalyzed	11/14/2001		11/14/2001		11/14/2001		11/14/2001	
	SDGNumber	51695		51695		51695		51695	
Parameter	**Units**								
Arsenic, TCLP	ug/L								
Barium, TCLP	ug/L								
Cadmium, TCLP	ug/L								
Chromium, TCLP	ug/L								
Lead, TCLP	ug/L								
Mercury, TCLP	ug/L								
Selenium, TCLP	ug/L								
Silver, TCLP	ug/L								

	StationID	A002SB048		A002SB048		A002SB049		A002SB049	
	SampleID	002SB04801 (0-1ft)		002SB04802 (3-5ft)		002SB04901 (0-1ft)		002SB04902 (3-5ft)	
	DateCollected	11/7/2001 12:00 AM		11/7/2001 12:00 AM		11/7/2001 12:00 AM		11/7/2001 12:00 AM	
	DateAnalyzed	11/14/2001		11/14/2001		11/14/2001		11/14/2001	
	SDGNumber	51695		51695		51695		51695	
Parameter	**Units**								
Arsenic, TCLP	ug/L								
Barium, TCLP	ug/L								
Cadmium, TCLP	ug/L								
Chromium, TCLP	ug/L								
Lead, TCLP	ug/L								
Mercury, TCLP	ug/L								
Selenium, TCLP	ug/L								
Silver, TCLP	ug/L								

	StationID	A002SB050		A002SB050		A002SB051		A002SB051	
	SampleID	002SB05001 (0-1ft)		002SB05002 (3-5ft)		002SB05101 (0-1ft)		002SB05102 (3-5ft)	
	DateCollected	11/7/2001 12:00 AM		11/7/2001 12:00 AM		11/7/2001 12:00 AM		11/7/2001 12:00 AM	
	DateAnalyzed	11/14/2001		11/14/2001		11/14/2001		11/14/2001	
	SDGNumber	51695		51695		51695		51695	
Parameter	**Units**								
Arsenic, TCLP	ug/L								
Barium, TCLP	ug/L								
Cadmium, TCLP	ug/L								
Chromium, TCLP	ug/L								
Lead, TCLP	ug/L								
Mercury, TCLP	ug/L								
Selenium, TCLP	ug/L								
Silver, TCLP	ug/L								

	StationID	A002SB054		A002SB054	
	SampleID	002SB05401 (0-1ft)		002SB05401 (0-1ft)	
	DateCollected	12/10/2001 12:00 AM		12/10/2001 12:00 AM	
	DateAnalyzed	12/13/2001		12/14/2001	
	SDGNumber	53215T		53215T	
Parameter	**Units**				
Arsenic, TCLP	ug/L			26	U
Barium, TCLP	ug/L			556	J
Cadmium, TCLP	ug/L			40.5	J
Chromium, TCLP	ug/L			10.9	U
Lead, TCLP	ug/L			1540	=
Mercury, TCLP	ug/L	0.642	U		
Selenium, TCLP	ug/L			34.9	U
Silver, TCLP	ug/L			6.66	U

Appendix B

Data Validation Summary - Charleston Naval Complex – Zone A, SWMU 2

TO: Jim Edens/CH2M HILL/GNV

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

DATE: January 10, 2002

The purpose of this memorandum is to present the results of the data validation process for the samples collected at Zone A, SWMU 2. The samples were collected on December 10, 2001.

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 General Engineering Laboratories, Inc., in Charleston, South Carolina, for Lead following SW-846 6010 methodology. One sample was also submitted for the Toxicity Characteristic Leaching Procedure (TCLP) and the "leachate" was analyzed for the RCRA Metals.

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

Code	Definition
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 2, Charleston, SC

SDG	Station ID	Sample ID	Lab Sample ID	Date Collected	Matrix	Sample Type	Upper Depth	Lower Depth	SW6010 Lead	SW6010 TCLP Metals
53215	A002SB042	002SB04201	52315001	12/10/2001	SO	N	0	1	X	
53215	A002SB042	002SB04201MS	1200121328	12/10/2001	SO	MS	0	1	X	
53215	A002SB042	002SB04201SD	1200121329	12/10/2001	SO	SD	0	1	X	
53215	A002SB042	002SB04202	52315002	12/10/2001	SO	N	3	5	X	
53215	A002SB043	002SB04301	52315003	12/10/2001	SO	N	0	1	X	
53215	A002SB043	002SB04302	53215004	12/10/2001	SO	N	3	5	X	
53217	A002SB054	002SB05401	53217001	12/10/2001	SO	N				X
53217	A002SB054	002SB05401MS	1200121781	12/10/2001	SO	MS				X
53217	A002SB054	002SB05401SD	1200121782	12/10/2001	SO	SD				X
53219	FIELDQC	002EB042L1	53219001	12/10/2001	SQ	EB			X	
53219	FIELDQC	002EB042L1MS	1200121323	12/10/2001	SQ	MS			X	
53219	FIELDQC	002EB042L1SD	1200121324	12/10/2001	SQ	SD			X	

MATRIX CODE

SO – Soil
SQ – Soil QC Samples

SAMPLE TYPE CODE

EB - Equipment Blank
MS - Matrix Spike
SD - Matrix Spike Duplicate
N - Native Sample

Inorganic Parameters

Quality Control Review

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

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

Metals Analyses

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

Blanks

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

TABLE 2
Blank Contamination: Metals
Charleston Naval Complex, Zone A, SWMU 2, Charleston, SC

SDG	Lab Sample ID	Sample ID	Sample Type	Parameter	Lab Result	Units	Flag Concentrations Less than	Associated Samples
53217		CCB	CCB	Arsenic	3.45	ug/L	17.25 ug/L	No flags applied – sample ND
53217		CCB	CCB	Barium	0.262	ug/L	1.31 ug/L	No flags applied – samples >5X blk
53217	1200120291	1200120291	LB	Chromium	18.8	ug/L	94 ug/L	53217 - 01
53217	1200121764	1200121764	LB	Selenium	46.6	ug/L	233 ug/L	No flags applied – sample ND

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

One result was qualified due to blank contamination.

Precision – Field Duplicates

This specific sampling event did not contain a Native/Field Duplicate set.

Conclusion

A review of the analytical data submitted regarding the investigation of SWMU 2 in Zone A 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 indicated above, however, it did not affect data usability for those specific results. 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 2 - Data Validation

SDG	Sample ID	Lab Sample ID	Matrix	Parameter Class	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
53217	002SB05401	53217001	SO	METAL	SW6010	Barium, TCLP	556	B	556	J	ug/L	IB
53217	002SB05401	53217001	SO	METAL	SW6010	Cadmiun, TCLP	40.5	B	40.5	J	ug/L	IB
53217	002SB05401	53217001	SO	METAL	SW6010	Chromium, TCLP	10.9	B	10.9	U	ug/L	BL

Appendix C

1v 01-04-02
BC Summer
Soils Pb
Dumpster #2

OAKRIDGE LANDFILL
1163 Highway 78, Dorchester, SC 29437
Tel 843-563-3607 Fax 843-563-3276

SPECIAL WASTE MANIFEST
APPROVAL # OR 0105037
EXPIRATION 05/31/2002

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address: CHARLESTON NAVAL YARD CHARLESTON (10)

Tele Number: 843-740-2780 Contact: JED HEAMES

Generator Signature: [signature]

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

Transporter of Waste: WMI OF CHARLESTON Truck # 407741

Date: Jan 04-2002 Driver Signature: [signature]

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

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL / PETROLEUM CONTAMINATED SOIL

Ticket Number: 971298 Tonnage: 22.16

Received by: K Arnold Date: 1/5/02

Dumpster # 3
BC Summit
1-4-02
1430
Sc L - Pb

WM
WASTE MANAGEMENT

OAKRIDGE LANDFIL
2193 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3575

SPECIAL WASTE MANIFEST
APPROVAL # OR 0112018
EXPIRATION 12/31/2002

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address: 1849 AVENUE F N CHARLESTON SC (10)

Tele Number: 843-740-2780 **Contact:** JED HAEMES

Generator Signature: _____

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

Transporter of Waste: WM CHARLESTON **Truck #** 40714

Date: 1-4-02 **Driver Signature:** _____

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

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/CONTAMINATED SOIL

Ticket Number: 97169 **Tonnage:** 11.37

Received by: _____ **Date:** 1/7/02

BC Summ 2
1-4-02
1430
S.L. PV

OAKRIDGE LANDFIL
2185 Highway 78, Dorchester, SC 29437
Tel 843-563-2607 Fax 843-563-3775

SPECIAL WASTE MANIFEST
APPROVAL # OR 0112018
EXPIRATION 12/31/2002

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address: 1849 AVENUE F N CHARLESTON SC (10)

Tele Number: 843-740-2780 **Contact:** JED HAEMES

Generator Signature: _____

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

Transporter of Waste: WM CHARLESTON **Truck #** 40774

Date: 1-8-02 **Driver Signature:** _____

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

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: 97780 **Tonnage:** 0102

Received by: K Arnold **Date:** 1/8/02

Post-it™ brand fax transmittal memo 7671	# of pages 2
To Brian Crawford	From Nicol Carter
Co.	Co. OakRidge
Dept.	Phone # 568-8609
Fax # 843 740-2780	Fax # 5684158

WM
WASTE MANAGEMENT

1-4-02
1430
S.L. PL

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

SPECIAL WASTE MANIFEST
APPROVAL # OR 0112018
EXPIRATION 12/31/2002

Generator: CHARLESTON NAVAL COMPLEX

Account Number: 490-439

Location / Address: 1849 AVENUE F N CHARLESTON SC (10)

Tele Number: 843-740-2780 Contact: JED HAEMES

Generator Signature: _____

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

Transporter of Waste: WM CHARLESTON Truck # 40174

Date: 1-8-02 Driver Signature: _____

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

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/CONTAMINATED SOIL

Ticket Number: 917382 Tonnage: 23.51

Received by: R Arnold Date: 1/8/02

BC - Source 2
Soils - Pb
Dumpster #1

OAKRIDGE LANDFILL
[illegible]
Tel 843-563-3007 Fax 843-563-3378

SPECIAL WASTE MANIFEST
APPROVAL # OR 0105037
EXPIRATION 05/31/2002

Generator: CHARLESTON NAVAL COMPLEX
Account Number: 490-439
Location / Address: CHARLESTON NAVAL YARD CHARLESTON (10)
Tele Number: 843-740-2780 **Contact:** JED HEAMES
Generator Signature:

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

Transporter of Waste: WMI OF CHARLESTON **Truck #** 407741
Date: JAN 04-2002 **Driver Signature:**

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

Disposal Site: Oakridge Landfill DWP 130
Description of Waste: SOL / PETROLEUM CONTAMINATED SOIL
Ticket Number: 97812 **Tonnage:** 17.52
Received by: **Date:** 1/4/02

INTERIM MEASURE WORK PLAN

DRMO Storage and Lead Contamination Area SWMU 2, Zone A

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

October 2001

Revision 0
Contract N62467-99-C-0960
158814.ZA.PR.02

Certification Page for Interim Measure Work Plan (Revision 0) – SWMU 2, DRMO Storage and Lead Contamination Area, Zone A

Soil Removal

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

South Carolina

Temporary Permit No. T2000358

Casey Hudson, P.E.

10.17.01

Date

SOUTH CAROLINA
CH2M
HILL, INC.
No. C00201
CERTIFICATE OF AUTHORIZATION

Contents

Acronyms and Abbreviations

CMS	corrective measures study
CNC	Charleston Naval Complex
COPC	chemical of potential concern
EPA	U.S. Environmental Protection Agency
ft^2	square feet
ft bls	feet below land surface
IDW	investigation-derived waste
IM	interim measure
mg/kg	milligram per kilogram
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
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

Section 1.0

1.0 Introduction

In June 2001, CH2M-Jones submitted a Corrective Measures Study (CMS) Work Plan recommending that No Further Action (NFA) be taken at Solid Waste Management Units (SWMUs) 1 and 2 in Zone A of the Charleston Naval Complex (CNC). The CMS Work Plan evaluated available data collected at the site and concluded that the site was suitable for unrestricted land use, as the exposure (mean) concentration was below the residential cleanup level.

Comments received from the South Carolina Department of Health and Environmental Control (SCDHEC) in September 2001 indicated that SCDHEC was in general agreement with the conclusions of the SWMUs 1 and 2 CMS Work Plan. Conditional approval of the recommendation for NFA was granted, providing that the potential lead contamination remaining at sample location A002SB020 (3,870 milligrams per kilogram [mg/kg]) would be addressed.

1.1 Purpose of the Interim Measure

This Interim Measure (IM) Work Plan presents the proposed technical approach for delineation of the extent of lead-impacted soil in the vicinity of sample location A002SB020, and its subsequent removal at SWMU 2 in Zone A of the CNC. The proposed IM investigation will include the collection of soil samples to identify the extent of lead in soil, and the excavation of lead-impacted surface soil with reported concentrations above a target cleanup level of 400 mg/kg.

Data for subsurface soil indicate that lead is not widely present at the site above the soil screening level (SSL) of 400 mg/kg; this value is generally being used to screen for lead as a subsurface chemical of potential concern (COPC). Consequently, subsurface soil is not expected to require removal at this site. However, subsurface soil confirmatory samples will be collected prior to the excavation work to confirm that lead is not a subsurface soil COPC. Appropriate subsurface soil removal will be implemented if necessary.

1.2 Organization of the IM 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 Technical Approach — Provides a brief description of the technical approach for the IM.

3.0 Waste Management and Disposal — Describes the procedures for waste management.

4.0 IM Completion Report — Describes the contents of the IM Completion Report.

5.0 References — Lists the references used in this document.

Section 2.0

2.0 Technical Approach

This section outlines the technical approach for the delineation and removal of lead-impacted soil above the residential cleanup level (400 mg/kg). The overall strategy for the investigation will be to sample soil in and around the area expected to have lead concentrations above 400 mg/kg. This area is illustrated on Figure 2-1. It is based on analytical results of samples collected during the RCRA Facility Investigation (RFI) and a previously completed IM. The boundary of the area shown in Figure 2-1 was estimated and may vary based on the analytical results of the samples proposed in this work plan. The lead data for these samples are included in Table 2-1. Once the extent of soil containing lead at concentrations greater than 400 mg/kg has been determined, it will be removed and disposed of off site.

2.1 Pre-Excavation Sampling and Contaminant Delineation

Lead concentrations for surface samples A002SB020 (3,870 mg/kg) and A002SB021 (584 mg/kg) were above 400 mg/kg. Eight IM surface soil sample locations (82-01, 3.77 mg/kg; 83-01, 13.2 mg/kg; 84-01, 25.9 mg/kg; 85-01, 5.45 mg/kg; 90-01, 24.3 mg/kg; 91-01, 22 mg/kg; 92-01, 390 mg/kg; and 93-01, 46.8 mg/kg) located adjacent to the above locations all reported lead concentrations below the residential cleanup level.

Prior to excavation, ten additional surface and subsurface soil samples will be collected and analyzed for lead to more precisely determine the areal extent of the excavation. These samples will also be used as confirmatory samples. Approximate locations of the delineation/confirmation samples are shown in Figure 2-1. A toxicity characteristic leachate procedure (TCLP) sample will be collected for analysis to confirm that the soil can be handled as non-hazardous. CH2M-Jones will collect the samples in the field based on site conditions (such as the presence of pavement or other obstructions).

Once the limits of excavation have been established, the footprint of the area to be excavated will be clearly marked by staking the site.

The sampling strategy and procedures will be performed in accordance with the Environmental Services Division *Standard Operating Procedures and Quality Assurance Manual* (ESDSOPQAM) (U.S. Environmental Protection Agency [EPA], 1996).

2.2 Excavation of Soil

2.2.1 Target Cleanup Criteria

As described in Section 2.0 of this IM Work Plan, the lead cleanup criterion is 400 mg/kg.

2.2.2 Excavation

Figure 2-1 presents the approximate areal extent of lead-impacted surface soil above 400-mg/kg. The excavation is expected to encompass this approximate area. The area may vary somewhat based on the results of the delineation sampling.

Removal of soil will be accomplished with a backhoe or similar equipment to an expected depth of two feet below land surface (ft bls). Excavated soils will be transferred immediately to a disposal container (e.g., a roll-off box or similar container) and subsequently transported to an appropriately permitted offsite disposal facility for landfilling. The transported waste will be covered with a tarp to minimize airborne transfer of soil particulates.

2.2.3 Site Restoration

The excavation will be backfilled with appropriate fill material and the grade will be restored to match the original grade. Pavement will be restored as appropriate.

TABLE 2-1
Analytical Results for Lead
IM Work Plan, SWMU 2, Zone A, Charleston Naval Complex

Sample ID	Sample Date	Sample Interval	Result (mg/kg)
A002SB02001	01/29/1997	Surface	**3,870**
A002SB02101	01/29/1997	Surface	**584**
82-01	03/31/1998	Surface	3.77
83-01	03/31/1998	Surface	13.2
84-01	03/31/1998	Surface	25.9
85-01	03/31/1998	Surface	5.45
90-01	03/31/1998	Surface	22.3
91-01	03/31/1998	Surface	22
92-01	03/31/1998	Surface	390
93-01	03/31/1998	Surface	46.8
A002SB02002	01/29/1997	Subsurface	13.3
A002SB02102	01/29/1997	Subsurface	179

Concentrations in bold and outlined in boxes indicate exceedances of target cleanup level (400 mg/kg).

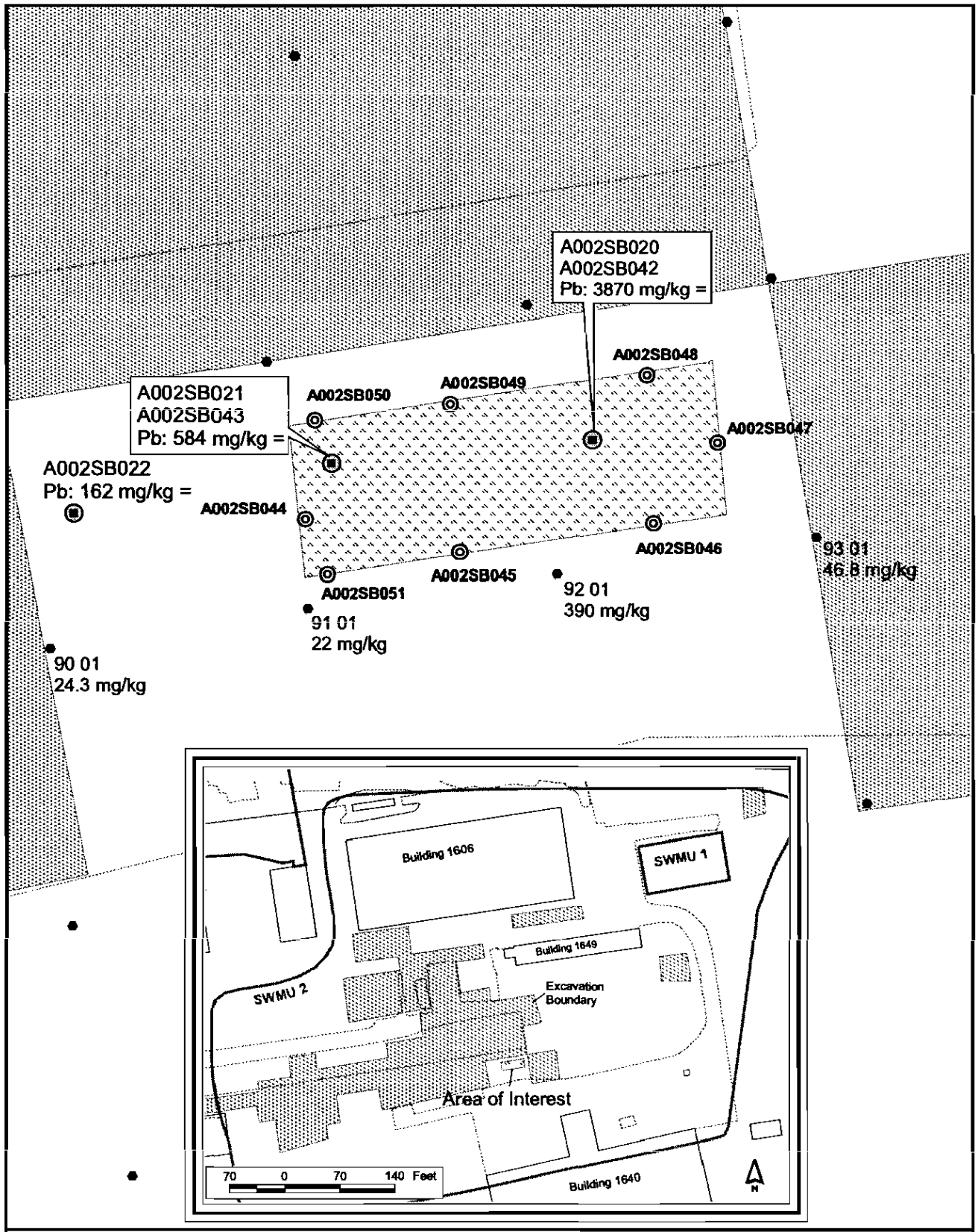

Figure 2-1
Approximate IM Excavation Area
SWMU 2, Zone A
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_A\Swmu_2\Aprs\swmu_2.apr, Date: 17 Oct 2001 10:04, User: ASWINFOR, excavation boundary - Figure 2-1 Proposed IM Excavation Area

Section 3.0

3.0 Waste Management and Disposal

Three waste streams will be generated as part of this IM: excavated soils, decontamination wastes, and personal protective equipment (PPE). No hazardous wastes are expected to be generated as a result of this IM. Excavated soils will be characterized in accordance with South Carolina Hazardous Waste Management Regulations (Section SCDHEC R.61-79.261) and disposed of in accordance with all applicable regulations and permits.

Assuming that soils and decontamination water will be characterized as non-hazardous, the soil will be sent to a subtitle D landfill and the water will be sent to the sanitary sewer once approval is received from the City of North Charleston. PPE will be disposed of as municipal solid waste.

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.

4.0 IM Completion Report

A final report will be submitted within 60 days of receipt of all analytical data. The report will summarize the actions that were taken and provide the following information:

- Excavated volumes
- Nature and volume of waste generated
- Waste disposal
- Sampling results
- Problems encountered
- Other information that would be helpful in evaluating the IM

Section 5.0

5.0 References

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