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INTERIM MEASURE WORK PLAN SOIL REMOVAL AREA OF CONCERN 518 (AOC 518) COAL STORAGE BINS ZONE C WITH TRANSMITTAL CNC CHARLESTON SC

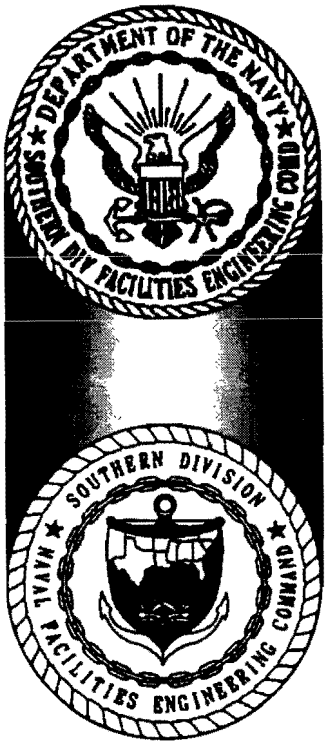
4/2/2001

NAVFAC SOUTHERN

INTERIM MEASURE WORK PLAN

Soil Removal

Area of Concern 518, Coal Storage Bins, Zone C



Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

April 2001

Revision 0
Contract N62467-99-C-0960
158814.ZC.PR.01

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Code 18B1
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Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF AREA OF CONCERN 518 INTERIM MEASURE WORK PLAN

Dear Mr. Litton,

The purpose of this letter is to submit an Interim Measure Work Plan (Revision 0) for Area of Concern (AOC) 518, Coal Storage Bins, Zone C, located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency.

The document is distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate. If you should have any questions, please contact Matthew Humphrey or Matthew A. Hunt at (843) 743-9985 and (843) 820-5525 respectively.

Sincerely,

ROBERT A. HARRELL JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4),
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

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CH2MHILL

April 2, 2001

John Litton, P.E.
Director
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

Dear Mr. Litton:

Enclosed please find four copies of the Interim Measure Work Plan for Soil Removal at AOC 518, Zone C at 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.

Please contact me if you have any questions or comments.

Sincerely,

Dean Williamson, P.E.

xc: Tony Hunt/Navy, w/att
Rob Harrell/Navy, w/att
Mihir Mehta/SCDHEC
Gary Foster/CH2M HILL, w/att

INTERIM MEASURE WORK PLAN

Soil Removal
Area of Concern 518, Coal Storage Bins, Zone C

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

April 2001

Revision 0
Contract N62467-99-C-0960
158814.ZC.PR.01

Certification Page for Interim Measure Work Plan – AOC 518, Coal Storage Bins, Zone C

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

Temporary Permit No. T2000342

Dean Williamson, P.E.

4/2/2001

Date

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

Contents

Acronyms and Abbreviations

AOC	area of concern
CMS	corrective measures study
CNC	Charleston Naval Complex
COC	chemical of concern
COPC	chemical of potential concern
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
ft bls	feet below land surface
IM	interim measure
mg/kg	milligrams per kilogram
NFA	No Further Action
PPE	personal protective equipment
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SSL	soil screening level

Section 1a

Introduction

1.0 Introduction

1.1 Purpose of the Interim Measure Work Plan

This Interim Measure (IM) Work Plan presents the proposed technical approach to delineation of the extent of the lead-impacted soil (i.e., those soils with lead in excess of 400 milligrams per kilogram [mg/kg]) and its subsequent removal at Area of Concern (AOC) 518, Zone C, at the Charleston Naval Complex (CNC).

Specifically, the proposed IM activities include collecting soil samples to identify the extent of the lead-impacted soil, and excavating lead-impacted surface soil with 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 generally accepted soil screening level (SSL) of 400 mg/kg for lead (U.S. Environmental Protection Agency [EPA], 1996). Consequently, subsurface soil is not expected to require removal at this site. However, subsurface soil confirmatory samples will be collected during the excavation work to confirm that lead is not a subsurface soil chemical of concern (COC). If the data indicate the presence of significant lead contamination in subsurface soil, appropriate subsurface soil removal will be implemented.

1.2 Site Background and Setting

AOC 518 is located near the center of Zone C. It consists of the former site of several coal storage bins that were used from approximately 1926 until 1937. The exact location of the coal bins has not been determined, as the unit was taken out of service approximately 57 years ago and no records have been found that provide any information on its design features, dates of operation, or operating practices. The approximate location of AOC 518 is near the gravel and asphalt parking lot adjacent to Buildings M1257 and M1123. No evidence was found that indicated any spills or releases of hazardous materials took place at AOC 518.

Chlordane was identified in the RCRA Facility Investigation (RFI) (June 6, 1995) performed by EnSafe Inc. (EnSafe) as the sole COC for surface soil at AOC 518. The location and the concentration of the chlordane detection above the risk-based concentration (RBC) in surface soil was considered consistent with pesticide application. No soil concentration that would be indicative of a chlordane spill, dumping, or disposal was identified. Lead was

detected at a single location at a concentration that exceeded the residential cleanup level, but was not identified as a COC in the RFI.

No COCs were identified in subsurface soil in the RFI. Based on the available data, groundwater was not expected to have been impacted by site activities at AOC 518. Based on these data, the RFI recommended AOC 518 for No Further Action (NFA).

Supplemental sampling was later conducted at AOC 518 to determine the extent of chlordane and lead-impacted surface soil. CH2M-Jones presented the results of the supplemental sampling in the *CMS Work Plan, Rationale for No Further Action, AOC 518, Zone C*, Revision 0, dated February 2001. CH2M-Jones concluded that lead does not represent an unacceptable level of risk, however there are several samples with reported lead concentrations above the generally accepted residential cleanup level of 400 mg/kg. The South Carolina Department of Health and Environmental Control (SCDHEC) concluded that this lead-impacted area represented a source area that should be considered for active remediation.

Chlordane was not detected above its RBC in any of the CMS samples. Therefore chlordane was determined not to warrant further investigation.

In order to expidite the closeout of AOC 518, CH2M-Jones has determined that removal of the small area of lead-containing soil around soil boring C518SB010 is appropriate, and should enable closeout of AOC 518 in a condition that is suitable for future unrestricted use (i.e., with no land use controls). Accordingly, CH2M-Jones has prepared this IM Work Plan to describe the proposed approach to excavate and dispose of this soil. Comments received from SCDHEC on this IM Work Plan will be adjudicated with SCDHEC prior to implementing the IM.

1.3 Organization of the IM Work Plan

This IM Work Plan consists of the following five 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 3

Technical Approach

2.0 Technical Approach

This section outlines the technical approach to the delineation and removal of lead-impacted soil above the target residential cleanup level (400 mg/kg). The overall strategy for the investigation will be to sample soil around, and in, the area expected to have lead concentrations above 400 mg/kg. This area is illustrated in Figure 2-1. It is based on analytical results of samples collected during the RFI and CMS. The boundary of the area shown in Figure 2-1 was estimated via geostatistical kriging. The lead data for these samples is included in Table 2-1. Once the extent of lead-impacted soil has been determined, it will be removed and disposed of offsite.

2.1 Pre-Excavation Sampling and Contaminant Delineation

Lead concentrations for surface samples C518SB010, C518SBC05, C518SBC06, C518SBC09, and C518SBC10 were above 400 mg/kg. Seven surface soil sample locations (C518SBC04, C518SBC07, C518SBC08, C518SBC11, C518SBC13, C518SBC14, and CGDCSB025) located adjacent to the above locations all reported lead concentrations below the residential cleanup level.

Prior to excavation, additional surface soil samples will be collected and analyzed for lead to more precisely determine the areal extent of the excavation. Approximate locations of the delineation samples are shown in Figure 2-1. CH2M-Jones team members will collect the samples in the field based on site conditions (i.e., the presence of pavement, trees, 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. It should be noted that several trees are located near the excavation area. Removal of these trees as part of the excavation will be avoided to the extent practical.

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

2.2 Excavation of Soils

2.2.1 Cleanup Criteria

As mentioned in 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 the depth of one foot below land surface (ft bls). Subsurface soil samples will be collected from the floor of the excavation spaced approximately 15 to 20 feet apart. Stained or discolored soil that may be contaminated will be sampled if observed. If soil samples from the floor of the excavation report lead concentrations that exceed 400 mg/kg, additional soil will be excavated. The floor of the excavation will be re-sampled after each removal activity to verify that subsurface soil meets the cleanup criterion.

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
Surface and Subsurface Soil Analytical Results for Lead
IM Work Plan, Soil Removal, AOC 518, Zone C, Charleston Naval Complex

		Surface Soil		Subsurface Soil	
Station ID	**Date Collected**	**Result (mg/kg)**	**Qualifier**	**Result (mg/kg)**	**Qualifier**
C518SB001	04/05/1995	5.6	J	2.6	J
C518SB002	04/05/1995	129	J	6.5	J
C518SB003	04/05/1995	55.3	J	4.5	J
C518SB004	04/05/1995	89.6	J	3.2	J
C518CB004	04/05/1995	185	J	NS	
C518SB005	04/05/1995	9.8	J	3.2	J
C518SB006	06/28/1995	3.2	J	NS	
C518CB006	06/28/1995	30	=	NS	
C518SB007	06/28/1995	NS		NS	
C518SB008	06/28/1995	94.2	=	NS	
C518SB009	06/28/1995	71.1	U	NS	
C518SB010	06/28/1995	**750**	=	NS	
C518SBC01	03/08/1999	NS		NS	
C518SBC02	03/08/1999	NS		NS	
C518SBC03	03/08/1999	NS		NS	
C518CBC03	03/08/1999	NS		NS	
C518SBC04	03/08/1999	123	J	17.6	J
C518SBC05	03/08/1999	**934**	J	16.8	J
C518SBC06	03/08/1999	**766**	J	45.4	J
C518SBC07	03/08/1999	214	J	14.1	J
C518CBC07	03/08/1999	NS		12.6	J
C518SBC08	05/13/1999	149	=	34.8	J

TABLE 2-1
Surface and Subsurface Soil Analytical Results for Lead
IM Work Plan, Soil Removal, AOC 518, Zone C, Charleston Naval Complex

		Surface Soil		Subsurface Soil	
Station ID	**Date Collected**	**Result (mg/kg)**	**Qualifier**	**Result (mg/kg)**	**Qualifier**
C518SBC09	05/13/1999	**508**	=	3	J
C518SBC10	05/13/1999	**645**	=	177	J
C518SBC11	05/13/1999	210	=	5	J
C518SBC12	05/13/1999	38.1	=	3	J
C518SBC13	05/13/1999	176	=	9.5	J
C518SBC14	05/13/1999	306	=	**428**	J
C518CBC14	05/13/1999	297	=	NS	
CGDCSB025	04/12/1995	163	J	30	J

Bold values indicate exceedances of Cleanup Level (400 mg/kg).

= indicates that the compound was detected and the reported value is equal to the concentration.
J indicates that the compound was detected and the concentration is an estimated value.
U indicates that the compound was not detected.
UJ indicates that the compound was not detected and the value provided is estimated.
NS indicates that the sample was not collected and/or not analyzed for that constituent.

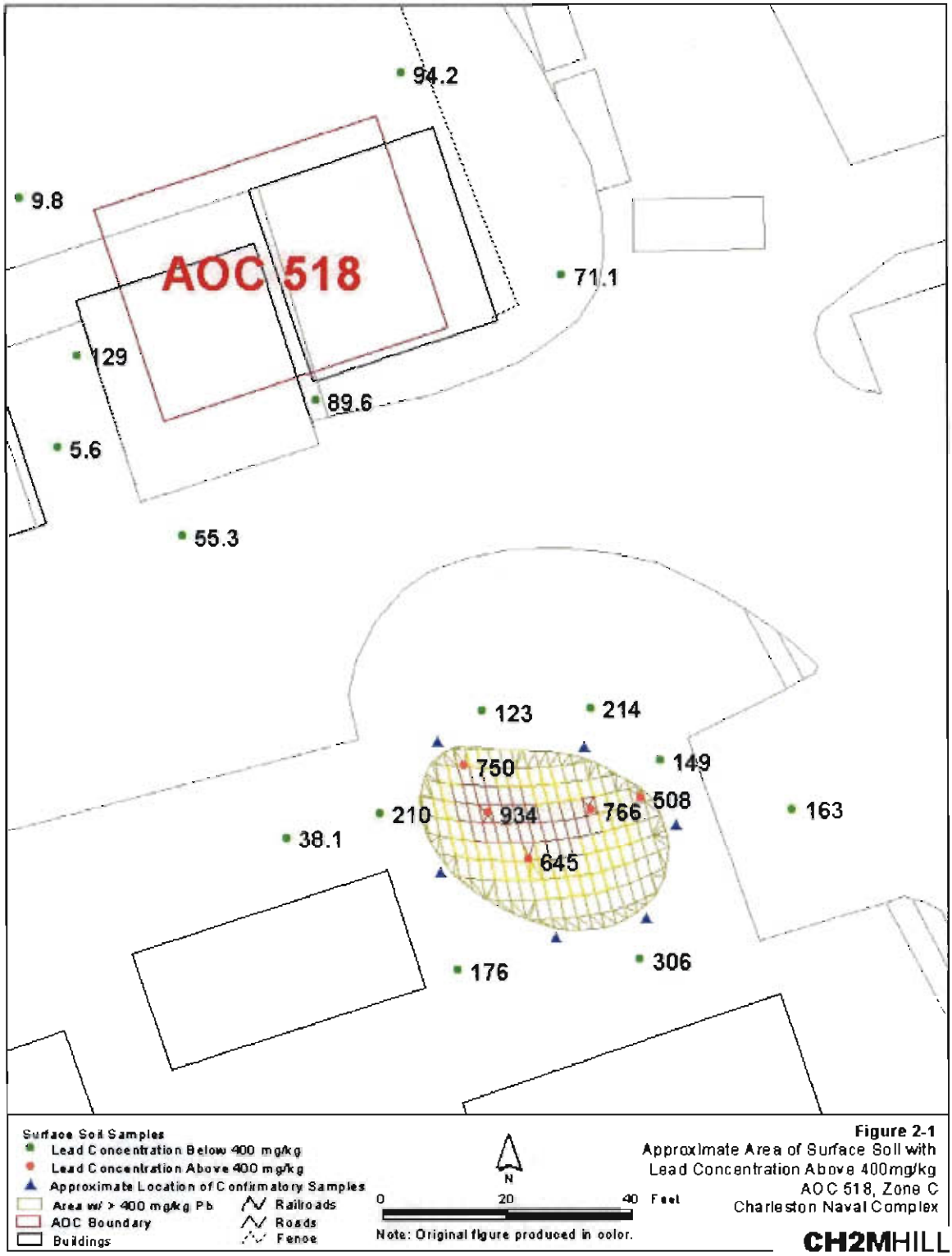

Figure 2-1
Approximate Area of Surface Soil with Lead Concentration Above 400mg/kg
AOC 518, Zone C
Charleston Naval Complex

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SECTION 24

Waste Management and Disposal

3.0 Waste Management and Disposal

Three waste streams will be generated as part of this IM; they are 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 soils will be characterized as non-hazardous, they 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.

PROPOSAL

IM Completion Report

4.0 IM Completion Report

A final report will be submitted within 60 days of completion of the IM. 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
- Site photographs
- Problems encountered
- Other information that would be helpful in evaluating the success of the IM

Section 9.0

References

5.0 References

CH2M-Jones. *Corrective Measures Study Report, Rationale for No Further Action, Area of Concern 518, Coal Storage Bins, Zone C*. February 2001.

EnSafe. *Zone C Final RCRA Facility Investigation Report, NAVBASE Charleston*. June 6, 1995.

U.S. Environmental Protection Agency. *Soil Screening Guidance: Technical Background Document*. May 1996.

INTERIM MEASURE COMPLETION REPORT

AOC 518, Zone C

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

July 2001

Revision 0
Contract N62467-99-C-0960
158814.ZC.PR.01

Certification Page for Interim Measure Completion Report (Revision 0), AOC 518, Zone C

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

South Carolina

Temporary Permit No. T2000342

Dean Williamson, P.E.

7/2/2001

Date

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

Contents

Acronyms and Abbreviations

AOC	area of concern
BCT	BRAC Cleanup Team
BEQ	benzo(a)pyrene equivalent
bls	below land surface
BRAC	Base Realignment and Closure Act
CA	corrective action
CMS	corrective measures study
CNC	Charleston Naval Complex
COC	chemical of concern
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

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.

Corrective Action (CA) activities are being conducted under the Resource Conservation and Recovery Act (RCRA) with the South Carolina Department of Health and Environmental Control (SCDHEC) as the lead agency for CA activities at the CNC. All RCRA CA activities are performed in accordance with the Final Permit (Permit No. SC0 170 022 560).

In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to complete the RCRA Facility Investigation (RFI) for Area of Concern (AOC) 518 in Zone C of the Naval Complex. Review of site data resulted in the site being recommended for an Interim Measure (IM) to delineate and remove lead-impacted soil above 400 milligrams per kilogram (mg/kg) (CH2M-Jones, 2001b)

1.1 Background

As part of RCRA CA activities, a RCRA Facility Investigation (RFI) report was finalized for Zone C (EnSafe Inc. [EnSafe], 1997). Zone C is located on the western edge of the northern portion of the CNC. It is bounded by McMillian Avenue to the south; Hobson Avenue to the east; Avenue "D" to the northeast; and the CNC property boundary to the west and north.

Located near the center of Zone C, AOC 518 consists of the former site of several coal storage bins that were used from approximately 1926 to 1937. AOC 518 is approximately located near the gravel and asphalt parking lot, adjacent to Buildings M1257 and M1123. In April 2001, an IM Work Plan (WP) was developed to remove lead-impacted surface soil at AOC 518 (CH2M-Jones, 2001c). Lead in surface soil at sample locations C518SB010 (750 mg/kg), C518SBC05 (934 mg/kg), C518SBC06 (766 mg/kg), C518SBC09 (508 mg/kg), and C518SBC10 (645 mg/kg) was detected above its cleanup level of 400 mg/kg established for unrestricted (residential) land use (EPA, 1996).

The BRAC Cleanup Team (BCT) determined that removal of surface soil containing lead above the EPA's cleanup level of 400 mg/kg was appropriate, and should enable closeout of AOC 518 in a condition that is suitable for future unrestricted use (i.e., with no land-use controls). Accordingly, CH2M-Jones prepared an IM WP for the removal of lead-impacted soil at AOC 518, which was submitted on April 2, 2001, and subsequently approved by SCDHEC. The target cleanup levels for site soil was 400 mg/kg for lead-impacted soil. The IM was completed on June 7, 2001. This IM Completion Report summarizes the IM completed at AOC 518.

1.2 Purpose of the IM Completion Report

This report provides information about the soil removal activities and documents the results of the IM conducted at AOC 518.

1.3 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 AOC 518.

3.0 Interim Measure Outcome — Provides a discussion of post-IM activities, including confirmation sampling and backfill of the excavation.

4.0 Residual Issues — Provides a discussion of outstanding issues related to AOC 518.

5.0 Recommendations — Provides recommendations for proceeding with site closure.

6.0 References — Lists the references used in this document.

Appendix A contains the analytical data from the delineation samples collected at AOC 518.

Appendix B contains the analytical data from the toxicity characteristic leachate procedure (TCLP) sample collected for soil disposal.

Appendix C contains the data validation reports for the IM analytical data.

Appendix D contains the waste manifest from Waste Management Inc. for soil disposal.

Appendix E contains the analytical data from the conformation samples collected at AOC 518.

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

Section 20

2.0 Interim Measure Implementation

On April 26, 2001, equipment and personnel were mobilized to AOC 518 to begin preparing the site for removal activities in accordance with the approved AOC 518 IM WP. All work was performed in accordance with the approved work plan. Also, on this date, eight surface (0 to 1 foot) and subsurface (1 to 2 feet) delineation samples were collected from around the perimeter of the expected area of lead-impacted soil. The subsurface samples were collected at this depth because previously analyzed subsurface soil samples collected from 3 to 5 feet below land surface (ft bls) indicated that significant lead-impacted soil was not present at that deeper intervals. The sample locations, numbered C518SBI01 through C518SBI08, are illustrated on Figure 2-1. The sample IDs originally assigned to the delineation samples (C518SB001 through C518SB008) coincide with samples collected earlier at this site as part of the RFI. In order to eliminate any confusion that this might cause, the matrix ID (SB) has been changed to "SBI" and the sample number truncated to the last two digits in this document to indicate that the soil sample was collected to support the IM. The analytical data sheets in the appendices show the original sample IDs. Only data from samples collected to support the IM are presented in the appendices.

No sample was collected from location C518SBI06 due to a subsurface obstruction. Concrete was observed at the ground surface, and provisions were made to core through it during the first sampling effort. However, bricks were encountered several inches below the level of the concrete. Incidentally, it was thought that the coring machine would not be needed once the concrete was cored, and it was returned before the bricks were encountered. Consequently, the samples at this location could not be collected during the first attempt. Therefore, the field team collected a surface soil sample at C518SBI09. In the event that this sample reported lead concentrations below the cleanup level, it could be substituted for the uncollected delineation sample. The analytical results indicated that the surface soil lead concentration at C518SBI09 (560 mg/kg) was above the cleanup level. The location of this sample was excavated during the IM.

On May 8, 2001, an additional attempt was made to collect the surface and subsurface sample at location C518SBI06. CH2M-Jones attempted to bore through the remaining subsurface obstruction (bricks) at the original location. The bricks were still present at the limit of the coring depth (approximately 2 feet below land surface [ft bls]) and coring was discontinued. The location of soil boring C518SBI06 was then moved approximately 5 feet

to the east. The concrete was cored at this location and additional obstructions were not encountered. The samples at C518SBI06 were collected at the location shown on Figure 2-1.

To confirm the depth of lead-impacted soil within the excavation area, three subsurface (1 to 2 feet) soil samples (518SBI0902 through 518SBI1102) were collected near previously collected sample locations (C518SBC05, C518SBC06, C518SBC09, and C518SBC10) that reported surface soil lead concentrations above the cleanup level. The confirmation sample locations and the CMS samples are shown on Figure 2-1. A surface soil sample was also collected at location C518SBI09.

A duplicate sample (518CBI0201) was also submitted for analysis. Additionally, a composite TCLP sample (518SBI13L2) was collected for waste characterization. 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 delineation samples; Appendix B contains the complete TCLP data. Appendix C contains the data validation reports.

The reported lead concentrations from the delineation samples were below the cleanup levels established in the IM WP. Based on the analytical results, the area requiring soil removal was accurately defined in the CMS WP. Additionally, no subsurface samples collected in the 1 to 2 foot interval reported a lead concentration above its cleanup level. The absence of subsurface concentrations of lead above its cleanup level indicated that excavation of soil below two feet bls was not necessary. The resulting excavation measured approximately 28 feet long by 22.4 feet wide and two feet deep (1,254 cubic feet ~ 46 cubic yards). The waste manifests (see Appendix D) from Waste Management Inc. (WMI) indicate that a total of 81.38 tons of soil were excavated from the site and disposed of off site.

Results from the waste characterization sample (TCLP, 518SBI13L2) 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 CFR 261). The soil was 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 D.

TABLE 2-1
Delineation Sample Results for Lead
IM Completion Report, AOC 518, Zone C, CNC

Interval	Location ID	Sample ID	Collection Date	Concentration (mg/kg)
Surface	C518SBI01	518SBI0101	04/26/2001	230
	C518SBI02	518SBI0201	04/26/2001	220
	C518SBI03	518SBI0301	04/26/2001	300
	C518SBI04	518SBI0401	04/26/2001	230
	C518SBI05	518SBI0501	04/26/2001	130
	C518SBI06	518SBI0601	05/08/2001	16
	C518SBI07	518SBI0701	04/26/2001	180
	C518SBI08	518SBI0801	04/26/2001	220
Subsurface	C518SBI01	518SBI0102	04/26/2001	6.1
	C518SBI02	518SBI0202	04/26/2001	7.8
	C518SBI03	518SBI0302	04/26/2001	4.8
	C518SBI04	518SBI0402	04/26/2001	23
	C518SBI05	518SBI0502	04/26/2001	6.8
	C518SBI06	518SBI0602	05/08/2001	140
	C518SBI07	518SBI0702	04/26/2001	29
	C518SBI08	518SBI0802	04/26/2001	200

TABLE 2-2
TCLP Results
IM Completion Report, AOC 518, Zone C, CNC

Location ID	Sample ID	Collection Date	Parameter	Concentration (mg/kg)	Maximum Concentration*
Composite	518SBI13L2	04/26/2001	Arsenic	< 0.20	5.0
			Barium	< 1.0	100
			Cadmium	< 0.10	1.0
			Chromium	< 0.20	5.0
			Lead	0.65	5.0
			Mercury	< 0.020	0.2
			Selenium	< 0.50	1.0
			Silver	< 0.10	5.0

* Maximum concentration of contaminants for the Toxicity Characteristic (40 CFR 261).

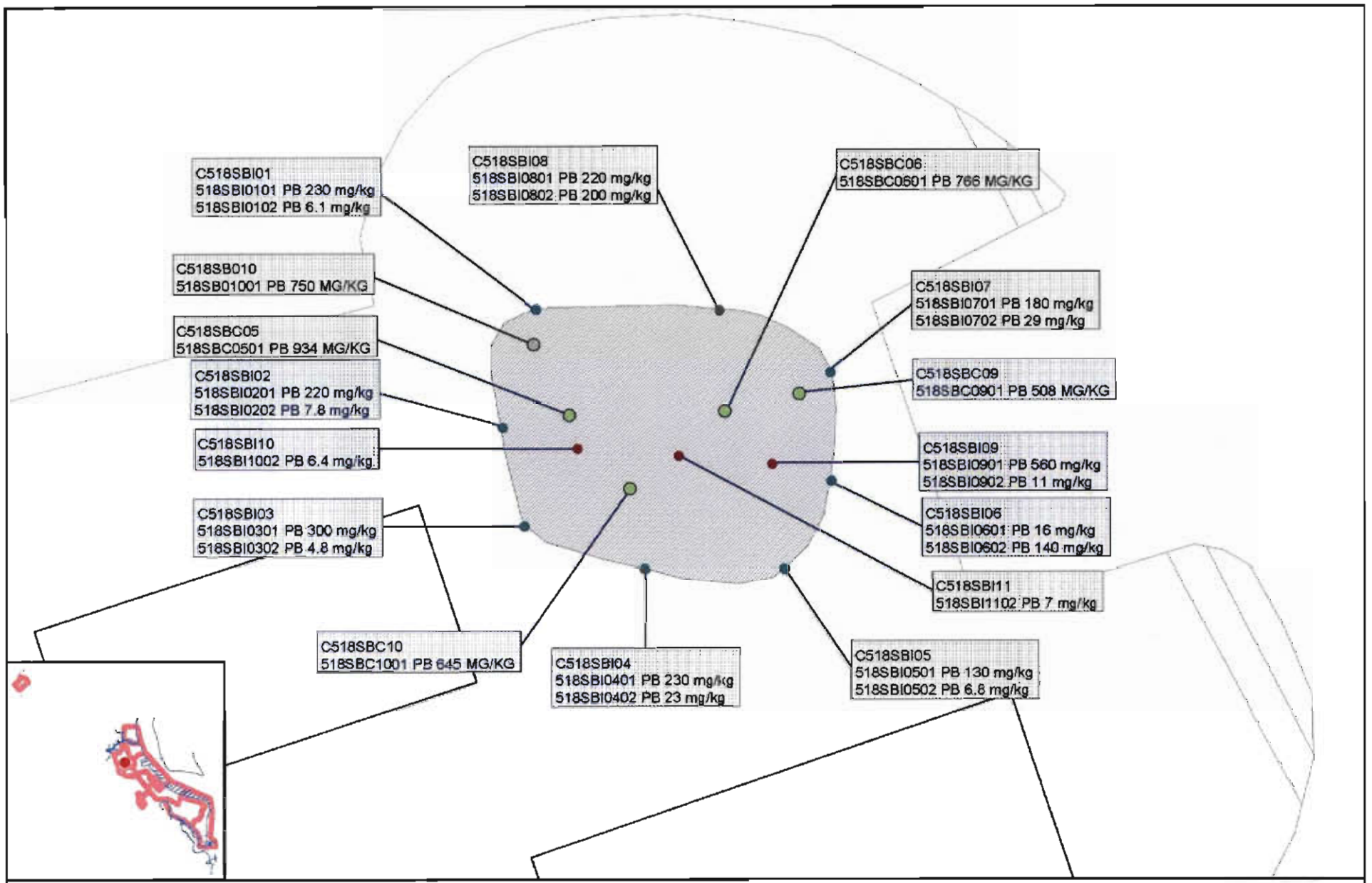

Figure 2-1
Sample Locations and Excavation Boundary
AOC 518, Zone C
Charleston Naval Complex

CH2MHILL

File Path: c:\winnt\profiles\jedens\desktop\my briefcase\cnc\zone c\aoc518\aoc518.apr, Date: 27 Jun 2001 14:25, User: JEDENS

Section 3.0

3.0 Interim Measure Outcome

Prior to excavation, three confirmation samples (518SBI0902, 518SBI1002, and 518SBI1102) were collected at a depth of 2 ft bls and submitted for lead analysis. The depth was chosen to coincide with the floor of the excavation. The locations of the confirmation samples are presented on Figure 2-1. A summary of the analytical results is presented in Table 3-1; the complete data are provided in Appendix D.

Confirmation samples collected from the interior of the excavation, combined with the delineation samples, indicated that the remaining soil met the cleanup criteria for lead (400 mg/kg). Lead concentrations in the confirmation samples ranged from 6.4 mg/kg in sample C518SBI10 (3.75 mg/kg in the duplicate sample) to 11.0 mg/kg in sample C518SBI09. Delineation samples reported lead concentrations that ranged from 4.8 mg/kg in sample C518SBI0302 to 300 mg/kg in sample C518SBI0301. None of these samples exceeded the lead cleanup criteria.

Based on these data, lead-impacted soil at AOC 518 has been adequately remediated and no further investigative or remedial actions are warranted at AOC 518.

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.

TABLE 3-1
Confirmation Sample Results for Lead
IM Completion Report, AOC 518, Zone C, CNC

Interval	Location ID	Sample ID	Collection Date	Concentration (mg/kg)
Surface	C518SBI09	518SBI0901	04/26/2001	**560**
Subsurface	C518SBI09	518SBI0902	04/26/2001	11
	C518SBI10	518SBI1002	04/26/2001	6.4
	C518SBI11	518SBI1102	04/26/2001	7.0

Section 4.0

4.0 Residual Issues

The CMS WP (Revision 0) for AOC 518 was submitted on February 23, 2001, by CH2M-Jones. SCDHEC issued comments on the WP on March 27, 2001. Response to comments were presented to SCDHEC by CH2M-Jones on April 19, 2001. The CMS WP was revised (Revision 1) and issued on May 17, 2001. A complete copy of the response to comments was provided in the CMS WP (Revision 1). An IM WP was also prepared and issued on April 2, 2001.

This IM Completion Report documents the IM conducted at AOC 518 and presents the analytical data collected to support it.

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

Section 5.0

5.0 Recommendations

Because the data supports the conclusion that AOC 518 has been adequately remediated, this IM is expected to be the final remedial action at AOC 518. Therefore, CH2M-Jones recommends that the status of the site be changed to NFA.

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

- Status of the RFI
- Presence of metals (inorganics) in groundwater
- Potential linkage to SWMU 37, Investigated Sanitary Sewers at the CNC
- Potential linkage to AOC 699, Investigated Storm Sewers at the CNC
- Potential linkage of AOC 504, Investigated Railroad Lines at the CNC
- Potential linkage to surface water bodies (Zone J)
- Potential contamination associated with oil-water separators (OWSs)
- Relevance or need for land-use controls at the site

Information regarding these closeout issues has been provided previously in the AOC 518 CMS WP.

It is expected that review of the information related to the closeout issues will result in BCT consensus that the closeout issues have been adequately addressed and the site is now suitable for unrestricted land use. Therefore, CH2M-Jones recommend NFA at AOC 518. Once the BCT concurs that NFA is appropriate for the site, a Statement of Basis can be prepared and made available for public comment, in accordance with SCDHEC policy.

Section 6.0

6.0 References

CH2M-Jones Inc. *Corrective Measures Study Work Plan – AOC 518, Coal Storage Bins, Zone C, Charleston Naval Complex*. Revision 0. February, 2001.a

CH2M-Jones Inc. *Corrective Measures Study Work Plan – AOC 518, Coal Storage Bins, Zone C, Charleston Naval Complex*. Revision 1. May, 2001.b

CH2M-Jones Inc. *Interim Measure Work Plan – AOC 518, Coal Storage Bins, Zone C, Charleston Naval Complex*. Revision 0. April, 2001.c

U.S. Environmental Protection Agency (EPA). *Soil Screening Guidance: Technical Background Document*. May 1996.

Appendix A

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stl-inc.com

LOG NO: S1-12581
Received: 27 APR 01
Reported: 02 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
12581-1	518SB00101	04-26-01/11:00
12581-2	518SB00102	04-26-01/13:48
12581-3	518SB00201	04-26-01/11:07
12581-4	518CB00201	04-26-01/11:15
12581-5	518SB00202	04-26-01/13:45

PARAMETER	12581-1	12581-2	12581-3	12581-4	12581-5
Lead (6010), mg/kg dw	230	6.1	220	240	7.8
Dilution Factor	1	1	1	1	1
Prep Date	04.30.01	04.30.01	04.30.01	04.30.01	04.30.01
Prep Time	11:00	11:00	11:00	11:00	11:00
Analysis Date	05.01.01	05.01.01	05.01.01	05.01.01	05.01.01
Analysis Time	08:02	08:40	08:43	08:47	08:51
Batch ID	0430A	0430A	0430A	0430A	0430A
Clock ID	1D0430	1D0430	1D0430	1D0430	1D0430
Quantitation Factor	1.0	0.99	1.0	1.0	0.99
Percent Solids	95	96	95	96	94

AT 5/23/01

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stl-inc.com

LOG NO: S1-12581
Received: 27 APR 01
Reported: 02 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
12581-6	518SB00301	04-26-01/11:25
12581-7	518SB00302	04-26-01/13:13
12581-8	518SB00401	04-26-01/11:30
12581-9	518SB00402	04-26-01/13:25
12581-10	518SB00501	04-26-01/13:30

PARAMETER	12581-6	12581-7	12581-8	12581-9	12581-10
Lead (6010), mg/kg dw	300	4.8	230	23	130
Dilution Factor	1	1	1	1	1
Prep Date	04.30.01	04.30.01	04.30.01	04.30.01	04.30.01
Prep Time	11:00	11:00	11:00	11:00	11:00
Analysis Date	05.01.01	05.01.01	05.01.01	05.01.01	05.01.01
Analysis Time	08:55	08:59	09:02	09:06	09:10
Batch ID	0430A	0430A	0430A	0430A	0430A
Clock ID	1D0430	1D0430	1D0430	1D0430	1D0430
Quantitation Factor	0.98	1.0	0.97	1.0	1.1
Percent Solids	96	92	96	92	93

AA 5123

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stl-inc.com

LOG NO: S1-12581
Received: 27 APR 01
Reported: 02 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
12581-11	518SB00502	04-26-01/13:35
12581-12	518SB00701	04-26-01/11:42
12581-13	518SB00702	04-26-01/13:40
12581-14	518SB00801	04-26-01/13:00
12581-15	518SB00802	04-26-01/13:10

PARAMETER	12581-11	12581-12	12581-13	12581-14	12581-15
Lead (6010), mg/kg dw	6.8	180	29	220	200
Dilution Factor	1	1	1	1	1
Prep Date	04.30.01	04.30.01	04.30.01	04.30.01	04.30.01
Prep Time	11:00	11:00	11:00	11:00	11:00
Analysis Date	05.01.01	05.01.01	05.01.01	05.01.01	05.01.01
Analysis Time	09:14	09:27	09:30	09:34	09:38
Batch ID	0430A	0430A	0430A	0430A	0430A
Clock ID	1D0430	1D0430	1D0430	1D0430	1D0430
Quantitation Factor	0.99	1.1	1.0	1.0	1.0
Percent Solids	92	88	92	94	93

5/23

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stl-inc.com

LOG NO: S1-12929
Received: 11 MAY 01
Reported: 15 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Charleston/CNC
Sampled By: Client
Code: 092610516

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
12929-1	518SB00601	05-10-01/11:00
12929-2	518SB00602	05-08-01/10:00

PARAMETER	12929-1	12929-2
Lead (6010), mg/kg dw	16	140
Dilution Factor	1	1
Prep Date	05.14.01	05.14.01
Prep Time	10:55	10:55
Analysis Date	05.15.01	05.15.01
Analysis Time	06:30	06:50
Batch ID	0514A	0514A
Clock ID	1A0514	1A0514
Quantitation Factor	1.1	0.98
Percent Solids	93	93

5/23/2001

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stl-inc.com

LOG NO: S1-12929
Received: 11 MAY 01
Reported: 15 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Charleston/CNC
Sampled By: Client
Code: 092610516

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
12929-3	Method Blank	
12929-4	Lab Control Standard Result	
12929-5	Lab Control Standard % Recovery	
12929-6	LCS Accuracy Control Limit (%R)	
12929-7	Spike Amount Added, LCS	

PARAMETER	12929-3	12929-4	12929-5	12929-6	12929-7
Lead (6010), mg/kg dw	<0.50	50.0	100 %	75-125 %	50.0
Dilution Factor	1	1	1	---	---
Prep Date	05.14.01	05.14.01	05.14.01	---	---
Prep Time	10:55	10:55	10:55	---	---
Analysis Date	05.15.01	05.15.01	05.15.01	---	---
Analysis Time	06:22	06:26	06:26	---	---
Batch ID	0514A	0514A	0514A	---	---
Clock ID	1A0514	1A0514	1A0514	---	---
Quantitation Factor	1	1	1	---	---

5/23/2001

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stl-inc.com

LOG NO: S1-12929
Received: 11 MAY 01
Reported: 15 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Charleston/CNC
Sampled By: Client
Code: 092610516

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
12929-8	Reporting Limit (RL)	
12929-9	Method Detection Limit (MDL)	

PARAMETER	12929-8	12929-9
Lead (6010), mg/kg dw	0.50	0.42

These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.
SW-846, Test Methods for Evaluating Solid Waste, Third Edition, September 1986, and Updates I, II, IIA, IIB, and III.

L. Michelle Owens
Michelle Owens, Project Manager

Final Page Of Report

5/23/2001

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stlinc.com

LOG NO: S1-12581
Received: 27 APR 01
Reported: 02 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
12581-21	518EB00101	04-26-01/14:00

PARAMETER	12581-21
Lead (6010), mg/l	<0.0050
Dilution Factor	1
Prep Date	04.30.01
Prep Time	10:15
Analysis Date	05.01.01
Analysis Time	10:57
Batch ID	0430G
Clock ID	1D0430
Quantitation Factor	1.0

GB

5/23

Chain of Custody/ Laboratory Analysis Form

Lab Batch/SDG ID: _____

Laboratory:	STL, Savannah, GA
Project Name:	Charleston Navy Complex
Site Name:	Zone C, AOC 518
Project Number:	
TAT:	3 day results *
Project Manager:	Gary Foster/ATL/CCI
Level:	Level 2
Address:	GNV: see back of COC
	JAJ: see back of COC
Send Report To:	see 3rd page of COC
EDD:	CNC format

Sample ID	Station ID	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Arsenic (SW6010) 1 - 4oz jar	Lead (SW6010) 1 - 4oz jar	TCLP RCRA Metals (SW6010/7000 series) 1 - 8oz jar	Arsenic & Lead (SW6010) 1 - 500mL HNO3	Comments
518SB00101	C518SB001			1100 4-26-01	SO	1		X			
518SB00102	C518SB001			~~0952~~ 1345 4-26-01	SO	1		X			
518SB00201	C518SB002			1107 4-26-01	SO	1		X			
518CB00201	C518SB002			1115 4-26-01	SO	1		X			
518SB00202	C518SB002			1345 4-26-01	SO	1		X			
518SB00301	C518SB003			1125 4-26-01	SO	1		X			
518SB00302	C518SB003			1313 4-26-01	SO	1		X			
518SB00401	C518SB004			1130 4-26-01	SO	1		X			
518SB00402	C518SB004			1325 4-26-01	SO	1		X			
518SB00501	C518SB005			1330 4-26-01	SO	1		X			
518SB00502	C518SB005			1335 4-26-01	SO	1		X			
~~518SB00601~~	~~C518SB006~~				~~SO~~			~~X~~			Not Suplcd
~~518SB00602~~	~~C518SB006~~				~~SO~~			~~X~~			
518SB00701	C516SB007			1142 4-26-01	SO	1		X			
518SB00702	C518SB007			1340 4-26-01	SO	1		X			
518SB00801	C518SB008			1300 4-26-01	SO	1		X			
518SB00802	C518SB008			1310 4-26-01	SO	1		X			
518SB00901 BK	C518SB009			1250 4-26-01	SO	1		X			
518SB00902 BK	C518SB009			1355 4-26-01	SO	1		X			
518SB01002	C518SB010			1250 4-26-01	SO	1		X			
518SB01102	C518SB011			1245 4-26-01	SO	1		X			
518SB013L2	C518SB013	composite		1252 4-26-01	SO	1			X		

RUSH!

3 day turn-around on all Suplcd

Sampled By Brian Crawford Date/Time 4-26-01 1600

Relinquished by: Received C. Vaughn Date/Time 4-27-01 9:20

Additional Samplers: Ted Hawes

STL Savannah, 5102 LaRoche Avenue, Savannah, GA, 31404 912-354-7858

31-12581

Chain of Custody/ Laboratory Analysis Form

Lab Batch/SDG ID: _____

Received By Lab: C. Vasquez Date/Time 4-27-01 9:20

Relinquished by: Date/Time

Received By Date/Time

Shipped Via: UPS FedEx Hand Other _____

Remarks:

Temperature:

Laboratory:	STL, Savannah, GA
Project Name:	Charleston Navy Complex
Site Name:	Zone C, AOC 518
Project Number:	
TAT:	3 day results
Project Manager:	Gary Foster/ATL/CCI
Level:	Level 2
Address:	GNV: see back of COC
	JAJ: see back of COC
Send Report To:	see 3rd page of COC
EDD:	CNC format

Sample ID	Station ID	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Arsenic (SW6010) 1 - 4oz jar	Lead (SW6010) 1 - 4oz jar	TCLP RCRA Metals (SW6010/7000 series) 1 - 8oz jar	Arsenic & Lead (SW6010) 1 - 500mL HNO3							Comments
518EB00101	C518EB001			1400 4-26-01	SQ	1				X							EB

RUSH!

SI-12581

Chain of Custody/ Laboratory Analysis Form

Lab Batch/SDG ID: _____

Sampled By: Brian Crawford Date/Time: 4-26-01 1600 Relinquished by: Date/Time

Additional Samplers: Jed Hess

Received By Lab: Date/Time Relinquished by: Date/Time

Received By: Date/Time Shipped Via: UPS FedEx Hand Other _____

Remarks: Temperature:

Fed Ex to STL

Reports

Herb Kelly/GNV - 1 hardcopy
Jed Heames/JAJ - 1 hardcopy

FAX quick TAT results to:

Jed Heams, 843-740-2785

JAJ address:
CH2M-Jones, LLC
Charleston Naval Complex
1849 Avenue F
North Charleston, SC 29405

GNV address:
CH2M Hill
3011 SW Williston Rd.
Gainesville, FL 32605

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: CNC Charleston

Collected by/Company: JA JONES Brian Crawford 843 2968203

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Lead	Remarks
5185B00601	5-10-01	1100	X				1																X	
5185B00602	5-8-01	1000	X				1																X	
																								3 day turnaround
																					RUSH			

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	5-10-01	1600	[signature] 5/11/01 9:30				

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

White = sample collector Yellow = file Pink = with report

S1-12929

Data Review and Validation for: Metals and/or Cyanide + TCLP

Project Name & Task:	CNC	ZONE C	
Project # & Case/SDG:	158814.PM.04	S112581	
Methods:	☐ ILM04.0 ☒ SW-846 (6010B,7000 Series) ☒ Hg 7470A/71A ☐ 200 series ☐ 300 series ☐ 1600 series		
Program:	☐ AFCEE ☐ NFESC ☒ Other: CNC	**Number of Samples:**	
Field QC Samples:	# 3/4 FD, #21 EB		
Reviewed by & Date:	A Juchem	5/23/01	
Matrix:	☐ Water ☒ Soil ☐ Other TCLP + TOT		

Quality Control	Form #	Requirements	Check (If No* checked, see comments)	Flags Applied (see comments)
Data Pkg Complete (DP)	Pkg	All required deliverables in pkg.	☐ OK ☐ No* ☐ Not provided	☐ Flags Applied
	COC	All samples on COC reported	☐ OK ☒ No*	☐ Flags Applied
Holding Times (HT)	1, 13,	Cyanide 14 day HT met	☐ OK ☐ No* ☒ N/A	☐ Flags Applied
	14,	Mercury 28 day HT met	☒ OK ☐ No* ☐ N/A	☐ Flags Applied
	COC	Other metals 160 day HT met	☒ OK ☐ No* ☐ N/A	☐ Flags Applied
Initial Calibration (IC)	14	Min. initial # of levels per method	☐ OK ☐ No* ☐ Not provided	☐ Flags Applied
	raw	Linearity method criteria	☐ OK ☐ No* ☐ Not provided	
	2	ICV criteria	☐ OK ☐ No*	
Continuing Calibration (CC)	14	CCV frequency	☐ OK ☐ No*	☐ Flags Applied
	2	CCV critieria	☐ OK ☐ No*	
Blanks (PB,EB,FB/AB)	3	Detects (>RL/CRDL)	☒ OK ☐ No* ☐ see blnk wksht	☐ Flags Applied
ICB and CCB	3	ICB, CCB NOT Prov.	~~☐ OK ☐ No* ☐ see blnk wksht~~	
Prep Blank Frequency (PB)	3	1 PB per batch	☒ OK ☐ No*	
ICP Interference Check (ICS)	4	Method criteria met	☐ OK ☐ No* NOT Provided	☐ Flags Applied
MS/MSD or MS/LD	5	☐ MS/MSD ☐ MS/LD ☐ None*	☐ OK ☐ No*	☐ Flags Applied
	5	Recovery Limits: ☐ Lab ☐ Meth	☐ OK ☐ No* N/A	
	6	Precision criteria	☐ OK ☐ No*	
Post Spike Samp. Recov.	5	Criteria met	☐ OK ☐ No* ☒ N/A	☐ Flags Applied
Duplicate Samples (LD)	6	Criteria met	☐ OK ☐ No* ☒ N/A	☐ Flags Applied
LCS (BS)	7	Frequency	☒ OK ☐ No* ☐ N/A	☐ Flags Applied
☒ LCS only ☐ LCS/LCSD		Acceptance criteria met	☒ OK ☐ No*	
Standard Addition	8	Criteria met	☐ OK ☐ No* ☒ N/A	☐ Flags Applied
ICP Serial Dilution (SD)	9	Criteria met	☐ OK ☐ No* ☒ N/A	☐ Flags Applied
Internal Standard (IS)		Internal Standards used	☐ OK ☐ No* ☒ N/A	
Sample Evaluations (SAM)	1	All hits within cal. Range	☒ OK ☐ No* ☐ All ND	☐ Flags Applied
	1	Total > Dissolved	☐ OK ☐ No* ☒ N/A	☐ Flags Applied
Field Duplicates (FD)	1	Precision of native vs Field Dup	☒ OK ☐ No* ☐ N/A	☐ Flags Applied

This sheet is applicable to multiple methods. All requirement items may not apply to every analytical method.

Case Narrative Comments: None.

QC Item	Comments
COC	#21 - EB COC indicates Pb + As should have been run, but only Pb data is included in pkg. NM - only Pb samples sent to STL 5/23
	NO Flags Applied

Appendix B

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stl-inc.com

LOG NO: S1-12581
Received: 27 APR 01
Reported: 02 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
12581-20	518SB013L2	04-26-01/12:52

PARAMETER	12581-20
Metals in TCLP Extract (6010)	
Arsenic (TCLP), mg/l	<0.20
Barium (TCLP), mg/l	<1.0
Cadmium (TCLP), mg/l	<0.10
Chromium (TCLP), mg/l	<0.20
Lead (TCLP), mg/l	0.65
Selenium (TCLP), mg/l	<0.50
Silver (TCLP), mg/l	<0.10
TCLP (1311) Sec. 7.2 Extraction Date	04.27.01
Dilution Factor	1
Prep Date	04.30.01
Prep Time	12:10
Analysis Date	05.01.01
Analysis Time	10:21
Batch ID	0430P
Clock ID	1D0430
Quantitation Factor	1.0

5/23

SEVERN TRENT SERVICES
STL Savannah
5102 LaRoche Avenue • Savannah, GA 31404 • Tel: 912 354 7858 • Fax: 912 352 0165 • www.stlinc.com

LOG NO: S1-12581
Received: 27 APR 01
Reported: 02 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
12581-20	518SB013L2	04-26-01/12:52

PARAMETER	12581-20
Mercury in TCLP Extract (7470)	
Mercury (TCLP), mg/l	<0.020
TCLP (1311) Sec. 7.2 Extraction Date	04.27.01
Dilution Factor	1
Prep Date	04.30.01
Analysis Date	05.01.01
Analysis Time	12:44
Batch ID	0430R
Quantitation Factor	1

5/23

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STL Savannah
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LOG NO: S1-12581
Received: 27 APR 01
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Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
12581-22	TCLP Extraction Fluid Blank	

PARAMETER	12581-22
Metals in TCLP Extract (6010)	
Arsenic (TCLP), mg/l	<0.20
Barium (TCLP), mg/l	<1.0
Cadmium (TCLP), mg/l	<0.10
Chromium (TCLP), mg/l	<0.20
Lead (TCLP), mg/l	<0.20
Selenium (TCLP), mg/l	<0.50
Silver (TCLP), mg/l	<0.10
TCLP (1311) Sec. 7.2 Extraction Date	04.27.01
Dilution Factor	1
Prep Date	04.30.01
Prep Time	12:10
Analysis Date	05.01.01
Analysis Time	10:14
Batch ID	0430P
Clock ID	1D0430
Quantitation Factor	1.0

BLK

5/23

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STL Savannah
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LOG NO: S1-12581
Received: 27 APR 01
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Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
12581-22	TCLP Extraction Fluid Blank	

PARAMETER	12581-22
Mercury in TCLP Extract (7470)	
Mercury (TCLP), mg/l	<0.020
TCLP (1311) Sec. 7.2 Extraction Date	04.27.01
Dilution Factor	1
Prep Date	04.30.01
Analysis Date	05.01.01
Analysis Time	12:03
Batch ID	0430R
Quantitation Factor	1

BLK

5/23

Appendix C

Data Validation Summary for Charleston Naval Complex – Zone C, AOC 518

TO: Jim Edens/CH2M HILL/GNV

FROM: Herb Kelly/CH2M HILL/GNA

DATE: June 26, 2001

The purpose of this memorandum is to present the results of the data validation process for the samples collected at the Charleston Naval Complex, Zone C, AOC 518. Samples were collected on April 26, May 8, and May 10, 2001. Each area reviewed and the 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 following procedures described in the EPA guidance document *Functional Guidelines for Evaluating Data Quality* (EPA, 1994). Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

A total of 22 samples were submitted to Severn Trent Services, STL Savannah Laboratories, Inc., in Savannah, Georgia, for SW-846 6010 analysis for Lead. In addition, a single composite sample was submitted for TCLP Metals 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 in Table 1. The following primary flags were used to qualify the data:

- **U** Undetected. Samples were analyzed for this analyte, but it was not detected above the method detection limit (MDL) or instrument detection limit (IDL).
- **UJ** Detection limit estimated. Samples were analyzed for this analyte, but the results were qualified as not detected. The result is estimated.
- **J** Estimated. The analyte was present, but the reported value may not be accurate or precise.
- **R** Rejected. The data are unusable. (NOTE: Analyte/compound may or may not be present.)
- **=** Detected. Target parameter detected at the concentration reported.

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 and equipment blanks were provided. 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.

Lead Analyses

The QA/QC parameters for the lead analyses for all of the samples were within acceptable control limits.

TCLP Metals Analyses

The QA/QC parameters for the TCLP Metals analyses for all of the samples were within acceptable control limits.

Conclusion

There were no qualifiers applied to the data. The data can be used in the project decision-making process as received and reported.

Table 1 - Secondary Data Validation Qualifiers

Code	Definition
2S	Second Source
BL	Blank
BS	Blank Spike/LCS
CC	Continuing Calibration
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
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

Appendix D

AOC 518

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

6-6-01 0900
Truck #16
Load #1

SPECIAL WASTE MANIFEST
APPROVAL # OR 0105039
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: BUTLER WARE **Truck #** 16

Date: 6/6/01 **Driver Signature:** [signature]

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

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL / LEAD CONTAMINATED SOIL

Ticket Number: 95310 **Tonnage:** 18.80

Received by: [signature] **Date:** 6/6/01

AOC 518

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

6-6-01 0930
Truck #31
load 2

SPECIAL WASTE MANIFEST
APPROVAL # OR 0105039
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: BUTLER WARE **Truck #** 31

Date: 6-6-01 **Driver Signature:** Thomas Bennett

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

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL / LEAD CONTAMINATED SOIL

Ticket Number: 951312 **Tonnage:** 16.43

Received by: [signature] **Date:** 6-6-01

AOC 518

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

6-6-01 1150
Truck #16
Load #3

SPECIAL WASTE MANIFEST
APPROVAL # OR 0105039
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: BUTLER WARE **Truck #** 16

Date: 6, 6, 201 **Driver Signature:** _____

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

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL / LEAD CONTAMINATED SOIL

Ticket Number: 53548 **Tonnage:** 21.14

Received by: _____ **Date:** 6/6/01

AOC 518

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

6-6-01 1219
Truck # 31
4th load

SPECIAL WASTE MANIFEST
APPROVAL # OR 0105039
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: BUTLER WARE **Truck #** 31

Date: 6-6-01 **Driver Signature:** Thomas Bennett

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

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL / LEAD CONTAMINATED SOIL

Ticket Number: 951370 **Tonnage:** 24.84

Received by: DC **Date:** 6/6/01

ADC 578 13398

BUTLER WARE TRUCKING CO.

Customer CHZM HILL Date 6/6/201

Job: NAVY BAS

Location DORCHESTER Pit BW Material FILL

Time Start: _____ Time Stop: _____ Hours Rental: _____

Truck # 16 Truck Type _____ C.Y. 20

Driver X BENNY Load Count 2

Signature X [signature]

3 4 5 6 7 8 9 10 11

AOC 518 14163 12

ITLER WARE TRUCKING CO.

er CHZM Jones Date 6-6-01 13

Navy Yard 14

n Dorchester Material Fill

tart: Time Stop: Hours Rental: 15

31 Truck Type TT C.Y. 20 yd 16

X Thomas Bennett Load Count 1

ure X 17

26 25 24 23 22 21 20 19 18

2 3 4 5 6 7 8 9 10 11

AOC 518 14164 12

BUTLER WARE TRUCKING CO.

Customer CHZM Jones Date 6-6-01 13

Job: Navy Yard

Location Dorchester Material Top Soil 14

Time Start: Time Stop: Hours Rental: 15

Truck # 31 Truck Type TT C.Y. 20 yd 16

Driver X Thomas Bennett Load Count 1

Signature X 17

Appendix F

SEVERN TRENT SERVICES
STL Savannah
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LOG NO: S1-12581
Received: 27 APR 01
Reported: 02 MAY 01

Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32308-3928

Project: Zone C, AOC 518
Sampled By: Client
Code: 10091053

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
12581-16	518SB00901	04-26-01/13:50
12581-17	518SB00902	04-26-01/13:55
12581-18	518SB01002	04-26-01/12:50
12581-19	518SB01102	04-26-01/12:45

PARAMETER	12581-16	12581-17	12581-18	12581-19
Lead (6010), mg/kg dw	560	11	6.4	7.0
Dilution Factor	1	1	1	1
Prep Date	04.30.01	04.30.01	04.30.01	04.30.01
Prep Time	11:00	11:00	11:00	11:00
Analysis Date	05.01.01	05.01.01	05.01.01	05.01.01
Analysis Time	09:42	09:46	09:50	09:53
Batch ID	0430A	0430A	0430A	0430A
Clock ID	1D0430	1D0430	1D0430	1D0430
Quantitation Factor	1.0	1.0	1.0	0.96
Percent Solids	91	94	92	93

5/23

5090/11
Code 18B1
2 APR 01

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF AREA OF CONCERN 518 INTERIM MEASURE WORK PLAN

Dear Mr. Litton,

The purpose of this letter is to submit an Interim Measure Work Plan (Revision 0) for Area of Concern (AOC) 518, Coal Storage Bins, Zone C, located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency.

The document is distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate. If you should have any questions, please contact Matthew Humphrey or Matthew A. Hunt at (843) 743-9985 and (843) 820-5525 respectively.

Sincerely,

ROBERT A. HARRELL JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4),
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32608-3928
Mailing address:
P.O. Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

CH2MHILL

April 2, 2001

John Litton, P.E.
Director
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

Dear Mr. Litton:

Enclosed please find four copies of the Interim Measure Work Plan for Soil Removal at AOC 518, Zone C at 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.

Please contact me if you have any questions or comments.

Sincerely,

Dean Williamson, P.E.

xc: Tony Hunt/Navy, w/att
Rob Harrell/Navy, w/att
Mihir Mehta/SCDHEC
Gary Foster/CH2M HILL, w/att

INTERIM MEASURE WORK PLAN

Soil Removal
Area of Concern 518, Coal Storage Bins, Zone C

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

April 2001

Revision 0
Contract N62467-99-C-0960
158814.ZC.PR.01

Certification Page for Interim Measure Work Plan – AOC 518, Coal Storage Bins, Zone C

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

Temporary Permit No. T2000342

Dean Williamson, P.E.

4/2/2001

Date

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

Contents

Acronyms and Abbreviations

AOC	area of concern
CMS	corrective measures study
CNC	Charleston Naval Complex
COC	chemical of concern
COPC	chemical of potential concern
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
ft bls	feet below land surface
IM	interim measure
mg/kg	milligrams per kilogram
NFA	No Further Action
PPE	personal protective equipment
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SSL	soil screening level

SECTION 1.0

Introduction

1.0 Introduction

1.1 Purpose of the Interim Measure Work Plan

This Interim Measure (IM) Work Plan presents the proposed technical approach to delineation of the extent of the lead-impacted soil (i.e., those soils with lead in excess of 400 milligrams per kilogram [mg/kg]) and its subsequent removal at Area of Concern (AOC) 518, Zone C, at the Charleston Naval Complex (CNC).

Specifically, the proposed IM activities include collecting soil samples to identify the extent of the lead-impacted soil, and excavating lead-impacted surface soil with 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 generally accepted soil screening level (SSL) of 400 mg/kg for lead (U.S. Environmental Protection Agency [EPA], 1996). Consequently, subsurface soil is not expected to require removal at this site. However, subsurface soil confirmatory samples will be collected during the excavation work to confirm that lead is not a subsurface soil chemical of concern (COC). If the data indicate the presence of significant lead contamination in subsurface soil, appropriate subsurface soil removal will be implemented.

1.2 Site Background and Setting

AOC 518 is located near the center of Zone C. It consists of the former site of several coal storage bins that were used from approximately 1926 until 1937. The exact location of the coal bins has not been determined, as the unit was taken out of service approximately 57 years ago and no records have been found that provide any information on its design features, dates of operation, or operating practices. The approximate location of AOC 518 is near the gravel and asphalt parking lot adjacent to Buildings M1257 and M1123. No evidence was found that indicated any spills or releases of hazardous materials took place at AOC 518.

Chlordane was identified in the RCRA Facility Investigation (RFI) (June 6, 1995) performed by EnSafe Inc. (EnSafe) as the sole COC for surface soil at AOC 518. The location and the concentration of the chlordane detection above the risk-based concentration (RBC) in surface soil was considered consistent with pesticide application. No soil concentration that would be indicative of a chlordane spill, dumping, or disposal was identified. Lead was

detected at a single location at a concentration that exceeded the residential cleanup level, but was not identified as a COC in the RFI.

No COCs were identified in subsurface soil in the RFI. Based on the available data, groundwater was not expected to have been impacted by site activities at AOC 518. Based on these data, the RFI recommended AOC 518 for No Further Action (NFA).

Supplemental sampling was later conducted at AOC 518 to determine the extent of chlordane and lead-impacted surface soil. CH2M-Jones presented the results of the supplemental sampling in the *CMS Work Plan, Rationale for No Further Action, AOC 518, Zone C*, Revision 0, dated February 2001. CH2M-Jones concluded that lead does not represent an unacceptable level of risk, however there are several samples with reported lead concentrations above the generally accepted residential cleanup level of 400 mg/kg. The South Carolina Department of Health and Environmental Control (SCDHEC) concluded that this lead-impacted area represented a source area that should be considered for active remediation.

Chlordane was not detected above its RBC in any of the CMS samples. Therefore chlordane was determined not to warrant further investigation.

In order to expidite the closeout of AOC 518, CH2M-Jones has determined that removal of the small area of lead-containing soil around soil boring C518SB010 is appropriate, and should enable closeout of AOC 518 in a condition that is suitable for future unrestricted use (i.e., with no land use controls). Accordingly, CH2M-Jones has prepared this IM Work Plan to describe the proposed approach to excavate and dispose of this soil. Comments received from SCDHEC on this IM Work Plan will be adjudicated with SCDHEC prior to implementing the IM.

1.3 Organization of the IM Work Plan

This IM Work Plan consists of the following five 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 11

Technical Approach

2.0 Technical Approach

This section outlines the technical approach to the delineation and removal of lead-impacted soil above the target residential cleanup level (400 mg/kg). The overall strategy for the investigation will be to sample soil around, and in, the area expected to have lead concentrations above 400 mg/kg. This area is illustrated in Figure 2-1. It is based on analytical results of samples collected during the RFI and CMS. The boundary of the area shown in Figure 2-1 was estimated via geostatistical kriging. The lead data for these samples is included in Table 2-1. Once the extent of lead-impacted soil has been determined, it will be removed and disposed of offsite.

2.1 Pre-Excavation Sampling and Contaminant Delineation

Lead concentrations for surface samples C518SB010, C518SBC05, C518SBC06, C518SBC09, and C518SBC10 were above 400 mg/kg. Seven surface soil sample locations (C518SBC04, C518SBC07, C518SBC08, C518SBC11, C518SBC13, C518SBC14, and CGDCSB025) located adjacent to the above locations all reported lead concentrations below the residential cleanup level.

Prior to excavation, additional surface soil samples will be collected and analyzed for lead to more precisely determine the areal extent of the excavation. Approximate locations of the delineation samples are shown in Figure 2-1. CH2M-Jones team members will collect the samples in the field based on site conditions (i.e., the presence of pavement, trees, 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. It should be noted that several trees are located near the excavation area. Removal of these trees as part of the excavation will be avoided to the extent practical.

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

2.2 Excavation of Soils

2.2.1 Cleanup Criteria

As mentioned in 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 the depth of one foot below land surface (ft bls). Subsurface soil samples will be collected from the floor of the excavation spaced approximately 15 to 20 feet apart. Stained or discolored soil that may be contaminated will be sampled if observed. If soil samples from the floor of the excavation report lead concentrations that exceed 400 mg/kg, additional soil will be excavated. The floor of the excavation will be re-sampled after each removal activity to verify that subsurface soil meets the cleanup criterion.

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
Surface and Subsurface Soil Anatytical Results for Lead
IM Work Plan, Soil Removal, AOC 518, Zone C, Charleston Naval Complex

		Surface Soil		Subsurface Soil	
Station ID	**Date Collected**	**Result (mg/kg)**	**Qualifier**	**Result (mg/kg)**	**Qualifier**
C518SB001	04/05/1995	5.6	J	2.6	J
C518SB002	04/05/1995	129	J	6.5	J
C518SB003	04/05/1995	55.3	J	4.5	J
C518SB004	04/05/1995	89.6	J	3.2	J
C518CB004	04/05/1995	185	J	NS	
C518SB005	04/05/1995	9.8	J	3.2	J
C518SB006	06/28/1995	3.2	J	NS	
C518CB006	06/28/1995	30	=	NS	
C518SB007	06/28/1995	NS		NS	
C518SB008	06/28/1995	94.2	=	NS	
C518SB009	06/28/1995	71.1	U	NS	
C518SB010	06/28/1995	750	=	NS	
C518SBC01	03/08/1999	NS		NS	
C518SBC02	03/08/1999	NS		NS	
C518SBC03	03/08/1999	NS		NS	
C518CBC03	03/08/1999	NS		NS	
C518SBC04	03/08/1999	123	J	17.6	J
C518SBC05	03/08/1999	934	J	16.8	J
C518SBC06	03/08/1999	766	J	45.4	J
C518SBC07	03/08/1999	214	J	14.1	J
C518CBC07	03/08/1999	NS		12.6	J
C518SBC08	05/13/1999	149	=	34.8	J

TABLE 2-1
Surface and Subsurface Soil Anatytical Results for Lead
IM Work Plan, Soil Removal, AOC 518, Zone C, Charleston Naval Complex

		Surface Soil		Subsurface Soil	
Station ID	**Date Collected**	**Result (mg/kg)**	**Qualifier**	**Result (mg/kg)**	**Qualifier**
C518SBC09	05/13/1999	**508**	=	3	J
C518SBC10	05/13/1999	**645**	=	177	J
C518SBC11	05/13/1999	210	=	5	J
C518SBC12	05/13/1999	38.1	=	3	J
C518SBC13	05/13/1999	176	=	9.5	J
C518SBC14	05/13/1999	306	=	**428**	J
C518CBC14	05/13/1999	297	=	NS	
CGDCSB025	04/12/1995	163	J	30	J

Bold values indicate exceedances of Cleanup Level (400 mg/kg).

= indicates that the compound was detected and the reported value is equal to the concentration.
J indicates that the compound was detected and the concentration is an estimated value.
U indicates that the compound was not detected.
UJ indicates that the compound was not detected and the value provided is estimated.
NS indicates that the sample was not collected and/or not analyzed for that constituent.

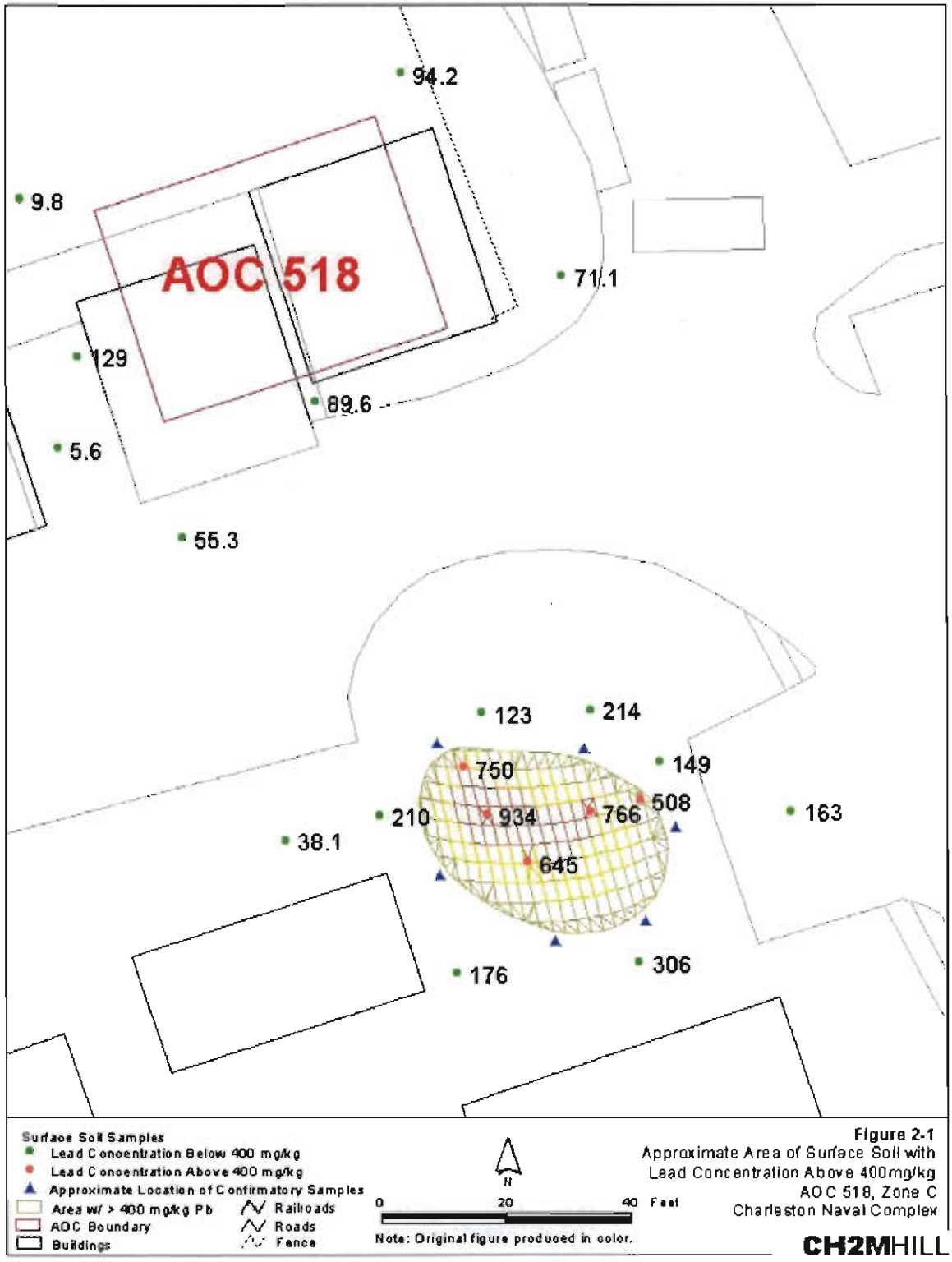

Figure 2-1
Approximate Area of Surface Soil with Lead Concentration Above 400mg/kg
AOC 518, Zone C
Charleston Naval Complex

CH2MHILL

SECTION 3E

Waste Management and Disposal

3.0 Waste Management and Disposal

Three waste streams will be generated as part of this IM; they are 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 soils will be characterized as non-hazardous, they 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 4.0

IM Completion Report

4.0 IM Completion Report

A final report will be submitted within 60 days of completion of the IM. 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
- Site photographs
- Problems encountered
- Other information that would be helpful in evaluating the success of the IM

SECTION 14

References

5.0 References

CH2M-Jones. *Corrective Measures Study Report, Rationale for No Further Action, Area of Concern 518, Coal Storage Bins, Zone C.* February 2001.

EnSafe. *Zone C Final RCRA Facility Investigation Report, NAVBASE Charleston.* June 6, 1995.

U.S. Environmental Protection Agency. *Soil Screening Guidance: Technical Background Document.* May 1996.