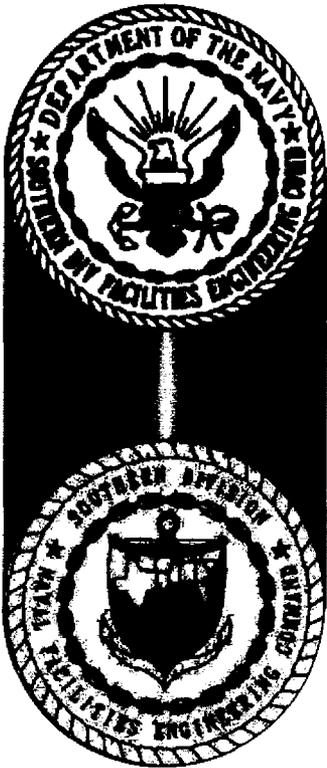


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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT
ADDENDUM CORRECTIVE MEASURES STUDY WORK PLAN AREA OF CONCERN 706
(AOC 706) ZONE G CNC CHARLESTON SC
5/30/2003
CH2M HILL

RFI REPORT ADDENDUM

RFI Report Addendum and CMS Work Plan AOC 706, Zone G



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

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

CH2M-Jones

May 2003

***Revision 1
Contract N62467-99-C-0960***



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May 30, 2003

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

Re: RFI Report Addendum and CMS Work Plan (Revision 1) – AOC 706, Zone G

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum and CMS Work Plan (Revision 1) and Response to Comments for AOC 706 in Zone G 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 Bill Elliott. Please contact him at 352/335-5877, extension 2477, if you have any questions or comments.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read "Dean Williamson".

Dean Williamson, P.E.

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

EPA Specific Comments

Comment:

1. Section 5.2, Page 5-3, Line 4 and Line 31.

The Sample ID for the four samples of chromium should be included for clarity.

CH2M-Jones Response:

Total chromium exceeded the surface soil RBC (HI=0.1) of 23 mg/kg and the Zone G background range (7 to 39 mg/kg) in samples from four borings (G706SB011, G706SB015, G706SB018, and G706SB020). See Table 4-2 of the RFIRA/CMSWP for a tabular summary of inorganic data. Also, on line 31 of page 5-3, thallium was detected in surface soil from location G706SB015 at 1.8J mg/kg, a level equal to its RBC. The text on page 5-3 has been updated with this additional information, and a Revision 1 replacement (slip) page is attached.

Comment:

2. Section 5.3, Page 5-5, Line 26.

The sample ID of soil samples and concentration level of Manganese should be included for clarity. It would be interesting to compare the spatial proximity of the soil samples to the groundwater sample locations.

CH2M-Jones Response:

Two subsurface soil sample locations (G706SB018 at 428 mg/kg and G706SB019 at 446 mg/kg) slightly exceeded Zone G background range (20 - 409 mg/kg), but are well within the combined Zones G and H background range of 5.6 to 966 mg/kg). The text of Page 5-5 has been revised to reflect this information, and a slip page is provided. See also Table 4-4 on Page 4-2 of the RFIRA/CMSWP for a tabular summary. Soil sample G706SB019 is located within approximately 20 feet of monitoring well G706GW001.

Comment:

3. Section 5.4, Page 5-7, Line 3.

It is unclear if the concentration of 2290 µg/L was detected in each of the two additional sampling events. A clarification should be provided.

CH2M-Jones Response:

As shown in Table 4-6, Page 4-29 of the RFIRA/CMSWP, barium was detected in well G706GW001 at 2,290 µg/L on July 27, 1999, and at 2,300 µg/L on June 20, 2002, both exceeding the 2,000 µg/L MCL. As also shown on the table, barium results for July and September 2002 sampling events returned to levels below MCLs. The text of Page 5-7 has been revised and a slip page is provided.

Comment:

4. Section 5.4, Page 5-7, Line 13.

The sample ID of all the samples referred to under the paragraph □Iron□ should be included for clarity.

CH2M-Jones Response:

In the discussion of iron results in groundwater on Page 5-7, line 13, references are to monitor well G706GW001. The text on Page 5-7 has been updated with this information, and a slip page is attached.

Comment:

5. Section 6.6, Page 6-2, Line 22.

A more detailed explanation or a reference to an explanation should be provided for the conclusion that there is no migration of groundwater contaminants to surface water.

CH2M-Jones Response:

Appendix C of the RFIRA/CMSWP presented a groundwater potentiometric contour map of the Zone G area, showing the groundwater flow from AOC 706 is primarily to the southeast, towards AOC 636, which lies between AOC 706 and the Cooper River. The hydraulic gradients near AOC 706 are very low, indicating minimal groundwater movement, at low flow rates. AOC 636 has received No Further Action (NFA) status, and wells there did not indicate a problem with iron contamination.

RFI REPORT ADDENDUM

RFI Report Addendum and CMS Work Plan AOC 706, Zone G



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

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

PREPARED BY
CH2M-Jones

May 2003

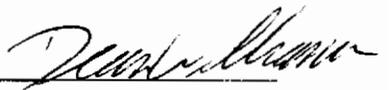
*Revision 1
Contract N62467-99-C-0960
158814.ZG.PR.08*

Certification Page for RFI Report Addendum and CMS Work Plan (Revision 1) – AOC 706, Zone G

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

South Carolina

Permit No. 21428





Date

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1 Acronyms and Abbreviations

2	AOC	Area of concern
3	AST	Aboveground storage tank
4	BCT	BRAC Cleanup Team
5	BEQ	Benzo[a]pyrene equivalent
6	BRAC	Base Realignment and Closure Act
7	BRC	Background reference concentration
8	CA	Corrective action
9	CMS	Corrective measures study
10	CNC	Charleston Naval Complex
11	COC	Chemical of concern
12	COPC	Chemical of potential concern
13	DAF	Dilution attenuation factor
14	ELCR	Excess Lifetime Cancer Risk
15	EnSafe	Ensafe Inc.
16	EPA	U.S. Environmental Protection Agency
17	EPC	Exposure point concentration
18	FDS	Fuel distribution system
19	ft bls	Feet below land surface
20	HEAST	Health Effects Assessment Summary Tables
21	HHRA	Human health risk assessment
22	HI	Hazard index
23	HQ	Hazard quotient
24	IM	Interim measure
25	IRIS	Integrated Risk Information System (EPA)
26	LUC	Land use control
27	MCL	Maximum contaminant level
28	MCS	Media cleanup standard
29	$\mu\text{g}/\text{kg}$	Microgram per kilogram
30	$\mu\text{g}/\text{L}$	Microgram per liter

1 **Acronyms and Abbreviations, Continued**

2	mg/kg	Milligram per kilogram
3	ng/kg	Nanogram per kilogram
4	NAVBASE	Naval Base
5	NFA	No further action
6	OWS	Oil/water separator
7	PCB	Polychlorinated biphenyl
8	RAGS	Risk Assessment Guidance for Superfund
9	RAO	Remedial action objective
10	RBC	Risk-based concentration
11	RCRA	Resource Conservation and Recovery Act
12	RFA	RCRA Facility Assessment
13	RFI	RCRA Facility Investigation
14	RGO	Remedial goal option
15	SCDHEC	South Carolina Department of Health and Environmental Control
16	SPLP	Synthetic precipitation leaching procedure
17	SSL	Soil screening level
18	SVOC	Semivolatile organic compound
19	SWMU	Solid waste management unit
20	TCE	Trichloroethene
21	TEQ	Toxicity Equivalent
22	UCL ₉₅	95-percent Upper Confidence Limit
23	UST	Underground storage tank
24	VOC	Volatile organic compound

1 1.0 Introduction

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

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

11 In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation
12 and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to
13 complete the RCRA Facility Investigation (RFI) for Area of Concern (AOC) 706 in Zone G of
14 the CNC. Figure 1-1 illustrates the location of AOC 706 within Zone G. Figure 1-2 is an
15 aerial photograph of AOC 706, taken in 1997.

16 1.1 Background

17 AOC 706 is located adjacent to Building 246, the former Hazardous Waste Container
18 Storage and Transfer Facility known as Solid Waste Management Unit (SWMU) 10, near the
19 intersection of Forest Sherman Road and Dyess Avenue in Zone G of the CNC. Building 246
20 and the surrounding asphalt-paved parking lot were constructed in 1986, and were
21 designed and constructed for the specific purpose of safely storing and transferring
22 containers of hazardous waste. Review of historical public works maps indicates that this
23 area was undeveloped or used for open storage prior to construction of Building 246 in
24 1986.

25 From 1987 until the closure of the CNC, Building 246 was used as a less-than-90-day
26 temporary storage facility with separate storage bays for the following types of wastes:
27 flammable liquids, acids, alkalies, chlorinated hydrocarbons, oxidizers, reactives,
28 polychlorinated biphenyls (PCBs), and general wastes. The external loading ramp was
29 equipped with a spill containment/storm drainage system with an elevated curb. There are
30 no records or reports of spills or other releases of hazardous materials or hazardous wastes
31 during operations of this unit.

1 The *Final RCRA Facility Assessment (RFA), Volume V, Addendum II* (EnSafe Inc.
2 [EnSafe]/Allen & Hoshall, 1995), describes AOC 706 as consisting of the asphalt driveway
3 to the north and west of Building 246. The RFA states that no containment structures are
4 associated with the driveway and no materials are known to have been stored outside the
5 building on the paved area. A copy of Volume V, Addendum II of the RFA is included in
6 Appendix A. It is not clear how the boundaries of AOC 706 were expanded from only the
7 asphalt driveway, as shown in the RFA, to include the entire perimeter area outside
8 Building 246, as shown in the *Zone G RFI Report, Revision 0* (EnSafe, 1998a).

9 According to the RFA, during closure of Building 246, composite soil samples were
10 collected from the top six inches of soil along each side of the driveway (see Appendix A).
11 Several metals (barium, copper, and mercury) were detected in these samples above Zone H
12 background levels. The PCB Aroclor-1260 was detected in three samples. Based on these
13 detections, AOC 706 was recommended for an RFI. The parcel is currently zoned as M-1, for
14 maritime industrial use.

15 AOC 706 is located in an area that prior to the expansion of the CNC in the 1940s and
16 afterwards was largely tidal marshland. This area was filled extensively to create the
17 property. AOC 706 is directly adjacent to and is surrounded on three sides by SWMU 9, the
18 former landfill. It is possible that some of the property underlying AOC 706 has
19 characteristics very similar or identical to parts of SWMU 9 that are identified as a landfill.
20 There may have been materials similar to those buried in SWMU 9 used as fill at AOC 706
21 during the historical filling processes that created the property. For this reason, including
22 this site within the SWMU 9 boundaries may be appropriate from an administrative
23 perspective, given the location of this site and its proximity to and partial enclosure by
24 SWMU 9.

25 **1.2 Purpose of the RFI Report Addendum/CMS Work Plan**

26 This RFI Report Addendum provides information about AOC 706 that documents the
27 conclusions from the *Zone G RFI Report, Revision 0*, provides the results of additional
28 sampling performed after the RFI report was submitted, presents conclusions from the new
29 data collected, and provides a recommendation for proceeding with the RCRA CA process
30 at AOC 706. Section 8.0 of this document contains a focused Corrective Measures Study
31 (CMS) Work Plan. This CMS Work Plan presents the steps that will address the CMS
32 recommended for antimony in soil and groundwater, which is identified as a COC for AOC
33 706 following the RFI and additional investigations.

1 Prior to changing the status of any site to No Further Action (NFA) in the CNC RCRA CA
2 permit, the BCT agreed that the following issues should be considered:

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

11 Although NFA is not currently being requested for this site, information regarding these
12 issues is provided in Section 6.0 of this RFI Report Addendum to expedite the decision-
13 making process for the site.

14 **1.3 Report Organization**

15 This RFI Report Addendum/CMS Work Plan consists of the following sections, including
16 this introductory section:

17 **1.0 Introduction** — Presents the purpose of and background information relating to this RFI
18 Report Addendum.

19 **2.0 Summary of RFI Conclusions for AOC 706** — Summarizes the conclusions from the
20 RFI investigations and risk evaluations for AOC 706 as presented in the *Zone G RFI Report,*
21 *Revision 0.*

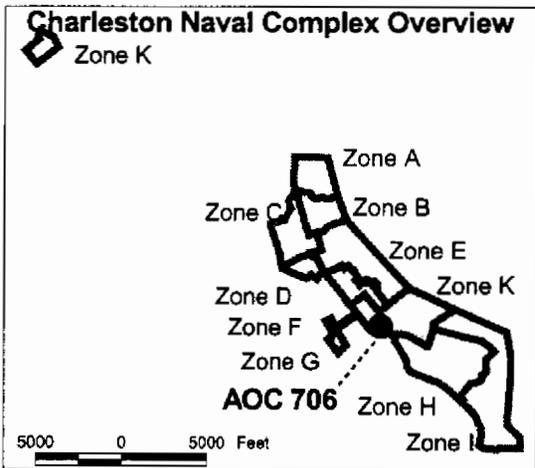
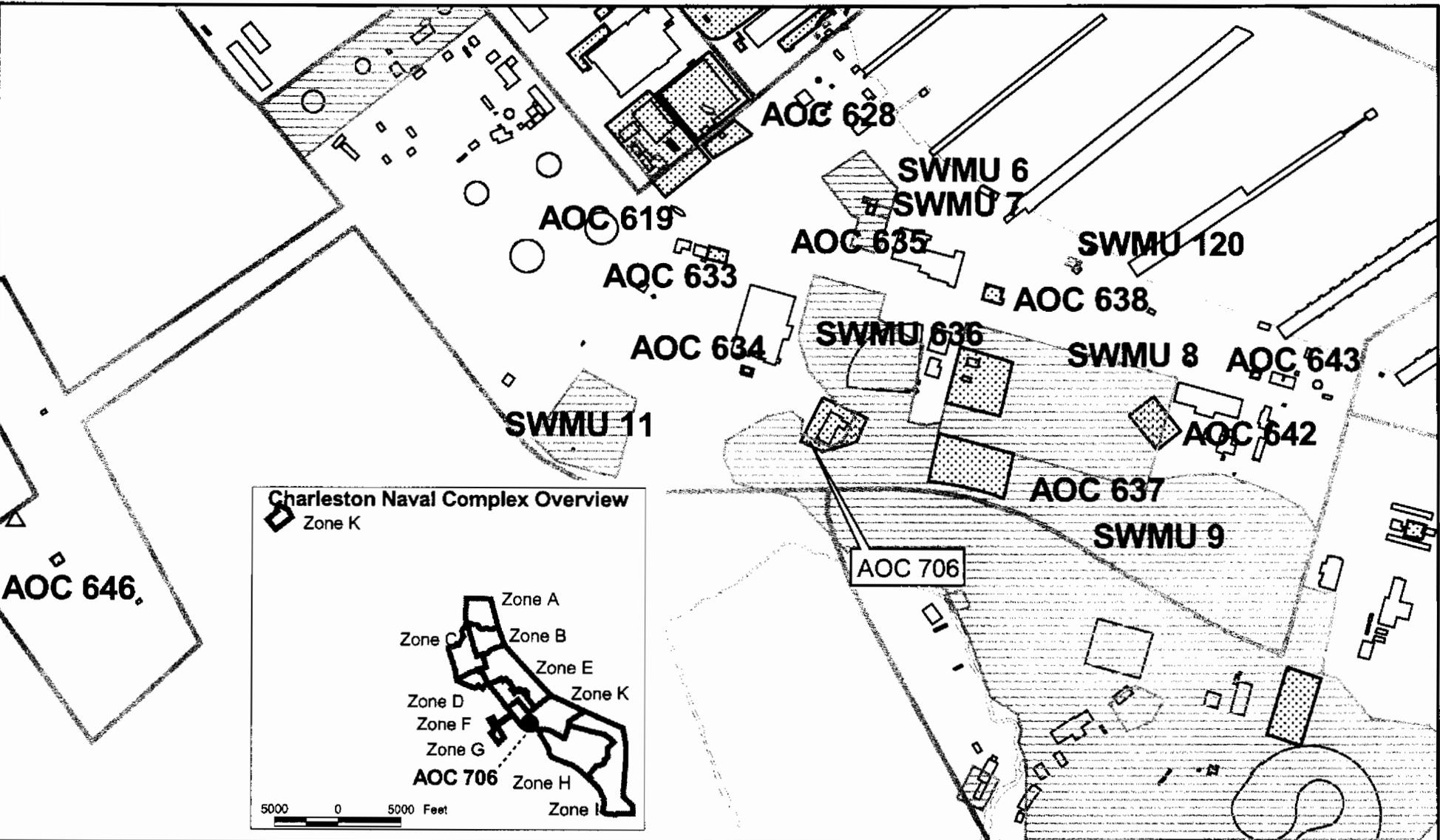
22 **3.0 Summary of Interim Measures and UST/AST Removals at AOC 706** — Provides
23 information regarding any interim measures (IMs) or tank removal activities performed at
24 the site.

25 **4.0 Summary of Additional Investigations**— Summarizes the additional information
26 collected after completion of the RFI.

27 **5.0 COPC/COC Refinement**— Provides further evaluation of COPCs based on RFI and
28 additional data to assess them as COCs.

29 **6.0 Summary of Information Related to Site Closeout Issues**— Discusses the various site
30 closeout issues that the BRAC Cleanup Team (BCT) agreed to evaluate prior to site closeout.

- 1 **7.0 Recommendations**— Provides recommendations for proceeding with a CMS for this
2 site.
- 3 **8.0 CMS Work Plan for AOC 706** — Provides a CMS Work Plan for assessing applicable
4 corrective measures to address the COCs identified in the site soil and groundwater at AOC
5 706.
- 6 **9.0 References** — Lists the references used in this document.
- 7 **Appendix A** contains a copy of the *Final RCRA Facility Assessment (RFA) Naval Base*
8 *Charleston, Volume V, Addendum II* (EnSafe/Allen & Hoshall, 1995).
- 9 **Appendix B** contains CH2M-Jones' responses to SCDHEC comments on the *Zone G RFI*
10 *Report, Revision 0*, in regard to AOC 706.
- 11 **Appendix C** contains excerpts from the *Zone G RFI Report, Revision 0*, including Figure 2.5,
12 *Shallow Groundwater Potentiometric Contours*.
- 13 **Appendix D** contains the analytical results and data validation report from the additional
14 sampling performed at AOC 706 by EnSafe (1999-2000).
- 15 **Appendix E** contains the analytical results and data validation report from the additional
16 sampling performed at AOC 706 by CH2M-Jones (2002).
- 17 **Appendix F** contains the 95-percent Upper Confidence Limit (UCL₉₅) calculation summaries
18 for inorganic COPCs identified at AOC 706.
- 19 **Appendix G** contains the risk calculation tables for future potential receptors at AOC 706.
20 All tables and figures appear at the end of their respective sections.



-  AOC Boundary
-  SWMU Boundary
-  Zone Boundary
-  Zone G

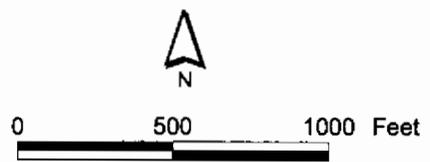
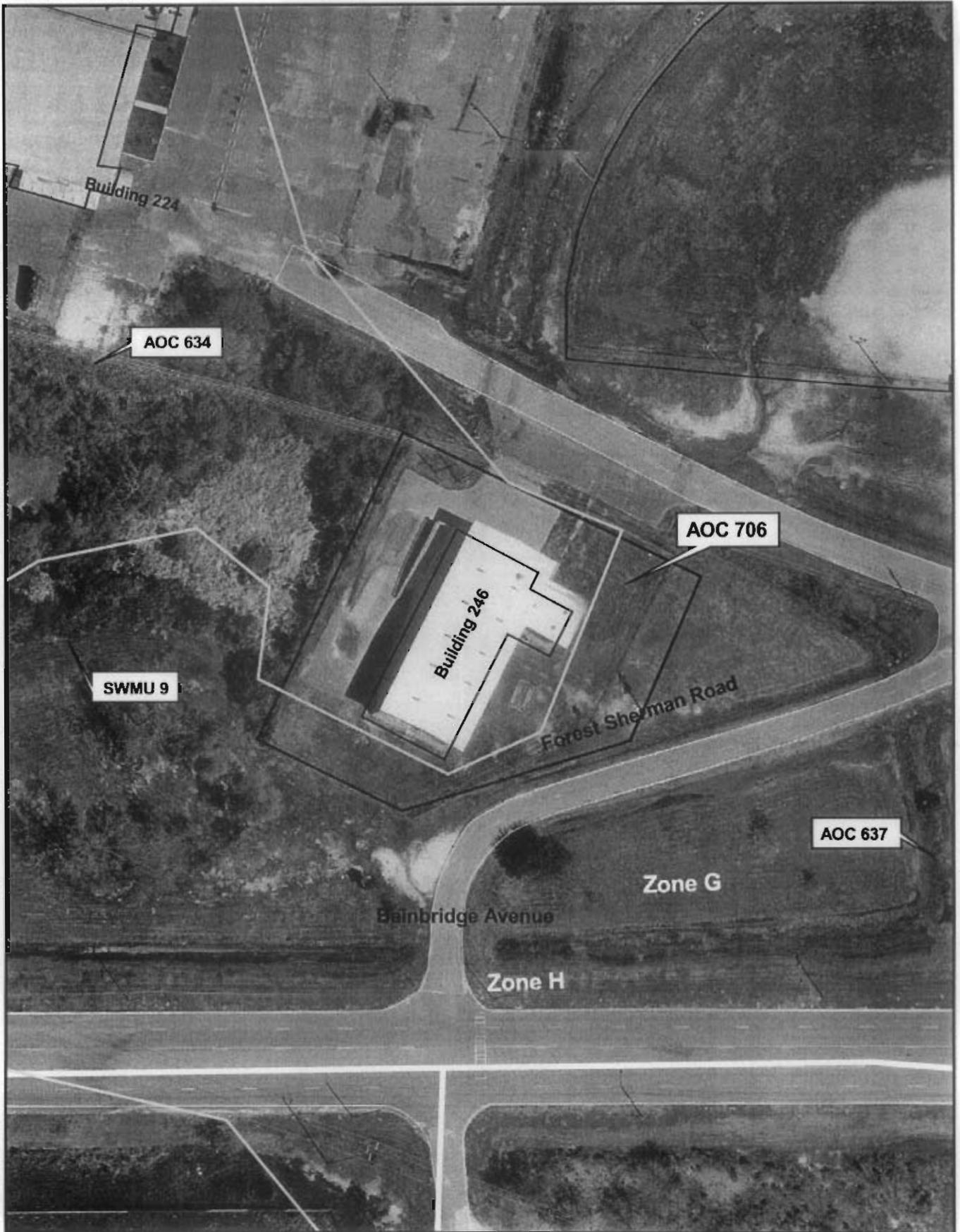


Figure 1-1
 Location of AOC 706
 Zone G
 Charleston Naval Complex

CH2MHILL



-  Roads
-  AOC Boundary
-  SWMU Boundary
-  Buildings



0 60 120 Feet

Figure 1-2
Aerial View
AOC 706, Zone G
Charleston Naval Complex

2.0 Summary of RFI Conclusions for AOC 706

This section summarizes the results and conclusions from the soil and groundwater investigations conducted at AOC 706, which were reported in the *Zone G RFI Report, Revision 0* (EnSafe, 1998a). The RFI report was submitted to SCDHEC for review on February 20, 1998. Appendix B contains CH2M-Jones' responses to regulatory review comments on the RFI report, specifically in reference to AOC 706.

The RFI included investigations of soil and groundwater outside of Building 246 to evaluate the potential for releases from outdoor waste management activities. The original RFI field work included installing and sampling 10 soil borings surrounding the asphalt parking area, with collection of soil samples at multiple depths for laboratory analysis.

Although the *Zone G RFI Work Plan Addendum* (EnSafe, 2000) did not propose monitoring well installation for the site, metals concentrations observed in initial soil sampling results prompted installation of one shallow monitoring well to evaluate potential groundwater impacts. Data tables in the *Zone G RFI Report, Revision 0* indicate that groundwater was sampled three times in 1997 and once in early 1998, with samples analyzed for metals and semivolatile organic compounds (SVOCs), prior to the submittal of the report to SCDHEC in February 1998.

The *Zone G RFI Report, Revision 0* presented the analytical results for these samples, as well as conclusions concerning contamination and human health risk assessments (HHRAs). Conclusions from the RFI report regarding site soil and groundwater are summarized below. Excerpts from the RFI report showing the detected constituents in surface and subsurface soil, as well as groundwater, are presented in Appendix C of this RFI Report Addendum.

2.1 Soil Sampling and Analysis

During the Zone G RFI, 10 soil borings (G706SB001 through G706SB010) were installed and sampled. Surface (from 0 to 1 foot below land surface [ft bls]) soil samples were collected from 10 borings and subsurface (3 to 5 ft bls) soil samples were collected from seven borings. The sampling locations are presented on Figure 2-1, and were along the north, west and south edges of the asphalt-paved parking lot on the west side of the building. At three locations (G706SB005, G706SB008, and G706SB010) subsurface samples could not be collected, reportedly due to encountering the shallow water table. These samples were

1 analyzed for metals, pesticides, PCBs, and SVOCs. One surface soil sample was also
2 analyzed for volatile organic compounds (VOCs) and dioxin compounds.

3 The results of surface soil analyses were compared in the *Zone G RFI Report, Revision 0* to the
4 applicable screening criteria. These criteria were the U.S. Environmental Protection Agency
5 (EPA) Region III unrestricted (i.e., residential) land use risk-based concentrations (RBCs)
6 with a Hazard Index (HI) equal to 0.1, EPA soil screening levels (SSLs) with a dilution
7 attenuation factor (DAF)=20, and the Zone G RFI background reference concentrations
8 (BRCs) for surface and subsurface soil.

9 Analytes that exceeded these screening criteria were identified as COPCs in the RFI report,
10 and were retained for further evaluation in the RFI risk assessment to determine which of
11 these, if any, were considered COCs.

12 **2.1.1 Surface Soil Results**

13 Section 10.14.3.1 of the *Zone G RFI Report, Revision 0* presented the following conclusions
14 regarding the surface soil samples collected and analyzed at AOC 706:

- 15 • Three VOCs (benzene, carbon disulfide, and 1,2,3-trichloropropane) were detected in
16 surface soil; concentrations of these chemicals were below their respective RBCs. The
17 concentration of 1,2,3-trichloropropane (6 micrograms per kilogram [$\mu\text{g}/\text{kg}$]), which
18 was detected only in the duplicate sample, exceeded the SSL used in the RFI (6
19 nanograms per kilogram [ng/kg]).
- 20 • Eleven SVOCs were detected in surface soil; all at concentrations below their respective
21 RBCs and SSLs, and below risk-based criteria for calculated benzo[a]pyrene equivalent
22 (BEQ) concentrations.
- 23 • Five pesticides were detected in surface soil at concentrations well below their
24 respective RBCs and SSLs.
- 25 • The PCB compound Aroclor-1260 was detected in one surface soil sample at AOC 706
26 ($64 \mu\text{g}/\text{kg}$ in boring G706SB008), which is below its RBC and the SSL used in the RFI
27 ($1,000 \mu\text{g}/\text{kg}$).
- 28 • Dioxin (TEQ) was detected in one duplicate sample at a concentration of $5.3 \text{ ng}/\text{kg}$,
29 which is below the COPC screening criteria used in the RFI ($1,000 \text{ ng}/\text{kg}$) but slightly
30 above its residential RBC ($4.3 \text{ ng}/\text{kg}$).
- 31 • Twenty-three metals were detected in surface soil samples collected at AOC 706. In one
32 surface soil sample (at boring G706SB002), the antimony concentration was reported at

1 4.2 mg/kg, which exceeds the 3.1 mg/kg RBC (HI=0.1) and Zone G BRC (2.89 mg/kg).
2 In the same surface soil sample (at boring G706SB002) cadmium was reported at 5
3 mg/kg, which exceeds its RBC of 3.9 mg/kg (HI=0.1) and Zone G BRC of 0.52 mg/kg.
4 Iron also exceeded its RBC, and no background concentrations were determined for it.
5 Antimony and cadmium were identified as COPCs in surface soil, however they were
6 not identified as COCs in the RFI report.

7 No surface soil COCs were identified in the *Zone G RFI Report, Revision 0* for AOC 706.

8 **2.1.2 Subsurface Soil Results**

9 Section 10.14.3.1 of the *Zone G RFI Report, Revision 0* presented the following conclusions
10 regarding the subsurface soil samples collected and analyzed at AOC 706:

- 11 • Five VOCs were detected in subsurface soil at concentrations below their respective
12 SSLs.
- 13 • Eleven SVOCs were detected in surface soil at AOC 706. One chemical,
14 pentachlorophenol, was detected in one subsurface soil sample at a concentration of 62
15 $\mu\text{g}/\text{kg}$ at boring G706SB004, which exceeded the SSL of 30 $\mu\text{g}/\text{kg}$, used in the RFI.
- 16 • Six pesticides were detected in subsurface soil at concentrations well below their
17 respective SSLs.
- 18 • Aroclor-1260 was detected in three subsurface soil samples, with the concentration in
19 one sample (1,100 $\mu\text{g}/\text{kg}$ at boring G706SB004) exceeding the SSL used in the RFI (1,000
20 $\mu\text{g}/\text{kg}$).

21 Twenty-four metals were detected in subsurface soil samples, with antimony, copper, lead,
22 mercury, and thallium concentrations exceeding both their respective SSLs and Zone G
23 BRCs in at least one sample. Because the area containing elevated metals in subsurface soil
24 is limited, and because groundwater generally lacked significant concentrations of these
25 metals, they were not considered COCs.

26 No subsurface soil COCs were identified in the *Zone G RFI Report, Revision 0* for AOC 706.

27 **2.2 Groundwater Sampling and Analysis**

28 One shallow monitoring well was installed, and screened from approximately 4 to 14 ft bls.
29 Four sets of groundwater samples were collected prior to the submittal of the RFI report.
30 These samples were analyzed for metals and SVOCs. The monitoring well location is shown
31 in Figure 2-1.

1 **2.2.1 Groundwater Results**

2 Section 10.14.4 of the *Zone G RFI Report, Revision 0* describes the results of only the first set
3 of groundwater samples analyzed from AOC 706. The groundwater sampling detected one
4 SVOC, 4-methylphenol, at a concentration well below its EPA Region III Tap Water RBC
5 during the first sampling event conducted in 1997. During the subsequent sampling events,
6 4-methylphenol was not detected in groundwater.

7 During the first groundwater sampling event, barium and thallium exceeded both their tap
8 water RBCs and respective Zone G groundwater BRCs. Iron was the only other parameter
9 which exceeded COPC screening criteria. Barium and thallium were identified as COPCs
10 for evaluation in the HHRA section of the RFI report (10.14.6). Potentiometric maps from
11 the RFI report of the shallow groundwater in this part of Zone G indicate flow locally to the
12 south, with regional flow to the east to Cooper River (see figure in Appendix C).
13 Groundwater data from the site are discussed further in Section 4.3 of this RFI Report
14 Addendum.

15 **2.3 Human Health Risk Assessment Summary**

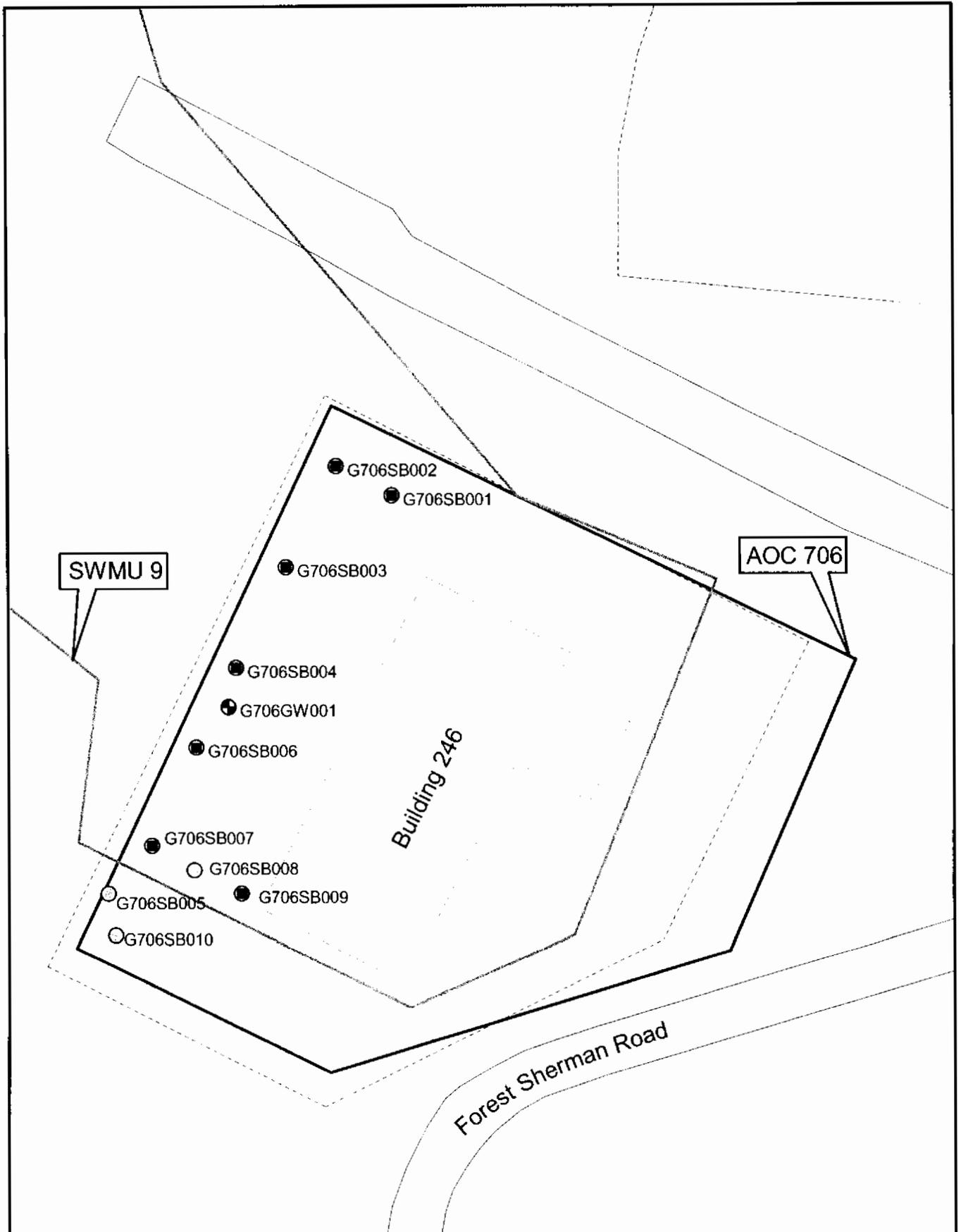
16 The HHRA section (10.14.6) of the *Zone G RFI Report, Revision 0* evaluated the COPCs for
17 risk via air inhalation, soil incidental ingestion/contact, and groundwater ingestion
18 pathways for current site worker and future unrestricted (i.e., residential) land use
19 scenarios. The identification of COCs was based on cumulative (all pathway) risk and
20 hazard on a medium-specific basis. EPA has established an acceptable risk range of 1E-04 to
21 1E-06, and an HI threshold of 1.0. As recommended by SCDHEC, the RFI considered a COC
22 to be any chemical contributing to a cumulative risk level of 1E-06 or greater, and/or a
23 cumulative HI above 1.0 and individual Incremental Lifetime Cancer Risk (ILCR) exceeding
24 1E-06, or a hazard quotient (HQ) exceeding 0.1. For carcinogens, this approach is
25 conservative because a cumulative risk level of 1E-04 and an individual ILCR of 1E-06 is
26 recommended by EPA Region IV as the trigger for establishing COCs.

27 The HHRA concluded that no surface or subsurface soil COCs were present for either the
28 unrestricted or site worker scenarios. Barium and thallium were identified as COCs in
29 shallow groundwater at AOC 706.

1 **2.4 COPC/COC Summary**

2 The *Zone G RFI Report, Revision 0* concluded that there are no COCs present in surface or
3 subsurface soils at AOC 706, based on conclusions of the HHRA and the potential for offsite
4 migration evaluations.

5 Barium and thallium were identified as COCs in shallow groundwater, and it was
6 concluded that a CMS would be required for these COCs. The presence of barium and
7 thallium in the shallow groundwater at AOC 706 is discussed further in Section 5.0 of this
8 RFI Report Addendum.



- Subsurface Soil Samples
- Surface Soil Samples
- Groundwater Well
- ⚡ Railroads
- ⚡ Fence
- ⚡ Roads
- ▭ AOC Boundary
- ▭ Buildings

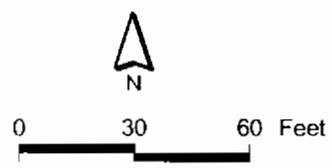


Figure 2-1
RFI Sampling Locations
AOC 706, Zone G
Charleston Naval Complex

1 **3.0 Summary of Interim Measures and UST/AST**
2 **Removals at AOC 706**

3 **3.1 Interim Measures**

4 No IMs have been conducted at AOC 706.

5 **3.2 UST/AST Removals**

6 There are no known underground storage tanks (USTs) or aboveground storage tanks
7 (ASTs) associated with AOC 706. Visual inspections made by BCT members during 2001
8 indicated no physical evidence of USTs or ASTs.

4.0 Summary of Additional Investigations

In February 1998, July and December 1999, and January 2000, additional field activities were conducted by the Navy/EnSafe team in Zone G subsequent to the *Zone G RFI Report, Revision 0* (EnSafe, 1998a). The work was performed in January 2000 as described in the *Zone G RFI Work Plan Addendum* (EnSafe, 2000).

The sampling event included collecting Synthetic Precipitation Leaching Procedure (SPLP) soil samples at AOC 706 to support SSL calculations, additional delineation soil sampling, and groundwater sampling. Summaries of the analytical results and a copy of the data validation report for this sampling event are presented in Appendix D of this RFI Report Addendum.

4.1 Screening Criteria used for Additional Sampling and Analysis

Surface soil sampling results were screened against EPA Region III residential RBCs (noncarcinogens at $HI=0.1$) and the generic soil-to-groundwater SSLs (DAF=1 for VOCs, DAF=10 for all other parameters). Results for inorganic parameters were also compared to their Zone G surface soil background range of concentrations. When both the Zone G background range maximum concentration value and either the RBC or SSL were exceeded, the chemical was selected as a COPC. COPCs identified using this process are discussed further in Section 5.0 of this RFI Report Addendum.

Similarly, subsurface soil results were compared to the Zone G background range of concentrations (for inorganics) and generic SSLs (DAF=10). When an organic compound concentration exceeded the SSL, or when an inorganic compound concentration exceeded both criteria, the chemical was selected as a COPC for the soil-to-groundwater leachability pathway.

Groundwater sample results were compared to EPA National Primary Drinking Water Standard Maximum Contaminant Levels (MCLs) (or EPA Region III Tap Water RBCs if no MCL exists), and to the CNC Zone G BRCs for inorganics.

The sampling locations are shown in Figure 4-1. Tables 4-1 and 4-2 present the analytical result summaries for organic and inorganic parameters detected in surface soils, respectively. Summaries for organic and inorganic parameters detected in subsurface soils

1 are shown in Tables 4-3 and 4-4, respectively. The results of detected organic and inorganic
2 chemicals in groundwater samples are summarized in Tables 4-5 and Table 4-6,
3 respectively.

4 **4.2 Summary of Additional Investigations**

5 **4.2.1 Additional Soil and Groundwater Investigations (EnSafe, 1999-2000)**

6 In July 1999, three soil borings were installed along the fence line at the western edge of the
7 parking lot. The locations of soil borings G706SB011, G706SB012, and G706SB013 are shown
8 on Figure 4-1. Boring G706SB013 is co-located with RFI boring G706SB004, and boring
9 G706SB014 is co-located with RFI boring G706SB012. Surface and subsurface soil samples
10 were collected at each boring, except at boring G706SB013, where only a subsurface sample
11 was collected. Soil samples were analyzed for metals, pesticides, PCBs, and SVOCs. In
12 addition, the surface soil sample from boring G706SB011 was analyzed for pesticides, and
13 the subsurface sample from boring G706SB013 was analyzed for SPLP metals. The SPLP
14 data were intended to provide information for the calculation of site-specific SSLs for soil-
15 to-groundwater leachability information. A groundwater sample was also collected from
16 monitoring well G706GW001 at this time, and analyzed for total metals and SVOCs.

17 In July 1999, a groundwater sample was collected from monitoring well G706GW001 and
18 analyzed for metals, pesticides and PCBs. In December 1999, soil borings G706SB014
19 through G706SB020 were installed to obtain SPLP data. Boring G706SB019 was located
20 outside the fence and western AOC boundary in a grassy area; the remaining borings were
21 located along the western AOC boundary. Samples were analyzed for metals (total), SPLP
22 metals, and dioxin compounds. Surface and subsurface samples were collected at all
23 locations except G706SB015 and G706SB017, where only a surface soil sample was collected.

24 In January 2000, the surface soil at boring location G706SB018 was resampled and analyzed
25 for hexavalent chromium. Borings G706SB021 and G706SB022 were also installed outside
26 the northwest AOC boundary, along the south right-of-way of Dyess Avenue. As presented
27 in the *Zone G RFI Work Plan Addendum* (EnSafe, 2000), these samples were collected to
28 further delineate metals north of G706SB002 and north-northwest of G706SB011. Surface
29 and subsurface soil samples at these two locations were analyzed for total metals.

30 **4.2.2 Additional Groundwater Investigation (CH2M-Jones, 2002)**

31 The existing monitoring well, G706GW001, was resampled on July 13, 2002 by CH2M-Jones.
32 The sample was analyzed for VOCs, SVOCs, pesticides/PCBs, barium, and hydrazine. This
33 well was also sampled in June and September 2002 as part of the SWMU 9 quarterly

1 monitoring. The analytical data summaries and data validation report for this collection
2 event are found in Appendix E of this RFI Report Addendum.

3 **4.3 Soil Sampling and Analysis**

4 **4.3.1 Surface Soil Results**

5 **Organic Compounds**

6 Results of the additional surface soil sampling for pesticides and PCBs did not produce any
7 exceedances of COPC screening criteria (see Table 4-1). Various dioxin compounds were
8 detected at low levels, as shown in Table 4-1. The detected TCDD equivalents (TEQs)
9 indicated an exceedance of the EPA Region III residential RBC of 4.3 ng/kg, but at a
10 concentration below the industrial RBC of 38 ng/kg. No 2,4,7,8 TCDD detections were
11 reported in any of the samples, and the majority of the detections were OCDD congeners, as
12 presented in Table 4-1. TEQs are discussed further in Section 5.0.

13 **Inorganic Compounds**

14 The surface soil sample from boring G706SB011 contained aluminum, antimony, total
15 chromium, copper, iron, and manganese at concentrations which exceed their respective
16 RBCs and Zone G surface soil background concentration ranges. None of these parameters
17 exceeded their RBCs in surface soil samples surrounding G706SB011. The metals that
18 exceeded the COPC screening criteria are summarized below. Table 4-2 presents the
19 inorganic parameters detected in these samples.

- 20 • **Aluminum** - Aluminum exceeded the residential RBC (HI=0.1) and Zone G background
21 range maximum concentration in three samples.
- 22 • **Antimony** - Antimony exceeded the residential RBC (HI=0.1) and Zone G background
23 range maximum concentration in two samples.
- 24 • **Arsenic** - Arsenic exceeded the residential RBC and Zone G background range
25 maximum concentration in one sample.
- 26 • **Cadmium** - Cadmium detected in RFI boring G706SB002 was further investigated with
27 borings G706SB011, G706SB012, and SPLP borings G706SB014 and G706SB018.
28 Cadmium did not exceed its COPC screening criteria in any of the delineation samples
29 collected or in adjacent SPLP borings. Therefore, cadmium is not confirmed as a COPC
30 during this sampling.

- 1 • **Chromium-** Chromium exceeded the residential RBC (HI=0.1) and Zone G background
2 range maximum concentration in four samples.
- 3 • **Copper-** Copper exceeded the residential RBC (HI=0.1) and Zone G background range
4 maximum concentration in two samples.
- 5 • **Iron-** Iron exceeded the residential RBC (HI = 0.1) and the Zone G background range
6 maximum concentration in three samples.
- 7 • **Lead-** Lead exceeded its 400 mg/kg EPA Region III residential RBC and the Zone G
8 surface soil background range in one sample from boring G706SB012 (1,300 mg/kg).
9 Lead concentrations in surface soil samples from surrounding borings G706SB011,
10 G706SB014, G706SB018, and G706SB020 did not exceed the screening criteria.
- 11 • **Manganese-** Manganese exceeded the residential RBC (HI=0.1)) and the Zone G surface
12 soil background concentration range in three samples.
- 13 • **Thallium -** Thallium exceeded the residential RBC (HI=0.1) and Zone G background
14 range in one sample.
- 15 • **Vanadium -** Vanadium exceeded the residential RBC (HI=0.1) and Zone G background
16 range in three samples.
- 17 On the basis of these results, TEQs, aluminum, antimony, arsenic, chromium, copper, iron,
18 manganese, lead, thallium, and vanadium were identified as COPCs in surface soil and are
19 evaluated further in Section 5.0.

20 **4.3.2 Subsurface Soil Results**

21 **Organic Compounds**

22 Results of the additional subsurface soil sampling for dioxin/furan compounds, pesticides,
23 and PCBs did not produce any exceedances of SSLs (DAF=10) for these parameters. Dioxin
24 compounds were detected in two samples, as indicated in Table 4-3. No SSL is listed for
25 dioxins in the *EPA Soil Screening Guidance: Technical Background Document* (EPA, 1996). Only
26 the 2,3,7,8-TCDD congener has an SSL listed in the EPA Region III RBC tables at a value of
27 4.3 ng/kg (DAF=10). No detections of the 2,3,7,8-TCDD congener occurred in any of the
28 samples analyzed for dioxins.

29 Aroclor-1260 was detected in samples from borings G706SB011 and G706SB012 at
30 concentrations of 86 and 110 µg/kg, respectively. No generic SSL is provided for Aroclor-
31 1260 in the EPA SSL Guidance Document. The detected values are both below the EPA

1 Region III SSL (DAF=10) of 540 $\mu\text{g}/\text{kg}$ for Aroclor-1254. Therefore, these isolated detections
2 of Aroclor-1260 are not considered significant. No organic COPCs were identified in
3 subsurface soil from this sampling.

4 **Inorganic Compounds**

5 The following inorganic compounds were identified as exceeding the appropriate COPC
6 screening criteria:

- 7 • **Antimony**- Antimony was detected in one subsurface sample above its SSL and Zone
8 G background range of concentrations. Antimony was not detected in the seven Zone G
9 RFI grid-based reference samples, but was detected in adjacent Zone H subsurface soil
10 reference samples (n=58), with a concentration range of 1.5 to 19 mg/kg. The use of the
11 Zone H background range is appropriate since the site is adjacent to Zone H and
12 historic industrial activities that occurred in Zones G and H are similar.
- 13 • **Chromium** - Chromium exceeded its SSL and Zone G background range in two
14 samples.
- 15 • **Manganese** - Manganese exceeded its SSL and Zone G background range in two
16 samples.
- 17 • **Mercury** - Mercury exceeded its SSL and Zone G background range in two samples.
- 18 • **Thallium** - Thallium exceeded its SSL and the Zone G background range in four
19 samples.
- 20 • **Tin** - Tin was above background levels in two samples; however, it does not have an
21 SSL value listed in either the EPA SSL Guidance Document or the EPA Region III risk-
22 based tables.

23 Based upon these results, antimony, chromium, manganese, mercury, and thallium were
24 identified as COPCs in subsurface soil at AOC 706, and are evaluated further in Section 5.0.

25 **4.3.3 SPLP Sampling Results**

26 Soil borings G706SB014 through G706SB020 were installed for SPLP sampling in December
27 1999. A surface soil sample and a subsurface soil sample were collected from each boring,
28 except at borings G706SB015 and G706SB017, where only surface soil samples were
29 collected. The parameters detected in the surface and subsurface soils are included in Tables
30 4-2 and 4-4, and were included in the COPC screening. Analytical results for the liquid
31 extract from the SPLP tests are included in Appendix D.

4.4 Groundwater Sampling and Analysis

Monitoring well G706GW001 was sampled during four events after submittal of the *Zone G RFI Report, Revision 0*. In July 1999, the well was sampled for PCBs, pesticides/herbicides, and metals. The well was also sampled in June, July, and September 2002. Analyses were performed on these groundwater samples for VOCs, SVOCs, hydrazine, and selected metals. Table 4-5 presents the detections of all organic chemicals in this well for all sampling events. Table 4-6 presents the detections of all metals in this well for all sampling events.

Pesticides and PCBs have not been detected to date in site groundwater. Several SVOCs were detected at low concentrations, as shown in Table 4-5. Of those detected, only n-nitrosodi-n-propylamine exceeded its screening criterion (EPA Region III tap water RBC), and is identified as a COPC. No MCL exists for this chemical.

Several metals were detected during both events, as indicated in Table 4-6, with barium present at concentrations above the EPA Primary Drinking Water Standards in at least one sampling event. During the July 1999 and June 2000 events, the barium concentration exceeded the 2,000 $\mu\text{g}/\text{L}$ MCL. Although there are no EPA Primary Drinking Water Standards for iron, the observed iron concentration in one sample exceeds the Zone G background range of concentrations (see Table 4-6). Antimony was detected above background levels in the last two sampling events for which it was analyzed. The last detected antimony concentration at 45.6 $\mu\text{g}/\text{L}$ exceeds its background concentration and MCL (6 $\mu\text{g}/\text{L}$). Therefore, antimony, barium, and iron are identified as COPCs and are further evaluated in Section 5.0.

4.5 COPC/COC Summary

The *Zone G RFI Report, Revision 0* did not identify any COCs for surface or subsurface soil at AOC 706. Screening the results from the additional investigations identified TEQs, aluminum, antimony, arsenic, chromium, copper, iron, manganese, lead, thallium and vanadium as COPCs in surface soil and requiring further evaluation. These COPCs are further evaluated in Section 5.0. The results of the additional investigations indicate that antimony, manganese, mercury, and thallium should be evaluated as COPCs in subsurface soil, and are discussed further in Section 5.0.

The *Zone G RFI Report, Revision 0* identified barium and thallium as COCs for site groundwater. Results of additional groundwater sampling identified n-nitrosodi-n-propylamine, antimony, barium, and iron as COPCs. The significance of these parameters as COPCs is discussed further in Section 5.0.

TABLE 4-1
 Organic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration	Units	Qualifier	EPA Region	Soil-to-
					III Residential RBC (HI=0.1) ^a	Groundwater SSL (DAF=10) ^b
1,2,3,4,6,7,8- Heptachlorodibenzo-p-dioxin	G706SB018	268.5	ng/kg	J		
	G706SB014	53.8		=		
1,2,3,4,6,7,8- Heptachlorodibenzofuran	G706SB014	16.1		=		
	G706SB018	47.4		=		
1,2,3,4,7,8- Hexachlorodibenzo-p-dioxin	G706SB018	3.5		=		
	G706SB014	0.4		J		
1,2,3,4,7,8- Hexachlorodibenzofuran	G706SB018	27.1		J		
	G706SB014	12.4		J		
1,2,3,6,7,8- Hexachlorodibenzo-p-dioxin	G706SB014	1.9		J		
	G706SB018	12.5		=		
1,2,3,6,7,8- Hexachlorodibenzofuran	G706SB018	6.2		J		
	G706SB014	2.7		J		
1,2,3,7,8,9- Hexachlorodibenzo-p-dioxin	G706SB014	3.2		=		
	G706SB018	12.8		J		
1,2,3,7,8- Pentachlorodibenzofuran	G706SB014	1.4		J		
	G706SB018	2.1		J		
2,3,4,6,7,8- Hexachlorodibenzofuran	G706SB014	2.3		=		
	G706SB018	4.0		=		
2,3,4,7,8- Pentachlorodibenzofuran	G706SB018	4.0		=		
	G706SB014	2.1		=		
2,3,7,8- Tetrachlorodibenzofuran	G706SB014	3.3		J		
	G706SB018	9.6		=		

TABLE 4-1
 Organic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration	Units	Qualifier	EPA Region III Residential RBC (HI=0.1) ^a	Soil-to-Groundwater SSL (DAF=10) ^b
Octachlorodibenzo-p-dioxin	G706SB018	1,215.6	ng/kg	=		
	G706SB014	419.2		=		
Octachlorodibenzofuran	G706SB014	20.7		=		
	G706SB018	25.9		=		
TEQs	G706SB014	5.1		=	4.3	NA
	G706SB018	14.2		=		
PCB-1260 (Aroclor-1260)	G706SB012	260	µg/kg	J	320	550
	G706SB011	200		J		
Alpha-Chlordane	G706SB012	5.3		J	1,800	5,000
Endosulfan Sulfate	G706SB012	7.9		J	47,000	9,000
Gamma-Chlordane	G706SB012	18.0		J	1,800	5,000
p,p'-DDE	G706SB012	12.0		J	1,900	27,000
	G706SB011	15.0		J		
p,p'-DDT	G706SB012	15.0	µg/kg	J	1,900	16,000
	G706SB011	11.0		=		

^a EPA Region III Residential RBCs (HI=0.1 for noncarcinogens) were obtained from the EPA Region III RBC Table, October 2000, unless otherwise noted.

^b Generic soil-to-groundwater SSLs (DAF=10) are from EPA Soil Screening Guidance: Technical Background Document (Table A-1), EPA/540/R-95/128, May 1996, unless otherwise noted.

Concentrations shown in bold and outlined within the table indicate exceedances of the appropriate screening criteria.

= Indicates that the analyte was detected at the concentration shown.

J Indicates that the concentration is an estimated value.

µg/kg Micrograms per kilogram

NL Not listed

ng/kg Nanograms per kilogram

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
Aluminum	G706SB011	23,400	=	7,800	NL	2,190 - 17,800
	G706SB012	9,510	=			
	G706SB014	13,400	=			
	G706SB015	31,100	=			
	G706SB016	6,740	=			
	G706SB017	9,180	=			
	G706SB018	34,500	=			
	G706SB019	10,900	=			
	G706SB020	12,800	=			
	G706SB021	4,180	=			
	G706SB022	4,290	=			
Antimony	G706SB011	10.7	J	3.1	2.5	0.79 - 5.7
	G706SB014	4.2	J			
	G706SB015	1.8	J			
	G706SB016	0.4	J			
	G706SB017	1.4	J			
	G706SB018	5.7	J			
	G706SB019	0.7	J			
	G706SB020	11.6	J			
Arsenic	G706SB011	22.5	=	0.43 ^d	14.5	3.1 - 25
	G706SB012	9.9	=			
	G706SB014	8	=			
	G706SB015	47.6	=			
	G706SB016	0.5	J			
	G706SB017	5.1	=			
	G706SB018	18.1	=			
	G706SB019	1.1	=			
G706SB020	7	=				

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
Arsenic	G706SB021	2.2	J	0.43 ^d	14.5	3.1 - 25
	G706SB022	2.7	=			
Barium	G706SB011	208	J	550	800	11 - 129
	G706SB014	49.8	=			
	G706SB015	62.6	=			
	G706SB016	14.6	J			
	G706SB017	18.3	J			
	G706SB018	119	=			
	G706SB019	21.2	=			
	G706SB020	66.8	=			
	G706SB012	36.1	J			
	G706SB021	12.2	=			
	G706SB022	28.6	=			
Beryllium	G706SB011	1.2	=	16	31.5	0.47 - 1.1
	G706SB012	0.4	J			
	G706SB014	0.6	=			
	G706SB015	1.7	=			
	G706SB018	1.8	=			
	G706SB020	0.5	=			
	G706SB021	0.2	J			
Cadmium	G706SB022	0.3	J			
	G706SB011	2.2	J	7.8	4.0	0.12 - 1.7
	G706SB012	0.6	J			
	G706SB014	0.4	J			
Calcium	G706SB016	0.2	J			
	G706SB011	24,300	=	NL	NL	NL
	G706SB012	6,140	=			
	G706SB014	6,430	=			

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
Calcium	G706SB015	5,690	=	NL	NL	NL
	G706SB016	1,950	=			
	G706SB017	3,080	=			
	G706SB018	14,500	=			
	G706SB019	980	=			
	G706SB020	3,280	=			
	G706SB021	57,400	=			
	G706SB022	31,000	=			
Chromium, Total	G706SB011	56.1	J	23	19	7 - 39
	G706SB012	22.9	J			
	G706SB014	2.4	J			
	G706SB015	5.8	J			
	G706SB015	59.5	=			
	G706SB016	0.8	J			
	G706SB017	0.8	J			
	G706SB018	6	J			
	G706SB018	70.5	=			
	G706SB019	0.9	J			
	G706SB020	1.5	J			
	G706SB020	41.5	=			
	G706SB021	14.9	=			
	G706SB022	23	=			
Cobalt	G706SB011	7.8	=	470	NL	1.1 - 6.2
	G706SB012	2.6	J			
	G706SB014	3.5	J			
	G706SB015	9.4	=			
	G706SB016	0.8	J			
	G706SB017	1.7	J			

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
Cobalt	G706SB018	9.5	=	470	NL	1.1 - 6.2
	G706SB019	2	J			
	G706SB020	3.8	J			
	G706SB021	1.5	J			
	G706SB022	1.6	J			
Copper	G706SB011	548	J	310	5,500	23 - 431
	G706SB012	53.3	J			
	G706SB014	158	=			
	G706SB015	53.3	=			
	G706SB016	3.4	=			
	G706SB017	15.3	=			
	G706SB018	861	=			
	G706SB019	8.5	=			
	G706SB020	271	=			
	G706SB021	24	=			
	G706SB022	52.6	=			
Iron	G706SB011	33,000	=	2,300	NL	4,300 - 32,700
	G706SB012	11,200	=			
	G706SB014	13,200	=			
	G706SB015	35,700	=			
	G706SB016	1,770	=			
	G706SB017	8,110	=			
	G706SB018	38,200	=			
	G706SB019	3,930	=			
	G706SB020	19,900	=			
	G706SB021	3,870	=			
	G706SB022	4,840	=			

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
Lead	G706SB011	320	J	400 ^e	400	3.5 - 275
	G706SB012	1,300	J			
	G706SB014	160	=			
	G706SB015	75.8	=			
	G706SB016	6.3	=			
	G706SB017	53.7	=			
	G706SB018	221	=			
	G706SB019	10.7	=			
	G706SB020	181	=			
	G706SB021	29	=			
	G706SB022	84	=			
	Magnesium	G706SB011	5,270			
G706SB012		1,020	=			
G706SB014		1,380	=			
G706SB015		4,190	=			
G706SB016		284	J			
G706SB017		612	=			
G706SB018		5,370	=			
G706SB019		608	=			
G706SB020		1,360	=			
G706SB021		1,530	=			
G706SB022		1,010	=			
Manganese		G706SB011	575	=	160	NL
	G706SB012	174	=			
	G706SB014	142	=			
	G706SB015	532	=			
	G706SB016	11.9	=			
	G706SB017	64.9	=			

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
Manganese	G706SB018	431	=	160	NL	39 - 359
	G706SB019	30.4	=			
	G706SB020	201	=			
	G706SB021	82.6	=			
	G706SB022	89.8	=			
Mercury	G706SB011	1.4	=	2.3 ^f	1.0	0.06 - 2
	G706SB012	0.3	=			
	G706SB014	0.3	=			
	G706SB015	0.4	=			
	G706SB017	0.1	=			
	G706SB018	0.7	=			
	G706SB020	0.9	=			
	G706SB021	0.1	J			
	G706SB022	0.1	J			
Nickel	G706SB011	29.7	=	160	65	2 - 26.5
	G706SB012	8.2	=			
	G706SB014	19.1	=			
	G706SB015	20.4	=			
	G706SB016	2.1	J			
	G706SB017	5.5	=			
	G706SB018	27.3	=			
	G706SB019	4.6	=			
	G706SB020	18.5	=			
	G706SB021	5.3	=			
	G706SB022	6.2	=			
	Potassium	G706SB011	2,060	J	NL	NL
G706SB012		565	J			
G706SB014		1,010	=			

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
Potassium	G706SB015	2,780	=	NL	NL	NL
	G706SB016	263	J			
	G706SB017	339	J			
	G706SB018	3,540	=			
	G706SB019	479	J			
	G706SB020	843	=			
	G706SB021	254	J			
	G706SB022	210	J			
Selenium	G706SB011	1.1	=	39	2.5	0.45 - 1.4
	G706SB012	0.5	J			
	G706SB014	1.3	=			
	G706SB015	2.8	=			
	G706SB017	1.3	=			
	G706SB018	2.7	=			
	G706SB020	2.5	=			
Silver	G706SB011	0.6	J	39	17	ND
	G706SB014	0.3	J			
	G706SB020	1.8	=			
Sodium	G706SB011	1,980	=	NL	NL	NL
	G706SB012	206	J			
	G706SB014	309	J			
	G706SB015	927	=			
	G706SB016	79	J			
	G706SB017	213	J			
	G706SB018	2,490	=			
	G706SB019	111	J			
	G706SB020	272	J			
	G706SB021	411	=			

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
Sodium	G706SB022	436	=	NL	NL	NL
Thallium	G706SB014	0.5	J	1.8	0.4	ND
	G706SB015	1.8	J			
	G706SB018	1.6	J			
	G706SB020	0.8	J			
Tin (Sn)	G706SB011	28.6	J	470	NL	2.6 - 26
	G706SB018	16.1	=			
	G706SB020	16.7	=			
Vanadium	G706SB011	71.1	=	55.0	3,000	7.5 - 57
	G706SB012	26.7	=			
	G706SB014	32.3	=			
	G706SB015	87.2	=			
	G706SB016	10.3	=			
	G706SB017	19.3	=			
	G706SB018	85.2	=			
	G706SB019	13.8	=			
	G706SB020	30.9	=			
	G706SB021	8.3	=			
	G706SB022	12.8	=			
	Zinc	G706SB011	1,060	J	2,300	6,000
G706SB012		200	J			
G706SB014		286	=			
G706SB015		320	=			
G706SB016		9.8	=			
G706SB017		41.5	=			
G706SB018		618	=			
G706SB019		33.8	=			
Zinc	G706SB020	614	=	2,300	6,000	18 - 1,650

TABLE 4-2
 Inorganic Parameters Detected in Surface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	EPA Region III Residential Soil RBC ^a (HI=0.1)	Soil-to-Groundwater SSL ^b (DAF=10)	Zone G Surface Soil Background Concentration Range ^c
	G706SB021	45.7	=			
	G706SB022	99.5	=			

^a EPA Region III Residential RBCs (HI=0.1 for noncarcinogens) were obtained from the EPA Region III RBC Table, October 2000, unless otherwise noted.

^b Generic soil-to-groundwater SSLs (DAF=10) are from EPA Soil Screening Guidance: Technical Background Document (Table A-1), EPA/540/R-95/128, May 1996, unless otherwise noted.

^c Background values for Zone G are as described in the Zone G RFI Report, Revision 0 (EnSafe, 1998) Section 5- Data Evaluation and Background Comparison; where Zone G Background ranges are not available due to no detections, range shown is for Zone H.

^d Carcinogen-residential RBC was used directly from the EPA Region III RBC Table, October 5, 2000.

^e Residential RBC for lead was obtained from EPA Soil Screening Guidance: Technical Background Document, Appendix A (page A-5) EPA/540/R95/128, May 1996.

^f Residential RBC (HI=0.1) for mercury was obtained from the EPA Region III RBC Table document distributed on October 22, 1997.

Concentrations shown in bold and outlined within the table indicate exceedances of the appropriate screening criteria.

= Indicates that the analyte was detected at the concentration shown.

J Indicates that the concentration is an estimated value.

mg/kg Milligrams per kilogram

NL Not listed

TABLE 4-3
 Organic Parameters Detected in Subsurface Soil Samples, Additional Investigations
RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration	Units	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)
1,2,3,4,6,7,8-Heptachlorodibenzofuran	G706SB018	5.1	ng/kg	=	
	G706SB014	42.5		=	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	G706SB018	238.6		J	
	G706SB014	7,630		=	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	G706SB014	2		J	
1,2,3,4,7,8-Hexachlorodibenzofuran	G706SB018	1.8		J	
	G706SB014	16.3		J	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	G706SB014	24		=	
1,2,3,6,7,8-Hexachlorodibenzofuran	G706SB014	4.7		J	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	G706SB018	6		J	
	G706SB014	59.1		=	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	G706SB018	7		J	
	G706SB014	79.6		=	
1,2,3,7,8-Pentachlorodibenzofuran	G706SB014	2.8		J	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	G706SB014	3.8		J	
2,3,4,6,7,8-Hexachlorodibenzofuran	G706SB014	4.5		J	
2,3,4,7,8-Pentachlorodibenzofuran	G706SB018	0.6		=	
	G706SB014	1.5		J	
2,3,7,8-Tetrachlorodibenzofuran	G706SB018	1.5		J	
	G706SB014	5.4		=	

TABLE 4-3
 Organic Parameters Detected in Subsurface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration	Units	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)
Octachlorodibenzofuran	G706SB018	7.9	ng/kg	=	
	G706SB014	89.1		=	
Octachlorodibenzo-p-dioxin	G706SB018	1,906.1		=	
	G706SB014	60,722		=	
TEQs	G706SB014	159.8		=	4.3
	G706SB018	6.6		=	
PCB-1260 (Aroclor-1260)	G706SB011	86	μg/kg	J	550
	G706SB012	110		J	
p,p'-DDD	G706SB012	5.6		J	8,000
p,p'-DDE	G706SB011	5.4		J	27,000

^a Residential RBCs (HI=0.1 for noncarcinogens) were obtained from the EPA Region III RBC Table, October 2000, unless otherwise noted.

Concentrations in bold and outlined within the table indicate exceedances of the appropriate screening criteria.

= Indicates that the analyte was detected at the concentration shown.

J Indicates that the concentration is an estimated value.

μg/kg Micrograms per kilogram

ng/kg Nanograms per kilogram

TABLE 4-4
 Inorganic Parameters Detected in Subsurface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)	Zone G Subsurface Soil Background Concentration Range ^b
Aluminum	G706SB012	26,000	=	NL	2,630 - 36,800
	G706SB011	20,100	=		
	G706SB013	8,830	=		
	G706SB014	17,800	=		
	G706SB016	17,700	=		
	G706SB018	32,600	=		
	G706SB019	23,800	=		
	G706SB020	15,600	=		
	G706SB022	7,100	=		
	G706SB021	4,250	=		
Antimony	G706SB012	5.6	J	2.5	1.5 - 19 ^c
	G706SB011	3	J		
	G706SB014	6.7	J		
	G706SB016	23.3	J		
	G706SB018	3.8	J		
	G706SB019	1.6	J		
	G706SB020	8.6	J		
Arsenic	G706SB012	33.2	=	14.5	1.4 - 36
	G706SB011	22.8	=		
	G706SB013	1.4	=		
	G706SB014	10.3	=		
	G706SB016	8.5	=		
	G706SB018	16.6	=		
	G706SB019	25.1	=		
	G706SB020	9.6	=		
	G706SB022	6.9	=		
	G706SB021	1.7	J		
Barium	G706SB012	121	J	800	7.7 - 63
	G706SB011	50.5	J		

TABLE 4-4
 Inorganic Parameters Detected in Subsurface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)	Zone G Subsurface Soil Background Concentration Range ^b
Barium	G706SB013	17.1	J	800	7.7 - 63
	G706SB014	83.6	=		
	G706SB016	83.6	=		
	G706SB018	77.5	=		
	G706SB019	53.6	=		
	G706SB020	69.5	=		
	G706SB022	43.7	=		
	G706SB021	15.6	=		
Beryllium	G706SB012	1.4	=	31.5	0.45 - 2.4
	G706SB011	1.2	=		
	G706SB013	0.2	J		
	G706SB014	0.7	=		
	G706SB016	1.0	=		
	G706SB018	1.7	=		
	G706SB019	1.2	=		
	G706SB020	0.7	=		
	G706SB022	0.3	J		
	G706SB021	0.2	J		
Cadmium	G706SB012	0.8	J	4	0.08 - 0.52
	G706SB011	0.7	J		
	G706SB013	0.1	J		
	G706SB014	0.5	J		
	G706SB016	0.2	J		
	G706SB020	0.2	J		
Calcium	G706SB012	8,190	=	NL	NL
	G706SB011	29,600	=		
	G706SB013	1,800	=		
	G706SB014	6,490	=		
	G706SB016	12,100	=		

TABLE 4-4
 Inorganic Parameters Detected in Subsurface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)	Zone G Subsurface Soil Background Concentration Range ^b
Calcium	G706SB018	56,000	=	NL	NL
	G706SB019	3,970	=		
	G706SB020	17,000	=		
	G706SB022	17,800	=		
	G706SB021	25,600	=		
Chromium, Total	G706SB012	43.4	J	19	7.4 - 65
	G706SB011	41.4	J		
	G706SB013	9.9	=		
	G706SB014	177	=		
	G706SB014	0.9	J		
	G706SB016	1.7	J		
	G706SB016	74	=		
	G706SB018	62.1	=		
	G706SB018	2.7	J		
	G706SB019	2.4	J		
	G706SB019	44.5	=		
	G706SB020	0.6	J		
	G706SB020	47.1	=		
	G706SB022	19.1	=		
	G706SB021	13.3	=		
Cobalt	G706SB012	7.9	=	NL	0.9 - 15
	G706SB011	5.8	=		
	G706SB013	1.2	J		
	G706SB014	4.5	J		
	G706SB016	6.2	=		
	G706SB018	8.2	=		
	G706SB019	6.6	=		
	G706SB020	4.6	J		
G706SB022	2	J			

TABLE 4-4
 Inorganic Parameters Detected in Subsurface Soil Samples, Additional Investigations
RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)	Zone G Subsurface Soil Background Concentration Range ^b
Cobalt	G706SB021	1.1	J	NL	0.9 - 15
Copper	G706SB012	179	J	5,500 ^d	4.5 - 46
	G706SB011	123	J		
	G706SB013	11.3	J		
	G706SB014	200	=		
	G706SB016	380	=		
	G706SB018	175	=		
	G706SB019	51.8	=		
	G706SB020	298	=		
	G706SB022	132	=		
	G706SB021	10.5	=		
Iron	G706SB012	47,200	=	NL	3,110 - 58,100
	G706SB011	30,300	=		
	G706SB013	3,410	=		
	G706SB014	15,900	=		
	G706SB016	29,300	=		
	G706SB018	31,200	=		
	G706SB019	28,400	=		
	G706SB020	25,900	=		
	G706SB022	7,680	=		
	G706SB021	3,200	=		
Lead	G706SB012	175	J	400	2.4 - 76
	G706SB011	93.6	J		
	G706SB013	8.9	J		
	G706SB014	237	=		
	G706SB016	267	=		
	G706SB018	113	=		
	G706SB019	56.9	=		
	G706SB020	330	=		

TABLE 4-4
Inorganic Parameters Detected in Subsurface Soil Samples, Additional Investigations
RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)	Zone G Subsurface Soil Background Concentration Range ^b																																																																																							
Lead	G706SB022	82	=	400	2.4 - 76																																																																																							
	G706SB021	18	=			Magnesium	G706SB012	4,770	=	NL	NL	G706SB011	4,900	=	G706SB013	477	=	G706SB014	1,850	=	G706SB016	2,260	=	G706SB018	6,420	=	G706SB019	2,820	=	G706SB020	2,200	=	G706SB022	1,340	=	G706SB021	741	=	Manganese	G706SB012	396	=	NL	20 - 409	G706SB011	374	=	G706SB013	21	=	G706SB014	181	=	G706SB016	158	=	G706SB018	428	=	G706SB019	446	=	G706SB020	289	=	G706SB022	87.3	=	G706SB021	35.7	=	Mercury	G706SB012	1.8	=	1	0.05 - 0.37	G706SB011	0.4	=	G706SB013	0.1	=	G706SB014	0.3	=	G706SB016	0.2	=	G706SB018	0.5	=
Magnesium	G706SB012	4,770	=	NL	NL																																																																																							
	G706SB011	4,900	=																																																																																									
	G706SB013	477	=																																																																																									
	G706SB014	1,850	=																																																																																									
	G706SB016	2,260	=																																																																																									
	G706SB018	6,420	=																																																																																									
	G706SB019	2,820	=																																																																																									
	G706SB020	2,200	=																																																																																									
	G706SB022	1,340	=																																																																																									
	G706SB021	741	=																																																																																									
Manganese	G706SB012	396	=	NL	20 - 409																																																																																							
	G706SB011	374	=																																																																																									
	G706SB013	21	=																																																																																									
	G706SB014	181	=																																																																																									
	G706SB016	158	=																																																																																									
	G706SB018	428	=																																																																																									
	G706SB019	446	=																																																																																									
	G706SB020	289	=																																																																																									
	G706SB022	87.3	=																																																																																									
	G706SB021	35.7	=																																																																																									
Mercury	G706SB012	1.8	=	1	0.05 - 0.37																																																																																							
	G706SB011	0.4	=																																																																																									
	G706SB013	0.1	=																																																																																									
	G706SB014	0.3	=																																																																																									
	G706SB016	0.2	=																																																																																									
	G706SB018	0.5	=																																																																																									
	G706SB019	0.2	=																																																																																									

TABLE 4-4
 Inorganic Parameters Detected in Subsurface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)	Zone G Subsurface Soil Background Concentration Range ^b
Mercury	G706SB020	0.4	=	1	0.05 - 0.37
	G706SB022	1.2	=		
Nickel	G706SB012	23.2	=	65 ^d	1.9 - 22
	G706SB011	16.2	=		
	G706SB013	3.8	J		
	G706SB014	26.2	=		
	G706SB016	30.5	=		
	G706SB018	24	=		
	G706SB019	14.6	=		
	G706SB020	26.5	=		
	G706SB022	10	=		
	G706SB021	3.6	J		
Potassium	G706SB012	2,270	J	NL	NL
	G706SB011	1,900	J		
	G706SB013	333	=		
	G706SB014	1,290	=		
	G706SB016	1,420	=		
	G706SB018	4,260	=		
	G706SB019	2,120	=		
	G706SB020	1,370	=		
	G706SB022	449	=		
	G706SB021	229	J		
Selenium	G706SB012	0.7	J	2.5	0.54 - 1
	G706SB012	0.65	J		
	G706SB011	0.51	U		
	G706SB013	0.33	U		
	G706SB014	1.7	=		
	G706SB016	2.4	=		
	G706SB018	2.1	=		

TABLE 4-4
 Inorganic Parameters Detected in Subsurface Soil Samples, Additional Investigations
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)	Zone G Subsurface Soil Background Concentration Range ^b
Selenium	G706SB019	2.4	=	2.5	0.54 - 1
	G706SB020	1.9	=		
	G706SB022	0.44	U		
	G706SB021	0.39	U		
Silver	G706SB014	0.2	J	17	ND
	G706SB016	0.5	J		
	G706SB020	0.3	J		
Sodium	G706SB014	377	J	NL	NL
	G706SB016	936	=		
	G706SB018	4,710	=		
	G706SB019	506	J		
	G706SB020	851	=		
Thallium	G706SB011	0.6	J	0.35	1
	G706SB014	0.7	J		
	G706SB016	0.9	J		
	G706SB018	1.8	J		
	G706SB019	1.1	J		
	G706SB020	0.8	J		
	G706SB022	19.4	=		
	G706SB022	0.6	J		
	G706SB021	7.2	=		
Tin (Sn)	G706SB016	22.3	=	NL	1.1 - 2.9
	G706SB020	124	=		
Vanadium	G706SB012	65.5	=	3,000	5.9 - 112
	G706SB011	60	=		
	G706SB013	11.8	=		
	G706SB014	42.1	=		
	G706SB016	47.6	=		

TABLE 4-4
 Inorganic Parameters Detected in Subsurface Soil Samples, Additional Investigations
RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Soil-to-Groundwater SSL ^a (DAF=10)	Zone G Subsurface Soil Background Concentration Range ^b
Vanadium	G706SB018	71.1	=	3,000	5.9 - 112
	G706SB019	61.4	=		
	G706SB020	37.9	=		
Zinc	G706SB012	479	J	6,000	20 - 198
	G706SB011	281	J		
	G706SB013	26.1	J		
	G706SB014	531	=		
	G706SB016	1,150	=		
	G706SB018	304	=		
	G706SB019	174	=		
	G706SB020	685	=		
	G706SB022	243	=		
	G706SB021	36.8	=		

^a Generic soil-to-groundwater SSLs (DAF=10) are from EPA Soil Screening Guidance: Technical Background Document (Table A-1), EPA/540/R-95/128, May 1996, unless otherwise noted.

^b Background values for Zone G are as described in the Zone G RFI Report, Revision 0 (EnSafe, 1998) Section 5- Data Evaluation and Background Comparison.

^c Where Zone G Background ranges are not available due to no detections, range shown is for Zone H.

^d Where SSLs are not available from EPA tables, SSLs from the Region III RBC tables are used.

Concentrations in bold and outlined in boxes exceeded the SSLs and the Zone G background concentration range.

= Indicates that the analyte was detected at the concentration shown.

J Indicates that the concentration is an estimated value.

mg/kg Milligrams per kilogram

ND Not detected

NL Not listed

U Indicates that analyte was analyzed for but not detected above the method detection limit.

TABLE 4-5

Organic Compounds Detected in Groundwater Samples from Monitoring Well G706GW001, Additional Investigation
RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Concentration ($\mu\text{g/L}$)	Qualifier	Date Collected	MCL/RBC ^a
Benzoic Acid	2.0	J	02/12/1998	<i>15,000</i>
Benzo[g,h,i]Perylene	0.75	J	09/09/2002	NA
1,2-Dichlorobenzene	1.1	J	06/20/2002	75
Di-n-butyl Phthalate	0.36	J	09/09/2002	<i>370</i>
N-Nitrosodi-n-propylamine	8.1	J	06/20/2002	<i>0.0096</i>

^a Results were compared to EPA National Primary Drinking Water Standard MCLs (or EPA Region III Tap Water RBCs if no MCL exists). MCLs are presented in bold; RBCs are presented in italics.

Concentrations in bold and outlined in boxes exceed the appropriate screening criterion.

J Indicates that the concentration is an estimated value.

MCL Maximum Contaminant Level

$\mu\text{g/L}$ Micrograms per liter

RBC Risk-based Concentration

TABLE 4-6
 Inorganic Compounds Detected in Groundwater Samples from Monitoring Well G706GW001, Additional Investigation
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Concentration (µg/L)	Qualifier	Date Collected	EPA Primary Drinking Water MCL	EPA Tap Water RBC	Zone G RFI Reference Concentration ^a
Aluminum	22.6	J	2/12/98	NL	37,000	692
	45.6	J	7/27/99			
Antimony	9.4	J	2/12/98	6	15	4.85
	45.6	J	7/27/99			
Arsenic	16.6	=	2/12/98	50	0.045	17.8
	39.9	=	7/27/99			
	41	J	6/20/02			
	12	=	7/13/02			
	30	=	9/9/02			
Barium	1,440	=	2/12/98	2,000	2,600	31
	2,290	=	7/27/99			
	2,300	=	6/20/02			
	810	=	7/13/02			
	1,500	=	9/9/02			
Cadmium	0.5	J	2/12/98	5	NL	3.88
	3.4	J	6/20/02			
	1.1	J	7/13/02			
	1.9	J	9/9/02			
Calcium	251,000	=	2/12/98	NL	NL	NL
	225,000	=	7/27/99			
Chromium, Total	2.1	J	2/12/98	100	110*	0.53
	1.6	J	9/9/02			
Cobalt	0.9	J	2/12/98	NL	2,200	1.45
	3.4	J	7/27/99			
Iron	43,900	=	2/12/98	NL	11,000	30,400
Lead	1.3	J	2/12/98	15	NL	4.6

TABLE 4-6
 Inorganic Compounds Detected in Groundwater Samples from Monitoring Well G706GW001, Additional Investigation
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Concentration ($\mu\text{g/L}$)	Qualifier	Date Collected	EPA Primary Drinking Water MCL	EPA Tap Water RBC	Zone G RFI Reference Concentration ^a
Magnesium	466,000	=	2/12/98	NL	NL	NL
	287,000	=	7/27/99			
Manganese	1,370	=	2/12/98	NL	730	2,906
	1,000	=	7/27/99			
Mercury	0.1	J	2/12/98	2	NL	ND
Nickel	6	J	2/12/98	NL	730	4.08
	13.9	J	7/27/99			
Potassium	188,000	=	2/12/98	NL	NL	NL
Sodium	4,910,000	=	2/12/98	NL	NL	NL
	3,520,000	=	7/27/99			
Vanadium	1.2	J	2/12/98	NL	260	15.4
	2	J	7/27/99			
Zinc	51.8	=	2/12/98	NL	11,000	15.6

^a Shallow Groundwater Reference Concentrations From Zone G RFI Report, EnSafe, Inc, February 1998.

* Tap Water RBC for Chromium VI.

Concentrations shown in bold and outlined within the table indicate an exceedance of the appropriate screening criterion(a).

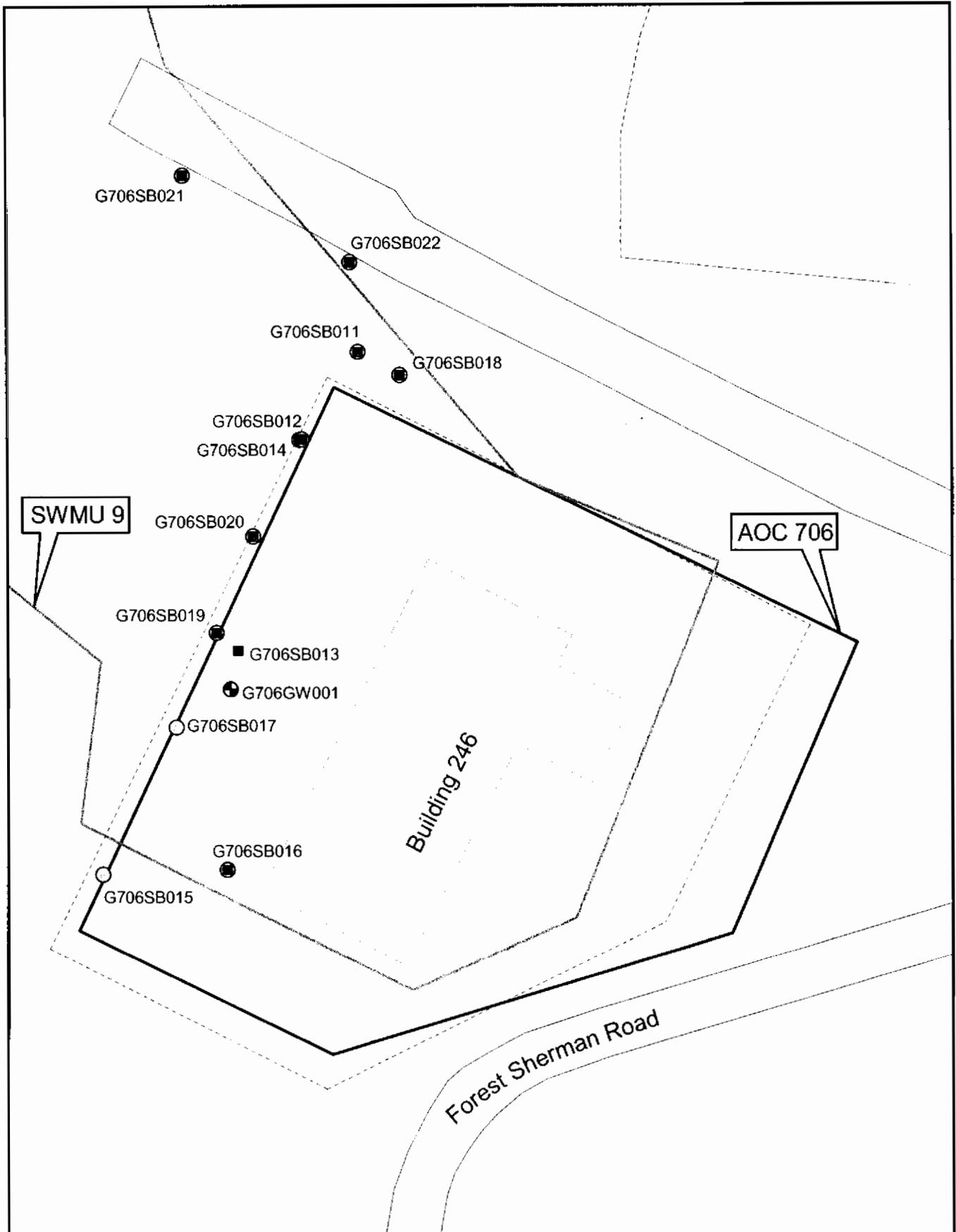
= Indicates that the analyte was detected at the concentration shown.

J Indicates that the concentration is an estimated value.

$\mu\text{g/L}$ Micrograms per liter

NL Not Listed

ND Not Detected



- Subsurface Soil Samples
- Surface Soil Samples
- Groundwater Well
- ⚡ Railroads
- ⚡ Fence
- ⚡ Roads
- ▭ AOC Boundary
- ▭ Buildings

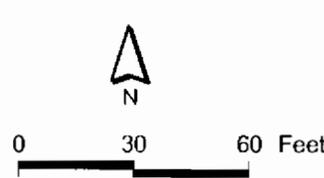


Figure 4-1
 Additional Sampling Locations
 AOC 706, Zone G
 Charleston Naval Complex

1 **5.0 COPC/COC Refinement**

2 This section discusses chemicals that were identified as COCs at AOC 706 in the *Zone G RFI*
3 *Report, Revision 0* (EnSafe, 1998a) and COPCs from additional investigation samples from
4 AOC 706, as summarized in Section 4.0 of this RFI Report Addendum.

5 In this section, the COPCs that were identified in Section 4.0 are further evaluated to
6 determine if any of these should be considered COCs. The original RFI data are also
7 combined with data collected during the additional sampling effort reported in Section 4.0.
8 An HHRA was conducted for these combined data to determine the potential risk drivers in
9 site surface soil, and whether any chemicals should be considered COCs. A 95-percent
10 Upper Confidence Limit (UCL₉₅) estimate was calculated for the inorganic COPCs to
11 provide an exposure point concentration (EPC). Summaries of the UCL₉₅ calculations for
12 these parameters are presented in Appendix F. For TEQs, the maximum detected surface
13 soil concentration was used as the EPC, since only two samples were available.

14 The background values used as a screening criterion for inorganic chemicals in Section 4.0
15 were derived from Zone G grid-based samples only. However, due to the small size of the
16 background data set for Zone G, as well as the close proximity of AOC 706 to the Zone H
17 boundary, a combined background data set for Zones G and H are used in selecting COPCs
18 for the risk assessment, as discussed below.

19 **5.1 Rescreening of Soil VOCs Using an SSL (DAF=1)**

20 The *Zone G RFI Report, Revision 0* evaluated VOC leachability to groundwater using an SSL
21 based on a DAF=20. The BCT has agreed to rescreen the soil VOC data using SSLs based on
22 a DAF=1.0. Three VOC compounds, benzene, carbon disulfide, and 1,2,3-trichloropropane,
23 were reported in RFI surface soils (see Table 5-1).

24 Five VOCs were reported as being detected in RFI subsurface soil samples, all at a "J"
25 flagged concentration of 2 µg/kg (see Table 5-1), which is below a typical reporting limit for
26 VOCs in soil. Trichloroethene (TCE) was reported in two samples; the other VOCs were
27 each detected in only one sample.

28 Of the VOCs detected, one detection of 1,2,3-trichloropropane at 6 µg/kg exceeds the
29 generic SSL of 0.002 µg/kg. This chemical was previously evaluated as a COPC in the RFI
30 but was not identified as a COC after the weight of evidence considerations during fate and

1 transport evaluations for the lack of potential for its migration to groundwater in the *Zone G*
2 *RFI Report, Revision 0*. Therefore, 1,2,3-trichloropropane is not evaluated further in this
3 section and is not identified as a COC for this site.

4 **5.2 Surface Soil COCs**

5 The *Zone G RFI Report, Revision 0* did not identify any COCs in surface soil at AOC 706.
6 Surface soil COCs identified as a result of the additional sampling include:

- 7 • **TEQs** – The surface soil exceedances for TEQs at boring locations G706SB014 (5.1
8 ng/kg) and G706SB018 (14.2 ng/kg) were the only samples analyzed for dioxin
9 compounds, and exceed the EPA Region III residential RBC of 4.3 ng/kg. The detected
10 TEQs in site samples were compared to background TEQ levels in combined data from
11 Zones G and H (0.41 to 14.11 ng/kg). As can be noted from this comparison,
12 background sample concentrations are only marginally exceeded by the maximum site
13 concentration. The detected TEQs are included as COCs for a risk assessment as
14 presented below. No 2,3,7,8-TCDD congener was detected in soil samples at the site.
15 Most of the detections were of the heavier chlorinated congeners (hexa-, hepta- and
16 octa-CDDs), which indicates a potential origin for the detected TEQs from air-borne
17 deposition.
- 18 • **Aluminum** – Aluminum exceeded its RBC (7,800 mg/kg at HI=0.1) and background
19 range (2,190 to 17,800 mg/kg) in three of the soil borings (G706SB011, G706SB015, and
20 G706SB018). Therefore, aluminum was selected as a COC and is included in the risk
21 assessment.
- 22 • **Antimony** - Antimony was reported to exceed its surface soil RBC (3.1 mg/kg) and
23 Zone G surface soil background range maximum (5.7 mg/kg) in the samples from
24 borings G706SB011 and G706SB020. Sample location G706SB011 is outside the AOC 706
25 fence along the road, approximately 40 feet north of RFI boring G706SB002, and is not
26 within the former waste management area. Antimony was selected as a COC and is
27 included in the risk assessment.
- 28 • **Arsenic** – Arsenic was detected as exceeding its RBC (0.43 mg/kg), its SSL (DAF=10) of
29 14.5 mg/kg, and the Zone G surface soil background range maximum (25 mg/kg) in
30 one sample from boring G706SB015 at a reported concentration of 47.6 mg/kg. Sample
31 location G706SB015 is away from the main operations at AOC 706 on the south end of
32 the investigation area. Other samples around this area did not have elevated arsenic.

1 Because of the one location with the elevated concentration, arsenic was selected as a
2 COPC and is included in the risk assessment.

3 • **Chromium** – Total chromium exceeded the surface soil RBC (HI=0.1) of 23 mg/kg and
4 the Zone G background range (7 to 39 mg/kg) in four samples; G706SB011 at
5 56.1 mg/kg, G706SB015 at 59.5 mg/kg, G706SB01B at 70.5 mg/kg, and G706SB020 at
6 41.5 mg/kg. Therefore, total chromium was selected as a COPC and is included in the
7 risk assessment.

8 • **Copper** – Copper exceeded the surface soil RBC (310 mg/kg) and the Zone G
9 background range (23 to 431 mg/kg) in boring G706SB011 at 548 mg/kg, and in boring
10 G706SB018 at 861 mg/kg. These values are well below the soil-to-groundwater
11 leachability SSL (DAF=10) of 5,500 mg/kg. Copper is included in the risk assessment.

12 • **Iron** – The iron concentrations in borings G706SB011 (33,000 mg/kg), G706SB015 (35,700
13 mg/kg), and G706SB018 (38,200 mg/kg) during the additional investigations slightly
14 exceeded the Zone G surface soil background range (4,300 to 32,700 mg/kg). Therefore,
15 iron is included in the risk assessment.

16 • **Lead** – Lead was detected at a maximum concentration of 1,300 mg/kg in one surface
17 soil sample, collected from boring G706SB012. Lead was not identified as a surface soil
18 COC during the RFI. In boring G706SB014, which is co-located with boring G706SB012,
19 lead was not detected above screening criteria in surface soil. In the subsurface soil
20 sample collected from the same location, lead concentrations do not exceed the
21 subsurface soil screening criteria. Lead was also not detected in surrounding borings
22 G706SB011, G706SB018, or G706SB020 (see Figure 4-1 for locations) or in site
23 groundwater. The site average lead concentration is 125 mg/kg (as presented in
24 Appendix F), which is below the screening value of 400 mg/kg used for unrestricted
25 land use as well as for leachability. Since the lead remaining at the site does not present
26 an exposure concern even under unrestricted land use, lead is not considered a COC for
27 surface soils at AOC 706.

28 • **Manganese** - The manganese concentrations in the surface soil sample from three
29 locations G706SB011, G706SB015, and G706SB018 exceed the RBC (160 mg/kg) and
30 Zone G background range (39 to 359 mg/kg), but is within the adjacent Zone H
31 background range of 5.3 to 1,200 mg/kg. Manganese is included as a COPC for the risk
32 assessment.

- 1 • **Thallium** – Thallium was detected in one surface soil (G706SB015 at 1.8J mg/kg) above
2 its RBC and background levels for Zone G. Therefore, thallium is included as a COPC
3 for the risk assessment.
- 4 • **Vanadium** – Vanadium was detected above its RBC and Zone G background levels at
5 three locations (G706SB011, G706SB015, and G706SB018). Therefore, vanadium is
6 included as a COPC in the risk assessment.

7 The majority of inorganic exceedances of RBCs were found in the three surface soil samples,
8 at borings G706SB011, G706SB015 and G706SB018. All three samples are outside of the
9 footprint of the area originally identified as AOC 706 (the driveway at Building 246). Two of
10 the borings are located in the right-of way outside the fenced parking lot, near the road on
11 the northern boundary. At surrounding borings, none of these metals exceed COPC
12 screening criteria, nor do the subsurface soil results at the same locations exceed criteria for
13 any of these metals, with the exception of thallium. It is possible that a corrosion halo from
14 a piece of discarded metal (such as chromium-plated tool steel) was encountered at this
15 location during surface soil sampling. There is likely little difference in soil types between
16 surface and subsurface soil due to filling activities that occurred in this area, which consists
17 of built-up land over a former marshy area. Thus, a potential source of detected inorganic
18 chemicals in soil is a piece of scrap metal, and such a source would not be expected to create
19 a dissolved groundwater plume.

20 A risk assessment for the surface soil COPCs identified above is presented in Section 5.5.

21 **5.3 Subsurface Soil COCs**

22 No COCs were identified for subsurface soil at AOC 706 in the *Zone G RFI Report, Revision 0*.
23 Results from subsequent additional sampling (as described in Section 4.0) indicated the
24 following COPCs in subsurface soil requiring further evaluation:

- 25 • **Antimony** – As indicated in Table 4-4, antimony was reported in subsurface soil
26 samples from five borings, with “J” flagged concentrations ranging from 3 to 23.3
27 mg/kg. Antimony was not detected in the seven Zone G subsurface background soil
28 samples. The subsurface soil background concentrations for Zone H ranged between 1.5
29 and 19 mg/kg, and the maximum subsurface soil antimony concentration from AOC
30 706 is closer to the maximum background level from Zone H. These concentrations
31 exceed the SSL (DAF=10) for antimony of 2.5 mg/kg in subsurface soils.

1 The site average antimony concentration of 13.4 mg/kg is also above the generic SSL
2 value (see Appendix F for site average calculation). The average antimony concentration
3 in Zone H subsurface soil grid samples is also 2.5 mg/kg; however, the average
4 antimony concentration in Zones A and B subsurface soil grid samples ranges from 6.5
5 to 7.7 mg/kg, indicating that antimony occurrences in background soil at the CNC may
6 be above the generic SSL.

7 Overall, antimony concentrations in site soil do not appear to be related to site
8 operations or due to releases of antimony to the soil from site operations, and they
9 appear to be similar to concentrations encountered in background samples in Zone H.
10 However, because of an elevated antimony value in groundwater detected during the
11 last two analyses for antimony in groundwater, a potential linkage between subsurface
12 antimony concentrations and groundwater may be present, which should be further
13 evaluated before concluding that antimony is not a COC. Therefore, antimony is
14 retained as a subsurface soil COC.

15 • **Chromium, total** – Two subsurface soil samples had chromium above the hexavalent
16 chromium-based SSL of 19 mg/kg (DAF=10) and Zone G background range of 7.4 to
17 65 mg/kg at boring locations G706SB014 (177 mg/kg) and G706SB016 (74 mg/kg). The
18 average subsurface soil concentration of chromium is 52 mg/kg (see appendix F), which
19 is above the generic SSL of 19 mg/kg. Surface soil samples from the same locations were
20 near the low-end range of background levels for total chromium. In addition, the
21 subsurface soil sample previously collected from approximately the same location as
22 G706SB016 (previous sample ID is 706SB009) had chromium at 29 mg/kg, which is
23 within background levels. Surface soil for boring G706SB018 was analyzed for
24 hexavalent chromium; no detectable hexavalent chromium was found. Site groundwater
25 also does not have chromium above screening criteria. The SPLP data from the site soils
26 did not have detectable levels of chromium (see appendix E). Overall, site
27 concentrations do not indicate that chromium in soil is related to site operations or to
28 releases from site operations. Therefore, chromium in surface soil is not retained as a
29 COC for AOC 706.

30 • **Manganese** – Two subsurface soil samples had manganese above the Zone G
31 background range of concentrations for subsurface soils; G706SB018 at 428 mg/kg and
32 G706SB019 at 446 mg/kg. However, site groundwater manganese levels were well
33 below the typical background manganese levels, indicating that area groundwater is not
34 impacted by soil manganese. Manganese concentrations in soil are within the Zones G

1 and H combined background subsurface soil range of 5.6 to 966 mg/kg. Thus,
2 manganese is not included as a COC for site subsurface soil.

- 3 • **Mercury** – Mercury was detected in two subsurface soil samples at concentrations above
4 the Zone G background range (0.05 to 0.37 mg/kg) and SSL (1 mg/kg) in two samples;
5 G706SB012 (1.8 mg/kg) and G706SB022 (1.2 mg/kg).

6 The average subsurface soil mercury concentration is 0.74 mg/kg, which is below the
7 SSL of 1 mg/kg (see Appendix F for calculation). Thus, the overall mercury
8 concentrations in soil do not represent a significant leaching hazard. Also, SPLP boring
9 G706SB014, which is co-located with soil boring G706SB012, reported a mercury
10 concentration of 0.3 mg/kg, which does not confirm the earlier measurement of 1.8
11 mg/kg at this location. None of the other four subsurface SPLP samples at various
12 locations on site exceed the mercury SSL. Based on this information, mercury is not
13 retained as a COC in subsurface soil at AOC 706.

- 14 • **Thallium** – Four of the subsurface soil samples had elevated thallium, with the highest
15 concentrations in two samples located (G706SB021 and G706SB022) on the northern
16 edge of the investigation area, away from the site and along the roadway. The site
17 subsurface soil concentration ranges of 0.34 U to 1.8 mg/kg within the AOC 706
18 boundary, are within the combined Zones G and H background range of 0.36 to 1.9
19 mg/kg. The latest four sets of groundwater samples did not have detectable thallium,
20 thus migration to groundwater is not indicated. Based on these considerations, thallium
21 is not retained as a COC for subsurface soil at AOC 706.

22 Based on the evaluations above, antimony is identified and retained as a subsurface soil
23 COC.

24 **5.4 Groundwater COCs**

25 Results of RFI and additional groundwater sampling indicated that antimony, barium, iron,
26 manganese, and thallium should be evaluated as COPCs in site groundwater.

- 27 • **Antimony** – Monitoring well G706MW001 data was analyzed for antimony during five
28 sampling events since 1996, with the last analysis conducted in 1999. Though the well
29 has since been monitored, the samples were not analyzed for antimony. Antimony was
30 detected in three of the five sampling events. It exceeded its MCL in two of those
31 sampling events, and the most recent sampling event (1999) had antimony detected at
32 45.6 µg/L (see Table 5-2). This concentration significantly exceeds the Zone G

1 background concentration range of 3 to 6 $\mu\text{g}/\text{L}$, the MCL of 6 $\mu\text{g}/\text{L}$, and RBC of 15 $\mu\text{g}/\text{L}$
2 (HI=1.0). It is possible that turbidity was elevated during the sampling events in which
3 elevated concentrations of antimony were detected, however, turbidity data for these
4 events could not be located. Therefore, antimony is retained as a groundwater COC
5 requiring further evaluation at this site.

- 6 • **Barium-** Barium was identified during the RFI as a groundwater COC based on one
7 detection at 539 $\mu\text{g}/\text{L}$, as compared to a tap water RBC of 2,600 $\mu\text{g}/\text{L}$. Barium was
8 detected in all sampling events, slightly exceeding the EPA Primary Drinking Water
9 Standard of 2,000 $\mu\text{g}/\text{L}$ during the December 1999 sampling event (2,290 $\mu\text{g}/\text{L}$) and the
10 June 202 event (2,300 $\mu\text{g}/\text{L}$). The maximum barium concentration reported in the Zone
11 G grid wells during the RFI (1997) was 731 $\mu\text{g}/\text{L}$.

12 The existing monitoring well, G706GW001, was resampled on July 13, 2002 by CH2M-
13 Jones as part of the assessment and delineation activities for SWMU 8 and SWMU 9,
14 which are adjacent to AOC 706. The barium concentration observed in this sample (810
15 $\mu\text{g}/\text{L}$) does not exceed its drinking water MCL of 2,000 $\mu\text{g}/\text{L}$. Therefore, sporadic
16 exceedances of the barium MCL are not believed to be indicative of a site-related
17 contaminant release, and barium is not retained as a groundwater COC at AOC 706.

- 18 • **Iron-** Iron was not identified as a groundwater COC in the *Zone G RFI Report, Revision 0*,
19 but was detected in monitoring well G706GW001 after the RFI at a concentration of
20 43,900 $\mu\text{g}/\text{L}$, above the Zone G grid well maximum value of 35,700 $\mu\text{g}/\text{L}$. However, the
21 iron concentrations from this well in preceding samples, and in one sample collected
22 after this elevated concentration, are within the range of iron concentrations occurring
23 in Zone G grid wells. It is likely that these changes in iron concentrations are due to
24 naturally occurring geochemical conditions at the site. The elevated iron value is not
25 indicative of a contaminant release at the site. For these reasons, iron is not considered a
26 COC in site groundwater.

- 27 • **Thallium** – Thallium was detected once in well G706GW001, during the RFI sampling
28 in 1997. The RFI concentration of 9 $\mu\text{g}/\text{L}$ exceeded the tap water RBC of 2.6 $\mu\text{g}/\text{L}$, and
29 its MCL of 2 $\mu\text{g}/\text{L}$, causing thallium to be listed as a COC. Subsequent sampling events
30 have not detected thallium in groundwater at AOC 706. Thallium has been consistently
31 detected in adjacent SWMU 8 and SWMU 6/7 wells and in many Zone G Fuel
32 Distribution System (FDS) wells at similar concentrations, and is believed to be
33 naturally occurring in the fine-grained soils of Zone G. Site operational history does not
34 indicate that thallium-containing wastes were handled, spilled, or disposed of at this

1 location. This single detection of thallium is not believed to be indicative of a site-related
2 contaminant release. Based on this information, thallium is not retained as a COC in
3 AOC 706 groundwater.

4 **5.5 Human Health Risk Assessment**

5 The surface soil at AOC 706 had several inorganic chemicals and one organic chemical
6 (TEQ) above screening criteria. To assess whether these chemicals pose an unacceptable
7 human health risk from direct exposure, a focused human health risk assessment was
8 conducted for the surface soil at AOC 706 using the available data. The risk assessment was
9 conducted in accordance with RAGS and EPA Region IV supplemental guidance (EPA,
10 1989 and EPA, 1994).

11 **5.5.1 Selection of COPCs**

12 All of the surface soil sample data from the 1996 sampling and the addendum sampling, as
13 reported in Section 4.0, were combined to select a list of COPCs. The sample results for
14 surface soil from AOC 706 were screened for COPCs in this evaluation to provide a health-
15 based risk evaluation of all soils at this group of sites. The maximum detected
16 concentrations in surface soil samples for each chemical were screened against the EPA
17 Region III RBC values and the combined Zones G and H range of background values. If a
18 chemical exceeded the established background value and the RBC value (carcinogens at
19 $ELCR=1E-6$ and noncarcinogens at $HI=0.1$), it was selected as a COPC.

20 The results of this COPC screening step are presented in Table 5-3. Of the 13 chemicals
21 initially included from Section 2.0 and this section, nine qualified as the COPCs for this risk
22 assessment.

23 The list of COPCs carried forward in this human health risk assessment are:

- 24 • Aluminum
- 25 • Antimony
- 26 • Arsenic
- 27 • Cadmium
- 28 • Copper
- 29 • Lead
- 30 • Thallium
- 31 • Vanadium
- 32 • TEQs

1 **5.5.2 Toxicity Assessment**

2 Toxicity factors were obtained from the Integrated Risk Information System (IRIS) website
3 or Health Effects Assessment Summary Tables (HEAST, 1997) as appropriate. Toxicity
4 factors are provided in Table 5-4. The toxicity factors for hexavalent chromium were used
5 for total chromium as conservative surrogate values in risk estimations. The dioxins and
6 dibenzofurans were evaluated as TEQs in accordance with EPA Region IV policy. There are
7 no toxicity factors available for lead, therefore lead is addressed separately.

8 **5.5.3 Exposure Assessment**

9 The site soils are evaluated for future unrestricted (i.e., residential) land use and future
10 industrial land use under conservative exposures using default exposure assumptions
11 provided by EPA guidance. Exposure pathways were assumed to be complete for a
12 hypothetical industrial worker and hypothetical future residential adult and child. Routes
13 of exposure include ingestion, dermal, and inhalation. Exposure factors are the default
14 values from EPA guidance, and are provided in the risk calculation sheets in Appendix G.

15 Surface soil results were used to estimate EPCs for receptors at this site. EPCs are the UCL_{95}
16 on the mean. Each UCL_{95} was estimated using statistical guidance adapted by EPA, which
17 is based on the sample population distribution. Results of sample distribution testing and
18 the estimated EPCs for COPCs used in the risk estimations are included in Table 5-5.

19 **5.5.4 Risk Characterization**

20 Table 5-6 includes a summary of the Excess Lifetime Cancer Risk (ELCR) and the HI per
21 exposure route and receptor. The details of the per chemical ELCR and hazard quotients
22 (HQs) and HI are presented in Appendix G.

23 The ELCR for a hypothetical industrial worker is estimated to be $5.9E-06$. This is within the
24 acceptable risk range of 1 to 100 in a million for carcinogenic effects. The HI for a worker is
25 0.066, which is well below the target HI of 1.0 for noncarcinogenic effects.

26 The total ELCR for a future hypothetical residential adult is estimated at $4.35E-05$, which is
27 within the acceptable risk range. The total HI for a residential adult is 0.15, which is below
28 the acceptable HI of 1.0 for noncarcinogenic effects. The HI for a future hypothetical
29 residential child is 1.39, which is slightly above the value of 1.0. However, no individual
30 chemical exceeded a value of 1.0, and the target organ analysis indicated that cumulative
31 effects to any one target organ are not above a value of 1.0. Risk summaries can be found in
32 Table 5-6.

1 Approximately 92 percent of the risk is from arsenic at a sitewide UCL₉₅ level of 16.8
2 mg/kg, which is well below background level. Approximately 8 percent of the risk is from
3 TEQs at the maximum detected concentration level.

4 No single chemical exceeded an HQ of 1.0 for any target organ for any receptor in surface
5 media at this site. The majority of the HI for a residential child was from arsenic at an EPC
6 of 16.8 mg/kg. The maximum detected arsenic concentration (47.6 mg/kg) in sample
7 G706SB015 is located on the southern end of the investigation are away from site
8 operations, and is likely from activities associated with site maintenance along the fenced
9 areas. The observed arsenic levels are similar to those detected elsewhere across CNC.

10 **Lead**

11 Maximum detected concentrations of lead exceeded the residential action level of 400
12 mg/kg, however average site concentrations (125 mg/kg) were well below this action level.
13 Therefore, lead levels at these sites is not human exposure concern even under unrestricted
14 (i.e., residential) land use conditions. Therefore, lead is not a COC for soil at AOC 706.

15 **5.5.5 Risk Characterization Summary**

16 None of the surface soil COPCs are identified as COCs, due to the absence of unacceptable
17 risk to human health from the surface soil COPCs. Only arsenic was identified as resulting
18 in most of the calculated risk and HI, however these levels are still within acceptable risk
19 criteria. Thus, no COCs are identified for surface soil at AOC 706.

20 **5.6 COC Summary**

21 Based on the evaluation of data collected during the RFI, as well as the evaluation of
22 additional data collected, no surface soil COCs were identified at AOC 706. Thus, no human
23 health or environmental impacts are noted from past operations at AOC 706. Antimony is
24 identified as a subsurface soil COC.

25 Antimony in groundwater was retained as a COC. A CMS will be prepared to assess
26 applicable corrective measures for addressing antimony in subsurface soil and
27 groundwater. A focused CMS Work Plan for antimony in subsurface soil and groundwater
28 at AOC 706 is presented in Section 8.0 of this RFI Report Addendum.

TABLE 5-1
 VOCs Detected in Surface and Subsurface Soils During Zone G RFI
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration ($\mu\text{g}/\text{kg}$)		Qualifier	SSL (DAF=1) ^a
		Surface Soil	Subsurface Soil		
Benzene	706SB005	1	2	J, J	2
Carbon Disulfide	706SB002	ND	2	J	2,000
	706SB005	2	NT	J	
Chlorobenzene	706SB009	ND	2	J	70
Toluene	706SB009	ND	2	J	600
Trichloroethene	706SB007	ND	2	J	3
	706BS009	ND	2	J	
1,2,3-Trichloropropane	706SB002	6	NA	=	0.002

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

^a Soil screening level (SSL) taken from EPA *Soil Screening Guidance, Technical Background Document*, (Table A-1), EPA540/R95/128, May 1996 or the risk-based concentration (RBC) taken from the U.S. Environmental Protection Agency (EPA) Region III RBC Table, October 2002.

J Indicates that the reported concentration is an estimated value.

ND Not Detected

NT Not Taken

TABLE 5-2
 Groundwater COC Analytical Results, All Sampling Events
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	EPA Primary Drinking Water MCL	EPA Tap Water RBC (HI=1.0)	Zone G Range of Background Concentrations
Antimony	G706GW001	3.8	J	04/30/97	6	15	3 - 6
		8.9	U	09/15/97			
		6.5	U	12/12/97			
		9.4	J	02/12/98			
		45.6	J	07/27/99			
Barium	G706GW001	539	=	04/30/97	2,000	2,600	14 - 937
		422	J	09/15/97			
		299	J	12/12/97			
		1,440	=	02/12/98			
		2,290	=	07/27/99			
		2,300	=	06/20/02			
		810	=	07/13/02			
		1,500	=	09/09/02			
Iron	G706GW001	23,300	=	04/30/97	NL	11,000	2,000 - 35,700
		24,200	J	09/15/97			
		20,900	J	12/12/97			
		43,900	=	02/12/98			
		187	U	07/27/99			
Thallium	G706GW001	9	J	04/30/97	2	2.6	NA
		5	U	09/15/97			
		5	U	12/12/97			
		5	U	02/12/98			
		2.3	U	07/27/99			

Concentrations shown in bold and outlined within the table exceed the MCL and the maximum Zone G background value, or RBC and background value if no MCL is available.

= Indicates that the analyte was detected at the concentration shown.

BRC Background reference concentration

J Indicates that the concentration is an estimated value.

MCL Maximum contaminant level

µg/L Micrograms per liter

ND Not detected

NL Not listed

U Indicates that analyte was analyzed for but not detected above the method detection limit.

TABLE 5-3
 COPC Selection for Surface Soil at AOC 706
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Chemical	No. of Samples	No. of Detects	Minimum Detect	Maximum Detect	Average Detect	Mean	Zones G & H Comb. Background Range of Concentrations	EPA Region III RBC	Considered a COPC? (Y/N) ^a
Aluminum	22	22	4,030	34,500	10,501.8	10,501.8	1,090 - 32,700	7,800	Y
Antimony	22	12	0.42	11.6	3.89	2.25	0.79 - 5.7	3.1	Y
Arsenic	22	22	0.49	47.6	6.93	6.93	0.64 - 25	0.43	Y
Cadmium	22	13	0.07	9.3	1.12	0.69	0.12 - 1.7	7.8	Y
Chromium, total	22	22	3.8	70.5	20.2	20.2	3.4 - 114	23	N
Copper	22	22	3.4	861	108.6	108.59	0.94 - 431	310	Y
Iron	22	22	669	38,200	9,739.3	9,739.3	695 - 38,800	23,00	N
Lead	22	22	4.7	1,300	122.8	122.8	1.8 - 275	400	Y
Manganese	22	22	7.7	575	135.9	135.9	5.3 - 1,200	160	N
Mercury	22	12	0.05	1.4	0.40	0.23	0.02 - 3.8	2.3	N
Thallium	22	4	0.52	1.8	1.18	0.38	0.12 - 1.1	0.55	Y
Vanadium	22	22	4	87.2	23.4	23.36	4.1 - 75	55	Y
TEQs	2	2	5.1	14.2	9.65	9.65	0.46 - 14.11	4.3	Y/N

^a When the maximum detected concentration is higher than RBC and background values, that chemical is identified as a COPC (Y=Yes, N=No).

Units used for all values are mg/kg, with the exception of TEQs (ng/kg used).

COPC Chemical of potential concern

mg/kg Milligrams per kilogram

ng/kg Nanograms per kilogram

RBC Risk-based concentration

TABLE 5-4
 Toxicity Factors for the COPCs Identified in Surface Soil at AOC 706
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Chemical	Oral SF (kg-day/mg)	Inhalation SF (kg-day/mg)	C Oral RfD (mg/kg-day)	C Inhalation RfD (mg/kg-day)
Aluminum	NA	NA	1.00E+00	1.00E-03
Antimony	NA	NA	4.00E-04	NA
Arsenic	1.50E+00	1.51E+01	3.00E-04	NA
Cadmium	NA	NA	5.00E-04	NA
Copper	NA	NA	3.70E-02	NA
Lead	NA	NA	NA	NA
Thallium	NA	NA	6.60E-05	NA
Vanadium	NA	NA	7.00E-03	NA
TEQs	1.50E+05	1.50E+05	NA	NA

C Carcinogenic
 kg Kilograms
 mg Milligrams
 NA Not applicable/not available
 RfD Reference dose
 SF Slope factor

TABLE 5-5
 Exposure Point Concentrations for Surface Soil COPCs at AOC 706
 RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Chemical	No. of Samples	No. of Detects	FOD	Minimum Detected Value (mg/kg)	Maximum Detected Value (mg/kg)	Average Detect	Mean	UCL ₉₅ Norm	UCL ₉₅ Log	UCL ₉₅ Nonparm	UCL ₉₅ Bootstrap	EPC (mg/kg)	Basis
Aluminum	21	21	100%	4,030	34,500	10,511.4	10,511.4	13,775.0	13,901.2	4,960.0	13,579.8	13,579.8	Nonparametric
Antimony	21	11	52%	0.42	11.6	3.64	2.05	3.3	4.9	0.2	3.3	3.3	Nonparametric
Arsenic	21	21	100%	0.49	47.6	7.03	7.03	11.2	16.8	1.1	10.8	16.8	Lognormal
Cadmium	21	12	57%	0.07	9.3	1.15	0.69	1.5	1.7	0.0	1.4	1.7	Lognormal
Copper	21	21	100%	3.4	861	106.0	106.05	186.8	326.9	7.5	183.5	326.9	Lognormal
Lead	21	21	100%	4.7	1,300	124.9	124.9	231.3	387.0	8.4	216.9	124.9	Lognormal
Thallium	21	4	19%	0.52	1.8	1.18	0.38	0.6	0.5	0.2	0.5	0.5	Nonparametric
Vanadium	21	21	100%	4	87.2	23.5	23.53	33.2	37.6	8.3	33.4	37.6	Lognormal
TEQs	2	2	100%	5.1E-06	1.4E-05	9.7E-06	9.7E-06	NA	NA	NA	NA	1.4E-05	Max Detect

All values presented in units of milligrams per kilogram (mg/kg).

- EPC Exposure point concentration
- FOD Frequency of detection
- UCL₉₅ 95-percent Upper Confidence Limit

TABLE 5-6
 Risk Assessment Summary
RFI Report Addendum and CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Receptor	Exposure Route	ELCR	HI	Primary COPC Risk Driver
Industrial Worker	Ingestion	4.8E-06	0.050719	
	Dermal	1.1E-06	0.013482	
	Inhalation	1.2E-08	0.0021	
	Total	5.9E-06	0.066	
Residential Adult	Ingestion	4.3E-05	0.14	Arsenic
	Dermal	7.3E-07	3.0E-03	
	Inhalation	5.7E-09	4.7E-04	
	Total	4.35E-05	0.15	
Residential Child	Ingestion		1.3	Arsenic
	Dermal		0.062	
	Inhalation		0.0016	
	Total		1.39	

HI Hazard Index
 ELCR Excess Lifetime Cancer Risk

1 **6.0 Summary of Information Related to Site** 2 **Closeout Issues**

3 **6.1 RFI Status**

4 The *Zone G RFI Report, Revision 0* (EnSafe, 1998a) addressed SWMUs/ AOCs within the
5 CNC, including AOC 706. The *Zone G RFI Report Work Plan Addendum* (EnSafe, 2000)
6 recommended collecting additional samples for delineation of inorganics, which was
7 subsequently completed. In 2002, CH2M-Jones resampled the existing monitoring well at
8 the site to confirm previous results. No other sampling is proposed or considered necessary
9 at AOC 706, and the RFI is considered to be complete.

10 **6.2 Presence of Inorganics in Groundwater**

11 For the purpose of site closeout documentation, the inorganics in groundwater issue refers
12 to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and
13 antimony) in groundwater at concentrations above the applicable MCL, preceded or
14 followed by detections of these same metals below the MCL or below the practicable
15 quantitation limit.

16 Analytical results from monitoring well G706GW001 indicate that arsenic and thallium are
17 not site-related COCs in groundwater at AOC 706. Antimony has been identified as a
18 groundwater COC at this site.

19 **6.3 Potential Linkage to SWMU 37, Investigated Sanitary** 20 **Sewers at the CNC**

21 The sanitary sewer investigation was designed to include segments of the sewer where
22 releases of contamination were known or considered likely to have occurred. No
23 investigations related to SWMU 37 were conducted at AOC 706. No known or suspected
24 linkage between SWMU 37 and AOC 706 exists. Therefore, further evaluation of this issue is
25 not warranted.

6.4 Potential Linkage to AOC 699, Investigated Storm Sewers at the CNC

Investigated segments of the storm sewer were identified in the *Zone L RFI Report, Revision 0* (EnSafe, 1998b). No investigated segments of the storm sewer were identified in Zone G. The nearest investigated segment of the storm sewer is approximately 1,600 feet to the northeast in Zone E.

There are no data or information to suggest that AOC 706 has impacted the storm sewer system that is 1,600 feet away. Therefore, further investigation of a linkage between the storm sewer system and AOC 706 is not warranted.

6.5 Potential Linkage to AOC 504, Investigated Railroad Lines at the CNC

Investigated railroad lines were identified in the *Zone L RFI Report, Revision 0*. The nearest investigated railroad line to AOC 706 is over 1,500 feet to the northeast, in Zone E. There is no known linkage between AOC 706 and the investigated railroad lines of Zone E. Therefore, further evaluation of this issue is not warranted.

6.6 Potential Migration Pathways to Surface Water Bodies at the CNC

Two potential migration pathways from the site to surface water are overland flow via stormwater runoff, and subsurface flow via groundwater. There were no COCs identified in surface soil at AOC 706; therefore, further evaluation of a potential pathway for contaminant migration via stormwater runoff is not warranted.

There is no indication that migration of groundwater contaminants to surface water is occurring.

6.7 Potential Contamination in Oil/Water Separators (OWSs)

The issue of potential contamination of OWSs refers to the possible presence of an OWS that has not yet been investigated at a SWMU or AOC as part of the RCRA or UST process.

No OWSs are present at AOC 706. Therefore, additional evaluation of this issue at AOC 706 is not warranted.

1 **6.8 Land Use Controls (LUCs)**

- 2 The need for LUCs will be assessed as part of the CMS process for AOC 706. Potential LUCs
- 3 could include site use restrictions (for non-residential purposes only), and restrictions on
- 4 the use of site groundwater for potable purposes.

1 **7.0 Recommendations**

2 AOC 706 is located adjacent to Building 246, the former Hazardous Waste Container
3 Storage and Transfer Facility known as Solid Waste Management Unit (SWMU) 10, near the
4 intersection of Forest Sherman Road and Dyess Avenue in Zone G of CNC. Building 246
5 and the surrounding asphalt-paved parking lot were constructed in 1986 for the specific
6 purpose of safely storing and transferring containers of hazardous waste.

7 From 1987 until the closure of the CNC, Building 246 was used as a less-than-90-day
8 temporary storage facility with separate storage bays for the following types of wastes:
9 flammable liquids, acids, alkalies, chlorinated hydrocarbons, oxidizers, reactives, PCBs, and
10 general wastes. The external loading ramp was equipped with a spill containment/storm
11 drainage system with an elevated curb. There are no records or reports of spills or other
12 releases of hazardous materials or hazardous wastes during operations of this unit.

13 The *Final RCRA Facility Assessment (RFA), Volume II* (EnSafe/Allen & Hoshall, 1995)
14 describes AOC 706 as consisting of the asphalt driveway to the north and west of Building
15 246. The RFA states that no containment structures are associated with the driveway and no
16 materials are known to have been stored outside the building on the paved area. It is not
17 clear how the boundaries of AOC 706 were expanded from only the asphalt driveway, as
18 shown in the RFA, to include the entire perimeter area outside Building 246, as shown in
19 the *Zone G RFI Report, Revision 0* (EnSafe, 1998a).

20 Based on the results of the RFI and subsequent investigations and evaluations, antimony is
21 identified as a COC in subsurface soil and groundwater at AOC 706. Potential corrective
22 measures to address these COCs will be evaluated as part of the CMS portion of the RCRA
23 CA process. A CMS Work Plan is included in Section 8.0 of this RFI Report Addendum.

1 **8.0 CMS Work Plan for AOC 706**

2 At AOC 706, antimony was identified as a subsurface soil and groundwater COC. Currently
3 there is no unacceptable exposure or risk at the site. However, it is feasible that in the
4 future, should land use and/or site conditions change, some exposure could occur.
5 Therefore, a CMS should be conducted to evaluate potential corrective measures and
6 identify an appropriate remedy for the site.

7 This section presents a focused CMS work plan. MCSs are identified for COCs and potential
8 remedies that should be evaluated are also presented.

9 **8.1 Remedial Action Objectives**

10 Remedial action objectives (RAOs) are medium-specific goals that the remedial actions are
11 designed to accomplish in order to protect human health and the environment by
12 preventing or reducing exposures under current and future land use conditions. The RAOs
13 identified for soil and groundwater at AOC 706 are 1) to prevent ingestion and
14 direct/dermal contact with soil or groundwater having unacceptable carcinogenic or non-
15 carcinogenic risk, and 2) to restore the site soils and the aquifer to beneficial use.

16 **8.2 Remedial Goal Options and Media Cleanup Standards**

17 Throughout the process of remediating a hazardous waste site, a risk manager uses a
18 progression of increasingly acceptable site-specific media levels in considering remedial
19 alternatives. Under the RCRA program, remedial goal options (RGOs) and MCSs are
20 developed at the end of the risk assessment in the RFI/Remedial Investigation (RI)
21 programs, before completion of the CMS.

22 RGOs can be based on a variety of criteria, such as specific ILCR levels (e.g., 1E-04, 1E-05, or
23 1E-06), HI levels (e.g., 0.1, 1.0, 3.0), or site background concentrations. For a particular RGO,
24 specific MCSs can be determined as target concentration values. Achieving these MCSs is
25 accepted as demonstrating that RGOs and RAOs have been achieved. Achieving these goals
26 should promote the protection of human health and the environment, while achieving
27 compliance with applicable state and federal standards.

28 The exposure media of concern for this site is subsurface soil and shallow groundwater
29 containing antimony. Because this site is located within a developed area of the CNC and

1 there are no surface water bodies in the immediate vicinity of the site, ecological exposures
2 were not considered applicable for evaluation.

3 The site average antimony concentration of 13.4 mg/kg is above the generic SSL of 2.5
4 mg/kg and also the average antimony concentration in Zone H subsurface soil grid
5 samples (2.5 mg/kg). Subsurface soil antimony concentrations that were significantly
6 greater than the SSL occurred at borings G706SB001, G706SB004, G706SB006, and
7 G706SB016T. All of these are located in the general vicinity of well G706GW001, suggesting
8 a potential linkage between soil concentrations and groundwater.

9 The proposed RGO for antimony in subsurface soil is to achieve subsurface soil
10 concentrations that do not pose an unacceptable antimony leaching hazard. A proposed
11 MCS for antimony in subsurface soil is a site-specific SSL, which can be determined as part
12 of the CMS process.

13 For groundwater, the proposed MCS/RGO for antimony in groundwater is the MCL of 6
14 $\mu\text{g/L}$.

15 **8.3 Potential Remedies to Evaluate**

16 The presumptive remedies that will be evaluated as part of the CMS for soil at AOC 706
17 include:

- 18 • Soil excavation and disposal
- 19 • Land use controls (LUCs)

20 The presumptive remedy that will be evaluated as part of the CMS for groundwater at
21 AOC 706 is the following:

- 22 • Natural attenuation with LUCs

23 **8.4 Focused CMS Approach**

24 The focused CMS will consist of the following tasks that will be performed in the order
25 presented below:

- 26 1. The corrective measure alternatives described above will be screened using several
27 criteria and decision factors.
- 28 2. A preferred corrective measure alternative will be selected.
- 29 3. The CMS and preferred corrective measure alternative will be documented in the CMS
30 report.

1 **8.5 Approach to Evaluating Corrective Measure Alternatives**

2 According to the RCRA permit issued by SCDHEC (SCDHEC, 1998), the alternatives will be
3 evaluated with the following five criteria:

- 4 1. Protecting human health and the environment.
- 5 2. Attaining media cleanup standards (RGOs).
- 6 3. Controlling the source of releases to minimize future releases that may pose a threat to
7 human health and the environment.
- 8 4. Complying with applicable standards for the management of wastes generated by
9 remedial activities.
- 10 5. Other factors include (a) long-term reliability and effectiveness; (b) reduction in toxicity,
11 mobility, or volume of wastes; (c) short-term effectiveness; (d) implementability; and
12 (e) cost.

13 Each of the five standards is defined in more detail below:

- 14 1. **Protecting human health and the environment.** The alternatives will be evaluated on
15 the basis of their ability to protect human health and the environment. The ability of an
16 alternative to achieve this criteria may or may not be independent of its ability to
17 achieve the other four criteria. For example, an alternative may be protective of human
18 health, but may not be able to attain the MCSs if the MCSs are not directly tied to
19 protecting human health.
- 20 2. **Attaining media cleanup standards (RGOs).** The alternatives will be evaluated on the
21 basis of their ability to achieve the RGOs defined in this CMS Work Plan. Another
22 aspect of this criteria is the timeframe to achieve the RGOs. Estimates of the timeframe
23 for the alternatives to achieve RGOs will be provided.
- 24 3. **Controlling the source of releases.** This criteria deals with the control of releases of
25 contamination from the source (the area in which the contamination originated).
- 26 4. **Complying with applicable standards for management of wastes.** This criteria deals
27 with the management of wastes derived from implementing the alternatives, for
28 example, treatment or disposal of excavated material. The soil removal alternative will
29 be designed to comply with all applicable standards for management of remediation
30 wastes. Consequently, this criteria will not be explicitly included in the detailed
31 evaluation presented in the CMS but will be part of a work plan specific to the removal
32 action should a removal action become the chosen alternative.

1 5. **Other factors.** Five other factors are to be considered if an alternative is found to meet
2 the four criteria described above. These other factors are as follows:

3 a. **Long-term reliability and effectiveness**

4 The two alternatives will be evaluated on the basis of their reliability, and the
5 potential impact should the chosen alternative fail. In other words, a qualitative
6 assessment will be made as to the chance of the alternative's failure and the
7 consequences of that failure.

8 b. **Reduction in the toxicity, mobility, or volume of wastes**

9 Alternatives with technologies that reduce the toxicity, mobility, or volume of the
10 contamination will be generally favored over those that do not. Consequently, a
11 qualitative assessment of this factor will be performed for each alternative.

12 c. **Short-term effectiveness**

13 Alternatives will be evaluated on the basis of the risk they create during the
14 implementation of the remedy. Factors that may be considered include fire,
15 explosion, and exposure of workers to hazardous substances.

16 d. **Implementability**

17 The alternatives will be evaluated for their implementability by considering any
18 difficulties associated with conducting the alternatives (such as the construction
19 disturbances they may create), operation of the alternatives, and the availability of
20 equipment and resources to implement the technologies comprising the alternatives.

21 e. **Cost**

22 A net present value of each alternative will be developed. These cost estimates will
23 be used for the relative evaluation of the alternatives, not to bid or budget the work.
24 The estimates will be based on information available at the time of the CMS and on a
25 conceptual design of the alternative. They will be "order-of-magnitude" estimates
26 with a generally expected accuracy of -50 percent to +50 percent for the scope of
27 action described for each alternative. The estimates will be categorized into capital
28 costs and operations and maintenance costs for each alternative.

29 In addition to the criteria described above, the alternatives will be evaluated for their ability
30 to achieve all contractual obligations of CH2M-Jones and the Navy.

1 **8.6 Focused CMS Report**

- 2 A focused CMS Report will be prepared to present the identification, development, and
3 evaluation of potential corrective measures for this site. A proposed outline of the report, as
4 shown in Table 8-1, provides an example of the report format and content.

TABLE B-1
 Outline of Focused CMS Report for AOC 706
RFI Report Addendum & CMS Work Plan, AOC 706, Zone G, Charleston Naval Complex

Section No.	Section Title
1.0	Introduction
1.1	Corrective Measures Study Purpose and Scope
1.2	Report Organization
1.3	Background Information
1.3.1	Facility Description
1.3.2	Site History and Background
1.3.2.1	Nature and Extent of Contamination
1.3.2.2	Summary of Risk Assessment
2.0	Remedial Goal Objectives
3.0	Detailed Analysis of Focused Alternatives
3.1	Approach
3.2	Evaluation Criteria
3.3	Description of Alternatives
3.3.1	Soil Alternative 1: Soil excavation and disposal
3.3.2	Soil Alternative 2: Land Use Controls (LUCs)
3.3.3	Groundwater Alternative 1: Natural attenuation with LUCs
3.4	Detailed Analysis of Alternatives
3.4.1	Analysis of Soil Alternative 1
3.4.2	Analysis of Soil Alternative 2
3.4.3	Analysis of Groundwater Alternative 1
3.5	Comparative Analysis of Soil and Groundwater Alternatives
4.0	Recommended Remedial Alternative
5.0	References
Appendix A	Corrective Measure Alternative Cost Estimates^b
	List of Tables
	List of Figures

^a Additional alternatives will be analyzed as found necessary.

^b Additional appendices will be added, if necessary.

1 **9.0 References**

- 2 EnSafe/Allen & Hoshall. *Final RCRA Facility Assessment Naval Base Charleston Volume II.*
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- 4 EnSafe Inc. *Zone G RCRA Facility Investigation Report.* Revision 0. February 20, 1998a.
- 5 EnSafe Inc. *Zone L RCRA Facility Investigation Report.* Revision 0. December 18, 1998b.
- 6 EnSafe Inc. *Zone G RCRA Facility Investigation Report Work Plan Addendum.* January 17, 2000.
- 7 U.S. Environmental Protection Agency. *Risk Assessment Guidance for Superfund : Volume*
8 *I - Human Health Evaluation Manual (Part A), (RAGS), Interim Final.* EPA/540/1-89/002.
9 December 1989.
- 10 U.S. Environmental Protection Agency. *Supplemental EPA Region IV Guidance.* 1994.
- 11 U.S. Environmental Protection Agency. *Soil Screening Guidance: Technical Background*
12 *Document.* Table A-1. EPA/540/R-95/128. May 1996.
- 13 U.S. Environmental Protection Agency. *Health Effects Assessment Summary Tables*
14 *(HEAST).* EPA-540-R-97-036. 1997.
- 15 U.S. Environmental Protection Agency. *EPA Region III RBC Table.* October 2000.
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17 <http://www.epa.gov/iris/>. 2001.

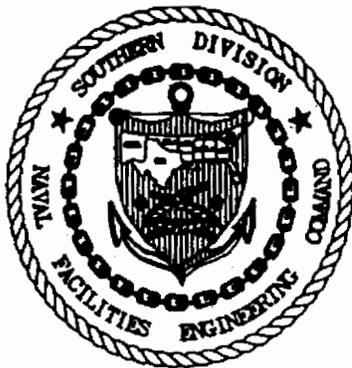


**FINAL RCRA FACILITY ASSESSMENT
NAVAL BASE CHARLESTON
VOLUME V, ADDENDUM II**

**SOUTHDIR Contract Number:
N62467-89-D-0318
CTO-029**

Prepared for:

**Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina**



Prepared by:

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June 17, 1996

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A. RCRA FACILITY ASSESSMENT ADDENDUM

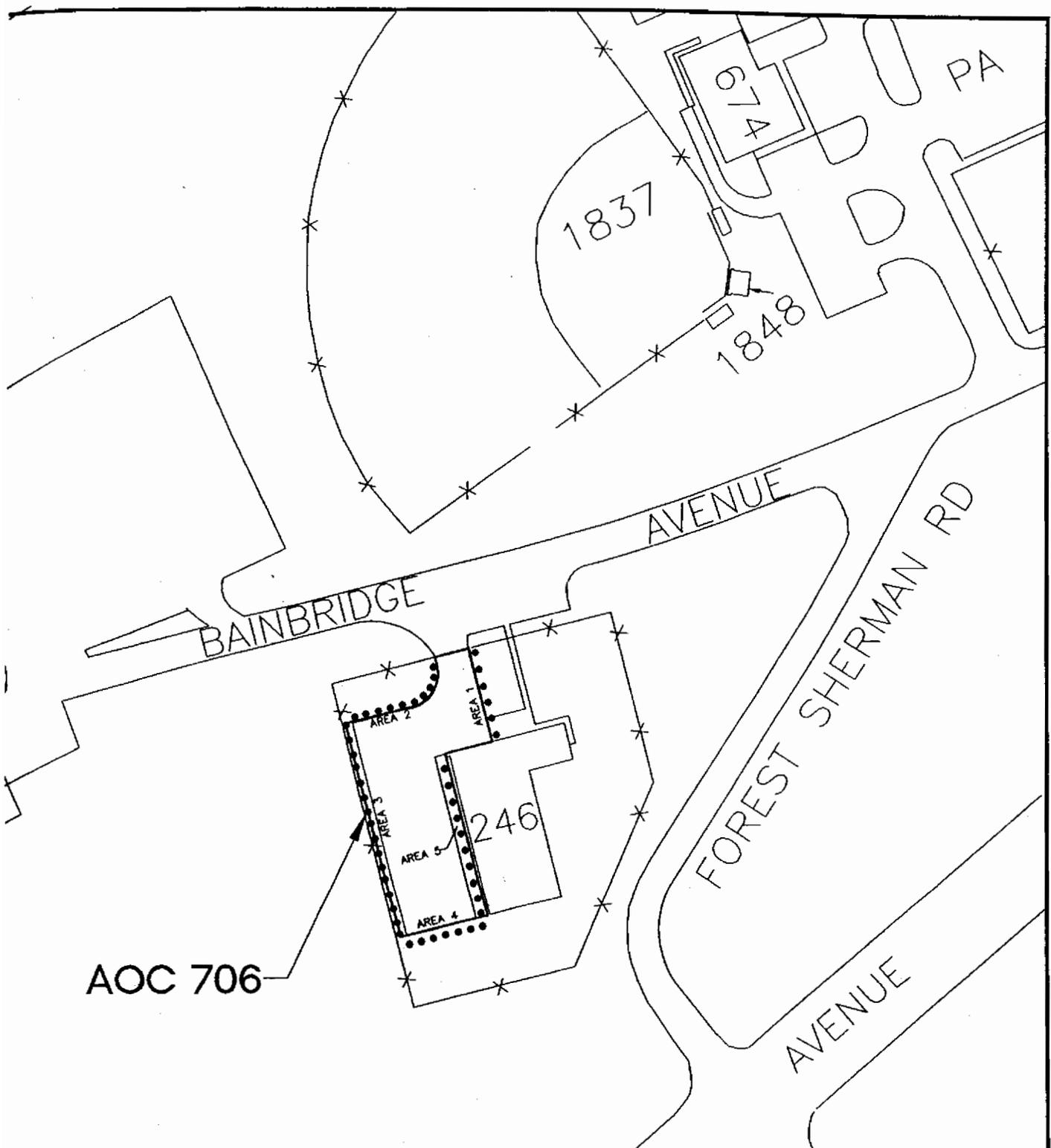
A.1 AOC #706 — Area Behind Building 246

A.1.1 Unit Characteristics

AOC #706 consists of the asphalt driveway to the north and west of Building 246, the former Hazardous Waste Storage and Transit Facility. A review of records including historical aerial photographs indicate Building 246 and the associated paved area were constructed in 1986. Prior to that the parcel appears to have been an open lot surrounded by trees to the north, west and south, with access from Bainbridge Avenue. No containment structures are associated with the driveway and no materials are known to have been stored outside of the building on the paved area. There are no stormwater drains located on the paved area, or on the ground around Building 246. Rainwater that falls on the roof of Building 246 flows into gutters, then into an underground collection system. Surface water runoff on the northwest side of the building accumulates along the western edge of the asphalt drive prior to draining into a nearby wetland area. Other areas surrounding Building 246 are covered by soil and grass. AOC #706 is shown in Figure 1.

A.1.2 Waste Characteristics

Soil sample data presented in the *Closure Activities Report and Certification for Building 246*, (*Rust Environment and Infrastructure, March 1996*), indicates the presence of Arochlor 1260, a polychlorinated biphenyl (PCB). Arochlor 1260 is a viscous, sticky resin commonly used in heat transfer fluids, hydraulic fluids, lubricants, insecticides, and as dielectric fluid in electrical transformers. Arochlor 1260 is resistant to biodegradation and does not break down readily. If



AOC 706

100 0 100
SCALE FEET

LEGEND

- APPROXIMATE LOCATION OF SOIL BORING



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FIGURE 1
AOC #706
AREA BEHIND BUILDING 246

DWG DATE: 4/2/96 DWG NAME: AOC706

released to soil, Aroclor 1260 adsorbs tightly to the soil, and does not leach significantly in saturated soil conditions. If released to water, adsorption to sediment and suspended matter is an important fate process. Although adsorption can immobilize PCBs for relatively long periods of time, eventual resolution into the water column has been shown to occur.

A.1.3 Migration Pathways

Since the driveway is not equipped with spill containment, surface water runoff, soil, and groundwater are potential migration pathways. Since PCBs are relatively immobile, nonvolatile compounds, air, and subsurface gas are not considered potential pathways.

A.1.4 Evidence of Release

According to the *Closure Activities Report and Certification for Building 246, (Rust Environment and Infrastructure, March 1996)*, composite soil samples were collected from the top six inches of soil along each side of the driveway to Building 246, areas 1 through 5 on Figure 1, and analyzed for Total Appendix IX constituents, excluding dioxins. Table 1 summarizes all contaminant concentrations that were found above detection limits. Essentially, eight metals and Aroclor 1260 fall into this category. The contaminants that were detected were then compared to the Zone H soil background data as described in the closure report. If the concentrations of contaminants exceeded the background levels for Zone H, then they were compared to the US EPA Region III Risk Based Concentration (RBC) Table, Fourth Quarter, 1994. All concentrations that exceeded Zone H background levels were below the RBCs. The source of

the PCBs is not currently known. The closure report states that PCBs were not stored in Building 246, while the *Interim RCRA Facility Assessment of USN Charleston Naval Shipyard, Charleston, South Carolina, (Ebasco Services Incorporated, August 1987)*, states that an area in Building 246 was reserved for PCB storage. However, evidence was not found to support that PCBs were actually stored in the building.

Table 1 Summary of Analytical Results (Soils Sampling) Charleston Naval Shipyard						
Analyte	Area 1	Area 2	Area 3	Area 4	Area 5	Zone H
Barium	7.97 mg/kg	48.8 mg/kg	32.4mg/kg	16.0mg/kg	10.1mg/kg	43.8mg/kg
Chromium	3.46 mg/kg	13.4 mg/kg	38.2mg/kg	7.16mg/kg	4.36mg/kg	83.86mg/kg
Copper	4.55 mg/kg	48.1 mg/kg	89.6mg/kg	26.0mg/kg	11.8mg/kg	31.62mg/kg
Nickel	3.29 mg/kg	6.45 mg/kg	12.8mg/kg	4.16mg/kg	J	29.9mg/kg
Lead	50.5 mg/kg	40.8 mg/kg	59.7mg/kg	11.4mg/kg	9.53mg/kg	68.69mg/kg
Vanadium	U	9.02 mg/kg	9.57mg/kg	J	3.67mg/kg	131.6mg/kg
Zinc	20.0 mg/kg	124.0 mg/kg	118mg/kg	53.4mg/kg	23.9mg/kg	129.6mg/kg
Mercury	U	J	J	1.01mg/kg	J	0.735mg/kg
PCB-1260	U	84.0 ug/kg	95.7ug/kg	761.0ug/kg	U	N/A

A.1.5 Exposure Potential

An approximately 5-acre Area of Ecological Concern is located to the south and west of Building 246 where stormwater from the asphalt driveway drains. Described in the *Final Zone J Work Plan, (E/A&H November 1995)*, the area has a heavily overgrown drainage system to the east and a maintained field with several trees to the west. The eastern ditches form a scrub-shrub wetland which is vegetated along its entire perimeter. An open, marshy area is in the center of the southeastern portion of the wetland, where the channel expands to an

approximately 50 feet wide marsh. Various ecological receptors may be exposed to contaminated surface water and sediment runoff. Exposure potential exists for Navy and civilian employees who frequent the unit and perform activities which may bring them in contact with surface soil.

A.1.6 Recommended Action

An RFI is recommended for this AOC due to the evidence of past releases, the hazards associated with PCBs, and the multiple migration pathways. The current land use is industrial with no residential areas within an approximate quarter mile radius. Considering the chemical and physical properties of PCBs, it is highly unlikely that the contaminants could migrate far enough to expose a residential population. All but one of the reuse plan scenarios target the area for future industrial uses. The remaining scenario does propose passive recreation as a possible reuse alternative.

A.2 SIGNATORY REQUIREMENT

Condition I.E. of the HSWA portion of RCRA Part B Permit (EPA SCO 170 022 560) states that "All applications, reports, or information submitted to the Regional Administrator shall be signed and certified in accordance with 40 CFR §270.11." The certification reads as follows:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Caretaker Site Officer,
Naval Base Charleston

Date

Comments by Stacey French

Comment 37:

Section 10.14 AOC 706 Area Behind Building 246, Page 10.14.1

This section provides a description of AOC 706, however, it is unclear why this site was identified as needing a RFI. It appears that this area was impacted by waste handling activities associated with the former Hazardous Waste Storage and Transit Facility. This section should be revised to indicate if there were any spills at AOC 706 that would give insight into the types of wastes that might have contaminated the site. Please revise this section to provide more information about the use of AOC 706.

Navy/EnSafe Response 37:

This site is a former Hazardous Waste Storage building, as such it was a permitted TSD and therefore, was not included in the RFI until it was closed. Once it was closed, the Project Team was asked to take a few samples to identify any potential impact from releases. The closure report from the facility should provide the requested information, which will be summarized in the Final RFI.

CH2M-Jones Response:

Although Section 10.14 of the Draft Final Zone G RFI report states that AOC 706 is located behind Building 246, the RFA states that AOC 706 is the paved driveway, not the area behind the building. No records were found of any spills in the driveway. The permitted TSD was clean closed - no further evaluation of its closure is necessary for evaluating AOC 706.

Comment 38:

Figure 10.14-1 Sampling Locations AOC 706

This figure includes the sediment sample locations taken from AOC 633. The area of the sediment samples appears to be a wetland, however, this is unclear from the figure. If this is a wetland, the legend should define the area. Please revise the figure to include this designation.

Navy/EnSafe Response 38:

The figure will be revised to indicate the wetland in the legend.

CH2M-Jones Response:

The figure appears to be adequately descriptive.

Comments by Michael Danielsen

Comment 12:

AOC 706

A) See comment #3A.

Comment 3.A) The text states that the purpose of the field investigation is to confirm or deny the presence of contamination, however there were no subsurface soil or groundwater samples taken. The sampling in this area does not adequately address the presence or absence of contamination in the groundwater or subsurface soil. Therefore these media need to be investigated with the addition of monitoring wells and sampling.

B) The groundwater cannot be adequately characterized by only one well. More wells are needed to sufficiently show the presence or absence of contamination. Therefore this medium needs to be further investigated with the addition of monitoring wells and sampling. Additional wells may be placed northeast, south, and east from the present well.

C) This site should remain in RFI status until further investigation has been completed.

Navy/EnSafe Response 12:

A) Surface and subsurface soil and groundwater samples were collected from this site. Barium and thallium were the only analytes determined to be COPCs in shallow groundwater.

B) To address concerns regarding the inorganic analytes detected in groundwater, the Navy proposes to sample the well for inorganics and PCBs using low-flow techniques. The Navy will defer additional well installation at the site pending the results of this sampling.

C) The Navy agrees that this site should remain in RFI status pending the outcome of the additional sampling at the site.

CH2M-Jones Response:

The additional groundwater sampling at the site has been completed. The area in which AOC 706 is located is adjacent to SWMU 9 and SWMU 8. Extensive groundwater will continue to be conducted in the vicinity of these sites as well as at AOC 706. Therefore, no additional wells are needed at this time. If groundwater monitoring data indicate the need for additional wells, these can be added during the CMS remedy implementation phases.

Comment 13:

Page 10.14.53 AOC 706, second paragraph

A) This paragraph suggests that the vertical extent of contamination can be somewhat explained, but does not delineate the horizontal extent of contamination. Additional soil samples are needed to delineate the extent of contamination northwest and southeast of the present sample locations.

B) The contaminants (chromium, copper, lead, and mercury) found in the sediment samples (633M0003, 0004, 0005, 0006) may be more attributable to the various hazardous materials handled and stored at AOC 706 rather than any other surrounding AOC. See comment #2.

C) This site should remain in RFI status until further investigation has been completed.

Navy/EnSafe Response 13:

A) The Navy will collect soil samples from two additional locations, north and west of 706SB002 to delineate the COPCs detected here. To address the subsurface concentrations of inorganics detected, the Navy proposes to perform a SPLP analysis. This test will determine empirically the concentration of Aroclor 1260 and inorganics that could be expected to leach from soil-to-groundwater using materials from the site.

B) Please see the response to Comment #42 (French).

C) The Navy agrees and will add the additional information into the final RFI report.

CH2M-Jones Response:

The additional sampling requested has been completed and is summarized in the RFI Report Addendum (see Section 4.0).

**CH2M-Jones Response to SCDHEC Comments
Zone G RFI Work Plan Addendum (EnSafe, 2000)
AOC 706, Zone G
Charleston Naval Complex**

Comment by Michael W. Danielsen

Comment 13

AOC 706

Page 2.57 Section 2.10.3 Sampling and Analysis Plan

The text states that the proposed additional sample locations will be northeast and north-northwest of 706SB002 and 706SB011 respectively. However, no additional sample locations are proposed east of 706SB011. Please explain the rationale for not sampling in this direction.

CH2M-Jones Response 13:

Samples were actually collected to the east of G706SB011 at soil boring G706SB018. The locations of G706SB018 and all the Work Plan Addendum (WPA) soil borings are shown in Figure 4-1 of the RFI Report Addendum.

Comment by Susan Peterson

Comment 1

AOC 706

The Department does not have enough information to refute the possibility that hazardous waste could have been stored east of what is now Building 246. Given the fact that only one (1) groundwater well exists, the direction of the groundwater flow is in question. The Navy should collect soil samples east of Building 246.

CH2M-Jones Response 1:

Historically, Building 246 was a regulated unit designed specifically for storing containerized waste inside on the western portion. The eastern side was used as office space. All areas where hazardous waste was stored in the building were decontaminated and subjected to confirmatory sampling during implementation of the approved RCRA Closure Plan for the less-than-90-day storage facility. Details can be found in the "Closure Activities Report and Engineering Certification for Building 246, Charleston Naval Shipyard, March 1996", prepared by Rust Environment and Infrastructure, Inc.

Zone G RCRA Facility Investigation Report
 NAVBASE Charleston
 Section 10 — Site-Specific Evaluations
 Revision: 0

Table 10.14.4
Zone G
AOC 706
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Volatile Organic Compounds (µg/kg)							
Benzene	706SB009	1	22000	NA	2	30	NA
Carbon Disulfide	706SB002	ND	780000	NA	2	32000	NA
	706SB005	2			NT		
Chlorobenzene	706SB009	ND	160000	NA	2	1000	NA
Toluene	706SB009	ND	1600000	NA	2	12000	NA
Trichloroethene	706SB007	ND	58000	NA	2	60	NA
	706SB009	ND			2		
1,2,3-Trichloropropane	706SB002	6	91	NA	ND	0.006	NA
Semivolatile Organic Compounds (µg/kg)							
BEQs ¹	706SB001	ND	88.0	NA	NA	NL	NA
	706SB002	5.22			NA		
	706SB004	ND			NA		
	706SB006	ND			NA		
	706SB007	77.8			NA		
	706SB009	80			NA		
Benzo(a)anthracene	706SB001	ND	880.0	NA	180	2000	NA
	706SB004	ND			920 ✓		
	706SB006	ND			920 ✓		
	706SB007	50			85		
	706SB009	ND			680 ✓		

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Benzo(a)pyrene	706SB001	ND	88.0	NA	270	8000	NA
	706SB002	ND			76		
	706SB004	ND			1200 ✓		
	706SB006	ND			840 ✓		
	706SB007	72			100		
	706SB009	67			640 ✓		
Benzo(b)fluoranthene	706SB001	ND	880	NA	210	5000	NA
	706SB002	49			ND		
	706SB006	ND			810		
	706SB007	ND			120		
	706SB009	130			540		
Benzo(k)fluoranthene	706SB001	ND	8800	NA	170	49000	NA
	706SB002	32			ND		
	706SB004	ND			2000		
	706SB006	ND			640		
	706SB007	79			120		
	706SB009	ND			530		
Chrysene	706SB001	ND	88000	NA	200	160000	NA
	706SB002	ND			140		
	706SB004	ND			1400		
	706SB006	ND			860		
	706SB007	59			100		
	706SB009	ND			660		

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Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Dibenz(a,h)anthracene	706SB001	ND	88	NA	94 ✓	2000	NA
	706SB004	ND			360 ✓		
	706SB006	ND			280 ✓		
	706SB007	ND			74 ✓		
	706SB009	ND			140 ✓		
Indeno(1,2,3-cd)pyrene	706SB001	ND	880	NA	170 ✓	14000	NA
	706SB004	ND			730 ✓		
	706SB006	ND			500 ✓		
	706SB007	ND			98 ✓		
	706SB009	ND			240 ✓		
Acenaphthene	706SB001	ND	470000	NA	87	570000	NA
	706SB009	ND			65		
Acenaphthylene	706SB004	ND	230000	NA	98	293000	NA
	706SB009	ND			110		
Anthracene	706SB004	ND	2300000	NA	200	12000000	NA
	706SB006	ND			240		
	706SB009	ND			200		
Benzo(g,h,i)perylene	706SB001	ND	230000	NA	190	4.66E08	NA
	706SB002	ND			77		
	706SB004	ND			780		
	706SB006	ND			560		
	706SB007	ND			140		
	706SB009	ND			220		

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ = 0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Benzoic acid	706SB004	ND	31000000	NA	170	400000	NA
	706SB006	ND			92		
	706SB007	83			120		
	706SB009	170			68		
Butylbenzylphthalate	706SB007	ND	1600000	NA	97	930000	NA
4-Chloro-3-methylphenol	706SB001	ND	39000	NA	170	6300000	NA
Di-n-butylphthalate	706SB007	ND	780000	NA	66	2300000	NA
Di-n-octylphthalate	706SB007	ND	160000	NA	69	10000000	NA
Dibenzofuran	706SB004	ND	31000	NA	49	240000	NA
	706SB009	ND			54		
Fluoranthene	706SB001	ND	310000.0	NA	210	4300000	NA
	706SB004	45			1100		
	706SB006	ND			1400		
	706SB007	88			88		
	706SB009	72			1200		
Fluorene	706SB004	ND	310000	NA	48	560000	NA
	706SB009	ND			100		
2-Methylnaphthalene	706SB003	74	310000	NA	ND	126000	NA
	706SB004	ND			77		
	706SB006	ND			85		
	706SB009	ND			290		

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
4-Methylphenol (p-Cresol)	706SB003	52	39000	NA	ND	1380	NA
	706SB006	ND			120		
Naphthalene	706SB003	51	310000	NA	ND	84000	NA
	706SB004	ND			83		
	706SB006	ND			70		
	706SB009	ND			210		
Pentachlorophenol	706SB004	ND	5300	NA	62	30	NA
Phenanthrene	706SB001	ND	230000.0	NA	100	1380000	NA
	706SB004	ND			550		
	706SB006	ND			620		
	706SB009	ND			440		
Pyrene	706SB001	ND	230000.0	NA	350	4200000	NA
	706SB002	46			440		
	706SB003	91			ND		
	706SB004	ND			920		
	706SB006	ND			1500		
	706SB007	70			96		
	706SB009	84			1400		
Pesticides/PCBs (µg/kg)							
alpha-Chlordane	706SB006	ND	1800	NA	11	10000	NA
	706SB010	7.7 =			NT		

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ = 0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
gamma-Chlordane	706SB001	2.7	1800	NA	2.6	10000	NA
	706SB002	1.4			ND		
	706SB006	ND			13		
	706SB010	7.7			NT		
4,4'-DDD	706SB001	ND	2700	NA	81	16000	NA
	706SB002	5.6			110		
	706SB006	ND			98		
4,4'-DDE	706SB001	ND	1900	NA	130	54000	NA
	706SB002	58			21		
	706SB004	ND			28		
	706SB006	ND			140		
	706SB010	7.5			NT		
4,4'-DDT	706SB001	ND	1900	NA	18	32000	NA
	706SB002	4.4			9		
	706SB004	ND			100		
	706SB006	ND			140		
Endrin aldehyde	706SB001	ND	2300	NA	5.1	1000	NA
Aroclor-1260	706SB004	ND	320	NA	1100	1000	NA
	706SB006	ND			520		
	706SB007	ND			70		
	706SB008	64			NT		
Dioxins (ng/kg)							
Dioxin (2,3,7,8-TCDD TEQs) ¹	706SB002	5.3	1000	NA	NA	1900	NA

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Aluminum (Al)	706SB001	8170	7800.0	18700	23400	1000000	23600
	706SB002	10055			26400		
	706SB003	6120			4770		
	706SB004	4210			8620		
	706SB005	4360			NT		
	706SB006	4960			9710		
	706SB007	6180			28800		
	706SB008	4030			NT		
	706SB009	5760			15000		
	706SB010	7140			NT		
Antimony (Sb)	706SB001	ND	3.1	2.89	33.8 /	5	NL
	706SB002	4.2 ✓			4		
	706SB003	0.68			ND		
	706SB004	ND			82.4 ✓✓		
	706SB006	ND			49.9 ✓✓		
	706SB007	ND			2.8		
	706SB009	ND			1		
	706SB010	1			NT		

1, 4, 6

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Arsenic (As)	706SB001	2.4	0.43	17.2 ^a	21.5	29	15.5 ^a
	706SB002	3.8			20.2		
	706SB003	1			ND		
	706SB004	1.3			9.4		
	706SB005	1.6			NT		
	706SB006	0.75			14		
	706SB007	1.2			22.3		
	706SB008	0.49			NT		
	706SB009	0.63			12.7		
	706SB010	10.8			NT		
Barium (Ba)	706SB001	17.1	550.0	109	243	1600	64.5
	706SB002	40.25			62.4		
	706SB003	13.6			12.5		
	706SB004	10.4			325		
	706SB005	13.2			NT		
	706SB006	6.7			166		
	706SB007	11.5			49.4		
	706SB008	8.3			NT		
	706SB009	13.2			152		
	706SB010	26.6			NT		

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Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Beryllium (Be)	706SB001	ND	0.15	1.20	1.2	63	1.63
	706SB002	ND			1.3		
	706SB003	0.13			0.15		
	706SB004	0.17			0.45		
	706SB005	0.16			NT		
	706SB006	0.14			0.59		
	706SB007	0.22			1.5		
	706SB008	0.11			NT		
	706SB009	0.16			0.86		
	706SB010	0.44			NT		
Cadmium (Cd)	706SB001	0.23 ✓	3.9	1.07	3.6 ✓	8	0.48
	706SB002	5.045 ✓			0.62		
	706SB003	0.08			ND		
	706SB004	0.15			6.2 ✓		
	706SB005	0.1			NT		
	706SB006	0.07			3.2 ✓		
	706SB007	0.13			0.54		
	706SB009	ND			0.81		
	706SB010	0.27 ✓			NT		

1, 2, 4

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Calcium (Ca)	706SB001	7330	NL	NL	14300	NL	NL
	706SB002	5160			28500		
	706SB003	3310			3250		
	706SB004	43000			15100		
	706SB005	1440			NT		
	706SB006	11100			14700		
	706SB007	38300			9260		
	706SB008	1370			NT		
	706SB009	8260			20700		
	706SB010	12000			NT		
Chromium (Cr)	706SB001	9.3	39 VI	42.8	88.7	1000000	43.4*
	706SB002	14.25	7800 III		46.1		
	706SB003	6.2			5.3		
	706SB004	5.5			81.5		
	706SB005	4.8			NT		
	706SB006	4.8			56.5		
	706SB007	8.2			47.8		
	706SB008	3.8			NT		
	706SB009	6.6			29.1		
	706SB010	15.9			NT		

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Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Cobalt (Co)	706SB001	0.99	470.0	6.60	7.6	2000	8.14
	706SB002	1.9			6.5		
	706SB003	1.2			0.49		
	706SB004	0.96			5.2		
	706SB005	0.44			NT		
	706SB006	0.39			4.8		
	706SB007	0.81			7.6		
	706SB009	0.63			4.4		
	706SB010	2.1			NT		
	Copper (Cu)	706SB001			33.7 ✓		
706SB002		112.05 ✓	84.9				
706SB003		15.1	2.7				
706SB004		7.5	2210 ✓				
706SB005		6.1	NT				
706SB006		8.2	777 ✓				
706SB007		4.8	90.5				
706SB008		5.7	NT				
706SB009		4.7	151				
706SB010		30.7 ✓	NT				

1, 4, 6

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Iron (Fe)	706SB001	3640	2300.0	NL	36200	NL	NL
	706SB002	7035			28600		
	706SB003	2140			1240		
	706SB004	1890			28600		
	706SB005	2400			NT		
	706SB006	865			31900		
	706SB007	2190			34200		
	706SB008	669			NT		
	706SB009	1680			17000		
	706SB010	11000			NT		
Lead(Pb) 1, 4, 6	706SB001	19.9 ✓	400.0	181	631 ✓	400	66.3
	706SB002	71.55 ✓			68.8		
	706SB003	15.1 ✓			4.6		
	706SB004	12.2 ✓			905 ✓		
	706SB005	8.4			NT		
	706SB006	6.1			406 ✓		
	706SB007	7			61		
	706SB008	4.9			NT		
	706SB009	4.7			112		
	706SB010	38 ✓			NT		

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Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Magnesium (Mg)	706SB001	757	NL	NL	5320	NL	NL
	706SB002	928.5			5690		
	706SB003	473			273		
	706SB004	938			2310		
	706SB005	285			NT		
	706SB006	400			2220		
	706SB007	1730			4700		
	706SB008	158			NT		
	706SB009	338			3510		
	706SB010	930			NT		
Manganese (Mn)	706SB001	52.7	180.0	325	551	1100	291
	706SB002	154.5			322		
	706SB003	16.2			9.5		
	706SB004	55.6			258		
	706SB005	16.7			NT		
	706SB006	11.7			447		
	706SB007	40.7			463		
	706SB008	7.7			NT		
	706SB009	16.9			204		
	706SB010	129			NT		
Mercury (Hg) 1,416	706SB001	0.07 ✓	2.3	1.03	1.4 ✓	2.1	0.31
	706SB002	0.225 ✓			1.2		
	706SB004	ND			2.4 ✓		
	706SB006	ND			1.8 ✓		
	706SB007	ND			0.51		

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background	
Nickel (Ni)	706SB001	3.9	160.0	20.6	41.8	130	18.3	
	706SB002	8.3			18.8			
	706SB003	2.5			1.4			
	706SB004	2.7			48.7			
	706SB005	1.4			NT			
	706SB006	1.8			49.5			
	706SB007	2.8			14.5			
	706SB008	1			NT			
	706SB009	1.9			12.3			
	706SB010	5.5			NT			
Potassium (K)	706SB001	395	NL	NL	2430	NL	NL	
	706SB002	553.5			2860			
	706SB003	298			ND			
	706SB004	ND			771			
	706SB006	ND			833			
	706SB007	327			2480			
	706SB009	261			1710			
	706SB010	507			NT			
	Selenium (Se)	706SB001	0.66 ✓	39.0	1.22	1.8 ✓	5	1.26
		706SB002	0.605 ✓			1.3 ✓		
706SB003		0.39			ND			
706SB004		ND			1.2			
706SB005		0.5			NT			
706SB006		ND			1.1			
706SB007		ND			0.97			
706SB008		0.58 ✓			NT			
706SB009		ND			1.3 ✓			
706SB010		0.54			NT			

1, 2, 9, 4, 16

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Silver (Ag)	706SB001	ND	39.0	NL	0.74	34	NL
	706SB004	ND			2.5		
	706SB006	ND			0.8		
	706SB010	0.24			NT		
Sodium (Na)	706SB001	312	NL	NL	4080	NL	NL
	706SB002	282			4350		
	706SB003	177			212		
	706SB004	216			1210		
	706SB006	248			1300		
	706SB007	203			2170		
	706SB008	159			NT		
	706SB009	273			2950		
	706SB010	292			NT		
	Thallium (Tl) 1, 2, 6, 4, 9	706SB001			ND		
706SB002		ND	0.98 ✓				
706SB004		ND	0.59				
706SB006		ND	0.98 ✓				
706SB007		ND	0.6				
706SB009		ND	1.2 ✓				
Tin (Sn)		706SB001	ND	4700	9.67	57.2	11000
	706SB004	ND	182				
	706SB005	6.4	NT				
	706SB006	ND	27.7				

Table 10.14.4
 Zone G
 AOC 706
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Vanadium (V)	706SB001	12.1	55.0	60.9	73	6000	72.5
	706SB002	16.35			69.4		
	706SB003	7			6.1		
	706SB004	6.1			37.6		
	706SB005	6.9			NT		
	706SB006	4.8			36.7		
	706SB007	9.5			75.4		
	706SB008	4			NT		
	706SB009	8.9			37.4		
	706SB010	24			NT		
Zinc (Zn)	706SB001	66.5	2300.0	519	1580 ✓	12000	145
	706SB002	194.5			269		
	706SB003	34			8.4 ✓		
	706SB004	15.5			2560 ✓		
	706SB005	238			NT ✓		
	706SB006	7.1			1240 ✓		
	706SB007	13.2			167		
	706SB008	10.8			NT		
	706SB009	8			585		
	706SB010	89.2			NT		

1, 4, 6

Zone G RCRA Facility Investigation Report
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Notes:

- a** = Background value for non-clay samples
- = Residential RBCs (THQ=0.1) were used as a reference concentration for upper interval samples. Generic soil-to-groundwater SSLs (DAF=20) from the *Soil Screening Guidance: Technical Background Documents* (USEPA, 1996b) were used as a reference concentration for lower interval samples
- l** = Calculated from methods described in USEPA Interim Supplemental Guidance to RAGS: Human Health Risk Assessment, Bulletin 2 (USEPA, 1995c)
- ND** = Not detected
- NT** = Not taken
- NL** = Not listed
- NA** = Not applicable
- µg/kg** = Micrograms per kilogram
- mg/kg** = Milligrams per kilogram
- ng/kg** = Nanograms per kilogram

Bolded concentrations exceed both the reference concentration (RBC or SSL) and the zone background

All background values for Zone G are based on twice the means of the grid sample concentrations

Table 10.14.8
 Zone G
 AOC 706
 Analytes Detected in Shallow Groundwater

Parameters	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Semivolatile Organic Compounds (µg/L)							
4-Methylphenol	706001	NI	1	ND	18	NL	NA
Inorganics (µg/L)							
Aluminum (Al)	706001	NI	ND	216	3700	50	692
Antimony (Sb)	706001	NI	3.8	ND	1.5	6	3.9
Arsenic (As)	706001	NI	7.3	6.8	0.045	50	17.8
Barium (Ba)	706001	NI	539	422	260	2000	31
Beryllium (Be)	706001	NI	ND	0.6	0.016	4	ND
Cadmium (Cd)	706001	NI	0.4	2.0	1.8	5	0.53
Calcium (Ca)	706001	NI	195000	194000	NL	NL	NL
Chromium (Cr)	706001	NI	5.2	2.3	18	100	3.88
Cobalt (Co)	706001	NI	3.4	1.9	220	NL	1.45
Iron (Fe)	706001	NI	23300	24200	1100	300	NL
Magnesium (Mg)	706001	NI	809000	683000	NL	NL	NL
Manganese (Mn)	706001	NI	1100	781	84	50	2906
Nickel (Ni)	706001	NI	13.7	1.6	73	100	4.08

Table 10.14.8
 Zone G
 AOC 706
 Analytes Detected in Shallow Groundwater

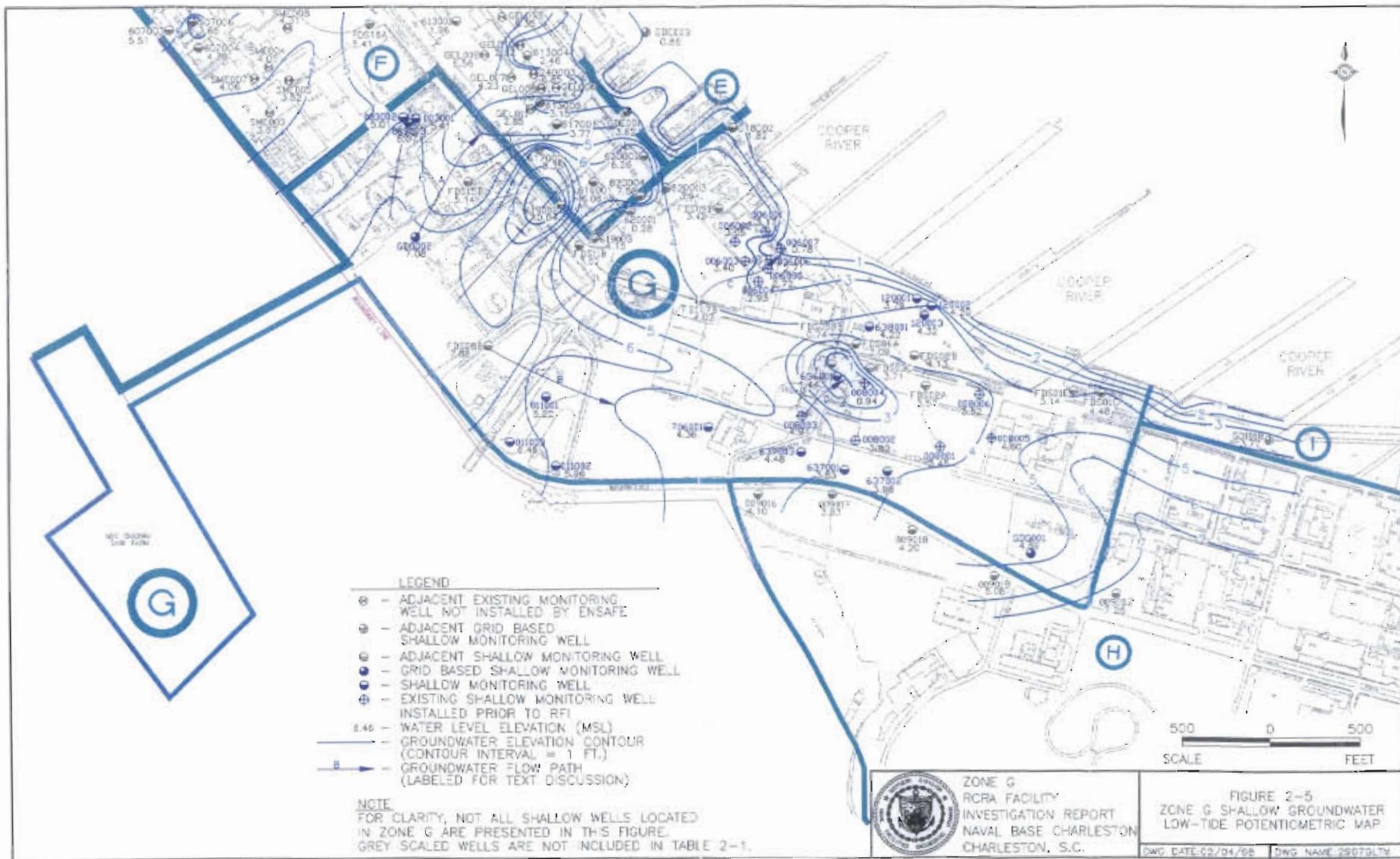
Parameters	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Potassium (K)	706001	NI	221000	224000	NL	NL	NL
Sodium (Na)	706001	NI	7100000	7460000	NL	NL	NL
Thallium (Tl)	706001	NI	9	ND	0.29	2	NL
Vanadium (V)	706001	NI	2.6	1.8	26	NL	15.4

Notes:

- NI = Not installed
- NL = Not listed
- ND = Not detected
- µg/L = Micrograms per liter
- * = Tap Water RBCs (THQ=0.1) from *Risk-Based Concentration Table* (USEPA, October 22, 1997), and MCLs/SMCLs from *Drinking Water Regulations and Health Advisories* (USEPA, 1996e)

Bolded concentrations exceed both the RBC and the zone background

All background values for Zone G are based on twice the means of the grid sample concentrations. Background values for groundwater are based on two sampling rounds in two wells at each depth



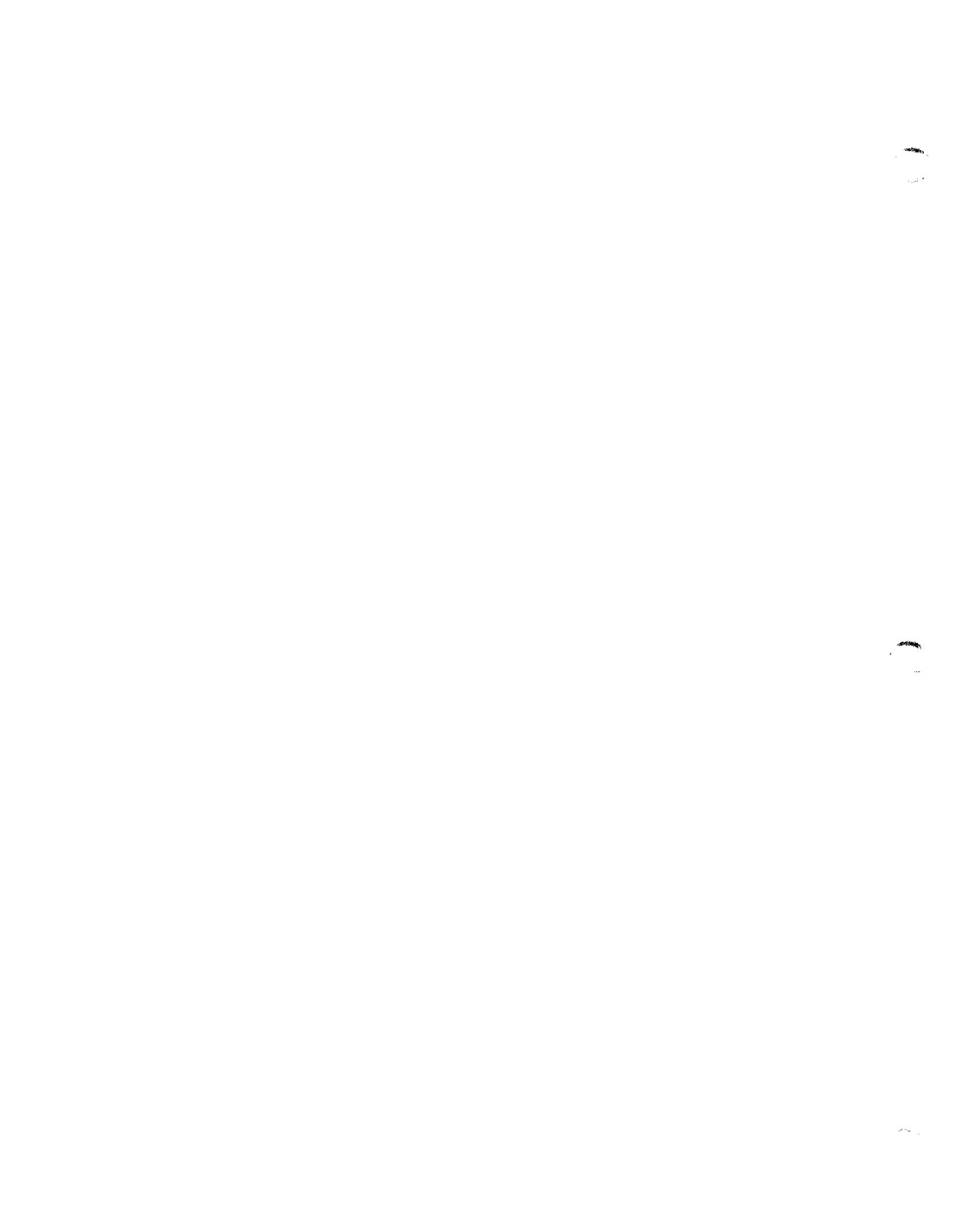
- LEGEND**
- ⊕ - ADJACENT EXISTING MONITORING WELL NOT INSTALLED BY ENSAFE
 - ⊙ - ADJACENT GRID BASED SHALLOW MONITORING WELL
 - ⊗ - ADJACENT SHALLOW MONITORING WELL
 - ⊙ - GRID BASED SHALLOW MONITORING WELL
 - ⊙ - SHALLOW MONITORING WELL
 - ⊕ - EXISTING SHALLOW MONITORING WELL INSTALLED PRIOR TO RFI
 - 4.46 - WATER LEVEL ELEVATION (MSL)
 - - GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 1 FT.)
 - - GROUNDWATER FLOW PATH (LABELED FOR TEXT DISCUSSION)

NOTE
 FOR CLARITY, NOT ALL SHALLOW WELLS LOCATED IN ZONE G ARE PRESENTED IN THIS FIGURE. GREY SCALED WELLS ARE NOT INCLUDED IN TABLE 2-1.


ZONE G
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 CHARLESTON, S.C.

FIGURE 2-5
 ZONE G SHALLOW GROUNDWATER
 LOW-TIDE POTENTIOMETRIC MAP
 DWG DATE: 02/04/98 | DWG NAME: 29079LTY

Analytical Results (EnSafe 1999-2000)



Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB011	G706SB011	G706SB011
SampleID	706SB01101 (0-1ft)	706SB01101DL (0-1ft)	706SB01102 (3-5ft)
DateCollected	7/27/1999	7/27/1999	7/27/1999
DateExtracted	7/30/1999	7/30/1999	7/30/1999
DateAnalyzed	8/6/1999	8/12/1999	8/6/1999
SDGNumber	39679	39679	39679

Parameter	Units	G706SB011		G706SB011		G706SB011	
Aldrin	ug/Kg	2.3	U	23	R	2	U
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/Kg	2.3	U	23	R	2	U
Alpha-chlordane	ug/Kg	2.3	U	23	R	2	U
Beta BHC (Beta Hexachlorocyclohexane)	ug/Kg	2.3	U	23	R	2	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/Kg	2.3	U	23	R	2	U
Dieldrin	ug/Kg	4.5	U	45	R	3.9	U
Endosulfan I	ug/Kg	2.3	U	23	R	2	U
Endosulfan II	ug/Kg	4.5	U	45	R	3.9	U
Endosulfan Sulfate	ug/Kg	4.5	U	45	R	3.9	U
Endrin Aldehyde	ug/Kg	4.5	U	45	R	3.9	U
Endrin Ketone	ug/Kg	4.5	U	45	R	3.9	U
Endrin	ug/Kg	4.5	U	45	R	3.9	U
Gamma BHC (Lindane)	ug/Kg	2.3	U	23	R	2	U
Gamma-chlordane	ug/Kg	2.3	U	23	R	2	U
Heptachlor Epoxide	ug/Kg	2.3	U	23	R	2	U
Heptachlor	ug/Kg	2.3	U	23	R	2	U
Methoxychlor	ug/Kg	23	UJ	230	R	20	UJ
p,p'-DDD	ug/Kg	4.5	U	45	R	3.9	U
p,p'-DDE	ug/Kg	15	J	45	R	5.4	J
p,p'-DDT	ug/Kg	11	=	45	R	3.9	U
Toxaphene	ug/Kg	150	U	1500	R	130	U

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB011		G706SB012		G706SB012		
SampleID	706SB01102DL (3-5ft)		706SB01201 (0-1ft)		706SB01201DL (0-1ft)		
DateCollected	7/27/1999		7/27/1999		7/27/1999		
DateExtracted	7/30/1999		7/30/1999		7/30/1999		
DateAnalyzed	8/12/1999		8/7/1999		8/12/1999		
SDGNumber	39679		39679		39679		
Parameter	Units						
Aldrin	ug/Kg	20	R	1.5	U	15	R
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/Kg	20	R	1.5	U	15	R
Alpha-chlordane	ug/Kg	20	R	5.3	J	15	R
Beta BHC (Beta Hexachlorocyclohexane)	ug/Kg	20	R	1.5	U	15	R
Delta BHC (Delta Hexachlorocyclohexane)	ug/Kg	20	R	1.5	U	15	R
Dieldrin	ug/Kg	39	R	2.8	U	28	R
Endosulfan I	ug/Kg	20	R	1.5	U	15	R
Endosulfan II	ug/Kg	39	R	2.8	U	28	R
Endosulfan Sulfate	ug/Kg	39	R	7.9	J	28	R
Endrin Aldehyde	ug/Kg	39	R	2.8	U	28	R
Endrin Ketone	ug/Kg	39	R	2.8	U	28	R
Endrin	ug/Kg	39	R	2.8	U	28	R
Gamma BHC (Lindane)	ug/Kg	20	R	1.5	U	15	R
Gamma-chlordane	ug/Kg	20	R	18	J	15	R
Heptachlor Epoxide	ug/Kg	20	R	7.3	U	15	R
Heptachlor	ug/Kg	20	R	1.5	U	15	R
Methoxychlor	ug/Kg	200	R	15	UJ	150	R
p,p'-DDD	ug/Kg	39	R	2.8	U	28	R
p,p'-DDE	ug/Kg	39	R	12	J	28	R
p,p'-DDT	ug/Kg	39	R	15	J	28	R
Toxaphene	ug/Kg	1300	R	94	U	940	R

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB012		G706SB012		
SampleID	706SB01202 (3-5ft)		706SB01202DL (3-5ft)		
DateCollected	7/27/1999		7/27/1999		
DateExtracted	7/30/1999		7/30/1999		
DateAnalyzed	8/7/1999		8/12/1999		
SDGNumber	39679		39679		
Parameter	Units				
Aldrin	ug/Kg	1.8	UJ	18	R
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/Kg	1.8	UJ	18	R
Alpha-chlordane	ug/Kg	1.8	UJ	18	R
Beta BHC (Beta Hexachlorocyclohexane)	ug/Kg	1.8	UJ	18	R
Delta BHC (Delta Hexachlorocyclohexane)	ug/Kg	1.8	UJ	18	R
Dieldrin	ug/Kg	3.6	UJ	36	R
Endosulfan I	ug/Kg	1.8	UJ	18	R
Endosulfan II	ug/Kg	3.6	UJ	36	R
Endosulfan Sulfate	ug/Kg	3.6	UJ	36	R
Endrin Aldehyde	ug/Kg	3.6	UJ	36	R
Endrin Ketone	ug/Kg	3.6	UJ	36	R
Endrin	ug/Kg	3.6	UJ	36	R
Gamma BHC (Lindane)	ug/Kg	1.8	UJ	18	R
Gamma-chlordane	ug/Kg	1.8	UJ	18	R
Heptachlor Epoxide	ug/Kg	1.8	UJ	18	R
Heptachlor	ug/Kg	1.8	UJ	18	R
Methoxychlor	ug/Kg	18	UJ	180	R
p,p'-DDD	ug/Kg	5.6	J	36	R
p,p'-DDE	ug/Kg	3.6	UJ	36	R
p,p'-DDT	ug/Kg	3.6	UJ	36	R
Toxaphene	ug/Kg	120	U	1200	R

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB011		G706SB011		G706SB012		G706SB012		
SampleID	706SB01101 (0-1ft)		706SB01102 (3-5ft)		706SB01201 (0-1ft)		706SB01202 (3-5ft)		
DateCollected	7/27/1999		7/27/1999		7/27/1999		7/27/1999		
DateExtracted	7/30/1999		7/30/1999		7/30/1999		7/30/1999		
DateAnalyzed	8/6/1999		8/6/1999		8/7/1999		8/7/1999		
SDGNumber	39679		39679		39679		39679		
Parameter	Units								
PCB-1016 (Arochlor 1016), SPLP	ug/L								
PCB-1016 (Arochlor 1016)	ug/Kg	65	U	50	U	34	U	48	U
PCB-1221 (Arochlor 1221), SPLP	ug/L								
PCB-1221 (Arochlor 1221)	ug/Kg	65	U	50	U	34	U	48	U
PCB-1232 (Arochlor 1232), SPLP	ug/L								
PCB-1232 (Arochlor 1232)	ug/Kg	65	U	50	U	34	U	48	U
PCB-1242 (Arochlor 1242), SPLP	ug/L								
PCB-1242 (Arochlor 1242)	ug/Kg	65	U	50	U	34	U	48	U
PCB-1248 (Arochlor 1248), SPLP	ug/L								
PCB-1248 (Arochlor 1248)	ug/Kg	65	U	50	U	34	U	48	U
PCB-1254 (Arochlor 1254), SPLP	ug/L								
PCB-1254 (Arochlor 1254)	ug/Kg	65	U	50	U	34	U	48	U
PCB-1260 (Arochlor 1260), SPLP	ug/L								
PCB-1260 (Arochlor 1260)	ug/Kg	200	J	86	J	260	J	110	J

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB013	G706SB013
SampleID	706SB01302a (3-5ft)	706SB01302a (3-5ft)
DateCollected	7/27/1999	7/27/1999
DateExtracted	8/31/1999	9/13/1999
DateAnalyzed	9/1/1999	9/17/1999
SDGNumber	39679	39679

Parameter	Units				
PCB-1016 (Arochlor 1016), SPLP	ug/L			2	U
PCB-1016 (Arochlor 1016)	ug/Kg	40	U		
PCB-1221 (Arochlor 1221), SPLP	ug/L			2	U
PCB-1221 (Arochlor 1221)	ug/Kg	40	U		
PCB-1232 (Arochlor 1232), SPLP	ug/L			2	U
PCB-1232 (Arochlor 1232)	ug/Kg	40	U		
PCB-1242 (Arochlor 1242), SPLP	ug/L			5	U
PCB-1242 (Arochlor 1242)	ug/Kg	40	U		
PCB-1248 (Arochlor 1248), SPLP	ug/L			2	U
PCB-1248 (Arochlor 1248)	ug/Kg	40	U		
PCB-1254 (Arochlor 1254), SPLP	ug/L			5	U
PCB-1254 (Arochlor 1254)	ug/Kg	40	U		
PCB-1260 (Arochlor 1260), SPLP	ug/L			2	U
PCB-1260 (Arochlor 1260)	ug/Kg	40	U		

Analytical Data Summary

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StationID	G706SB011		G706SB011		G706SB012		G706SB012		
SampleID	706SB01101 (0-1ft)		706SB01102 (3-5ft)		706SB01201 (0-1ft)		706SB01202 (3-5ft)		
DateCollected	7/27/1999		7/27/1999		7/27/1999		7/27/1999		
DateExtracted	8/12/1999		8/12/1999		8/12/1999		8/12/1999		
DateAnalyzed	8/13/1999		8/13/1999		8/13/1999		8/13/1999		
SDGNumber	39679		39679		39679		39679		
Parameter	Units								
Aluminum, SPLP	ug/L								
Aluminum	mg/Kg	23400	=	20100	=	9510	=	26000	=
Antimony, SPLP	ug/L								
Antimony	mg/Kg	10.7	J	3	J	1.9	UJ	5.6	J
Arsenic, SPLP	ug/L								
Arsenic	mg/Kg	22.5	=	22.8	=	9.9	=	33.2	=
Barium, SPLP	ug/L								
Barium	mg/Kg	208	J	50.5	J	36.1	J	121	J
Beryllium, SPLP	ug/L								
Beryllium	mg/Kg	1.2	=	1.2	=	0.39	J	1.4	=
Cadmium, SPLP	ug/L								
Cadmium	mg/Kg	2.2	J	0.65	J	0.63	J	0.77	J
Calcium, SPLP	ug/L								
Calcium	mg/Kg	24300	=	29600	=	6140	=	8190	=
Chromium, Total	mg/Kg	56.1	J	41.4	J	22.9	J	43.4	J
Chromium, Total	ug/L								
Cobalt, SPLP	ug/L								
Cobalt	mg/Kg	7.8	=	5.8	=	2.6	J	7.9	=
Copper, SPLP	ug/L								
Copper	mg/Kg	548	J	123	J	53.3	J	179	J
Iron, SPLP	ug/L								
Iron	mg/Kg	33000	=	30300	=	11200	=	47200	=
Lead, SPLP	ug/L								
Lead	mg/Kg	320	J	93.6	J	1300	J	175	J
Magnesium, SPLP	ug/L								
Magnesium	mg/Kg	5270	=	4900	=	1020	=	4770	=
Manganese, SPLP	ug/L								
Manganese	mg/Kg	575	=	374	=	174	=	396	=
Mercury, SPLP	ug/L								
Mercury	mg/Kg	1.4	=	0.39	=	0.3	=	1.8	=

Analytical Data Summary

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StationID	G706SB013		G706SB013		G706SB014		G706SB014		
SampleID	706SB01302a (3-5ft)		706SB01302b (3-5ft)		706SB014S1 (0-1ft)		706SB014S2 (3-5ft)		
DateCollected	7/27/1999		7/29/1999		12/14/1999		12/14/1999		
DateExtracted	8/3/1999		10/5/1999		12/20/1999		12/20/1999		
DateAnalyzed	8/4/1999		10/5/1999		12/23/1999		12/23/1999		
SDGNumber	39679		39679		EN032		EN032		
Parameter	Units								
Aluminum, SPLP	ug/L	186	J			1120	J	452	J
Aluminum	mg/Kg			8830	=				
Antimony, SPLP	ug/L	5	U			13.1	J	15.2	J
Antimony	mg/Kg			0.45	UJ				
Arsenic, SPLP	ug/L	3.3	U			2.9	J	3.2	J
Arsenic	mg/Kg			1.4	=				
Barium, SPLP	ug/L	302	=			940	=	473	=
Barium	mg/Kg			17.1	J				
Beryllium, SPLP	ug/L	0.3	U			0.9	UJ	0.9	UJ
Beryllium	mg/Kg			0.16	J				
Cadmium, SPLP	ug/L	20.7	J			0.4	J	0.3	J
Cadmium	mg/Kg			0.1	J				
Calcium, SPLP	ug/L	7330	=			34900	=	27300	=
Calcium	mg/Kg			1800	=				
Chromium, Total	mg/Kg			9.9	=				
Chromium, Total	ug/L	0.5	U			2.4	J	0.9	J
Cobalt, SPLP	ug/L	1.7	U			0.5	UJ	0.5	UJ
Cobalt	mg/Kg			1.2	J				
Copper, SPLP	ug/L	5.5	J			30.1	=	19	J
Copper	mg/Kg			11.3	J				
Iron, SPLP	ug/L	380	=			1260	J	476	J
Iron	mg/Kg			3410	=				
Lead, SPLP	ug/L	2.3	J			16.5	=	8.4	J
Lead	mg/Kg			8.9	J				
Magnesium, SPLP	ug/L	406	=			6500	=	5700	=
Magnesium	mg/Kg			477	=				
Manganese, SPLP	ug/L	2.6	J			9.5	J	3.5	J
Manganese	mg/Kg			21	=				
Mercury, SPLP	ug/L	1.2	J			0.2	U	0.2	U
Mercury	mg/Kg			0.05	=				

Analytical Data Summary

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StationID	G706SB014	G706SB014	G706SB015	G706SB015
SampleID	706SB014T1 (0-1ft)	706SB014T2 (3-5ft)	706SB015S1 (0-1ft)	706SB015T1 (0-1ft)
DateCollected	12/14/1999	12/14/1999	12/14/1999	12/14/1999
DateExtracted	12/16/1999	12/16/1999	12/20/1999	12/16/1999
DateAnalyzed	12/27/1999	12/27/1999	12/23/1999	12/27/1999
SDGNumber	EN032	EN032	EN032	EN032

Parameter	Units	G706SB014		G706SB015	
Aluminum, SPLP	ug/L			2480	J
Aluminum	mg/Kg	13400	=	17800	=
Antimony, SPLP	ug/L			2.4	U
Antimony	mg/Kg	4.2	J	6.7	J
Arsenic, SPLP	ug/L			13.4	=
Arsenic	mg/Kg	8	=	10.3	=
Barium, SPLP	ug/L			1630	=
Barium	mg/Kg	49.8	=	83.6	=
Beryllium, SPLP	ug/L			3.2	J
Beryllium	mg/Kg	0.58	=	0.65	=
Cadmium, SPLP	ug/L			0.3	U
Cadmium	mg/Kg	0.41	J	0.5	J
Calcium, SPLP	ug/L			5260	=
Calcium	mg/Kg	6430	=	6490	=
Chromium, Total	mg/Kg	27.2	=	177	=
Chromium, Total	ug/L			5.8	J
Cobalt, SPLP	ug/L			0.5	UJ
Cobalt	mg/Kg	3.5	J	4.5	J
Copper, SPLP	ug/L			18.8	J
Copper	mg/Kg	158	=	200	=
Iron, SPLP	ug/L			6390	J
Iron	mg/Kg	13200	=	15900	=
Lead, SPLP	ug/L			26.8	=
Lead	mg/Kg	160	=	237	=
Magnesium, SPLP	ug/L			1720	J
Magnesium	mg/Kg	1380	=	1850	=
Manganese, SPLP	ug/L			74.4	=
Manganese	mg/Kg	142	=	181	=
Mercury, SPLP	ug/L			0.23	=
Mercury	mg/Kg	0.33	=	0.34	=

Analytical Data Summary

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StationID	G706SB016		G706SB016		G706SB016		G706SB016		
SampleID	706SB016S1 (0-1ft)		706SB016S2 (3-5ft)		706SB016T1 (0-1ft)		706SB016T2 (3-5ft)		
DateCollected	12/14/1999		12/14/1999		12/14/1999		12/14/1999		
DateExtracted	12/20/1999		12/20/1999		12/16/1999		12/16/1999		
DateAnalyzed	12/23/1999		12/23/1999		12/27/1999		12/27/1999		
SDGNumber	EN032		EN032		EN032		EN032		
Parameter	Units								
Aluminum, SPLP	ug/L	1200	J	1210	J				
Aluminum	mg/Kg					6740	=	17700	=
Antimony, SPLP	ug/L	2.4	U	75.1	=				
Antimony	mg/Kg					0.42	J	23.3	J
Arsenic, SPLP	ug/L	2	U	2	U				
Arsenic	mg/Kg					0.54	J	8.5	=
Barium, SPLP	ug/L	707	=	1230	=				
Barium	mg/Kg					14.6	J	83.6	=
Beryllium, SPLP	ug/L	0.9	UJ	0.9	UJ				
Beryllium	mg/Kg					0.22	U	0.95	=
Cadmium, SPLP	ug/L	0.3	U	0.3	J				
Cadmium	mg/Kg					0.17	J	0.18	J
Calcium, SPLP	ug/L	12600	=	14900	=				
Calcium	mg/Kg					1950	=	12100	=
Chromium, Total	mg/Kg					8.7	=	74	=
Chromium, Total	ug/L	0.8	J	1.7	J				
Cobalt, SPLP	ug/L	0.5	UJ	0.5	UJ				
Cobalt	mg/Kg					0.81	J	6.2	=
Copper, SPLP	ug/L	2.5	U	24.6	J				
Copper	mg/Kg					3.4	=	380	=
Iron, SPLP	ug/L	146	J	1560	J				
Iron	mg/Kg					1770	=	29300	=
Lead, SPLP	ug/L	4.8	J	29.3	=				
Lead	mg/Kg					6.3	=	267	=
Magnesium, SPLP	ug/L	564	J	1930	J				
Magnesium	mg/Kg					284	J	2260	=
Manganese, SPLP	ug/L	0.9	J	8.6	J				
Manganese	mg/Kg					11.9	=	158	=
Mercury, SPLP	ug/L	0.2	U	0.2	U				
Mercury	mg/Kg					0.04	U	0.21	=

Analytical Data Summary

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StationID	G706SB017		G706SB017		G706SB018		G706SB018		
SampleID	706SB017S1 (0-1ft)		706SB017T1 (0-1ft)		706SB018S1 (0-1ft)		706SB018S2 (3-5ft)		
DateCollected	12/14/1999		12/14/1999		12/14/1999		12/14/1999		
DateExtracted	12/20/1999		12/16/1999		12/20/1999		12/20/1999		
DateAnalyzed	12/23/1999		12/27/1999		12/23/1999		12/23/1999		
SDGNumber	EN032		EN032		EN032		EN032		
Parameter	Units								
Aluminum, SPLP	ug/L	431	J			2280	J	850	J
Aluminum	mg/Kg			9180	=				
Antimony, SPLP	ug/L	2.4	U			11.3	J	8.8	J
Antimony	mg/Kg			1.4	J				
Arsenic, SPLP	ug/L	2.1	J			6.6	J	5.4	J
Arsenic	mg/Kg			5.1	=				
Barium, SPLP	ug/L	737	=			1210	=	1230	=
Barium	mg/Kg			18.3	J				
Beryllium, SPLP	ug/L	0.9	UJ			0.9	UJ	2.3	J
Beryllium	mg/Kg			0.38	U				
Cadmium, SPLP	ug/L	0.3	U			0.3	J	0.3	U
Cadmium	mg/Kg			0.03	U				
Calcium, SPLP	ug/L	18400	=			12000	=	6800	=
Calcium	mg/Kg			3080	=				
Chromium, Total	mg/Kg			14.5	=				
Chromium, Total	ug/L	0.8	J			6	J	2.7	J
Cobalt, SPLP	ug/L	0.5	UJ			0.5	UJ	0.5	UJ
Cobalt	mg/Kg			1.7	J				
Copper, SPLP	ug/L	5.2	U			140	=	13.8	J
Copper	mg/Kg			15.3	=				
Iron, SPLP	ug/L	514	J			4260	J	2460	J
Iron	mg/Kg			8110	=				
Lead, SPLP	ug/L	10.7	=			39.6	=	9.9	J
Lead	mg/Kg			53.7	=				
Magnesium, SPLP	ug/L	1070	J			3520	J	3590	J
Magnesium	mg/Kg			612	=				
Manganese, SPLP	ug/L	5.8	J			26.5	=	42.2	=
Manganese	mg/Kg			64.9	=				
Mercury, SPLP	ug/L	0.2	U			0.2	U	0.2	U
Mercury	mg/Kg			0.1	=				

Analytical Data Summary

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StationID	G706SB018		G706SB018		G706SB019		G706SB019		
SampleID	706SB018T1 (0-1ft)		706SB018T2 (3-5ft)		706SB019S1 (0-1ft)		706SB019S2 (3-5ft)		
DateCollected	12/14/1999		12/14/1999		12/14/1999		12/14/1999		
DateExtracted	12/16/1999		12/16/1999		12/20/1999		12/20/1999		
DateAnalyzed	12/27/1999		12/27/1999		12/23/1999		12/23/1999		
SDGNumber	EN032		EN032		EN032		EN032		
Parameter	Units								
Aluminum, SPLP	ug/L				1130	J	818	J	
Aluminum	mg/Kg	34500	=	32600	=				
Antimony, SPLP	ug/L				2.4	U	7.1	J	
Antimony	mg/Kg	5.7	J	3.8	J				
Arsenic, SPLP	ug/L				2	U	15.3	=	
Arsenic	mg/Kg	18.1	=	16.6	=				
Barium, SPLP	ug/L				721	=	1020	=	
Barium	mg/Kg	119	=	77.5	=				
Beryllium, SPLP	ug/L				0.9	UJ	0.9	UJ	
Beryllium	mg/Kg	1.8	=	1.7	=				
Cadmium, SPLP	ug/L				0.3	J	0.3	U	
Cadmium	mg/Kg	0.04	U	0.04	U				
Calcium, SPLP	ug/L				9880	=	4730	J	
Calcium	mg/Kg	14500	=	56000	=				
Chromium, Total	mg/Kg	70.5	=	62.1	=				
Chromium, Total	ug/L				0.9	J	2.4	J	
Cobalt, SPLP	ug/L				0.5	UJ	0.5	UJ	
Cobalt	mg/Kg	9.5	=	8.2	=				
Copper, SPLP	ug/L				8.5	J	13.4	J	
Copper	mg/Kg	861	=	175	=				
Iron, SPLP	ug/L				306	J	2030	J	
Iron	mg/Kg	38200	=	31200	=				
Lead, SPLP	ug/L				6.5	J	10.1	=	
Lead	mg/Kg	221	=	113	=				
Magnesium, SPLP	ug/L				439	J	1170	J	
Magnesium	mg/Kg	5370	=	6420	=				
Manganese, SPLP	ug/L				2.8	J	70.8	=	
Manganese	mg/Kg	431	=	428	=				
Mercury, SPLP	ug/L				0.2	U	0.2	U	
Mercury	mg/Kg	0.7	=	0.47	=				

Analytical Data Summary

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StationID	G706SB019	G706SB019	G706SB020	G706SB020
SampleID	706SB019T1 (0-1ft)	706SB019T2 (3-5ft)	706SB020S1 (0-1ft)	706SB020S2 (3-5ft)
DateCollected	12/14/1999	12/14/1999	12/14/1999	12/14/1999
DateExtracted	12/16/1999	12/16/1999	12/20/1999	12/20/1999
DateAnalyzed	12/27/1999	12/27/1999	12/23/1999	12/23/1999
SDGNumber	EN032	EN032	EN032	EN032

Parameter	Units	G706SB019		G706SB020	
Aluminum, SPLP	ug/L			822	J
Aluminum	mg/Kg	10900	=	23800	=
Antimony, SPLP	ug/L			27.9	J
Antimony	mg/Kg	0.73	J	1.6	J
Arsenic, SPLP	ug/L			2.5	J
Arsenic	mg/Kg	1.1	=	25.1	=
Barium, SPLP	ug/L			1050	=
Barium	mg/Kg	21.2	=	53.6	=
Beryllium, SPLP	ug/L			0.9	UJ
Beryllium	mg/Kg	0.24	U	1.2	=
Cadmium, SPLP	ug/L			0.3	U
Cadmium	mg/Kg	0.03	U	0.18	U
Calcium, SPLP	ug/L			18800	=
Calcium	mg/Kg	980	=	3970	=
Chromium, Total	mg/Kg	12.3	=	44.5	=
Chromium, Total	ug/L			1.5	J
Cobalt, SPLP	ug/L			0.5	UJ
Cobalt	mg/Kg	2	J	6.6	=
Copper, SPLP	ug/L			21.7	J
Copper	mg/Kg	8.5	=	51.8	=
Iron, SPLP	ug/L			1530	J
Iron	mg/Kg	3930	=	28400	=
Lead, SPLP	ug/L			23.2	=
Lead	mg/Kg	10.7	=	56.9	=
Magnesium, SPLP	ug/L			2080	J
Magnesium	mg/Kg	608	=	2820	=
Manganese, SPLP	ug/L			8.6	J
Manganese	mg/Kg	30.4	=	446	=
Mercury, SPLP	ug/L			0.2	U
Mercury	mg/Kg	0.05	U	0.23	=

Analytical Data Summary

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StationID	G706SB020		G706SB020		G706SB021		G706SB021		
SampleID	706SB020T1 (0-1ft)		706SB020T2 (3-5ft)		706SB02101 (0-1ft)		706SB02102 (3-5ft)		
DateCollected	12/14/1999		12/14/1999		1/26/2000		1/26/2000		
DateExtracted	12/16/1999		12/16/1999		1/31/2000		1/31/2000		
DateAnalyzed	12/27/1999		12/27/1999		1/31/2000		1/31/2000		
SDGNumber	EN032		EN032		41874		41874		
Parameter	Units								
Aluminum, SPLP	ug/L								
Aluminum	mg/Kg	12800	=	15600	=	4180	=	4250	=
Antimony, SPLP	ug/L								
Antimony	mg/Kg	11.6	J	8.6	J	0.54	U	0.32	U
Arsenic, SPLP	ug/L								
Arsenic	mg/Kg	7	=	9.6	=	2.2	J	1.7	J
Barium, SPLP	ug/L								
Barium	mg/Kg	66.8	=	69.5	=	12.2	=	15.6	=
Beryllium, SPLP	ug/L								
Beryllium	mg/Kg	0.54	=	0.65	=	0.22	J	0.18	J
Cadmium, SPLP	ug/L								
Cadmium	mg/Kg	0.03	U	0.16	J	0.36	U	0.33	U
Calcium, SPLP	ug/L								
Calcium	mg/Kg	3280	=	17000	=	57400	=	25600	=
Chromium, Total	mg/Kg	41.5	=	47.1	=	14.9	=	13.3	=
Chromium, Total	ug/L								
Cobalt, SPLP	ug/L								
Cobalt	mg/Kg	3.8	J	4.6	J	1.5	J	1.1	J
Copper, SPLP	ug/L								
Copper	mg/Kg	271	=	298	=	24	=	10.5	=
Iron, SPLP	ug/L								
Iron	mg/Kg	19900	=	25900	=	3870	=	3200	=
Lead, SPLP	ug/L								
Lead	mg/Kg	181	=	330	=	29	=	18	=
Magnesium, SPLP	ug/L								
Magnesium	mg/Kg	1360	=	2200	=	1530	=	741	=
Manganese, SPLP	ug/L								
Manganese	mg/Kg	201	=	289	=	82.6	=	35.7	=
Mercury, SPLP	ug/L								
Mercury	mg/Kg	0.9	=	0.41	=	0.05	J	0.02	UJ

Analytical Data Summary

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StationID	G706SB022	G706SB022
SampleID	706SB02201 (0-1ft)	706SB02202 (3-5ft)
DateCollected	1/26/2000	1/26/2000
DateExtracted	1/31/2000	1/31/2000
DateAnalyzed	1/31/2000	1/31/2000
SDGNumber	41874	41874

Parameter	Units				
Aluminum, SPLP	ug/L				
Aluminum	mg/Kg	4290	=	7100	=
Antimony, SPLP	ug/L				
Antimony	mg/Kg	0.64	U	1.7	U
Arsenic, SPLP	ug/L				
Arsenic	mg/Kg	2.7	=	6.9	=
Barium, SPLP	ug/L				
Barium	mg/Kg	28.6	=	43.7	=
Beryllium, SPLP	ug/L				
Beryllium	mg/Kg	0.28	J	0.31	J
Cadmium, SPLP	ug/L				
Cadmium	mg/Kg	0.6	U	0.92	U
Calcium, SPLP	ug/L				
Calcium	mg/Kg	31000	=	17800	=
Chromium, Total	mg/Kg	23	=	19.1	=
Chromium, Total	ug/L				
Cobalt, SPLP	ug/L				
Cobalt	mg/Kg	1.6	J	2	J
Copper, SPLP	ug/L				
Copper	mg/Kg	52.6	=	132	=
Iron, SPLP	ug/L				
Iron	mg/Kg	4840	=	7680	=
Lead, SPLP	ug/L				
Lead	mg/Kg	84	=	82	=
Magnesium, SPLP	ug/L				
Magnesium	mg/Kg	1010	=	1340	=
Manganese, SPLP	ug/L				
Manganese	mg/Kg	89.8	=	87.3	=
Mercury, SPLP	ug/L				
Mercury	mg/Kg	0.11	J	1.2	=

Analytical Data Summary

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StationID	G706SB011		G706SB011		G706SB012		G706SB012		
SampleID	706SB01101 (0-1ft)		706SB01102 (3-5ft)		706SB01201 (0-1ft)		706SB01202 (3-5ft)		
DateCollected	7/27/1999		7/27/1999		7/27/1999		7/27/1999		
DateExtracted	8/12/1999		8/12/1999		8/12/1999		8/12/1999		
DateAnalyzed	8/13/1999		8/13/1999		8/13/1999		8/13/1999		
SDGNumber	39679		39679		39679		39679		
Parameter	Units								
Nickel, SPLP	ug/L								
Nickel	mg/Kg	29.7	=	16.2	=	8.2	=	23.2	=
Potassium, SPLP	ug/L								
Potassium	mg/Kg	2060	J	1900	J	565	J	2270	J
Selenium, SPLP	ug/L								
Selenium	mg/Kg	1.1	=	0.51	U	0.48	J	0.65	J
Silver, SPLP	ug/L								
Silver	mg/Kg	0.59	J	0.19	U	0.14	U	0.18	U
Sodium, SPLP	ug/L								
Sodium	mg/Kg	1980	=	2300	=	206	J	1790	=
Thallium, SPLP	ug/L								
Thallium	mg/Kg	0.66	U	0.63	J	0.38	U	0.51	U
Tin (Sn), SPLP	ug/L								
Tin (Sn)	mg/Kg	28.6	J	7.3	U	6.2	U	8.7	U
Vanadium, SPLP	ug/L								
Vanadium	mg/Kg	71.1	=	60	=	26.7	=	65.5	=
Zinc, SPLP	ug/L								
Zinc	mg/Kg	1060	J	281	J	200	J	479	J

Analytical Data Summary

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StationID	G706SB013		G706SB013		G706SB014		G706SB014		
SampleID	706SB01302a (3-5ft)		706SB01302b (3-5ft)		706SB014S1 (0-1ft)		706SB014S2 (3-5ft)		
DateCollected	7/27/1999		7/29/1999		12/14/1999		12/14/1999		
DateExtracted	8/3/1999		10/5/1999		12/20/1999		12/20/1999		
DateAnalyzed	8/4/1999		10/5/1999		12/23/1999		12/23/1999		
SDGNumber	39679		39679		EN032		EN032		
Parameter	Units								
Nickel, SPLP	ug/L	1.2	J			2.8	J	1.6	J
Nickel	mg/Kg			3.8	J				
Potassium, SPLP	ug/L	353	U			9550	J	9190	J
Potassium	mg/Kg			333	=				
Selenium, SPLP	ug/L	2.9	U			2	J	2.5	J
Selenium	mg/Kg			0.33	U				
Silver, SPLP	ug/L	2	U			0.5	U	0.5	U
Silver	mg/Kg			0.12	U				
Sodium, SPLP	ug/L	4780	=			35300	=	34400	=
Sodium	mg/Kg			374	=				
Thallium, SPLP	ug/L	2.3	U			2.4	UJ	2.4	UJ
Thallium	mg/Kg			0.34	U				
Tin (Sn), SPLP	ug/L	29.5	U			2.7	U	2.7	U
Tin (Sn)	mg/Kg			4	U				
Vanadium, SPLP	ug/L	2.7	J			8	J	6.8	J
Vanadium	mg/Kg			11.8	=				
Zinc, SPLP	ug/L	75.3	=			112	=	31.3	=
Zinc	mg/Kg			26.1	J				

Analytical Data Summary

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StationID	G706SB014	G706SB014	G706SB015	G706SB015
SampleID	706SB014T1 (0-1ft)	706SB014T2 (3-5ft)	706SB015S1 (0-1ft)	706SB015T1 (0-1ft)
DateCollected	12/14/1999	12/14/1999	12/14/1999	12/14/1999
DateExtracted	12/16/1999	12/16/1999	12/20/1999	12/16/1999
DateAnalyzed	12/27/1999	12/27/1999	12/23/1999	12/27/1999
SDGNumber	EN032	EN032	EN032	EN032
Parameter	Units			
Nickel, SPLP	ug/L			3.7 J
Nickel	mg/Kg	19.1 =	26.2 =	20.4 =
Potassium, SPLP	ug/L			1520 J
Potassium	mg/Kg	1010 =	1290 =	2780 =
Selenium, SPLP	ug/L			1.7 U
Selenium	mg/Kg	1.3 =	1.7 =	2.8 =
Silver, SPLP	ug/L			0.5 U
Silver	mg/Kg	0.3 J	0.17 J	0.06 U
Sodium, SPLP	ug/L			13500 =
Sodium	mg/Kg	309 J	377 J	927 =
Thallium, SPLP	ug/L			2.4 UJ
Thallium	mg/Kg	0.52 J	0.66 J	1.8 J
Tin (Sn), SPLP	ug/L			2.7 U
Tin (Sn)	mg/Kg	8.7 U	11.5 U	8.7 U
Vanadium, SPLP	ug/L			25 J
Vanadium	mg/Kg	32.3 =	42.1 =	87.2 =
Zinc, SPLP	ug/L			289 =
Zinc	mg/Kg	286 =	531 =	320 =

Analytical Data Summary

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StationID	G706SB016		G706SB016		G706SB016		G706SB016		
SampleID	706SB016S1 (0-1ft)		706SB016S2 (3-5ft)		706SB016T1 (0-1ft)		706SB016T2 (3-5ft)		
DateCollected	12/14/1999		12/14/1999		12/14/1999		12/14/1999		
DateExtracted	12/20/1999		12/20/1999		12/16/1999		12/16/1999		
DateAnalyzed	12/23/1999		12/23/1999		12/27/1999		12/27/1999		
SDGNumber	EN032		EN032		EN032		EN032		
Parameter	Units								
Nickel, SPLP	ug/L	1.1	U	2.1	J				
Nickel	mg/Kg					2.1	J	30.5	=
Potassium, SPLP	ug/L	252	J	4750	J				
Potassium	mg/Kg					263	J	1420	=
Selenium, SPLP	ug/L	1.7	U	2.4	J				
Selenium	mg/Kg					0.45	U	2.4	=
Silver, SPLP	ug/L	0.5	U	0.5	U				
Silver	mg/Kg					0.04	U	0.51	J
Sodium, SPLP	ug/L	6630	=	26600	=				
Sodium	mg/Kg					79	J	936	=
Thallium, SPLP	ug/L	2.4	UJ	2.4	UJ				
Thallium	mg/Kg					0.2	UJ	0.92	J
Tin (Sn), SPLP	ug/L	2.7	U	2.7	U				
Tin (Sn)	mg/Kg					3	U	22.3	=
Vanadium, SPLP	ug/L	9	J	5.3	J				
Vanadium	mg/Kg					10.3	=	47.6	=
Zinc, SPLP	ug/L	20.5	=	101	=				
Zinc	mg/Kg					9.8	=	1150	=

Analytical Data Summary

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StationID	G706SB017		G706SB017		G706SB018		G706SB018		
SampleID	706SB017S1 (0-1ft)		706SB017T1 (0-1ft)		706SB018S1 (0-1ft)		706SB018S2 (3-5ft)		
DateCollected	12/14/1999		12/14/1999		12/14/1999		12/14/1999		
DateExtracted	12/20/1999		12/16/1999		12/20/1999		12/20/1999		
DateAnalyzed	12/23/1999		12/27/1999		12/23/1999		12/23/1999		
SDGNumber	EN032		EN032		EN032		EN032		
Parameter	Units								
Nickel, SPLP	ug/L	1.1	U			3.9	J	2.4	J
Nickel	mg/Kg			5.5	=				
Potassium, SPLP	ug/L	430	J			5460	J	12600	J
Potassium	mg/Kg			339	J				
Selenium, SPLP	ug/L	1.7	U			3.2	J	1.7	U
Selenium	mg/Kg			1.3	=				
Silver, SPLP	ug/L	0.5	U			0.5	U	0.5	U
Silver	mg/Kg			0.05	U				
Sodium, SPLP	ug/L	9850	=			59800	=	79700	=
Sodium	mg/Kg			213	J				
Thallium, SPLP	ug/L	2.4	UJ			2.4	UJ	2.4	UJ
Thallium	mg/Kg			0.22	UJ				
Tin (Sn), SPLP	ug/L	2.7	U			3	J	2.7	U
Tin (Sn)	mg/Kg			4.1	U				
Vanadium, SPLP	ug/L	4.6	J			16.4	J	12.9	J
Vanadium	mg/Kg			19.3	=				
Zinc, SPLP	ug/L	19	J			233	=	73.2	=
Zinc	mg/Kg			41.5	=				

Analytical Data Summary

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StationID	G706SB018		G706SB018		G706SB019		G706SB019	
SampleID	706SB018T1 (0-1ft)		706SB018T2 (3-5ft)		706SB019S1 (0-1ft)		706SB019S2 (3-5ft)	
DateCollected	12/14/1999		12/14/1999		12/14/1999		12/14/1999	
DateExtracted	12/16/1999		12/16/1999		12/20/1999		12/20/1999	
DateAnalyzed	12/27/1999		12/27/1999		12/23/1999		12/23/1999	
SDGNumber	EN032		EN032		EN032		EN032	
Parameter	Units							
Nickel, SPLP	ug/L				1.1	U	2	J
Nickel	mg/Kg	27.3	=	24	=			
Potassium, SPLP	ug/L				275	J	3230	J
Potassium	mg/Kg	3540	=	4260	=			
Selenium, SPLP	ug/L				2.2	J	2.1	J
Selenium	mg/Kg	2.7	=	2.1	=			
Silver, SPLP	ug/L				0.5	U	0.5	U
Silver	mg/Kg	0.06	U	0.06	U			
Sodium, SPLP	ug/L				6770	=	14200	=
Sodium	mg/Kg	2490	=	4710	=			
Thallium, SPLP	ug/L				2.4	UJ	2.4	UJ
Thallium	mg/Kg	1.6	J	1.8	J			
Tin (Sn), SPLP	ug/L				2.7	U	2.7	U
Tin (Sn)	mg/Kg	16.1	=	10.9	U			
Vanadium, SPLP	ug/L				3.1	J	8.4	J
Vanadium	mg/Kg	85.2	=	71.1	=			
Zinc, SPLP	ug/L				26.7	=	61.5	=
Zinc	mg/Kg	618	=	304	=			

Analytical Data Summary

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StationID	G706SB019		G706SB019		G706SB020		G706SB020		
SampleID	706SB019T1 (0-1ft)		706SB019T2 (3-5ft)		706SB020S1 (0-1ft)		706SB020S2 (3-5ft)		
DateCollected	12/14/1999		12/14/1999		12/14/1999		12/14/1999		
DateExtracted	12/16/1999		12/16/1999		12/20/1999		12/20/1999		
DateAnalyzed	12/27/1999		12/27/1999		12/23/1999		12/23/1999		
SDGNumber	EN032		EN032		EN032		EN032		
Parameter	Units								
Nickel, SPLP	ug/L				1.7	J	2.3	J	
Nickel	mg/Kg	4.6	=	14.6	=				
Potassium, SPLP	ug/L				2420	J	4470	J	
Potassium	mg/Kg	479	J	2120	=				
Selenium, SPLP	ug/L				3	J	1.7	U	
Selenium	mg/Kg	0.69	U	2.4	=				
Silver, SPLP	ug/L				0.5	U	0.5	U	
Silver	mg/Kg	0.05	U	0.06	U				
Sodium, SPLP	ug/L				15100	=	21000	=	
Sodium	mg/Kg	111	J	506	J				
Thallium, SPLP	ug/L				2.4	UJ	2.4	UJ	
Thallium	mg/Kg	0.24	UJ	1.1	J				
Tin (Sn), SPLP	ug/L				2.7	U	2.7	U	
Tin (Sn)	mg/Kg	4	U	7	U				
Vanadium, SPLP	ug/L				8	J	3.8	J	
Vanadium	mg/Kg	13.8	=	61.4	=				
Zinc, SPLP	ug/L				84.8	=	23.6	=	
Zinc	mg/Kg	33.8	=	174	=				

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB020		G706SB020		G706SB021		G706SB021		
SampleID	706SB020T1 (0-1ft)		706SB020T2 (3-5ft)		706SB02101 (0-1ft)		706SB02102 (3-5ft)		
DateCollected	12/14/1999		12/14/1999		1/26/2000		1/26/2000		
DateExtracted	12/16/1999		12/16/1999		1/31/2000		1/31/2000		
DateAnalyzed	12/27/1999		12/27/1999		1/31/2000		1/31/2000		
SDGNumber	EN032		EN032		41874		41874		
Parameter	Units								
Nickel, SPLP	ug/L								
Nickel	mg/Kg	18.5	=	26.5	=	5.3	=	3.6	J
Potassium, SPLP	ug/L								
Potassium	mg/Kg	843	=	1370	=	254	J	229	J
Selenium, SPLP	ug/L								
Selenium	mg/Kg	2.5	=	1.9	=	0.4	U	0.39	U
Silver, SPLP	ug/L								
Silver	mg/Kg	1.8	=	0.32	J	0.23	U	0.29	U
Sodium, SPLP	ug/L								
Sodium	mg/Kg	272	J	851	=	411	=	884	=
Thallium, SPLP	ug/L								
Thallium	mg/Kg	0.78	J	0.8	J	0.42	U	0.4	U
Tin (Sn), SPLP	ug/L								
Tin (Sn)	mg/Kg	16.7	=	124	=	5.3	U	5	U
Vanadium, SPLP	ug/L								
Vanadium	mg/Kg	30.9	=	37.9	=	8.3	=	7.2	=
Zinc, SPLP	ug/L								
Zinc	mg/Kg	614	=	685	=	45.7	=	36.8	=

Analytical Data Summary

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StationID	G706SB022	G706SB022
SampleID	706SB02201 (0-1ft)	706SB02202 (3-5ft)
DateCollected	1/26/2000	1/26/2000
DateExtracted	1/31/2000	1/31/2000
DateAnalyzed	1/31/2000	1/31/2000
SDGNumber	41874	41874

Parameter	Units	G706SB022		G706SB022	
Nickel, SPLP	ug/L				
Nickel	mg/Kg	6.2	=	10	=
Potassium, SPLP	ug/L				
Potassium	mg/Kg	210	J	449	=
Selenium, SPLP	ug/L				
Selenium	mg/Kg	0.43	U	0.44	U
Silver, SPLP	ug/L				
Silver	mg/Kg	0.45	U	0.52	U
Sodium, SPLP	ug/L				
Sodium	mg/Kg	436	=	953	=
Thallium, SPLP	ug/L				
Thallium	mg/Kg	0.44	U	0.59	J
Tin (Sn), SPLP	ug/L				
Tin (Sn)	mg/Kg	8.4	U	11.4	U
Vanadium, SPLP	ug/L				
Vanadium	mg/Kg	12.8	=	19.4	=
Zinc, SPLP	ug/L				
Zinc	mg/Kg	99.5	=	243	=

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB013	G706SB014	G706SB014	G706SB015
SampleID	706SB01302a (3-5ft)	706SB01401 (0-1ft)	706SB01402 (3-5ft)	706SB01501 (0-1ft)
DateCollected	7/27/1999	12/14/1999	12/14/1999	12/14/1999
DateExtracted	8/30/1999	12/20/1999	12/20/1999	12/20/1999
DateAnalyzed	9/9/1999	1/7/2000	1/7/2000	1/7/2000
SDGNumber	39679	EN032	EN032	EN032

Parameter	Units						
Chromium (Hexavalent)	mg/Kg						
Total Organic Carbon	%, DR		1.7	=	3.6	=	3.8
Total Organic Carbon	mg/Kg	3860	=				

Analytical Data Summary

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StationID	G706SB016	G706SB016	G706SB017	G706SB018
SampleID	706SB01601 (0-1ft)	706SB01602 (3-5ft)	706SB01701 (0-1ft)	706SB01801a (0-1ft)
DateCollected	12/14/1999	12/14/1999	12/14/1999	12/14/1999
DateExtracted	12/20/1999	12/20/1999	12/20/1999	12/20/1999
DateAnalyzed	1/7/2000	1/7/2000	1/7/2000	1/7/2000
SDGNumber	EN032	EN032	EN032	EN032

Parameter	Units	G706SB016		G706SB017		G706SB018	
Chromium (Hexavalent)	mg/Kg						
Total Organic Carbon	%, DR	0.4	=	0.7	=	1	=
Total Organic Carbon	mg/Kg						

Analytical Data Summary

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StationID	G706SB018		G706SB018		G706SB018		G706SB019	
SampleID	706SB01801b (0-1ft)		706SB01802a (3-5ft)		706SB01802b (3-5ft)		706SB01901 (0-1ft)	
DateCollected	1/26/2000		1/26/2000		12/14/1999		12/14/1999	
DateExtracted					12/20/1999		12/20/1999	
DateAnalyzed	2/2/2000		2/2/2000		1/7/2000		1/7/2000	
SDGNumber	41874		41874		EN032		EN032	
Parameter	Units							
Chromium (Hexavalent)	mg/Kg	0.3	=	0.7	=			
Total Organic Carbon	%, DR					2.1	=	0.2
Total Organic Carbon	mg/Kg							

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB019	G706SB020	G706SB020
SampleID	706SB01902 (3-5ft)	706SB02001 (0-1ft)	706SB02002 (3-5ft)
DateCollected	12/14/1999	12/14/1999	12/14/1999
DateExtracted	12/20/1999	12/20/1999	12/20/1999
DateAnalyzed	1/7/2000	1/7/2000	1/7/2000
SDGNumber	EN032	EN032	EN032

Parameter	Units				
Chromium (Hexavalent)	mg/Kg				
Total Organic Carbon	%, DR	2.1	=	1.5	=
Total Organic Carbon	mg/Kg				

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706SB014		G706SB014		G706SB014	
SampleID	706SB01401 (0-1ft)		706SB01402 (3-5ft)		706SB01402RE (3-5ft)	
DateCollected	12/14/1999		12/14/1999		12/14/1999	
DateExtracted	12/21/1999		12/21/1999		1/3/2000	
DateAnalyzed	12/29/1999		12/29/1999		1/10/2000	
SDGNumber	41541		41541		41541	
Parameter	Units					
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	53.762	=	7630	=	7629.653 R
1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	16.146	=	42.472	=	138.805 R
1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	1.205	U	1.969	J	72.502 R
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	0.437	J	23.95	=	91.919 R
1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	12.444	J	16.347	J	47.354 R
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	1.946	J	59.102	=	204.89 R
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	2.677	J	4.693	J	35.514 R
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	3.18	=	79.596	=	204.468 R
1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	2.145	U	5.016	U	56.221 R
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	1.201	U	3.838	J	51.78 R
1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	1.393	J	2.82	J	34.024 R
2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	2.267	=	4.537	J	41.525 R
2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	2.108	=	1.45	J	34.4 R
2,3,7,8-Tetrachlorodibenzo-p-dioxin	ng/kg	0.204	U	0.232	U	33.653 R
2,3,7,8-Tetrachlorodibenzofuran	ng/kg	3.285	J	5.397	=	36.263 R
Octachlorodibenzo-p-dioxin	ng/kg	419.157	=	60722	=	60722.315 R
Octachlorodibenzofuran	ng/kg	20.733	=	89.112	=	285.265 R
Total Hepta-Dioxins	ng/kg	230.534	=	16669	=	16669.227 R
Total Hepta-Furans	ng/kg	16.146	=	42.472	=	138.805 R
Total Hexa-Dioxins	ng/kg	20.415	=	764.522	=	296.387 R
Total Hexa-Furans	ng/kg	19.161	=	27.476	=	35.514 R
Total Penta-Dioxins	ng/kg	1.201	U	6.302	=	51.78 R
Total Penta-Furans	ng/kg	30.5	=	29.419	=	34.4 R
Total Tetra-Dioxins	ng/kg	0.204	U	2.404	=	33.653 R
Total Tetra-Furans	ng/kg	1.562	=	20.401	=	36.263 R

Analytical Data Summary

01/24/2003 10:00 AM

StationID	G706SB018		G706SB018		
SampleID	706SB01801a (0-1ft)		706SB01802b (3-5ft)		
DateCollected	12/14/1999		12/14/1999		
DateExtracted	12/21/1999		12/21/1999		
DateAnalyzed	12/29/1999		12/29/1999		
SDGNumber	41541		41541		
Parameter	Units				
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	268.499	J	238.588	J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	47.395	=	5.032	=
1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	0.962	U	0.374	U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	3.489	=	0.903	U
1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	27.09	J	1.75	J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	12.486	=	5.975	J
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	6.209	J	0.417	U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	12.792	J	7.041	J
1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	3.782	U	0.661	U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	1.473	U	0.929	U
1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	2.14	J	0.395	U
2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	8.873	U	0.488	U
2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	3.984	=	0.646	=
2,3,7,8-Tetrachlorodibenzo-p-dioxin	ng/kg	0.184	U	0.399	U
2,3,7,8-Tetrachlorodibenzofuran	ng/kg	9.638	=	1.487	J
Octachlorodibenzo-p-dioxin	ng/kg	1215.572	=	1906.051	=
Octachlorodibenzofuran	ng/kg	25.858	=	7.933	=
Total Hepta-Dioxins	ng/kg	4.501	U	332.459	=
Total Hepta-Furans	ng/kg	47.395	=	5.032	=
Total Hexa-Dioxins	ng/kg	85.088	=	32.871	=
Total Hexa-Furans	ng/kg	44.767	=	0.417	U
Total Penta-Dioxins	ng/kg	1.473	U	0.929	U
Total Penta-Furans	ng/kg	67.569	=	6.027	=
Total Tetra-Dioxins	ng/kg	0.877	=	0.399	U
Total Tetra-Furans	ng/kg	30.152	=	3.134	=

Analytical Data Summary

01/24/2003 10:04 AM

Parameter	Units		
		StationID	G706GW001
		SampleID	706GW001A4
		DateCollected	02/12/1998
		DateExtracted	02/17/1998
		DateAnalyzed	02/21/1998
		SDGNumber	32754
2,2'-Oxybis(1-chloro)propane	ug/L	10	U
4-Methylphenol (p-Cresol)	ug/L	10	U
N-Nitrosodiphenylamine	ug/L	10	U
Phenol	ug/L	10	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/l	10	U
2-Chlorophenol	ug/L	10	U
1,3-Dichlorobenzene	ug/L	10	U
1,4-Dichlorobenzene	ug/l	10	U
Benzyl alcohol	ug/L	10	U
1,2-Dichlorobenzene	ug/L	10	U
Bis(2-Chloroisopropyl)Ether	ug/l		
2-Methylphenol (o-Cresol)	ug/L	10	U
N-Nitrosodi-n-propylamine	ug/l	10	U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/l		
Hexachloroethane	ug/L	10	U
Nitrobenzene	ug/l	10	U
Isophorone	ug/l	10	U
2-Nitrophenol	ug/L	10	U
2,4-Dimethylphenol	ug/L	10	U
bis(2-Chloroethoxy) Methane	ug/l	10	U
2,4-Dichlorophenol	ug/L	10	U
Benzoic acid	ug/l	2	J
1,2,4-Trichlorobenzene	ug/l		
Naphthalene	ug/L	10	U
4-Chloroaniline	ug/L	10	U
Hexachlorobutadiene	ug/L	10	U
4-Chloro-3-methylphenol	ug/l	10	U
2-Methylnaphthalene	ug/l	10	U
Hexachlorocyclopentadiene	ug/l	10	U
2,4,6-Trichlorophenol	ug/l	10	U

Analytical Data Summary

01/24/2003 10:07 AM

Parameter	Units	Value	Unit
StationID		G706GW001	
SampleID		706GW001A4	
DateCollected		02/12/1998	
DateExtracted		02/17/1998	
DateAnalyzed		02/21/1998	
SDGNumber		32754	
2,4,5-Trichlorophenol	ug/l	50	U
2-Chloronaphthalene	ug/l	10	U
2-Nitroaniline	ug/L	50	U
3-Nitroaniline	ug/L	50	U
Dimethyl Phthalate	ug/l	10	U
2,6-Dinitrotoluene	ug/l	10	U
Acenaphthylene	ug/l	10	U
Acenaphthene	ug/l	10	U
2,4-Dinitrophenol	ug/L	50	U
Dibenzofuran	ug/L	10	U
2,4-Dinitrotoluene	ug/l	10	U
Diethyl Phthalate	ug/l	10	U
4-Nitrophenol	ug/L	50	U
Fluorene	ug/l	10	U
4-Chlorophenyl Phenyl Ether	ug/L	10	U
4,6-Dinitro-2-methylphenol	ug/l	50	U
4-Nitroaniline	ug/l	50	U
4-Bromophenyl Phenyl Ether	ug/l	10	U
Hexachlorobenzene	ug/L	10	UJ
Pentachlorophenol	ug/L	50	U
Phenanthrene	ug/L	10	U
Anthracene	ug/L	10	U
Di-n-butyl Phthalate	ug/L	10	U
Fluoranthene	ug/l	10	U
Pyrene	ug/L	10	U
Benzyl Butyl Phthalate	ug/L	10	U
Benzo(a)Anthracene	ug/L	10	U
3,3'-Dichlorobenzidine	ug/l	20	U
Chrysene	ug/L	10	U
bis(2-Ethylhexyl) Phthalate	ug/L	10	U

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706GW001
SampleID	706GW001A4
DateCollected	02/12/1998
DateExtracted	02/17/1998
DateAnalyzed	02/21/1998
SDGNumber	32754

Parameter	Units		
Di-n-octylphthalate	ug/l	10	U
Benzo(b)Fluoranthene	ug/L	10	U
Benzo(k)Fluoranthene	ug/l	10	U
Benzo(a)Pyrene	ug/L	10	U
Indeno(1,2,3-c,d)pyrene	ug/l	10	U
Dibenz(a,h)anthracene	ug/l	10	U
Benzo(g,h,i)Perylene	ug/l	10	U
Carbazole	ug/l		

Analytical Data Summary

01/24/2003 10:00 AM

StationID	G706GW001	G706GW001
SampleID	706GW001A4	706GW001A5
DateCollected	02/12/1998	07/27/1999
DateExtracted	02/18/1998	08/12/1999
DateAnalyzed	02/20/1998	08/13/1999
SDGNumber	32754	39675

Parameter	Units				
Tin (Sn)	ug/L	14	U	4.1	U
Aluminum	ug/L	22.6	J	32.1	U
Antimony	ug/L	9.4	J	45.6	J
Arsenic	ug/L	16.6	=	39.9	=
Barium	ug/L	1440	=	2290	=
Beryllium	ug/L	0.2	U	0.3	U
Cadmium	ug/L	0.48	J	0.83	U
Calcium	ug/L	251000	=	225000	=
Chromium, Total	ug/L	2.1	J	0.5	UJ
Cobalt	ug/L	0.88	J	3.4	J
Copper	ug/L	1.4	U	1	U
Iron	ug/L	43900	=	187	U
Lead	ug/L	1.3	J	2.1	U
Magnesium	ug/L	466000	=	287000	=
Manganese	ug/L	1370	=	1000	=
Nickel	ug/L	6	J	13.9	J
Potassium	ug/L	188000	=	353	U
Selenium	ug/L	3.4	U	2.9	U
Silver	ug/L	1	U	2	U
Sodium	ug/L	4910000	=	3520000	=
Thallium	ug/L	5	U	2.3	U
Vanadium	ug/L	1.2	J	2	J
Zinc	ug/L	51.8	=	89.9	=
Mercury	ug/L	0.12	J	0.37	U
Arsenic	mg/l				
Barium	mg/l				
Cadmium	mg/l				
Chromium, Total	mg/l				
Lead	mg/l				
Selenium	mg/l				

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706GW001	G706GW001
SampleID	706GW001A4	706GW001A5
DateCollected	02/12/1998	07/27/1999
DateExtracted	02/18/1998	08/12/1999
DateAnalyzed	02/20/1998	08/13/1999
SDGNumber	32754	39675

Parameter	Units				
Silver	mg/l				
Mercury	mg/l				

Analytical Data Summary

01/24/2003 10:41 AM

StationID G706GW001
SampleID 706GW001A5
DateCollected 7/27/1999
DateExtracted 7/29/1999
DateAnalyzed 8/6/1999
SDGNumber 39675

Parameter	Units		
PCB-1016 (Arochlor 1016)	ug/L	1	U
PCB-1221 (Arochlor 1221)	ug/L	1	U
PCB-1232 (Arochlor 1232)	ug/L	1	U
PCB-1242 (Arochlor 1242)	ug/L	1	U
PCB-1248 (Arochlor 1248)	ug/L	1	U
PCB-1254 (Arochlor 1254)	ug/L	1	U
PCB-1260 (Arochlor 1260)	ug/L	1	U

Analytical Data Summary

01/24/2003 10:04 AM

StationID G706GW001
 SampleID 706GW001A5
 DateCollected 7/27/1999
 DateExtracted 7/29/1999
 DateAnalyzed 8/6/1999
 SDGNumber 39675

Parameter	Units		
Aldrin	ug/L	0.04	U
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/L	0.04	U
Alpha-chlordane	ug/L	0.04	U
Beta BHC (Beta Hexachlorocyclohexane)	ug/L	0.04	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/L	0.04	U
Dieldrin	ug/L	0.08	U
Endosulfan I	ug/L	0.04	U
Endosulfan II	ug/L	0.08	U
Endosulfan Sulfate	ug/L	0.08	U
Endrin Aldehyde	ug/L	0.08	U
Endrin Ketone	ug/L	0.08	U
Endrin	ug/L	0.08	U
Gamma BHC (Lindane)	ug/L	0.04	U
Gamma-chlordane	ug/L	0.04	U
Heptachlor Epoxide	ug/L	0.04	U
Heptachlor	ug/L	0.04	U
Methoxychlor	ug/L	0.38	U
p,p'-DDD	ug/L	0.08	U
p,p'-DDE	ug/L	0.08	U
p,p'-DDT	ug/L	0.08	U
Toxaphene	ug/L	2.5	U

Analytical Data Summary

01/24/2003 10:11 AM

StationID	G706GW001
SampleID	706GW001A4
DateCollected	02/12/1998
DateExtracted	02/17/1998
DateAnalyzed	02/21/1998
SDGNumber	32754

Parameter	Units		
m-Xylene	ug/l		
1,2,4-Trichlorobenzene	ug/L	10	U
Chloromethane	ug/l		
Vinyl chloride	ug/l		
Bromomethane	ug/l		
Chloroethane	ug/l		
1,1-Dichloroethene	ug/l		
Acetone	ug/l		
Carbon Disulfide	ug/l		
Methylene Chloride	ug/l		
trans-1,2-Dichloroethene	ug/l		
1,1-Dichloroethane	ug/l		
Vinyl acetate	ug/l		
Methyl ethyl ketone (2-Butanone)	ug/l		
cis-1,2-Dichloroethylene	ug/l		
1,2-Dichloroethene (total)	ug/l		
Chloroform	ug/l		
1,1,1-Trichloroethane	ug/l		
Carbon Tetrachloride	ug/l		
1,2-Dichloroethane	ug/l		
Benzene	ug/l		
Trichloroethylene (TCE)	ug/l		
1,2-Dichloropropane	ug/l		
Bromodichloromethane	ug/l		
2-Chloroethyl vinyl ether	ug/l		
cis-1,3-Dichloropropene	ug/l		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/l		
Toluene	ug/l		
trans-1,3-Dichloropropene	ug/l		
1,1,2-Trichloroethane	ug/l		

Analytical Data Summary

01/24/2003 10:04 AM

StationID	G706GW001	
SampleID	706GW001A4	
DateCollected	02/12/1998	
DateExtracted	02/17/1998	
DateAnalyzed	02/21/1998	
SDGNumber	32754	
Parameter	Units	
2-Hexanone	ug/l	
Tetrachloroethylene (PCE)	ug/l	
Dibromochloromethane	ug/l	
Chlorobenzene	ug/l	
Ethylbenzene	ug/l	
m+p Xylene	ug/l	
o-Xylene	ug/l	
Xylenes, Total	ug/l	
Styrene	ug/l	
Bromoform	ug/l	
1,1,2,2-Tetrachloroethane	ug/l	
1,3-Dichlorobenzene	ug/l	
1,4-Dichlorobenzene	ug/l	
1,2-Dichlorobenzene	ug/l	
1,2,4-Trichlorobenzene	ug/l	
1,2,3-Trichlorobenzene	ug/l	

Data Validation Report (EnSafe 1999-2000)



HEARTLAND

ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 39741
Date: September 13, 1999
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: July 30, 1999
Number of Samples: 3 Non-Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data, February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fraction: Pesticides / PCBs

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

9-14-99
Date

SDG# 39741

Samples and Fractions Reviewed

Sample Identifications Analytical Fraction

ENSAFE ID	MATRIX	P/P	
003SB01301	SOIL		X
003CB01301	SOIL		X
003SB01302	SOIL		X
Total Billable Samples (Water/Soil)		0	3

P/P= Pesticides / PCBs

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081 and 8082; the National Functional Guidelines for Organic Data Validation, February 1994; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 39741

A validation was performed on the Pesticide/Aroclor Data from SDG 39741. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC Performance
- * • Calibration
- * • Blanks
- Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Compound Identification
- Compound Quantitation

* - All criteria were met for this parameter.

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLOR ANALYSIS

PAGE - 2

Surrogate Recoveries

The samples listed below exhibited high TCX and/or DCB recoveries during the Pesticide analysis. The positive results are qualified as estimated, J.

<u>Sample ID</u>	<u>Surrogate</u>	<u>% Recovery</u>
003SB01301	TCX-1	123%
003CB01301	TCX-1	138%
	DCB-2	146%

Compound Quantitation

Several samples exhibited column quantitation %Ds greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences < 40%. The "P" flag is removed from the result.
2. The positive sample result which exhibited a column quantitation difference > 40%, but ≤ 100% is qualified as estimated, J.
3. The positive single component pesticide sample result which exhibited a column quantitation difference > 100% and is < 10X the respective compound CRQL, is qualified as non-detect, U. (All multi-component results are exempt from this rule.)
4. The positive single component pesticide sample result which exhibited a column quantitation difference > 100% and > 10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ. (All multi-component results are exempt from this rule.)
5. The positive multi-component pesticide sample result which exhibited a column quantitation difference > 100% and < 10X the respective multi-component CRQL is qualified as presumptively present at an estimated concentration, NJ.

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLOR ANALYSIS

PAGE - 3

Compound Quantitation, Continued

The following samples and compounds have been qualified for high column quantitation %Ds.

<u>Sample ID</u>	<u>Compound</u>	<u>%D</u>	<u>Lab Qual.</u>	<u>HESI Qual.</u>	<u>Ref. #</u>
003SB01301	Endosulfan I	63.8%	P	J	2
	Gamma-Chlordane	73.2%	P	J	2
003SB01301DL	4,4'-DDD	96.1%	P	J	2
003CB01301	Gamma-Chlordane	73.5%	P	J	2
003CB01301DL	4,4'-DDD	93.4%	P	J	2
003SB01302	4,4'-DDD	76.7%	P	J	2

All samples were diluted to accurately quantitate target compounds. For the following samples, the results for the E-flagged compounds are replaced with the corresponding results from the dilution analysis. All other results from the dilution analysis are not used.

All Samples

Sample 003SB01301 exhibited a positive result above the calibration range of the instrument for 4,4'-DDE. Alpha-Chlordane was not detected in the dilution analysis. For the following sample and E-flagged compound, the positive result is qualified as estimated, J.

003SB01301 4,4'-DDE

System Performance and Overall Assessment

The data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

NJ = Result is considered presumptively present at an estimated concentration

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
003SB01301	All Pesticides	+	J
003CB01301	All Pesticides	+	J
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	single component pests All P > 100% And < 10X CRQL	+	U
ALL	single component pests All P > 100% And > 10X CRQL	+	NJ
ALL	multi-component pests All P > 100% And < 10X CRQL	+	NJ
All Samples	All E-Flagged	+E	D
All DL Samples	All except corresponding D-Flagged results	+/-	not used
003SB01301	4,4'-DDE	+E	J

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non-detect result

**MULTI-MEDIA PESTICIDE/AROCLOR FRACTION
BLANK SUMMARY**

1. Blank qualification guidelines:

- a) If a compound is found in the blank but not in the sample, no action is taken.
- b) Any compound detected in the sample, which was also detected in the associated blank, must be qualified by elevating the limit of detection or adjusting the limit of detection to the sample result, when the sample concentration is less than five (5) times the blank concentration.
- c) The reviewer should take note that the blank analysis may not involve the same weights, volumes or dilution factors as associated samples. These factors must be taken into consideration when applying the 5X and 10X criteria.
- d) In addition, the reviewer must review the trip blanks, rinseate blanks and field blanks (if they were submitted with the data package) and all associated samples. Apply the same data validation guidelines used in assessing the method blanks.
- e) Qualification/Action codes:

U - The sample result is greater than the CRQL and less than five times (5X) the blank value. Cross out the "B" flag and qualify the sample result with a "U".

CRQL - The sample result is less than the CRQL and less than five times (5X) the blank value. Reject the sample result, cross out the "B" flag, and report the CRQL.

No Action - The sample result is greater than the CRQL and greater than five times (5X) the blank value.

MULTI-MEDIA PESTICIDE/AROCLOR FRACTION

SAMPLE RESULT VERIFICATION

1. Were the sample results reported within the calibration range (YES/NO)? YES-
dilutions were required
2. Was the percent moisture reported for all soil samples (YES/NO/NA)? YES
3. Was the data reported on a dry weight basis (YES/NO/NA)? YES
4. Did the GC chromatograms exhibit interferences, off scale peaks or elevated baseline (YES/NO)? Level III--Chromatograms not included
5. Did the data contain elevated detection limits that could not be verified (YES/NO)?NO
6. Were any computational or transcription errors found (YES/NO)? NO

Specific Comments:

P-Flags

Dilutions: all samples

DDE in sample 003SB01301 was above the calibration range of the instrument and non-detect in DL. Qualify as estimated, J.

Reviewer

Erica K. Ketchum

Date:

9/12/99

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

SDG NARRATIVE

CLIENT: ENSAFE
PROJECT: ZONE G, RELEASE 118
SDG NO: 39741
FRACTION: PCBs

3 soil samples were extracted by SW846 method 3550 and analyzed for PCBs by SW846 method 8082.

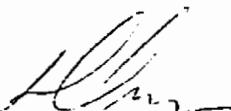
No major problems occurred during the analyses of these samples.

Blanks: No corrective action required.

Surrogates: No corrective action required.

Laboratory Control Spikes: No corrective action required.

Matrix Spikes: No corrective action required.


Drew Cowan
GC Supervisor
Dc

August 18, 1999

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

SDG NARRATIVE

CLIENT: ENSAFE
PROJECT: ZONE G, RELEASE 118
EPISODE: 39741
FRACTION: Pesticides

3 soil samples were extracted by SW846 method 3550 and analyzed for pesticides by SW846 method 8081.

It should be noted that SWLO is in the process of correcting a "software bug" in the program that generates the Form 8D. The program does not allow for the center of the retention time window to be updated with the daily calibration verification. As a result, there are surrogate retention times flagged as out of window incorrectly.

When analyzed undiluted the soil samples in this SDG caused breakdown of pesticides in the calibration verification standards following their injection (making the data non-compliant according to method 8000/8081A). The calibration verification standards analyzed before these samples met method 8000/8081A continuing calibration criteria. When diluted the samples met acceptance criteria. A non-compliant undiluted analysis and a compliant, dilution analysis was performed for these samples. Forms for the undiluted and the dilution data have been submitted. All of the samples except 003SB01302 required dilution in order to bring target analytes within calibration range.

Blanks: No corrective action required.

Surrogates: No corrective action required.

Laboratory Control Spike: No corrective action required.

Matrix Spikes: No corrective action required (SWLO episode 39681).


Drew Cowan
GC Supervisor
Dc

August 18, 1999



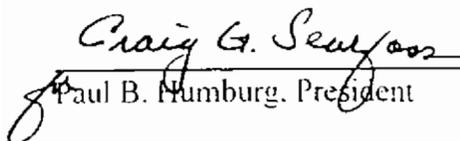
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: EN031
Date: January 13, 2000
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: December 13 - 14, 1999
Number of Samples: 22 Non-Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Laucks Testing Laboratories
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data.
February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Semivolatiles, Metals, SPLP Metals and Total Organic Carbon

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

1-20-00.
Date

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # EN031

A validation was performed on the Semivolatile Data from SDG EN031. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- * • Calibration
- * • Blanks
- * • Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Internal Standard Performance
- * • Compound Identification
- * • Compound Quantitation

* - All criteria were met for this parameter.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
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No qualifications are required.

- * DL denotes the Form I qualifier supplied by the laboratory
- QL denotes the qualifier used by the data validation firm
- + in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE METALS (SOILS AND SPLP) AND TOC

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # EN031

A validation was performed on the Metals for soils and SPLP and TOC Data from SDG EN031. The data was evaluated based on the following parameters.

- * ● Data Completeness
- * ● Holding Times
- * ● Calibrations
- Blanks
- * ● Interferences
- Matrix Spike Recovery
- Matrix Duplicates
- * ● Field Duplicates
- * ● Laboratory Control Samples
- Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Copper	1.0 ug/l	all SPLP samples below 5.0 ug/l
Lead	2.1 ug/l	all SPLP samples below 10.5 ug/l
Manganese	0.5 ug/l	all SPLP samples below 2.5 ug/l
Zinc	2.4 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Arsenic	-0.24 mg/kg	all soil samples below 2.4 mg/kg
Calcium	-11.5 mg/kg	no impact
Thallium	-0.86 mg/kg	all soil samples below 8.6 mg/kg
Thallium	-2.7 ug/l	all SPLP samples below 27.0 ug/l

This reviewer qualifies all samples results below 10 times the absolute value of the negative blank value.

Matrix Spike Recovery results

The matrix spike recoveries for soils for Antimony (62%) and for SPLP for Aluminum (58%), Iron (63%) and Silver (46%) were below the lower control limits (>30% but <75%). All positive and non-detect results are qualified as estimated, "J" or "UJ".

The matrix spike recovery for soils for Zinc (199%) was above the upper control limits (>125%). All positive results are qualified as estimated, "J".

Matrix Duplicate results

The matrix duplicate RPD results for soils for Calcium (37%) was greater than 35% for waters for Aluminum (83%), Iron (113%) and Zinc (70%) were greater than 20%. All positive results are qualified as estimated, "J". The difference for soils for Mercury was not greater than two times the CRDL and the percent differences for soils for Chromium (33%), Lead (21%), Manganese (21%) and Zinc (26%) were not greater than 35% and therefore are not qualified.

Serial Dilution recovery results

The serial dilution results for SPLPs for Magnesium was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all SPLP samples below 5.0 ug/l	Cu.	+	U
all SPLP samples below 10.5 ug/l	Pb.		
all SPLP samples below 2.5 ug/l	Mn.		
all soil samples below 8.6 mg/kg	Tl.	+/U	J/UJ
all SPLP samples below 2.7 ug/l	Tl..		
all soil samples below 2.4 mg/kg	As.		
all soil samples	Sb.	+/U	J/UJ
all SPLP samples	Al, Fe and Ag.		
all soil samples	Zn.	+	J
all soil samples	Ca.	+	J
all SPLP samples	Al, Fe and Zn.		
all SPLP samples	Mg.	+	J
all "B" results	all analytes	B	J



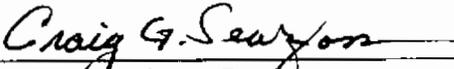
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 39715
Date: October 15, 1999
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: July 28 & 29, 1999
Number of Samples: 22 Non-Aqueous Sample(s) with 0 MS/MSD(s)
1 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma, Inc.
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data,
February, 1994
QA/QC Level: DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, Semivolatiles, Pesticides, PCBs, SPLP Pesticides, SPLP
PCBs, Metals, SPLP Metals and Total Organic Carbons

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


for Paul B. Humburg, President

10-18-99.
Date

SDG# 39715

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA	SVOA	PEST	PCB	SP-PEST	SP-PCB	MET	SP-MET	TOC									
FDSTB03101	WATER	X																	
FDSSI102801	SOIL	X	X	X				X											
FDSSI102802	SOIL	X	X	X				X											
FDSSH02901	SOIL	X	X	X				X											
FDSSI102902	SOIL	X	X	X				X											
FDSSI103001	SOIL	X	X	X				X											
FDSCI103001	SOIL	X	X	X				X											
FDSSH03002	SOIL	X	X	X				X											
FDSSH03101	SOIL	X	X	X				X											
FDSCI03101	SOIL	X	X	X				X											
FDSSI103102	SOIL	X	X	X				X											
003SB01101	SOIL			X															
003SB01102	SOIL			X															
003SB01201	SOIL			X															
003CB01201	SOIL			X															
003SB01202	SOIL			X															
003SB01402	SOIL			X		X				X									
633SB01101	SOIL			X															
633CB01101	SOIL			X															
633SB01102	SOIL			X															
633SB01202	SOIL				X		X			X									
643SB01302	SOIL			X		X		X	X	X									
642SB01102	SOIL							X	X	X									
Total Billable Samples (Water/Soil)		1	10	0	10	0	20	0	1	0	2	0	1	0	12	0	2	0	4

VOA= Volatiles
 SVOA= Semivolatiles
 PEST= Pesticides
 PCB= PCBs
 SP-PEST= SPLP Pesticides

SP-PCB= SPLP PCBs
 MET= Metals
 SP-MET= SPLP Metals
 TOC= Total Organic Carbons



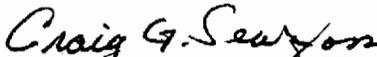
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 39715
Date: October 15, 1999
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: July 28 & 29, 1999
Number of Samples: 22 Non-Aqueous Sample(s) with 0 MS/MSD(s)
1 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma, Inc.
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data,
February, 1994
QA/QC Level: DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, Semivolatiles, Pesticides, PCBs, SPLP Pesticides. SPLP
PCBs, Metals, SPLP Metals and Total Organic Carbons

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:



Paul B. Humburg, President

10-18-99.

Date

SDG# 39715

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA	SVOA	PEST	PCB	SP-PEST	SP-PCB	MET	SP-MET	TOC									
FDSTB03101	WATER	X																	
FDSSH02801	SOIL	X	X	X				X											
FDSSH02802	SOIL	X	X	X				X											
FDSSH02901	SOIL	X	X	X				X											
FDSSH02902	SOIL	X	X	X				X											
FDSSH03001	SOIL	X	X	X				X											
FDSCH03001	SOIL	X	X	X				X											
FDSSH03002	SOIL	X	X	X				X											
FDSSH03101	SOIL	X	X	X				X											
FDSCH03101	SOIL	X	X	X				X											
FDSSH03102	SOIL	X	X	X				X											
003SB01101	SOIL			X															
003SB01102	SOIL			X															
003SB01201	SOIL			X															
003CB01201	SOIL			X															
003SB01202	SOIL			X															
003SB01402	SOIL			X		X				X									
633SB01101	SOIL			X															
633CB01101	SOIL			X															
633SB01102	SOIL			X															
633SB01202	SOIL				X		X			X									
643SB01302	SOIL			X		X		X	X	X									
642SB01102	SOIL							X	X	X									
Total Billable Samples (Water/Soil)		1	10	0	10	0	20	0	1	0	2	0	1	0	12	0	2	0	4

VOA= Volatiles
 SVOA= Semivolatiles
 PEST= Pesticides
 PCB= PCBs
 SP-PEST= SPLP Pesticides

SP-PCB= SPLP PCBs
 MET= Metals
 SP-MET= SPLP Metals
 TOC= Total Organic Carbons



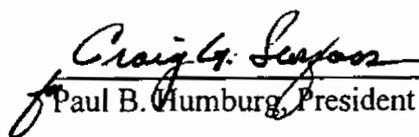
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 41874
Date: February 17, 2000
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: January 26, 2000
Number of Samples: 11 Non-Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data, February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Metals and Hexavalent Chromium

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

2-23-00.
Date

SDG# 41874

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	MET		CR+6
636SB01801	SOIL		X	
636SB01802	SOIL		X	
636SB01901	SOIL		X	
636SB01902	SOIL		X	
636SB02001	SOIL		X	
706SB01801	SOIL			X
706SB01802	SOIL			X
706SB02101	SOIL		X	
706SB02102	SOIL		X	
706SB02201	SOIL		X	
706SB02202	SOIL		X	
Total Billable Samples (Water/Soil)		0	9	0 2

MET= Metals

CR+6= Hexavalent Chromium



HEARTLAND

ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: ECZG02
Date: June 9, 1998
Client Name: EnSafe
Project/Site Name: Charleston - Zone F & G
Date Sampled: April 20-22, 1998
Number of Samples: 16 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Savannah Laboratories
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data, February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, Semivolatiles, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:



Paul B. Humburg, President

6-15-98.

Date



HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 41852
Date: February 17, 2000
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: January 25, 2000
Number of Samples: 23 Non-Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data, February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Semivolatiles and Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

2-24-00.
Date

SDG# 41852

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	SVOA	MET
120SB01301	SOIL	X	
120SB01302	SOIL	X	
120SB01401	SOIL	X	
120SB01402	SOIL	X	
120SB01501	SOIL	X	
120SB01502	SOIL	X	
120SB01601	SOIL	X	
120SB01602	SOIL	X	
638SB00601	SOIL		X
638SB00602	SOIL		X
638SB01001	SOIL	X	
638SB01002	SOIL	X	
638SB01101	SOIL	X	
638SB01102	SOIL	X	
643SB01401	SOIL	X	
643SB02101	SOIL	X	X
643SB02102	SOIL	X	X
643SB02501	SOIL	X	X
643SB02502	SOIL	X	X
643SB02601	SOIL	X	X
643SB02602	SOIL	X	X
643SB02701	SOIL	X	X
643SB02702	SOIL	X	X
Total Billable Samples (Water/Soil)		0 21	0 10

SVOA= Semivolatiles

MET= Metals

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C for GC/MS Semivolatiles; the National Functional Guidelines for Organic Data Validation, 2/94, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 41852

A validation was performed on the Semivolatile Data from SDG 41852. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- * • Calibration
- Blanks
- Internal Standard Performance
- * • Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Compound Identification
- Compound Quantitation

* - All criteria were met for this parameter.

Internal Standards

The following samples exhibited non-compliant EICP area recoveries below the QC limits for the noted internal standards. All reported positive and non-detect results are qualified as estimated, J/UJ.

643SB02101	naphthalene-d8 acenaphthene-d10 phenanthrene-d10
120SB01401	perylene-d12

**DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ORGANICS**

PAGE 2

Blanks

The two (2) method blanks associated with the field samples in this SDG exhibited contamination for which qualifications were required. The end user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into considerations when applying the 5X and 10X criteria to field samples.

<u>Associated blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
SBLK1	naphthalene	18J ug/Kg	90 ug/Kg
	bis(2-ethylhexyl)phthalate	43J ug/Kg	430 ug/Kg
SBLK2	bis(2-ethylhexyl)phthalate	20J ug/Kg	200 ug/Kg

<u>Samples</u>	<u>Compound</u>	<u>Qualifications</u>
120SB01301	naphthalene	CRQL
120SB01601		
120SB01501		
120SB01401		
643SB02702		
643SB01401		
638SB01001		
643SB02101		
120SB01402		
643SB02502		
643SB02701		
643SB01102		
643SB02602		
120SB01302		
638SB01101		
643SB02102		
120SB01301		
120SB01601		
120SB01602		
120SB01501		
120SB01502		
120SB01401		
643SB02702		

**DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ORGANICS**

PAGE 3

Blanks (continued)

<u>Samples</u>	<u>Compound</u>	<u>Qualifications</u>
643SB01401	bis(2-ethylhexyl)phthalate	CRQL
638SB01001		
643SB02101		
120SB01402		
643SB02502		
643SB02701		
643SB01102		
643SB02602		
120SB01302		
638SB01101		
643SB02102		
643SB02501		
643SB02601		
638SB01002		

Compound Quantitation

For the following sample, the E flagged result is not used in favor of the corresponding D flagged result reported in the dilution analysis of the sample. All other results reported in the dilution analysis are not used in favor of the results reported in the lessor dilution of the sample.

120SB01401
643SB02501

System Performance and Overall Assessment

The data, as reported, required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
643SB02101	<i>All associated with</i> naphthalene-d8 acenaphthene-d10 phenanthrene-d10	+/-	J/UJ
120SB01401	<i>All associated with</i> perylene-d12	+/-	J/UJ
120SB01301	naphthalene	+B	CRQL
120SB01601			
120SB01501			
120SB01401			
643SB02702			
643SB01401			
638SB01001			
643SB02101			
120SB01402			
643SB02502			
643SB02701			
643SB01102			
643SB02602			
120SB01302			
638SB01101			
643SB02102			
120SB01301	bis(2-ethylhexyl)phthalate	+B	CRQL
120SB01601			
120SB01602			
120SB01501			
120SB01502			
120SB01401			
643SB02702			
643SB01401			
638SB01001			
643SB02101			
120SB01402			
643SB02502			
643SB02701			

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
643SB01102 643SB02602 120SB01302 638SB01101 643SB02102 643SB02501 643SB02601 638SB01002	bis(2-ethylhexyl)phthalate	+B	CRQL
120SB01401 643SB02501	All E flagged compounds	+E	Do not use
120SB01401DL 643SB02501DL	All except corresponding D flagged results	+/-	Do Not use

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

METALS

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # 41852

A validation was performed on the Metals Data from SDG 41852. The data was evaluated based on the following parameters.

- * ● Data Completeness
- * ● Holding Times
- * ● Calibrations
- Blanks
- * ● Interferences
- Matrix Spike Recovery
- * ● Matrix Duplicates
- * ● Field Duplicates
- * ● Laboratory Control Samples
- Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Antimony	0.52 mg/kg	all soil samples below 2.6 mg/kg
Barium	0.18 mg/kg	no impact
Cadmium	0.20 mg/kg	all soil samples below 1.0 mg/kg
Iron	6.85 mg/kg	no impact
Lead	0.22 mg/kg	no impact
Manganese	0.09 mg/kg	no impact
Silver	0.55 mg/kg	all soil samples below 2.75 mg/kg

Zinc	0.99 mg/kg	no impact
Tin	3.49 mg/kg	all soil samples below 17.5 mg/kg

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Arsenic	-0.22 mg/kg	all soil samples below 2.2 mg/kg
Mercury	-0.03 mg/kg	all soil samples below 0.3 mg/kg

This reviewer qualifies all samples results below 10 times the absolute value of the negative blank value.

Matrix Spike Recovery results

The matrix spike recovery for soils for Antimony (72%) was below the lower control limits (>30% but <75%). All positive and non-detect results are qualified as estimated, "J" or "UJ"

Matrix Duplicate results

The matrix duplicate RPD for soils for Iron (24%) was below 35%. No qualification is necessary.

Serial Dilution results

The serial dilution result for soils for Zinc was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 2.6 mg/kg	Sb.	+	U
all soil samples below 1.0 mg/kg	Cd.		
all soil samples below 2.75 mg/kg	Ag.		
all soil samples below 17.5 mg/kg	Sn.		
all soil samples below 2.2 mg/kg	As.	+/U	J/UJ
all soil samples below 0.3 mg/kg	Hg.		
all soil samples	Sb.	+/U	J/UJ
all soil samples	Zn.	+	J
all samples	all analytes	B	J



800-589-7942

MEMPHIS, TENNESSEE

ALBUQUERQUE, NM; ANCHORAGE, AK; ANTIPOLO, PHILIPPINES; BIRMINGHAM, AL; BOSTON, MA; CHICAGO, IL; CINCINNATI, OH; DALLAS, TX; JACKSONVILLE, FL; KNOXVILLE, TN; LAS VEGAS, NV; LITTLE ROCK, AR; LOS ANGELES, CA; MILWAUKEE, WI; MOBILE, AL; NEW YORK, NY; OMAHA, NE; PHOENIX, AZ; RICHMOND, VA; TAMPA, FL; WASHINGTON, DC; WILMINGTON, DE; WISCONSIN, WI

CHAIN OF CUSTODY RECORD

PAGE 1 OF 2

PROJECT/JOB NO: 2907-09, 09420

COC NO: _____

PO NO: 4

REL NO: 139

LAB NAME: SWC

LOCATION: Naval Base Charleston

PROJECT MANAGER: Charlie Vernay

DESCRIPTION: Zone G

TELE/FAX NO: 843-974-629

PREPARED BY (SIGNATURE):

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS			REMARKS
					TEMP.	CHEMICAL	Metals	SVOC	ANALYSIS REQUIRED	
G 6435B 21 1 1	1-25-00	1035	S	4oz. JARS	4°C	None	2	X	X	
G 6435B 21 1 2		1041					2	X	X	
G 6435B 27 1 1		1105					2	X	X	
G 6435B 27 1 2		1110					2	X	X	
G 6435B 26 1 1		1135					2	X	X	
G 6435B 26 1 2		1141					2	X	X	
G 6435B 25 1 1		1200					2	X	X	
G 6435B 25 1 2		1208					2	X	X	
G 6435B 14 1 1		1221					2		X	
G 12 1 1 1 1 1		1500					2		X	
G 12 1 1 1 1 2		1505					2		X	
G 12 1 1 1 1 1		1516					2		X	
G 12 1 1 1 1 2		1519					2		X	
G 12 1 1 1 1 1		1530					2		X	
G 12 1 1 1 1 2		1535					2		X	
G 12 1 1 1 1 1		1550					2		X	

DATE: <u>1-25-00</u>	RECEIVER: _____	DATE: _____	RECEIVER: _____
TIME: <u>1755</u>	PRINTED: _____	TIME: _____	PRINTED: _____
COMPANY: <u>EnSafe</u>	COMPANY: _____	COMPANY: _____	COMPANY: _____

NO. OF SHIPMENT: 1 (Fed Ex)
 ENS NO: 4819147870
 COMMENTS: _____

ENSAFE, INC. 803 656 0107 P. 02/03



800-556-1107
 MEMPHIS, TENNESSEE
 CHICAGO, ILLINOIS; JACKSON, TN; KNOXVILLE, TN;
 NASHVILLE, TN; HOUSTON, TX; MOBILE, AL; PENSACOLA, FL;
 BALTIMORE, COLORED; GERMANY

CHAIN OF CUSTODY RECORD

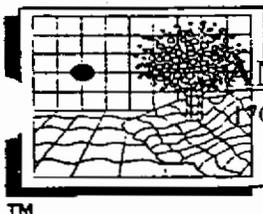
PAGE 2 OF 2
 PROJECT/JOB NO: 2907-001-0,120-0
 COC NO: _____
 PO NO: 4
 REL NO: 139
 LAB NAME: SWC

JAN-26-2008 10:19 EN SAFE, INC. 803 556 0107 P.03/03

Naval Base Charleston PROJECT MANAGER Charlie Verney
 Zone G TELE/FAK NO. 843-984-0029
 (SIGNATURE) [Signature]

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	ANALYSIS REQUIRED										REMARKS									
					TEMP.	CHEMICAL		SVOC	Metals																		
1205B01302	01-25-08	1557	S	4oz. JARS	4°C	None	2	X																			
6385B01101		1626					2	X																			
6385B01102		1633					2	X																			
6385B01001		1645					2	X																			
6385B01002		1653					2	X																			
6385B00601		1713					2		X																		
6385B00602		1721					2		X																		
<i>Rec'd M. White 1-25-08</i>																											

DATE 1-25-08 RECEIVER: _____ DATE _____ RECEIVER: _____ DATE _____
 TIME 17:55 PRINTED: _____ TIME _____ PRINTED: _____ TIME _____
 COMPANY: _____ COMPANY: _____ COMPANY: _____
 RELINQUISHOR: _____
 COMMENTS: _____
 FEDEX SHIPMENT NO. 4619147070



SOUTHWEST LABORATORY OF OKLAHOMA, INC.
AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

SDG NARRATIVE

CONTRACT: ENSAFE
CASE: 41852
SDG: 41852

DATE: February 4, 2000
SOW NO.: SW846
EPISODE NO.: 41852

INORGANIC METAL FRACTION:

Ten soil samples were submitted for ICP and Hg analysis. No major problems occurred during the digestion or analyses of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analysis was completed according to the following:

<u>SWL SOP #</u>	<u>Method SOP is based</u>
SWL-IN-205	SW846 3010A, 3050A, & 6010B
SWL-IN-207	SW846 7470A & 7471A

Initial and Continuing Calibration Checks: No problems.

Initial and Continuing Calibration Blanks: The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Sb, As, Hg, Ag, V,

No action required.

Linearity near the CRDL (CRA & CRI): The CRI standard was outside of our in-house warning limits of 70 - 130%R for the following elements: Hg & Cu. No action required.

Preparation Blanks: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Sb, As, Ba, Cd, Cr, Fe, Pb, Mn, Mg, Hg, Ag, Zn, & Sn. No action required.

Lab Control Spikes: No problems.

Matrix Spike (and MSD): The following element was outside the control limits of 75-125% recovery: Sb. All associated samples were flagged with a "N" on Form I's. No action required.

Duplicates (LCSD and MSD): The following elements were outside the control limits of 0-20% RPD: LCSSD = no problems; MSD = Fe. All associated samples were flagged with a "*" on Form I's. No action required.

Serial Dilution (ICP): The serial dilution was outside the control limits of 10% for the following elements: Zn. All associated samples were flagged with an "E" on Form I's. No action required.

SW846 MDLs: The IDL column on the Form 10s contain our MDLs rather than IDLs and the PQL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Deborah J. Inman
Inorganic Program Manager



800-588-7147
 MEMPHIS, TENNESSEE
 CINCINNATI, OHIO DALLAS, TX JACKSON, MS KNOXVILLE, TN
 OKLAHOMA CITY, OKLAHOMA NORFOLK, VA FORT WORTH, TX
 ALBUQUERQUE, NM DENVER, CO

CHAIN OF CUSTODY RECORD

PAGE 1 OF 2
 PROJECT/JOB NO: 2907-091-08420
 COC NO: _____
 PO NO: 4
 REL NO: 139
 LAB NAME: SWL

LOCATION: Naval Base Charleston PROJECT MANAGER: Charlie Vernoy
 ZONE: Zone G TELE/FAX NO.: 803-994-6229
 SIGNATURES: (SIGNATURE) [Signature]

NO. OF CONTAINERS		ANALYSIS REQUIRED										REMARKS
Metals	SVOC											

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	Metals	SVOC												
					TEMP.	CHEMICAL															
G6435B02101	1-25-00	1035	S	4OZ. JARS	4°C	None	2	X	X												
G6435B02102		1041					2	X	X												
G6435B02701		1105					2	X	X												
G6435B02702		1110					2	X	X												
G6435B02601		1135					2	X	X												
G6435B02602		1141					2	X	X												
G6435B02501		1200					2	X	X												
G6435B02502		1208					2	X	X												
G6435B01401		1221					2		X												
G1205B01601		1500					2		X												
G1205B01602		1505					2		X												
G1205B01501		1516					2		X												
G1205B01502		1519					2		X												
G1205B01401		1530					2		X												
G1205B01402		1535					2		X												
G1205B01301		1550					2		X												

TRANSFERRED BY: <u>Rachel M. White</u> RECEIVED BY: _____ DATE: <u>1-25-00</u> TIME: <u>1755</u>	RELINQUISHER: _____ PRINTED: _____ COMPANY: _____	DATE: _____ TIME: _____	RECEIVER: _____ PRINTED: _____ COMPANY: _____	DATE: _____ TIME: _____
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MODE OF SHIPMENT: Fed Ex
 TRACKING NO.: 4849147870
 RESULTS TO: Charlie Vernoy

COMMENTS: _____

JAN-26-2000 10:18 EN SAFE, INC. 803 656 0107 P.02/03

EN'SAFE

800-555-7107
MEMPHIS, TENNESSEE
DALLAS, TEXAS; JACKSON, MISSISSIPPI; ANCHORAGE, ALASKA
MEMPHIS, TENNESSEE; MILWAUKEE, WISCONSIN; PORTLAND, OREGON
MILWAUKEE, WISCONSIN; PORTLAND, OREGON

CHAIN OF CUSTODY RECORD

PAGE 2 OF 2

PROJECT/JOB NO: 2907-001-L-420-0

COC NO: _____

PO NO: 4

REL NO: 139

LAB NAME: SWL

JAN-26-2000 10:19

EN SAFE, INC.

803 856 0107

P. 03/03

Naval Base Charleston
Zone G
PROJECT MANAGER Charlie Verney
TELE/FAX NO. 843-984-0629
S: (SIGNATURE) [Signature]

FIELD LE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		ANALYSIS REQUIRED			REMARKS
					TEMP.	CHEMICAL	NO. OF CONTAINERS	SVOC	Metals	
205B01302	01-25-00	1557	S	4oz. JARS	4°C	None	2	X		
385B01101		1626					2	X		
385B01102		1633					2	X		
385B01001		1645					2	X		
385B01002		1653					2	X		
385B00601		1713					2		X	
385B00602		1721					2		X	

*Rec'd M. White
1-25-00*

DATE: <u>1-25-00</u>	RECEIVER: _____	DATE: _____	RECEIVER: _____	DATE: _____
TIME: <u>17:55</u>	PRINTED: _____	TIME: _____	PRINTED: _____	TIME: _____
COMPANY: <u>En Safe</u>	COMPANY: _____	COMPANY: _____	COMPANY: _____	COMPANY: _____

SHIPMENT: Fed Ex
4849147070

COMMENTS: _____



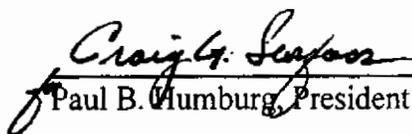
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 41874
Date: February 17, 2000
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: January 26, 2000
Number of Samples: 11 Non-Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data, February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Metals and Hexavalent Chromium

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

2-23-00.
Date

SDG# 41874

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	MET	CR+6		
636SB01801	SOIL	X			
636SB01802	SOIL	X			
636SB01901	SOIL	X			
636SB01902	SOIL	X			
636SB02001	SOIL	X			
706SB01801	SOIL		X		
706SB01802	SOIL		X		
706SB02101	SOIL	X			
706SB02102	SOIL	X			
706SB02201	SOIL	X			
706SB02202	SOIL	X			
Total Billable Samples (Water/Soil)		0	9	0	2

MET= Metals

CR+6= Hexavalent Chromium

Chu
2-26-00

CHARLESTON - ZONE G
CHARLESTON ZONE G SOIL (ONLY)
SDG# 41874

je: 1
Time: 10:41

Parameter	706-S-8018-01 706S801801 41874.10 01/26/00 02/02/00 Soil MG/KG	706-S-8018-02 706S801802 41874.11 01/26/00 02/02/00 Soil MG/KG	BLK-0-1874-02 PBS1 PBS1 01/26/00 02/02/00 Soil MG/KG			
9-9 Chromium (Hexavalent)	0.3	0.7	0.25 U			

Handwritten: PB# 2/15/00

003

(14)
7-26-00

CHARLESTON - ZONE G
CHARLESTON ZONE G SOIL (ONLY)
SDG# 41874

je: 2
Time: 10:41

META	636-S-8018-01	636-S-8018-02	636-S-8019-01	636-S-8019-02	636-S-8020-01	706-S-8021-01
SAMPLE ID ----->	636S801801	636S801802	636S801901	636S801902	636S802001	706S802101
ORIGINAL ID ----->	41874.02	41874.03	41874.04	41874.05	41874.01	41874.06
LAB SAMPLE ID ---->	01/26/00	01/26/00	01/26/00	01/26/00	01/26/00	01/26/00
SAMPLE DATE ----->	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00
DATE EXTRACTED -->	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00
DATE ANALYZED ---->	Soil	Soil	Soil	Soil	Soil	Soil
MATRIX ----->	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
UNITS ----->	A	A	A	A	A	A
Parameter						
0-5 Aluminum (Al)	3920.	5050.	3730.	9850.	2940.	4180.
0-5 Antimony (Sb)	0.5	0.32	0.32	47.5	0.31	0.54
0-2 Arsenic (As)	2.3	2.1	0.63	25.	1.6	2.2
9-3 Barium (Ba)	18.6	7.	5.9	437.	3.4	12.2
1-7 Beryllium (Be)	0.22	0.26	0.11	0.63	0.22	0.22
3-9 Cadmium (Cd)	0.37	0.18	0.15	9.2	0.45	0.36
0-2 Calcium (Ca)	53300.	2450.	1260.	10400.	132000.	57400.
7-3 Chromium (Cr)	7.8	5.8	5.7	91.8	5.3	14.9
8-4 Cobalt (Co)	1.3	1.5	0.8	9.1	2.5	1.5
0-8 Copper (Cu)	38.8	1.4	7.3	1940.	1.3	24.
09-6 Iron (Fe)	4110.	3080.	2000.	53500.	2360.	3870.
02-1 Lead (Pb)	38.1	2.8	4.9	1250.	2.7	29.
05-4 Magnesium (Mg)	689.	262.	241.	3330.	1390.	1530.
06-5 Manganese (Mn)	41.2	20.	19.9	478.	55.3	82.6
07-6 Mercury (Hg)	0.02	0.02	0.02	0.38	0.02	0.05
02-0 Nickel (Ni)	4.	2.2	2.	76.7	3.6	5.3
09-7 Potassium (K)	136.	113.	93.	963.	233.	254.
09-2 Selenium (Se)	0.39	0.39	0.39	0.9	0.38	0.4
02-4 Silver (Ag)	0.33	0.17	0.22	1.9	0.2	0.23
03-5 Sodium (Na)	893.	474.	306.	2110.	467.	411.
08-0 Thallium (Tl)	0.4	0.4	0.41	3.8	0.4	0.42
01-5 Tin (Sn)	5.8	4.2	4.6	99.5	3.8	5.3
02-2 Vanadium (V)	7.8	4.9	4.3	74.5	3.7	8.3
06-6 Zinc (Zn)	88.4	5.9	9.6	2210.	9.7	45.7

BB
2/15/00

CHARLESTON - ZONE G
CHARLESTON ZONE G SOIL (ONLY)

SDG# 41874

ge: 3
Time: 10:41

-META	SAMPLE ID ----->	706-S-8021-02	706-S-8022-01	706-S-8022-02	BLK-0-1874-01	BLK-0-1874-03
	ORIGINAL ID ----->	706S802102	706S802201	706S802202	PBS	PBSH
	LAB SAMPLE ID ---->	41874.08	41874.07	41874.09	PBS	PBSH
	SAMPLE DATE ----->	01/26/00	01/26/00	01/26/00	01/26/00	01/26/00
	DATE EXTRACTED -->	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00
	DATE ANALYZED ---->	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00
	MATRIX ----->	Soil	Soil	Soil	Soil	Soil
	UNITS ----->	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
		A	A	A	D	D
Parameter						
0-5 Aluminum (Al)	4250.	4290.	7100.	2.8	U	?????????
6-0 Antimony (Sb)	0.32	0.64	1.7	0.52	B	?????????
8-2 Arsenic (As)	1.7	2.7	6.9	-0.22	B	?????????
9-3 Barium (Ba)	15.6	28.6	43.7	0.18	B	?????????
1-7 Beryllium (Be)	0.18	0.28	0.31	0.08	U	?????????
3-9 Cadmium (Cd)	0.33	0.6	0.92	0.2	B	?????????
0-2 Calcium (Ca)	25600.	31000.	17800.	25.8	U	?????????
7-3 Chromium (Cr)	13.3	23.	19.1	0.38	B	?????????
8-4 Cobalt (Co)	1.1	1.6	2.	0.08	U	?????????
0-8 Copper (Cu)	10.5	52.6	132.	0.25	U	?????????
39-6 Iron (Fe)	3200.	4840.	7680.	6.8	B	?????????
2-1 Lead (Pb)	18.	84.	82.	0.22	B	?????????
5-4 Magnesium (Mg)	741.	1010.	1340.	9.2	U	?????????
6-5 Manganese (Mn)	35.7	89.8	87.3	0.089	B	?????????
7-6 Mercury (Hg)	0.02	0.11	1.2	?????????		-0.03 B
02-0 Nickel (Ni)	3.6	6.2	10.	0.36	U	?????????
09-7 Potassium (K)	229.	210.	449.	15.2	U	?????????
49-2 Selenium (Se)	0.39	0.43	0.44	0.33	U	?????????
22-4 Silver (Ag)	0.29	0.45	0.52	0.55	B	?????????
23-5 Sodium (Na)	884.	436.	953.	50.2	U	?????????
28-0 Thallium (Tl)	0.4	0.44	0.59	0.34	U	?????????
31-5 Tin (Sn)	5.	8.4	11.4	3.5	B	?????????
62-2 Vanadium (V)	7.2	12.8	19.4	0.07	U	?????????
66-6 Zinc (Zn)	36.8	99.5	243.	0.99	B	?????????

Handwritten: JB 2/15/00

Analytical Results (CH2M-Jones 2002)

Analytical Data Summary

01/24/2003 10:05 AM

StationID	G706GW001	G706GW001	G706GW001	G706GW001	
SampleID	706GW001M6	706GW001M6	706GW001M7	706GW001M7	
DateCollected	06/20/2002	06/20/2002	07/13/2002	07/13/2002	
DateExtracted	06/25/2002	06/25/2002	07/18/2002	07/24/2002	
DateAnalyzed	06/27/2002	07/02/2002	07/19/2002	07/26/2002	
SDGNumber	CNC118	CNC118	CNC129	CNC129	
Parameter	Units				
Tin (Sn)	ug/L				
Aluminum	ug/L				
Antimony	ug/L				
Arsenic	ug/L				
Barium	ug/L				
Beryllium	ug/L				
Cadmium	ug/L				
Calcium	ug/L				
Chromium, Total	ug/L				
Cobalt	ug/L				
Copper	ug/L				
Iron	ug/L				
Lead	ug/L				
Magnesium	ug/L				
Manganese	ug/L				
Nickel	ug/L				
Potassium	ug/L				
Selenium	ug/L				
Silver	ug/L				
Sodium	ug/L				
Thallium	ug/L				
Vanadium	ug/L				
Zinc	ug/L				
Mercury	ug/L				
Arsenic	mg/l	0.041	J	0.012	=
Barium	mg/l	2.3	=	0.81	=
Cadmium	mg/l	0.0034	J	0.0011	J
Chromium, Total	mg/l	0.002	U	0.00085	U
Lead	mg/l	0.0028	U	0.00075	U
Selenium	mg/l	0.0021	UJ	0.0021	U

Analytical Data Summary

01/24/2003 10:05 AM

StationID	G706GW001	G706GW001
SampleID	706GW001M8	706GW001M8
DateCollected	09/09/2002	09/09/2002
DateExtracted	09/13/2002	09/18/2002
DateAnalyzed	09/13/2002	09/19/2002
SDGNumber	CNC144	CNC144
Parameter	Units	
Tin (Sn)	ug/L	
Aluminum	ug/L	
Antimony	ug/L	
Arsenic	ug/L	
Barium	ug/L	
Beryllium	ug/L	
Cadmium	ug/L	
Calcium	ug/L	
Chromium, Total	ug/L	
Cobalt	ug/L	
Copper	ug/L	
Iron	ug/L	
Lead	ug/L	
Magnesium	ug/L	
Manganese	ug/L	
Nickel	ug/L	
Potassium	ug/L	
Selenium	ug/L	
Silver	ug/L	
Sodium	ug/L	
Thallium	ug/L	
Vanadium	ug/L	
Zinc	ug/L	
Mercury	ug/L	
Arsenic	mg/l	0.03 =
Barium	mg/l	1.5 =
Cadmium	mg/l	0.0019 J
Chromium, Total	mg/l	0.0016 J
Lead	mg/l	0.00092 U
Selenium	mg/l	0.0021 U

Analytical Data Summary

01/24/2003 10:00 AM

StationID	G706GW001	G706GW001	G706GW001	G706GW001	
SampleID	706GW001M6	706GW001M6	706GW001M7	706GW001M7	
DateCollected	06/20/2002	06/20/2002	07/13/2002	07/13/2002	
DateExtracted	06/25/2002	06/25/2002	07/18/2002	07/24/2002	
DateAnalyzed	06/27/2002	07/02/2002	07/19/2002	07/26/2002	
SDGNumber	CNC118	CNC118	CNC129	CNC129	
Parameter	Units				
Silver	mg/l	0.00095	U	0.00095	U
Mercury	mg/l			0.000072	U
				0.000072	U

Analytical Data Summary

01/24/2003 10:05 AM

StationID	G706GW001	G706GW001
SampleID	706GW001M8	706GW001M8
DateCollected	09/09/2002	09/09/2002
DateExtracted	09/13/2002	09/18/2002
DateAnalyzed	09/13/2002	09/19/2002
SDGNumber	CNC144	CNC144
Parameter	Units	
Silver	mg/l	0.00095 U
Mercury	mg/l	0.000072 U

Analytical Data Summary

01/24/2003 10:00 AM

StationID	G706GW001		G706GW001		G706GW001		G706GW001		G706GW001		
SampleID	706GW001M1		706GW001M1		706GW001M6		706GW001M6		706GW001M7		
DateCollected	03/29/2002		03/29/2002		06/20/2002		06/20/2002		07/13/2002		
DateExtracted	04/02/2002		05/07/2002				06/21/2002				
DateAnalyzed	04/02/2002		05/07/2002		07/03/2002		06/21/2002		07/18/2002		
SDGNumber	CNC86		CNC86A		CNC123		CNC118		CNC130		
Parameter	Units										
Hydrazine	mg/l	0.1	S	0.013	J			0.005	U		
Hydrazine	ug/L					10	U			10	U

Analytical Data Summary

01/24/2003 10:05 AM

StationID	G706GW001
SampleID	706GW001M7
DateCollected	07/13/2002
DateExtracted	07/17/2002
DateAnalyzed	07/17/2002
SDGNumber	CNC129

Parameter	Units		
Hydrazine	mg/l	0.005	U
Hydrazine	ug/L		

Analytical Data Summary

01/24/2003 10:05 AM

StationID	G706GW001		G706GW001		G706GW001	
SampleID	706GW001M6		706GW001M7		706GW001M8	
DateCollected	06/20/2002		07/13/2002		09/09/2002	
DateExtracted	06/26/2002		07/17/2002		09/16/2002	
DateAnalyzed	06/26/2002		07/17/2002		09/16/2002	
SDGNumber	CNC118		CNC129		CNC144	
Parameter	Units					
m-Xylene	ug/l	5	U			
1,2,4-Trichlorobenzene	ug/L					
Chloromethane	ug/l	10	U	10	U	10
Vinyl chloride	ug/l	10	U	10	U	10
Bromomethane	ug/l	10	UJ	10	U	10
Chloroethane	ug/l	10	U	10	U	10
1,1-Dichloroethene	ug/l	5	U	5	U	5
Acetone	ug/l	12	J	10	UJ	10
Carbon Disulfide	ug/l	5	U	5	U	5
Methylene Chloride	ug/l	5	U	5	U	5
trans-1,2-Dichloroethene	ug/l	5	U	5	U	5
1,1-Dichloroethane	ug/l	5	U	5	U	5
Vinyl acetate	ug/l	10	U	10	UJ	10
Methyl ethyl ketone (2-Butanone)	ug/l	10	U	10	U	10
cis-1,2-Dichloroethylene	ug/l	5	U	5	U	5
1,2-Dichloroethene (total)	ug/l	5	U	5	U	5
Chloroform	ug/l	5	U	5	U	5
1,1,1-Trichloroethane	ug/l	5	U	5	U	5
Carbon Tetrachloride	ug/l	5	U	5	U	5
1,2-Dichloroethane	ug/l	5	U	5	U	5
Benzene	ug/l	5	U	5	U	5
Trichloroethylene (TCE)	ug/l	5	U	5	U	5
1,2-Dichloropropane	ug/l	5	U	5	U	5
Bromodichloromethane	ug/l	5	U	5	U	5
2-Chloroethyl vinyl ether	ug/l	10	UJ	10	U	10
cis-1,3-Dichloropropene	ug/l	5	U	5	U	5
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/l	10	U	10	U	10
Toluene	ug/l	5	U	5	U	5
trans-1,3-Dichloropropene	ug/l	5	U	5	U	5
1,1,2-Trichloroethane	ug/l	5	U	5	U	5

Analytical Data Summary

01/24/2003 10:05 AM

StationID	G706GW001		G706GW001		G706GW001		
SampleID	706GW001M6		706GW001M7		706GW001M8		
DateCollected	06/20/2002		07/13/2002		09/09/2002		
DateExtracted	06/26/2002		07/17/2002		09/16/2002		
DateAnalyzed	06/26/2002		07/17/2002		09/16/2002		
SDGNumber	CNC118		CNC129		CNC144		
Parameter	Units						
2-Hexanone	ug/l	10	U	10	U	10	UJ
Tetrachloroethylene (PCE)	ug/l	5	U	5	U	5	U
Dibromochloromethane	ug/l	5	U	5	U	5	U
Chlorobenzene	ug/l	0.74	J	5	U	5	U
Ethylbenzene	ug/l	5	U	5	U	5	U
m+p Xylene	ug/l			5	U	5	U
o-Xylene	ug/l	5	U	5	U	5	U
Xylenes, Total	ug/l	5	U	5	U	5	U
Styrene	ug/l	5	U	5	U	5	U
Bromoform	ug/l	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	ug/l	5	U	5	U	5	UJ
1,3-Dichlorobenzene	ug/l	5	U	5	U	5	U
1,4-Dichlorobenzene	ug/l	0.58	J	5	U	5	U
1,2-Dichlorobenzene	ug/l	5	U	5	U	5	U
1,2,4-Trichlorobenzene	ug/l	5	U	5	U	5	U
1,2,3-Trichlorobenzene	ug/l	5	U	5	U	5	UJ

Data Validation Report (CH2M-Jones 2002)

Data Validation Summary - Charleston Naval Complex - Zone G, AOC 706

TO: William Elliott/CH2M HILL/GNA

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

DATE: January 24, 2003

The purpose of this memorandum is to present the results of the data validation process for the samples collected in Zone G, AOC 706. The samples were collected between the dates of March 29 and September 9, 2002.

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

The Quality Control areas that were reviewed 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 2002)* and *National Functional Guidelines for Organic Data Review (EPA 1999)*. Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

Samples were submitted to Severn Trent Services, STL Savannah Laboratories, Inc., in Savannah, Georgia for the following analyses: SW-846 8260 Volatile Organic Compounds (VOC), SW-846 8270 Semivolatile Organic Compounds (SVOC), Metals following SW-846 6010/7000 Series methodology, and Hydrazine following Standard Methods D1385.

Samples were submitted to Severn Trent Services, STL Savannah Laboratories, Inc., in Tallahassee, Florida for the following analyses: Hydrazine following a modified method STL-SOP.

Sample results that were not within the acceptance limits were appended with a qualifying flag, which consisted of a single- or double-letter code that indicated a possible problem with the data. The qualifying flags originated during the data review and validation processes. These also include the secondary, or the two-digit "sub-qualifier" flags. The secondary qualifiers provide the reasoning behind the assignment of a qualifier flag to the data. The secondary qualifiers are presented and defined below.

Attachment 1 lists the changes in data qualifiers, due to the validation process.

The following primary flags were used to qualify the data:

- [=] Detected. The analyte was analyzed for and detected at the concentration shown.
- [J] Estimated. The analyte was present but the reported value may not be accurate or precise.
- [U] Undetected. The analyte was analyzed for but not detected above the method detection limit.
- [UJ] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.
- [R] Rejected. The data is not useable.

Secondary Data Validation Qualifiers

<u>Code</u>	<u>Definition</u>
2S	Second Source
2C	Second Column Confirmation
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
TD	Total vs. Dissolved
TN	Tune

Table 1 - Chemical Analytical Methods – Field and Quality Control Samples

S/C	Station ID	Sample ID	Lab Sample ID	Contaminant	Method	Date	Method Approved	Lab Accredited	Method Validated	Method Approved	Method Validated	Method Approved	Method Validated
CNC86	G706GW001	706GW001M1	S242233A*6	WG	N	03/29/02							X
CNC86	G706GW001	706GW001M1MS	S242233A*15	WG	MS	03/29/02							X
CNC86	G706GW001	706GW001M1SD	S242233A*17	WG	SD	03/29/02							X
CNC86	LABQC	42233A22LB	S242233A*22	WQ	LB								X
CNC86	LABQC	42233A23BS	S242233A*23	WQ	BS								X
CNC86A	G706GW001	706GW001M1	S242233D*6	WG	N	03/29/02							X
CNC86A	LABQC	42233D22LB	S242233D*22	WQ	LB								X
CNC86A	LABQC	42233D23BS	S242233D*23	WQ	BS								X
CNC118	G706GW001	706GW001M6	S244366*10	WG	N	06/20/02	X	X	X	X	X	X	
CNC118	G706GW001	706GW001M6RE	S244366*10*RE	WG	LR	RE	06/20/02		X				
CNC118	FIELDQC	009EW001M6 **	S244366*17	WQ	EB		06/21/02	X	X	X	X	X	
CNC118	FIELDQC	009TW001M6 **	S244366*18	WQ	TB		06/20/02	X					
CNC118	LABQC	4436619LB	S244366*19	WQ	LB			X	X	X	X	X	
CNC118	LABQC	4436620BS	S244366*20	WQ	BS			X	X	X	X	X	
CNC123	G706GW001	706GW001M6	D2F250169006	WG	N	06/20/02							X
CNC123	FIELDQC	009EW001M6 **	D2F250169007	WQ	EB		06/21/02						X
CNC123	LABQC	D2G040000144B	D2G040000144B	WQ	LB								X
CNC123	LABQC	D2G040000144C	D2G040000144C	WQ	BS								X
CNC123	LABQC	D2G040000144L	D2G040000144L	WQ	BD								X
CNC129	G706GW001	706GW001M7	S245045*1	WG	N	07/13/02	X	X	X	X	X	X	
CNC129	FIELDQC	706EW001M7	S245045*2	WQ	EB		07/13/02	X	X	X	X	X	

Well ID	Well Type	Well Name	Well ID	Well Type	Well Name	Completion Date	07/13/02	09/09/02	01/23/03	04/23/03	07/13/02	09/09/02	01/23/03	04/23/03
CNC129	FIELDQC	706TW001M7	S245045*3	WQ	TB	07/13/02	X							
CNC129	LABQC	450454LB	S245045*4	WQ	LB		X	X	X	X	X			
CNC129	LABQC	450455BS	S245045*5	WQ	BS		X	X	X	X	X			
CNC129	LABQC	4504511LB	S245045*11	WQ	LB		X							
CNC129	LABQC	4504512BS	S245045*12	WQ	BS		X							
CNC130	G706GW001	706GW001M7	D2G170235001	WG	N	07/13/02								X
CNC130	FIELDQC	706EW001M7	D2G170235002	WQ	EB	07/13/02								X
CNC130	LABQC	D2G200000195B	D2G200000195B	WQ	LB									X
CNC130	LABQC	D2G200000195C	D2G200000195C	WQ	BS									X
CNC130	LABQC	D2G200000195L	D2G200000195L	WQ	BD									X
CNC144	G706GW001	706GW001M8	S246477*14	WG	N	09/09/02	X	X	X	X				
CNC144	LABQC	4647721LB	S246477*21	WQ	LB			X	X	X				
CNC144	LABQC	4647722BS	S246477*22	WQ	BS			X	X	X				
CNC144	LABQC	4647734LB	S246477*34	WQ	LB		X							
CNC144	LABQC	4647735BS	S246477*35	WQ	BS		X							

REV	DESCRIPTION	DATE	BY	STATUS	REVISIONS	APPROVAL	REVISIONS	APPROVAL	REVISIONS	APPROVAL
<p>** - Field blanks named for a different AOC were included in this report if they were associated with the AOC 706 samples included in that sample set.</p> <p>MATRIX CODE</p> <p>WG - Groundwater WQ - Water QC Samples</p> <p>SAMPLE TYPE CODE</p> <p>BS - Blank Spike BD - Blank Spike Duplicate EB - Equipment Blank TB - Trip Blank FD - Field Duplicate N - Normal LB - Laboratory Blank LR - Laboratory Replicate MS - Matrix Spike SD - Matrix Spike duplicate</p> <p>LR TYPE CODE</p> <p>RE - Reanalysis</p> <p>ANALYSIS CODE</p> <p>VOC - Volatile Organic Compounds SVOC - Semi-Volatile Organic Compounds</p>										

Organic Parameters

Quality Control Review

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

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Method blanks, equipment blanks, and trip blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Surrogate Recoveries** – Surrogate Compounds are added to each sample and the recoveries are used to monitor lab performance and possible matrix interference.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", either laboratory reagent water or Ottawa sand, in which target compounds have been added prior to extraction/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **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.

Volatile Organic Compounds (VOC) Analyses

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

Blanks

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

TABLE 2

Blank Contamination: VOC

Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

ID	Sample ID	Sample ID	Sample ID	Parameter	Value	Unit	Reporting Limit
CNC118	4436619LB	S244366*19	LB	1,2,3-Trichlorobenzene	1.6	µg/L	8.0 µg/L
CNC118	009EW001M6	S244366*17	EB	Methylene chloride	0.76	µg/L	7.6 µg/L
CNC118	009EW001M6	S244366*17	EB	1,2,3-Trichlorobenzene	1.2	µg/L	12.0 µg/L
CNC118	009TW001M6	S244366*18	TB	Methylene chloride	2.6	µg/L	26.0 µg/L
CNC118	009TW001M6	S244366*18	TB	1,2,3-Trichlorobenzene	2.0	µg/L	20.0 µg/L
CNC129	706EW001M7	S245045*2	EB	Methylene chloride	2.1	µg/L	21.0 µg/L
CNC144	4647734LB	S246477*34	LB	Methylene chloride	0.42	µg/L	4.2 µg/L
CNC144	4647734LB	S246477*34	LB	Trichloroethene	1.0	µg/L	5.0 µg/L

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.

Recoveries - Surrogate, MS/MSD and LCS

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

TABLE 3
 Surrogate, MS/MSD, and LCS Recoveries Out of QC Limits: VOC
 Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Site	Sample	Analyte	Recovery	Control Limits	Sample ID	Flags
CNC118	4436620BS (LCS)	Bromomethane	52*	70-130	S244366*10	Detects-J, non-detects-UJ
		Acetone	140*	70-130		
		Vinyl acetate	140*	70-130		
		2-Butanone	160*	70-130		
		2-Chloroethyl vinyl ether	350*	70-130		
		4-Methyl-2-pentanone	170*	70-130		
		2-Hexanone	180*	70-130		
		1,1,2,2-Tetrachloroethane	148*	70-130		
CNC129	4504512BS (LCS)	Vinyl acetate	68*	70-130	S245045*3	Detects-J, non-detects-UJ (no flags - TB)

* - out of control limits

Initial and Continuing Calibration Criteria

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

TABLE 4
 Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: VOC
 Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Instrument/Calibration Date	Analyte	Qualitative Standard Evaluation Difference (COAL)	Associated Samples
MSA5973-CCAL-06/26/02, 1234	2-Chloroethyl vinyl ether	20.9% low RRF=0.048	S244366*10
MSO5973-ICAL-07/11/02, 1352	Acetone	RRF=0.048	CNC129 - All
MSO5973-CCAL-07/17/02, 0914	Vinyl acetate	42.1% low	S245045*1,2 (EB)
	Acetone	RRF=0.039	

TABLE 4
 Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: VOC
 Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Sample ID	Compound	RRF	Flag
MSO5973-CCAL-07/17/02, 2057	Acetone	RRF=0.040	S245045*3 (TB)
MSB5973-CCAL-09/16/02, 1109	Acetone	RRF=0.028	S246477*14
	Vinyl acetate	27.3% low	
	2-Hexanone	24.1% low	
	1,1,2,2-Tetrachloroethane	22.5% low	
	1,2,3-Trichlorobenzene	20.4% 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 Relative Response Factor (RRF) was low in the initial or continuing calibration, detected compounds were flagged "J", and non-detected compounds were flagged "UJ", as estimated.

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 5.

TABLE 5
 Blank Contamination: SVOC
 Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Site	Sample ID	Sample ID	Sample ID	Compound	Lab Result	Unit	Reference
CNC144	4647721LB	S246477*21	LB	Phenol	64.0	µg/L	320.0 µg/L
CNC144	4647721LB	S246477*21	LB	Benzyl alcohol	8.5	µg/L	42.5 µg/L

TABLE 5
 Blank Contamination: SVOC
 Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Sample ID	Sample ID	Sample ID	Sample ID	Parameter	Reported	Unit	Reporting Limit
CNC144	4647721LB	S246477*21	LB	4-Chloroaniline	1.5	µg/L	7.5 µg/L

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

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

No results were qualified due to blank contamination.

Recoveries - Surrogate, MS/MSD and LCS

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

TABLE 6
 Surrogate, MS/MSD, and LCS Recoveries Out of QC Limits: SVOC
 Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Sample ID	Sample ID	Parameter	Recovery (%)	Reporting Limit	Sample ID	Notes
CNC118	4436620BS (LCS)	4-Nitrophenol	98*	10-80	S244366*10	Detects Only - J
		2,4-Dinitrotoluene	98*	24-96		
CNC129	450455BS (LCS)	4-Nitrophenol	92*	10-80	S245045*1	Detects Only - J
CNC144	4647722BS (LCS)	Phenol	0*	12-110	S246477*14	Detects-J, non-detects-R

* - out of control limits

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 7.

TABLE 7

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOC
Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Initial Calibration Criteria	Continuing Calibration Criteria	Initial Calibration Criteria	Continuing Calibration Criteria
MSG5973-ICAL-06/29/02, 1223	Benzo(k)fluoranthene	$R^2 = 0.989$	S244366*10
	Indeno(1,2,3-cd)pyrene	$R^2 = 0.989$	
MSD5973-ICAL-06/30/02, 1545	Benzo(k)fluoranthene	15.2% RSD	S244366*10RE
MSD5973-CCAL-07/03/02, 1432	4-Nitrophenol	23.1% high	S244366*10RE
	Benzo(g,h,i)perylene	20.1% low	
MSG5963-CCAL-07/22/02, 0601	Bis(2-chloroethyl)ether	33.5% low	S245045*2 (EB)
	2,4-Dinitrophenol	20.7% high	
MSJ5971-CCAL-09/25/02, 0955	Bis(2-chloroisopropyl)ether	23.8% low	S246477*14
	n-Nitroso-di-n-propylamine	24.6% low	
	Nitrobenzene	20.2% high	
	2-Methylnaphthalene	22.8% low	
	2-Nitroaniline	26.4% low	
	2,4-Dinitrophenol	44.1% high	
	4,6-Dinitro-2-methylphenol	25.8% high	
	3,3'-Dichlorobenzidine	27.2% low	
	Benzo(k)fluoranthene	29.8% high	
Indeno(1,2,3-cd)pyrene	22.3% 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 (%D) was high in the continuing calibration standards, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.
- 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.

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 8.

TABLE 8
Blank Contamination: Metals
Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Sample ID	Sample Type	Location	Parameter	Concentration	Unit	Equivalent Concentration	
CNC118	CCB		CCB	Barium	2.59	ug/L	0.01295 mg/L
CNC118	CCB		CCB	Chromium	2.46	ug/L	0.01230 mg/L
CNC118	CCB		CCB	Lead	3.42	ug/L	0.01710 mg/L
CNC118	CCB		CCB	Selenium	9.02	ug/L	0.04510 mg/L
CNC118	CCB		CCB	Silver	2.28	ug/L	0.01140 mg/L
CNC118	S244366*19	4436619LB	LB	Arsenic	2.61	ug/L	0.01305 mg/L
CNC118	S244366*19	4436619LB	LB	Barium	2.40	ug/L	0.012 mg/L
CNC118	S244366*19	4436619LB	LB	Chromium	2.05	ug/L	0.01025 mg/L
CNC118	S244366*19	4436619LB	LB	Lead	1.72	ug/L	0.0086 mg/L
CNC129	CCB		CCB	Barium	1.59	ug/L	0.00795 mg/L
CNC129	S245045*2	706EW001M7	EB	Barium	0.0067	mg/L	0.0335 mg/L
CNC144	CCB		CCB	Lead	1.62	ug/L	0.0081 mg/L

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. Initial and continuing calibration blanks were also evaluated for possible contamination.

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

Recoveries - Surrogate, MS/MSD and LCS

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), and Laboratory Control Sample (LCS) recoveries were within acceptable quality control limits, except as noted in Table 9 below.

TABLE 9
 Surrogate, MS/MSD, and LCS Recoveries Out of QC Limits: Metals
 Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Site	Sample	Parameter	Recovery	Reporting Limit	Applicable Control Limits	Flags
CNC118	S244366*6 MS/MSD	Arsenic	121* / 121*	80-120	CNC118 – All	Detects Only - J
		Silver	150* / 151*	80-120	CNC118 – All	Detects Only - J
		Selenium	73* / 68*	80-120	CNC118 – All	Detects-J, non-detects-UJ
CNC144	S246477*2 MS/MSD	Cadmium	79* / 93	80-120	CNC144 – All	Detects-J, non-detects-UJ
		Silver	124* / 139*	80-120	CNC144 – All	Detects Only - J

* - out of control limits

General Chemistry Analyses – (Hydrazine)

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

- For sample 706GW001M1 in SDG CNC86, the laboratory reported for the original Hydrazine analysis with a reporting limit of 100 ug/L, which did not meet the project specified reporting limit of 5 ug/L. Since the sample did not have a detect greater than 100 ug/L in the first analysis, the sample was reanalyzed and reported in CNC86A with the correct reporting limit. The initial analysis was qualified as screening data only, "S-OT" and the second analysis result is usable as qualified.
- The second analysis of 706GW001M1 in CNC86A was reanalyzed outside of holding time criteria. The sample result was qualified as estimated, J.

Rejected Data

The majority of rejected data were associated with re-runs and dilutions (there can only be a single valid result per parameter per sample). However, there were selected results qualified as "R", rejected, due to associated QC parameters out of criteria. The rejected data are summarized in Table 10 below.

TABLE 10
Data Qualification Summary: Rejected Data
Charleston Naval Complex, Zone G, AOC 706, Charleston, SC

Sample ID	Sample Name	Parameter	Method	Result	QC	Dilution	Unit	Notes
CNC144	706GW001M8	SVOA	PHENOL	10	U	10	ug/L	BS

Conclusion

A review of the analytical data submitted regarding the investigation of Zone G, AOC 706 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.

As discussed above, there was a specific result that was rejected, in which the data cannot be used. With the exception of this result, the validation review demonstrated that the analytical systems were generally in control and the data can be used in the decision making process.

Attachment 1 - Chapter Qualifiers and Results
Zone G, AOC 3 - Data Validation

Parameter	Analysis Method	Parameter	Site	Sample ID	Lab Sample ID	Unit	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reason
GENCHEM	ASTM D1385	Hydrazine	CNC86	706GW001M1	S242233A*6	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385	Hydrazine	CNC86A	706GW001M1	S242233D*6	WG	0.013	=	0.013	J	mg/l	HT
METAL	SW6010B	ARSENIC	CNC118	706GW001M6	S244366*10	WG	0.041	N	0.041	J	mg/l	MS
METAL	SW6010B	CADMIUM	CNC118	706GW001M6	S244366*10	WG	0.0034	B	0.0034	J	mg/l	IB
METAL	SW6010B	CADMIUM	CNC129	706GW001M7	S245045*1	WG	0.0011	B	0.0011	J	mg/l	IB
METAL	SW6010B	CADMIUM	CNC144	706GW001M8	S246477*14	WG	0.0019	BN	0.0019	J	mg/l	MS
METAL	SW6010B	CHROMIUM, TOTAL	CNC118	706GW001M6	S244366*10	WG	0.002	B	0.002	U	mg/l	BL
METAL	SW6010B	CHROMIUM, TOTAL	CNC144	706GW001M8	S246477*14	WG	0.0016	B	0.0016	J	mg/l	IB
METAL	SW6010B	LEAD	CNC118	706GW001M6	S244366*10	WG	0.0028	B	0.0028	U	mg/l	BL
METAL	SW6010B	LEAD	CNC144	706GW001M8	S246477*14	WG	0.0009	B	0.0009	U	mg/l	BL
METAL	SW6010B	SELENIUM	CNC118	706GW001M6	S244366*10	WG	0.0021	UN	0.0021	UJ	mg/l	MS
SVOA	SW8270C	1,2,4-TRICHLOROBENZENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	1,2-DICHLOROBENZENE	CNC118	706GW001M6RE	S244366*10*RE	WG	1	J	1	R	ug/l	RE
SVOA	SW8270C	1,3-DICHLOROBENZENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	1,4-DICHLOROBENZENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,4,5-TRICHLOROPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	2,4,6-TRICHLOROPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,4-DICHLOROPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,4-DIMETHYLPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,4-DINITROPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	2,4-DINITROTOLUENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,6-DINITROTOLUENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-CHLORONAPHTHALENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-CHLOROPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-METHYLNAPHTHALENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-METHYLNAPHTHALENE	CNC144	706GW001M8	S246477*14	WG	10	U	10	UJ	ug/l	CC
SVOA	SW8270C	2-METHYLPHENOL (o-CRESOL)	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE

Attachment 1 - Characterized Qualifiers and Results
 Zone G, AOC 3 - Data Validation

Parameter Class	Analytical Method	Parameter	Site	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Field Result	Field Qual	Unit	Reason
SVOA	SW8270C	2-NITROANILINE	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	2-NITROANILINE	CNC144	706GW001M8	S246477*14	WG	50	U	50	UJ	ug/l	CC
SVOA	SW8270C	2-NITROPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	3,3'-DICHLOROBENZIDINE	CNC118	706GW001M6RE	S244366*10*RE	WG	20	U	20	R	ug/l	RE
SVOA	SW8270C	3,3'-DICHLOROBENZIDINE	CNC144	706GW001M8	S246477*14	WG	20	U	20	UJ	ug/l	CC
SVOA	SW8270C	3-NITROANILINE	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	4,6-DINITRO-2-METHYLPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	4-BROMOPHENYL PHENYL ETHER	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	4-CHLORO-3-METHYLPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	4-CHLOROANILINE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	4-CHLOROPHENYL PHENYL ETHER	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	4-NITROANILINE	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	4-NITROPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	ACENAPHTHENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	ACENAPHTHYLENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	ANTHRACENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	BENZO(a)ANTHRACENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	BENZO(a)PYRENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	BENZO(b)FLUORANTHENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	BENZO(g,h,i)PERYLENE	CNC118	706GW001M6RE	S244366*10*RE	WG	1.4	J	1.4	R	ug/l	RE
SVOA	SW8270C	BENZO(k)FLUORANTHENE	CNC118	706GW001M6	S244366*10	WG	10	U	10	UJ	ug/l	IC
SVOA	SW8270C	BENZO(k)FLUORANTHENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	Benzoic acid	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	Benzyl alcohol	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	BENZYL BUTYL PHTHALATE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	bis(2-CHLOROETHOXY) METHANE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-CHLOROETHYL ETHER	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE

Attachment 1 - Characterized Qualifiers and Results
 Zone G, AOC δ - Data Validation

Parameter Code	Sample ID	Parameter	SPIC	Sample ID	Lab Sample ID	Units	Lab Result	Lab Qual	TRP (ug/l)	TRM (ug/l)	Units	Reason
SVOA	SW8270C	Bis(2-Chloroisopropyl)Ether	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	Bis(2-Chloroisopropyl)Ether	CNC144	706GW001M8	S246477*14	WG	10	U	10	UJ	ug/l	CC
SVOA	SW8270C	bis(2-ETHYLHEXYL) PHTHALATE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	CARBAZOLE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	CHRYSENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	DIBENZ(a,h)ANTHRACENE	CNC118	706GW001M6RE	S244366*10*RE	WG	1.2	J	1.2	R	ug/l	RE
SVOA	SW8270C	DIBENZOFURAN	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	DIETHYL PHTHALATE	CNC118	706GW001M6RE	S244366*10*RE	WG	0.76	J	0.76	R	ug/l	RE
SVOA	SW8270C	DIMETHYL PHTHALATE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	DI-n-BUTYL PHTHALATE	CNC118	706GW001M6RE	S244366*10*RE	WG	0.99	J	0.99	R	ug/l	RE
SVOA	SW8270C	DI-n-OCTYLPHTHALATE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	FLUORANTHENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	FLUORENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	HEXACHLOROBENZENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	HEXACHLOROBUTADIENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	HEXACHLOROCYCLOPENTADIENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	HEXACHLOROETHANE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	INDENO(1,2,3-c,d)PYRENE	CNC118	706GW001M6	S244366*10	WG	10	U	10	UJ	ug/l	IC
SVOA	SW8270C	INDENO(1,2,3-c,d)PYRENE	CNC118	706GW001M6RE	S244366*10*RE	WG	1.1	J	1.1	R	ug/l	RE
SVOA	SW8270C	INDENO(1,2,3-c,d)PYRENE	CNC144	706GW001M8	S246477*14	WG	10	U	10	UJ	ug/l	CC
SVOA	SW8270C	ISOPHORONE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	m,p-Cresols	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	NAPHTHALENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	NITROBENZENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	N-NITROSODI-n-PROPYLAMINE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	N-NITROSODI-n-PROPYLAMINE	CNC144	706GW001M8	S246477*14	WG	10	U	10	UJ	ug/l	CC
SVOA	SW8270C	N-NITROSODIPHENYLAMINE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE

Attachment 1 - Characterized Qualifiers and Results
 Zone G, AOC 103 - Data Validation

Parameter	Analytical Method	Parameter	SDE	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reason
SVOA	SW8270C	PENTACHLOROPHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	PHENANTHRENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	PHENOL	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	PHENOL	CNC144	706GW001M8	S246477*14	WG	10	U	10	R	ug/l	BS
SVOA	SW8270C	PYRENE	CNC118	706GW001M6RE	S244366*10*RE	WG	10	U	10	R	ug/l	RE
VOA	SW8260B	1,1,2,2-TETRACHLOROETHANE	CNC144	706GW001M8	S246477*14	WG	5	U	5	UJ	ug/l	CC
VOA	SW8260B	1,2,3-Trichlorobenzene	CNC144	706GW001M8	S246477*14	WG	5	U	5	UJ	ug/l	CC
VOA	SW8260B	1,2-DICHLOROBENZENE	CNC118	706GW001M6	S244366*10	WG	4.6	J	5	U	ug/l	BL
VOA	SW8260B	2-Chloroethyl vinyl ether	CNC118	706GW001M6	S244366*10	WG	10	U	10	UJ	ug/l	CC
VOA	SW8260B	2-HEXANONE	CNC144	706GW001M8	S246477*14	WG	10	U	10	UJ	ug/l	CC
VOA	SW8260B	ACETONE	CNC118	706GW001M6	S244366*10	WG	12	=	12	J	ug/l	BS
VOA	SW8260B	ACETONE	CNC129	706GW001M7	S245045*1	WG	10	U	10	UJ	ug/l	IC,CC
VOA	SW8260B	ACETONE	CNC144	706GW001M8	S246477*14	WG	10	U	10	UJ	ug/l	CC
VOA	SW8260B	BROMOMETHANE	CNC118	706GW001M6	S244366*10	WG	10	U	10	UJ	ug/l	BS
VOA	SW8260B	TRICHLOROETHYLENE (TCE)	CNC144	706GW001M8	S246477*14	WG	0.5	JB	5	U	ug/l	BL
VOA	SW8260B	Vinyl acetate	CNC129	706GW001M7	S245045*1	WG	10	U	10	UJ	ug/l	CC
VOA	SW8260B	Vinyl acetate	CNC144	706GW001M8	S246477*14	WG	10	U	10	UJ	ug/l	CC

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory: **STL**
 Site Name: **Charleston Navy Complex**
 Zone G, SWMU 8 and AOC 636 and 637
 Project Number: **158814.PM.04** TAT: **14 day package**
 Project Manager: **GA Level: 3**
 Address: **GNV: 3011 SW Whitton Rd, Gainesville, FL 32605**
ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278

Lab Batch/SDG:
CNC 85
CNC 86
CNC 87

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

Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	1 - 125ml HDPE	1 - 2 ounce jar	1 - 500ml HDPE, HNCB	1 - 2 ounce jar	1 - 2 ounce jar	Fingerprints	PCBs (SW8016)	Comments
			Hydrazine (ASTM)	Hydrazine (ASTM)				Metals (SW6010B)	GFC	DRO					
08GW001M1	G008GW001	G008GW001				WG	X		X						
08GW002M1	G008GW002	G008GW002				WG	X		X						
08GW003M1	G008GW003	G008GW003			3/29/02 1120	WG	2	X	X						
08HW003M1	G008GW003	G008GW003			3/29/02 1120	WG	2	X	X						
08GW004M1	G008GW004	G008GW004			3/21/02 1655	WG	2	X	X						
08GW005M1	G008GW005	G008GW005				WG		X	X						
08GW006M1	G008GW006	G008GW006				WG		X	X						
37GW001M1	G637GW001	G637GW001			3/29/02 1215	WG	2	X	X						
37GW003M1	G637GW003	G637GW003			3/29/02 1215	WG	2	X	X						
7GW003M1MS	G637GW003	G637GW003			3/29/02 1215	WG	2	X	X						MS
7GW003M1SD	G637GW003	G637GW003			3/29/02 1215	WG	2	X	X						MSD
DSGW02AM1	GFDSGW02A	GFDSGW02A			3/28/02 1810	WG	2	X	X						
DSGW02CM1	GFDSGW02C	GFDSGW02C			3/28/02 1835	WG	2	X	X						
DSGW03CM1	GFDSGW03C	GFDSGW03C			3/28/02 1740	WG	2	X	X						
DSGW05BM1	GFDSGW05B	GFDSGW05B			3/28/02 1545	WG	2	X	X						
36GW001M1	G636GW001	G636GW001			3/28/02 1625	WG	1	X							
37GW002M1	G637GW002	G637GW002			3/29/02 1910	WG	1	X							
38GW001M1	G638GW001	G638GW001			3/28/02 1510	WG	1	X							
38HW001M1	G638GW001	G638GW001			3/28/02 1510	WG	1	X							
DSGW01EM1	GFDSGW01E	GFDSGW01E			3/29/02 1655	WG	1	X							

Collected By: *Angie Willis* Date/Time: **3/29/02**

Reinquished by: *Angie Willis* Date/Time: **3/29/02**

Initial Sampler: *Ryan Bitaly*

1580

Collected By Lab: _____ Date/Time: _____

Reinquished by: _____ Date/Time: _____

Collected By: _____ Date/Time: _____

Shipped Via: UPS ~~FEDEX~~ Hand Other Tracking#: _____

Receipt Exceptions: *None 4/15*

Temperature: _____

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZG008-032602-01 page 2 of 3

Laboratory: STL		Project Name: Charleston Navy Complex		Site Name:		Lab Batch/SDG:													
Project Number: 158814.PM.04		TAT: 14 day package		QA Level: 3															
Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605																			
Address: ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30348-1278																			
Send Report To: see last page of COC		EDD: CNC format																	
Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	1 - 125mL HDPE	1 - 2 ounce jar	1 - 500mL HDPE, HNO3	1 - 2 ounce jar	1 - 2 ounce jar						Comments	
			Begin	End															
653GW003M1	H653GW003	H653GW003				WG		X											
FDSGW02DM1	GFDSGW02D	GFDSGW02D				WG		X											
706GW001M1	G706GW001	G706GW001			3/29/02 1540	WG	1	X											
706GW001M1MS	G706GW001	G706GW001			3/29/02 1540	WG	1	X											MS
706GW001M1SD	G706GW001	G706GW001			3/29/02 1546	WG	1	X											MSD
C16GW005M1	GC16GW005	GCNC16-MW05			3/29/02 1740	WG	1	X											
009GW018M1	H009GW018	H009GW018				WG		X											
GDGGW001M1	GGDGGW001	GGDGGW001			3-29-02 1630	WG	1	X											
008GSP01M1	G008GSP01	Vertical Pipe 01			3-29-02 1510	WG	1	X											
008HSP01M1	G008GSP01	Vertical Pipe 01			3-29-02 1310	WG	1	X											
008GSP06M1	G008GSP06	Vertical Pipe 06			3-29-02 1245	WG	1	X											
008GSP09M1	G008GSP09	Vertical Pipe 09			3-29-02 1140	WG	1	X											
008GSP14M1	G008GSP14	Vertical Pipe 14			3/29/02 1010	WG	1	X											
008GSP18M1	G008GSP18	Vertical Pipe 18			3/29/02 1030	WG	1	X											
008GSP05M1	G008GSP05	Vertical Pipe 05			3/29/02 1805	OL	3		X		X	X	X	X	X				LNAPL
008GSP11M1	G008GSP11	Vertical Pipe 11			3/29/02 1820	OL	3		X		X	X	X	X	X				LNAPL
008EW001M1	G008EW001				3/29/02 1620	WQ	2	X		X									EB1
008EW002M1	G008EW002					WQ	2	X		X									EB2

Sampled By: Greg Drullis Date/Time: 3/29/02 1830 Relinquished by: Greg Drullis Date/Time: 3/29/02 1930

Additional Samplers: Ryan Mitchell

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

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

Remarks: _____ Temperature: _____

Metals (SW6010B)

CNC Standard metals list

Fingerprint

Fingerprint Analysis (I.e. carbon chain range C5-C36 with description)

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

Reports

Herb Kelly/GNV - 1 hardcopy, 1 CD
Tom Beisel/ATL - 1 CD
Brian Crawford/JAJ - 1 CD

Herb Kelly
3011 SW Williston Rd
Gainesville, FL 32608
Ph: (352) 335 - 5877 ext.2572
Fax: (352) 271 - 4811

Tom Beisel
115 Perimeter Center Place NE, Suite 700
Atlanta, GA 30346-1278
Ph: (770) 604 - 9182 ext.367
Fax: (770) 604 - 9183

JAJones - Brian Crawford and Jed Heames
CH2M-Jones, LLC
Charleston Naval Complex
1849 Avenue F
North Charleston, SC 29405

5242233

Receipt Exceptions: _____

laboratory: STL
 Project Name: Charleston Navy Complex Site Name: Zone H, SWMU 9
 Project Number: 158814.PM.04 TAT: standard
 Project Manager: Tom Beisel/ATL Level: Level 3
 Address: GNV: 3011 SW Willston Rd., Gainesville, FL 32605
ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278
 Send Report To: see last page of COC EDD: CNC format

Lab Batch/SDG:
CNC118

Sample ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	1 - 125mL HDPE	3 - 40mL vial, HCl	2 - 1L amber	1 - 250mL HDPE, HNO3										Comments
		Begin	End																	
009GW001M6	H009GW001			6-19-02/1110	WG	4	X	X	X	X										SAMPLES complete
009GW004M6	H009GW004			6-19-02/1345	WG	7	X	X	X	X										
009GW013M6	H009GW013			6-21-02/0835	WG	7	X	X	X	X										RCRA
009HW013M6	H009GW013			6-21-02/0845	WG	7	X	X	X	X										
009GW014M6	H009GW014			6-19-02/1200	WG	7	X	X	X	X										
009GW021M6	H009GW021			6-19-02/1030	WG	7	X	X	X	X										
009HW021M6	H009GW021			6-19-02/1035	WG	7	X	X	X	X										
009GW024M6	H009GW024			6-19-02/1145	WG	7	X	X	X	X										
008GW001M6	G008GW001			6-21-02/1140	WG	7	X	X	X	X										
008GW004M6	G008GW004			6-20-02/1015	WG	7	X	X	X	X										
008GW04DM6	G008GW04D				WG		X	X	X	X										Not Installed yet
008GW005M6	G008GW005			6-21-02/0955	WG	7	X	X	X	X										
636GW001M6	G636GW001			6-20-02/0920	WG	7	X	X	X	X										
706GW001M6	G706GW001			6-20-02/0130	WG	7	X	X	X	X										
009GW008M6	H009GW008			6-20-02/0930	WG	7	X	X	X	X										
009GW005M6	H009GW005			6-20-02/0845	WG	7	X	X	X	X										
121GW001M6	H121GW001				WG		X	X	X	X										Product
009GW01DM6	H009GW01D			6-19-02/1005	WG	7	X	X	X	X										
009GW05DM6	H009GW05D			6-19-02/1555	WG	7	X	X	X	X										
009GW08DM6	H009GW08D			6-20-02/1135	WG	7	X	X	X	X										

Sampled By: ANDREW O'CONNOR & Kim Lee Date/Time: 6-19-02/6-21-02 Relinquished by: [Signature] Date/Time: 6-21-02/1600

Additional Samplers: C. Deas, J. Deas, A. Stokes

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

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

Remarks: _____ Temperature: _____

Receipt Exceptions: PI/4 2/5

Laboratory: STL
 Project Name: Charleston Navy Complex Site Name: Zone H, SWMU 9
 Project Number: 158814.PM.04 TAT: standard
 Project Manager: Tom Beise/ATL Level: Level 3
 Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605
ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278
 Send Report To: see last page of COC EDD: CNC format

Lab Batch/SDG:

Sample ID	Sample Description	Depth		Date & Time		Matrix	# of containers	Hydrazine	VOCs (SW8260B)	SVOCs (SW8270C)	RCRA Metals	1 - 125mL HDPE	3 - 40mL vial, HCl	2 - 1L amber	1 - 250mL HDPE, HNO3							Comments	
		Begin	End	Collected																			
009GW02DM6	H009GW02D			6-20-02	1440	WG	7	X	X	X	X												2CRF
009GW07DM6	H009GW07D			6-19-02	1530	WG	7	X	X	X	X												
009GW031M6	H009GW031					WG		X	X	X	X												Well not in use
009GW071M6MS	H009GW031			6-19-02	1145	WG	7	X	X	X	X												MS 024
009GW071M6SD	H009GW031			6-19-02	1145	WG	7	X	X	X	X												MSD 024
009EW001M6	H009EW001			6-20-02	0925	WQ	7	X	X	X	X												EB
009TW001M6	H009TW001			LAB SUPPLIED		WQ	3		X														TB

Sampled By: A. O'Leary : Kim Lee Date/Time: _____

Relinquished by: _____ Date/Time: _____

Additional Samplers: C. Deas T. Deas A. Stokes

Received By Lab: _____ Date/Time: _____

Relinquished by: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Shipped Via: UPS FedEx Hand Other Tracking#: _____

Remarks: _____ Temperature: _____

Receipt Exceptions: _____

VOCs
full CNC VOC list

SVOCs
full CNC SVOC list

STL Savannah
5102 LaRoche Ave.
Savannah, GA 31404
912-354-7858

Reports

Herb Kelly/GNV - 1 hardcopy, 1 CD
Tom Beisel/ATL - 1 CD
Brian Crawford/JAJ - 1 CD

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Gainesville, FL 32608
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Tom Beisel
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Fax: (770) 604 - 9183

JAJones - Brian Crawford and Jed Heames
CH2M-Jones, LLC
Charleston Naval Complex
1849 Avenue F
North Charleston, SC 29405

Receipt Exceptions: _____

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZH009-060602-02 page 1 of 2

JUL. 2. 2002 1:03PM STL TALLAHASSEE

NO. 415 P. 2/2

Laboratory: STL Tallahassee		Project Name: Charleston Navy Complex		Site Name: Zone H, SWMU 9		Lab Batch/SDG: CNC123 7202453				
Project Number: 158B14.PM.04		TAT: standard		Level: Level 3						
Project Manager: Tom Beisel/ATL		Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605		Address: ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30348-1278						
Send Report To: see last page of COC		EDC: CNC format								
Sample ID	Sample Description	Depth		Date & Time		Matrix	# of containers	Hydrazine (IC)	1 - 1L amber glass	Comments
		Begin	End	Collected						
009GW013M6 ✓	H009GW013			6-21-02/0850		WG	1	X		RCRA
008GW001M6 ✓	G008GW001			6-21-02/1140		WG	1	X		
008GW004M6 ✓	G008GW004			6-20-02/1015		WG	1	X		samples complete
008GW005M6 ✓	G008GW005			6-21-02/0955		WG	1	X		
636GW001M6 ✓	G636GW001			6-20-02/0920		WG	1	X		
706GW001M6 ✓	G706GW001			6-20-02/1130		WG	1	X		
009EW001M6 ✓	H009EW001			6-21-02/1215		WQ	1	X		EB

Sampled By: Andrew O'Connor Date/Time: 6-20/6-21-02 Relinquished by: [Signature] Date/Time: 6-21-02/1600

Additional Samplers: G. Deas, J. Deas, A. Stokes

Received By Lab: S. Orlidge Date/Time: 6/22/02 0950 Relinquished by: _____ Date/Time: _____

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

Remarks: 7202453 Temperature: 6°

Receipt Exceptions:

VOCs

full CNC VOC list

SVOCs

full CNC SVOC list

STL Savannah
5102 LaRoche Ave.
Savannah, GA 31404
912-354-7858

Reports

Herb Kelly/GNV - 1 hardcopy, 1 CD

Tom Beisel/ATL - 1 CD

Brian Crawford/JAJ - 1 CD

Herb Kelly

3011 SW Williston Rd

Gainesville, FL 32608

Ph: (352) 335 - 5877 ext.2572

Fax: (352) 271 - 4811

Tom Beisel

115 Perimeter Center Place NE, Suite 700

Atlanta, GA 30348-1278

Ph: (770) 604 - 9182 ext.367

Fax: (770) 604 - 9183

JA Jones - Brian Crawford and Jed Heames

CH2M-Jones, LLC

Charleston Naval Complex

1849 Avenue F

North Charleston, SC 29405

Receipt Exceptions: _____

Reports

Herb Kelly/GNV - 1 hardcopy, 1 CD
Tom Beisel/ATL - 1 CD
Brian Crawford/JAJ - 1 CD

Herb Kelly
3011 SW Williston Rd
Gainesville, FL 32608
Ph: (352) 335 - 5877 ext.2572
Fax: (352) 271 - 4811

Tom Beisel
115 Perimeter Center Place NE, Suite 700
Atlanta, GA 30346-1278
Ph: (770) 604 - 9182 ext.367
Fax: (770) 604 - 9183

JA Jones - Brian Crawford and Jed Heames
CH2M-Jones, LLC
Charleston Naval Complex
1849 Avenue F
North Charleston, SC 29405

STL Tallahassee
2846 Industrial Plaza Drive
Tallahassee, FL 32301
850-878-3994

Receipt Exceptions: _____

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory: **STL**
 Project Name: **Charleston Navy Complex** Site Name: **Zone H, SWMU 9**
 Project Number: **158814.PM.04** TAT: **standard**
 Project Manager: **Tom Belse/VTL** Level: **Level 3**
 Address: **GNV: 3011 SW Williston Rd., Gainesville, FL 32605**
ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278
 Send Report To: **see last page of COC** EDD: **CNC format**

Lab Batch/SDG:
CNC144
CNC145

Sample ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	3 - 40ml vial, HQ	2 - 1L amber	1 - 250ml HDPE, HNO3	VOCs (SW8260B)	SVOCs (SW8270C)	RCRA Metals							Comments	
		Begin	End																	
009GW001M7 ✓	H009GW001			9/5 1335	WG	6	X	X	X											
009GW004M7 ✓	H009GW004	9/6	1300	9/9 1020	WG	6	X	X	X											
009GW013M7 ✓	H009GW013			9/9 1500	WG	6	X	X	X											
009HW013M7 ✓	H009GW013			9/9 1505	WG	6	X	X	X											
009GW014M7 ✓	H009GW014			9/9 1435	WG	6	X	X	X											
009GW021M7 ✓	H009GW021			9/9 1520	WG	6	X	X	X											RCRA
009HW021M7 ✓	H009GW021			9/9 1530	WG	6	X	X	X											SITE
009GW024M7 ✓	H009GW024			9/5 1145	WG	6	X	X	X											
008GW001M7 ✓	G008GW001			9/9 1215	WG	6	X	X	X											
008GW004M7 ✓	G008GW004			9/9 1020	WG	6	X	X	X											
008GW04DM7 ✓	G008GW04D			9/9 0950	WG	6	X	X	X											
008GW005M7 ✓	G008GW005			9/9 1140	WG	6	X	X	X											
636GW001M7 ✓	G636GW001			9/9 1010	WG	6	X	X	X											
706GW001M7 ✓	G706GW001			9/9 1105	WG	6	X	X	X											
009GW008M7 ✓	H009GW008			9/9 0900	WG	6	X	X	X											
009GW005M7 ✓	H009GW005			9/5 1545	WG	6	X	X	X											
121GW001M7	H121GW001			9/6 1620	WG	6	X	X	X											PID No. Sample / Free Product
009GW01DM7 ✓	H009GW01D			9/5 1300	WG	6	X	X	X											
009GW05DM7 ✓	H009GW05D			9/5 1520	WG	6	X	X	X											
009GW08DM7 ✓	H009GW08D			9/6 1620	WG	6	X	X	X											

Sampled By: **Andrew D'Onofrio** Date/Time: **9/6 - 9/9/02**

Relinquished by: **[Signature]** Date/Time: **9-10-02/1600**

Additional Samplers: **BC**

Received By Lab: **[Signature]** Date/Time: _____

Relinquished by: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Shipped Via: **UPS FedEx** and Other Tracking#: _____

Remarks: **Due by: 10-02-02**

Temperature: _____

Receipt Exceptions: **09-29-02**

S246477

VOCs

full CNC VOC list

SVOCs

full CNC SVOC list

STL Savannah
5102 LaRoche Ave.
Savannah, GA 31404
912-354-7858

Reports

Herb Kelly/GNV - 1 hardcopy, 1 CD
Tom Beisel/ATL - 1 CD
Brian Crawford/JAJ - 1 CD

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Gainesville, FL 32608
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Tom Beisel
115 Perimeter Center Place NE, Suite 700
Atlanta, GA 30346-1278
Ph: (770) 604 - 9182 ext.367
Fax: (770) 604 - 9183

JAJones - Brian Crawford and Lead Hearnes
CH2M-Jones, LLC
Charleston Naval Complex
1849 Avenue F
North Charleston, SC 29405

S2416477

Surface Soil -Hypothetical Future Industrial Worker Carcinogenic Scenario
 AOC 706, Zone G, CNC

Units	Chemical	Woe	SFo	SFd	SFI	RME	DE	ABS	Ingestion		Dermal		Inhalation	
									CDI	ELCR	CDI	ELCR	CDI	ELCR
MG/KG	Aluminum		na		na	1.36E+04	1.00E-01	0.001	2.37E-03		3.81E-06		7.19E-07	
MG/KG	Antimony	D	na		na	3.27E+00	2.00E-02	0.001	5.71E-07		9.18E-10		1.73E-10	
MG/KG	Arsenic	A	1.50E+00	3.66E+00	1.51E+01	1.68E+01	4.10E-01	0.03	2.93E-06	4.4E-06	1.41E-07	5.2E-07	8.89E-10	1.3E-08
MG/KG	Cadmium		na		na	1.73E+00	1.00E-02	0.01	3.03E-07		4.87E-09		9.18E-11	
MG/KG	Copper		na		na	3.27E+02	3.00E-01	0.001	5.71E-05		9.18E-08		1.73E-08	
MG/KG	Lead		na		na	1.25E+02	1.50E-01	0.001	2.18E-05		3.51E-08		6.62E-09	
MG/KG	Thallium		na		na	5.47E-01	1.50E-01	0.15	9.56E-08		2.30E-08		2.90E-11	
MG/KG	Vanadium		na		na	3.76E+01	3.10E-01	0.001	6.58E-06		1.08E-08		1.99E-09	
MG/KG	TEQs		1.50E+05	3.00E+05	1.50E+05	1.42E-05	5.00E-01	0.5	2.48E-12	3.7E-07	1.99E-12	6.0E-07	7.52E-16	1.1E-10
Total Risk									4.8E-06		1.1E-06		5.9E-06	1E-08
									Total Risk =		5.9E-06			

Notes: WOE = Weight of Evidence; CDI = Chronic Daily Intake; RME = Reasonable Maximum Exposure Concentration; ELCR = Excess Lifetime Cancer Exposure

Surface Soil -Hypothetical Future Industrial Worker Non-carcinogenic Scenario
AOC 706, Zone G, CNC

Units	Chemical	Woe	RfDo	RfDd	RfDI	RME	DE	ABS	Ingestion		Dermal		Inhalation	
									CDI	HQ	CDI	HQ	CDI	HQ
MG/KG	Aluminum		1.00E+00	1.00E-01	1.00E-03	1.36E+04	1.00E-01	0.001	6.64E-03	6.6E-03	1.07E-05	1.1E-04	2.01E-06	2.0E-03
MG/KG	Antimony	D	4.00E-04	8.00E-06	na	3.27E+00	2.00E-02	0.001	1.60E-06	4.0E-03	2.57E-09	3.2E-04	4.85E-10	
MG/KG	Arsenic	A	3.00E-04	1.23E-04	na	1.68E+01	4.10E-01	0.03	8.21E-06	2.7E-02	3.96E-07	3.2E-03	2.49E-09	
MG/KG	Cadmium		5.00E-04	5.00E-06	na	1.73E+00	1.00E-02	0.01	8.49E-07	1.7E-03	1.36E-08	2.7E-03	2.57E-10	
MG/KG	Copper		3.70E-02	1.11E-02	na	3.27E+02	3.00E-01	0.001	1.60E-04	4.3E-03	2.57E-07	2.3E-05	4.85E-08	
MG/KG	Lead		na		na	1.25E+02	1.50E-01	0.001	6.11E-05		9.83E-08		1.85E-08	
MG/KG	Thallium		6.60E-05	9.90E-06	na	5.47E-01	1.50E-01	0.15	2.68E-07	4.1E-03	6.45E-08	6.5E-03	8.11E-11	
MG/KG	Vanadium		7.00E-03	2.17E-03	na	3.76E+01	3.10E-01	0.001	1.84E-05	2.6E-03	2.96E-08	1.4E-05	5.58E-09	
MG/KG	TEQs		na		na	1.42E-05	5.00E-01	0.5	6.95E-12		5.58E-12		2.11E-15	
Hazard Index									0.05		0.013		0.002	
											Total HI=		0.066	

Notes: WOE = Weight of Evidence; CDI = Chronic Daily Intake; RME = Reasonable Maximum Exposure Concentration; HQ = Hazard Quotient; HI = Hazard Index

Surface Soil - Hypothetical Future On-Site Residential (Adult) Carcinogenic Scenario
AOC 706, Zone G, CNC

Units	Chemical	Woe	SFo	SFd	SFI	VFind	RME	DE	ABS	Ingestion		Dermal		Inhalation	
										CDI _{add}	ELCR	CDI _{add}	ELCR	CDI _{add}	ELCR
MG/KG	Aluminum		na		na		1.36E+04	1.00E-01	0.001	2.13E-02		2.48E-06		3.02E-07	
MG/KG	Antimony	D	na		na		3.27E+00	2.00E-02	0.001	5.12E-06		5.98E-10		7.27E-11	
MG/KG	Arsenic	A	1.50E+00	3.66E+00	1.51E+01		1.68E+01	4.10E-01	0.03	2.63E-05	3.9E-05	9.21E-08	3.4E-07	3.73E-10	5.6E-09
MG/KG	Cadmium		na		na		1.73E+00	1.00E-02	0.01	2.72E-06		3.17E-09		3.86E-11	
MG/KG	Copper		na		na		3.27E+02	3.00E-01	0.001	5.12E-04		5.98E-08		7.27E-09	
MG/KG	Lead		na		na		1.25E+02	1.50E-01	0.001	1.96E-04		2.29E-08		2.78E-09	
MG/KG	Thallium		na		na		5.47E-01	1.50E-01	0.15	8.56E-07		1.50E-08		1.22E-11	
MG/KG	Vanadium		na		na		3.76E+01	3.10E-01	0.001	5.89E-05		6.89E-09		8.37E-10	
MG/KG	TEQs		1.50E+05	3.00E+05	1.50E+05		1.42E-05	5.00E-01	0.5	2.22E-11	3.3E-06	1.30E-12	3.9E-07	3.16E-16	4.7E-11
Total Risk										4.3E-05		7.3E-07		4E-05	5.7E-09

Notes: WOE = Weight of Evidence; CDI = Chronic Daily Intake; RME = Reasonable Maximum Exposure Concentration;
ELCR = Excess Lifetime Cancer Exposure

Surface Soil - Hypothetical Future On-Site Residential (Adult) Non-carcinogenic Scenario
AOC 706, Zone G, CNC

Units	Chemical	Woe	RfDo	RfDd	RfDi	RME	DE	ABS	Ingestion		Dermal		Inhalation	
									CDI	HQ	CDI	HQ	CDI	HQ
MG/KG	Aluminum		1.00E+00	1.00E-01	1.00E-03	1.36E+04	1.00E-01	0.001	1.86E-02	0.0186	2.48E-06	0.000025	4.70E-07	0.00047
MG/KG	Antimony	D	4.00E-04	8.00E-06	na	3.27E+00	2.00E-02	0.001	4.48E-06	0.01120	5.98E-10	0.00007478	1.13E-10	
MG/KG	Arsenic	A	3.00E-04	1.23E-04	na	1.68E+01	4.10E-01	0.03	2.30E-05	0.07664	9.21E-08	0.00075	5.81E-10	
MG/KG	Cadmium		5.00E-04	5.00E-06	na	1.73E+00	1.00E-02	0.01	2.38E-06	0.00475	3.17E-09	0.00063	6.00E-11	
MG/KG	Copper		3.70E-02	1.11E-02	na	3.27E+02	3.00E-01	0.001	4.48E-04	0.01210	5.98E-08	0.00001	1.13E-08	
MG/KG	Lead		na	na	na	1.25E+02	1.50E-01	0.001	1.71E-04		2.29E-08		4.32E-09	
MG/KG	Thallium		6.60E-05	9.90E-06	na	5.47E-01	1.50E-01	0.15	7.49E-07	0.01135	1.50E-08	0.00152	1.89E-11	
MG/KG	Vanadium		7.00E-03	2.17E-03	na	3.76E+01	3.10E-01	0.001	5.16E-05	0.00737	6.89E-09	0.00000	1.30E-09	
MG/KG	TEQs		na	na	na	1.42E-05	5.00E-01	0.5	1.95E-11		1.30E-12		4.91E-16	
Hazard Index									0.142		0.00301		0.00047	
											Total HI=		0.145	

Notes: WOE = Weight of Evidence; CDI = Chronic Daily Intake; RME = Reasonable Maximum Exposure Concentration; HQ = Hazard Quotient; HI = Hazard Index

Functional Unit 1 (SS65A) Surface Soil - Hypothetical Future On-Site Residential (Child) Non-carcinogenic Scenario

AOC 706, Zone G, CNC

Units	Chemical	RfDo	RfDd	RfDI	RME	DE	ABS	Ingestion		Dermal		Inhalation	
								CDI	HQ	CDI	HQ	CDI	HQ
MG/KG	Aluminum	1.00E+00	1.00E-01	1.00E-03	1.36E+04	1.00E-01	0.001	1.74E-01	0.174	5.10E-05	0.00051	1.64E-06	0.0016
MG/KG	Antimony	4.00E-04	8.00E-06	na	3.27E+00	2.00E-02	0.001	4.18E-05	0.1045	1.23E-08	0.0015356	3.96E-10	
MG/KG	Arsenic	3.00E-04	1.23E-04	na	1.68E+01	4.10E-01	0.03	2.15E-04	0.72	1.89E-06	0.0154	2.03E-09	
MG/KG	Cadmium	5.00E-04	5.00E-06	na	1.73E+00	1.00E-02	0.01	2.22E-05	0.04	6.52E-08	0.0130	2.10E-10	
MG/KG	Copper	3.70E-02	1.11E-02	na	3.27E+02	3.00E-01	0.001	4.18E-03	0.11	1.23E-06	0.0001	3.96E-08	
MG/KG	Lead	na	na	na	1.25E+02	1.50E-01	0.001	1.60E-03		4.69E-07		1.51E-08	
MG/KG	Thallium	6.60E-05	9.90E-06	na	5.47E-01	1.50E-01	0.15	6.99E-06	0.11	3.08E-07	0.0311	6.62E-11	
MG/KG	Vanadium	7.00E-03	2.17E-03	na	3.76E+01	3.10E-01	0.001	4.81E-04	0.07	1.41E-07	0.0001	4.58E-09	
MG/KG	TEQs	na	na	na	1.42E-05	5.00E-01	0.5	1.82E-10		2.67E-11		1.72E-15	
Hazard Index									1.33	0.0618		0.0016	
										Total HI=		1.39	

Notes: WOE = Weight of Evidence; CDI = Chronic Daily Intake; RME = Reasonable Maximum Exposure Concentration; HQ = Hazard Quotient; HI = Hazard Index

Site: AOC 708
 Media: subsurface soil
 Units: mg/Kg

Chemical	CASRN	Samples	Detects	NonDetects	FOD	Min Detect	Max Detect	Avg Detect	Mean	Min nondetect	Max nondetect	W-Test	t-Statistic	UCL95 norm	H-statistic	UCL95 log nonparm	UCL95 nonparm	UCL95 bootstrap
Surface Soil																		
Aluminum		21	21	0	100%	4030	34500	10511	10511	0	0	NONPARAMETRIC	1.725	13774.98	2.09	13901	4960	13580
Antimony		21	11	10	52%	0.42	11.6	3.84	2.05	0.175	0.95	NONPARAMETRIC	1.725	3.30	2.92	4.91	0.185	3.27
Arsenic		21	21	0	100%	0.49	47.6	7.03	7.03	0	0	LOGNORMAL	1.725	11.2	2.9	16.8	1.1	10.8
Chromium		21	21	0	100%	3.8	70.5	20.37	20.37	0	0	LOGNORMAL	1.725	27.82	2.31	32.18	6.6	27.33
Cadmium		21	12	9	57%	0.07	9.3	1.15	0.69	0.015	0.3	LOGNORMAL	1.725	1.45	3.31	1.73	0.025	1.43
Copper		21	21	0	100%	3.4	861	106.0	106.0	0	0	LOGNORMAL	1.725	186.76	3.31	326.9	7.5	183.5
Iron		21	21	0	100%	669	38200	9765	9765	0	0	LOGNORMAL	1.725	14234.70	2.56	20317	2140	14082
Lead		21	21	0	100%	4.7	1300	124.9	124.9	0	0	LOGNORMAL	1.725	231.26	3.31	387.0	8.4	216.9
Manganese		21	21	0	100%	7.7	575	133.3	133.3	0	0	LOGNORMAL	1.725	197.22	2.92	343.5	16.9	194.8
Thallium		21	4	17	19%	0.52	1.8	1.18	0.38	0.1	0.33	NONPARAMETRIC	1.725	0.56	2.19	0.51	0.20	0.55
Vanadium		21	21	0	100%	4	87.2	23.5	23.5	0	0	LOGNORMAL	1.725	33.18	2.43	37.64	8.30	33.39
Subsurface Soil																		
Antimony		17	13	4	76%	1	82.4	17.42	13.41	0.16	0.85							
Chromium		17	17	0	100%	5.3	177	52	52	0	0							
Magnesium		17	17	0	100%	273	8420	3047	3047	0	0							
Manganese		17	17	0	100%	9.5	551	275	275	0	0							
Mercury		17	14	3	82%	0.05	2.4	0.89	0.74	0.01	0.055							
Thallium		17	13	4	76%	0.59	1.8	0.96	0.78	0.17	0.255							

Site: AOC 706
 Media: surface soil
 Units: mg/Kg
 Chemical: Aluminum
 CASRN:

STATISTICS

N	21
Detects	21
FOD	100%
Mean of Detect	10511.429
Min of Detect	4030.0000
Max of Detect	34500.00
Best Estimate of Mean (arithmetic)	10511
Best Estimate of Mean (geometric)	8349.8
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	13775.0
<i>t</i> -statistic	1.73
UCL95 Lognormal	13901.2
<i>H</i> -statistic	2.09
UCL95 Nonparametric	4960
UCL95 Bootstrap	13580

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	25818.82664
<i>coverage</i>	95%
UTL95 Lognormal	26118.80278
<i>coverage</i>	95%
UTL95 Nonparametric	34500.00
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.716
W_{log}	0.897
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Aluminum in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	9810	=
G706SB001	706SB00101	08/30/96	8170	=
G706SB007	706SB00701	09/03/96	6180	=
G706SB004	706SB00401	09/03/96	4210	=
G706SB006	706SB00601	09/03/96	4960	=
G706SB010	706SB01001	09/04/96	7140	=
G706SB008	706SB00801	09/04/96	4030	=
G706SB003	706SB00301	09/09/96	6120	=
G706SB009	706SB00901	09/09/96	5760	=
G706SB005	706SB00501	09/20/96	4380	=
G706SB011	706SB01101	07/27/99	23400	=
G706SB012	706SB01201	07/27/99	9510	=
G706SB018	706SB018T1	12/14/99	34500	=
G706SB014	706SB014T1	12/14/99	13400	=
G706SB020	706SB020T1	12/14/99	12800	=
G706SB019	706SB019T1	12/14/99	10900	=
G706SB016	706SB016T1	12/14/99	6740	=
G706SB015	706SB015T1	12/14/99	31100	=
G706SB017	706SB017T1	12/14/99	9180	=
G706SB022	706SB02201	01/26/00	4290	=
G706SB021	706SB02101	01/26/00	4180	=

Site: AOC 706
 Media: surface soil
 Units: mg/Kg
 Chemical: Antimony
 CASRN:

STATISTICS

N	21
Detects	11
FOD	52%
Mean of Detect	3.639
Min of Detect	0.4200
Max of Detect	11.60
Best Estimate of Mean (arithmetic)	2.05
Best Estimate of Mean (geometric)	0.8
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	3.3
<i>t-statistic</i>	1.73
UCL95 Lognormal	4.9
<i>H-statistic</i>	2.92
UCL95 Nonparametric	0.185
UCL95 Bootstrap	3.27

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	7.945022947
<i>coverage</i>	95%
UTL95 Lognormal	8.773966358
<i>coverage</i>	95%
UTL95 Nonparametric	11.60
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.609
W_{log}	0.891
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Antimony in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	1.8	J
G706SB001	706SB00101	08/30/96	0.68	UJ
G706SB007	706SB00701	09/03/96	0.37	U
G706SB004	706SB00401	09/03/96	0.37	U
G706SB006	706SB00601	09/03/96	0.36	U
G706SB010	706SB01001	09/04/96	1	J
G706SB008	706SB00801	09/04/96	0.35	U
G706SB003	706SB00301	09/09/96	0.68	J
G706SB009	706SB00901	09/09/96	0.35	U
G706SB005	706SB00501	09/20/96	0.37	UJ
G706SB012	706SB01201	07/27/99	1.9	UJ
G706SB011	706SB01101	07/27/99	10.7	J
G706SB018	706SB018T1	12/14/99	5.7	J
G706SB014	706SB014T1	12/14/99	4.2	J
G706SB020	706SB020T1	12/14/99	11.6	J
G706SB019	706SB019T1	12/14/99	0.73	J
G706SB015	706SB015T1	12/14/99	1.8	J
G706SB017	706SB017T1	12/14/99	1.4	J
G706SB016	706SB016T1	12/14/99	0.42	J
G706SB022	706SB02201	01/26/00	0.64	U
G706SB021	706SB02101	01/26/00	0.54	U

Site: AOC 706
 Media: Surface soil
 Units: mg/Kg
 Chemical: Arsenic
 CASRN:

STATISTICS

N	21
Detects	21
FOD	100%
Mean of Detect	7.034
Min of Detect	0.4900
Max of Detect	47.60
Best Estimate of Mean (arithmetic)	7.03
Best Estimate of Mean (geometric)	3.0
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	11.2
<i>t</i> -statistic	1.73
UCL95 Lognormal	16.8
<i>H</i> -statistic	2.92
UCL95 Nonparametric	1.1
UCL95 Bootstrap	10.8

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	26.6
coverage	95%
UTL95 Lognormal	30.5
coverage	95%
UTL95 Nonparametric	47.60
coverage	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.622
W_{log}	0.951
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Arsenic in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	2.8	J
G706SB001	706SB00101	08/30/96	2.4	J
G706SB007	706SB00701	09/03/96	1.2	J
G706SB004	706SB00401	09/03/96	1.3	=
G706SB006	706SB00601	09/03/96	0.75	J
G706SB010	706SB01001	09/04/96	10.8	=
G706SB008	706SB00801	09/04/96	0.49	J
G706SB003	706SB00301	09/09/96	1	J
G706SB009	706SB00901	09/09/96	0.63	J
G706SB005	706SB00501	09/20/96	1.6	=
G706SB011	706SB01101	07/27/99	22.5	=
G706SB012	706SB01201	07/27/99	9.9	=
G706SB018	706SB018T1	12/14/99	18.1	=
G706SB014	706SB014T1	12/14/99	8	=
G706SB020	706SB020T1	12/14/99	7	=
G706SB019	706SB019T1	12/14/99	1.1	=
G706SB016	706SB016T1	12/14/99	0.54	J
G706SB015	706SB015T1	12/14/99	47.6	=
G706SB017	706SB017T1	12/14/99	5.1	=
G706SB022	706SB02201	01/26/00	2.7	=
G706SB021	706SB02101	01/26/00	2.2	J

Site: AOC 706
 Media: surface soil
 Units: mg/Kg
 Chemical: Chromium
 CASRN:

STATISTICS

N	21
Detects	21
FOD	100%
Mean of Detect	20.371
Min of Detect	3.8000
Max of Detect	70.50
Best Estimate of Mean (arithmetic)	20.4
Best Estimate of Mean (geometric)	13.8
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	27.8
<i>t</i> -statistic	1.73
UCL95 Lognormal	32.2
<i>H</i> -statistic	2.31
UCL95 Nonparametric	6.6
UCL95 Bootstrap	27.3

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	55.30927502
coverage	95%
UTL95 Lognormal	65.69686636
coverage	95%
UTL95 Nonparametric	70.50
coverage	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.772
W_{log}	0.947
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Chromium in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	11.6	=
G706SB001	706SB00101	08/30/96	9.3	=
G706SB007	706SB00701	09/03/96	8.2	=
G706SB004	706SB00401	09/03/96	5.5	=
G706SB006	706SB00601	09/03/96	4.8	=
G706SB010	706SB01001	09/04/96	15.9	=
G706SB008	706SB00801	09/04/96	3.8	=
G706SB003	706SB00301	09/09/96	6.2	=
G706SB009	706SB00901	09/09/96	6.6	=
G706SB005	706SB00501	09/20/96	4.8	=
G706SB011	706SB01101	07/27/99	56.1	J
G706SB012	706SB01201	07/27/99	22.9	J
G706SB018	706SB018T1	12/14/99	70.5	=
G706SB014	706SB014T1	12/14/99	27.2	=
G706SB020	706SB020T1	12/14/99	41.5	=
G706SB019	706SB019T1	12/14/99	12.3	=
G706SB016	706SB016T1	12/14/99	8.7	=
G706SB015	706SB015T1	12/14/99	59.5	=
G706SB017	706SB017T1	12/14/99	14.5	=
G706SB022	706SB02201	01/26/00	23	=
G706SB021	706SB02101	01/26/00	14.9	=

Site: AOC 706
 Media: surface soil
 Units: mg/Kg
 Chemical: Cadmium
 CASRN:

STATISTICS

N	21
Detects	12
FOD	57%
Mean of Detect	1.145
Min of Detect	0.0700
Max of Detect	9.30
Best Estimate of Mean (arithmetic)	0.69
Best Estimate of Mean (geometric)	0.1
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	1.5
<i>t</i> -statistic	1.73
UCL95 Lognormal	1.7
<i>H</i> -statistic	3.31
UCL95 Nonparametric	0.025
UCL95 Bootstrap	1.4

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	4.269355539
coverage	95%
UTL95 Lognormal	2.389507584
coverage	95%
UTL95 Nonparametric	9.30
coverage	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.349
W_{log}	0.928
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Cadmium in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	9.3	=
G706SB001	706SB00101	08/30/96	0.23	J
G706SB007	706SB00701	09/03/96	0.13	J
G706SB004	706SB00401	09/03/96	0.15	J
G706SB006	706SB00601	09/03/96	0.07	J
G706SB010	706SB01001	09/04/96	0.27	J
G706SB008	706SB00801	09/04/96	0.05	U
G706SB003	706SB00301	09/09/96	0.08	J
G706SB009	706SB00901	09/09/96	0.05	U
G706SB005	706SB00501	09/20/96	0.1	J
G706SB011	706SB01101	07/27/99	2.2	J
G706SB012	706SB01201	07/27/99	0.63	J
G706SB018	706SB018T1	12/14/99	0.04	U
G706SB014	706SB014T1	12/14/99	0.41	J
G706SB020	706SB020T1	12/14/99	0.03	U
G706SB019	706SB019T1	12/14/99	0.03	U
G706SB016	706SB016T1	12/14/99	0.17	J
G706SB015	706SB015T1	12/14/99	0.19	U
G706SB017	706SB017T1	12/14/99	0.03	U
G706SB022	706SB02201	01/26/00	0.6	U
G706SB021	706SB02101	01/26/00	0.36	U

Site: AOC 706
 Media: surface soil
 Units: mg/Kg
 Chemical: Copper
 CASRN:

STATISTICS

N	21
Detects	21
FOD	100%
Mean of Detect	106.048
Min of Detect	3.4000
Max of Detect	861.00
Best Estimate of Mean (arithmetic)	106.0
Best Estimate of Mean (geometric)	27.3
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	186.8
<i>t</i> -statistic	1.73
UCL95 Lognormal	326.9
<i>H</i> -statistic	3.31
UCL95 Nonparametric	7.5
UCL95 Bootstrap	183.5

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	484.6440629
<i>coverage</i>	95%
UTL95 Lognormal	466.8889318
<i>coverage</i>	95%
UTL95 Nonparametric	861.00
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.530
W_{log}	0.927
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Copper in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	62.1	=
G706SB001	706SB00101	08/30/96	33.7	=
G706SB007	706SB00701	09/03/96	4.8	=
G706SB004	706SB00401	09/03/96	7.5	=
G706SB006	706SB00601	09/03/96	8.2	=
G706SB010	706SB01001	09/04/96	30.7	=
G706SB008	706SB00801	09/04/96	5.7	=
G706SB003	706SB00301	09/09/96	15.1	=
G706SB009	706SB00901	09/09/96	4.7	=
G706SB005	706SB00501	09/20/96	6.1	=
G706SB011	706SB01101	07/27/99	548	J
G706SB012	706SB01201	07/27/99	53.3	J
G706SB018	706SB018T1	12/14/99	861	=
G706SB014	706SB014T1	12/14/99	158	=
G706SB020	706SB020T1	12/14/99	271	=
G706SB019	706SB019T1	12/14/99	8.5	=
G706SB016	706SB016T1	12/14/99	3.4	=
G706SB015	706SB015T1	12/14/99	53.3	=
G706SB017	706SB017T1	12/14/99	15.3	=
G706SB022	706SB02201	01/26/00	52.6	=
G706SB021	706SB02101	01/26/00	24	=

Site: AOC 706
 Media: surface soil
 Units: mg/Kg
 Chemical: Iron
 CASRN:

STATISTICS

N	21
Detects	21
FOD	100%
Mean of Detect	9765
Min of Detect	669
Max of Detect	38200
Best Estimate of Mean (arithmetic)	9765
Best Estimate of Mean (geometric)	5041
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	14234.7
<i>t</i> -statistic	1.73
UCL95 Lognormal	20316.5
<i>H</i> -statistic	2.56
UCL95 Nonparametric	2140
UCL95 Bootstrap	14082

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	30728.19094
coverage	95%
UTL95 Lognormal	41354.55122
coverage	95%
UTL95 Nonparametric	38200.00
coverage	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.724
W_{log}	0.954
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Iron in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	4880	=
G706SB001	706SB00101	08/30/96	3640	=
G706SB007	706SB00701	09/03/96	2190	=
G706SB004	706SB00401	09/03/96	1890	=
G706SB006	706SB00601	09/03/96	865	=
G706SB010	706SB01001	09/04/96	11000	=
G706SB008	706SB00801	09/04/96	669	=
G706SB003	706SB00301	09/09/96	2140	=
G706SB009	706SB00901	09/09/96	1680	=
G706SB005	706SB00501	09/20/96	2400	=
G706SB011	706SB01101	07/27/99	33000	=
G706SB012	706SB01201	07/27/99	11200	=
G706SB018	706SB018T1	12/14/99	38200	=
G706SB014	706SB014T1	12/14/99	13200	=
G706SB020	706SB020T1	12/14/99	19900	=
G706SB019	706SB019T1	12/14/99	3930	=
G706SB016	706SB016T1	12/14/99	1770	=
G706SB015	706SB015T1	12/14/99	35700	=
G706SB017	706SB017T1	12/14/99	8110	=
G706SB022	706SB02201	01/26/00	4840	=
G706SB021	706SB02101	01/26/00	3870	=

Site: AOC 706
 Media: surface soil
 Units: mg/Kg
 Chemical: Lead
 CASRN:

STATISTICS

N	21
Detects	21
FOD	100%
Mean of Detect	124.948
Min of Detect	4.7000
Max of Detect	1300.00
Best Estimate of Mean (arithmetic)	124.9
Best Estimate of Mean (geometric)	33.9
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	231.3
<i>t-statistic</i>	1.73
UCL95 Lognormal	387.0
<i>H-statistic</i>	3.31
UCL95 Nonparametric	8.4
UCL95 Bootstrap	216.9

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	623.5866583
<i>coverage</i>	95%
UTL95 Lognormal	558.8404131
<i>coverage</i>	95%
UTL95 Nonparametric	1300.00
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.448
W_{log}	0.939
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Lead in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	66.1	J
G706SB001	706SB00101	08/30/96	19.9	J
G706SB007	706SB00701	09/03/96	7	J
G706SB004	706SB00401	09/03/96	12.2	J
G706SB006	706SB00601	09/03/96	6.1	J
G706SB010	706SB01001	09/04/96	38	J
G706SB008	706SB00801	09/04/96	4.9	J
G706SB003	706SB00301	09/09/96	15.1	J
G706SB009	706SB00901	09/09/96	4.7	J
G706SB005	706SB00501	09/20/96	8.4	=
G706SB011	706SB01101	07/27/99	320	J
G706SB012	706SB01201	07/27/99	1300	J
G706SB018	706SB018T1	12/14/99	221	=
G706SB014	706SB014T1	12/14/99	160	=
G706SB020	706SB020T1	12/14/99	181	=
G706SB019	706SB019T1	12/14/99	10.7	=
G706SB015	706SB015T1	12/14/99	75.8	=
G706SB017	706SB017T1	12/14/99	53.7	=
G706SB016	706SB016T1	12/14/99	6.3	=
G706SB022	706SB02201	01/26/00	84	=
G706SB021	706SB02101	01/26/00	29	=

Site: AOC 706
 Media: surface soil
 Units: mg/Kg
 Chemical: Manganese
 CASRN:

STATISTICS

N	21
Detects	21
FOD	100%
Mean of Detect	133.324
Min of Detect	7.7000
Max of Detect	575.00
Best Estimate of Mean (arithmetic)	133.3
Best Estimate of Mean (geometric)	64.0
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	197.2
<i>t-statistic</i>	1.73
UCL95 Lognormal	343.5
<i>H-statistic</i>	2.92
UCL95 Nonparametric	16.9
UCL95 Bootstrap	194.8

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	433.0197263
<i>coverage</i>	95%
UTL95 Lognormal	627.19097
<i>coverage</i>	95%
UTL95 Nonparametric	575.00
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.713
W_{log}	0.960
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Manganese in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	118	J
G706SB001	706SB00101	08/30/96	52.7	J
G706SB007	706SB00701	09/03/96	40.7	=
G706SB004	706SB00401	09/03/96	55.6	=
G706SB006	706SB00601	09/03/96	11.7	=
G706SB010	706SB01001	09/04/96	129	=
G706SB008	706SB00801	09/04/96	7.7	=
G706SB003	706SB00301	09/09/96	16.2	=
G706SB009	706SB00901	09/09/96	16.9	=
G706SB005	706SB00501	09/20/96	16.7	J
G706SB011	706SB01101	07/27/99	575	=
G706SB012	706SB01201	07/27/99	174	=
G706SB018	706SB018T1	12/14/99	431	=
G706SB014	706SB014T1	12/14/99	142	=
G706SB020	706SB020T1	12/14/99	201	=
G706SB019	706SB019T1	12/14/99	30.4	=
G706SB015	706SB015T1	12/14/99	532	=
G706SB016	706SB016T1	12/14/99	11.9	=
G706SB017	706SB017T1	12/14/99	64.9	=
G706SB022	706SB02201	01/26/00	89.8	=
G706SB021	706SB02101	01/26/00	82.6	=

Site: AOC 706
Media: Surface soil
Units: mg/Kg

Chemical: Thallium
CASRN:

STATISTICS

N	21
Detects	4
FOD	19%
Mean of Detect	1.175
Min of Detect	0.5200
Max of Detect	1.80
Best Estimate of Mean (arithmetic)	0.38
Best Estimate of Mean (geometric)	0.26
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	0.6
<i>t</i> -statistic	1.73
UCL95 Lognormal	0.5
<i>H</i> -statistic	2.19
UCL95 Nonparametric	0.195
UCL95 Bootstrap	0.55

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	1.201541168
<i>coverage</i>	95%
UTL95 Lognormal	1.015602297
<i>coverage</i>	95%
UTL95 Nonparametric	1.80
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.546
W_{log}	0.769
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Thallium in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	0.43	UJ
G706SB001	706SB00101	08/30/96	0.42	UJ
G706SB007	706SB00701	09/03/96	0.42	U
G706SB004	706SB00401	09/03/96	0.42	U
G706SB006	706SB00601	09/03/96	0.41	U
G706SB010	706SB01001	09/04/96	0.42	U
G706SB008	706SB00801	09/04/96	0.39	U
G706SB003	706SB00301	09/09/96	0.42	U
G706SB009	706SB00901	09/09/96	0.39	U
G706SB005	706SB00501	09/20/96	0.41	UJ
G706SB012	706SB01201	07/27/99	0.38	U
G706SB011	706SB01101	07/27/99	0.66	U
G706SB018	706SB018T1	12/14/99	1.6	J
G706SB014	706SB014T1	12/14/99	0.52	J
G706SB020	706SB020T1	12/14/99	0.78	J
G706SB019	706SB019T1	12/14/99	0.24	UJ
G706SB015	706SB015T1	12/14/99	1.8	J
G706SB017	706SB017T1	12/14/99	0.22	UJ
G706SB016	706SB016T1	12/14/99	0.2	UJ
G706SB022	706SB02201	01/26/00	0.44	U
G706SB021	706SB02101	01/26/00	0.42	U

Site: AOC 706
 Media: Surface soil
 Units: mg/Kg
 Chemical: Vanadium
 CASRN:

STATISTICS

N	21
Detects	21
FOD	100%
Mean of Detect	23.533
Min of Detect	4.0000
Max of Detect	87.20
Best Estimate of Mean (arithmetic)	23.5
Best Estimate of Mean (geometric)	15.3
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	33.2
<i>t-statistic</i>	1.73
UCL95 Lognormal	37.6
<i>H-statistic</i>	2.43
UCL95 Nonparametric	8.3
UCL95 Bootstrap	32.6

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	68.77938565
<i>coverage</i>	95%
UTL95 Lognormal	75.49533673
<i>coverage</i>	95%
UTL95 Nonparametric	87.20
<i>coverage</i>	95%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.698
W_{log}	0.935
$W_{\alpha = 0.05}$	0.908

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Vanadium in Surface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB002	706SB00201	08/30/96	13	=
G706SB001	706SB00101	08/30/96	12.1	=
G706SB007	706SB00701	09/03/96	9.5	=
G706SB004	706SB00401	09/03/96	6.1	=
G706SB006	706SB00601	09/03/96	4.8	=
G706SB010	706SB01001	09/04/96	24	=
G706SB008	706SB00801	09/04/96	4	=
G706SB003	706SB00301	09/09/96	7	=
G706SB009	706SB00901	09/09/96	8.9	=
G706SB005	706SB00501	09/20/96	6.9	=
G706SB012	706SB01201	07/27/99	26.7	=
G706SB011	706SB01101	07/27/99	71.1	=
G706SB018	706SB018T1	12/14/99	85.2	=
G706SB014	706SB014T1	12/14/99	32.3	=
G706SB020	706SB020T1	12/14/99	30.9	=
G706SB019	706SB019T1	12/14/99	13.8	=
G706SB015	706SB015T1	12/14/99	87.2	=
G706SB017	706SB017T1	12/14/99	19.3	=
G706SB016	706SB016T1	12/14/99	10.3	=
G706SB022	706SB02201	01/26/00	12.8	=
G706SB021	706SB02101	01/26/00	8.3	=

Site: AOC 706
 Media: subsurface soil
 Units: mg/Kg
 Chemical: Antimony
 CASRN:

STATISTICS

N	17
Detects	13
FOD	76%
Mean of Detect	17.423
Min of Detect	1.0000
Max of Detect	82.40
Best Estimate of Mean (arithmetic)	13.4
Best Estimate of Mean (geometric)	3.4
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	22.9
t-statistic	1.75
UCL95 Lognormal	124.8 Exceeds Max Detect
H-statistic	3.84
UCL95 Nonparametric	0.85
UCL95 Bootstrap	21.9

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	53.85900752
coverage	95%
UTL95 Lognormal	101.9002139
coverage	95%
UTL95 Nonparametric	82.40
coverage	94%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W _{normal}	0.641
W _{log}	0.961
W _{α = 0.05}	0.892

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Antimony in Subsurface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB001	706SB00102	08/30/96	33.8	J
G706SB002	706SB00202	08/30/96	4	J
G706SB006	706SB00602	09/03/96	49.9	=
G706SB007	706SB00702	09/03/96	2.8	J
G706SB004	706SB00402	09/03/96	82.4	=
G706SB003	706SB00302	09/09/96	0.38	U
G706SB009	706SB00902	09/09/96	1	J
G706SB012	706SB01202	07/27/99	5.6	J
G706SB011	706SB01102	07/27/99	3	J
G706SB013	706SB01302b	07/29/99	0.45	UJ
G706SB018	706SB018T2	12/14/99	3.8	J
G706SB014	706SB014T2	12/14/99	6.7	J
G706SB020	706SB020T2	12/14/99	8.6	J
G706SB019	706SB019T2	12/14/99	1.6	J
G706SB016	706SB016T2	12/14/99	23.3	J
G706SB022	706SB02202	01/26/00	1.7	U
G706SB021	706SB02102	01/26/00	0.32	U

Site: AOC 706
 Media: Subsurface soil
 Units: mg/Kg
 Chemical: Chromium
 CASRN:

STATISTICS

N	17
Detects	17
FOD	100%
Mean of Detect	52.165
Min of Detect	5.3
Max of Detect	177
Best Estimate of Mean (arithmetic)	52.2
Best Estimate of Mean (geometric)	38.9
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	69.2
<i>t</i> -statistic	1.75
UCL95 Lognormal	94.3
<i>H</i> -statistic	2.35
UCL95 Nonparametric	19.1
UCL95 Bootstrap	67.5

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	124.344285
<i>coverage</i>	95%
UTL95 Lognormal	184.6443284
<i>coverage</i>	95%
UTL95 Nonparametric	177.00
<i>coverage</i>	94%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.830
W_{log}	0.933
$W_{\alpha = 0.05}$	0.892

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Chromium in Subsurface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB001	706SB00102	08/30/96	88.7	=
G706SB002	706SB00202	08/30/96	46.1	=
G706SB006	706SB00602	09/03/96	56.5	=
G706SB007	706SB00702	09/03/96	47.8	=
G706SB004	706SB00402	09/03/96	81.5	=
G706SB003	706SB00302	09/09/96	5.3	=
G706SB009	706SB00902	09/09/96	29.1	=
G706SB012	706SB01202	07/27/99	43.4	J
G706SB011	706SB01102	07/27/99	41.4	J
G706SB013	706SB01302b	07/29/99	9.9	=
G706SB018	706SB018T2	12/14/99	62.1	=
G706SB014	706SB014T2	12/14/99	177	=
G706SB020	706SB020T2	12/14/99	47.1	=
G706SB019	706SB019T2	12/14/99	44.5	=
G706SB016	706SB016T2	12/14/99	74	=
G706SB022	706SB02202	01/26/00	19.1	=
G706SB021	706SB02102	01/26/00	13.3	=

Site: AOC 706
 Media: Subsurface soil
 Units: mg/Kg
 Chemical: Magnesium
 CASRN:

STATISTICS

N	17
Detects	17
FOD	100%
Mean of Detect	3047.118
Min of Detect	273
Max of Detect	6420
Best Estimate of Mean (arithmetic)	3047
Best Estimate of Mean (geometric)	2287.8
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	3863.4
<i>t</i> -statistic	1.75
UCL95 Lognormal	6028.9
<i>H</i> -statistic	2.48
UCL95 Nonparametric	1340
UCL95 Bootstrap	3788.2

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	6510.502991
coverage	95%
UTL95 Lognormal	11593.49849
coverage	95%
UTL95 Nonparametric	6420.00
coverage	94%

DISTRIBUTION TESTING

Population is best described as:	NORMAL
W_{normal}	0.938
W_{log}	0.890
$W_{\alpha = 0.05}$	0.892

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Magnesium in Subsurface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB001	706SB00102	08/30/96	5320	=
G706SB002	706SB00202	08/30/96	5690	=
G706SB006	706SB00602	09/03/96	2220	=
G706SB007	706SB00702	09/03/96	4700	=
G706SB004	706SB00402	09/03/96	2310	=
G706SB003	706SB00302	09/09/96	273	=
G706SB009	706SB00902	09/09/96	3510	=
G706SB012	706SB01202	07/27/99	4770	=
G706SB011	706SB01102	07/27/99	4900	=
G706SB013	706SB01302b	07/29/99	477	=
G706SB018	706SB018T2	12/14/99	6420	=
G706SB014	706SB014T2	12/14/99	1850	=
G706SB020	706SB020T2	12/14/99	2200	=
G706SB019	706SB019T2	12/14/99	2820	=
G706SB016	706SB016T2	12/14/99	2260	=
G706SB022	706SB02202	01/26/00	1340	=
G706SB021	706SB02102	01/26/00	741	=

Site: AOC 706
 Media: Subsurface soil
 Units: mg/Kg

Chemical: Manganese
 CASRN:

STATISTICS

N	17
Detects	17
FOD	100%
Mean of Detect	274.735
Min of Detect	9.5000
Max of Detect	551.00
Best Estimate of Mean (arithmetic)	274.7
Best Estimate of Mean (geometric)	182.7
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	347.8	
<i>t</i> -statistic	1.75	
UCL95 Lognormal	816.4	Exceeds Max Detect
<i>H</i> -statistic	2.62	
UCL95 Nonparametric	87.3	
UCL95 Bootstrap	340.8	

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	584.6055035	
<i>coverage</i>	95%	
UTL95 Lognormal	1562.287538	
<i>coverage</i>	95%	
UTL95 Nonparametric	551.00	
<i>coverage</i>	94%	

DISTRIBUTION TESTING

Population is best described as:	NORMAL
W_{normal}	0.941
W_{log}	0.805
$W_{\alpha = 0.05}$	0.892

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Manganese in Subsurface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB001	706SB00102	08/30/96	551	J
G706SB002	706SB00202	08/30/96	322	J
G706SB006	706SB00602	09/03/96	447	=
G706SB007	706SB00702	09/03/96	463	=
G706SB004	706SB00402	09/03/96	258	=
G706SB003	706SB00302	09/09/96	9.5	=
G706SB009	706SB00902	09/09/96	204	=
G706SB012	706SB01202	07/27/99	396	=
G706SB011	706SB01102	07/27/99	374	=
G706SB013	706SB01302b	07/29/99	21	=
G706SB018	706SB018T2	12/14/99	428	=
G706SB014	706SB014T2	12/14/99	181	=
G706SB020	706SB020T2	12/14/99	289	=
G706SB019	706SB019T2	12/14/99	446	=
G706SB016	706SB016T2	12/14/99	158	=
G706SB022	706SB02202	01/26/00	87.3	=
G706SB021	706SB02102	01/26/00	35.7	=

Site: AOC 706
 Media: subsurface soil
 Units: mg/Kg

 Chemical: Mercury
 CASRN:

STATISTICS

N	17
Detects	14
FOD	82%
Mean of Detect	0.886
Min of Detect	0.0500
Max of Detect	2.40
Best Estimate of Mean (arithmetic)	0.74
Best Estimate of Mean (geometric)	0.3
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	1.1	
<i>t</i> -statistic	1.75	
UCL95 Lognormal	5.0	Exceeds Max Detect
<i>H</i> -statistic	3.41	
UCL95 Nonparametric	0.055	
UCL95 Bootstrap	1.02	

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	2.076161475	
<i>coverage</i>	95%	
UTL95 Lognormal	6.142661767	
<i>coverage</i>	95%	
UTL95 Nonparametric	2.40	
<i>coverage</i>	94%	

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.852
W_{log}	0.910
$W_{\alpha = 0.05}$	0.892

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Mercury in Subsurface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB001	706SB00102	08/30/96	1.4	=
G706SB002	706SB00202	08/30/96	1.2	=
G706SB006	706SB00602	09/03/96	1.8	=
G706SB007	706SB00702	09/03/96	0.51	=
G706SB004	706SB00402	09/03/96	2.4	=
G706SB003	706SB00302	09/09/96	0.04	U
G706SB009	706SB00902	09/09/96	0.11	U
G706SB012	706SB01202	07/27/99	1.8	=
G706SB011	706SB01102	07/27/99	0.39	=
G706SB013	706SB01302b	07/29/99	0.05	=
G706SB018	706SB018T2	12/14/99	0.47	=
G706SB020	706SB020T2	12/14/99	0.41	=
G706SB014	706SB014T2	12/14/99	0.34	=
G706SB019	706SB019T2	12/14/99	0.23	=
G706SB016	706SB016T2	12/14/99	0.21	=
G706SB022	706SB02202	01/26/00	1.2	=
G706SB021	706SB02102	01/26/00	0.02	UJ

Site: AOC 706
 Media: subsurface soil
 Units: mg/Kg
 Chemical: Thallium
 CASRN:

STATISTICS

N	17
Detects	13
FOD	76%
Mean of Detect	0.958
Min of Detect	0.5900
Max of Detect	1.80
Best Estimate of Mean (arithmetic)	0.78
Best Estimate of Mean (geometric)	0.6
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	1.0
<i>t</i> -statistic	1.75
UCL95 Lognormal	1.2
<i>H</i> -statistic	2.23
UCL95 Nonparametric	0.255
UCL95 Bootstrap	0.967

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	1.626414247
<i>coverage</i>	95%
UTL95 Lognormal	2.314470796
<i>coverage</i>	95%
UTL95 Nonparametric	1.80
<i>coverage</i>	94%

DISTRIBUTION TESTING

Population is best described as:	NORMAL
W_{normal}	0.935
W_{log}	0.913
$W_{\alpha = 0.05}$	0.892

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Thallium in Subsurface Soil
AOC 706, Zone G, CNC

Station ID	Sample ID	Date Collected	Concentration (mg/Kg)	Qualifier
G706SB001	706SB00102	08/30/96	1.6	J
G706SB002	706SB00202	08/30/96	0.98	J
G706SB006	706SB00602	09/03/96	0.98	J
G706SB007	706SB00702	09/03/96	0.6	J
G706SB004	706SB00402	09/03/96	0.59	J
G706SB003	706SB00302	09/09/96	0.43	U
G706SB009	706SB00902	09/09/96	1.2	J
G706SB012	706SB01202	07/27/99	0.51	U
G706SB011	706SB01102	07/27/99	0.63	J
G706SB013	706SB01302b	07/29/99	0.34	U
G706SB018	706SB018T2	12/14/99	1.8	J
G706SB014	706SB014T2	12/14/99	0.66	J
G706SB020	706SB020T2	12/14/99	0.8	J
G706SB019	706SB019T2	12/14/99	1.1	J
G706SB016	706SB016T2	12/14/99	0.92	J
G706SB022	706SB02202	01/26/00	0.59	J
G706SB021	706SB02102	01/26/00	0.4	U