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PHASE II INTERIM MEASURE WORK PLAN SOIL REMOVAL SOLID WASTE MANAGEMENT UNIT 5 AND 18 (SWMU 5 AND 18) AREA OF CONCERN 605 AND 621 (AOC 605 AND 621) ZONE E WITH TRANSMITTAL CNC CHARLESTON SC

10/1/2002

CH2M HILL

PHASE II INTERIM MEASURE WORK PLAN

Soil Removal
SWMU 5, SWMU 18, AOC 605, and AOC 621
Zone E

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

April 2002

Revision No. 0
Contract N62467-99-C-0960
158814.ZE.PR.26

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October 1, 2002

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

Re: Phase II Interim Measure Work Plan Addendum 2 for SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E

Dear Mr. Scaturo:

Enclosed please find four copies of the Phase II Interim Measure Work Plan Addendum 2 for SWMU 5, SWMU 18, AOC 605, and AOC 621 in Zone E of the Charleston Naval Complex (CNC). This Phase II IM Work Plan Addendum 2 outlines the results from the Phase II samples and the impacts, if any, to the remainder of the Phase II activities.

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

Phase II Interim Measure Work Plan Addendum 2

SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E

Charleston Naval Complex
North Charleston, SC

Prepared for

U.S. Navy Southern Division
Naval Facilities Engineering Command

Prepared by

CH2M-Jones

October 2002

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Acronyms and Abbreviations

AOC	Area of concern
CNC	Charleston Naval Complex
CSAP	Comprehensive Sampling and Analysis Plan
DMP	Data Management Plan
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
ESDLOQCM	EPA Environmental Services Division *Laboratory Operations and Quality Control Manual*
ft bls	Feet below land surface
IM	Interim measure
lf	Linear feet
MCS	Media Cleanup Standard
mg/L	Milligrams per liter
mg/kg	Milligrams per kilogram
OSWER	Office of Solid Waste and Emergency Response
QAP	Quality Assurance Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SSL	Soil screening level
SWMU	Solid waste management unit
TCLP	Toxicity characteristic leaching procedure
yd^3	Cubic yards

1.0 Introduction

1.1 Purpose of the Phase II Interim Measure Work Plan Addendum 2

An Interim Measure (IM) is proposed to remove soils contaminated with lead at Solid Waste Management Units (SWMUs) 5, 18 and Areas of Concern (AOCs) 605, 621 (herein referred to as Combined SWMU 5) in Zone E of the Charleston Naval Complex (CNC). The IM for this site consists of two phases:

- Phase I —Pre-excavation sampling
- Phase II — Delineation sampling and soil removal

The Phase I and Phase II pre-excavation sampling at Combined SWMU 5 has been completed in accordance with the *Phase I Interim Measure Work Plan; SWMU 5, SWMU 18, AOC 605, and AOC 62,1 Zone E* (CH2M-Jones, 2001) and the *Phase II Interim Measure Work Plan (and Addendum); SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E* (CH2M-Jones, 2002a and b).

The analytical results from these pre-excavation activities have been received and evaluated. This Phase II IM Work Plan Addendum 2 outlines the results from the Phase II samples and the impacts, if any, to the remainder of the Phase II activities.

2.0 Sampling Results

2.1 Intermediate Interval Samples

A total of five intermediate interval samples were proposed in the Phase II IM Work Plan (CH2M-Jones, 2002a). The intermediate interval samples were located where lead was detected at concentrations above the media cleanup standard (MCS) in surface soil, and below the MCS in subsurface soil. The samples were collected as proposed in the Phase II IM Work Plan Addendum (CH2M-Jones, 2002b). Figure 2-1 presents the locations of the intermediate interval samples.

As agreed, the data from these samples were screened in the same manner as previous soil data to determine if subsurface lead concentrations likely present a potential for leaching. Table 2-1 presents the analytical results.

The results from samples within the northern excavation area (at sample locations E005SB060, E005SB061, and E005SB062) show that lead concentrations are all below the soil screening level (SSL) in the intermediate soil interval. Therefore, no changes are proposed for the northern excavation area.

One sample (005SB06403, 4,600 milligrams per kilogram [mg/kg]) exhibited a lead concentration above the SSL in the southern excavation area. The other sample from the southern excavation area contained lead at a concentration below its SSL. As specified in the IM Work Plan, samples that contain lead concentrations more than 2 times the SSL will be excavated. Therefore, soil in the intermediate depth interval (1 to 3 feet below land surface [ft bls]) at the location of E005SB064 is recommended for removal. It was considered unnecessary to revisit mean lead concentrations as this addendum recommends removal of the only sample that would upwardly impact the mean lead concentration.

Figure 2-1 illustrates the revised excavation areas. It should be noted that three (3) depths are now specified for removal at Combined SWMU 5. The two large excavation areas are to be excavated to 1 ft bls. Within the northern excavation area are two sub-areas to be excavated to approximately 5 ft bls (or the top of the water bearing zone). The newly collected intermediate interval sample results indicate that a sub-area within the southern excavation boundary requires removal to 3 ft bls. Additional confirmation samples are

recommended in the intermediate interval excavation to confirm the lateral extent of the 1 to 3-ft bls excavation. These additional samples are discussed in Section 3.0.

2.2 Toxicity Characteristic Leaching Procedure Results

Two waste characterization samples (005SA001M2 and 005SA002M2) were collected during the pre-excavation sampling effort. These samples were analyzed using the toxicity characteristic leaching procedure (TCLP) for lead. The waste characterization samples were composite samples of surface soil within the northern and southern excavation areas, respectively. Each sample was composed of five aliquots. Table 2-2 presents the analytical results for the waste characterization samples.

The analytical results from the waste characterization samples indicate that the lead concentrations in the areas, or part of the areas, where these samples were collected is above that allowed in a Subtitle D landfill. The waste characterization samples were largely comprised of surface soil at the locations of the intermediate interval samples. The samples were biased toward locations where historical data indicated that lead was present at elevated concentrations.

TABLE 2-1
Intermediate Sample Lead Analytical Results
Phase II IM Work Plan Addendum 2, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Sample Location	Sample ID	Result (mg/kg)	Qualifier	SSL (mg/kg)
E005SB060	005SB06003	540	=	1,218
E005SB061	005SB06103	820	=	1,218
E005SB062	005SB06203	1,100	=	1,218
E005SB063	005SB06303	930	=	1,218
E005SB064	005SB06403	**4,600**	=	1,218

Notes: **Bold** and boxed values exceed the site-specific SSL of 1,218 mg/kg.

TABLE 2-2
Waste Characterization (TCLP) Analytical Results
Phase II IM Work Plan Addendum 2, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Sample ID	Composite Sample Locations	Result (mg/L)	Qualifier	TCLP Limit (mg/L)
005SA001M2	E621SB014	350	=	5.0
	E621SB018			
	E005SB060			
	E005SB061			
	E005SB062			
005SA002M2	E005SB063	85	=	5.0
	E005SB064			
	and 3 previously unsampled locations along north side of acid tank			

NOTE: Original figure created in color

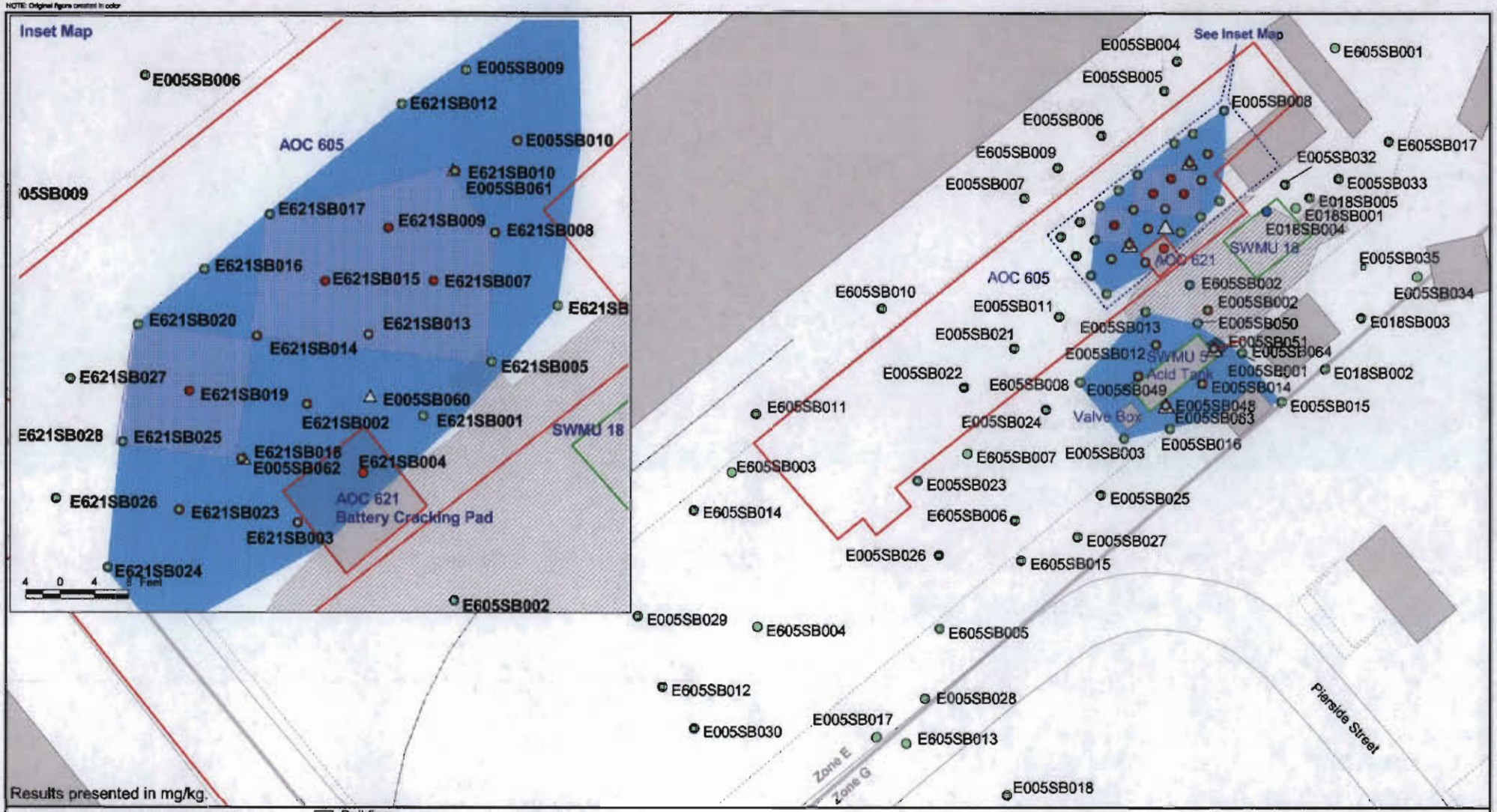

Figure 2-1
Revised Proposed Excavation Areas
AOCs 605 & 621, SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL

File Path: C:\Bgs\Projects\Zone_E\aoc605_swmu5&18aoc_605\a.apr, Date: 24 Sep 2002 10:13, User: NMOUDRY, Lead Surface - Figure 4-1jc

3.0 Confirmation and Waste Characterization Samples

All samples will be collected according to the procedures provided in the approved Comprehensive Sampling and Analysis Plan (CSAP) portion of the *Final Comprehensive RFI Work Plan* (EnSafe/Allen & Hoshall, 1996), except as noted below (saturated samples). The CSAP outlines all monitoring procedures to be performed during the investigation to characterize the environmental setting, source, and releases of hazardous constituents. In addition, the CSAP includes the Quality Assurance Plan (QAP) and Data Management Plan (DMP) to verify that all information and data are valid and properly documented. Sample analysis will be conducted in accordance with the guidance in the EPA's *Test Methods for Evaluating Solid Waste, SW-846, 3rd Ed.*, Office of Solid Waste and Emergency Response (SW846) and in the EPA Environmental Services Division *Laboratory Operations and Quality Control Manual* (ESDLOQCM).

3.1 Excavation Floor

As agreed, CH2M-Jones will collect confirmation samples from the floor of the excavation within the deepest excavation. These samples have a high probability of being saturated due to the depth of the excavation and the relatively high water table elevation. SCDHEC and CH2M-Jones have agreed that draining the water from samples with significant moisture content will not have a significant impact on the analytical results. Therefore, free liquid will be drained from saturated samples prior to being placed into sample containers and submitted to the laboratory for analysis. The collected saturated soil samples will be placed into a paper paint filter, or similar material, and the water allowed to drain. Once the water has drained to the extent practical, the sample will be containerized and packaged for transport to the laboratory.

3.2 Excavation Walls

The horizontal limits of the surface (1 ft bls) and subsurface (5 ft bls) excavations have been adequately defined in the Phase II IM Work Plan (CH2M-Jones, 2002a). Therefore, the collection of confirmation samples from the walls of these excavations is not considered necessary. However, a single intermediate interval sample (005SB06403, 4,600 mg/kg)

contained lead at a concentration that requires removal (e.g., above 2 times the SSL, 2,854 mg/kg). The areal extent of soil containing lead above this level within this depth interval has not been fully determined. Therefore, confirmation samples will be collected from the walls of the 3-ft bls excavation area. The confirmation samples will be collected at a minimum frequency of one sample per 100 linear feet (lf) of excavation wall with a minimum of two samples.

If the analytical results from one or more of these confirmation samples indicate that lead is present above 2,854 mg/kg, the excavation will continue until sampling indicates that lead concentrations are below 2,854 mg/kg.

3.3 Proposed Waste Characterization

Prior to disposal, the excavated soil will be sampled and characterized for waste disposal purposes, as required by the receiving waste facility. Excavated soil will be stockpiled within the excavation area or within bermed storage areas. A composite waste characterization sample will be collected for approximately every 200 cubic yards (yd^3) of excavated soil. The samples will be analyzed for TCLP characteristics. The soil that fails the TCLP will be disposed of in a Subtitle C landfill. The soil that does not fail the TCLP will be disposed of in a Subtitle D landfill.

4.0 References

CH2M-Jones. *Phase I Interim Measure Work Plan; SWMU 5, SWMU 18, AOC 605, and AOC 621 Zone E*. October 2001.

CH2M-Jones. *Phase II Interim Measure Work Plan; SWMU 5, SWMU 18, AOC 605, and AOC 621 Zone E*. April 2002a.

CH2M-Jones. *Phase II Interim Measure Work Plan Addendum; SWMU 5, SWMU 18, AOC 605, and AOC 621 Zone E*. June 2002b.

EnSafe/Allen & Hoshall. *Final Comprehensive Sampling and Analysis Plan (CSAP), RCRA Facility Investigation*. July, 1996.

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

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April 24, 2002

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
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Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: Phase II Interim Measure Work Plan (Revision 0) – SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E

Dear Mr. Scaturo:

Enclosed please find four copies of the Phase II Interim Measure Work Plan (Revision 0) for SWMU 5, SWMU 18, AOC 605, and AOC 621 in Zone E of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Jim Edens. Please contact him at 352/335-5877, extension 2491, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

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

PHASE II INTERIM MEASURE WORK PLAN

Soil Removal
SWMU 5, SWMU 18, AOC 605, and AOC 621
Zone E

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

April 2002

Revision No. 0
Contract N62467-99-C-0960
158814.ZE.PR.26

Certification Page for Phase II Interim Measure Work Plan – SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E

Soil Removal

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

South Carolina

P. E. No. 21428

Dean Williamson, P.E.

4/18/2002

Date

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Acronyms and Abbreviations

ALM	Adult Lead Methodology
AOC	Area of concern
BCT	BRAC Cleanup Team
BEQ	Benzo(a)pyrene equivalent
BRC	Background reference concentration
CMS	Corrective measures study
CNC	Charleston Naval Complex
COC	Chemical of concern
DAF	Dilution attenuation factor
DET	Environmental Detachment Charleston
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
ft bls	Feet below land surface
HI	Hazard index
IEUBK	Integrated Exposures and Uptake Biokinetic (Model)
IM	Interim measure
L/kg	Liters per kilogram
MCL	Maximum contaminant level
MCS	Media cleanup standard
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
PPE	Personal protective equipment
RBC	Risk-based concentration
RCRA	Resource Conservation and Recovery Act
SPLP	Synthetic precipitation leaching procedure

Acronyms and Abbreviations, Continued

SSL	Soil screening level
SVOC	Semivolatile organic compound
SWMU	Solid waste management unit
TCLP	Toxicity characteristic leachate procedure
TSDF	Treatment, storage, and disposal facility
TTAL	Treatment Technique Action Level

1.0 Introduction

1.1 Purpose of the Phase II Interim Measure Work Plan

An Interim Measure (IM) is proposed to remove soils contaminated with lead at Solid Waste Management Units (SWMUs) 5, 18, and at Areas of Concern (AOCs) 605, 621 (referred to as Combined SWMU 5) in Zone E of the Charleston Naval Complex (CNC). The IM for this site consists of two phases:

- Phase I —Pre-excavation sampling
- Phase II —Delineation sampling and soil removal

The Phase I pre-excavation sampling at Combined SWMU 5 has been completed in accordance with the *Phase I Interim Measure Work Plan for SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E* (CH2M-Jones, 2001b). The Phase II IM involves excavating and removing soils as needed within combined SWMU 5.

1.2 Site Background

Combined SWMU 5 is located in the industrial area of Zone E between Pierside Street and Dry Dock No. 4. This area is zoned for continued industrial use.

Previous investigations in the vicinity of the site have indicated the presence of lead contamination in soil and groundwater. An IM for soil has been completed at these sites by the Environmental Detachment Charleston (DET); however, review of site data indicated that the IM has not remediated the sites to be adequately protective of human health and the environment as the final remedy.

The *Zone E RFI Report, Revision 0* (EnSafe Inc. [EnSafe], 1997) identified arsenic, beryllium, and benzo(a)pyrene equivalents (BEQs) as chemicals of concern (COCs) in soil for SWMUs 5, 18, and AOC 605. Review of the analytical results for arsenic and beryllium indicates that these chemicals are present at concentrations within background concentration ranges or below their respective industrial risk-based concentrations (RBCs). Therefore, their presence is not expected to require remedial action and they will be addressed in a subsequent RFI Report Addendum for this site. Nickel and lead have been detected in at least one soil sample at concentrations that exceed their generic soil screening levels (SSLs). Based on this information, lead and nickel in site soil are the focus of this Phase II IM WP. Lead, which has

also been detected in the site groundwater, will be addressed in the subsequent RFI Report Addendum; a Corrective Measures Study (CMS) Work Plan will be prepared to address lead in groundwater, if necessary.

Additional details of the regulatory background and description of these sites are provided in the *Phase I Interim Measure Work Plan for SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E* and the *Zone E RFI Report, Revision 0*.

1.3 Organization of the Phase II Interim Measure Work Plan

This Phase II IM Work Plan consists of the following sections, including this introductory section.

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

2.0 Results of Phase I Interim Measure – Presents the results of the Phase I IM Pre-excavation sampling.

3.0 Identification of Media Cleanup Standards – Identifies and presents the derivation of the proposed media cleanup standards (MCSs) for lead and nickel at combined SWMU 5.

4.0 Technical Approach for the Phase II Interim Measure— Provides a brief description of the technical approach for the IM soil removal, including identification of the proposed excavation area and procedures for waste management and disposal.

5.0 Phase II Interim Measure Completion Report — Describes the proposed contents of the Phase II IM Completion Report.

6.0 References — Lists the references used in this document.

Appendix A presents the analytical data collected during the Phase I IM work.

Appendix B presents the data validation summary for the analytical data collected during the Phase I IM work.

Appendix C presents the boring logs for the newly installed monitoring wells (E605GW005 through E605GW008).

Appendix D presents the Technical Memorandum *Adult Lead Methodology (ALM) Derived Target Lead Concentrations for Industrial Land Use*, (CH2M-Jones, 2001c).

Appendix E presents the derivation for infiltration rate(s).

Appendix F presents supporting parameters for calculating the dilution attenuation factor (DAF), partitioning coefficient (K_d) and SSL values for lead and nickel.

Appendix G presents the Technical Memorandum *Infiltration Variable Used in SSL Calculation.* (CH2M-Jones, 2002).

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

2.0 Results of the Phase I Interim Measure

This section presents the results of the Phase I IM pre-excavation sampling. The soil and groundwater samples were collected as proposed in the *Phase I IM Work Plan for SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E* (CH2M-Jones, 2001b).

Soil samples were analyzed for semivolatile organic compounds (SVOCs), pesticides, lead, and nickel. Soil samples were also analyzed for synthetic precipitation leaching procedure (SPLP) characteristics and pH. Soil sample results are compared to generic screening values in this section, and will be compared to appropriate risk-based criteria and site-specific SSL values in Section 4.0 of this Phase II IM Work Plan. The groundwater samples collected were analyzed for the eight Resource Conservation and Recovery Act (RCRA) metals.

2.1 Phase I Interim Measure Pre-excavation Soil Sampling

The Phase I IM WP involved collecting surface and subsurface soil samples to further delineate the extent of soils exceeding the MCS. Surface soil samples were collected from the 0 to 1 foot below land surface (ft bls) interval and subsurface samples were collected from the 3 to 5 ft bls interval. The data from the Phase I sampling are provided in Appendix A; the data validation summary for these analytical results is provided in Appendix B.

For the Phase I sampling effort, the extent of surface soil with lead concentrations higher than 1,218 milligrams per kilogram (mg/kg) (the industrial land use screening value) was used as the surface soil target MCS. The proposed subsurface soil MCS for lead (1,427 mg/kg, for unpaved land use) is based on the SPLP results from the Phase I samples. Further information on the industrial land use screening value and the SPLP-based MCS is presented in Section 3.0 of this Phase II IM Work Plan.

Nickel was not identified as a COC in the *Zone E RFI Report, Revision 0* (EnSafe, 1997). However, nickel was detected at concentrations that exceeded its calculated SSL (based on a dilution attenuation factor [DAF]=10) of 77.1 mg/kg, which is presented in the *Zone E RFI Report, Revision 0*. Selected samples were analyzed for total nickel and SPLP characteristics during the Phase I sampling to determine whether nickel concentrations threaten local groundwater, and to delineate the extent of nickel-impacted soil in the event remediation of nickel is deemed necessary.

In November 2001, CH2M-Jones collected surface and subsurface samples from 39 locations to complete the delineation at Combined SWMU 5. On February 21, 2002, CH2M-Jones collected soil samples at eight soil borings to calculate the site-specific SSLs.

Figure 2-1 presents the locations of samples collected at combined SWMU 5. Locations of soil samples previously collected by EnSafe for the Zone E RFI are also shown on the figure. Tables 2-1 and 2-2 present summaries of detected compounds from the Phase I IM sampling for surface and subsurface soil, respectively.

2.1.1 Surface Soil Results

Metals

Lead was detected in all 39 samples. Lead concentrations ranged from 4.3 to 15,000 mg/kg. Thirty-four surface soil samples were reported at concentrations above the range of background concentrations for Zone E (1.0 to 400 mg/kg) and the generic SSL (400 mg/kg). Eleven surface soil samples contained lead above the industrial screening level (1,218 mg/kg).

Nickel was detected in all 17 surface soil samples analyzed for nickel. Concentrations ranged from 2.9 J to 120 mg/kg. Five samples contained nickel at concentrations that exceed its generic SSL (DAF=10) of 65 mg/kg. No surface soil sample contained nickel above its industrial RBC (based on a hazard index [HI]=0.1) of 4,100 mg/kg.

Pesticides

Nine pesticides were detected in the seven samples collected and analyzed for pesticides as part of the Phase I IM WP at combined SWMU 5. Only dieldrin was detected at a concentration (E005SB03201, 3.5 J micrograms per kilogram [µg/kg]) that exceeded its generic SSL (DAF=10) of 2 µg/kg. No sample concentration exceeded its industrial RBC of 360 µg/kg.

Dieldrin was detected in the subsurface sample at soil boring E005SB032 at a concentration of 0.33 J mg/kg, which is below the generic SSL. This indicates that dieldrin is adequately attenuated with depth, and therefore does not represent a threat to groundwater at this location.

Dieldrin was detected in 4 of 27 surface soil samples collected during the RFI. All four detections were reported at concentrations that exceed the generic SSL (2 µg/kg, DAF=10). Detected concentrations of dieldrin in RFI surface soil samples did not exceed the industrial

RBC (360 µg/kg), and dieldrin was not detected in any of the 19 subsurface soil samples collected during the RFI. Specifically, dieldrin was not detected in the subsurface sample collected at soil boring E018SB005, which exhibited the highest surface soil concentration of dieldrin. This information supports the conclusion that dieldrin is adequately attenuated with depth, and therefore does not represent a threat to groundwater.

Based on the above information, dieldrin does not warrant further investigation or remedial action at combined SWMU 5.

SVOCs

Eleven SVOCs were detected in the three samples collected and analyzed for SVOCs as part of the Phase I IM WP at combined SWMU 5. No SVOC was detected above the screening criterion.

2.1.2 Subsurface Soil Results

Metals

Lead was detected in all 39 subsurface soil samples. Concentrations ranged from 1.3 to 2,700 mg/kg. Ten subsurface soil samples were reported at concentrations above the range of background concentrations for Zone E (1.8 to 322 mg/kg); nine subsurface soil samples contained lead above the generic SSL of 400 mg/kg for unrestricted (residential) land use (U.S. Environmental Protection Agency [EPA], 1996).

Nickel was detected in 10 of 14 subsurface soil samples analyzed for nickel. The detected concentrations ranged from 4.9 J to 68 mg/kg. Only one sample (005SB02102, 68 mg/kg) contained nickel at a concentration that exceeded its generic SSL (DAF=10) of 65.

Pesticides

Six pesticides were detected in the seven samples collected and analyzed for pesticides as part of the Phase I IM WP at combined SWMU 5. No sample analyzed exceeded its respective generic SSL (DAF=10).

SVOCs

Nine SVOCs were detected in the three samples collected and analyzed for SVOCs as part of the Phase I IM WP at combined SWMU 5. No SVOC was detected above its respective SSL (DAF=10).

2.1.3 SPLP Results

Eight soil borings were advanced to collect SPLP samples. The locations of the SPLP soil borings are presented in Figure 2-2. Samples were collected and analyzed for total lead and SPLP characteristics from five borings. Samples from two borings were analyzed for total nickel and SPLP. Samples from one boring were analyzed for both total lead and nickel as well as SPLP characteristics. A surface and subsurface sample was collected from each boring. The analytical results from these samples are presented in Table 2-3 and are briefly discussed below.

Lead

Lead was detected in both the soil sample and the leachate in all 12 samples (from six borings) collected and analyzed for lead. Total lead concentrations ranged from 3.7 to 150,000 mg/kg. Lead concentrations in the SPLP leachate ranged from 3.5 to 20,000 micrograms per liter (µg/L).

Nickel

Nickel was detected in all six samples (from three borings) collected and analyzed for nickel. Total nickel concentrations ranged from 5.7 to 250 mg/kg. Nickel was detected in the leachate of one surface soil sample (at sample location E005SB05701). Nickel concentrations in the leachate ranged from non-detect (< 4.7 µg/L) to 21 µg/L.

2.2 Phase I IM Pre-excavation Groundwater Sampling

As proposed in the Phase I IM WP, groundwater samples were collected from five locations (E018GW001, E018GW002, E605GW004, E605GW005, and E605GW006) to delineate the extent of lead-impacted groundwater. Four new monitoring wells (E605GW005, E605GW006, E605GW007, and E605GW008) were installed as part of the Phase I IM WP. Only two of the four new wells were sampled. The boring logs for these wells are presented in Appendix C. The locations of the groundwater samples are shown on Figure 2-2.

All groundwater samples were analyzed for the eight RCRA metals, and the analytical results from the groundwater samples were compared to the Zone E background reference concentrations (BRCs) and maximum contaminant levels (MCLs). In the absence of an MCL, the EPA Region III tap water RBC was used. In the case of lead, the Treatment Technique Action Level (TTAL) was used in lieu of an MCL. The analytical results from these samples are presented in Table 2-4. Five metals (arsenic, barium, chromium, lead, and mercury) were detected in one or more of the five samples.

Lead exceeded its TTAL (15 µg/L) only in the sample collected from E605GW004, at a concentration of 21.4 µg/L. Monitoring well E605GW004 is less than 5 feet from the former location of monitoring well E605GW002 (now abandoned) where lead has been previously detected at elevated levels.

None of the other four metals were reported at concentrations that exceed their respective MCLs and BRCs.

TABLE 2-1
Detected Compounds in Surface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Result	Qualifier	Units	EPA Region III RBC[a] (HI=0.1)	SSL[b] (DAF=10)	Zone E Background Range of Concentrations[c]
Lead	E005SB004	11/13/01	**670**	=	mg/kg	1,218	400	1.0 - 400
	E005SB005	11/13/01	**480**	=				
	E005SB006	11/13/01	**440**	=				
	E005SB007	11/13/01	**670**	=				
	E005SB008	11/13/01	**1,900**	=				
	E005SB009	11/13/01	**720**	=				
	E005SB010	11/13/01	**6,900**	=				
	E005SB011	11/13/01	**910**	=				
	E005SB012	11/15/01	**7,000**	=				
	E005SB013	11/15/01	4.3	=				
	E005SB014	11/15/01	**15,000**	=				
	E005SB015	11/15/01	160	=				
	E005SB016	11/15/01	**840**	=				
	E005SB017	11/15/01	260	=				
	E005SB018	11/14/01	100	=				
	E005SB019	11/14/01	160	=				
	E005SB021	11/14/01	**750**	=				
	E005SB022	11/14/01	**1,400**	=				
	E005SB023	11/14/01	**1,400**	=				
	E005SB024	11/15/01	**1,900**	=				
	E005SB025	11/15/01	**700**	=				
	E005SB026	11/15/01	**980**	=				
	E005SB027	11/15/01	400	=				
	E005SB028	11/15/01	110	=				
	E005SB029	11/14/01	170	=				
	E005SB030	11/14/01	**1,900**	=				

TABLE 2-1
Detected Compounds in Surface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Result	Qualifier	Units	EPA Region III RBC[a] (HI=0.1)	SSL[b] (DAF=10)	Zone E Background Range of Concentrations[c]
	E005SB032	11/14/01	**930**	=				
Lead	E005SB033	11/14/01	**490**	=	mg/kg	1,218	400	1.0 - 400
	E005SB034	11/19/01	44	=				
	E005SB034	11/15/01	9.9	=				
	E005SB036	11/15/01	92	=				
	E005SB048	11/16/01	**7,600**	=				
	E005SB049	11/16/01	**6,300**	=				
	E005SB050	11/16/01	8.2	=				
	E005SB051	11/16/01	**8,900**	=				
Nickel	E005SB021	11/14/01	**95**	=	mg/kg	4,100	65	0.6 - 72
	E005SB022	11/14/01	46	=				
	E005SB023	11/14/01	**79**	=				
	E005SB024	11/15/01	59	=				
	E005SB025	11/15/01	**120**	=				
	E005SB026	11/15/01	**120**	=				
	E005SB027	11/15/01	34	=				
	E005SB028	11/15/01	7.4	J				
	E005SB029	11/14/01	25	=				
	E005SB030	11/14/01	**110**	=				
	E005SB032	11/14/01	41	=				
	E005SB033	11/14/01	18	=				
	E005SB034	11/19/01	5.9	J				
	E005SB034	11/15/01	2.9	J				
	E005SB036	11/15/01	7.4	J				
Alpha-chlordane	E005SB032	11/14/01	0.66	J	µg/kg	16,000	5,000	NA
	E005SB034	11/19/01	0.84	J				
	E005SB036	11/15/01	6.8	J				

TABLE 2-1
Detected Compounds in Surface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Result	Qualifier	Units	EPA Region III RBC[a] (HI=0.1)	SSL[b] (DAF=10)	Zone E Background Range of Concentrations[c]
Dieldrin	E005SB032	11/14/01	**3.5**	J	µg/kg	360	2	NA
	E005SB034	11/19/01	0.55	J				
	E005SB036	11/15/01	0.39	J				
	E005SB037	11/13/01	0.55	J				
Endosulfan II	E005SB032	11/14/01	1.3	J	µg/kg	1,200,000	9,000	NA
	E005SB037	11/13/01	0.61	J				
Endrin Aldehyde	E005SB036	11/15/01	0.67	J	µg/kg	61,000	500	NA
Gamma-chlordane	E005SB032	11/14/01	0.68	J	µg/kg	16,000	5,000	NA
	E005SB033	11/14/01	1.4	=				
	E005SB034	11/19/01	1.4	J				
	E005SB036	11/15/01	15	=				
	E005SB037	11/13/01	2.5	J				
Heptachlor Epoxide	E005SB032	11/14/01	0.81	J	µg/kg	630	350	NA
	E005SB033	11/14/01	0.49	J				
	E005SB038	11/14/01	2.6	J				
p,p'-DDD	E005SB034	11/19/01	4.1	J	µg/kg	24,000	8,000	NA
	E005SB036	11/15/01	0.68	J				
	E005SB037	11/13/01	3.4	J				
	E005SB038	11/14/01	29	J				
p,p'-DDE	E005SB032	11/14/01	13	=	µg/kg	17,000	27,000	NA
	E005SB033	11/14/01	2.3	J				
	E005SB034	11/19/01	4.2	J				
	E005SB036	11/15/01	2.1	J				
	E005SB037	11/13/01	9.6	=				
	E005SB038	11/14/01	12	J				
p,p'-DDT	E005SB032	11/14/01	34	J	µg/kg	17,000	16,000	NA

TABLE 2-1
Detected Compounds in Surface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Result	Qualifier	Units	EPA Region III RBC[a] (HI=0.1)	SSL[b] (DAF=10)	Zone E Background Range of Concentrations[c]
	E005SB033	11/14/01	8.8	J				
p,p'-DDT	E005SB034	11/19/01	2.6	J	µg/kg	17,000	16,000	NA
	E005SB036	11/15/01	1	J				
	E005SB037	11/13/01	14	J				
	E005SB038	11/14/01	11	J				
Acenaphthene	E005SB039	11/13/01	340	J	µg/kg	12,000,000	285,000	NA
Benzo(a)Anthracene	E005SB039	11/13/01	56	J	µg/kg	7,800	1,000	NA
	E005SB040	11/13/01	110	J				
Benzo(a)Pyrene	E005SB039	11/13/01	43	J	µg/kg	780	4,000	NA
	E005SB040	11/13/01	100	J				
Benzo(b)Fluoranthene	E005SB039	11/13/01	63	J	µg/kg	7,800	2,500	NA
Benzo(g,h,i)Perylene	E005SB040	11/13/01	57	J	µg/kg	NA	NA	NA
Benzo(k)Fluoranthene	E005SB040	11/13/01	210	J	µg/kg	78,000	24,500	NA
Chrysene	E005SB039	11/13/01	63	J	µg/kg	780,000	80,000	NA
	E005SB040	11/13/01	100	J				
Flouranthene	E005SB039	11/13/01	430	=	µg/kg	8,200,000	2,150,000	NA
	E005SB040	11/13/01	560	J				
	E005SB041	11/13/01	350	J				
Fluorene	E005SB039	11/13/01	340	J	µg/kg	8,200,000	280,000	NA
Phenanthrene	E005SB040	11/13/01	39	J	µg/kg	NA	NA	NA
Pyrene	E005SB039	11/13/01	84	J	µg/kg	6,100,000	2,100,000	NA
	E005SB040	11/13/01	160	J				
BEQs	E005SB039	11/13/01	277.0	J	µg/kg	780	NA	1,304[d]
	E005SB040	11/13/01	386.2	J				
	E005SB041	11/13/01	439.3	J				

Concentrations in bold and outlined text exceed the Zone E range of background concentrations and either the EPA Region III risk-based concentration (RBC) or the soil screening level (SSL).

TABLE 2-1
Detected Compounds in Surface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Result	Qualifier	Units	EPA Region III RBC[a] (HI=0.1)	SSL[b] (DAF=10)	Zone E Background Range of Concentrations[c]

[a] Industrial risk-based concentration (RBC) from the U.S. EPA Region III RBC table (10/2000), based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

[b] U.S. EPA *Soil Screening Guidance: Technical Background Document* (5/1996) based on a dilution attenuation factor (DAF) of 10.

[c] *Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project.* Revision 1A. (CH2M-Jones, December 2001).

[d] BEQ concentrations are derived from calculations made per the Technical Memorandum, *Technical Information for Development of Background BEQ Values* (CH2M-Jones, February 2001).

=	Indicates that the compound was detected. The reported value is the concentration of the compound.
J	Indicates that the compound was detected. The reported value is the estimated concentration of the compound.
UJ	Indicates that the compound was not detected. The reported value is an estimated detection limit.
U	Indicates that the compound was not detected. The reported value is the detection limit.
µg/kg	Micrograms per kilogram
mg/kg	Milligrams per kilogram
NA	Indicates that the information is not available or not applicable.

TABLE 2-2
Detected Compounds in Subsurface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Station ID	Date Collected	Result (mg/kg)	Qualifier	Units	SSL[a] (DAF=10)	Zone E Background Range of Concentrations[b]
Lead	E005SB004	11/13/01	92	=	mg/kg	400	1.8 - 322
	E005SB005	11/13/01	200	=			
	E005SB006	11/13/01	140	=			
	E005SB007	11/13/01	140	=			
	E005SB008	11/13/01	7.6	=			
	E005SB009	11/13/01	350	=			
	E005SB010	11/13/01	200	=			
	E005SB011	11/13/01	74	=			
	E005SB012	11/15/01	**620**	=			
	E005SB013	11/15/01	**700**	=			
	E005SB014	11/15/01	120	=			
	E005SB015	11/15/01	**470**	=			
	E005SB016	11/15/01	14	=			
	E005SB018	11/14/01	90	=			
	E005SB019	11/14/01	77	=			
	E005SB021	11/14/01	**960**	=			
	E005SB022	11/14/01	16	=			
	E005SB023	11/14/01	19	=			
	E005SB024	11/15/01	86	=			
	E005SB025	11/15/01	37	=			
	E005SB026	11/15/01	51	=			
	E005SB027	11/15/01	1.3	=			
	E005SB028	11/15/01	5.6	=			
	E005SB029	11/14/01	21	=			
	E005SB030	11/14/01	300	=			
	E005SB032	11/14/01	**830**	=			
	E005SB033	11/14/01	**550**	=			
	E005SB035	11/19/01	52	=			

TABLE 2-2
Detected Compounds in Subsurface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Station ID	Date Collected	Result (mg/kg)	Qualifier	Units	SSL[a] (DAF=10)	Zone E Background Range of Concentrations[b]
Lead	E005SB036	11/15/01	52	=	mg/kg	400	1.8 - 322
	E005SB048	11/16/01	**2,700**	=			
	E005SB049	11/16/01	200	=			
	E005SB050	11/16/01	**2,100**	=			
	E005SB051	11/16/01	**2,200**	=			
Nickel	E005SB021	11/14/01	**68**	=	mg/kg	65	0.85 - 20
	E005SB024	11/15/01	9.6	=			
	E005SB025	11/15/01	9.8	=			
	E005SB026	11/15/01	13	=			
	E005SB027	11/15/01	14	=			
	E005SB028	11/15/01	1.4	J			
	E005SB030	11/14/01	25	=			
	E005SB033	11/14/01	18	=			
	E005SB035	11/19/01	9.5	=			
	E005SB036	11/15/01	4.9	J			
Dieldrin	E005SB032	11/14/01	0.33	J	µg/kg	2	NA
	E005SB033	11/14/01	0.48	J			
	E005SB035	11/19/01	0.56	J			
Endosulfan II	E005SB033	11/14/01	0.46	J	µg/kg	9,000	NA
Gamma-chlordane	E005SB032	11/14/01	0.29	J	µg/kg	5,000	NA
	E005SB033	11/14/01	1.7	=			
	E005SB036	11/15/01	2.4	J			
p,p'-DDD	E005SB036	11/15/01	2.8	=	µg/kg	8,000	NA
p,p'-DDE	E005SB032	11/14/01	0.7	J	µg/kg	27,000	NA
	E005SB033	11/14/01	1.4	J			
	E005SB035	11/19/01	0.87	J			
	E005SB036	11/15/01	4	=			

TABLE 2-2
Detected Compounds in Subsurface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Station ID	Date Collected	Result (mg/kg)	Qualifier	Units	SSL[a] (DAF=10)	Zone E Background Range of Concentrations[b]
p,p'-DDT	E005SB032	11/14/01	4	J	µg/kg	16,000	NA
	E005SB033	11/14/01	11	J			
	E005SB035	11/19/01	0.91	J			
Acenaphthene	E005SB039	11/13/01	370	J	µg/kg	285,000	NA
	E005SB040	11/13/01	320	J			
	E005SB041	11/13/01	380	J			
Benzo(a)Anthracene	E005SB040	11/13/01	130	J	µg/kg	1,000	NA
Benzo(a)Pyrene	E005SB040	11/13/01	120	J	µg/kg	4,000	NA
Benzo(b)Fluoranthene	E005SB040	11/13/01	200	J	µg/kg	2,500	NA
Benzo(k)Fluoranthene	E005SB040	11/13/01	71	J	µg/kg	24,500	NA
Chrysene	E005SB040	11/13/01	99	J	µg/kg	80,000	NA
Flouranthene	E005SB039	11/13/01	420	J	µg/kg	2,150,000	NA
	E005SB040	11/13/01	510	J			
	E005SB041	11/13/01	460	=			
Fluorene	E005SB039	11/13/01	370	J	µg/kg	280,000	NA
	E005SB041	11/13/01	390	J			
Phenanthrene	E005SB039	11/13/01	43	J	µg/kg	NA	NA
	E005SB040	11/13/01	53	J			
	E005SB041	11/13/01	28	J			
Pyrene	E005SB040	11/13/01	180	J	µg/kg	2,100,000	NA
BEQs	E005SB039	11/13/01	508.4	U	µg/kg	NA	1,400[c]
	E005SB040	11/13/01	352.8	J			
	E005SB041	11/13/01	520.0	U			

Concentrations in bold and outlined text exceed the Zone E range of background concentrations and soil screening level (SSL).

[a] U.S. EPA *Soil Screening Guidance: Technical Background Document* (May 1996) based on a dilution attenuation factor (DAF) of 10.

TABLE 2-2
Detected Compounds in Subsurface Soil (Phase I IM Sampling)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Station ID	Date Collected	Result (mg/kg)	Qualifier	Units	SSL[a] (DAF=10)	Zone E Background Range of Concentrations[b]

[b] *Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project.* Revision 1A. (CH2M-Jones, December 2001).

[c] BEQ concentrations are derived from calculations made per the Technical Memorandum, *Technical Information for Development of Background BEQ Values* (CH2M-Jones, February 2001).

=	Indicates that the compound was detected. The reported value is the concentration of the compound.
J	Indicates that the compound was detected. The reported value is the estimated concentration of the compound.
UJ	Indicates that the compound was not detected. The reported value is an estimated detection limit.
U	Indicates that the compound was not detected. The reported value is the detection limit.
µg/kg	Micrograms per kilogram
mg/kg	Milligrams per kilogram
NA	Indicates that the information is not available or not applicable.

TABLE 2-3
SPLP Results
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

		Lead				Nickel				
Station ID	Sample ID	Soil Result (mg/kg)	Qualifier	Leachate (mg/L)	Qualifier	Soil Result (mg/kg)	Qualifier	Leachate (mg/L)	Qualifier	pH
E005SB052	005SB05201	80	=	0.0078	J	6.3	J	0.0047	U	6.85
	005SB05202	38	=	0.015	J	5.7	J	0.0047	U	4.35
E005SB053	005SB05301	2,500	=	0.21	J	-		-		4.54
	005SB05302	24	=	0.03	J	-		-		6.09
E005SB054	005SB05401	42	=	0.022	J	-		-		5.74
	005SB05402	3.7	=	0.033	J	-		-		5.54
E005SB055	005SB05501	16,000	=	20	=	-		-		5.39
	005SB05502	5,700	=	0.14	J	-		-		5.59
E005SB056	005SB05601	6,900	=	3.2	=	-		-		5.27
	005SB05602	370	=	0.0076	J	-		-		6.21
E005SB057	005SB05701	-		-		250	=	0.021	J	6.61
	005SB05702	-		-		36	=	0.0047	U	7.06
E005SB058	005SB05801	-		-		73	=	0.0047	U	7.64
	005SB05802	-		-		29	=	0.0047	U	7.5
E005SB059	005SB05901	150,000	=	0.055	J	-		-		6.35
	005SB05902	840	=	0.0035	J	-		-		4.7

- Indicates that the sample was not analyzed for the constituent.
= Indicates that the compound was detected. The reported value is the concentration of the compound.
J Indicates that the compound was detected. The reported value is the estimated concentration of the compound.

TABLE 2-3
SPLP Results
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

		Lead				Nickel				
Station ID	**Sample ID**	**Soil Result (mg/kg)**	**Qualifier**	**Leachate (mg/L)**	**Qualifier**	**Soil Result (mg/kg)**	**Qualifier**	**Leachate (mg/L)**	**Qualifier**	**pH**

U Indicates that the compound was not detected. The reported value is the detection limit.
UJ Indicates that the compound was not detected. The reported value is an estimated detection limit.
mg/kg Milligrams per kilogram
mg/L Milligrams per liter

TABLE 2-4
Detected Inorganic Compounds from Phase I IM Groundwater Sampling
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Analyte	Sample Location	Sample ID	Date Collected	Result (µg/L)	Qualifier	MCL[a]	Zone E BRC[b]
Arsenic	E018GW001	018GW001L2	12/05/01	5.21	J	50	18.7
	E605GW004	605GW004L2	12/05/01	6.98	J		
	E605GW005	605GW005L2	12/05/01	8.91	J		
	E605GW006	605GW006L2	12/05/01	4.97	J		
Barium	E018GW001	018GW001L2	12/05/01	85.8	J	2,000	211
	E018GW002	018GW002L2	12/05/01	423	=		
	E605GW006	605GW006L2	12/05/01	158	J		
Chromium, Total	E605GW004	605GW004L2	12/05/01	7.98	J	100	12.3
Lead	E018GW001	018GW001L2	12/05/01	5.58	=	15	4.8
	E605GW004	605GW004L2	12/05/01	**21.4**	=		
	E605GW005	605GW005L2	12/05/01	4.63	=		
	E605GW006	605GW006L2	12/05/01	3.77	=		
Mercury	E018GW001	018GW001L2	12/05/01	0.145	J	2	NC

Concentrations in bold and outlined text exceed the Zone E background reference concentration (BRC) and maximum contaminant level (MCL).

[a] U.S. EPA National Primary Drinking Water Standards (March 2001).

[b] Background Reference Concentration (BRC) from the *Zone E RFI Report, Revision 0* (EnSafe, 1997).

= Indicates that the compound was detected. The reported value is the concentration of the compound.

J Indicates that the compound was detected. The reported value is the estimated concentration of the compound.

U Indicates that the compound was not detected. The reported value is the detection limit.

UJ Indicates that the compound was not detected. The reported value is an estimated detection limit.

µg/L Micrograms per liter

NC Indicates that the BRC was not calculated due to a large percentage (>90%) of non-detects.

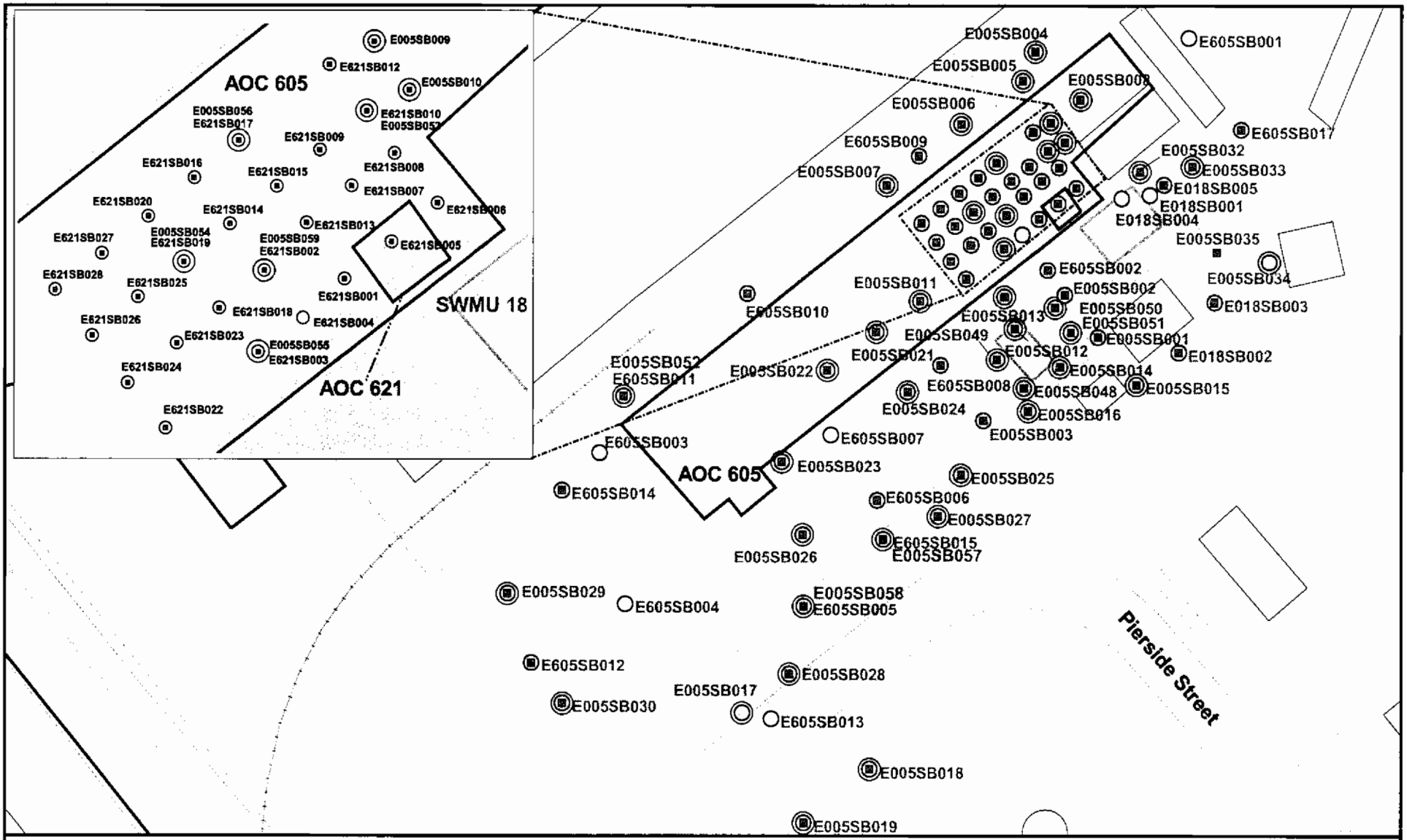
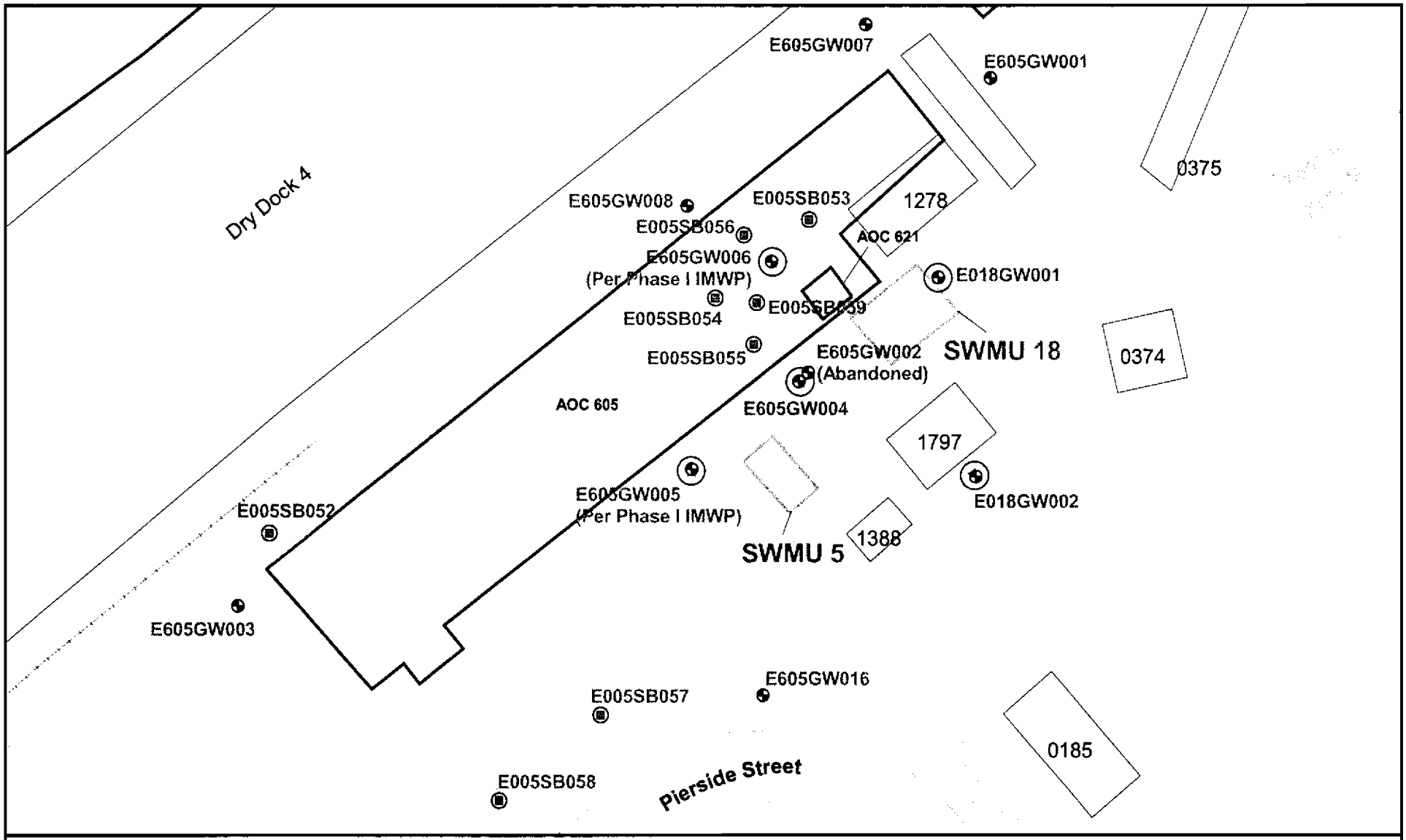


Figure 2-1
Soil Sample Locations
AOCs 605 & 621, and SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\projects\zone_e\aoc605_swmu5&18\aoc_605.apr, Date: 26 Mar 2002 12:32, User: AHOLECEK, EGIS: Charleston Naval Complex - Figure 2-1 Soil Sample Locations



Groundwater Well
Sampled Groundwater Wells
Railroads
Fence
Roads
Buildings
Subsurface Soil Samples (SPLP Sample Type)
Surface Soil Samples (SPLP Sample Type)
Zone Boundary
IM Excavation Area (1998)
AOC Boundary
SWMU Boundary

N

0 40 80 Feet

Figure 2-2
Groundwater Wells and SPLP Samples
AOCs 605 & 621, and SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\projects\zone_e\aoc605_swmu5&18\aoc_805.apr, Date: 26 Mar 2002 12:46, User: AHOLECEK, Groundwater Well Locations - Figure 2-2 Groundwater Well Locations

Section 3.0

3.0 Identification of Media Cleanup Standards

This section identifies the proposed MCSs for lead and nickel, and describes how they are derived. The MCSs are based on human health exposure-based concentrations and concentrations protective of groundwater.

The exposure-based MCSs are described in the subsections below. For groundwater protection, SSLs are calculated using area-specific soil partitioning values and site-specific DAFs. The derivation of the site-specific DAF, the area-specific partitioning coefficients, and the area-specific SSLs are also described in the subsections below.

3.1 Health-Based MCS

To evaluate surface soil for the IM, concentrations will be compared to criteria derived on the basis of direct exposure to human receptors. Combined SWMU 5 and the surrounding area are designated for industrial land use. The land use for the area is expected to remain industrial. Both an unrestricted (residential) land use-based MCS and an industrial land use-based MCS are listed below for lead and nickel. However, proposed MCSs are selected on the basis of industrial land use. It is expected that land use restrictions will also be applied at this site.

3.1.1 Health-Based MCS for Lead

For unrestricted land use at the CNC, the BRAC Cleanup Team (BCT) has agreed to use the generally accepted MCS of 400 mg/kg target screening level in surface soil, which is based on protection of residential children against lead exposure. A CNC-specific lead target value was developed to be protective of adults against lead exposure in areas identified for current and future industrial land use. The target lead MCS was derived from the EPA Adult Lead Methodology (ALM), as detailed in the Technical Memorandum *Adult Lead Methodology (ALM) Derived Target Lead Concentrations for Industrial Land Use* (CH2M-Jones, 2001c). A copy of the technical memorandum is included in Appendix D.

The ALM is specifically used for calculating target lead concentrations protective of adult receptors (e.g., site workers). The ALM uses a biokinetic slope factor to represent lead biokinetecs, and an exposure model in which all exposure pathways, except the soil ingestion pathway, are represented by a background blood-lead concentration. As detailed in the technical memorandum, the ALM calculates a target cleanup value of 1,218 mg/kg

for industrial use sites. Average site residual concentrations will be compared with the target MCS value of 1,218 mg/kg. Combined SWMU 5 is zoned for industrial use, and land use restrictions are planned to be compatible with this use.

3.1.2 Health-Based MCS for Nickel

Nickel was identified as requiring further evaluation based on exceedances of its generic SSL. No surface soil samples were found to contain nickel at concentrations that exceed its residential RBC of 1,600 mg/kg (HI=1) or the industrial RBC of 41,000 mg/kg (HI=1) from the U.S. EPA Region III RBC table (October 2000). Because combined SWMU 5 is located in an area designated for current and future industrial use, an MCS value of 41,000 mg/kg would be appropriate for the protection of human health for workers in the area in the event that remedial actions were determined necessary for nickel in surface soil. Because surface soil concentrations of nickel are all below the industrial RBC, surface soil concentrations also need to be compared to a site-specific SSL .

3.2 Site-Specific SSLs

Site-specific SSLs were derived using EPA SSL guidance (*Soil Screening Guidance: Technical Background Document*, EPA 1996). First, a DAF was calculated specific to combined SWMU 5 and the surrounding area. Then, area-specific partition coefficients (K_d) values were calculated from the SPLP data collected at combined SWMU 5. These two factors were used to calculate site-specific SSLs at combined SWMU 5. K_d values depend on chemical properties and vary with the dynamics between the chemical and the soil in which it is present. The subsections below present the methods used to derive the SSLs.

3.2.1 Site-Specific DAF

Equations 11 and 12 from the EPA *Soil Screening Guidance: Technical Background Document* (1996) were used to derive the DAF, as shown below.

Equation 11: DAF = 1 + Kid/IL

Where K = hydraulic conductivity = 3.0 ft/day = 333.8 m/yr

i = hydraulic gradient = 0.0045 ft/ft

d = mixing zone thickness (from equation 12)

I = infiltration rate = 0.14 m/yr unpaved; 0.0087 m/yr paved

L = source length parallel to groundwater flow direction = 60 ft = 18.3 m

The hydraulic conductivity is extrapolated from the USGS model presented in *Hydrogeology and Simulation of Ground-Water Flow in the Surficial Aquifer System in the Area of Charleston Naval Base, North Charleston, South Carolina, 1995-97, United States Geological Survey Administrative Report 1999*. The hydraulic gradient is estimated from the potentiometric surface map presented in the *Interim Measures Report for Groundwater Monitoring Fiscal Year 2000, Revision 0* (CH2M-Jones, 2001a). The mixing zone thickness is a function of the site properties, as described below. The derivation of the infiltration rates is presented in Appendix E; an unpaved condition will be used to evaluate a worst-case SSL. The source length in the direction of groundwater flow is estimated as 60 ft using the area of soil determined to have been impacted by lead. The estimated value for L was based on historical and recent lead concentration data. Variations in this value have only minor effects on the resulting DAF calculation.

The mixing zone thickness, d, in meters, is calculated from Equation 12 from the Soil Screening Guidance:

Equation 12: $d = (0.0112L^2)^{0.5} + d_a\{1\text{-}\exp[(-LI)/(Kid_a)]\}$

Where L = source length parallel to groundwater flow direction = 18.3 m

d_a = aquifer thickness = 25 ft or 7.6 m

I = infiltration rate = 0.14 m/yr for unpaved

K = hydraulic conductivity = 333.8 m/yr

i = hydraulic gradient = 0.0045 ft/ft

The thickness of the mixing zone is the lessor of Equation 12 or the total aquifer thickness as the mixing zone cannot exceed the saturated thickness of the water bearing zone.

For the unpaved surface, the mixing zone thickness at the combined SWMU 5 is 2.2 m. Using this value, the DAF for the future unpaved condition at the sites is estimated as 3.1. For comparison, using an infiltration rate of 0.0087 m/yr, representative of a paved condition, the DAF at combined SWMU 5 is calculated as 20.6. The value based on the unpaved scenario will be used to develop the leachability-based MCS for lead and nickel at combined SWMU 5 as a conservative assumption, even though the site is expected to remain paved.

3.2.2 Partitioning Coefficient for Lead

A partitioning coefficient (K_d) was calculated for each sample, on the basis of the quantities of soil and water used in the SPLP test and the resulting leachate concentrations. The K_d is the ratio between the soil and the leachate concentrations, expressed in units of liters per kilogram (L/kg). Calculations are presented in Appendix F. The partitioning coefficient for each sample that was analyzed for lead by SPLP is listed in Table 3-1.

For the purposes of calculating site-specific SSLs from SPLP data, samples where lead was not detected in the leachate, or in the soil samples where lead was detected within or below the range of background concentrations (surface soil, 400 mg/kg; subsurface soil, 322 mg/kg) were not used in the SSL (K_d) calculation.

As described in the Technical Memorandum *Infiltration Variables Used in SSL Calculations* (CH2M-Jones, 2002), in the case where the metal is not detected in the leachate, one-half the detection limit is used for the leachate concentration to calculate K_d. A copy of the technical memorandum is included in Appendix G.

The solubility of lead in water varies with pH. The equilibrium concentration of lead in water at a pH of 4 is a maximum of 4 mg/L. At a pH of 8 the maximum lead concentration would be 0.2 mg/L. The equilibrium lead concentration could be significantly less in the presence of phosphate and chloride, as low as 0.3 mg/L at a pH of 4 and 0.001 mg/L at a pH of 8 (EPA, 1999b). Based on this information, chemistry in SPLP samples with lead concentrations in the leachate above the solubility limit would be controlled by precipitation chemistry rather than adsorption reactions. One sample (005SB05501, 20 mg/L) was found to contain lead at a concentration that was above the solubility limit and one sample (005SB05601, 3.2 mg/L) was near the solubility limit. As a conservative assumption, the results from these samples were used in the calculation of Kd to provide a conservative SSL value, but it should be noted that the analytical results from these samples may not be representative of actual site conditions (they may over-predict the leachability of lead).

As shown in Table 3-1, the K_d for the soil at the combined SWMU 5 was calculated at values ranging from 2,136 to 2,727,253 L/kg for samples used in the site-specific SSL calculation. The geometric mean of these K_d values was calculated to provide a conservative partitioning coefficient for the site of 30,695 L/kg.

3.2.3 Partitioning Coefficient for Nickel

Partitioning coefficients for each SPLP sample were calculated from the total nickel concentration and the leachate concentration. Results for samples where the soil

concentrations of nickel were below the upper bound of background concentrations (surface soil, 72 mg/kg; subsurface soil, 20 mg/kg) were not used in the site-specific SSL (K_d) calculation.

As described in the Technical Memorandum *Infiltration Variables Used in SSL Calculations* (CH2M-Jones, 2002), in the case where the metal is not detected in the leachate, one-half the detection limit is used for the leachate concentration to calculate K_d. A copy of the technical memorandum is included in Appendix G.

As shown in Table 3-1, the partitioning coefficient for nickel was calculated to be 16,225 L/kg.

3.2.4 SSL for Lead at Combined SWMU 5

SSLs were calculated using the following equation:

$$SSL = K_d \times MCL \times DAF$$

Where MCL = Maximum Contaminant Level. The National Primary Drinking Water TTAL of 0.015 mg/L was used for lead although it is applicable to treated water at the tap. The SSLs calculated from the site-specific K_d values and the site-specific DAF are listed in Table 3-1.

The SSL for the future unpaved condition was calculated at 1,427 mg/kg, and for a future paved condition, the SSL was calculated at 9,485 mg/kg.

3.2.5 SSL for Nickel at Combined SWMU 5

Table 3-1 and Appendix F show that the partitioning coefficient for nickel was calculated at 16,225 L/kg. The DAF values used for the lead SSL calculations, with a conservative value of source length (L) of 60 ft, were used to calculate an SSL of 36,716 mg/kg for the unpaved future scenario, and 243,987 mg/kg for the paved scenario.

3.3 Application of MCS for Lead at Combined SWMU 5

The MCS for surface soil (0 to 1 ft bls) is the lower value of the industrial RBC (1,218 mg/kg) and the site-specific SSL (1,472 mg/kg), in areas exceeding background conditions. Therefore the proposed surface soil MCS is 1,218 mg/kg. The MCS for subsurface soil (greater than 1 ft bls) is the SSL of 1,427 mg/kg.

The industrial RBC is based on exposure to the average site concentration. Therefore, meeting the MCS requires removing lead-impacted soil until the mean lead concentration drops below the proposed MCS.

Likewise, individual SSL exceedances are not necessarily expected to pose a threat to groundwater. To determine if a threat to groundwater exists, mean concentrations within suspected source areas were compared to the SSL. Lead-impacted subsurface soil will be removed such that the mean lead concentration remaining in the source area is less than the MCS (1,427 mg/kg). In order to insure that the proposed IM adequately protects groundwater, individual soil borings that contain lead at concentrations greater than 2 times the SSL (2,854 mg/kg) will be excavated regardless of the mean concentration.

3.4 Application of MCS for Nickel at Combined SWMU 5

Tables 3-2 and 3-3 present all nickel data from Combined SWMU 5 surface and subsurface soils, respectively. As seen in Table 3-3, all surface soil samples at combined SWMU 5 reveal nickel concentrations below the health-based MCS for industrial land use and the site-specific SSL. All subsurface soil samples are below the site-specific SSL. It should be noted that nickel has not been detected in groundwater at the site above the tap water RBC (73 µg/L, HI=0.1). Therefore, remediation of nickel-containing soils is not warranted for protection of human health or of groundwater, and will not be addressed further in this IM.

TABLE 3-1
Partitioning Coefficients and SSLs
Phase II IM Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

			Lead					Nickel				
Soil Boring	**Sample Location**	**Soil Sample Type**	**Soil Result (mg/kg)**	**Leachate Result (mg/L)**	**Kd (L/kg)**	**Unpaved SSL (DAF=3.1) (mg/kg)**	**Paved SSL (DAF=20.6) (mg/kg)**	**Soil Result (mg/kg)**	**Leachate Result (mg/L)**	**Kd (L/kg)**	**Unpaved SSL (DAF=3.1) (mg/kg)**	**Paved SSL (DAF=20.6) (mg/kg)**
E005SB052	Non-Impacted Area	Surface	80 J	0.0078 U	10,246[a]			6.3 J	0.0047 U	1,320[ac]		
		Subsurface	38 J	0.015 U	2,523[a]			5.7 J	0.0047 U	1,193[ac]		
E005SB053	Lead-Impacted Area	Surface	2,500 J	0.21 J	11,885			-	-	-		
		Subsurface	24 J	0.030 J	780[a]			-	-	-		
E005SB054	Lead-Impacted Area	Surface	42 J	0.022 J	1,889[a]			-	-	-		
		Subsurface	3.7 J	0.033 J	92[a]			-	-	-		
E005SB055	Lead-Impacted Area	Surface	16,000 J	20	780[b]			-	-	-		
		Subsurface	5,700 J	0.14 J	40,694			-	-	-		
E005SB056	Lead-Impacted Area	Surface	6,900 J	3.2	2,136			-	-	-		
		Subsurface	370 J	0.0076 U	48,674			-	-	-		
E005SB057	Nickel-Impacted Area	Surface	-	-	-			250	0.021 J	11,885		
		Subsurface	-	-	-			36	0.0047 U	15,279[c]		
E005SB058	Nickel-Impacted Area	Surface	-	-	-			73	0.0047 U	31,024[c]		
		Subsurface	-	-	-			29	0.0047 U	12,300[c]		
E005SB059	Lead-Impacted Area	Surface	150,000 J	0.055 J	2,727,253			-	-	-		
		Subsurface	840 J	0.0035 U	239,990			-	-	-		
Geometric Mean (excludes samples with soil concentrations below background)					**30,695**	**1,427**	**9,485**			**16,225**	**36,716**	**243,987**

TABLE 3-1
Partitioning Coefficients and SSLs
Phase II IM Work Plan, SWMUs 5, 18 and AOCs 605, 621, Zone E, Charleston Naval Complex

			Lead					Nickel				
Soil Boring	**Sample Location**	**Soil Sample Type**	**Soil Result (mg/kg)**	**Leachate Result (mg/L)**	**Kd (L/kg)**	**Unpaved SSL (DAF=3.1) (mg/kg)**	**Paved SSL (DAF=20.6) (mg/kg)**	**Soil Result (mg/kg)**	**Leachate Result (mg/L)**	**Kd (L/kg)**	**Unpaved SSL (DAF=3.1) (mg/kg)**	**Paved SSL (DAF=20.6) (mg/kg)**

[a] Soil concentration within background range.

[b] Leachate concentration exceeds solubility limit.

[c] Leachate concentration below detection limit. Kd based on ½ detection limit.

J Reported concentration is estimated.

Kd Site-Specific Partitioning Coefficient

SSL Site-Specific Soil Screening Level for Groundwater Protection. SSL based on DAF = 3.1 for unpaved; 20.6 for paved.

TABLE 3-2
Nickel Concentrations in Surface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Result (mg/kg)	Qualifier	EPA Region III RBC[a] (HI=0.1)	Site-Specific SSL[b] (DAF=10)	Zone E Background Range of Concentrations[c]
E005SB002	005SB00201	09/25/1995	1.4	J	4,100	36,716	0.6 - 72
E005SB001	005SB00101	09/25/1995	8.7	=			
E005SB003	005SB00301	09/22/1995	17.6	=			
E018SB005	018SB00501a	09/25/1995	22.8	=			
E018SB004	018SB00401a	09/25/1995	16.7	=			
E018SB003	018SB00301a	10/03/1995	6.3	J			
E018SB002	018SB00201a	09/25/1995	1.7	J			
E018SB001	018SB00101a	09/25/1995	10.3	=			
E605SB004	605SB00401	09/21/1995	11.6	=			
E605SB005	605SB00501	09/26/1995	73.8	=			
E605SB006	605SB00601	09/22/1995	16.3	=			
E605SB007	605SB00701	09/22/1995	245	=			
E605SB008	605SB00801	09/22/1995	21.9	=			
E605SB009	605SB00901	09/22/1995	39.2	=			
E605SB002	605SB00201	09/26/1995	0.77	J			
E605SB010	605SB01001	09/21/1995	9.30	=			
E605SB011	605SB01101	09/21/1995	33.0	=			
E605SB012	605SB01201	05/31/1996	221	J			
E605SB013	605SB01301	05/31/1996	53.1	J			
E605SB014	605SB01401	05/31/1996	35.0	J			
E605SB003	605SB00301	09/21/1995	38.8	=			
E605SB001	605SB00101	09/25/1995	20.5	=			
E605SB017	605SB01701	09/17/1996	13.0	=			
E621SB001	621SB00101	01/27/1999	2.7	J			
E621SB002	621SB00201	01/27/1999	7.1	=			
E621SB003	621SB00301	01/27/1999	7.6	=			
E621SB004	621SB00401	01/27/1999	1.7	J			
E605SB015	605SB01501	05/31/1996	17	J			
E005SB021	005SB02101	11/14/2001	95.0	=			

TABLE 3-2
Nickel Concentrations in Surface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Result (mg/kg)	Qualifier	EPA Region III RBC[a] (HI=0.1)	Site-Specific SSL[b] (DAF=10)	Zone E Background Range of Concentrations[c]
E005SB022	005SB02201	11/14/2001	46.0	=	4,100	36,716	0.6 - 72
E005SB023	005SB02301	11/14/2001	79.0	=			
E005SB024	005SB02401	11/15/2001	59.0	=			
E005SB025	005SB02501	11/15/2001	120	=			
E005SB026	005SB02601	11/15/2001	120	=			
E005SB027	005SB02701	11/15/2001	34.0	=			
E005SB028	005SB02801	11/15/2001	7.40	J			
E005SB029	005SB02901	11/14/2001	25.0	=			
E005SB030	005SB03001	11/14/2001	110	=			
E005SB032	005SB03201	11/14/2001	41.0	=			
E005SB033	005SB03301	11/14/2001	18.0	=			
E005SB034	005SB03501	11/19/2001	5.9	J			
E005SB034	005SB03401	11/15/2001	2.9	J			
E005SB036	005SB03601	11/15/2001	7.4	J			

[a] Industrial Risk Based Concentration (RBC) from the U.S. EPA Region III RBC table (10/2000), based on a hazard index (HI) of 0.1 for non-carcinogenic compounds.

[b] Site-specific soil screening level presented in this Phase II IM WP.

[c] *Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project.* Revision 1A (CH2M-Jones, December 2001).

=	Indicates that the compound was detected. The reported value is the concentration of the compound.
J	Indicates that the compound was detected. The reported value is the estimated concentration of the compound.
UJ	Indicates that the compound was not detected. The reported value is an estimated detection limit.
U	Indicates that the compound was not detected. The reported value is the detection limit.
mg/kg	Milligrams per kilogram

TABLE 3-3
Nickel Concentrations in Subsurface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier	Site-Specific SSL[a] (DAF=10)	Zone E Background Range of Concentrations[b]
E005SB001	005SB00102	09/25/1995	127	=	36,716	0.85 - 20
E005SB003	005SB00302	09/22/1995	16.2	=		
E005SB002	005SB00202	09/25/1995	0.79	J		
E018SB005	018SB00502a	09/25/1995	3.2	J		
E018SB003	018SB00302a	10/03/1995	8.6	J		
E018SB002	018SB00202a	09/25/1995	9.7	=		
E605SB009	605SB00902	09/22/1995	20.6	=		
E605SB005	605SB00502	09/26/1995	27.7	=		
E605SB006	605SB00602	09/22/1995	12.7	=		
E605SB002	605SB00202	09/26/1995	7.4	=		
E605SB010	605SB01002	09/21/1995	12.3	=		
E605SB011	605SB01102	09/21/1995	8.1	=		
E605SB012	605SB01202	05/31/1996	19.2	J		
E605SB008	605SB00802	09/22/1995	1.7	J		
E605SB015	605SB01502	05/31/1996	17.5	J		
E605SB014	605SB01402	05/31/1996	23.7	J		
E605SB017	605SB01702	09/17/1996	12.7	=		
E621SB001	621SB00102	01/27/1999	8.2	=		
E621SB002	621SB00202	01/27/1999	10.5	=		
E621SB003	621SB00302	01/27/1999	7.9	=		
E005SB021	005SB02102	11/14/2001	68.0	=		
E005SB024	005SB02402	11/15/2001	9.6	=		
E005SB025	005SB02502	11/15/2001	9.8	=		
E005SB026	005SB02602	11/15/2001	13.0	=		
E005SB027	005SB02702	11/15/2001	14.0	=		
E005SB028	005SB02802	11/15/2001	1.40	J		
E005SB030	005SB03002	11/14/2001	25.0	=		
E005SB033	005SB03302	11/14/2001	18.0	=		

TABLE 3-3
Nickel Concentrations in Subsurface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier	Site-Specific SSL[a] (DAF=10)	Zone E Background Range of Concentrations[b]
E005SB035	005SB03502	11/19/2001	9.5	=	36,716	0.85 - 20
E005SB036	005SB03602	11/15/2001	4.9	J		

[a] Site-specific soil screening level presented in this Phase II IM WP.

[b] *Project Team Notebook and Instructions, Charleston Naval Complex, Environmental Restoration Project.* Revision 1A (CH2M-Jones, December 2001).

=	Indicates that the compound was detected. The reported value is the concentration of the compound.
J	Indicates that the compound was detected. The reported value is the estimated concentration of the compound.
UJ	Indicates that the compound was not detected. The reported value is an estimated detection limit.
U	Indicates that the compound was not detected. The reported value is the detection limit.
mg/kg	Milligrams per kilogram

4.0 Technical Approach for the Phase II Interim Measure

This section outlines the technical approach to the removal of lead-contaminated soil at combined SWMU 5, where lead concentrations were detected above the MCS.

As discussed in Section 3.4 of this IM Work Plan, the soils containing nickel at combined SWMU 5 do not warrant remediation.

4.1 Contaminant Delineation

The lead concentrations in surface soil samples shown in Table 4-1 were screened against a CNC-specific MCS of 1,218 mg/kg for industrial land use and the site-specific SSL. The lead concentrations in the subsurface soil samples shown in Table 4-2 were screened against the site-specific SSL of 1,427 mg/kg. The background range of concentrations for Zone E are shown in Tables 4-1 and 4-2, but because the MCSs are greater than the range of background concentrations, comparison to background values is not appropriate. Figures 4-1 and 4-2 illustrate the locations where lead has been detected at concentrations above the appropriate MCS(s) at the site for surface and subsurface soil respectively.

The extent of lead contamination has been evaluated to estimate the area for soil removal for the Phase II IM. The estimated target boundaries of the excavations are presented in Figure 4-3.

The excavation areas for surface removal were determined by taking the analytical results from samples within the exposure area and calculating an exposure concentration. Because the site is expected to remain industrial and site workers would be expected to be uniformly exposed to the entire site, the entire site was considered the exposure area. The resulting exposure concentration was then compared to the MCSs. The lead cleanup standard is set using EPA's Integrated Exposures and Uptake Biokinetic (IEUBK) Model, which estimates blood lead concentrations based on exposure averages. Based on application of the IEUBK Model, a mean exposure concentration was calculated for the exposure area, as recommended by EPA.

The mean lead concentration for surface soil within the exposure area was calculated to be 6,451 mg/kg, which is above the 1,218 mg/kg MCS for surface soil. Table 4-1 lists the

analytical results for lead in surface soil in order of increasing concentration. The "Mean Concentration" column shows the calculated mean concentration for samples with lead concentrations equal to, or less than, the corresponding sample where the mean concentration is shown. Sample results that were within the 1998 IM excavation area were eliminated from the exposure calculation (identified with a superscript "r" at the end of the Station ID). Table 4-1 shows that eliminating the 12 highest surface soil concentrations (>8,900 mg/kg) results in a mean lead concentration of 1,157 mg/kg, which is below the MCS. However, seven additional samples contain lead above twice the SSL value (2,854 mg/kg). CH2M-Jones has proposed to remove surface soil with lead concentrations above twice the SSL, as a conservative approach. Removal of locations exhibiting lead concentrations above 2,854 mg/kg results in two surface soil excavation areas. One to the north and one to the south of the previous IM excavation performed by the DET. The locations of surface soil samples with lead concentrations above 2,854 mg/kg are located within the two target excavation areas. The excavation boundaries extend to the nearest surface soil sample containing lead below 2,854 mg/kg. The approximate areas of the surface soil excavations are presented in Figure 4-1. The estimated residual mean surface soil lead concentration following the completion of this IM was calculated to be 601 mg/kg .

Mean lead concentrations for subsurface soil at each of the two surface soil excavation areas were calculated. Tables 4-3 and 4-4 present the samples, individual sample concentrations, and calculated mean concentrations for each of the two proposed excavation areas. The tables list the analytical results for lead in subsurface soil in order of increasing concentration. The "Mean Concentration" column shows the calculated mean concentration for samples with lead concentrations equal to, or less than, the corresponding sample where the mean concentration is shown. Sample results that were within the 1998 IM excavation area were eliminated from the calculation (identified with a superscript "r" at the end of the Station ID).

The mean concentration for the AOC 621 samples, which were used to define the northern surface soil excavation area, was calculated to be 1,103 mg/kg, which is below the SSL. However, four locations exhibited lead concentrations above twice the SSL. Therefore, the subsurface excavation area includes these four locations and is shown on Figure 4-2.

At the southern surface soil excavation area, the mean subsurface lead concentration was calculated to be 750 mg/kg, which is below the SSL. Within the southern surface soil excavation area no subsurface soil samples exceeded twice the SSL value. Because the mean

subsurface lead concentration is below the SSL and no individual sample exceeds twice the SSL, subsurface excavation is not warranted in the southern surface soil excavation area.

The method presented in this IM Work Plan is considered to provide a conservative approach to be protective of groundwater. This conclusion is supported by the groundwater analytical results. Lead concentrations in monitoring well E605GW002 were generally increasing in 1996 (see Table 4-5). This monitoring well was abandoned around the time of the IM conducted by the DET. Monitoring well E605GW004 was subsequently installed within 5 feet of the former location of E605GW002. Lead concentrations from the Phase I IM sampling showed a marked decrease in lead concentrations in the area (21.4 µg/L). The current lead concentration in monitoring well E605GW004 is within the range of Zone E background concentrations, indicating that the DET's IM had a substantial, positive, impact on groundwater quality. During the Phase I IM sampling, monitoring well E605GW006 was installed within the presumed source area near soil boring E621SB015. Lead results for the sample collected from this well are below the TTAL and the Zone E BRC, indicating that groundwater quality in this area has not been significantly impacted by the existing concentrations of lead. The proposed removal would be expected to further improve groundwater quality with respect to lead. Figure 4-3 presents the lead concentrations in groundwater samples collected as part of the Phase I IM.

Subsurface soil in the interval between 1 and 3 ft bls has not been evaluated. A total of four samples in this interval are proposed to determine the final depth of the surface excavation. The locations of the four proposed delineation samples are presented on Figures 4-1 and 4-2.

4.2 Soil Excavation

The initial surface soil excavation boundary is illustrated in Figure 4-1. The depth of the shallow excavation will be determined prior to field activities from analytical results obtained from the intermediate interval (1 to 3 ft bls) samples. The area identified as the subsurface excavation area (see Figure 4-2) will be excavated to a depth of 5 ft bls, or to the top of the water bearing zone. The soil will be removed using an excavator or similar equipment. The excavated soil will be stockpiled within a lined containment area for temporary storage prior to off-site disposal.

Prior to removal activities, monitoring well E605GW006 will be abandoned. Abandonment will be performed in accordance with South Carolina well abandonment regulations.

4.3 Waste Management and Disposal

Three waste streams will be generated as part of this IM:

- excavated soils;
- decontamination wastes; and
- personal protective equipment (PPE) and stockpile liners.

Two toxicity characteristic leaching procedure (TCLP) samples are proposed for waste characterization (i.e., one for each excavation area). The TCLP samples will be a composite of five surface soil samples. The samples that makeup the composite sample will be representative of the soil that will be removed. Locations for each aliquot should be randomly chosen from within the proposed excavation area.

Soil samples with lead concentrations greater than 5 mg/L in the leachate will be delivered to a permitted Treatment, Storage, and Disposal Facility (TSDF). Other soil will be transferred to a Subtitle D landfill.

Decontamination wastes and PPE will be disposed of in accordance with appropriate 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 documented in the IM Completion Report generated for combined SWMU 5.

TABLE 4-1
Lead Concentrations in Surface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Mean Concentration[a]
E005SB013	005SB01301	11/15/2001	4.3	=	
E621SB005	621SB00501	07/28/1999	7.7	=	
E005SB050	005SB05001	11/16/2001	8.2	=	
E018SB002	018SB00201a	09/25/1995	8.7	J	
E005SB034	005SB03401	11/15/2001	9.9	=	
E621SB006	621SB00601	07/28/1999	16.0	=	
E018SB003	018SB00301a	10/03/1995	42.4	J	
E005SB034	005SB03501	11/19/2001	44.0	=	
E005SB036	005SB03601	11/15/2001	92.0	=	
E005SB018	005SB01801	11/14/2001	100	=	
E005SB028	005SB02801	11/15/2001	110	=	
E605SB004	605SB00401	09/21/1995	113	J	
E605SB010	605SB01001	09/21/1995	120	J	
E605SB014	605SB01401	05/31/1996	123	J	
E621SB028	621SB02801	07/28/1999	140	=	
E005SB019	005SB01901	11/14/2001	160	=	
E005SB015	005SB01501	11/15/2001	160	=	
E005SB029	005SB02901	11/14/2001	170	=	
E605SB017	605SB01701	09/17/1996	176	=	
E605SB011	605SB01101	09/21/1995	177	J	
E605SB001	605SB00101	09/25/1995	205	J	
E621SB026	621SB02601	07/28/1999	240	=	
E605SB005	605SB00501	09/26/1995	249	J	
E005SB017	005SB01701	11/15/2001	260	=	
E605SB003	605SB00301	09/21/1995	270	J	
E005SB001	005SB00101	09/25/1995	338	J	
E605SB006	605SB00601	09/22/1995	399	J	
E005SB027	005SB02701	11/15/2001	400	=	
E018SB001	018SB00101a	09/25/1995	404	J	
E621SB020	621SB02001	07/28/1999	420	=	

TABLE 4-1
Lead Concentrations in Surface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Mean Concentration[a]
E005SB006	005SB00601	11/13/2001	440	=	
E621SB016	621SB01601	07/28/1999	450	=	
E605SB008	605SB00801	09/22/1995	460	J	
E005SB003	005SB00301	09/22/1995	462	J	
E005SB005	005SB00501	11/13/2001	480	=	
E005SB033	005SB03301	11/14/2001	490	=	
E605SB013	605SB01301	05/31/1996	627	J	
E005SB004	005SB00401	11/13/2001	670	=	
E005SB007	005SB00701	11/13/2001	670	=	
E018SB005	018SB00501a	09/25/1995	680	J	
E005SB025	005SB02501	11/15/2001	700	=	
E005SB009	005SB00901	11/13/2001	720	=	
E605SB009	605SB00901	09/22/1995	731	J	
E621SB027	621SB02701	07/28/1999	750	=	
E005SB021	005SB02101	11/14/2001	750	=	
E605SB012	605SB01201	05/31/1996	815	J	
E005SB016	005SB01601	11/15/2001	840	=	
E005SB011	005SB01101	11/13/2001	910	=	
E621SB022	621SB02201	07/28/1999	930	=	
E005SB032	005SB03201	11/14/2001	930	=	
E005SB026	005SB02601	11/15/2001	980	=	
E621SB001	621SB00101	01/27/1999	1,000	J	
E621SB012	621SB01201	07/28/1999	1,100	=	
E605SB015	605SB01501	05/31/1996	1,120	J	
E605SB007	605SB00701	09/22/1995	1,190	J	
E621SB024	621SB02401	07/28/1999	1,400	=	
E005SB022	005SB02201	11/14/2001	1,400	=	
E005SB023	005SB02301	11/14/2001	1,400	=	
E605SB002[r]	605SB00201	09/26/1995	1,600	J	
E621SB025	621SB02501	07/28/1999	1,700	=	

TABLE 4-1
Lead Concentrations in Surface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Mean Concentration[a]
E005SB024	005SB02401	11/15/2001	1,900	=	
E005SB030	005SB03001	11/14/2001	1,900	=	
E005SB008	005SB00801	11/13/2001	1,900	=	
E018SB004[r]	018SB00401a	09/25/1995	1,960	J	
E621SB017	621SB01701	07/28/1999	2,400	=	601
E621SB018	621SB01801	07/28/1999	3,100	=	
E621SB014	621SB01401	07/28/1999	3,300	=	
E005SB049	005SB04901	11/16/2001	6,300	=	
E005SB010	005SB01001	11/13/2001	6,900	=	
E005SB012	005SB01201	11/15/2001	7,000	=	
E005SB048	005SB04801	11/16/2001	7,600	=	
E005SB051	005SB05101	11/16/2001	8,900	=	1,157
E005SB002[r]	005SB00201	09/25/1995	10,500	J	
E621SB023	621SB02301	07/28/1999	11,000	=	1,295
E005SB014	005SB01401	11/15/2001	15,000	=	
E621SB004	621SB00401	01/27/1999	15,700	J	
E621SB013	621SB01301	07/28/1999	16,000	=	
E621SB010	621SB01001	07/28/1999	16,000	=	
E621SB008	621SB00801	07/28/1999	19,000	=	
E621SB009	621SB00901	07/28/1999	21,000	=	
E621SB007	621SB00701	07/28/1999	26,000	=	
E621SB019	621SB01901	07/28/1999	28,000	=	
E621SB003	621SB00301	01/27/1999	41,300	J	
E621SB015	621SB01501	07/28/1999	110,000	=	
E621SB002	621SB00201	01/27/1999	129,000	J	6,451

[a] Mean lead concentration calculated for samples with lead concentrations less than or equal to (≤) the adjacent concentration value.

[r] Removed during 1998 IM excavation (DET).

= Indicates that the compound was detected. The reported value is the concentration of the compound.

J Indicates that the compound was detected. The reported value is the estimated concentration of the compound.

U Indicates that the compound was not detected. The reported value is the detection limit.

UJ Indicates that the compound was not detected. The reported value is an estimated detection limit.

TABLE 4-2
Lead Concentrations in Subsurface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Mean Concentration[a]
E005SB027	005SB02702	11/15/2001	1.3	=	
E005SB028	005SB02802	11/15/2001	5.6	=	
E005SB008	005SB00802	11/13/2001	7.6	=	
E005SB003	005SB00302	09/22/1995	10.7	J	
E621SB028	621SB02802	07/28/1999	13.0	=	
E005SB016	005SB01602	11/15/2001	14.0	=	
E605SB008	605SB00802	09/22/1995	14.2	J	
E005SB022	005SB02202	11/14/2001	16.0	=	
E005SB023	005SB02302	11/14/2001	19.0	=	
E621SB006	621SB00602	07/28/1999	19.0	=	
E005SB029	005SB02902	11/14/2001	21.0	=	
E621SB005	621SB00502	07/28/1999	22.0	=	
E605SB011	605SB01102	09/21/1995	23.4	J	
E605SB006	605SB00602	09/22/1995	33.2	J	
E621SB001	621SB00102	01/27/1999	36.7	J	
E005SB025	005SB02502	11/15/2001	37.0	=	
E621SB027	621SB02702	07/28/1999	37.0	=	
E621SB024	621SB02402	07/28/1999	45.0	=	
E005SB026	005SB02602	11/15/2001	51.0	=	
E005SB035	005SB03502	11/19/2001	52.0	=	
E005SB036	005SB03602	11/15/2001	52.0	=	
E005SB004	005CB00402	11/13/2001	53.0	=	
E018SB002	018SB00202a	09/25/1995	54.5	J	
E605SB010	605SB01002	09/21/1995	68.6	J	
E005SB011	005SB01102	11/13/2001	74.0	=	
E018SB003	018SB00302a	10/03/1995	76.3	J	
E005SB019	005SB01902	11/14/2001	77.0	=	
E605SB014	605SB01402	05/31/1996	82.4	J	
E005SB024	005SB02402	11/15/2001	86.0	=	
E005SB018	005SB01802	11/14/2001	90.0	=	

TABLE 4-2
Lead Concentrations in Subsurface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Mean Concentration[a]
E005SB004	005SB00402	11/13/2001	92.0	=	
E605SB012	605SB01202	05/31/1996	97.2	J	
E605SB017	605SB01702	09/17/1996	112	=	
E005SB014	005SB01402	11/15/2001	120	=	
E621SB020	621SB02002	07/28/1999	120	=	
E621SB026	621SB02602	07/28/1999	120	=	
E005SB002[r]	005SB00202	09/25/1995	125	J	
E005SB006	005SB00602	11/13/2001	140	=	
E005SB007	005SB00702	11/13/2001	140	=	
E621SB017	621SB01702	07/28/1999	170	=	
E018SB005	018SB00502a	09/25/1995	199	J	
E005SB005	005SB00502	11/13/2001	200	=	
E005SB010	005SB01002	11/13/2001	200	=	
E005SB049	005SB04902	11/16/2001	200	=	
E605SB009	605SB00902	09/22/1995	200	J	
E621SB016	621SB01602	07/28/1999	230	=	
E005SB001	005SB00102	09/25/1995	283	J	
E621SB022	621SB02202	07/28/1999	290	=	
E005SB030	005SB03002	11/14/2001	300	=	
E605SB005	605SB00502	09/26/1995	300	J	
E005SB009	005SB00902	11/13/2001	350	=	
E621SB014	621SB01402	07/28/1999	420	=	
E605SB015	605SB01502	05/31/1996	429	J	
E005SB015	005SB01502	11/15/2001	470	=	
E621SB012	621SB01202	07/28/1999	530	=	
E005SB033	005SB03302	11/14/2001	550	=	
E005SB012	005SB01202	11/15/2001	620	=	
E621SB023	621SB02302	07/28/1999	660	=	
E621SB025	621SB02502	07/28/1999	670	=	
E005SB013	005SB01302	11/15/2001	700	=	

TABLE 4-2
Lead Concentrations in Subsurface Soil
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Mean Concentration[a]
E005SB032	005SB03202	11/14/2001	830	=	
E621SB008	621SB00802	07/28/1999	950	=	
E005SB021	005SB02102	11/14/2001	960	=	
E621SB018	621SB01802	07/28/1999	1,000	=	
E621SB010	621SB01002	07/28/1999	1,200	=	
E605SB002[r]	605SB00202	09/26/1995	1,260	J	
E621SB002	621SB00202	01/27/1999	1,320	J	
E005SB050	005SB05002	11/16/2001	2,100	=	
E005SB051	005SB05102	11/16/2001	2,200	=	
E621SB003	621SB00302	01/27/1999	2,210	J	
E621SB013	621SB01302	07/28/1999	2,600	=	
E005SB048	005SB04802	11/16/2001	2,700	=	411
E621SB007	621SB00702	07/28/1999	2,900	=	
E621SB015	621SB01502	07/28/1999	2,900	=	
E621SB019	621SB01902	07/28/1999	4,400	=	
E621SB009	621SB00902	07/28/1999	4,700	=	585

[a] Mean lead concentration calculated for samples with lead concentrations less than or equal to (≤) the adjacent concentration value.

[r] Removed during 1998 IM excavation (DET).

= Indicates that the compound was detected. The reported value is the concentration of the compound.

J Indicates that the compound was detected. The reported value is the estimated concentration of the compound.

U Indicates that the compound was not detected. The reported value is the detection limit.

UJ Indicates that the compound was not detected. The reported value is an estimated detection limit.

TABLE 4-3
Subsurface Soil Lead Concentrations in North (Area 1)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Mean Concentration[a]
E621SB028	621SB02802	13.0	=	
E621SB006	621SB00602	19.0	=	
E621SB005	621SB00502	22.0	=	
E621SB001	621SB00102	36.7	J	
E621SB027	621SB02702	37.0	=	
E621SB024	621SB02402	45.0	=	
E621SB026	621SB02602	120	=	
E621SB020	621SB02002	120	=	
E621SB017	621SB01702	170	=	
E621SB016	621SB01602	230	=	
E621SB022	621SB02202	290	=	
E621SB014	621SB01402	420	=	
E621SB012	621SB01202	530	=	
E621SB023	621SB02302	660	=	
E621SB025	621SB02502	670	=	
E621SB008	621SB00802	950	=	
E621SB018	621SB01802	1,000	=	
E621SB010	621SB01002	1,200	=	
E621SB002	621SB00202	1,320	J	
E621SB003	621SB00302	2,210	J	
E621SB013	621SB01302	2,600	=	603
E621SB015	621SB01502	2,900	=	
E621SB007	621SB00702	2,900	=	
E621SB019	621SB01902	4,400	=	
E621SB009	621SB00902	4,700	=	1,103

[a] Mean lead concentration calculated for samples with lead concentrations less than or equal to (≤) the adjacent concentration value.

= Indicates that the compound was detected. The reported value is the concentration of the compound.

J Indicates that the compound was detected. The reported value is the estimated concentration of the compound.

TABLE 4-4
Subsurface Soil Lead Concentrations in South (Area 2)
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Station ID	Sample ID	Date Collected	Concentration (mg/kg)	Qualifier	Mean Concentration[a]
E005SB003	005SB00302	09/22/1995	10.7	J	
E005SB016	005SB01602	11/15/2001	14.0	=	
E005SB014	005SB01402	11/15/2001	120	=	
E005SB049	005SB04902	11/16/2001	200	=	
E005SB001	005SB00102	09/25/1995	283	J	
E005SB012	005SB01202	11/15/2001	620	=	
E005SB013	005SB01302	11/15/2001	700	=	
E005SB050	005SB05002	11/16/2001	2,100	=	
E005SB048	005SB04802	11/16/2001	2,700	=	750

[a] Mean lead concentration calculated for samples with lead concentrations less than or equal to (≤) the adjacent concentration value.

= Indicates that the compound was detected. The reported value is the concentration of the compound.

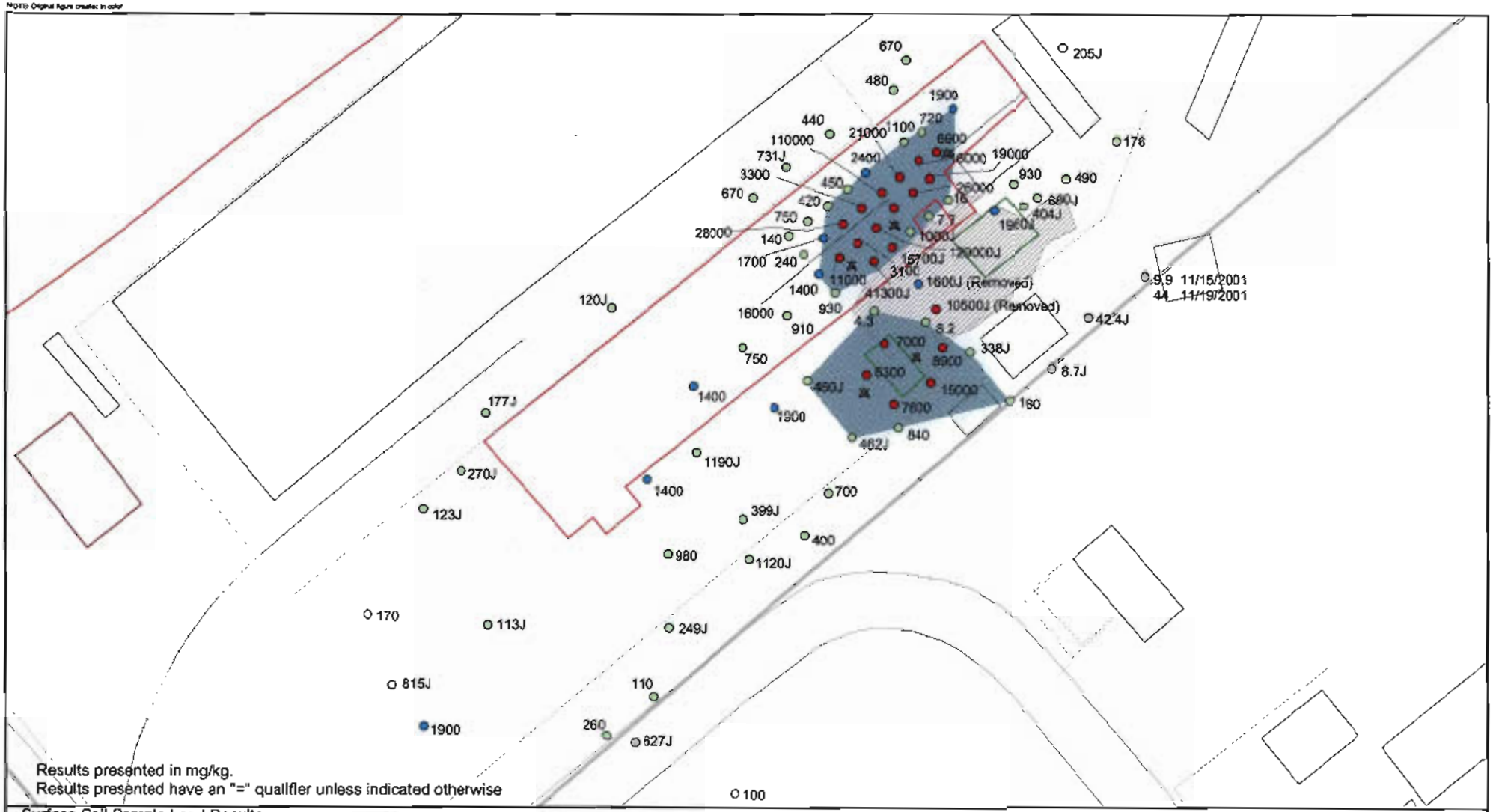
J Indicates that the compound was detected. The reported value is the estimated concentration of the compound.

TABLE 4-5
Lead Concentrations in Monitoring Well E605GW002
Phase II IM Work Plan, SWMU 5, SWMU 18, AOC 605, and AOC 621, Zone E, Charleston Naval Complex

Date Collected	Concentration (µg/L)
March 20, 1996	426
July 2, 1996	68
October 28, 1996	404
January 7, 1997	1,970

µg/L Micrograms per liter

NOTE: Original figure created in color



Results presented in mg/kg.
Results presented have an "=" qualifier unless indicated otherwise

Surface Soil Sample Lead Results
- 4.3 - 1218 (Surface MCS)
- 1218 - 2854 (SSL - 2X SSL)
- 2854 - 129000

- Railroads
- Fence
- Roads

- Buildings
- AOC Boundary
- SWMU Boundary
- Zone Boundary
- IM Excavation (1998)
- Surface Soils Excavation (0-1 ft bls)
- Proposed Delineation Samples

N

0 20 40 Feet

Figure 4-1
Lead Concentrations and Approximate Surface Soil Excavation Area
AOCs 605 & 621, SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL

File Path: C:\Idgis\Projects\Zone_Elec\605_swmu5&18\acc_605.apr; Date: 11 Apr 2002 10:54; User: JEDENS; Lead Surface - Figure 4-1p

NOTE: Original figure created in color

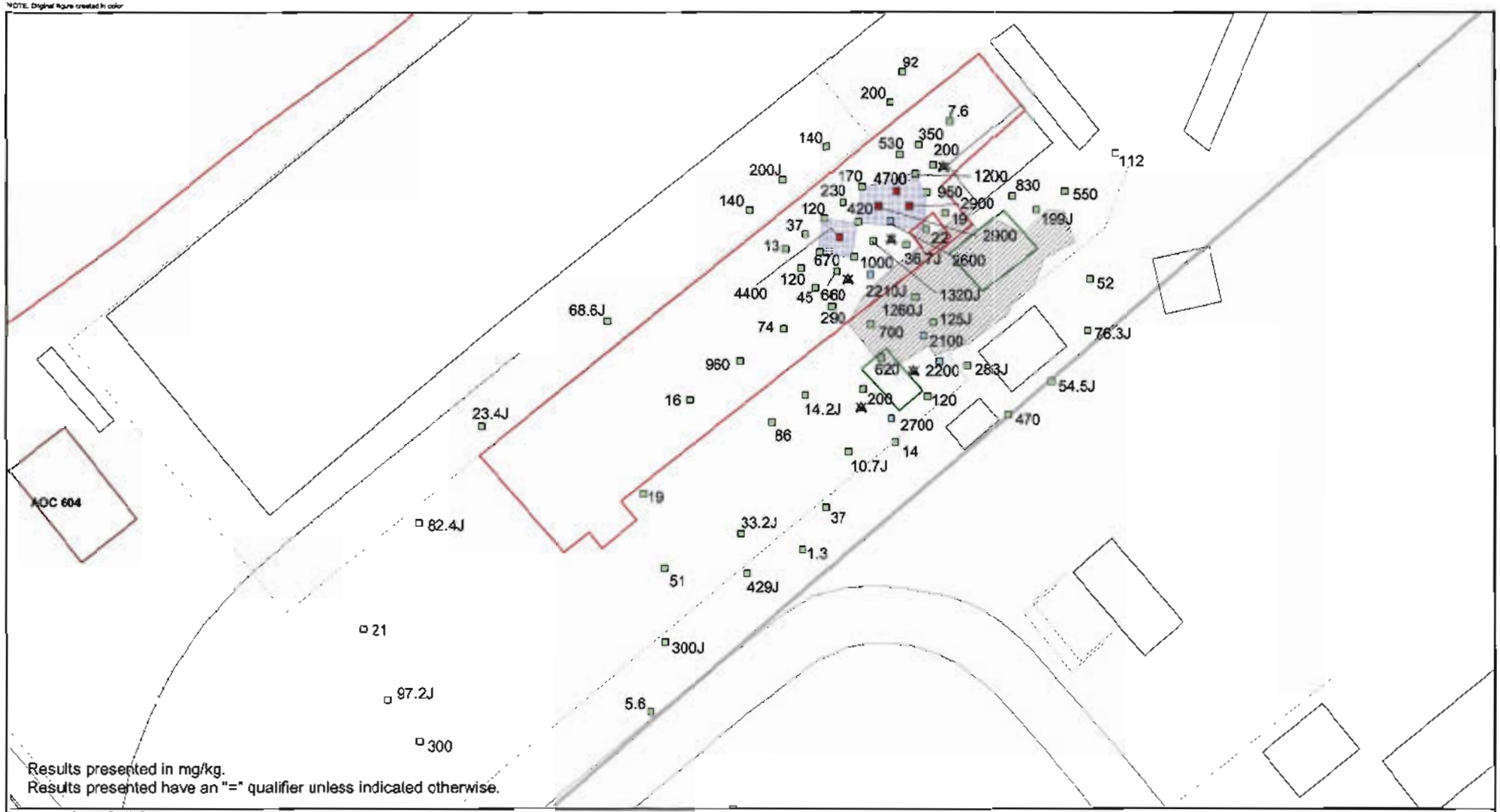
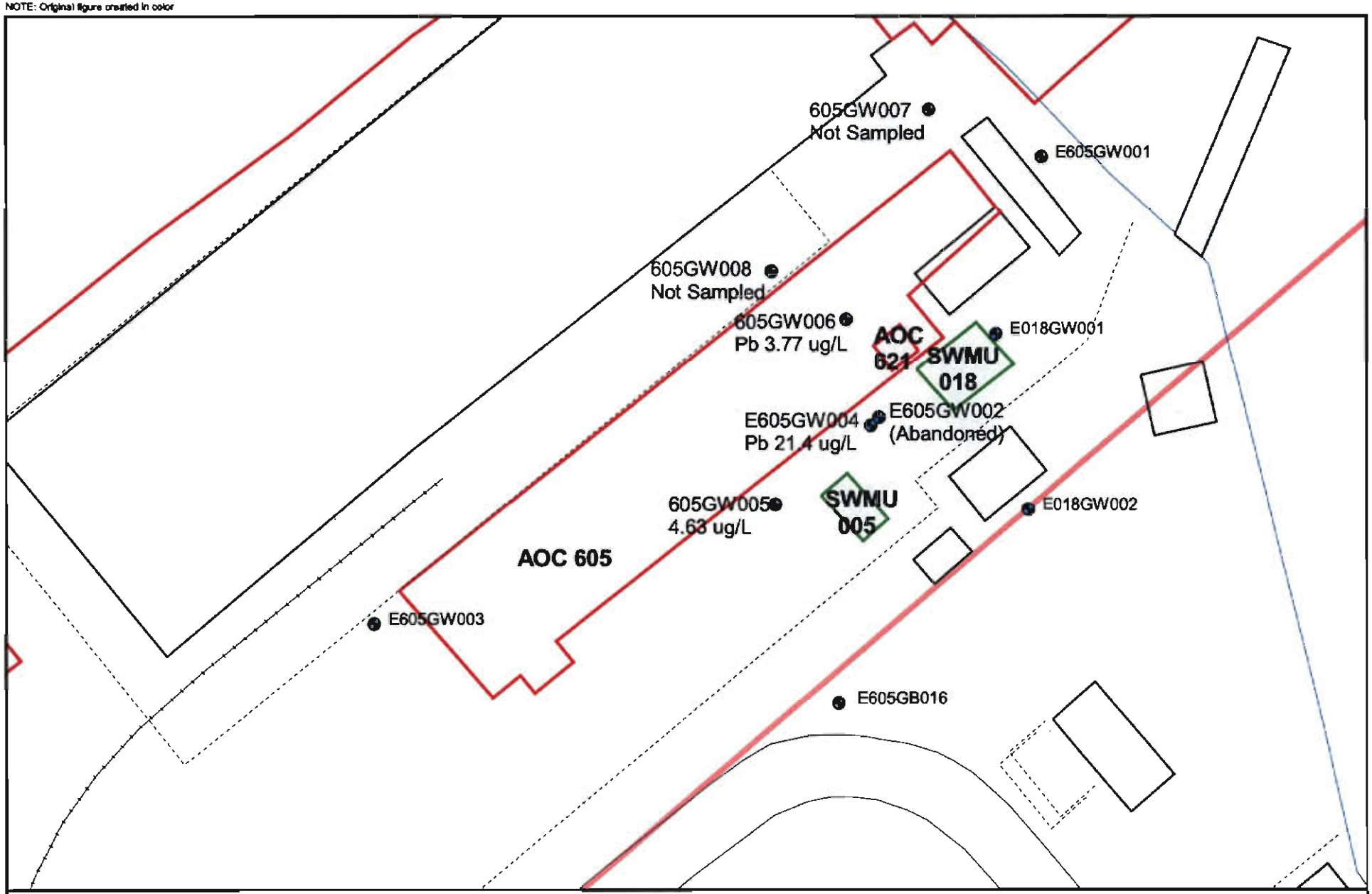


Figure 4-2
Lead Concentrations and Approximate Subsurface Excavation Area
AOCs 605 & 621, SWMUs 5 & 18
Charleston Naval Complex

CH2MHILL

File Path: c:\fldprojects\cns_charr\605_swmu5\18\aoc_605p.apr; Date: 17 Apr 2002 11:00 User: JEDEAS; Lead subsurface- Figure 4-2

NOTE: Original figure created in color



Groundwater Well

Railroads
Fence
Roads
Shoreline

Buildings
AOC Boundary
SWMU Boundary
Zone Boundary

N

0 40 80 Feet

Figure 4-3
Phase I IM Lead Concentrations in Groundwater
AOCs 605 & 621 and SWMUs 5 & 18, Zone E
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\CNC\cnc-egis.apr, Date: 17 Apr 2002 14:48, User: JEDENS, EGIS: Charleston Naval Complex - Figure 4-3 Phase I IM Lead Concentrations in Groundwater2

Section 5.0

5.0 Phase II Interim Measure Completion Report

An IM Completion Report will be submitted within 60 days of receipt of receiving the final data for the Phase II soil excavation IM. The report will summarize the actions that were taken and provide the following information:

- Analytical data reports from the pre-excavation sampling;
- Excavated area measurements and volumes of excavated soil;
- Nature and volume of excavated wastes generated;
- Waste transportation and disposal records;
- Site photographs; and
- Problems encountered during the excavation IM, if any, and the corrective measures implemented.

Section 6.0

6.0 References

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Appendix A

	StationID	E018GW001		E018GW001		E018GW002		E018GW002	
	SampleID	018GW001L2		018GW001L2		018GW002L2		018GW002L2	
	DateCollected	12/5/2001		12/5/2001		12/5/2001		12/5/2001	
	DateExtracted	12/6/2001		12/10/2001		12/6/2001		12/10/2001	
	DateAnalyzed	12/8/2001		12/11/2001		12/8/2001		12/11/2001	
	SDGNumber	52973		52973		52973		52973	
Parameter	**Units**								
Arsenic	ug/L	5.21	J			2.6	U		
Barium	ug/L	85.8	J			423	=		
Cadmium	ug/L	0.835	U			0.416	U		
Chromium, Total	ug/L	0.722	U			1.42	U		
Lead	ug/L	5.58	=			2.43	U		
Mercury	ug/L			0.145	J			0.064	U
Selenium	ug/L	3.49	U			3.49	U		
Silver	ug/L	0.666	U			0.666	U		

	StationID	E018GW002		E018GW002		E605GW004		E605GW004	
	SampleID	018HW002L2		018HW002L2		605GW004L2		605GW004L2	
	DateCollected	12/5/2001		12/5/2001		12/5/2001		12/5/2001	
	DateExtracted	12/6/2001		12/10/2001		12/6/2001		12/10/2001	
	DateAnalyzed	12/8/2001		12/11/2001		12/8/2001		12/11/2001	
	SDGNumber	52973		52973		52973		52973	
Parameter	**Units**								
Arsenic	ug/L	3.67	J			6.98	J		
Barium	ug/L	416	=			69.2	U		
Cadmium	ug/L	0.416	U			0.465	U		
Chromium, Total	ug/L	0.57	U			7.98	J		
Lead	ug/L	2.43	U			21.4	=		
Mercury	ug/L			0.064	U			0.064	U
Selenium	ug/L	3.49	U			3.49	U		
Silver	ug/L	0.666	U			0.666	U		

	StationID	E605GW005		E605GW005		E605GW006		E605GW006	
	SampleID	605GW005L2		605GW005L2		605GW006L2		605GW006L2	
	DateCollected	12/5/2001		12/5/2001		12/5/2001		12/5/2001	
	DateExtracted	12/6/2001		12/10/2001		12/6/2001		12/10/2001	
	DateAnalyzed	12/8/2001		12/11/2001		12/8/2001		12/11/2001	
	SDGNumber	52973		52973		52973		52973	
Parameter	**Units**								
Arsenic	ug/L	8.91	J			4.97	J		
Barium	ug/L	55.8	U			158	J		
Cadmium	ug/L	0.416	U			0.416	U		
Chromium, Total	ug/L	1.46	U			2.72	U		
Lead	ug/L	4.63	=			3.77	=		
Mercury	ug/L			0.064	U			0.064	U
Selenium	ug/L	3.49	U			3.49	U		
Silver	ug/L	0.666	U			0.666	U		

	StationID	E005CB052		E005CB052		E005SB004		E005SB004	
	SampleID	005CB05202 (3-5ft)		005CB05202 (3-5ft)		005CB00402 (3-5ft)		005SB00401 (0-1ft)	
	DateCollected	2/21/2002		2/21/2002		11/13/2001		11/13/2001	
	DateExtracted	2/25/2002		2/28/2002		11/26/2001		11/26/2001	
	DateAnalyzed	2/26/2002		2/28/2002		11/29/2001		11/29/2001	
	SDGNumber	CNC69		CNC69		CNC47		CNC47	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l			0.01	U				
Lead	mg/kg	27	J			53	=	670	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l			0.0047	U				
Nickel	mg/kg	6.6	J						
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB004		E005SB005		E005SB005		E005SB006	
	SampleID	005SB00402 (3-5ft)		005SB00501 (0-1ft)		005SB00502 (3-5ft)		005SB00601 (0-1ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	11/29/2001		11/30/2001		11/30/2001		11/30/2001	
	SDGNumber	CNC47		CNC47		CNC47		CNC47	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	92	=	480	=	200	=	440	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB006		E005SB007		E005SB007		E005SB008	
	SampleID	005SB00602 (3-5ft)		005SB00701 (0-1ft)		005SB00702 (3-5ft)		005SB00801 (0-1ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	11/30/2001		12/3/2001		12/3/2001		12/3/2001	
	SDGNumber	CNC47		CNC47		CNC47		CNC47	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	140	=	670	=	140	=	1900	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB008		E005SB009		E005SB009		E005SB010	
	SampleID	005SB00802 (3-5ft)		005SB00901 (0-1ft)		005SB00902 (3-5ft)		005SB01001 (0-1ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	12/3/2001		12/3/2001		12/3/2001		12/3/2001	
	SDGNumber	CNC47		CNC47		CNC47		CNC47	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	7.6	=	720	=	350	=	6900	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB010		E005SB011		E005SB011		E005SB011	
	SampleID	005SB01002 (3-5ft)		005CB01101 (0-1ft)		005SB01101 (0-1ft)		005SB01102 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	12/3/2001		12/3/2001		12/3/2001		12/3/2001	
	SDGNumber	CNC47		CNC47		CNC47		CNC47	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	200	=	470	=	910	=	74	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB012		E005SB012		E005SB013		E005SB013	
	SampleID	005SB01201 (0-1ft)		005SB01202 (3-5ft)		005SB01301 (0-1ft)		005SB01302 (3-5ft)	
	DateCollected	11/15/2001		11/15/2001		11/15/2001		11/15/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	12/3/2001		11/30/2001		11/30/2001		11/30/2001	
	SDGNumber	CNC51		CNC51		CNC51		CNC51	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	7000	=	620	=	4.3	=	700	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB014		E005SB014		E005SB015		E005SB015	
	SampleID	005SB01401 (0-1ft)		005SB01402 (3-5ft)		005SB01501 (0-1ft)		005SB01502 (3-5ft)	
	DateCollected	11/15/2001		11/15/2001		11/15/2001		11/15/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	12/3/2001		11/30/2001		11/30/2001		11/30/2001	
	SDGNumber	CNC51		CNC51		CNC51		CNC51	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	15000	=	120	=	160	=	470	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB016		E005SB016		E005SB017		E005SB018	
	SampleID	005SB01601 (0-1ft)		005SB01602 (3-5ft)		005SB01701 (0-1ft)		005SB01801 (0-1ft)	
	DateCollected	11/15/2001		11/15/2001		11/15/2001		11/14/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	11/30/2001		11/30/2001		11/30/2001		11/30/2001	
	SDGNumber	CNC51		CNC51		CNC51		CNC51	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	840	=	14	=	260	=	100	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB018		E005SB019		E005SB019		E005SB019	
	SampleID	005SB01802 (3-5ft)		005CB01902 (3-5ft)		005SB01901 (0-1ft)		005SB01902 (3-5ft)	
	DateCollected	11/14/2001		11/14/2001		11/14/2001		11/14/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	11/30/2001		11/30/2001		11/30/2001		11/30/2001	
	SDGNumber	CNC51		CNC51		CNC51		CNC51	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	90	=	46	=	160	=	77	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB021		E005SB021		E005SB021		E005SB022	
	SampleID	005CB02101 (0-1ft)		005SB02101 (0-1ft)		005SB02102 (3-5ft)		005SB02201 (0-1ft)	
	DateCollected	11/14/2001		11/14/2001		11/14/2001		11/14/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	11/29/2001		12/3/2001		11/29/2001		11/29/2001	
	SDGNumber	CNC50		CNC50		CNC50		CNC50	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	520	=	750	=	960	=	1400	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg	45	=	95	=	68	=	46	=
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB022		E005SB023		E005SB023		E005SB024	
	SampleID	005SB02202 (3-5ft)		005SB02301 (0-1ft)		005SB02302 (3-5ft)		005SB02401 (0-1ft)	
	DateCollected	11/14/2001		11/14/2001		11/14/2001		11/15/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	11/29/2001		11/29/2001		11/29/2001		11/29/2001	
	SDGNumber	CNC50		CNC50		CNC50		CNC50	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	16	=	1400	=	19	=	1900	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg	3.7	U	79	=	5.8	U	59	=
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB024		E005SB025		E005SB025		E005SB026	
	SampleID	005SB02402 (3-5ft)		005SB02501 (0-1ft)		005SB02502 (3-5ft)		005SB02601 (0-1ft)	
	DateCollected	11/15/2001		11/15/2001		11/15/2001		11/15/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	11/29/2001		11/29/2001		11/29/2001		11/29/2001	
	SDGNumber	CNC50		CNC50		CNC50		CNC50	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	86	=	700	=	37	=	980	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg	9.6	=	120	=	9.8	=	120	=
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB026		E005SB027		E005SB027		E005SB028	
	SampleID	005SB02602 (3-5ft)		005SB02701 (0-1ft)		005SB02702 (3-5ft)		005SB02801 (0-1ft)	
	DateCollected	11/15/2001		11/15/2001		11/15/2001		11/15/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	11/29/2001		11/29/2001		11/29/2001		11/29/2001	
	SDGNumber	CNC50		CNC50		CNC50		CNC50	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	51	=	400	=	1.3	=	110	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg	13	=	34	=	14	=	7.4	J
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB028		E005SB029		E005SB029		E005SB030	
	SampleID	005SB02802 (3-5ft)		005SB02901 (0-1ft)		005SB02902 (3-5ft)		005CB03002 (3-5ft)	
	DateCollected	11/15/2001		11/14/2001		11/14/2001		11/14/2001	
	DateExtracted	11/21/2001		11/21/2001		11/26/2001		11/26/2001	
	DateAnalyzed	11/29/2001		11/29/2001		11/30/2001		11/30/2001	
	SDGNumber	CNC50		CNC50		CNC50		CNC50	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	5.6	=	170	=	21	=	210	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg	1.4	J	25	=	8	U	20	=
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB030		E005SB030		E005SB032		E005SB032	
	SampleID	005SB03001 (0-1ft)		005SB03002 (3-5ft)		005SB03201 (0-1ft)		005SB03202 (3-5ft)	
	DateCollected	11/14/2001		11/14/2001		11/14/2001		11/14/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateAnalyzed	11/30/2001		11/30/2001		11/30/2001		11/30/2001	
	SDGNumber	CNC50		CNC50		CNC49		CNC49	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	1900	=	300	=	930	=	830	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg	110	=	25	=	41	=	6.3	U
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB033		E005SB033		E005SB034		E005SB034	
	SampleID	005SB03301 (0-1ft)		005SB03302 (3-5ft)		005SB03401 (0-1ft)		005SB03501 (0-1ft)	
	DateCollected	11/14/2001		11/14/2001		11/15/2001		11/19/2001	
	DateExtracted	11/26/2001		11/26/2001		11/26/2001		11/27/2001	
	DateAnalyzed	11/30/2001		11/30/2001		11/30/2001		11/30/2001	
	SDGNumber	CNC49		CNC49		CNC49		CNC52	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	490	=	550	=	9.9	=	44	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg	18	=	18	=	2.9	J	5.9	J
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB035		E005SB035	
	SampleID	005CB03501 (0-1ft)		005SB03502 (3-5ft)	
	DateCollected	11/19/2001		11/19/2001	
	DateExtracted	11/27/2001		11/27/2001	
	DateAnalyzed	11/30/2001		11/30/2001	
	SDGNumber	CNC52		CNC52	
Parameter	**Units**				
Arsenic,SPLP	mg/l				
Barium, SPLP	mg/l				
Cadmium, SPLP	mg/l				
Chromium, SPLP	mg/l				
Lead, SPLP	mg/l				
Lead	mg/kg	57	=	52	=
Mercury, SPLP	mg/l				
Nickel, SPLP	mg/l				
Nickel	mg/kg	6.2	J	9.5	=
Selenium, SPLP	mg/l				
Silver, SPLP	mg/l				

	StationID	E005SB036		E005SB036		E005SB042		E005SB042	
	SampleID	005SB03601 (0-1ft)		005SB03602 (3-5ft)		005SB04201 (0-1ft)		005SB04201 (0-1ft)	
	DateCollected	11/15/2001		11/15/2001		11/13/2001		11/13/2001	
	DateExtracted	11/26/2001		11/26/2001		11/27/2001		11/27/2001	
	DateAnalyzed	11/30/2001		11/30/2001		11/30/2001		11/29/2001	
	SDGNumber	CNC49		CNC49		CNC48		CNC48	
Parameter	**Units**								
Arsenic,SPLP	mg/l					0.0032	U		
Barium, SPLP	mg/l					0.0063	U		
Cadmium, SPLP	mg/l					0.00071	U		
Chromium, SPLP	mg/l					0.021	=		
Lead, SPLP	mg/l					0.03	=		
Lead	mg/kg	92	=	52	=				
Mercury, SPLP	mg/l							0.000072	U
Nickel, SPLP	mg/l								
Nickel	mg/kg	7.4	J	4.9	J				
Selenium, SPLP	mg/l					0.0042	U		
Silver, SPLP	mg/l					0.0019	U		

	StationID	E005SB042		E005SB042		E005SB043		E005SB043	
	SampleID	005SB04202 (3-5ft)		005SB04202 (3-5ft)		005SB04301 (0-1ft)		005SB04301 (0-1ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/27/2001		11/27/2001		11/27/2001		11/27/2001	
	DateAnalyzed	11/30/2001		11/29/2001		11/30/2001		11/29/2001	
	SDGNumber	CNC48		CNC48		CNC48		CNC48	
Parameter	**Units**								
Arsenic,SPLP	mg/l	0.0032	U			0.0032	U		
Barium, SPLP	mg/l	0.0062	U			0.021	J		
Cadmium, SPLP	mg/l	0.00071	U			0.00071	U		
Chromium, SPLP	mg/l	0.0017	U			0.022	=		
Lead, SPLP	mg/l	0.003	=			0.48	=		
Lead	mg/kg								
Mercury, SPLP	mg/l			0.000072	U			0.00016	J
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l	0.0042	U			0.0042	U		
Silver, SPLP	mg/l	0.0019	U			0.0019	U		

	StationID	E005SB043		E005SB043		E005SB044		E005SB044	
	SampleID	005SB04302 (3-5ft)		005SB04302 (3-5ft)		005SB04401 (0-1ft)		005SB04401 (0-1ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/27/2001		11/27/2001		11/27/2001		11/27/2001	
	DateAnalyzed	11/30/2001		11/29/2001		11/30/2001		11/29/2001	
	SDGNumber	CNC48		CNC48		CNC48		CNC48	
Parameter	**Units**								
Arsenic,SPLP	mg/l	0.0032	J			0.0032	U		
Barium, SPLP	mg/l	0.031	J			0.016	J		
Cadmium, SPLP	mg/l	0.0072	=			0.00071	U		
Chromium, SPLP	mg/l	0.0017	U			0.0034	U		
Lead, SPLP	mg/l	0.0015	U			0.037	=		
Lead	mg/kg								
Mercury, SPLP	mg/l			0.000072	U			0.000072	U
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l	0.0042	U			0.0042	U		
Silver, SPLP	mg/l	0.0019	U			0.0019	U		

	StationID	E005SB044		E005SB044		E005SB045		E005SB045	
	SampleID	005SB04402 (3-5ft)		005SB04402 (3-5ft)		005SB04501 (0-1ft)		005SB04501 (0-1ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/27/2001		11/27/2001		11/27/2001		11/27/2001	
	DateAnalyzed	11/30/2001		11/29/2001		11/30/2001		11/29/2001	
	SDGNumber	CNC48		CNC48		CNC48		CNC48	
Parameter	**Units**								
Arsenic,SPLP	mg/l	0.0032	U			0.0032	U		
Barium, SPLP	mg/l	0.0014	U			0.0091	U		
Cadmium, SPLP	mg/l	0.00071	U			0.00071	U		
Chromium, SPLP	mg/l	0.0017	U			0.0051	U		
Lead, SPLP	mg/l	0.0022	U			0.58	=		
Lead	mg/kg								
Mercury, SPLP	mg/l			0.000072	U			0.000072	U
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l	0.0042	U			0.0042	U		
Silver, SPLP	mg/l	0.0019	U			0.0019	U		

	StationID	E005SB045		E005SB045		E005SB046		E005SB046	
	SampleID	005SB04502 (3-5ft)		005SB04502 (3-5ft)		005SB04601 (0-1ft)		005SB04601 (0-1ft)	
	DateCollected	11/13/2001		11/13/2001		11/14/2001		11/14/2001	
	DateExtracted	11/27/2001		11/27/2001		11/27/2001		11/27/2001	
	DateAnalyzed	11/30/2001		11/29/2001		11/30/2001		11/29/2001	
	SDGNumber	CNC48		CNC48		CNC48		CNC48	
Parameter	**Units**								
Arsenic,SPLP	mg/l	0.0032	U			0.0032	U		
Barium, SPLP	mg/l	0.017	J			0.0025	U		
Cadmium, SPLP	mg/l	0.00071	U			0.00071	U		
Chromium, SPLP	mg/l	0.0017	U			0.0049	U		
Lead, SPLP	mg/l	0.1	=			0.0015	U		
Lead	mg/kg								
Mercury, SPLP	mg/l			0.000072	U			0.000072	U
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l	0.0042	U			0.0042	U		
Silver, SPLP	mg/l	0.0019	U			0.0019	U		

	StationID	E005SB046		E005SB046		E005SB047		E005SB047	
	SampleID	005SB04602 (3-5ft)		005SB04602 (3-5ft)		005SB04701 (0-1ft)		005SB04701 (0-1ft)	
	DateCollected	11/14/2001		11/14/2001		11/19/2001		11/19/2001	
	DateExtracted	11/27/2001		11/27/2001		11/27/2001		11/27/2001	
	DateAnalyzed	11/30/2001		11/29/2001		11/30/2001		11/29/2001	
	SDGNumber	CNC48		CNC48		CNC52		CNC52	
Parameter	**Units**								
Arsenic,SPLP	mg/l	0.0032	U			0.0032	U		
Barium, SPLP	mg/l	0.0031	U			0.022	J		
Cadmium, SPLP	mg/l	0.00071	U			0.00071	U		
Chromium, SPLP	mg/l	0.0031	U			0.0029	U		
Lead, SPLP	mg/l	0.0015	U			0.0051	=		
Lead	mg/kg								
Mercury, SPLP	mg/l			0.000072	U			0.000072	U
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l	0.0042	U			0.0042	U		
Silver, SPLP	mg/l	0.0019	U			0.0019	U		

	StationID	E005SB047		E005SB047		E005SB048		E005SB048	
	SampleID	005SB04702 (3-5ft)		005SB04702 (3-5ft)		005SB04801 (0-1ft)		005SB04802 (3-5ft)	
	DateCollected	11/19/2001		11/19/2001		11/16/2001		11/16/2001	
	DateExtracted	11/27/2001		11/27/2001		11/21/2001		11/21/2001	
	DateAnalyzed	11/30/2001		11/29/2001		12/3/2001		12/5/2001	
	SDGNumber	CNC52		CNC52		CNC51		CNC51	
Parameter	**Units**								
Arsenic,SPLP	mg/l	0.0032	U						
Barium, SPLP	mg/l	0.04	J						
Cadmium, SPLP	mg/l	0.00071	U						
Chromium, SPLP	mg/l	0.0025	U						
Lead, SPLP	mg/l	0.0026	J						
Lead	mg/kg					7600	=	2700	=
Mercury, SPLP	mg/l			0.000072	U				
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l	0.0042	U						
Silver, SPLP	mg/l	0.0019	U						

	StationID	E005SB049		E005SB049		E005SB050		E005SB050	
	SampleID	005SB04901 (0-1ft)		005SB04902 (3-5ft)		005SB05001 (0-1ft)		005SB05002 (3-5ft)	
	DateCollected	11/16/2001		11/16/2001		11/16/2001		11/16/2001	
	DateExtracted	11/21/2001		11/21/2001		11/26/2001		11/21/2001	
	DateAnalyzed	12/5/2001		12/3/2001		12/3/2001		12/3/2001	
	SDGNumber	CNC51		CNC51		CNC47		CNC47	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg	6300	=	200	=	8.2	=	2100	=
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB051		E005SB051		E005SB052		E005SB052	
	SampleID	005SB05101 (0-1ft)		005SB05102 (3-5ft)		005SB05201 (0-1ft)		005SB05201 (0-1ft)	
	DateCollected	11/16/2001		11/16/2001		2/21/2002		2/21/2002	
	DateExtracted	11/26/2001		11/21/2001		2/25/2002		2/28/2002	
	DateAnalyzed	12/3/2001		12/3/2001		2/26/2002		2/28/2002	
	SDGNumber	CNC47		CNC47		CNC69		CNC69	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l							0.0078	U
Lead	mg/kg	8900	=	2200	=	80	J		
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l							0.0047	U
Nickel	mg/kg					6.3	J		
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB052		E005SB052		E005SB053		E005SB053	
	SampleID	005SB05202 (3-5ft)		005SB05202 (3-5ft)		005SB05301 (0-1ft)		005SB05301 (0-1ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/25/2002		2/28/2002		2/25/2002		2/28/2002	
	DateAnalyzed	2/26/2002		2/28/2002		2/28/2002		2/28/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l			0.015	U			0.21	J
Lead	mg/kg	38	J			2500	J		
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l			0.0047	U				
Nickel	mg/kg	5.7	J						
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB053		E005SB053		E005SB054		E005SB054	
	SampleID	005SB05302 (3-5ft)		005SB05302 (3-5ft)		005SB05401 (0-1ft)		005SB05401 (0-1ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/25/2002		2/28/2002		2/25/2002		2/28/2002	
	DateAnalyzed	2/26/2002		2/28/2002		2/26/2002		2/28/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l			0.03	J			0.022	J
Lead	mg/kg	24	J			42	J		
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB054		E005SB054		E005SB055		E005SB055	
	SampleID	005SB05402 (3-5ft)		005SB05402 (3-5ft)		005SB05501 (0-1ft)		005SB05501 (0-1ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/25/2002		2/28/2002		2/25/2002		2/28/2002	
	DateAnalyzed	2/26/2002		2/28/2002		2/28/2002		3/1/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l			0.033	J			20	=
Lead	mg/kg	3.7	J			16000	J		
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB055		E005SB055		E005SB056		E005SB056	
	SampleID	005SB05502 (3-5ft)		005SB05502 (3-5ft)		005SB05601 (0-1ft)		005SB05601 (0-1ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/25/2002		2/28/2002		2/25/2002		2/28/2002	
	DateAnalyzed	2/28/2002		2/28/2002		2/28/2002		2/28/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l			0.14	J			3.2	=
Lead	mg/kg	5700	J			6900	J		
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l								
Nickel	mg/kg								
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB056		E005SB056		E005SB057		E005SB057	
	SampleID	005SB05602 (3-5ft)		005SB05602 (3-5ft)		005SB05701 (0-1ft)		005SB05701 (0-1ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/25/2002		2/28/2002		2/25/2002		2/28/2002	
	DateAnalyzed	2/26/2002		2/28/2002		2/26/2002		2/28/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l			0.0076	U				
Lead	mg/kg	370	J						
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l							0.021	J
Nickel	mg/kg					250	=		
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB057		E005SB057		E005SB058		E005SB058	
	SampleID	005SB05702 (3-5ft)		005SB05702 (3-5ft)		005SB05801 (0-1ft)		005SB05801 (0-1ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/25/2002		2/28/2002		2/25/2002		2/28/2002	
	DateAnalyzed	2/26/2002		2/28/2002		2/26/2002		2/28/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l								
Lead	mg/kg								
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l			0.0047	U			0.0047	U
Nickel	mg/kg	36	=			73	=		
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB058		E005SB058		E005SB059		E005SB059	
	SampleID	005SB05802 (3-5ft)		005SB05802 (3-5ft)		005SB05901 (0-1ft)		005SB05901 (0-1ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/25/2002		2/28/2002		2/25/2002		2/28/2002	
	DateAnalyzed	2/26/2002		2/28/2002		2/28/2002		2/28/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	**Units**								
Arsenic,SPLP	mg/l								
Barium, SPLP	mg/l								
Cadmium, SPLP	mg/l								
Chromium, SPLP	mg/l								
Lead, SPLP	mg/l							0.055	J
Lead	mg/kg					150000	J		
Mercury, SPLP	mg/l								
Nickel, SPLP	mg/l			0.0047	U				
Nickel	mg/kg	29	=						
Selenium, SPLP	mg/l								
Silver, SPLP	mg/l								

	StationID	E005SB059		E005SB059	
	SampleID	005SB05902 (3-5ft)		005SB05902 (3-5ft)	
	DateCollected	2/21/2002		2/21/2002	
	DateExtracted	2/25/2002		2/28/2002	
	DateAnalyzed	2/26/2002		2/28/2002	
	SDGNumber	CNC69		CNC69	
Parameter	**Units**				
Arsenic,SPLP	mg/l				
Barium, SPLP	mg/l				
Cadmium, SPLP	mg/l				
Chromium, SPLP	mg/l				
Lead, SPLP	mg/l			0.0035	U
Lead	mg/kg	840	J		
Mercury, SPLP	mg/l				
Nickel, SPLP	mg/l				
Nickel	mg/kg				
Selenium, SPLP	mg/l				
Silver, SPLP	mg/l				

	StationID	E005SB039		E005SB039		E005SB040	
	SampleID	005SB03901 (0-1ft)		005SB03902 (3-5ft)		005CB04002 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/1/2001		12/4/2001		12/4/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
3,4-Methylphenol (mp-Cresol)	ug/kg	400	U	440	U	380	U
N-Nitrosodiphenylamine	ug/kg	400	U	440	U	380	U
Phenol	ug/kg	400	U	440	U	380	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/kg	400	U	440	U	380	U
2-Chlorophenol	ug/kg	400	U	440	U	380	U
1,3-Dichlorobenzene	ug/kg	400	U	440	U	380	U
1,4-Dichlorobenzene	ug/kg	400	U	440	U	380	U
Benzyl alcohol	ug/kg	400	U	440	U	380	U
1,2-Dichlorobenzene	ug/kg	400	U	440	U	380	U
Bis(2-Chloroisopropyl)Ether	ug/kg	400	U	440	U	380	U
2-Methylphenol (o-Cresol)	ug/kg	400	U	440	U	380	U
N-Nitrosodi-n-propylamine	ug/kg	400	U	440	U	380	U
Hexachloroethane	ug/kg	400	U	440	U	380	U
Nitrobenzene	ug/kg	400	U	440	U	380	U
Isophorone	ug/kg	400	U	440	U	380	U
2-Nitrophenol	ug/kg	400	U	440	U	380	U
2,4-Dimethylphenol	ug/kg	400	U	440	U	380	U
bis(2-Chloroethoxy) Methane	ug/kg	400	U	440	U	380	U
2,4-Dichlorophenol	ug/kg	400	U	440	U	380	U
Benzoic acid	ug/kg	1900	U	2100	U	1900	U
1,2,4-Trichlorobenzene	ug/kg	400	U	440	U	380	U
Naphthalene	ug/kg	400	U	440	U	380	U
4-Chloroaniline	ug/kg	400	U	440	U	380	U
Hexachlorobutadiene	ug/kg	400	U	440	U	380	U
4-Chloro-3-methylphenol	ug/kg	400	U	440	U	380	U
2-Methylnaphthalene	ug/kg	400	U	440	U	380	U
Hexachlorocyclopentadiene	ug/kg	400	U	440	U	380	U
2,4,6-Trichlorophenol	ug/kg	400	U	440	U	380	U
2,4,5-Trichlorophenol	ug/kg	1900	U	2100	U	1900	U
2-Chloronaphthalene	ug/kg	400	U	440	U	380	U

	StationID	E005SB040		E005SB040		E005SB040	
	SampleID	005SB04001 (0-1ft)		005SB04001RE (0-1ft)		005SB04002 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/1/2001		12/5/2001		12/1/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
3,4-Methylphenol (mp-Cresol)	ug/kg	420	R	420	U	380	R
N-Nitrosodiphenylamine	ug/kg	420	R	420	U	380	R
Phenol	ug/kg	420	R	420	U	380	R
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/kg	420	R	420	U	380	R
2-Chlorophenol	ug/kg	420	R	420	U	380	R
1,3-Dichlorobenzene	ug/kg	420	R	420	U	380	R
1,4-Dichlorobenzene	ug/kg	420	R	420	U	380	R
Benzyl alcohol	ug/kg	420	R	420	U	380	R
1,2-Dichlorobenzene	ug/kg	420	R	420	U	380	R
Bis(2-Chloroisopropyl)Ether	ug/kg	420	R	420	U	380	R
2-Methylphenol (o-Cresol)	ug/kg	420	R	420	U	380	R
N-Nitrosodi-n-propylamine	ug/kg	420	R	420	U	380	R
Hexachloroethane	ug/kg	420	R	420	U	380	R
Nitrobenzene	ug/kg	420	R	420	U	380	R
Isophorone	ug/kg	420	R	420	U	380	R
2-Nitrophenol	ug/kg	420	R	420	U	380	R
2,4-Dimethylphenol	ug/kg	420	R	420	U	380	R
bis(2-Chloroethoxy) Methane	ug/kg	420	R	420	U	380	R
2,4-Dichlorophenol	ug/kg	420	R	420	U	380	R
Benzoic acid	ug/kg	2000	R	2000	U	1800	R
1,2,4-Trichlorobenzene	ug/kg	420	R	420	U	380	R
Naphthalene	ug/kg	420	R	420	U	380	R
4-Chloroaniline	ug/kg	420	R	420	U	760	R
Hexachlorobutadiene	ug/kg	420	R	420	U	380	R
4-Chloro-3-methylphenol	ug/kg	420	R	420	U	380	R
2-Methylnaphthalene	ug/kg	420	R	420	U	380	R
Hexachlorocyclopentadiene	ug/kg	420	R	420	U	380	R
2,4,6-Trichlorophenol	ug/kg	420	R	420	U	380	R
2,4,5-Trichlorophenol	ug/kg	2000	R	2000	U	380	R
2-Chloronaphthalene	ug/kg	420	R	420	U	380	R

	StationID	E005SB040		E005SB041		E005SB041	
	SampleID	005SB04002RE (3-5ft)		005SB04101 (0-1ft)		005SB04102 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/4/2001		12/4/2001		12/4/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
3,4-Methylphenol (mp-Cresol)	ug/kg	380	U	380	U	450	U
N-Nitrosodiphenylamine	ug/kg	380	U	380	U	450	U
Phenol	ug/kg	380	U	380	U	450	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/kg	380	U	380	U	450	U
2-Chlorophenol	ug/kg	380	U	380	U	450	U
1,3-Dichlorobenzene	ug/kg	380	U	380	U	450	U
1,4-Dichlorobenzene	ug/kg	380	U	380	U	450	U
Benzyl alcohol	ug/kg	380	U	380	U	450	U
1,2-Dichlorobenzene	ug/kg	380	U	380	U	450	U
Bis(2-Chloroisopropyl)Ether	ug/kg	380	U	380	U	450	U
2-Methylphenol (o-Cresol)	ug/kg	380	U	380	U	450	U
N-Nitrosodi-n-propylamine	ug/kg	380	U	380	U	450	U
Hexachloroethane	ug/kg	380	U	380	U	450	U
Nitrobenzene	ug/kg	380	U	380	U	450	U
Isophorone	ug/kg	380	U	380	U	450	U
2-Nitrophenol	ug/kg	380	U	380	U	450	U
2,4-Dimethylphenol	ug/kg	380	U	380	U	450	U
bis(2-Chloroethoxy) Methane	ug/kg	380	U	380	U	450	U
2,4-Dichlorophenol	ug/kg	380	U	380	U	450	U
Benzoic acid	ug/kg	1800	U	1900	U	2200	U
1,2,4-Trichlorobenzene	ug/kg	380	U	380	U	450	U
Naphthalene	ug/kg	380	U	380	U	450	U
4-Chloroaniline	ug/kg	380	U	380	U	450	U
Hexachlorobutadiene	ug/kg	380	U	380	U	450	U
4-Chloro-3-methylphenol	ug/kg	380	U	380	U	450	U
2-Methylnaphthalene	ug/kg	380	U	380	U	450	U
Hexachlorocyclopentadiene	ug/kg	380	U	380	U	450	U
2,4,6-Trichlorophenol	ug/kg	380	U	380	U	450	U
2,4,5-Trichlorophenol	ug/kg	1800	U	1900	U	2200	U
2-Chloronaphthalene	ug/kg	380	U	380	U	450	U

	StationID	E005SB039		E005SB039		E005SB040	
	SampleID	005SB03901 (0-1ft)		005SB03902 (3-5ft)		005CB04002 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/1/2001		12/4/2001		12/4/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
2-Nitroaniline	ug/kg	1900	U	2100	U	1900	U
3-Nitroaniline	ug/kg	1900	U	2100	U	1900	U
Dimethyl Phthalate	ug/kg	400	U	440	U	380	U
2,6-Dinitrotoluene	ug/kg	400	UJ	440	UJ	380	UJ
Acenaphthylene	ug/kg	400	U	440	U	380	U
Acenaphthene	ug/kg	340	J	370	J	320	J
2,4-Dinitrophenol	ug/kg	1900	U	2100	U	1900	U
Dibenzofuran	ug/kg	400	U	440	U	380	U
2,4-Dinitrotoluene	ug/kg	400	U	440	U	380	U
Diethyl Phthalate	ug/kg	400	U	440	U	380	U
4-Nitrophenol	ug/kg	1900	U	2100	U	1900	U
Fluorene	ug/kg	340	J	370	J	330	J
4-Chlorophenyl Phenyl Ether	ug/kg	400	U	440	U	380	U
4,6-Dinitro-2-methylphenol	ug/kg	1900	U	2100	U	1900	U
4-Nitroaniline	ug/kg	1900	U	2100	U	1900	U
4-Bromophenyl Phenyl Ether	ug/kg	400	U	440	U	380	U
Hexachlorobenzene	ug/kg	400	U	440	U	380	U
Pentachlorophenol	ug/kg	1900	U	2100	U	1900	U
Phenanthrene	ug/kg	400	U	43	J	56	J
Anthracene	ug/kg	400	U	440	U	380	U
Di-n-butyl Phthalate	ug/kg	400	UJ	440	UJ	380	UJ
Flouranthene	ug/kg	430	=	420	J	540	=
Pyrene	ug/kg	84	J	440	U	210	J
Benzyl Butyl Phthalate	ug/kg	400	U	440	U	380	U
Benzo(a)Anthracene	ug/kg	56	J	440	U	120	J
3,3'-Dichlorobenzidine	ug/kg	800	U	880	U	770	U
Chrysene	ug/kg	63	J	440	U	140	J
bis(2-Ethylhexyl) Phthalate	ug/kg	400	U	440	U	380	U
Di-n-octylphthalate	ug/kg	400	U	440	U	380	U
Benzo(b)Fluoranthene	ug/kg	63	J	440	U	220	J

	StationID	E005SB040		E005SB040		E005SB040	
	SampleID	005SB04001 (0-1ft)		005SB04001RE (0-1ft)		005SB04002 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/1/2001		12/5/2001		12/1/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
2-Nitroaniline	ug/kg	2000	R	2000	U	2000	R
3-Nitroaniline	ug/kg	2000	R	2000	U	2000	R
Dimethyl Phthalate	ug/kg	420	R	420	U	380	R
2,6-Dinitrotoluene	ug/kg	420	R	420	UJ	380	R
Acenaphthylene	ug/kg	420	R	420	U	380	R
Acenaphthene	ug/kg	420	R	420	U	320	R
2,4-Dinitrophenol	ug/kg	2000	R	2000	U	2000	R
Dibenzofuran	ug/kg	420	R	420	U	380	R
2,4-Dinitrotoluene	ug/kg	420	R	420	U	380	R
Diethyl Phthalate	ug/kg	420	R	420	U	380	R
4-Nitrophenol	ug/kg	2000	R	2000	U	2000	R
Fluorene	ug/kg	350	R	420	U	320	R
4-Chlorophenyl Phenyl Ether	ug/kg	420	R	420	U	380	R
4,6-Dinitro-2-methylphenol	ug/kg	2000	R	2000	U	2000	R
4-Nitroaniline	ug/kg	2000	R	2000	U	2000	R
4-Bromophenyl Phenyl Ether	ug/kg	420	R	420	U	380	R
Hexachlorobenzene	ug/kg	420	R	420	U	380	R
Pentachlorophenol	ug/kg	2000	R	2000	U	2000	R
Phenanthrene	ug/kg	39	R	39	J	61	R
Anthracene	ug/kg	420	R	420	U	380	R
Di-n-butyl Phthalate	ug/kg	42	R	420	UJ	49	R
Flouranthene	ug/kg	540	R	560	J	540	R
Pyrene	ug/kg	170	R	160	J	210	R
Benzyl Butyl Phthalate	ug/kg	420	R	420	U	380	R
Benzo(a)Anthracene	ug/kg	120	R	110	J	130	R
3,3'-Dichlorobenzidine	ug/kg	840	R	840	U	760	R
Chrysene	ug/kg	110	R	100	J	120	R
bis(2-Ethylhexyl) Phthalate	ug/kg	930	R	940	U	220	R
Di-n-octylphthalate	ug/kg	420	R	420	U	380	R
Benzo(b)Fluoranthene	ug/kg	160	R	420	U	190	R

	StationID	E005SB040		E005SB041		E005SB041	
	SampleID	005SB04002RE (3-5ft)		005SB04101 (0-1ft)		005SB04102 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/4/2001		12/4/2001		12/4/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
2-Nitroaniline	ug/kg	1800	U	1900	U	2200	U
3-Nitroaniline	ug/kg	1800	U	1900	U	2200	U
Dimethyl Phthalate	ug/kg	380	U	380	U	450	U
2,6-Dinitrotoluene	ug/kg	380	UJ	380	UJ	450	UJ
Acenaphthylene	ug/kg	380	U	380	U	450	U
Acenaphthene	ug/kg	320	J	380	U	380	J
2,4-Dinitrophenol	ug/kg	1800	U	1900	U	2200	U
Dibenzofuran	ug/kg	380	U	380	U	450	U
2,4-Dinitrotoluene	ug/kg	380	U	380	U	450	U
Diethyl Phthalate	ug/kg	380	U	380	U	450	U
4-Nitrophenol	ug/kg	1800	U	1900	U	2200	U
Fluorene	ug/kg	380	U	380	U	390	J
4-Chlorophenyl Phenyl Ether	ug/kg	380	U	380	U	450	U
4,6-Dinitro-2-methylphenol	ug/kg	1800	U	1900	U	2200	U
4-Nitroaniline	ug/kg	1800	U	1900	U	2200	U
4-Bromophenyl Phenyl Ether	ug/kg	380	U	380	U	450	U
Hexachlorobenzene	ug/kg	380	U	380	U	450	U
Pentachlorophenol	ug/kg	1800	U	1900	U	2200	U
Phenanthrene	ug/kg	53	J	380	U	28	J
Anthracene	ug/kg	380	U	380	U	450	U
Di-n-butyl Phthalate	ug/kg	380	UJ	380	UJ	450	UJ
Flouranthene	ug/kg	510	J	350	J	460	=
Pyrene	ug/kg	180	J	380	U	450	U
Benzyl Butyl Phthalate	ug/kg	380	U	380	U	450	U
Benzo(a)Anthracene	ug/kg	130	J	380	U	450	U
3,3'-Dichlorobenzidine	ug/kg	760	U	770	U	900	U
Chrysene	ug/kg	99	J	380	U	450	U
bis(2-Ethylhexyl) Phthalate	ug/kg	380	U	380	U	450	U
Di-n-octylphthalate	ug/kg	380	U	380	U	450	U
Benzo(b)Fluoranthene	ug/kg	200	J	380	U	450	U

	StationID	E005SB039		E005SB039		E005SB040	
	SampleID	005SB03901 (0-1ft)		005SB03902 (3-5ft)		005CB04002 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/1/2001		12/4/2001		12/4/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
Benzo(k)Fluoranthene	ug/kg	400	U	440	U	380	U
Benzo(a)Pyrene	ug/kg	43	J	440	U	130	J
Indeno(1,2,3-c,d)pyrene	ug/kg	400	U	440	U	380	U
Dibenz(a,h)anthracene	ug/kg	400	U	440	U	380	U
Benzo(g,h,i)Perylene	ug/kg	400	U	440	U	380	U
Carbazole	ug/kg	400	U	440	U	380	U
2,4,6-Tribromophenol	PERCENT						
2-Fluorobiphenyl	PERCENT						
2-Fluorophenol	PERCENT						
Nitrobenzene-D5	PERCENT						
Surrogate-PHL	PERCENT						
Terphenyl-d14	PERCENT						

	StationID	E005SB040		E005SB040		E005SB040	
	SampleID	005SB04001 (0-1ft)		005SB04001RE (0-1ft)		005SB04002 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/1/2001		12/5/2001		12/1/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
Benzo(k)Fluoranthene	ug/kg	57	R	210	J	65	R
Benzo(a)Pyrene	ug/kg	110	R	100	J	120	R
Indeno(1,2,3-c,d)pyrene	ug/kg	420	R	420	U	380	R
Dibenz(a,h)anthracene	ug/kg	420	R	420	U	380	R
Benzo(g,h,i)Perylene	ug/kg	62	R	57	J	58	R
Carbazole	ug/kg	420	R	420	U	380	R
2,4,6-Tribromophenol	PERCENT			71			
2-Fluorobiphenyl	PERCENT			41			
2-Fluorophenol	PERCENT			50			
Nitrobenzene-D5	PERCENT			47			
Surrogate-PHL	PERCENT			55			
Terphenyl-d14	PERCENT			43			

	StationID	E005SB040		E005SB041		E005SB041	
	SampleID	005SB04002RE (3-5ft)		005SB04101 (0-1ft)		005SB04102 (3-5ft)	
	DateCollected	11/13/2001		11/13/2001		11/13/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	12/4/2001		12/4/2001		12/4/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
Benzo(k)Fluoranthene	ug/kg	71	J	380	U	450	U
Benzo(a)Pyrene	ug/kg	120	J	380	U	450	U
Indeno(1,2,3-c,d)pyrene	ug/kg	380	U	380	U	450	U
Dibenz(a,h)anthracene	ug/kg	380	U	380	U	450	U
Benzo(g,h,i)Perylene	ug/kg	380	U	380	U	450	U
Carbazole	ug/kg	380	U	380	U	450	U
2,4,6-Tribromophenol	PERCENT	60					
2-Fluorobiphenyl	PERCENT	39					
2-Fluorophenol	PERCENT	50					
Nitrobenzene-D5	PERCENT	45					
Surrogate-PHL	PERCENT	55					
Terphenyl-d14	PERCENT	40					

	StationID	E005SB052		E005SB052		E005SB053		E005SB053	
	SampleID	005SB05201 (0-1ft)		005SB05202 (3-5ft)		005SB05301 (0-1ft)		005SB05302 (3-5ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/26/2002		2/26/2002		2/26/2002		2/26/2002	
	DateAnalyzed	2/26/2002		2/26/2002		2/26/2002		2/26/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	**Units**								
pH	pH units	6.85	=	4.35	=	4.54	=	6.09	=

	StationID	E005SB054		E005SB054		E005SB055		E005SB055	
	SampleID	005SB05401 (0-1ft)		005SB05402 (3-5ft)		005SB05501 (0-1ft)		005SB05502 (3-5ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/26/2002		2/26/2002		2/26/2002		2/26/2002	
	DateAnalyzed	2/26/2002		2/26/2002		2/26/2002		2/26/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	Units								
pH	pH units	5.74	=	5.54	=	5.39	=	5.59	=

	StationID	E005SB056		E005SB056		E005SB057		E005SB057	
	SampleID	005SB05601 (0-1ft)		005SB05602 (3-5ft)		005SB05701 (0-1ft)		005SB05702 (3-5ft)	
	DateCollected	2/21/2002		2/21/2002		2/21/2002		2/21/2002	
	DateExtracted	2/26/2002		2/26/2002		2/26/2002		2/26/2002	
	DateAnalyzed	2/26/2002		2/26/2002		2/26/2002		2/26/2002	
	SDGNumber	CNC69		CNC69		CNC69		CNC69	
Parameter	Units								
pH	pH units	5.27	=	6.21	=	6.61	=	7.06	=

	StationID	E005SB035		E005SB036		E005SB036	
	SampleID	005SB03502RE (3-5ft)		005SB03601 (0-1ft)		005SB03602 (3-5ft)	
	DateCollected	11/19/2001		11/15/2001		11/15/2001	
	DateExtracted	11/29/2001		11/21/2001		11/21/2001	
	DateAnalyzed	11/29/2001		11/28/2001		11/29/2001	
	SDGNumber	CNC52		CNC49		CNC49	
Parameter	**Units**						
Aldrin	ug/kg	1.6	UJ	1.4	UJ	1.4	UJ
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/kg	1.6	UJ	1.4	U	1.4	U
Alpha-chlordane	ug/kg	1.6	UJ	6.8	J	1.4	U
Beta BHC (Beta Hexachlorocyclohexane)	ug/kg	1.6	UJ	1.4	U	1.4	U
Chlordane	ug/kg	16	UJ	14	U	14	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/kg	1.6	UJ	1.4	U	1.4	U
Dieldrin	ug/kg	0.56	J	0.39	J	2.7	U
Endosulfan I	ug/kg	1.6	UJ	1.4	U	1.4	U
Endosulfan II	ug/kg	3.2	UJ	2.7	U	2.7	U
Endosulfan Sulfate	ug/kg	3.2	UJ	2.7	U	2.7	U
Endrin Aldehyde	ug/kg	3.2	UJ	0.67	J	2.7	U
Endrin Ketone	ug/kg	3.2	UJ	2.7	U	2.7	U
Endrin	ug/kg	3.2	UJ	2.7	U	2.7	U
Gamma BHC (Lindane)	ug/kg	1.6	UJ	1.4	U	1.4	U
Gamma-chlordane	ug/kg	1.6	UJ	15	=	2.4	J
Heptachlor Epoxide	ug/kg	1.6	UJ	1.4	U	1.4	U
Heptachlor	ug/kg	1.6	UJ	1.4	UJ	1.4	UJ
Methoxychlor	ug/kg	16	UJ	14	UJ	14	U
p,p'-DDD	ug/kg	3.2	UJ	0.68	J	2.8	=
p,p'-DDE	ug/kg	0.87	J	2.1	J	4	=
p,p'-DDT	ug/kg	0.91	J	1	J	2.7	U
Toxaphene	ug/kg	100	UJ	90	U	91	U
2,4,5,6-Tetrachloro-meta-xylene	PERCENT	52					
Decachlorobiphenyl	PERCENT	48					

	StationID	E005SB037		E005SB037		E005SB038	
	SampleID	005SB03701 (0-1ft)		005SB03702 (3-5ft)		005SB03801 (0-1ft)	
	DateCollected	11/13/2001		11/13/2001		11/14/2001	
	DateExtracted	11/21/2001		11/21/2001		11/21/2001	
	DateAnalyzed	11/28/2001		11/29/2001		11/29/2001	
	SDGNumber	CNC49		CNC49		CNC49	
Parameter	**Units**						
Aldrin	ug/kg	1.6	UJ	1.8	U	1.4	U
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/kg	1.6	U	1.8	U	1.4	U
Alpha-chlordane	ug/kg	1.6	U	1.8	U	1.4	U
Beta BHC (Beta Hexachlorocyclohexane)	ug/kg	1.6	U	1.8	U	1.4	U
Chlordane	ug/kg	16	U	18	U	14	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/kg	1.6	U	1.8	U	1.4	U
Dieldrin	ug/kg	0.55	J	3.4	U	2.7	U
Endosulfan I	ug/kg	1.6	U	1.8	U	1.4	U
Endosulfan II	ug/kg	0.61	J	3.4	U	2.7	U
Endosulfan Sulfate	ug/kg	3	U	3.4	U	2.7	U
Endrin Aldehyde	ug/kg	3	U	3.4	U	2.7	U
Endrin Ketone	ug/kg	3	U	3.4	U	2.7	U
Endrin	ug/kg	3	U	3.4	U	2.7	U
Gamma BHC (Lindane)	ug/kg	1.6	U	1.8	U	1.4	U
Gamma-chlordane	ug/kg	2.5	J	1.8	U	1.4	U
Heptachlor Epoxide	ug/kg	1.6	U	1.8	U	2.6	J
Heptachlor	ug/kg	1.6	UJ	1.8	U	1.4	U
Methoxychlor	ug/kg	16	UJ	18	U	14	U
p,p'-DDD	ug/kg	3.4	J	3.4	U	29	J
p,p'-DDE	ug/kg	9.6	=	3.4	U	12	J
p,p'-DDT	ug/kg	14	J	3.4	U	11	J
Toxaphene	ug/kg	100	U	110	U	91	U
2,4,5,6-Tetrachloro-meta-xylene	PERCENT						
Decachlorobiphenyl	PERCENT						

	StationID	E005SB038	
	SampleID	005SB03802 (3-5ft)	
	DateCollected	11/14/2001	
	DateExtracted	11/21/2001	
	DateAnalyzed	11/29/2001	
	SDGNumber	CNC49	
Parameter	**Units**		
Aldrin	ug/kg	1.8	U
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/kg	1.8	U
Alpha-chlordane	ug/kg	1.8	U
Beta BHC (Beta Hexachlorocyclohexane)	ug/kg	1.8	U
Chlordane	ug/kg	18	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/kg	1.8	U
Dieldrin	ug/kg	3.4	U
Endosulfan I	ug/kg	1.8	U
Endosulfan II	ug/kg	3.4	U
Endosulfan Sulfate	ug/kg	3.4	U
Endrin Aldehyde	ug/kg	3.4	U
Endrin Ketone	ug/kg	3.4	U
Endrin	ug/kg	3.4	U
Gamma BHC (Lindane)	ug/kg	1.8	U
Gamma-chlordane	ug/kg	1.8	U
Heptachlor Epoxide	ug/kg	1.8	U
Heptachlor	ug/kg	1.8	U
Methoxychlor	ug/kg	18	U
p,p'-DDD	ug/kg	3.4	U
p,p'-DDE	ug/kg	3.4	U
p,p'-DDT	ug/kg	3.4	U
Toxaphene	ug/kg	110	U
2,4,5,6-Tetrachloro-meta-xylene	PERCENT		
Decachlorobiphenyl	PERCENT		

Appendix B

Data Validation Summary - Charleston Naval Complex - Zone E

TO: Jim Edens/CH2M HILL/GNA

FROM: Herb Kelly/CH2M HILL/GNA

DATE: April 1, 2002

The purpose of this memorandum is to present the results of the data validation process for the samples collected at the following sites in Zone E: SWMU 5, SWMU 18, AOC 605 and AOC 621. The samples were collected between the dates of November 13, 2001 and February, 21, 2002.

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

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

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for the following analyses: RCRA Metals following SW-846 6010/7000 Series methodology.

Samples were submitted to Severn Trent Services, STL Savannah Laboratories, Inc., in Savannah, Georgia for the following analyses: SW-846 8081 Organochlorine Pesticides, SW-846 8270 Semivolatile Organic Compounds (SVOC) and selected Metals following SW-846 6010/7000 Series methodology.

In addition, selected samples were also submitted for the Synthetic Precipitation Leaching Procedure (SPLP) following method SW-1312, and the "leachate" was analyzed for Lead and/or Nickel.

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

SDG	Station ID	Lab Sample ID	Sample ID	Date Collected	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	SW6010 Lead Only	SW6010 Lead and Nickel only	SW1312/ SW6010 SPLP Lead and/or Nickel	SW6010/ SW7470 RCRA Metals and Mercury	SW8081 Pest	SW8270 SVOC	SW9045 Soil pH
52973	E018GW001	1200118787	018GW001L2MS	12/05/01	WG	MS							X			
52973	E018GW001	1200118789	018GW001L2SD	12/05/01	WG	SD							X			
52973	E018GW001	1200119384	018GW001L2MS	12/05/01	WG	MS							X			
52973	E018GW001	1200119385	018GW001L2SD	12/05/01	WG	SD							X			
52973	E018GW001	52973001	018GW001L2	12/05/01	WG	N							X			
52973	E018GW002	52973002	018GW002L2	12/05/01	WG	N							X			
52973	E018GW002	52973003	018HW002L2	12/05/01	WG	FD							X			
52973	E605GW004	52973004	605GW004L2	12/05/01	WG	N							X			
52973	E605GW005	52973005	605GW005L2	12/05/01	WG	N							X			
52973	E605GW006	52973006	605GW006L2	12/05/01	WG	N							X			
52973	FIELDQC	52973007	018EW001L2	12/05/01	WQ	EB							X			
CNC47	E005SB004	S117518*1	005SB00401	11/13/01	SO	N		0	1	X						
CNC47	E005SB008	S117518*10	005SB00801	11/13/01	SO	N		0	1	X						
CNC47	E005SB008	S117518*11	005SB00802	11/13/01	SO	N		3	5	X						
CNC47	E005SB009	S117518*12	005SB00901	11/13/01	SO	N		0	1	X						
CNC47	E005SB009	S117518*13	005SB00902	11/13/01	SO	N		3	5	X						
CNC47	E005SB010	S117518*14	005SB01001	11/13/01	SO	N		0	1	X						
CNC47	E005SB010	S117518*15	005SB01002	11/13/01	SO	N		3	5	X						

SDG	Station ID	Lab Sample ID	Sample ID	Date Collected	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	SW6010 Lead Only	SW6010 Lead and Nickel only	SW1312/ SW6010 SPLP Lead and/or Nickel	SW6010/ SW7470 RCRA Metals and Mercury	SW8081 Pest	SW8270 SVOC	SW9045 Soil pH
CNC47	E005SB011	S117518*16	005SB01101	11/13/01	SO	N		0	1	X						
CNC47	E005SB011	S117518*17	005CB01101	11/13/01	SO	FD		0	1	X						
CNC47	E005SB011	S117518*18	005SB01102	11/13/01	SO	N		3	5	X						
CNC47	E005SB004	S117518*2	005SB00402	11/13/01	SO	N		3	5	X						
CNC47	E005SB004	S117518*3	005CB00402	11/13/01	SO	FD		3	5	X						
CNC47	E005SB005	S117518*4	005SB00501	11/13/01	SO	N		0	1	X						
CNC47	E005SB005	S117518*5	005SB00502	11/13/01	SO	N		3	5	X						
CNC47	E005SB006	S117518*6	005SB00601	11/13/01	SO	N		0	1	X						
CNC47	E005SB006	S117518*7	005SB00602	11/13/01	SO	N		3	5	X						
CNC47	E005SB007	S117518*8	005SB00701	11/13/01	SO	N		0	1	X						
CNC47	E005SB007	S117518*9	005SB00702	11/13/01	SO	N		3	5	X						
CNC47	E005SB051	S117518*19	005SB05101	11/16/01	SO	N		0	1	X						
CNC47	E005SB050	S117518*20	005SB05001	11/16/01	SO	N		0	1	X						
CNC47	E005SB050	S117518*21	005SB05002	11/16/01	SO	N		3	5	X						
CNC47	E005SB051	S117518*22	005SB05102	11/16/01	SO	N		3	5	X						
CNC47	FIELDQC	S117518*30	005DB01001MS	11/13/01	SQ	MS				X						
CNC47	E005SB010	S117518*32	005SB01001SD	11/13/01	SQ	SD		0	1	X						
CNC47	LABQC	S117518*23	1751823LB		SQ	LB				X						
CNC47	LABQC	S117518*24	1751824BS		SQ	BS				X						
CNC47	LABQC	S117518*37	1751837LB		SQ	LB				X						
CNC47	LABQC	S117518*38	1751838BS		SO	BS				X						

SDG	Station ID	Lab Sample ID	Sample ID	Date Collected	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	SW6010 Lead Only	SW6010 Lead and Nickel only	SW1312/ SW6010 SPLP Lead and/or Nickel	SW6010/ SW7470 RCRA Metals and Mercury	SW8081 Pest	SW8270 SVOC	SW9045 Soil pH
CNC48	E005SB042	S117518A*1	005SB04201	11/13/01	SO	N		0	1			X				
CNC48	E005SB042	S117518A*2	005SB04202	11/13/01	SO	N		3	5			X				
CNC48	E005SB043	S117518A*3	005SB04301	11/13/01	SO	N		0	1			X				
CNC48	E005SB043	S117518A*4	005SB04302	11/13/01	SO	N		3	5			X				
CNC48	E005SB044	S117518A*5	005SB04401	11/13/01	SO	N		0	1			X				
CNC48	E005SB044	S117518A*6	005SB04402	11/13/01	SO	N		3	5			X				
CNC48	E005SB045	S117518A*7	005SB04501	11/13/01	SO	N		0	1			X				
CNC48	E005SB045	S117518A*8	005SB04502	11/13/01	SO	N		3	5			X				
CNC48	E005SB046	S117518A*10	005SB04602	11/14/01	SO	N		3	5			X				
CNC48	E005SB046	S117518A*9	005SB04601	11/14/01	SO	N		0	1			X				
CNC48	LABQC	S117518A*11	SPLP Extracti		SQ	BX						X				
CNC48	LABQC	S117518A*12	17518A12BS		SQ	BS						X				
CNC49	E005SB037	S117518B*10	005SB03702	11/13/01	SO	N		3	5					X		
CNC49	E005SB039	S117518B*13	005SB03901	11/13/01	SO	N		0	1						X	
CNC49	E005SB039	S117518B*14	005SB03902	11/13/01	SO	N		3	5						X	
CNC49	E005SB040	S117518B*15	005SB04001	11/13/01	SO	N		0	1						X	
CNC49	E005SB040	S117518B*15*RE	005SB04001RE	11/13/01	SO	LR	RE	0	1						X	
CNC49	E005SB040	S117518B*16	005SB04002	11/13/01	SO	N		3	5						X	
CNC49	E005SB040	S117518B*16*RE	005SB04002RE	11/13/01	SO	LR	RE	3	5						X	
CNC49	E005SB040	S117518B*17	005CB04002	11/13/01	SO	FD		3	5						X	
CNC49	E005SB041	S117518B*18	005SB04101	11/13/01	SO	N		0	1						X	

SDG	Station ID	Lab Sample ID	Sample ID	Date Collected	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	SW6010 Lead Only	SW6010 Lead and Nickel only	SW1312/ SW6010 SPLP Lead and/or Nickel	SW6010/ SW7470 RCRA Metals and Mercury	SW8081 Pest	SW8270 SVOC	SW9045 Soil pH
CNC49	E005SB041	S117518B*19	005SB04102	11/13/01	SO	N		3	5						X	
CNC49	E005SB037	S117518B*9	005SB03701	11/13/01	SO	N		0	1					X		
CNC49	E005SB032	S117518B*1	005SB03201	11/14/01	SO	N		0	1		X			X		
CNC49	E005SB038	S117518B*11	005SB03801	11/14/01	SO	N		0	1					X		
CNC49	E005SB038	S117518B*12	005SB03802	11/14/01	SO	N		3	5					X		
CNC49	E005SB032	S117518B*2	005SB03202	11/14/01	SO	N		3	5		X			X		
CNC49	E005SB033	S117518B*3	005SB03301	11/14/01	SO	N		0	1		X			X		
CNC49	E005SB033	S117518B*4	005SB03302	11/14/01	SO	N		3	5		X			X		
CNC49	E005SB036	S117518B*5	005SB03601	11/15/01	SO	N		0	1		X			X		
CNC49	E005SB036	S117518B*6	005SB03602	11/15/01	SO	N		3	5		X			X		
CNC49	E005SB034	S117518B*7	005SB03401	11/15/01	SO	N		0	1		X			X		
CNC49	FIELDQC	S117518B*27	005EB004L1	11/13/01	SO	EB					X			X	X	
CNC49	FIELDQC	S117518B*28	005EB005L1	11/14/01	SO	EB					X			X	X	
CNC49	FIELDQC	S117518B*29	005EB006L1	11/15/01	SO	EB					X			X	X	
CNC49	LABQC	S117518B*20	17518B20LB		SO	LB					X			X	X	
CNC49	LABQC	S117518B*21	17518B21BS		SO	BS					X			X	X	
CNC49	LABQC	S117518B*30	17518B30LB		WQ	LB					X			X	X	
CNC49	LABQC	S117518B*31	17518B31BS		WQ	BS					X			X	X	
CNC49	LABQC	S117518B*37	17518B37LB		WQ	LB								X	X	
CNC49	LABQC	S117518B*38	17518B38BS		WQ	BS								X	X	
CNC50	E005SB021	S117518C*1	005SB02101	11/14/01	SO	N		0	1		X					

SDG	Station ID	Lab Sample ID	Sample ID	Date Collected	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	SW6010 Lead Only	SW6010 Lead and Nickel only	SW1312/ SW6010 SPLP Lead and/or Nickel	SW6010/ SW7470 RCRA Metals and Mercury	SW8081 Pest	SW8270 SVOC	SW9045 Soil pH
CNC50	E005SB029	S117518C*18	005SB02901	11/14/01	SO	N		0	1		X					
CNC50	E005SB029	S117518C*19	005SB02902	11/14/01	SO	N		3	5		X					
CNC50	E005SB021	S117518C*2	005CB02101	11/14/01	SO	FD		0	1		X					
CNC50	E005SB030	S117518C*20	005SB03001	11/14/01	SO	N		0	1		X					
CNC50	E005SB030	S117518C*21	005SB03002	11/14/01	SO	N		3	5		X					
CNC50	E005SB030	S117518C*22	005CB03002	11/14/01	SO	FD		3	5		X					
CNC50	E005SB021	S117518C*3	005SB02102	11/14/01	SO	N		3	5		X					
CNC50	E005SB022	S117518C*4	005SB02201	11/14/01	SO	N		0	1		X					
CNC50	E005SB022	S117518C*5	005SB02202	11/14/01	SO	N		3	5		X					
CNC50	E005SB023	S117518C*6	005SB02301	11/14/01	SO	N		0	1		X					
CNC50	E005SB023	S117518C*7	005SB02302	11/14/01	SO	N		3	5		X					
CNC50	E005SB025	S117518C*10	005SB02501	11/15/01	SO	N		0	1		X					
CNC50	E005SB025	S117518C*11	005SB02502	11/15/01	SO	N		3	5		X					
CNC50	E005SB026	S117518C*12	005SB02601	11/15/01	SO	N		0	1		X					
CNC50	E005SB026	S117518C*13	005SB02602	11/15/01	SO	N		3	5		X					
CNC50	E005SB027	S117518C*14	005SB02701	11/15/01	SO	N		0	1		X					
CNC50	E005SB027	S117518C*15	005SB02702	11/15/01	SO	N		3	5		X					
CNC50	E005SB028	S117518C*16	005SB02801	11/15/01	SO	N		0	1		X					
CNC50	E005SB028	S117518C*17	005SB02802	11/15/01	SO	N		3	5		X					
CNC50	E005SB024	S117518C*8	005SB02401	11/15/01	SO	N		0	1		X					
CNC50	E005SB024	S117518C*9	005SB02402	11/15/01	SO	N		3	5		X					

SDG	Station ID	Lab Sample ID	Sample ID	Date Collected	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	SW6010 Lead Only	SW6010 Lead and Nickel only	SW1312/ SW6010 SPLP Lead and/or Nickel	SW6010/ SW7470 RCRA Metals and Mercury	SW8081 Pest	SW8270 SVOC	SW9045 Soil pH
CNC50	LABQC	S117518C*23	17518C23LB		SQ	LB					X					
CNC50	LABQC	S117518C*24	17518C24BS		SQ	BS					X					
CNC50	FIELDQC	S117518C*30	005SB02602S		SQ	MS					X					
CNC50	FIELDQC	S117518C*32	005SB02602SD		SQ	SD					X					
CNC50	LABQC	S117518C*37	17518C37LB		SO	LB					X					
CNC50	LABQC	S117518C*38	17518C38BS		SO	BS					X					
CNC50	LABQC	S117518C*40	17518C40LB		SO	LB					X					
CNC50	LABQC	S117518C*41	17518C41BS		SO	BS					X					
CNC52	E005SB034	S117574*1	005SB03501	11/19/01	SO	N		0	1		X			X		
CNC52	E005SB035	S117574*2	005SB03502	11/19/01	SO	N		3	5		X			X		
CNC52	E005SB035	S117574*2*RE	005SB03502RE	11/19/01	SO	LR	RE	3	5					X		
CNC52	E005SB035	S117574*3	005CB03501	11/19/01	SO	FD		0	1		X			X		
CNC52	E005SB035	S117574*3*RE	005CB03501RE	11/19/01	SO	FD	RE	0	1					X		
CNC52	E005SB047	S117574*4	005SB04701	11/19/01	SO	N		0	1			X				
CNC52	E005SB047	S117574*5	005SB04702	11/19/01	SO	N		3	5			X				
CNC52	LABQC	S117574*13	1757413LB		SQ	LB						X		X		
CNC52	LABQC	S117574*14	1757414BS		SQ	BS						X		X		
CNC52	LABQC	S117574*6	SPLP Extracti		SQ	BX					X	X				
CNC52	LABQC	S117574*7	175747BS		SQ	BS						X				
CNC52	LABQC	S117574*20	1757420LB		SO	LB								X		
CNC52	LABQC	S117574*21	1757421BS		SO	BS								X		

SDG	Station ID	Lab Sample ID	Sample ID	Date Collected	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	SW6010 Lead Only	SW6010 Lead and Nickel only	SW1312/ SW6010 SPLP Lead and/or Nickel	SW6010/ SW7470 RCRA Metals and Mercury	SW8081 Pest	SW8270 SVOC	SW9045 Soil pH
CNC69	E005SB052	S241239*1	005SB05201	02/21/02	SO	N					X	X				X
CNC69	E005SB056	S241239*10	005SB05601	02/21/02	SO	N					X	X				X
CNC69	E005SB056	S241239*11	005SB05602	02/21/02	SO	N					X	X				X
CNC69	E005SB059	S241239*12	005SB05901	02/21/02	SO	N					X	X				X
CNC69	E005SB059	S241239*13	005SB05902	02/21/02	SO	N					X	X				X
CNC69	E005SB057	S241239*14	005SB05701	02/21/02	SO	N					X	X				X
CNC69	E005SB057	S241239*15	005SB05702	02/21/02	SO	N					X	X				X
CNC69	E005SB058	S241239*16	005SB05801	02/21/02	SO	N					X	X				X
CNC69	E005SB058	S241239*17	005SB05802	02/21/02	SO	N					X	X				X
CNC69	E005SB052	S241239*2	005SB05202	02/21/02	SO	N					X	X				X
CNC69	E005CB052	S241239*3	005CB05202	02/21/02	SO	FD					X	X				X
CNC69	E005SB053	S241239*4	005SB05301	02/21/02	SO	N					X	X				X
CNC69	E005SB053	S241239*5	005SB05302	02/21/02	SO	N					X	X				X
CNC69	E005SB054	S241239*6	005SB05401	02/21/02	SO	N					X	X				X
CNC69	E005SB054	S241239*7	005SB05402	02/21/02	SO	N					X	X				X
CNC69	E005SB055	S241239*8	005SB05501	02/21/02	SO	N					X	X				X
CNC69	E005SB055	S241239*9	005SB05502	02/21/02	SO	N					X	X				X
CNC69	LABQC	S241239*19	4123919LB		SQ	LB					X	X				
CNC69	LABQC	S241239*20	4123920BS		SQ	BS					X	X				X
CNC69	FIELDQC	S241239*18	005EB052M1	02/21/02	WQ	EB					X	X				
CNC69	LABQC	S241239*26	4123926LB		WQ	LB					X	X				

SDG	Station ID	Lab Sample ID	Sample ID	Date Collected	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	SW6010 Lead Only	SW6010 Lead and Nickel only	SW1312/ SW6010 SPLP Lead and/or Nickel	SW6010/ SW7470 RCRA Metals and Mercury	SW8081 Peat	SW8270 SVOC	SW9045 Soil pH
CNC69	LABQC	S241239*27	4123927BS		WQ	BS					X	X				

MATRIX CODE

SO - Soil
SQ - Soil QC Samples
WG - Groundwater
WQ - Water QC Samples

SAMPLE TYPE CODE

BS - Blank Spike
BX - SPLP Blank Spike
EB - Equipment Blank
FD - Field Duplicate
N - Native Sample
LB - Laboratory Blank
LR - Laboratory Replicate
MS - Matrix Spike
SD - Matrix Spike duplicate

SAMPLE TYPE CODE

RE - Re-analysis

ANALYSIS CODE

Pest - Pesticides
SVOC - Semivolatile Organic Compounds

Organic Parameters

Quality Control Review

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

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Method blank and equipment blank samples were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Surrogate Recoveries** – Surrogate Compounds are added to each sample and the recoveries are used to monitor lab performance and possible matrix interference.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", either laboratory reagent water or Ottawa sand, in which target compounds have been added prior to extraction/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **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.
- **GC/MS Tuning** – The mass spectrum of the tuning compound is evaluated for method compliance. The criteria are established to verify the proper mass assignment and mass resolution.
- **Initial Calibration** – The initial calibration ensures that the instrument is capable of producing acceptable qualitative and quantitative data for the compounds of interest.
- **Continuing Calibration** – The continuing calibration checks satisfactory performance of the instrument and its predicted response to the target compounds.
- **Internal Standards** – The internal standards (retention time and response) are evaluated for method compliance. The internal standards are used in quantitation of the target parameters and monitor the instrument sensitivity and response for stability during each analysis.

- **Confirmation** – If GCMS methodology is not initially used for analysis, SW-846 method 8000 requires confirmation when the composition of samples is not well characterized. Therefore, even when the identification has been confirmed on a dissimilar column or detector, the agreement of the quantitative results on both columns is evaluated. For Pesticide and PCB analyses covered in this report, confirmation was performed using a dissimilar analytical column. The laboratory analyzed samples with a gas chromatograph (GC) utilizing simultaneous primary and confirmation data acquisition. Per SW-86 method 8000, a criteria of 40% Relative Percent Difference (RPD) was used as the acceptance limit.

Organochlorine Pesticide Analyses

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

Surrogate Recoveries

All surrogate recoveries were within acceptable quality control limits, except as noted in Table 2.

TABLE 2
Surrogate Recoveries Out of QC Limits: Organochlorine Pesticides
Charleston Naval Complex, Zone E, Charleston, SC

SDG	Sample	Parameter	Recovery (Col#1/Col#2)	Recovery Limits	Flag
CNC 49	S117518B*1	Tetrachloro-m-xylene (TCMX)	72/56*	60-150	No Flags applied, DCB recoveries OK
	S117518B*3	TCMX	72/59*	60-150	No Flags applied, DCB recoveries OK
	S117518B*5	Decachlorobiphenyl (DCB)	47*/83	60-150	No Flags applied, TCMX recoveries OK
	S117518B*9	DCB	120/170*	60-150	
	S117518B*27	DCB	58*/56*	60-150	
	S117518B*28	DCB	40*/38*	60-150	
	S117518B*29	DCB	46*/44*	60-150	
CNC 52	S17574*1	TCMX	56*/54*	60-150	Flag detect "J", non-detects "UJ"
	S17574*2	TCMX	38*/33*	60-150	Flag "R", use Re-analysis
		DCB	31*/33*	60-150	
	S17574*2Re	TCMX	48*/52*	60-150	Flag detect "J", non-detects "UJ"
		DCB	48*/46*	60-150	

TABLE 2
Surrogate Recoveries Out of QC Limits: Organochlorine Pesticides
Charleston Naval Complex, Zone E, Charleston, SC

SDG	Sample	Parameter	Recovery (Col#1/Col#2)	Recovery Limits	Flag
	S17574*3	TCMX	46*/40*	60-150	Flag "R", use Re-analysis
		DCB	53*/50*	60-150	
	S17574*3Re	TCMX	49*/47*	60-150	Flag detect "J", non-detects "UJ"
		DCB	44*/47*	60-150	

* - out of control limits

Matrix Spike (MS), Matrix Spike (MSD) Laboratory Control Spike (LCS), and Laboratory Control Spike Duplicate (LCSD) - Recoveries/ Relative Percent Differences (RPDs)

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

TABLE 3
MS/MSD and LCS/LCSD Recoveries and RPDs Out of QC Limits: Metals
Charleston Naval Complex, Zone E, Charleston, SC

SDG	Sample	Parameter	MS Recovery	MSD Recovery	Recovery Limits	RPD	RPD Limits	Associated Samples
CNC 52	S17574*3RE	Alpha-Chlordane	40*	78	45-140			S17574*1-3
		Heptachlor	81	38	35-130	73*	31	
	11270-IMB (LCS)	Alpha-Chlordane	20		45-140			S17574*1-3
		4,4'-DDD	140		28-134			
		Endosulfan Sulfate	149		26-144			
		Endrin Ketone	113		29-113			

* - out of control limits

- Flag detected results for Alpha-Chlordane "J", as estimated, and non-detected results "UJ", as estimated in samples S17574*1-3.
- Flag only detected results for 4,4'-DDD, Endosulfan Sulfate, and Endrin Ketone "J", as estimated.
- No flags were applied based upon RPD values out of QC limits alone, but in conjunction with recoveries.

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 4.

TABLE 4
Initial and Continuing Calibration Criteria Exceptions: Organochlorine Pesticides
Charleston Naval Complex, Zone E, Charleston, SC

Instrument/ Calibration Date	Analyte	% Difference Col#1 / Col#2	Associated Samples
SGJECD1-CCAL-11/28, 1131	Aldrin	15.6 / 7.7 low	S117518B*1-5, 9, 27-29
SGJECD1-CCAL-11/29, 0043	Heptachlor	18.3 / 9.3 low	S117518B*1-5, 9, 27-29
	Aldrin	20.5 / 6.4 low	
	4,4'-DDD	20.7 / 2.5 high	
	4,4'-DDT	33.3 / 46.3 low	
	Methoxyclor	28.6 / 43.5 low	
	Endrin Aldehyde	17.8 / 1.9 low	
	Endrin Sulfate	16.0 / 0.5 low	
	Endrin Ketone	21.5 / 5.7 low	
SGJECD1-CCAL-11/29, 1110	Heptachlor	21.4 / 12.6 low	S117518B*6, 7, 10-12
	Aldrin	26.2 / 8.8 low	
	Methoxyclor	15.9 / 0.9 low	
	Endrin Ketone	18.8 / 5.3 low	
SGJECD1-CCAL-11/29, 1949	4,4'-DDT	7.4 / 17.2 low	S117518B*6, 7, 10-12
	Alpha-BHC	18.4 / 12.0 high	
SGIECD2-CCAL-11/28, 1040	Delta-BHC	22.1 / 21.3 high	S17574*1, 2
	4,4'-DDD	20.5 / 26.0 high	
	Endrin Ketone	13.0 / 16.0 high	
SGIECD2-CCAL-11/28, 2150	Delta-BHC	20.7 / 27.6 high	S17574*1, 2
	4,4'-DDD	31.2 / 44.9 high	
	Endosulfan II	2.3 / 16.6 high	
	4,4'-DDT	31.9 / 21.8 low	
	Endrin Aldehyde	35.3 / 2.4 low	
	Methoxychlor	18.6 / 6.7 low	

TABLE 4
Initial and Continuing Calibration Criteria Exceptions: Organochlorine Pesticides
Charleston Naval Complex, Zone E, Charleston, SC

Instrument/ Calibration Date	Analyte	% Difference Col#1 / Col#2	Associated Samples
SGIECD2-CCAL-11/29, 1559	Methoxychlor	11.1 / 26.0 high	S17574*1, 2RE, 3RE
SGIECD2-CCAL-11/29, 2045	Delta-BHC	21.4 / 26.0 high	S17574*1, 2RE, 3RE
	4,4'-DDD	23.8 / 33.4 high	
	4,4'-DDT	25.5 / 16.8 low	
	Endrin Aldehyde	29.1 low/ 6.9 high	
	Methoxychlor	15.4 / 5.9 low	

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

- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference was high, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.

Internal Standard Area

All internal standard areas were within QC limits except as noted in Table 5 below.

TABLE 5
Internal Standard Area out of Criteria: Organochlorine Pesticides
Charleston Naval Complex, Zone E, Charleston, SC

SDG	Sample	Internal Standards	Flags applied to compounds associated with IS out
CNC 49	S17518B*7	Bromonitrobenzene = 2480% high	Detects-J
	S17518B*10	Bromonitrobenzene = 1053% high	
	S17518B*11	Bromonitrobenzene = 1220% high	
	S17518B*12	Bromonitrobenzene = 208% high	

Second Column Confirmation

The second column confirmation percent difference (%D) for some detected parameters, exceeded the 40 %D criteria. Those results were flagged "J", as estimated. The laboratory reported the lower of the two concentrations. The individual samples and specific compounds that were flagged are listed in Table 6 below.

TABLE 6
Second Column Confirmation out of Criteria: Organochlorine Pesticides
Charleston Naval Complex, Zone E, Charleston, SC

SDG	Lab Sample ID	Sample ID	Parameter
CNC49	S117518B*1	005SB03201	ALPHA-CHLORDANE
CNC49	S117518B*1	005SB03201	DIELDRIN
CNC49	S117518B*1	005SB03201	ENDOSULFAN II
CNC49	S117518B*1	005SB03201	GAMMA-CHLORDANE
CNC49	S117518B*1	005SB03201	HEPTACHLOR EPOXIDE
CNC49	S117518B*11	005SB03801	HEPTACHLOR EPOXIDE
CNC49	S117518B*11	005SB03801	p,p'-DDD
CNC49	S117518B*11	005SB03801	p,p'-DDE
CNC49	S117518B*11	005SB03801	p,p'-DDT
CNC49	S117518B*2	005SB03202	DIELDRIN
CNC49	S117518B*2	005SB03202	GAMMA-CHLORDANE
CNC49	S117518B*2	005SB03202	p,p'-DDE
CNC49	S117518B*3	005SB03301	p,p'-DDE
CNC49	S117518B*4	005SB03302	DIELDRIN
CNC49	S117518B*4	005SB03302	ENDOSULFAN II
CNC49	S117518B*4	005SB03302	p,p'-DDE
CNC49	S117518B*5	005SB03601	ALPHA-CHLORDANE
CNC49	S117518B*5	005SB03601	DIELDRIN
CNC49	S117518B*5	005SB03601	p,p'-DDE
CNC49	S117518B*5	005SB03601	p,p'-DDT
CNC49	S117518B*6	005SB03602	GAMMA-CHLORDANE
CNC49	S117518B*9	005SB03701	DIELDRIN
CNC49	S117518B*9	005SB03701	ENDOSULFAN II
CNC49	S117518B*9	005SB03701	GAMMA-CHLORDANE
CNC52	S117574*1	005SB03501	p,p'-DDT
CNC52	S117574*1	005SB03501	DIELDRIN
CNC52	S117574*1	005SB03501	GAMMA-CHLORDANE
CNC52	S117574*1	005SB03501	ALPHA-CHLORDANE

TABLE 6
Second Column Confirmation out of Criteria: Organochlorine Pesticides
Charleston Naval Complex, Zone E, Charleston, SC

SDG	Lab Sample ID	Sample ID	Parameter
CNC52	S117574*2*RE	005SB03502RE	p,p'-DDT
CNC52	S117574*2*RE	005SB03502RE	DIELDRIN
CNC52	S117574*3*RE	005CB03501RE	p,p'-DDD
CNC52	S117574*3*RE	005CB03501RE	p,p'-DDT
CNC52	S117574*3*RE	005CB03501RE	GAMMA-CHLORDANE

Semivolatile Organic Compounds (SVOC) Analyses

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

Blanks

The SVOC target parameters detected in blank samples are listed in Table 7.

TABLE 7
Equipment Blank Contamination: SVOCs
Charleston Naval Complex, Zone E, Charleston, SC

SDG	Lab Sample ID	Sample ID	Sample Type	Parameter	Lab Result	Units	Flag Concentrations
CNC 49	S117518B*37	17518B37LB	MB	Di-n-butyl phthalate	0.3	µg /Kg	<3.0 µg/Kg
	S117518B*20	17518B20LB	MB	Bis(2-ethylhexyl) phthalate	150	µg /Kg	<1500 µg/Kg
	S117518B*27	005EB004L1	EB	Bis(2-ethylhexyl) phthalate	1.6	µg /L	<528 µg/Kg
	S117518B*28	005EB005L1	EB	Benzo(b)fluoranthene	0.33	µg /L	<54.5 µg/Kg
	S117518B*29	005EB006L1	EB	Di-n-butyl phthalate	1.1	µg /L	<363 µg/Kg
	S117518B*29	005EB006L1	EB	Benzyl Alcohol	1.2	µg /L	<198 µg/Kg

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

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

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

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 8.

TABLE 8
Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOCs
Charleston Naval Complex, Zone E, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation (ICAL)/ %Difference (CCAL)/ R^2	Associated Samples
MSD5973-ICAL-11/26	Benzoic Acid	0.987	S17518B*27
	2,4-Dinitrophenol	0.988	
MSD5973-ICAL-11/30	2,6-Dinitrotoluene	15.1%	S17518B*13-16, 28, 29, 15RE, 16RE
	Di-n-butyl phthalate	15.4%	
MSD 5973-CCAL-12/3, 2129	Benzyl Alcohol	23.9 high	S17518B*28, 29
	N-nitroso-di-n-propylamine	25.1 high	
	Benzoic Acid	37.0 high	
	Pyrene	32,4 high	
	Butylbenzylphthalate	36.7 high	
	3,3'-Dichlorobenzidine	40.5 high	
	Indeno(1,2,3-cd)pyrene	50.8 high	
	Dibenz(a,h)anthracene	35.3 high	
	Benzo(g,h,i)perylene	37.7 high	
MSD 5973-CCAL-12/4, 0920	Benzyl Alcohol	21.1 high	S17518B*14, 17-19, 16RE
	2,4-Dimethylphenol	21.6 high	
	Benzoic Acid	29.3 high	
	2,4-Dinitrophenol	23,9 high	
MSD 5973-CCAL-12/5, 1022	Bis(2-chloroethyl)ether	21.2 high	S17518B*15RE
	Bis(2-chloroisopropyl)ether	29.8 high	
	Benzoic Acid	29.3 high	
	2-Nitroaniline	26.6 high	
	4-Nitrophenol	45.6 high	
	Diethylphthalate	21.1 high	
	Di-n-butyl phthalate	24.3 high	
MSD 5973-CCAL-12/7, 1330	Bis(2-chloroethyl)ether	20.1 high	S17518B*13

TABLE 8
Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOCs
Charleston Naval Complex, Zone E, Charleston, SC

Instrument/Calibration Date	Analyte	%Relative Standard Deviation (ICAL)/ %Difference (CCAL)/ R^2	Associated Samples
	Benzyl Alcohol	86.4 low	
	Bis(2-chloroisopropyl)ether	30.2 high	
	N-nitroso-di-n-propylamine	24.5 high	
	Nitrobenzene	26.4 high	
	4-Chloroaniline	44.7 high	
	2-Nitroaniline	28.5 high	
	2,4-Nitrophenol	24.4 high	
	4-Nitrophenol	36,4 high	
	Indeno(1,2,3-cd)pyrene	21.5 high	

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

- When the percent Relative Standard Deviation (%RSD) or Correlation Coefficient (R^2) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference was high, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.

Internal Standard Area

All internal standard areas were within QC limits except as noted in Table 9below.

TABLE 9
Internal Standard Area out of Criteria: SVOCs
Charleston Naval Complex, Zone E, Charleston, SC

SDG	Sample	Internal Standards	Flags applied to compounds associated with IS out
CNC 49	S17518B*15	IS#3-103% high	R (use re-analysis)
		IS#4-119% high	
		IS#5-134% high	
		IS#6-159% high	
	S17518B*15RE	IS#4-102% high	Detects-J
	S17518B*16	IS#3-103% high	R (use re-analysis)
		IS#4-122% high	
		IS#5-139% high	
		IS#6-139% high	
	S17518B*16RE	IS#4-120% high	Detects-J
	S17518B*16RE	IS#5-122% high	

Inorganic Parameters

Quality Control Review

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

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

Metals Analyses

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

Blanks

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

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

SDG	Lab Sample ID	Sample ID	Sample Type	Parameter	Lab Result	Units	Flag Concentrations
52973	52973007	018EW001L2	EB	BARIUM	14	ug/L	< 70 ug/l
52973	52973007	018EW001L2	EB	CHROMIUM, TOTAL	0.602	ug/L	< 3.01 ug/L
	CCB		CCB	BARIUM	0.278	ug/L	< 1.39 ug/L
	CCB		CCB	CADMIUM	0.644	ug/L	< 3.22 ug/L
	CCB		CCB	SILVER	0.752	ug/L	< 3.76 ug/L
CNC48	CCB		CCB	BARIUM	2.03	ug/L	< 10.15 ug/L
	CCB		CCB	CHROMIUM, TOTAL	1.73	ug/L	< 8.65 ug/L
	CCB		CCB	SELENIUM	4.54	ug/L	< 22.7 ug/L
CNC49	S117518B*27	005EB004L1	EB	LEAD	0.0029	mg/l	< 1.45 mg/Kg
CNC49	S117518B*28	005EB005L1	EB	LEAD	0.0062	mg/l	< 3.1 mg/Kg
CNC49	S117518B*28	005EB005L1	EB	NICKEL	0.019	mg/l	< 9.5 mg/Kg
CNC 52	CCB		CCB	BARIUM	2.03	ug/L	< 10.15 ug/L
	CCB		CCB	CHROMIUM, TOTAL	1.73	ug/L	< 8.65 ug/L
	CCB		CCB	SELENIUM	4.54	ug/L	< 22.7 ug/L
CNC69	S241239*19	4123919LB	LB	LEAD, SPLP	0.0049	mg/l	< 0.0245 mg/L
	CCB		CCB	LEAD	4.47	ug/l	< 1.215 mg/Kg

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.

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

Matrix Spike (MS), Matrix Spike (MSD) Laboratory Control Spike (LCS), and Laboratory Control Spike Duplicate (LCSD) Recoveries

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

- The recoveries for lead in the MS/MSD sample set in SDG CNC 69, were 147 and 80 percent respectively. Detected compounds in the soil samples were qualified "J" as estimated.

Rejected Data

All of the rejected data listed in Attachment 1 were associated with re-runs and dilutions (you can only have a single valid result per parameter per sample). No other data was rejected such that there is not a valid result for that parameter in each sample.

Conclusion

A review of the analytical data submitted regarding the investigation of selected sites in Zone E 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 - AOC 605, AOC 621, SWMU 5, and SWMU 18

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
52973	52973004	605GW004L2	WG	METAL	N		SW6010	NONE	BARIUM	69.2	B	69.2	U	ug/L	BL
52973	52973005	605GW005L2	WG	METAL	N		SW6010	NONE	BARIUM	55.8	B	55.8	U	ug/L	BL
52973	52973001	018GW001L2	WG	METAL	N		SW6010	NONE	CADMIUM	0.835	B	0.835	U	ug/L	BL
52973	52973004	605GW004L2	WG	METAL	N		SW6010	NONE	CADMIUM	0.465	B	0.465	U	ug/L	BL
52973	52973001	018GW001L2	WG	METAL	N		SW6010	NONE	CHROMIUM, TOTAL	0.722	B	0.722	U	ug/L	BL
52973	52973002	018GW002L2	WG	METAL	N		SW6010	NONE	CHROMIUM, TOTAL	1.42	B	1.42	U	ug/L	BL
52973	52973005	605GW005L2	WG	METAL	N		SW6010	NONE	CHROMIUM, TOTAL	1.46	B	1.46	U	ug/L	BL
52973	52973006	605GW006L2	WG	METAL	N		SW6010	NONE	CHROMIUM, TOTAL	2.72	B	2.72	U	ug/L	BL
52973	52973001	018GW001L2	WG	METAL	N		SW6010	NONE	ARSENIC	5.21	B	5.21	J	ug/L	IB
52973	52973003	018HW002L2	WG	METAL	FD		SW6010	NONE	ARSENIC	3.67	B	3.67	J	ug/L	IB
52973	52973004	605GW004L2	WG	METAL	N		SW6010	NONE	ARSENIC	6.98	B	6.98	J	ug/L	IB
52973	52973005	605GW005L2	WG	METAL	N		SW6010	NONE	ARSENIC	8.91	B	8.91	J	ug/L	IB
52973	52973006	605GW006L2	WG	METAL	N		SW6010	NONE	ARSENIC	4.97	B	4.97	J	ug/L	IB
52973	52973001	018GW001L2	WG	METAL	N		SW6010	NONE	BARIUM	85.8	B	85.8	J	ug/L	IB
52973	52973006	605GW006L2	WG	METAL	N		SW6010	NONE	BARIUM	158	B	158	J	ug/L	IB
52973	52973004	605GW004L2	WG	METAL	N		SW6010	NONE	CHROMIUM, TOTAL	7.98	B	7.98	J	ug/L	IB
52973	52973001	018GW001L2	WG	METAL	N		SW7470	NONE	MERCURY	0.145	B	0.145	J	ug/L	IB
CNC48	S117518A*1	005SB04201	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.0063	B	0.0063	U	mg/l	BL
CNC48	S117518A*2	005SB04202	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.0062	B	0.0062	U	mg/l	BL
CNC48	S117518A*6	005SB04402	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.0014	B	0.0014	U	mg/l	BL
CNC48	S117518A*7	005SB04501	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.0091	B	0.0091	U	mg/l	BL
CNC48	S117518A*9	005SB04601	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.0025	B	0.0025	U	mg/l	BL
CNC48	S117518A*10	005SB04602	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.0031	B	0.0031	U	mg/l	BL
CNC48	S117518A*5	005SB04401	SO	METAL	N		SW6010A	SW1312	CHROMIUM, SPLP	0.0034	B	0.0034	U	mg/l	BL
CNC48	S117518A*7	005SB04501	SO	METAL	N		SW6010A	SW1312	CHROMIUM, SPLP	0.0051	B	0.0051	U	mg/l	BL
CNC48	S117518A*9	005SB04601	SO	METAL	N		SW6010A	SW1312	CHROMIUM, SPLP	0.0049	B	0.0049	U	mg/l	BL
CNC48	S117518A*10	005SB04602	SO	METAL	N		SW6010A	SW1312	CHROMIUM, SPLP	0.0031	B	0.0031	U	mg/l	BL
CNC48	S117518A*6	005SB04402	SO	METAL	N		SW6010A	SW1312	LEAD, SPLP	0.0022	B	0.0022	U	mg/l	BL
CNC48	S117518A*4	005SB04302	SO	METAL	N		SW6010A	SW1312	ARSENIC,SPLP	0.0032	B	0.0032	J	mg/l	IB
CNC48	S117518A*3	005SB04301	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.021	B	0.021	J	mg/l	IB
CNC48	S117518A*4	005SB04302	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.031	B	0.031	J	mg/l	IB
CNC48	S117518A*5	005SB04401	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.016	B	0.016	J	mg/l	IB
CNC48	S117518A*8	005SB04502	SO	METAL	N		SW6010A	SW1312	BARIUM, SPLP	0.017	B	0.017	J	mg/l	IB
CNC48	S117518A*3	005SB04301	SO	METAL	N		SW7470A	SW1312	MERCURY, SPLP	0.0002	B	0.00016	J	mg/l	IB
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	ALPHA-CHLORDANE	0.66	JP	0.66	J	ug/kg	2C
CNC49	S117518B*5	005SB03601	SO	PEST	N		SW8081	NONE	ALPHA-CHLORDANE	6.8	P	6.8	J	ug/kg	2C
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	DIELDRIN	3.5	P	3.5	J	ug/kg	2C
CNC49	S117518B*2	005SB03202	SO	PEST	N		SW8081	NONE	DIELDRIN	0.33	JP	0.33	J	ug/kg	2C
CNC49	S117518B*4	005SB03302	SO	PEST	N		SW8081	NONE	DIELDRIN	0.48	JP	0.48	J	ug/kg	2C
CNC49	S117518B*5	005SB03601	SO	PEST	N		SW8081	NONE	DIELDRIN	0.39	JP	0.39	J	ug/kg	2C
CNC49	S117518B*9	005SB03701	SO	PEST	N		SW8081	NONE	DIELDRIN	0.55	JP	0.55	J	ug/kg	2C
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	ENDOSULFAN II	1.3	JP	1.3	J	ug/kg	2C
CNC49	S117518B*4	005SB03302	SO	PEST	N		SW8081	NONE	ENDOSULFAN II	0.46	JP	0.46	J	ug/kg	2C
CNC49	S117518B*9	005SB03701	SO	PEST	N		SW8081	NONE	ENDOSULFAN II	0.61	JP	0.61	J	ug/kg	2C
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	GAMMA-CHLORDANE	0.68	JP	0.68	J	ug/kg	2C

Attachment 1 - Changed Qualifiers and Results
Zone A - AOC 605, AOC 621, SWMU 5, and SWMU 18

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC49	S117518B*2	005SB03202	SO	PEST	N		SW8081	NONE	GAMMA-CHLORDANE	0.29	JP	0.29	J	ug/kg	2C
CNC49	S117518B*6	005SB03602	SO	PEST	N		SW8081	NONE	GAMMA-CHLORDANE	2.4	P	2.4	J	ug/kg	2C
CNC49	S117518B*9	005SB03701	SO	PEST	N		SW8081	NONE	GAMMA-CHLORDANE	2.5	P	2.5	J	ug/kg	2C
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	HEPTACHLOR EPOXIDE	0.81	JP	0.81	J	ug/kg	2C
CNC49	S117518B*2	005SB03202	SO	PEST	N		SW8081	NONE	p,p'-DDE	0.7	JP	0.7	J	ug/kg	2C
CNC49	S117518B*3	005SB03301	SO	PEST	N		SW8081	NONE	p,p'-DDE	2.3	JP	2.3	J	ug/kg	2C
CNC49	S117518B*4	005SB03302	SO	PEST	N		SW8081	NONE	p,p'-DDE	1.4	JP	1.4	J	ug/kg	2C
CNC49	S117518B*5	005SB03601	SO	PEST	N		SW8081	NONE	p,p'-DDE	2.1	JP	2.1	J	ug/kg	2C
CNC49	S117518B*15*	005SB04001RE	SO	SVOA	LR	RE	SW8270	NONE	BENZO(b)FLUORANTHENE	54	J	420	U	ug/kg	BL
CNC49	S117518B*17	005CB04002	SO	SVOA	FD		SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	210	JB	380	U	ug/kg	BL
CNC49	S117518B*13	005SB03901	SO	SVOA	N		SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	230	JB	400	U	ug/kg	BL
CNC49	S117518B*14	005SB03902	SO	SVOA	N		SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	200	BJ	440	U	ug/kg	BL
CNC49	S117518B*15*	005SB04001RE	SO	SVOA	LR	RE	SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	940	B	940	U	ug/kg	BL
CNC49	S117518B*16*	005SB04002RE	SO	SVOA	LR	RE	SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	210	JB	380	U	ug/kg	BL
CNC49	S117518B*18	005SB04101	SO	SVOA	N		SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	180	JB	380	U	ug/kg	BL
CNC49	S117518B*19	005SB04102	SO	SVOA	N		SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	200	JB	450	U	ug/kg	BL
CNC49	S117518B*2	005SB03202	SO	METAL	N		SW6010	NONE	NICKEL	6.3	B	6.3	U	mg/kg	BL
CNC49	S117518B*17	005CB04002	SO	SVOA	FD		SW8270	NONE	DI-n-BUTYL PHTHALATE	39	J	380	UJ	ug/kg	BL, IC
CNC49	S117518B*13	005SB03901	SO	SVOA	N		SW8270	NONE	DI-n-BUTYL PHTHALATE	49	J	400	UJ	ug/kg	BL, IC
CNC49	S117518B*14	005SB03902	SO	SVOA	N		SW8270	NONE	DI-n-BUTYL PHTHALATE	49	J	440	UJ	ug/kg	BL, IC
CNC49	S117518B*15*	005SB04001RE	SO	SVOA	LR	RE	SW8270	NONE	DI-n-BUTYL PHTHALATE	41	J	420	UJ	ug/kg	BL, IC
CNC49	S117518B*16*	005SB04002RE	SO	SVOA	LR	RE	SW8270	NONE	DI-n-BUTYL PHTHALATE	380	J	380	UJ	ug/kg	BL, IC
CNC49	S117518B*18	005SB04101	SO	SVOA	N		SW8270	NONE	DI-n-BUTYL PHTHALATE	43	J	380	UJ	ug/kg	BL, IC
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	ALDRIN	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*2	005SB03202	SO	PEST	N		SW8081	NONE	ALDRIN	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*3	005SB03301	SO	PEST	N		SW8081	NONE	ALDRIN	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*4	005SB03302	SO	PEST	N		SW8081	NONE	ALDRIN	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*5	005SB03601	SO	PEST	N		SW8081	NONE	ALDRIN	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*6	005SB03602	SO	PEST	N		SW8081	NONE	ALDRIN	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*9	005SB03701	SO	PEST	N		SW8081	NONE	ALDRIN	1.6	U	1.6	UJ	ug/kg	CC
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*2	005SB03202	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*3	005SB03301	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*4	005SB03302	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*5	005SB03601	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*6	005SB03602	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.4	U	1.4	UJ	ug/kg	CC
CNC49	S117518B*9	005SB03701	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.6	U	1.6	UJ	ug/kg	CC
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	METHOXYCHLOR	14	U	14	UJ	ug/kg	CC
CNC49	S117518B*2	005SB03202	SO	PEST	N		SW8081	NONE	METHOXYCHLOR	14	U	14	UJ	ug/kg	CC
CNC49	S117518B*3	005SB03301	SO	PEST	N		SW8081	NONE	METHOXYCHLOR	14	U	14	UJ	ug/kg	CC
CNC49	S117518B*4	005SB03302	SO	PEST	N		SW8081	NONE	METHOXYCHLOR	14	U	14	UJ	ug/kg	CC
CNC49	S117518B*5	005SB03601	SO	PEST	N		SW8081	NONE	METHOXYCHLOR	14	U	14	UJ	ug/kg	CC
CNC49	S117518B*9	005SB03701	SO	PEST	N		SW8081	NONE	METHOXYCHLOR	16	U	16	UJ	ug/kg	CC
CNC49	S117518B*5	005SB03601	SO	PEST	N		SW8081	NONE	p,p'-DDD	0.68	J	0.68	J	ug/kg	CC
CNC49	S117518B*9	005SB03701	SO	PEST	N		SW8081	NONE	p,p'-DDD	3.4	=	3.4	J	ug/kg	CC

Attachment 1 - Changed Qualifiers and Results
Zone A - AOC 605, AOC 621, SWMU 5, and SWMU 18

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC49	S117518B*1	005SB03201	SO	PEST	N		SW8081	NONE	p,p'-DDT	34	=	34	J	ug/kg	CC
CNC49	S117518B*2	005SB03202	SO	PEST	N		SW8081	NONE	p,p'-DDT	4	=	4	J	ug/kg	CC
CNC49	S117518B*3	005SB03301	SO	PEST	N		SW8081	NONE	p,p'-DDT	8.8	=	8.8	J	ug/kg	CC
CNC49	S117518B*4	005SB03302	SO	PEST	N		SW8081	NONE	p,p'-DDT	11	=	11	J	ug/kg	CC
CNC49	S117518B*9	005SB03701	SO	PEST	N		SW8081	NONE	p,p'-DDT	14	=	14	J	ug/kg	CC
CNC49	S117518B*5	005SB03601	SO	PEST	N		SW8081	NONE	p,p'-DDT	1	JP	1	J	ug/kg	CC, 2C
CNC49	S117518B*7	005SB03401	SO	METAL	N		SW6010	NONE	NICKEL	2.9	B	2.9	J	mg/kg	IB
CNC49	S117518B*5	005SB03601	SO	METAL	N		SW6010	NONE	NICKEL	7.4	B	7.4	J	mg/kg	IB
CNC49	S117518B*6	005SB03602	SO	METAL	N		SW6010	NONE	NICKEL	4.9	B	4.9	J	mg/kg	IB
CNC49	S117518B*17	005CB04002	SO	SVOA	FD		SW8270	NONE	2,6-DINITROTOLUENE	380	U	380	UJ	ug/kg	IC
CNC49	S117518B*13	005SB03901	SO	SVOA	N		SW8270	NONE	2,6-DINITROTOLUENE	400	U	400	UJ	ug/kg	IC
CNC49	S117518B*14	005SB03902	SO	SVOA	N		SW8270	NONE	2,6-DINITROTOLUENE	440	U	440	UJ	ug/kg	IC
CNC49	S117518B*15*	005SB04001RE	SO	SVOA	LR	RE	SW8270	NONE	2,6-DINITROTOLUENE	420	U	420	UJ	ug/kg	IC
CNC49	S117518B*16*	005SB04002RE	SO	SVOA	LR	RE	SW8270	NONE	2,6-DINITROTOLUENE	380	U	380	UJ	ug/kg	IC
CNC49	S117518B*18	005SB04101	SO	SVOA	N		SW8270	NONE	2,6-DINITROTOLUENE	380	U	380	UJ	ug/kg	IC
CNC49	S117518B*19	005SB04102	SO	SVOA	N		SW8270	NONE	2,6-DINITROTOLUENE	450	U	450	UJ	ug/kg	IC
CNC49	S117518B*19	005SB04102	SO	SVOA	N		SW8270	NONE	DI-n-BUTYL PHTHALATE	450	U	450	UJ	ug/kg	IC
CNC49	S117518B*16*	005SB04002RE	SO	SVOA	LR	RE	SW8270	NONE	BENZO(a)ANTHRACENE	130	J	130	J	ug/kg	IS
CNC49	S117518B*16*	005SB04002RE	SO	SVOA	LR	RE	SW8270	NONE	CHRYSENE	99	J	99	J	ug/kg	IS
CNC49	S117518B*15*	005SB04001RE	SO	SVOA	LR	RE	SW8270	NONE	FLUORANTHENE	560	=	560	J	ug/kg	IS
CNC49	S117518B*16*	005SB04002RE	SO	SVOA	LR	RE	SW8270	NONE	FLUORANTHENE	510	=	510	J	ug/kg	IS
CNC49	S117518B*15*	005SB04001RE	SO	SVOA	LR	RE	SW8270	NONE	PHENANTHRENE	39	J	39	J	ug/kg	IS
CNC49	S117518B*16*	005SB04002RE	SO	SVOA	LR	RE	SW8270	NONE	PHENANTHRENE	53	J	53	J	ug/kg	IS
CNC49	S117518B*16*	005SB04002RE	SO	SVOA	LR	RE	SW8270	NONE	PYRENE	180	J	180	J	ug/kg	IS
CNC49	S117518B*11	005SB03801	SO	PEST	N		SW8081	NONE	HEPTACHLOR EPOXIDE	2.6	P	2.6	J	ug/kg	IS, 2C
CNC49	S117518B*11	005SB03801	SO	PEST	N		SW8081	NONE	p,p'-DDD	29	P	29	J	ug/kg	IS, 2C
CNC49	S117518B*11	005SB03801	SO	PEST	N		SW8081	NONE	p,p'-DDE	12	P	12	J	ug/kg	IS, 2C
CNC49	S117518B*11	005SB03801	SO	PEST	N		SW8081	NONE	p,p'-DDT	11	P	11	J	ug/kg	IS, 2C
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	1,2,4-TRICHLOROBENZENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	1,2,4-TRICHLOROBENZENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	1,2-DICHLOROBENZENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	1,2-DICHLOROBENZENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	1,3-DICHLOROBENZENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	1,3-DICHLOROBENZENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	1,4-DICHLOROBENZENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	1,4-DICHLOROBENZENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2,4,5-TRICHLOROPHENOL	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2,4,5-TRICHLOROPHENOL	380	J	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2,4,6-TRICHLOROPHENOL	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2,4,6-TRICHLOROPHENOL	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2,4-DICHLOROPHENOL	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2,4-DICHLOROPHENOL	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2,4-DIMETHYLPHENOL	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2,4-DIMETHYLPHENOL	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2,4-DINITROPHENOL	2000	U	2000	R	ug/kg	RE

Attachment 1 - Changed Qualifiers and Results
Zone A - AOC 605, AOC 621, SWMU 5, and SWMU 18

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2,4-DINITROPHENOL	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2,4-DINITROTOLUENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2,4-DINITROTOLUENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2,6-DINITROTOLUENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2,6-DINITROTOLUENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2-CHLORONAPHTHALENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2-CHLORONAPHTHALENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2-CHLOROPHENOL	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2-CHLOROPHENOL	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2-METHYLNAPHTHALENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2-METHYLNAPHTHALENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2-METHYLPHENOL (o-CRESOL)	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2-METHYLPHENOL (o-CRESOL)	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2-NITROANILINE	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2-NITROANILINE	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	2-NITROPHENOL	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	2-NITROPHENOL	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	3,3'-DICHLOROBENZIDINE	840	U	840	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	3,3'-DICHLOROBENZIDINE	760	U	760	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	3-NITROANILINE	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	3-NITROANILINE	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	4,6-DINITRO-2-METHYLPHENOL	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	4,6-DINITRO-2-METHYLPHENOL	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	4-BROMOPHENYL PHENYL ETHER	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	4-BROMOPHENYL PHENYL ETHER	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	4-CHLORO-3-METHYLPHENOL	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	4-CHLORO-3-METHYLPHENOL	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	4-CHLOROANILINE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	4-CHLOROANILINE	760	U	760	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	4-CHLOROPHENYL PHENYL ETHER	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	4-CHLOROPHENYL PHENYL ETHER	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	4-NITROANILINE	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	4-NITROANILINE	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	4-NITROPHENOL	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	4-NITROPHENOL	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	ACENAPHTHENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	ACENAPHTHENE	320	J	320	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	ACENAPHTHYLENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	ACENAPHTHYLENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	ANTHRACENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	ANTHRACENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	BENZO(a)ANTHRACENE	120	J	120	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	BENZO(a)ANTHRACENE	130	J	130	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	BENZO(a)PYRENE	110	J	110	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	BENZO(a)PYRENE	120	J	120	R	ug/kg	RE

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	BENZO(b)FLUORANTHENE	160	J	160	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	BENZO(b)FLUORANTHENE	190	J	190	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	BENZO(g,h,i)PERYLENE	62	J	62	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	BENZO(g,h,i)PERYLENE	58	J	58	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	BENZO(k)FLUORANTHENE	57	J	57	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	BENZO(k)FLUORANTHENE	65	J	65	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	Benzoic acid	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	Benzoic acid	1800	U	1800	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	Benzyl alcohol	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	Benzyl alcohol	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	BENZYL BUTYL PHTHALATE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	BENZYL BUTYL PHTHALATE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	bis(2-CHLOROETHOXY) METHANE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	bis(2-CHLOROETHOXY) METHANE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	bis(2-CHLOROETHYL) ETHER	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	bis(2-CHLOROETHYL) ETHER	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	Bis(2-Chloroisopropyl)Ether	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	Bis(2-Chloroisopropyl)Ether	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	930	B	930	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	bis(2-ETHYLHEXYL) PHTHALATE	220	JB	220	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	CARBAZOLE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	CARBAZOLE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	CHRYSENE	110	J	110	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	CHRYSENE	120	J	120	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	DIBENZ(a,h)ANTHRACENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	DIBENZ(a,h)ANTHRACENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	DIBENZOFURAN	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	DIBENZOFURAN	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	DIETHYL PHTHALATE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	DIETHYL PHTHALATE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	DIMETHYL PHTHALATE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	DIMETHYL PHTHALATE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	DI-n-BUTYL PHTHALATE	42	J	42	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	DI-n-BUTYL PHTHALATE	49	J	49	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	DI-n-OCTYLPHTHALATE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	DI-n-OCTYLPHTHALATE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	FLUORANTHENE	540	=	540	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	FLUORANTHENE	540	=	540	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	FLUORENE	350	J	350	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	FLUORENE	320	J	320	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	HEXACHLOROBENZENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	HEXACHLOROBENZENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	HEXACHLOROBUTADIENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	HEXACHLOROBUTADIENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	HEXACHLOROCYCLOPENTADIENE	420	U	420	R	ug/kg	RE

Attachment 1 - Changed Qualifiers and Results
Zone A - AOC 605, AOC 621, SWMU 5, and SWMU 18

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	HEXACHLOROCYCLOPENTADIENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	HEXACHLOROETHANE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	HEXACHLOROETHANE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	INDENO(1,2,3-c,d)PYRENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	INDENO(1,2,3-c,d)PYRENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	ISOPHORONE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	ISOPHORONE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	m,p-Cresols	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	m,p-Cresols	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	NAPHTHALENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	NAPHTHALENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	NITROBENZENE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	NITROBENZENE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	N-NITROSODI-n-PROPYLAMINE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	N-NITROSODI-n-PROPYLAMINE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	N-NITROSODIPHENYLAMINE	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	N-NITROSODIPHENYLAMINE	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	PENTACHLOROPHENOL	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	PENTACHLOROPHENOL	2000	U	2000	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	PHENANTHRENE	39	J	39	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	PHENANTHRENE	61	J	61	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	PHENOL	420	U	420	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	PHENOL	380	U	380	R	ug/kg	RE
CNC49	S117518B*15	005SB04001	SO	SVOA	N		SW8270	NONE	PYRENE	170	J	170	R	ug/kg	RE
CNC49	S117518B*16	005SB04002	SO	SVOA	N		SW8270	NONE	PYRENE	210	J	210	R	ug/kg	RE
CNC50	S117518C*5	005SB02202	SO	METAL	N		SW6010	NONE	NICKEL	3.7	B	3.7	U	mg/kg	BL
CNC50	S117518C*7	005SB02302	SO	METAL	N		SW6010	NONE	NICKEL	5.8	B	5.8	U	mg/kg	BL
CNC50	S117518C*19	005SB02902	SO	METAL	N		SW6010	NONE	NICKEL	8	B	8	U	mg/kg	BL
CNC50	S117518C*16	005SB02801	SO	METAL	N		SW6010	NONE	NICKEL	7.4	B	7.4	J	mg/kg	IB
CNC50	S117518C*17	005SB02802	SO	METAL	N		SW6010	NONE	NICKEL	1.4	B	1.4	J	mg/kg	IB
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	p,p'-DDD	1.5	JP	1.5	J	ug/kg	2C, BS, CC,
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	p,p'-DDT	2.5	JP	2.5	J	ug/kg	2C, CC, SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	p,p'-DDT	2.6	JP	2.6	J	ug/kg	2C, CC, SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	p,p'-DDT	0.91	JP	0.91	J	ug/kg	2C, CC, SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	DIELDRIN	0.55	JP	0.55	J	ug/kg	2C, SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	DIELDRIN	0.56	JP	0.56	J	ug/kg	2C, SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	GAMMA-CHLORDANE	2.6	P	2.6	J	ug/kg	2C, SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	GAMMA-CHLORDANE	1.4	JP	1.4	J	ug/kg	2C, SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ALPHA-CHLORDANE	0.84	JP	0.84	J	ug/kg	2C, SS, BS
CNC52	S117574*4	005SB04701	SO	METAL	N		SW6010	SW1312	CHROMIUM, SPLP	0.0029	B	0.0029	U	mg/l	BL
CNC52	S117574*5	005SB04702	SO	METAL	N		SW6010	SW1312	CHROMIUM, SPLP	0.0025	B	0.0025	U	mg/l	BL
CNC52	S117574*4	005SB04701	SO	METAL	N		SW6010	SW1312	BARIUM, SPLP	0.022	B	0.022	J	mg/l	IB
CNC52	S117574*5	005SB04702	SO	METAL	N		SW6010	SW1312	BARIUM, SPLP	0.04	B	0.04	J	mg/l	IB
CNC52	S117574*5	005SB04702	SO	METAL	N		SW6010	SW1312	LEAD, SPLP	0.0026	B	0.0026	J	mg/l	IB
CNC52	S117574*3	005CB03501	SO	METAL	FD		SW6010	NONE	NICKEL	6.2	B	6.2	J	mg/kg	IB

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC52	S117574*1	005SB03501	SO	METAL	N		SW6010	NONE	NICKEL	5.9	B	5.9	J	mg/kg	IB
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ALDRIN	1.5	U	1.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ALDRIN	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ALPHA BHC	1.5	U	1.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ALPHA BHC	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ALPHA-CHLORDANE	1.6	=	1.6	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ALPHA-CHLORDANE	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	BETA BHC	1.5	U	1.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	BETA BHC	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	Chlordane	15	U	15	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	Chlordane	16	U	16	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	DELTA BHC	1.5	U	1.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	DELTA BHC	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	DIELDRIN	2.3	JP	2.3	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	DIELDRIN	1.7	J	1.7	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ENDOSULFAN I	1.5	U	1.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ENDOSULFAN I	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ENDOSULFAN II	2.8	U	2.8	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ENDOSULFAN II	3.2	U	3.2	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ENDOSULFAN SULFATE	2.8	U	2.8	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ENDOSULFAN SULFATE	3.2	U	3.2	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ENDRIN	2.8	U	2.8	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ENDRIN	3.2	U	3.2	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ENDRIN ALDEHYDE	2.8	U	2.8	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ENDRIN ALDEHYDE	3.2	U	3.2	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	ENDRIN KETONE	2.8	U	2.8	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	ENDRIN KETONE	3.2	U	3.2	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	GAMMA BHC (LINDANE)	1.5	U	1.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	GAMMA BHC (LINDANE)	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	GAMMA-CHLORDANE	2.5	P	2.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	GAMMA-CHLORDANE	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	HEPTACHLOR	1.5	U	1.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	HEPTACHLOR EPOXIDE	1.5	U	1.5	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	HEPTACHLOR EPOXIDE	1.6	U	1.6	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	METHOXYCHLOR	15	U	15	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	METHOXYCHLOR	16	U	16	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	p,p'-DDD	2.8	U	2.8	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	p,p'-DDD	1.9	JP	1.9	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	p,p'-DDE	5.3	=	5.3	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	p,p'-DDE	1.2	J	1.2	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	p,p'-DDT	2.6	JP	2.6	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	p,p'-DDT	1.2	JP	1.2	R	ug/kg	RE
CNC52	S117574*3	005CB03501	SO	PEST	FD		SW8081	NONE	TOXAPHENE	93	U	93	R	ug/kg	RE
CNC52	S117574*2	005SB03502	SO	PEST	N		SW8081	NONE	TOXAPHENE	100	U	100	R	ug/kg	RE

Attachment 1 - Changed Qualifiers and Results
Zone A - AOC 605, AOC 621, SWMU 5, and SWMU 18

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ALDRIN	1.5	U	1.5	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ALDRIN	1.4	U	1.4	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ALDRIN	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ALPHA BHC	1.5	U	1.5	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ALPHA BHC	1.4	U	1.4	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ALPHA BHC	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	BETA BHC	1.5	U	1.5	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	BETA BHC	1.4	U	1.4	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	BETA BHC	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	Chlordane	15	U	15	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	Chlordane	14	U	14	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	Chlordane	16	U	16	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	DELTA BHC	1.5	U	1.5	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	DELTA BHC	1.4	U	1.4	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	DELTA BHC	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ENDOSULFAN I	1.5	U	1.5	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ENDOSULFAN I	1.4	U	1.4	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ENDOSULFAN I	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ENDOSULFAN II	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ENDOSULFAN II	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ENDOSULFAN II	3.2	U	3.2	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ENDOSULFAN SULFATE	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ENDOSULFAN SULFATE	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ENDOSULFAN SULFATE	3.2	U	3.2	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ENDRIN	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ENDRIN	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ENDRIN	3.2	U	3.2	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ENDRIN ALDEHYDE	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ENDRIN ALDEHYDE	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ENDRIN ALDEHYDE	3.2	U	3.2	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ENDRIN KETONE	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	ENDRIN KETONE	2.8	U	2.8	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ENDRIN KETONE	3.2	U	3.2	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	GAMMA BHC (LINDANE)	1.5	U	1.5	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	GAMMA BHC (LINDANE)	1.4	U	1.4	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	GAMMA BHC (LINDANE)	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	GAMMA-CHLORDANE	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	HEPTACHLOR	1.4	U	1.4	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	HEPTACHLOR	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	HEPTACHLOR EPOXIDE	1.5	U	1.5	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	HEPTACHLOR EPOXIDE	1.4	U	1.4	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	HEPTACHLOR EPOXIDE	1.6	U	1.6	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	METHOXYCHLOR	15	U	15	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	METHOXYCHLOR	14	U	14	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	METHOXYCHLOR	16	U	16	UJ	ug/kg	SS

Attachment 1 - Changed Qualifiers and Results
Zone A - AQC 605, AOC 621, SWMU 5, and SWMU 18

SDG	Lab Sample ID	Sample ID	Matrix	Parameter Class	Sample Type	LR Type	Analytical Method	Leach Method	Parameter	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	p,p'-DDD	3.2	U	3.2	UJ	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	p,p'-DDE	4.1	=	4.1	J	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	p,p'-DDE	4.2	=	4.2	J	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	p,p'-DDE	0.87	J	0.87	J	ug/kg	SS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	TOXAPHENE	93	U	93	UJ	ug/kg	SS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	TOXAPHENE	92	U	92	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	TOXAPHENE	100	U	100	UJ	ug/kg	SS
CNC52	S117574*2*RE	005SB03502RE	SO	PEST	LR	RE	SW8081	NONE	ALPHA-CHLORDANE	1.6	U	1.6	UJ	ug/kg	SS, BS
CNC52	S117574*1	005SB03501	SO	PEST	N		SW8081	NONE	p,p'-DDD	4.1	=	4.1	J	ug/kg	SS, BS, CC
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	ALPHA-CHLORDANE	1.5	=	1.5	J	ug/kg	SS, BS, MS
CNC52	S117574*3*RE	005CB03501RE	SO	PEST	FD	RE	SW8081	NONE	HEPTACHLOR	1.5	U	1.5	UJ	ug/kg	SS, MD
CNC69	S241239*2	005SB05202	SO	METAL	N		SW6010B	NONE	NICKEL	5.7	B	5.7	J	mg/kg	IB
CNC69	S241239*3	005CB05202	SO	METAL	FD		SW6010B	SW1312	LEAD, SPLP	0.01	B	0.01	U	mg/l	BL
CNC69	S241239*1	005SB05201	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.0078	B	0.0078	U	mg/l	BL
CNC69	S241239*2	005SB05202	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.015	B	0.015	U	mg/l	BL
CNC69	S241239*11	005SB05602	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.0076	B	0.0076	U	mg/l	BL
CNC69	S241239*13	005SB05902	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.0035	B	0.0035	U	mg/l	BL
CNC69	S241239*4	005SB05301	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.21	B	0.21	J	mg/l	IB
CNC69	S241239*5	005SB05302	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.03	B	0.03	J	mg/l	IB
CNC69	S241239*6	005SB05401	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.022	B	0.022	J	mg/l	IB
CNC69	S241239*7	005SB05402	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.033	B	0.033	J	mg/l	IB
CNC69	S241239*9	005SB05502	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.14	B	0.14	J	mg/l	IB
CNC69	S241239*12	005SB05901	SO	METAL	N		SW6010B	SW1312	LEAD, SPLP	0.055	B	0.055	J	mg/l	IB
CNC69	S241239*3	005CB05202	SO	METAL	FD		SW6010B	NONE	NICKEL	6.6	B	6.6	J	mg/kg	IB
CNC69	S241239*1	005SB05201	SO	METAL	N		SW6010B	NONE	NICKEL	6.3	B	6.3	J	mg/kg	IB
CNC69	S241239*14	005SB05701	SO	METAL	N		SW6010B	SW1312	NICKEL, SPLP	0.021	B	0.021	J	mg/l	IB
CNC69	S241239*3	005CB05202	SO	METAL	FD		SW6010B	NONE	LEAD	27	=	27	J	mg/kg	MS
CNC69	S241239*1	005SB05201	SO	METAL	N		SW6010B	NONE	LEAD	80	=	80	J	mg/kg	MS
CNC69	S241239*2	005SB05202	SO	METAL	N		SW6010B	NONE	LEAD	38	=	38	J	mg/kg	MS
CNC69	S241239*4	005SB05301	SO	METAL	N		SW6010B	NONE	LEAD	2500	=	2500	J	mg/kg	MS
CNC69	S241239*5	005SB05302	SO	METAL	N		SW6010B	NONE	LEAD	24	=	24	J	mg/kg	MS
CNC69	S241239*6	005SB05401	SO	METAL	N		SW6010B	NONE	LEAD	42	=	42	J	mg/kg	MS
CNC69	S241239*7	005SB05402	SO	METAL	N		SW6010B	NONE	LEAD	3.7	=	3.7	J	mg/kg	MS
CNC69	S241239*8	005SB05501	SO	METAL	N		SW6010B	NONE	LEAD	16000	=	16000	J	mg/kg	MS
CNC69	S241239*9	005SB05502	SO	METAL	N		SW6010B	NONE	LEAD	5700	=	5700	J	mg/kg	MS
CNC69	S241239*10	005SB05601	SO	METAL	N		SW6010B	NONE	LEAD	6900	=	6900	J	mg/kg	MS
CNC69	S241239*11	005SB05602	SO	METAL	N		SW6010B	NONE	LEAD	370	=	370	J	mg/kg	MS
CNC69	S241239*12	005SB05901	SO	METAL	N		SW6010B	NONE	LEAD	150000	=	150000	J	mg/kg	MS
CNC69	S241239*13	005SB05902	SO	METAL	N		SW6010B	NONE	LEAD	840	=	840	J	mg/kg	MS

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZA005-110901-01** page 1 of 7

Laboratory: GEL, Charleston, SC
Project Name: Charleston Navy Complex
Site Name: Zone A, SWMU 5
Project Number: 158814.PM.04
TAT: 21 day TAT
Project Manager: Tom Beisel/ATL
Level: Level 3
Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605
CHS: 2470 Mail Dr. Suite B, N. Charleston, SC 29406
Send Report To: see back of COC
EDD: CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B)	Nickel (SW6010B)	Pesticides (SW8081A)	SVOCs (SW8270C)	SPLP Metals	RCRA Metals	Lead & Nickel	Pesticides (SW8081A)	SVOCs (SW8270C)		Comments
							1 - 4 ounce jar		1 - 8 ounce jar	1 - 8 ounce jar	1 - 16 ounce jar	1 - 0.5L HDPE, HNO3	1 - 0.5L HDPE, HNO3	2 - 1L amber	2 - 1L amber		
005SB00401	E005SB004	0	1	11-13-01/ 0940	SO	1	X										
005SB00402	E005SB004	3	5	11-13-01/ 0945	SO	1	X										
005CB00402	E005SB004	3	5	11-13-01/ 0946	SO	1	X										
005SB00501	E005SB005	0	1	11-13-01/ 0955	SO	1	X										
005SB00502	E005SB005	3	5	11-13-01/ 1000	SO	1	X										
005SB00601	E005SB006	0	1	11-13-01/ 1010	SO	1	X										
005SB00602	E005SB006	3	5	11-13-01/ 1015	SO	1	X										
005SB00701	E005SB007	0	1	11-13-01/ 1025	SO	1	X										
005SB00702	E005SB007	3	5	11-13-01/ 1030	SO	1	X										
005SB00801	E005SB008	0	1	11-13-01/ 1430	SO	1	X										
005SB00802	E005SB008	3	5	11-13-01/ 1435	SO	1	X										
005SB00901	E005SB009	0	1	11-13-01/ 1445	SO	1	X										
005SB00902	E005SB009	3	5	11-13-01/ 1450	SO	1	X										
005SB01001	E005SB010	0	1	11-13-01/ 1520	SO	1	X										
005SB01001MS	E005SB010	0	1	11-13-01/ 1521	SO	1	X										MS
005SB01001SD	E005SB010	0	1	11-13-01/ 1522	SO	1	X										MSD
005SB01002	E005SB010	3	5	11-13-01/ 1525	SO	1	X										
005SB01101	E005SB011	0	1	11-13-01/ 1625	SO	1	X										
005CB01101	E005SB011	0	1	11-13-01/ 1626	SO	1	X										
005SB01102	E005SB011	3	5	11-13-01/ 1630	SO	1	X										

Sampled By: BRIAN CRAWFORD — Date/Time: 11-16-01 1230
Additional Samplers: CHRIS BLANDY
Received By Lab: F. Bewaffard — Date/Time: 11/17/01 9:00
Received By: — Date/Time:
Relinquished by: — Date/Time:
Relinquished by: — Date/Time:
Shipped Via: UPS FedEx Hand Other Tracking#:
Remarks: Lists on last page of COC.
Temperature: 5/17518
Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory: GEL, Charleston, SC

Project Name: Charleston Navy Complex

Site Name: Zone A, SWMU 5

Project Number: 158814.PM.04

TAT: 21 day TAT

Project Manager: Tom Beisel/ATL

Level: Level 3

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

CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406

Send Report To: see back of COC

EDD: CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B) 1 - 4 ounce jar	Nickel (SW6010B)	Pesticides (SW8081A) 1 - 8 ounce jar	SVOCs (SW8270C) 1 - 8 ounce jar	SPLP Metals 1 - 16 ounce jar	RCRA Metals 1 - 0.5L HDPE, HNO3	Lead & Nickel 1 - 0.5L HDPE, HNO3	Pesticides (SW8081A) 2 - 1L amber	SVOCs (SW8270C) 2 - 1L amber		Comments
005SB01201	E005SB012	0	1	11-15-01 1425	SO	1	X										
005SB01202	E005SB012	3	5	11-15-01 1435	SO	1	X										
005SB01301	E005SB013	0	1	11-15-01 1415	SO	1	X										
005SB01302	E005SB013	3	5	11-15-01 1420	SO	1	X										
005SB01401	E005SB014	0	1	11-15-01 / 1450	SO	1	X										
005SB01402	E005SB014	3	5	11-15-01 / 1500	SO	1	X										
005SB01501	E005SB015	0	1	11-15-01 1400	SO	1	X										
005SB01502	E005SB015	3	5	11-15-01 1410	SO	1	X										
005SB01601	E005SB016	0	1	11-15-01 1345	SO	1	X										
005SB01602	E005SB016	3	5	11-15-01 1350	SO	1	X										
005SB01701	E005SB017	0	1	11-15-01 1125	SO	1	X										
005SB01702	E005SB017	3	5	~~11-15-01 1135~~	SO		X										SB17 NOT SAMPLED hit obstruction.
005SB01801	E005SB018	0	1	11-14-01 / 1450	SO	1	X										
005SB01802	E005SB018	3	5	11-14-01 / 1455	SO	1	X										
005SB01901	E005SB019	0	1	11-14-01 / 1505	SO	1	X										
005SB01902	E005SB019	3	5	11-14-01 / 1510	SO	1	X										
005CB01902	E005SB019	3	5	11-14-01 / 1511	SO	1	X										
005SB02001	E005SB020	0	1		SO		X										* DID NOT SAMPLE SB 20.
005SB02002	E005SB020	3	5		SO		X										
005SB02101	E005SB021	0	1	11-14-01 / 0850	SO	1	X	X									

Sampled By

Date/Time

Relinquished by:

Date/Time

Additional Samplers:

Received By Lab: F Swafford

Date/Time 11/17/01 9:00

Relinquished by:

Date/Time

Received By:

Date/Time

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: Lists on last page of COC.

Temperature:

Receipt Exceptions: 5, 4, 7, 5, 18

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory: GEL, Charleston, SC
Project Name: Charleston Navy Complex
Site Name: Zone A, SWMU 5
Project Number: 158814.PM.04
TAT: 21 day TAT
Project Manager: Tom Beisel/ATL
Level: Level 3
Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605
CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406
Send Report To: see back of COC
EDD: CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B) 1 - 4 ounce jar	Nickel (SW6010B) 1 - 8 ounce jar	Pesticides (SW8081A) 1 - 8 ounce jar	SVOCs (SW8270C) 1 - 16 ounce jar	SPLP Metals 1 - 0.5L HDPE, HNO3	RCRA Metals 1 - 0.5L HDPE, HNO3	Lead & Nickel 2 - 1L amber	Pesticides (SW8081A) 2 - 1L amber	SVOCs (SW8270C) 2 - 1L amber		Comments
005CB02101	E005SB021	0	1	11-14-01/ 0851	SO	1	X	X									
005SB02102	E005SB021	3	5	11-14-01/ 0855	SO	1	X	X									
005SB02201	E005SB022	0	1	11-14-01/ 0910	SO	1	X	X									
005SB02202	E005SB022	3	5	11-14-01/ 0915	SO	1	X	X									
005SB02301	E005SB023	0	1	11-14-01/ 1335	SO	1	X	X									
005SB02302	E005SB023	3	5	11-14-01/ 1340	SO	1	X	X									
005SB02401	E005SB024	0	1	11-15-01 1035	SO	1	X	X									
005SB02402	E005SB024	3	5	11-15-01 1045	SO	1	X	X									
005SB02501	E005SB025	0	1	11-15-01 1330	SO	1	X	X									
005SB02502	E005SB025	3	5	11-15-01 1340	SO	1	X	X									
005SB02601	E005SB026	0	1	11-15-01 1015	SO	1	X	X									
005SB02602	E005SB026	3	5	11-15-01 1025	SO	1	X	X									
005SB02602MS	E005SB026	3	5	11-15-01 1030	SO	1	X	X									
005SB02602SD	E005SB026	3	5	11-15-01 1030	SO	1	X	X									
005SB02701	E005SB027	0	1	11-15-01/ 1310	SO	1	X	X									
005SB02702	E005SB027	3	5	11-15-01/ 1320	SO	1	X	X									
005SB02801	E005SB028	0	1	11-15-01 1110	SO	1	X	X									
005SB02802	E005SB028	3	5	11-15-01 1120	SO	1	X	X									
005SB02901	E005SB029	0	1	11-14-01/ 0955	SO	1	X	X									
005SB02902	E005SB029	3	5	11-14-01/ 1000	SO	1	X	X									

Sampled By: Date/Time:
Additional Samplers:
Received By Lab: J Swafford Date/Time 11/17/01 9:00
Received By: Date/Time:
Remarks: Lists on last page of COC.

Relinquished by: Date/Time:
Relinquished by: Date/Time:
Shipped Via: UPS FedEx Hand Other Tracking#:
Temperature:

Receipt Exceptions: 3117518

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory: GEL, Charleston, SC
Project Name: Charleston Navy Complex
Site Name: Zone A, SWMU 5
Project Number: 158814.PM.04
TAT: 21 day TAT
Project Manager: Tom Beisel/ATL
Level: Level 3
Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605
CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406
Send Report To: see back of COC
EDD: CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B) 1 - 4 ounce jar	Nickel (SW6010B)	Pesticides (SW8081A) 1 - 8 ounce jar	SVOCs (SW8270C) 1 - 8 ounce jar	SPLP Metals 1 - 16 ounce jar	RCRA Metals 1 - 0.5L HDPE, HNO3	Lead & Nickel 1 - 0.5L HDPE, HNO3	Pesticides (SW8081A) 2 - 1L amber	SVOCs (SW8270C) 2 - 1L amber		Comments
005SB03001	E005SB030	0	1	11-14-01/ 1245	SO	1	X	X									
005SB03002	E005SB030	3	5	11-14-01/ 1250	SO	1	X	X									
005CB03002	E005SB030	3	5	11-14-01/ 1251	SO	1	X	X									
005SB03101	E005SB031	0	1		SO		X	X							SB31		DID NOT Sample
005SB03102	E005SB031	3	5		SO		X	X									
005SB03201	E005SB032	0	1	11-14-01/ 1355	SO	2	X	X	X								
005SB03202	E005SB032	3	5	11-14-01/ 1400	SO	2	X	X	X								
005SB03301	E005SB033	0	1	11-14-01/ 1410	SO	2	X	X	X								
005SB03302	E005SB033	3	5	11-14-01/ 1415	SO	2	X	X	X								
005SB03401	E005SB034	0	1	11-15-01 1505	SO		X	X	X								Pest. NOT Collected.
005SB03402	E005SB034	3	5	11-15-01 1510	SO		X	X	X								
005SB03501	E005SB035	0	1		SO		X	X	X								DID Not Sample Bottle Packed on location.
005CB03501	E005SB035	0	1		SO		X	X	X								
005SB03502	E005SB035	3	5		SO		X	X	X								
005SB03601	E005SB036	0	1	11-15-01/ 1520	SO		X	X	X								
005SB03602	E005SB036	3	5	11-15-01/ 1525	SO		X	X	X								
005SB03701	E005SB037	0	1	11-13-01/ 1140	SO	1			X								
005SB03702	E005SB037	3	5	11-13-01/ 1145	SO	1			X								
005SB03801	E005SB038	0	1	11-14-01/ 0940	SO	1			X								
005SB03802	E005SB038	3	5	11-14-01/ 0945	SO	1			X								

Sampled By _____ Date/Time _____ Relinquished by: _____ Date/Time _____

Additional Samplers: _____

Received By Lab: [signature] Date/Time 11/17/01 Relinquished by: _____ Date/Time _____

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

Remarks: Lists on last page of COC. Temperature: _____

Receipt Exceptions: _____ 5.1/7.5/8

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZA005-110901-01** page 5 of 11

Laboratory:	GEL, Charleston, SC
Project Name:	Charleston Navy Complex
Site Name:	Zone A, SWMU 5
Project Number:	158814.PM.04
TAT:	21 day TAT
Project Manager:	Tom Beisel/ATL
Level:	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406
Send Report To:	see back of COC
EDD:	CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B) (1 - 4 ounce jar)	Nickel (SW6010B)	Pesticides (SW8081A) (1 - 8 ounce jar)	SVOCs (SW8270C) (1 - 8 ounce jar)	SPLP Metals (1 - 16 ounce jar)	RCRA Metals (1 - 0.5L HDPE, HNO3)	Lead & Nickel (1 - 0.5L HDPE, HNO3)	Pesticides (SW8081A) (2 - 1L amber)	SVOCs (SW8270C) (2 - 1L amber)		Comments
005SB03901	E005SB039	0	1	11-13-01/ 1050	SO	1				X							
005SB03902	E005SB039	3	5	11-13-01/ 1055	SO	1				X							
005SB04001	E005SB040	0	1	11-13-01/ 1115	SO	1				X							
005SB04002	E005SB040	3	5	11-13-01/ 1120	SO	1				X							
005CB04002	E005SB040	3	5	11-13-01/ 1125	SO	1				X							
005SB04101	E005SB041	0	1	11-14-01/ 0830	SO	1				X							
005SB04102	E005SB041	3	5	11-14-01/ 0835	SO	1				X							
005SB04201	E005SB042	0	1	11-13-01/ 1155	SO	1					X						
005SB04202	E005SB042	3	5	11-13-01/ 1200	SO	1					X						
005SB04301	E005SB043	0	1	11-13-01/ 1535	SO	1					X						
005SB04302	E005SB043	3	5	11-13-01/ 1540	SO	1					X						
005SB04401	E005SB044	0	1	11-13-01/ 1600	SO	1					X						
005SB04402	E005SB044	3	5	11-13-01/ 1605	SO	1					X						
005SB04501	E005SB045	0	1	11-13-01/ 1615	SO	1					X						
005SB04502	E005SB045	3	5	11-13-01/ 1620	SO	1					X						
005SB04601	E005SB046	0	1	11-14-01/ 1305	SO	1					X						
005SB04602	E005SB046	3	5	11-14-01/ 1310	SO	1					X						
005SB04701	E005SB047	0	1		SO						X						DID NOT SAMPLE
005SB04702	E005SB047	3	5		SO						X						

Sampled By _____ Date/Time _____ Relinquished by: _____ Date/Time _____

Additional Samplers: _____

Received By Lab: F Swafford Date/Time 11/17/01 9:00 Relinquished by: _____ Date/Time _____

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

Remarks: Lists on last page of COC. Temperature: _____

Receipt Exceptions: 5117518

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory: GEL, Charleston, SC

Project Name: Charleston Navy Complex

Site Name: Zone A, SWMU 5

Project Number: 158814.PM.04

TAT: 21 day TAT

Project Manager: Tom Beisel/ATL

Level: Level 3

Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605
CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406

Send Report To: see back of COC

EDD: CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B) (1 - 4 ounce jar)	Nickel (SW6010B)	Pesticides (SW8081A) (1 - 8 ounce jar)	SVOCs (SW8270C) (1 - 8 ounce jar)	SPLP Metals (1 - 16 ounce jar)	RCRA Metals (1 - 0.5L HDPE, HNO3)	Lead & Nickel (1 - 0.5L HDPE, HNO3)	Pesticides (SW8081A) (2 - 1L amber)	SVOCs (SW8270C) (2 - 1L amber)		Comments
005SB04801	E005SB048	0	1	11-16-01/1005	SO	1	X										
005SB04802	E005SB048	3	5	11-16-01/1010	SO	1	X										
005SB04901	E005SB049	0	1	11-16-01/0935	SO	1	X										
005SB04902	E005SB049	3	5	11-16-01/0940	SO	1	X										
005EB004L1	E005EB004			11-13-01/1610	SQ	3							X	X	X		EB
005EB005L1	E005EB005			11-14-01/1500	SQ	3							X	X	X		EB
005EB006L1	E005EB006			11-15-01/1445	SQ	3											EB
605GP001___	E605GP001				WG							X					WELLS NOT SAMPLED
605GP002___	E605GP002				WG							X					
018GW001L1	E018GW001				WG							X					
018HW001L1	E018GW001				WG							X					
018GW002L1	E018GW002				WG							X					
605GW002L1	E605GW002				WG							X					
018EW001L1	E018EW001				WQ							X					EB
005SB05101	E005SB051			11-16-01/1015	SO	1	X										
005SB05001	E005SB050			11-16-01/0955	SO	1	X										
005SB05002	E005SB050			11-16-01/1006	SO	1	X										
005SB05102	E005SB051			11-16-01/1020	SO	1	X										

Sampled By: Date/Time: Relinquished by: Date/Time:

Additional Samplers:

Received By Lab: J Swafford Date/Time 11/17/01 9:00 Relinquished by: Date/Time:

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

Remarks: Lists on last page of COC. Temperature:

Receipt Exceptions: 5117518

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZA005-110901-02** page 1 of 2

Laboratory:	GEL, Charleston, SC
Project Name:	Charleston Navy Complex
Site Name:	Zone A, SWMU 5
Project Number:	158814.PM.04
TAT:	21 day TAT
Project Manager:	Tom Beisel/ATL
evel:	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406
Send Report To:	see back of COC
EDD:	CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B) (1 - 4 ounce jar)	Nickel (SW6010B) (1 - 4 ounce jar)	Pesticides (SW8081A) (1 - 8 ounce jar)	SVOCs (SW8270C) (1 - 8 ounce jar)	SPLP Metals (1 - 16 ounce jar)	RCRA Metals (1 - 0.5L HDPE, HNO3)	Lead & Nickel (1 - 0.5L HDPE, HNO3)	Pesticides (SW8081A) (2 - 1L amber)	SVOCs (SW8270C) (2 - 1L amber)		Comments
005SB04701	E005SB047	0	1	11-19-01/ 0930	SO	1	~~X~~ CD				X						
005SB04702	E005SB047	3	5	11-19-01/ 0920	SO	1	~~X~~ CD				X						
005SB03501	E005SB035	0	1	11-19-01/ 0905	SO	2	X	X	X								
005SB03502	E005SB035	3	5	11-19-01/ 0910	SO	2	X	X	X								
005CB03501	E005SB035	0	1	11-19-01/ 0906	SO	2	X	X	X								
																	Job Complete
																	RCRA Site

Sampled By: Chris Blundy Date/Time: 11-19-01 Relinquished by: [signature] Date/Time: 11-20-01/1600

Additional Samplers: Brian Crawford

Received By Lab: [signature] Date/Time: 11/21/01 0927 Relinquished by: Date/Time

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

52973%

COC Tracking #: **ZA005-120401-01** page 1 of 2

Laboratory:	GEL, Charleston, SC		
Project Name:	Charleston Navy Complex	**Site Name:**	Zone A, SWMU 5
Project Number:	158814.PM.04	**TAT:**	7 day TAT
Project Manager:	Tom Beisel/ATL	**Level:**	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605		
	CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406		
Send Report To:	see back of COC	**EDD:**	CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	1 - 0.5L HDPE, HNO3										Comments
							RCRA Metals										
018GW001L2	E018GW001			12-5-2001 / 1305	WG	1	X										
018GW002L2	E018GW002			12-5-2001 / 1340	WG	1	X										
018HW002L2	E018GW002			12-5-2001 / 1340	WG	1	X										
605GW004L2	E605GW004			12-5-2001 / 1415	WG	1	X										
605GW005L2	E605GW005			12-5-2001 / 1025	WG	1	X										
605GW006L2	E605GW006			12-5-2001 / 1150	WG	1	X										
018EW001L2	E018EW001			12-5-2001 / 1430	WQ	1	X										

Sampled By: Darryl Gates — Date/Time: 12-5-2001 / As noted — Relinquished by: [signature] — Date/Time 12-5-01 / 1600

Additional Samplers:

Received By Lab: [signature] — Date/Time 12/5/01 16:00 — Relinquished by: — Date/Time

Received By: — Date/Time — Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: — Temperature:

Reports

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZA005-021902-01** page 1 of 2

Laboratory:	STL
Project Name:	Charleston Navy Complex
Site Name:	Zone E, SWMU 5
Project Number:	158814.PM.04
TAT:	standard
Project Manager:	Tom Beisel/ATL
Level:	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406
Send Report To:	see back of COC
EDD:	CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	Lead (SW6010B)	Nickel (SW6010B)	Soil pH	SPLP Lead (SW1312/6010B0)	SPLP Nickel (SW1312/6010B0)	Lead & Nickel (SW6010B)					Comments
							1 - 4 ounce jar			1 - 8 ounce jar		1 - 0.5L HDPE, HNO3					
005SB05201	E005SB052	0	1	2-21-02/ ~~1040~~ 1035	SO	2	X	X	X	X	X						
005SB05202	E005SB052	3	5	2-21-02/ 1045	SO	2	X	X	X	X	X						
005CB05202	E005SB052	3	5	2-21-02/ 1046	SO	2	X	X	X	X	X						
005SB05301	E005SB053	0	1	2-21-02/ 1120	SO	2	X		X	X							
005SB05302	E005SB053	3	5	2-21-02/ 1125	SO	2	X		X	X							
005SB05401	E005SB054	0	1	2-21-02/ 1135	SO	2	X		X	X							
005SB05402	E005SB054	3	5	2-21-02/ 1145	SO	2	X		X	X							
005SB05501	E005SB055	0	1	2-21-02/ 1150	SO	2	X		X	X							
005SB05502	E005SB055	3	5	2-21-02/ 1155	SO	2	X		X	X							
005SB05601	E005SB056	0	1	2-21-02/ 1205	SO	2	X		X	X							RCRA
005SB05602	E005SB056	3	5	2-21-02/ 1215	SO	2	X		X	X							Complete
005SB05701	E005SB057	0	1	2-21-02/ 1250	SO	2		X	X		X						
005SB05702	E005SB057	3	5	2-21-02/ 1300	SO	2		X	X		X						
005SB05801	E005SB058	0	1	2-21-02/ 1220	SO	2		X	X		X						
005SB05802	E005SB058	3	5	2-21-02/ 1230	SO	2		X	X		X						
005SB05901	E005SB059	0	1	2-21-02/ 1235	SO	2	X		X	X							
005SB05902	E005SB059	3	5	2-21-02/ 1240	SO	2	X		X	X							
005EB052M1	E005EB052			2-21-02/ 1243	SQ	1					~~X~~	X					EB

Sampled By: Brian Crawford Date/Time: 2-21-02

Relinquished by: [signature] Date/Time: 2-21-02/1600

Additional Samplers: Chris Blundy, Andrew OConor

Received By Lab: K Conner Date/Time: 2/22/02 0844

Relinquished by: Date/Time

Received By: Date/Time

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: NO

Temperature: 2.6°C

Receipt Exceptions:

S241239

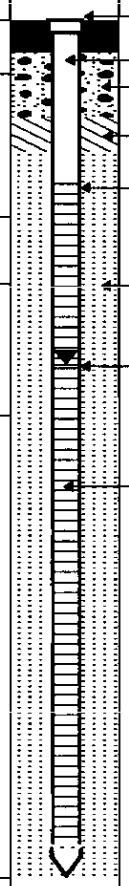
CH2MHILL

Well Number: E605GW005

Client: Navy
Project: CNC
Location: North Charleston, SC
Project Number: 158814

Driller: Columbia Technologies - License No. 1485
Drilling Method: 8.25" diameter Hollow Stem Auger
Sampling Method: Cuttings
Logged by: Darryl Gates
Start/Finish Date: 11/15,2001

Depth (ft)	Sample Info: Sample #	Sample Info: SPT (6"-6"-6")	Soil Log	Soil Description	Elev - Depth
				Ground Surface	8.1
0				**Asphalt**	0.0
				Dark brown medium sand w/ ROC, dry	7.3
				Light brown medium sand w/ ROC, dry	0.8
					5.1
				Orange fine to medium sand, dry	3.0
					4.1
				Brown fine to medium slightly clayey sand, saturated at 5 ft	4.0
5					2.1
				Olive gray fine clayey sand, saturated	6.0
10					-4.9
				End of Log	13.0
15					
20					



Well Construction Notes

- Top of casing elevation = 8.14 ft msl
- 2 inch diameter PVC well casing
- Grout (portland cement plus 5% bentonite)
- Bentonite
- Top of screen 2.5 ft bls
- 20/30 silica sand
- Water level = 5.23 ft below TOC (2.91 ft msl, 12/5/01)
- 2 inch diameter PVC 0.010 slotted well screen

CH2MHILL

Well Number: E605GW006

Client: Navy
Project: CNC
Location: Charleston, SC
Project Number: 158814

Driller: Columbia Technologies - License No. 1485
Drilling Method: 8.25" diameter Hollow Stem Auger
Sampling Method: Cuttings
Logged by: Darryl Gates
Start/Finish Date: 11/15,2001

Depth (ft)	Sample Info: Sample #	Sample Info: SPT (6"-6"-6")	Soil Log	Soil Description	Elev - Depth	Well Drawing	Well Construction Notes
0					10.5		
				Well Vault	0.0 10.0		Top of casing elevation = 10.50 ft msl
				Elevated concrete slab	0.5 9.3		
				Void Below Slab	1.2		2 inch diameter PVC well casing
				Ground Surface	6.2		8 inch diameter PVC outer casing, grouted in place w/ Type II Portland cement
				Dark brown medium sand w/ ROC, dry	4.3 5.5		
5				Light brown medium sand w/ ROC, dry	5.0		Bottom of outer casing (1.5 ft bls) Bentonite
					3.3		Top of screen 2.5 ft bls
				Orange fine to medium sand, dry	7.2 2.3		
				Brown fine to medium slightly clayey sand, saturated at 5 ft bls	8.2		Water level 8.84 ft below TOC (1.66 ft msl, 11/15/02)
10					0.3		
				Olive gray fine clayey sand, saturated	10.2		2 inch diameter PVC 0.010 slotted well screen
15					-6.7		
				End of Log	17.2		
20							

CH2MHILL

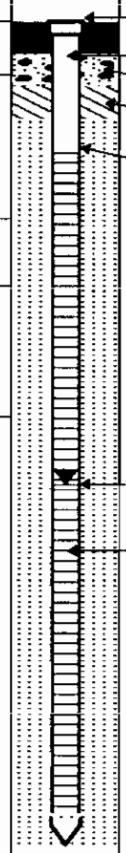
Well Number: E605GW007

Client: Navy
Project: CNC
Location: North Charleston, SC
Project Number: 158814

Driller: Columbia Technologies - License No. 1485
Drilling Method: 8.25" diameter Hollow Stem Auger
Sampling Method: Cuttings
Logged by: Darryl Gates
Start/Finish Date: 11/28,2001

Depth (ft)	Sample Info: Sample #	Sample Info: SPT (6"-6"-6")	Soil Log	Soil Description	Elev - Depth
				Ground Surface	9.5
0				Dark brown medium sand w/ ROC, dry	0.0 / 8.7
				Light brown medium sand w/ ROC, dry	0.8 / 6.5
				Orange fine to medium sand, dry	3.0 / 5.5
				Brown fine to medium slightly clayey sand, saturated at 5 ft	4.0 / 3.5
5				Olive gray fine clayey sand, saturated	6.0 / -3.5
10				End of Log	13.0
15					
20					

Well Drawing



Well Construction Notes

- Top of casing elevation = 9.51 ft msl
- 2 inch diameter PVC well casing
- Grout (portland cement plus 5% bentonite)
- Bentonite
- Top of screen 2.0 ft bls
- 20/30 silica sand
- Water level=7.02 ft below TOC (2.49 ft msl, 4/17/02)
- 2 inch diameter PVC 0.010 slotted well screen

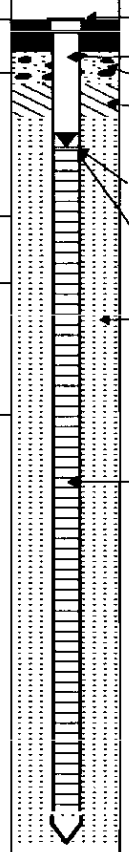
CH2MHILL

Well Number: E605GW008

Client: Navy
Project: CNC
Location: North Charleston, SC
Project Number: 158814

Driller: Columbia Technologies - License No. 1485
Drilling Method: 8.25" diameter Hollow Stem Auger
Sampling Method: Cuttings
Logged by: Darryl Gates
Start/Finish Date: 11/28,2001

Depth (ft)	Sample Info: Sample #	Sample Info: SPT (6"-6"-6")	Soil Log	Soil Description	Elev - Depth
				Ground Surface	8.0
0				Dark brown medium sand w/ ROC, dry	0.0
					7.2
				Light brown medium sand w/ ROC, dry	0.8
					5.0
				Orange fine to medium sand, dry	3.0
					4.0
				Brown fine to medium slightly clayey sand, saturated at 5 ft	4.0
5					2.0
				Olive gray fine clayey sand, saturated	6.0
10					-5.0
				End of Log	13.0
15					
20					



Well Construction Notes

Adult Lead Methodology (ALM) Derived Target Lead Concentrations for Industrial Land Use

PREPARED FOR: CNC BCT

PREPARED BY: Vijaya Mylavarapu/CH2M HILL
Dean Williamson/CH2M HILL

DATE: November 9, 2001

Introduction

Lead has been detected in surface soils at several sites across the Charleston Naval Complex (CNC) at concentrations above background levels. In many cases the elevated lead concentrations appear to be associated with past industrial activities at the CNC, such as handling/use of lead-based paints, sandblasting operations involving lead-based painted materials, or handling/refurbishing or recycling of lead batteries.

For sites designated for unrestricted land use, the BRAC Cleanup Team (BCT) has agreed to use the generally accepted target cleanup level of 400 milligrams per kilogram (mg/kg) as an appropriate target cleanup level for lead in surface soil. In order to proceed with remedial planning and close-out for sites located in areas targeted for industrial land use, the BCT needs an appropriate risk-based target cleanup level for lead in surface soil. This memorandum presents the proposed approach for determining a target surface soil cleanup level for lead that is protective of human health for sites with current and future industrial land use scenarios. The proposed approach is based on the U.S. Environmental Protection Agency (EPA)'s Adult Lead Methodology (ALM).

Description of EPA's Adult Lead Methodology

EPA's Technical Review Workgroup (TRW) for Lead developed the ALM, which was released as an interim report entitled *Recommendations of the Technical Review Workgroup (TRW) for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil* (August 2001). It is available from EPA's website at:

http://www.epa.gov/superfund/programs/lead/adult.htm.

The ALM model is simple, easy to use, and spreadsheet-based. This latest ALM guidance includes a re-evaluation of the adult lead model that was previously developed by the EPA, titled *Recommendations of the Technical Review Workgroup (TRW) for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil* (December 1996), and compares the 1996 proposed model to various lead models proposed since its publication. This review by the TRW resulted in retaining the previously proposed lead model as the interim guidance, and has since been named the ALM. The default-input factors from the 1996 guidance were not changed. Thus, any previously proposed lead

target concentrations developed using this approach during previous work at the CNC may still be valid. The EPA is in the process of developing yet another model, referred to as the All Ages Lead Model. Until this model becomes available, the ALM is retained for calculating target lead concentrations protective of adult receptors (e.g., site workers).

The ALM is a modified version of the approach proposed by Bowers et al. (1994), which has been used by several EPA regions in calculating target lead concentrations. The ALM uses a biokinetic slope factor (BKSF) to represent lead biokinetics, and a relatively simple exposure model in which all exposure pathways, except the soil ingestion pathway, are represented by a background blood-lead concentration (PbB). The equations for the ALM are presented below:

$$\mathbf{RBC = PbS = ((PbB_{adult,\,central,\,goal} - PbB_{adult,0}) \times AT) \div (BKSF \times IR_s \times AF_s \times EF_s)}$$

$$\mathbf{PbB_{adult,\,central,\,goal} = PbB_{fetal,\,0.95,\,goal} \div (GSD_{i,\,adult})^{\wedge 1.645} \times R_{fetal/maternal}),}$$

where:

RBC = risk-based concentration soil concentration (PbS) that would be estimated to result in a specified central tendency PbB concentration in adults (i.e., women of child-bearing age) at a site ($PbB_{adult,\,central,\,goal}$) and corresponding 95th percentile fetal PbB concentration ($PbB_{fetal,0.95,goal}$).

$PbB_{adult,0}$ = typical blood-lead concentration (µg/dL) (i.e., background) in women of child-bearing age at the site in the absence of exposure to contamination.

PbS = soil lead concentration (mg/kg).

AT = averaging time: the total period of exposure (365 days/year for long-term exposures).

BKSF = ratio of increase in typical adult PbB levels to average daily lead uptake (µg/dL PbB increase per µg/day lead uptake).

IRs = intake rate of soil, includes both outdoor soil and indoor soil-derived dust (g/day).

AFs = absorption factor for ingested lead from soil and dust (dimensionless).

EFs = exposure frequency for chronic exposures (days/year).

$PbB_{adul,\,central,\,goal}$ = goal for central estimate of blood lead concentration (µg/dL) in adults that come in contact with site contamination. The goal is intended to ensure that $PbB_{fetal,\,0.95,\,goal\ does}$ not exceed 10 ug/dL.

$PbB_{fetal,\,0.95,\,goal}$ = goal for the upper 95 th percentile blood lead concentration (µg/dL) among fetuses of women exposed to contaminated soil to be less 10 µg/dL (5-percent chance it could be >10 µg/dL).

$(GSD_{i,adult})^{\wedge 1.645}$ = estimated geometric standard deviation; the GSD among adults (i.e., women of child-bearing age) that have exposures to similar onsite lead concentrations, but that have non-uniform response (intake, biokinetics) to site lead and non-uniform offsite lead exposures

$R_{fetal/maternal}$ = constant of proportionality between fetal PbB concentration at birth and maternal PbB concentration.

The default factors for each of the above input parameters for the equation are listed in Table 1.

When a range of variables are available, a midpoint value was used in deriving a lower target lead concentration. For example, $GSD_{i,adult}$ default values were recommended to be 1.8 (for homogeneous population) and 2.1 (for heterogeneous population). A value of 1.95 (midpoint) was used in the ALM assuming that more sensitive population could be present among workers. All other factors are the default values provided in the EPA example spreadsheets.

Using these values, the ALM calculates a target cleanup value for industrial use sites of 1,218 mg/kg. At sites where remedial actions are being considered, average site concentrations will be compared with the ALM calculated value of 1,218 mg/kg, as the post-remedial exposure point concentration for protection of human health for industrial land use.

Additionally, a site-specific soil screening level (SSL) should be calculated for determining the appropriate target cleanup level for protection of groundwater quality. An SSL screening value of 400 mg/kg is being used as a conservative screening criterion. A site-specific SSL calculation should be developed for both a paved and unpaved site condition. A site-specific leachability value is developed when synthetic precipitation leaching procedure (SPLP) data are available.

TABLE 1
EPA Interim Adult Lead Methodology (ALM) - Target Lead Concentrations Protective of an Adult Worker

Exposure Parameter	Description	Adult Worker	Source[1]
RBC	Risk-Based Concentrations (RBCs) expressed in mg/kg; or PbS = Soil Lead Concentration (µg/g or mg/kg)	**1,218**	**Calc.**
$PbB_{adult,central,goal}$	Goal for central estimate of Blood Lead Concentration expressed in µg/dl;	3.7	Calc.
$PbB_{adult,0}$	Typical Blood Lead Concentration (µg/dL) in adults, (i.e., women of child-bearing age) in absence of exposures to the site	1.95	A
$PbB_{fetal,0.95,goal}$	Goal for 95 percent blood lead concentration (µg/dL) in fetuses from exposures to women workers of childbearing age	10.0	A
BKSF	Biokinetic Slope Factor expressed in (µg/dL) per (µg/day) or day/dl;	0.4	A
IR_s	Intake rate for soil, including both indoor and outdoor soil-derived dust (g/day) (50 mg/day)	0.05	A
AF_s	Absolute gastrointestinal absorption fraction for ingested lead in soil and lead in dust derived from soil (dimensionless)	0.12	A
EF_s	Exposure Frequency for contact with assessed soils and/or dust derived part from site soils (days/year)	219	B
AT	Averaging time; 365 days/year	365	B
$GSD_{i,adult}$	Geometric standard deviation of the responses to lead exposure, on-site and offsite (unitless) 1.8-uniform population, 2.1 –heterogeneous population	1.95	A
$R_{fetal/maternal}$	Constant proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless)	0.9	A

[1]**Sources:**

A. EPA. 2001. Review of Adult Lead Models: Evaluation of Models for Assessing Human health Risks Associated with Lead Exposure at Non-Residential Areas of Superfund and Other Hazardous Waste Sites, August, 2001

B. EPA. 1991. Human Health Evaluation Manual, Part B: "Development of Risk-based Preliminary Remedial Goals". Office of Solid Waste and Emergency Response. OSWER Directive 9285.7-01B. December 13, 1991.

Appendix E

Infiltration Rate Derivation

Infiltration can be defined as:

$$I = (P-ET)(1-C_r)$$

Where:

I = Infiltration (in/yr)

P = Precipitation (in/yr)

ET = Evapotranspiration (in/yr)

C_r = runoff coefficient

For Charleston, SC, a value of 46 in/yr is used for P (Park, 1985) and a value of 39.25 in/yr is used for ET (Laboratory of Climatology). For unpaved areas, a value of 0.20 is used for C_r (Florida DOT). For poorly paved (moderately degraded asphaltic concrete) surfaces, a value of 0.95 is used for C_r.

Using these values in the above equation results in a calculated infiltration of:

5.4 in/yr, or 0.14 m/yr for unpaved surfaces, and

0.34 in/yr, or 0.0086 m/yr for paved surfaces.

<u>References</u>

Park, A.D., 1985, "The Groundwater Resources of Charleston, Berkeley, and Dorchester Counties, South Carolina: South Carolina Water Resources Commission Report 139", 146 p.

Laboratory of Climatology, Map.

State of Florida Department of Transportation, Drainage Manual, Volume 2, 1987.

Appendix F

Table F-1 Dilution Attenuation Factor (DAF) Calculation
SWMUs 5, 18 and AOCs 605, 621, Zone E
Charleston Naval Complex, North Charleston, SC

Site(s) 5/18/605/621	Hydraulic Conductivity K (m/yr)	Hydraulic Gradient I (m/m)	Aquifer Thickness da (m)	Source Length Sw (m)	Infiltration Rate I' (m/yr)	Mixing Zone d (m)	DAF
Unpaved	333.8	0.0045	7.62	18.3	0.14	3.4	3.1
Paved	333.8	0.0045	7.62	18.3	0.01	2.0	20.6

C:/my briefcase/CNC/Zone E/5,18,605,621/SSL-SPLP table rev3.xls

K — the value for the hydraulic conductivity is based on interpolation of CH2M Hill's map of hydraulic conductivities (k.apr, 3 ft/day).

I — The hydraulic gradient is based on the distance (220 ft) between 3- and 4-foot shallow groundwater contours from GIS (CH2M-Jones, 2002).

da — The aquifier thickness is based on Figure 2-5B from the Zone E RFI, 25 ft.

Sw — The source length is the estimated area of lead above 1,218 mg/kg in the direction of groundwater flow (60 ft ~ 18.3 m).

I' — Internal CH2MHILL Technical Memorandum, *Infiltration Variable Used in SSL Calculation*, 0.45 ft/yr for unpaved areas and 0.026 for paved areas, October 5, 2001 (see Appendix A).

d — is the smaller of the aquifier thickness (da) or the result of the mixing zone equation:

$$d = (0.0112\ Sw^2)^{0.5} + da\{1 - \exp[(-Sw\ I')/(K\ I\ da)]\}$$

Lead

Location		E005SB052		E005SB053		E005SB054	
Sample Number		005SB05201	005SB05202	005SB05301	005SB05302	005SB05401	005SB05402
		(surface)	(subsurface)	(surface)	(subsurface)	(surface)	(subsurface)
Initial Soil Concentration	mg/kg	80	38	2500	24	42	3.7
SPLP Water Concentration	mg/L	0.0078	0.015	0.21	0.03	0.022	0.033
Soil mass	kg	0.1	0.1	0.1	0.1	0.1	0.1
Water volume	L	2	2	2	2	2	2
Total contaminant mass in soil	mg	8	3.8	250	2.4	4.2	0.37
Total contaminant mass in water	mg	0.0076	0.015	0.42	0.06	0.044	0.066
Adjusted soil concentration	mg/kg	79.9	37.85	2495.8	23.4	41.56	3.04
pH		6.85	4.35	4.54	6.09	5.74	5.54
Pb Solubility	mg/L	1.6	3.9	3.7	2.3	2.6	2.8
Kd	L/kg	10246	2523	11885	780	1889	92
Surface soil		X		X		X	
Subsurface soil			X		X		X
Lead-Impacted Area				X	X	X	X
Non Lead-Impacted Area		X	X				
Soil lead concentration below background (< 400 mg/kg, surface and 322 mg/kg subsurface).		X	X		X	X	X
Leachate concentration above solubility limit (4 mg/kg)							
Leachate concentration below detection limit.		X	X				

For DAF = 1, SSL = Kd x MCL

DAF =	1	154	38	178	12	28	1
DAF =	3.1	476	117	553	36	88	4
DAF =	20.8	3,166	780	3,672	241	584	28

MCL, mg/L 0.015

SSL = Kd x MCL x DAF

geometric mean of Kd in lead-impacted area	30695
SSL, DAF=1	460
SSL, DAF=3.1	1427
SSL, DAF=20.6	9485
min/max soil concentration, mg/Kg	3.7 / 150000
min/max liquid concentration, mg/L	0.0035 U / 20

Lead

Location		E005SB052		E005SB053		E005SB054	
Sample Number		005SB05201 (surface)	005SB05202 (subsurface)	005SB05301 (surface)	005SB05302 (subsurface)	005SB05401 (surface)	005SB05402 (subsurface)
Initial Soil Concentration	mg/kg	80	38	2500	24	42	3.7
SPLP Water Concentration	mg/L	0.0078	0.015	0.21	0.03	0.022	0.033
Soil mass	kg	0.1	0.1	0.1	0.1	0.1	0.1
Water volume	L	2	2	2	2	2	2
Total contaminant mass in soil	mg	8	3.8	250	2.4	4.2	0.37
Total contaminant mass in water	mg	0.0078	0.015	0.42	0.06	0.044	0.066
Adjusted soil concentration	mg/kg	79.9	37.85	2495.8	23.4	41.58	3.04
pH		8.85	4.35	4.54	8.09	5.74	5.54
Pb Solubility	mg/L	1.8	3.9	3.7	2.3	2.6	2.8
Kd	L/kg	10246	2523	11885	780	1889	92
Surface soil		X		X		X	
Subsurface soil			X		X		X
Lead-Impacted Area				X	X	X	X
Non Lead-Impacted Area		X	X				
Soil lead concentration below background (< 400 mg/kg, surface and 322 mg/kg subsurface).		X	X		X	X	X
Leachate concentration above solubility limit (4 mg/kg)							
Leachate concentration below detection limit.		X	X				

For DAF = 1, SSL = Kd x MCL

DAF =	1	154	38	178	12	28	1
DAF =	3.1	476	117	553	38	88	4
DAF =	20.6	3,166	780	3,672	241	584	28

MCL, mg/L 0.015

SSL = Kd x MCL x DAF

geometric mean of Kd in lead-impacted area	30695
SSL, DAF=1	460
SSL, DAF=3.1	1427
SSL, DAF=20.6	9485
min/max soil concentration, mg/Kg	3.7 / 150000
min/max liquid concentration, mg/L	0.0035 U / 20

Nickel

Location		E005SB052		E005SB057		E005SB058	
Sample Number (SPLP)		005SB05201	005SB05202	005SB05701	005SB05702	005SB05801	005SB05802
		(surface)	(subsurface)	(surface)	(subsurface)	(surface)	(subsurface)
Initial Soil Concentration	mg/kg	6.3	5.7	250	36	73	29
SPLP Water Concentration	mg/L	0.0047	0.0047	0.021	0.0047	0.0047	0.0047
Soil mass	kg	0.1	0.1	0.1	0.1	0.1	0.1
Water volume	L	2	2	2	2	2	2
Total contaminant mass in soil	mg	0.63	0.57	25	3.6	7.3	2.9
Total contaminant mass in water	mg	0.0047	0.0047	0.042	0.0094	0.0094	0.0094
Adjusted soil concentration	mg/kg	6.253	5.653	249.58	35.906	72.906	28.906
pH		6.85	4.35	6.61	7.06	7.64	7.5
Kd	L/kg	1330	1203	11885	15279	31024	12300
Surface soil		X		X		X	
Subsurface soil			X		X		X
Nickel not detected in leachate ("U" qualified)		X	X				
Soil lead concentration below background (< 72 mg/kg, surface and 20 mg/kg, subsurface)		X	X				

For DAF = 1, SSL = Kd x MCL

DAF =	1	971	878	8676	11154	22647	8979
DAF =	3.1	3011	2722	26895	34577	70207	27836
DAF =	20.6	20007	18087	178723	229768	466536	184974

RBC, mg/L	0.73

SSL = Kd x MCL x DAF

geometric mean of Kd	16225
SSL, DAF=1	11844
SSL, DAF=3.1	36716
SSL, DAF=20.6	243987
min/max soil concentration, mg/Kg	5.7 / 250
min/max liquid concentration, mg/L	0.0047 U / 0.021

Appendix G

Infiltration Variable Used in SSL Calculation

PREPARED FOR: Dean Williamson

PREPARED BY: Paul Favara

COPIES: CNC BCT (without attachments)

DATE: April 12, 2002

An infiltration rate of 1.2 in/yr has historically been used in SSL calculations for CNC. The basis of this value is a USGS report (1999) which reported a simulated recharge rate to the upper surgical aquifer of 0.1 ft/yr (1.2 in/yr). The simulated recharge rate was developed as part of model calibration by the USGS and represents the entire area. Therefore, the simulated infiltration rate would be expected to be high for paved areas and low for unpaved areas.

The purpose of this memorandum is to state the basis of the infiltration variable to be used in paved and unpaved areas.

Unpaved Areas

Infiltration can be defined as:

$$I = (P-ET)(1-C_r)$$

Where:

I = Infiltration (in/yr)

P = Precipitation (in/yr)

ET = Evapotranspiration (in/yr)

C_r = runoff coefficient

A value of 46 in/yr was used for P (Park, 1985). A value of 39.25 in/yr was used for ET (Laboratory of Climatology). A value of 0.20 was used for C_r (Florida DOT). Inputting these values into the above equation results in a calculated I of 5.4 in/yr.

Paved Areas

Where a SWMU or AOC are located beneath pavement or rooftops, the value of C_r is changed to 0.95 (Florida DOT). The values associated with the variables I, P, and ET remain unchanged for the paved area scenario. Inputting these values into the above equation results in a calculated I of 0.34 in/yr.

Calculations are attached.

References

USGS, 1999. "Hydrogeology and Simulation of Ground-Water Flow in the Surficial Aquifer System in the Area of Charleston Naval Base, North Charleston, South Carolina, 1995-1997"

Park, A.D., 1985, "The Groundwater Resources of Charleston, Berkeley, and Dorchester Counties, South Carolina: South Carolina Water Resources Commission Report 139", 146 p.

Laboratory of Climatology, Map.

State of Florida Department of Transportation, Drainage Manual, Volume 2, 1987.

CH2MHILL
MEMORANDUM

SUBJECT Estimation of Infiltration for SSL Calculations at CWC

BY Paul Favara DATE 10/5/01

SHEET NO. 1 OF 1 PROJECT NUMBER 158814.PM.01

$$I = (P - ET) \times (1 - C_R)$$

where:

I = Infiltration (m/yr)
P = Precipitation (m/yr)
C_R = Runoff Coefficient (dimensionless)
ET = Evapotranspiration (m/yr)

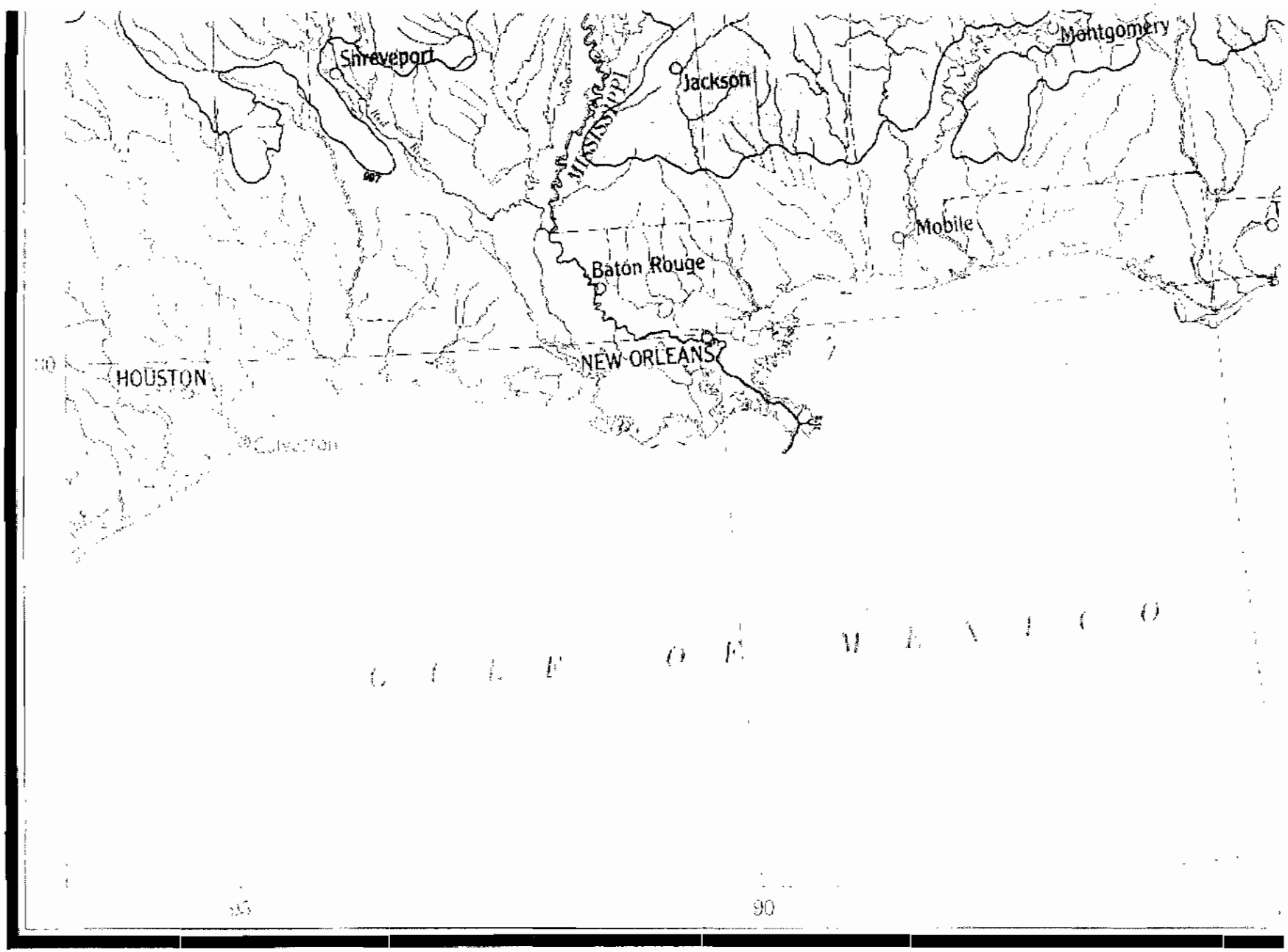
P = 46 in/yr = 1.17 m/yr
(USGS, 1994)

C_R = 0.20 (20%, Unpaved) 0.95 (95% (paved))
(State of Florida, DOT, 1987)

ET = 997 mm/yr = 0.997 m
(Laboratory of Climatology)

$$I = (1.17 - 0.997)(1 - 0.20)$$
$$= (0.173)(0.80)$$
$$= 0.138 \text{ m/yr}$$
$$= 5.41 \text{ in/yr} \quad \text{— Unpaved}$$

$$I = (1.17 - 0.997)(1 - 0.95)$$
$$= (0.173)(0.05)$$
$$= 0.0087 \text{ m/yr}$$
$$= 0.34 \text{ in/yr} \quad \text{— paved}$$



Climatic analysis by Douglas B. Carter, The Laboratory of Climatology, Centerton, N.J.

Base map by T

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0 100 200 300 400 Kilometers

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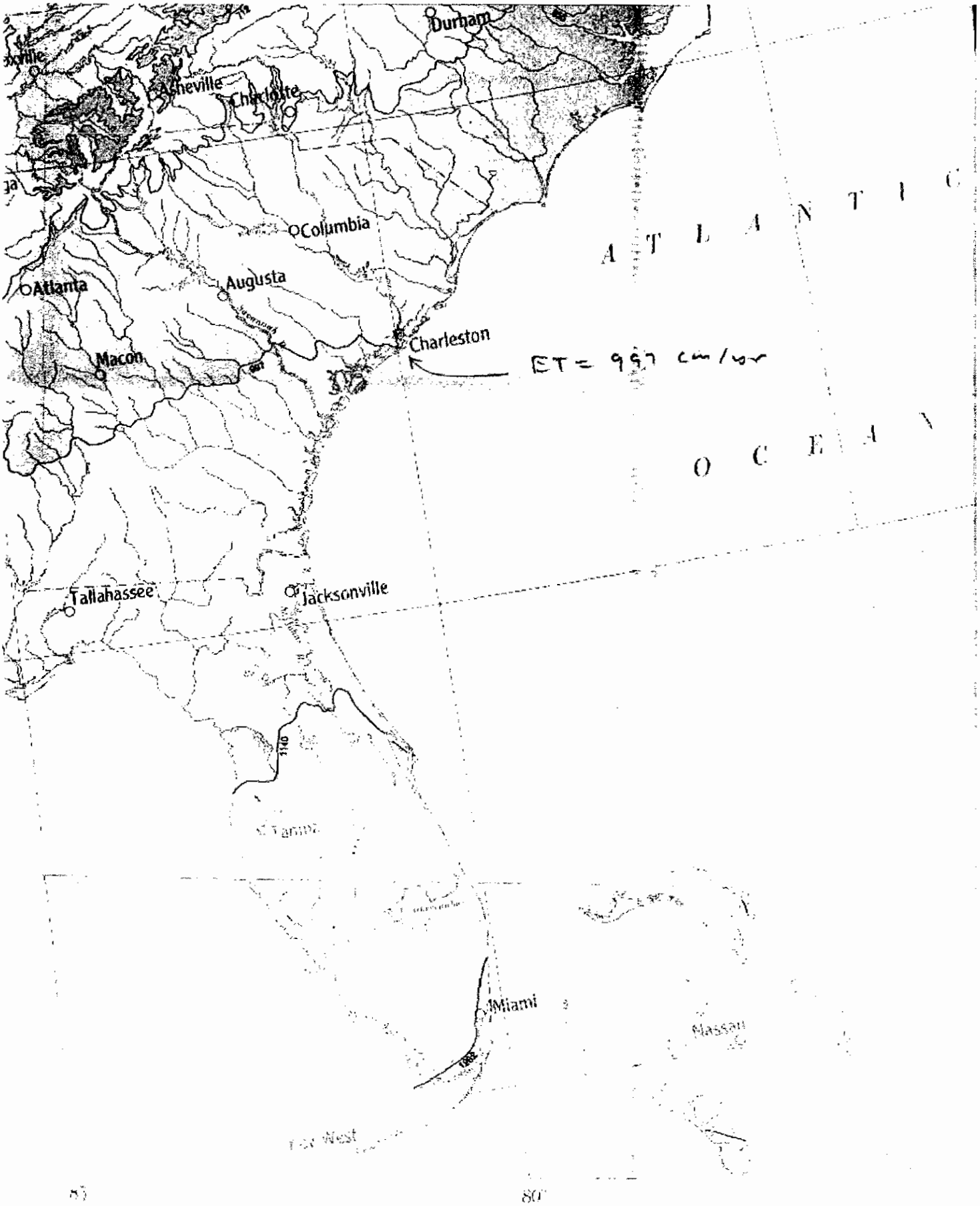

Base map by The American Geographical Society of New York. Printed by A. Hoen & Co., Inc., Baltimore, Md. 1957.

Copyright by Resources for the Future, Inc., and C. W. Thornthwaite

1425 1282 1140 855 712 570 427 MM

56.10 50.49 44.88 33.66 28.05 22.44 16.83 INCHES

TRANSPORT MANUAL

[illegible]

[illegible] 1987
Tallahassee, Florida

ATTACHMENT 1

Table 5-5
RUNOFF COEFFICIENTS[a] FOR A DESIGN STORM RETURN
PERIOD OF 10 YEARS OR LESS

Slope	Land Use	Sandy Soils Min.	Sandy Soils Max.	Clay Soils Min.	Clay Soils Max.
Flat (0-2%)	Woodlands	0.10	0.15	0.15	0.20
	Pasture, grass, and farmland[b]	0.15	0.20	0.20	0.25
	Rooftops and pavement	0.95	0.95	0.95	0.95
	Pervious pavements[c]	0.75	0.95	0.90	0.95
	SFR: ½-acre lots and larger	0.30	0.35	0.35	0.45
	Smaller lots	0.35	0.45	0.40	0.50
	Duplexes	0.35	0.45	0.40	0.50
	MFR: Apartments, townhouses, and condominiums	0.45	0.60	0.50	0.70
	Commercial and Industrial	0.50	0.95	0.50	0.95
Rolling (2-7%)	Woodlands	0.15	0.20	0.20	0.25
	Pasture, grass, and farmland[b]	0.20	0.25	0.25	0.30
	Rooftops and pavement	0.95	0.95	0.95	0.95
	Pervious pavements[c]	0.80	0.95	0.90	0.95
	SFR: ½-acre lots and larger	0.35	0.50	0.40	0.55
	Smaller lots	0.40	0.55	0.45	0.60
	Duplexes	0.40	0.55	0.45	0.60
	MFR: Apartments, townhouses, and condominiums	0.50	0.70	0.60	0.80
	Commercial and Industrial	0.50	0.95	0.60	0.95
Steep (7%+)	Woodlands	0.20	0.25	0.25	0.30
	Pasture, grass, and farmland[b]	0.25	0.35	0.30	0.40
	Rooftops and pavement	0.95	0.95	0.95	0.95
	Pervious pavements[c]	0.85	0.95	0.90	0.95
	SFR: ½-acre lots and larger	0.40	0.55	0.50	0.65
	Smaller lots	0.45	0.60	0.55	0.70
	Duplexes	0.45	0.60	0.55	0.70
	MFR: Apartments, townhouses, and condominiums	0.60	0.75	0.65	0.85
	Commercial and Industrial	0.60	0.95	0.65	0.95

[a] Weighted coefficient based on percentage of impervious surfaces and green areas must be selected for each site.

[b] Coefficients assume good ground cover and conservation treatment.

[c] Depends on depth and degree of permeability of underlying strata.

Note: SFR = Single Family Residential
MFR = Multi-Family Residential