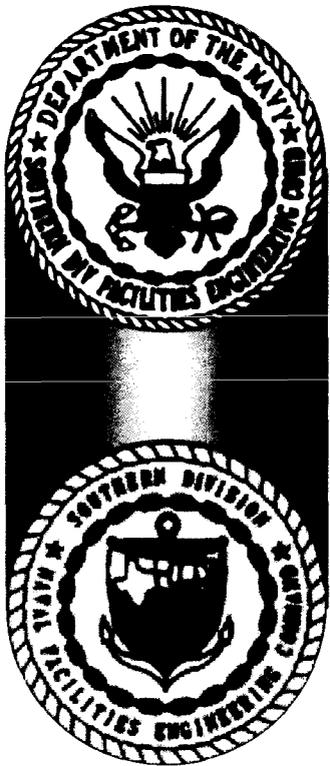


N61165.AR.003349
CNC CHARLESTON
5090.3a

RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT
ADDENDUM CORRECTIVE MEASURES STUDY WORK PLAN SOLID WASTE
MANAGEMENT UNIT 8 (SWMU 8) AREA OF CONCERN 636 (AOC 636) ZONE G CNC
CHARLESTON SC
1/10/2003
CH2M HILL

RFI REPORT ADDENDUM

RFI Report Addendum and CMS Work Plan SWMU 8/AOC 636, Zone G



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

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

CH2M Jones

January 2003

*Revision No. 0
Contract N62467-99-C-0960*



CH2MHILL

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32606-3928
Mailing address:
PO Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

January 10, 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 0) –SWMU 8/AOC 636, Zone
G, Charleston Naval Complex

Dear Mr. Scaturo:

Enclosed please find two copies of the RFI Report Addendum and CMS Work Plan
(Revision 0) for SWMU 8/AOC 636 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 Casey Hudson. Please contact him at 407/423-0030,
extension 251, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Tim Frederick/Gannett Fleming, Inc., w/att
Dann Spariosu/USEPA, w/att
Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

RFI REPORT ADDENDUM

RFI Report Addendum and CMS Work Plan SWMU 8/AOC 636, Zone G



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

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

PREPARED BY
CH2M-Jones

January 2003

*Revision 0
Contract N62467-99-C-0960
158814.ZG.PR.09*

Certification Page for RFI Report Addendum and CMS Work Plan (Revision 0) – SWMU 8/AOC 636, 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

P.E. No. 21428



Dean Williamson, P.E.



Date

1 Contents

2 Section	Page
3 Acronyms and Abbreviations	x
4 1.0 Introduction	1-1
5 1.1 Background.....	1-1
6 1.2 Purpose of the RFI Report Addendum/CMS Work Plan.....	1-2
7 1.3 Report Organization.....	1-3
8 Figure 1-1 Location of SWMU 8/AOC 636 in Zone G.....	1-5
9 Figure 1-2 Aerial Photograph of SWMU 8/AOC 636.....	1-6
10 2.0 Summary of RFI Conclusions for SWMU 8/AOC 636	2-1
11 2.1 Site Geology and Hydrogeology.....	2-1
12 2.2 Surface Soil Sampling and Analysis.....	2-2
13 2.2.1 RFI Surface Soil Results.....	2-2
14 2.2.2 Fuel Distribution System Surface Soil Results.....	2-4
15 2.3 Subsurface Soil Sampling and Analysis.....	2-5
16 2.4 Groundwater Sampling and Analysis.....	2-6
17 2.4.1 Groundwater Screening Results.....	2-6
18 2.4.2 Groundwater Monitoring Results.....	2-7
19 2.5 Human Health Risk Assessment.....	2-9
20 2.6 Conclusions and Recommendations.....	2-10
21 Table 2-1 COC Exposure Risk and Hazard Summary.....	2-11
22 Figure 2-1 Shallow Groundwater Potentiometric Surface Map.....	2-12
23 Figure 2-2 RFI Soil Sample Locations.....	2-13
24 Figure 2-3 RFI Groundwater Sample Locations.....	2-14
25 3.0 Interim Measures and UST/AST Removals	3-1
26 3.1 Interim Measures Summary.....	3-1
27 3.2 UST/AST Removals.....	3-2
28 Figure 3-1 Area of Excavation at SWMU 8/AOC 636 (DET, 1999).....	3-3
29 4.0 Summary of Additional Investigations	4-1
30 4.1 Additional Soil Investigations.....	4-1
31 4.1.1 Surface Soil.....	4-1
32 4.1.2 Subsurface Soil.....	4-2
33 4.2 Additional Groundwater Investigations.....	4-3

1 Contents, Continued

2	4.2.1	Groundwater Sampling	4-3
3	4.2.2	LNAPL.....	4-5
4	4.3	Summary of COPCs Identified.....	4-6
5	4.3.1	Surface Soil.....	4-6
6	4.3.2	Subsurface Soil	4-6
7	4.3.3	Groundwater	4-6
8	Table 4-1	Analytes Detected in Surface Soil, RFI Addendum Investigation.....	4-7
9	Table 4-2	Analytes Detected in Subsurface Soil, RFI Addendum Investigation.....	4-11
10	Table 4-3	Post-RFI Groundwater Sampling Event Summary	4-15
11	Table 4-4	Analytes Detected in Groundwater, RFI Addendum Investigation.....	4-16
12	Table 4-5	Analytes Detected in LNAPL Samples above MDLs.....	4-25
13	Figure 4-1	RFI Addendum Soil Sample Location Plan.....	4-26
14	Figure 4-2	Groundwater Sample Location Plan	4-27
15	5.0	COPC/COC Refinement.....	5-1
16	5.1	Soil VOCs Rescreening Using SSL (DAF=1)	5-1
17	5.2	Surface Soil COCs	5-2
18	5.2.1	Aroclor-1260	5-2
19	5.2.2	Total BEQs.....	5-3
20	5.2.3	Antimony	5-4
21	5.2.4	Arsenic.....	5-4
22	5.2.5	Chromium.....	5-5
23	5.2.6	Thallium	5-6
24	5.2.7	Hydrazine	5-7
25	5.2.8	Benzene.....	5-7
26	5.2.9	Ethylbenzene	5-8
27	5.3	Subsurface Soil COCs	5-8
28	5.3.1	Antimony	5-9
29	5.3.2	Cadmium.....	5-10
30	5.3.3	Chromium.....	5-10
31	5.3.4	Lead.....	5-11
32	5.3.5	Nickel.....	5-12
33	5.3.6	Thallium	5-12
34	5.3.7	Acetone.....	5-13

1 Contents, Continued

2	5.3.8	1,1,2,2-PCA.....	5-13
3	5.3.9	1,1,2-TCA.....	5-14
4	5.4	Groundwater COCs.....	5-15
5	5.4.1	BEHP.....	5-15
6	5.4.2	Benzo[a]Anthracene.....	5-16
7	5.4.3	Benzo[a]Pyrene.....	5-17
8	5.4.4	Benzo[b]Fluoranthene.....	5-17
9	5.4.5	Naphthalene.....	5-18
10	5.4.6	Antimony.....	5-18
11	5.4.7	Barium.....	5-19
12	5.4.8	Iron.....	5-19
13	5.4.9	Thallium.....	5-20
14	5.4.10	Vanadium.....	5-20
15	5.4.11	Hydrazine.....	5-21
16	Table 5-1	Detected VOCs in Surface Soil During Original RFI.....	5-22
17	Table 5-2	Detected VOCs in Subsurface Soil During Original RFI.....	5-24
18	Table 5-3	Aroclor-1260 Results in Surface Soil.....	5-25
19	Table 5-4	BEQ Results in Surface Soil.....	5-27
20	Table 5-5	Antimony Results in Surface Soil.....	5-29
21	Table 5-6	Arsenic Results in Surface Soil.....	5-31
22	Table 5-7	Total Chromium Results in Surface Soil.....	5-33
23	Table 5-8	Thallium Results in Surface Soil.....	5-35
24	Table 5-9	Benzene Results in Surface Soil.....	5-37
25	Table 5-10	Ethylbenzene Results in Surface Soil.....	5-39
26	Table 5-11	Antimony Results in Subsurface Soil.....	5-41
27	Table 5-12	Cadmium Results in Subsurface Soil.....	5-43
28	Table 5-13	Total Chromium Results in Subsurface Soil.....	5-45
29	Table 5-14	Lead Results in Subsurface Soil.....	5-47
30	Table 5-15	Nickel Results in Subsurface Soil.....	5-49
31	Table 5-16	Thallium Results in Subsurface Soil.....	5-51
32	Table 5-17	Acetone Results in Subsurface Soil.....	5-53
33	Table 5-18	1,1,2,2-PCA Results in Subsurface Soil.....	5-54
34	Table 5-19	1,1,2-TCA Results in Subsurface Soil.....	5-55

1 Contents, Continued

2	Table 5-20	BEHP Results in Groundwater.....	5-56
3	Table 5-21	Benzo[a]Anthracene Results in Groundwater	5-59
4	Table 5-22	Benzo[a] Pyrene Results in Groundwater	5-62
5	Table 5-23	Benzo[a]Fluoranthene Results in Groundwater	5-65
6	Table 5-24	Naphthalene Results in Groundwater	5-68
7	Table 5-25	Antimony Results in Groundwater	5-71
8	Table 5-26	Barium Results in Groundwater	5-73
9	Table 5-27	Iron Results in Groundwater	5-75
10	Table 5-28	Thallium Results in Groundwater	5-77
11	Table 5-29	Vanadium Results in Groundwater.....	5-79
12	Figure 5-1	RFI Sample Locations Within the IM Soil Excavation Areas.....	5-81
13	Figure 5-2	Aroclor-1260 in Surface Soil.....	5-82
14	Figure 5-3	BEQs in Surface Soil.....	5-83
15	Figure 5-4	Antimony in Surface Soil	5-84
16	Figure 5-5	Arsenic in Surface Soil.....	5-85
17	Figure 5-6	Chromium in Surface Soil	5-86
18	Figure 5-7	Thallium in Surface Soil	5-87
19	Figure 5-8	Antimony in Subsurface Soil	5-88
20	Figure 5-9	Chromium in Subsurface Soil.....	5-89
21	Figure 5-10	Thallium in Subsurface Soil	5-90
22	Figure 5-11	Benzo[a]Anthracene in Groundwater	5-91
23	Figure 5-12	Benzo[a] Pyrene in Groundwater	5-92
24	Figure 5-13	Benzo[a]Fluoranthene in Groundwater	5-93
25	Figure 5-14	Naphthalene in Groundwater	5-94
26	Figure 5-15	Antimony in Groundwater.....	5-95
27	6.0	Summary of Information Related to Site Closeout Issues.....	6-1
28	6.1	RFI Status.....	6-1
29	6.2	Presence of Inorganics in Groundwater	6-1
30	6.3	Potential Linkage to SWMU 37, Investigated Sanitary Sewers at the CNC	6-2
31	6.4	Potential Linkage to AOC 699, Investigated Storm Sewers at the CNC	6-2
32	6.5	Potential Linkage to AOC 504, Investigated Railroad Lines at the CNC	6-2

1 Contents, Continued

2	6.6	Potential Migration Pathways to Surface Water Bodies at the CNC.....	6-3
3	6.7	Potential Contamination in Oil/Water Separators (OWSs).....	6-3
4	6.8	Land Use Controls (LUCs).....	6-3
5	7.0	Conclusions and Recommendations	7-1
6	8.0	CMS Work Plan for SWMU 8/AOC 636.....	8-1
7	8.1	Remedial Action Objectives.....	8-1
8	8.2	Remedial Goal Options and Proposed Media Cleanup Standards	8-1
9	8.3	Identification of Potential Corrective Measure Technologies	8-2
10	8.3.1	Bailing.....	8-2
11	8.3.2	Skimmers or Pneumatic Pumps.....	8-3
12	8.3.3	Absorbent Filters.....	8-3
13	8.3.4	Aggressive Fluid Vapor Recovery (AFVR)	8-3
14	8.3.5	Butane Biosparging™.....	8-3
15	8.3.6	Land Use Controls	8-4
16	8.4	Focused CMS Approach.....	8-4
17	8.5	Approach to Evaluating Corrective Measure Alternatives.....	8-4
18	8.5.1	Protect Human Health and the Environment	8-5
19	8.5.2	Attain Media Cleanup Standards.....	8-5
20	8.5.3	Control the Source of Releases.....	8-5
21	8.5.4	Comply with Applicable Standards for Management of Wastes	8-5
22	8.5.5	Other Factors	8-5
23	8.6	Focused CMS Report	8-6
24	Table 8-1	Outline of Focused CMS Report for SWMU 8/AOC 636.....	8-7
25	9.0	References.....	9-1
26	Appendices		
27	A	Responses to SCDHEC Comments on the <i>Zone G RFI Report, Revision 0</i> (EnSafe,	
28		1998a)	
29	B	Excerpts from the <i>Zone G RFI Report, Revision 0</i>	
30	C	<i>Completion Report, Interim Measure for SWMU 8</i> (DET, November 19, 1999)	
31	D	Analytical Data Summaries, Post-RFI Sampling Events	
32	E	Data Validation Report, Post-RFI Sampling Events	
33	F	Well Log and Construction Diagram for G008GW04D	

1 **Contents, Continued**

- 2 **G** Technical Memorandum *Hydrazine Analytical Methods and Results* (CH2M-Jones,
3 2002)
- 4 **H** UCL₉₅ Calculation Summaries for Surface Soil COPCs
- 5 **I** PAH Results in Surface Soil Used for BEQ Calculation
- 6 **J** Site-Specific SSL and DAF Calculations for Benzene and 1,1,2-Trichloroethane

1 Acronyms and Abbreviations

2	ACM	Asbestos-containing material
3	AOC	Area of concern
4	AST	Aboveground storage tank
5	AVFR	Aggressive Fluid Vapor Recovery
6	BCT	BRAC Cleanup Team
7	BEQ	Benzo[a]pyrene equivalent
8	BRAC	Base Realignment and Closure Act
9	BRC	Background reference concentration
10	BTEX	Benzene, toluene, ethylbenzene, and xylenes
11	CA	Corrective action
12	CFR	<i>Code of Federal Regulations</i>
13	CMS	Corrective measures study
14	CNC	Charleston Naval Complex
15	COC	Chemical of concern
16	COPC	Chemical of potential concern
17	DAF	Dilution attenuation factor
18	DET	Environmental Detachment Charleston
19	DPT	Direct-push technology
20	EnSafe	EnSafe Inc.
21	EPA	U.S. Environmental Protection Agency
22	FDS	Fuel distribution system
23	FRE	Fixed-point risk evaluation
24	ft ²	Square feet
25	ft bls	Feet below land surface
26	ft msl	Feet mean sea level
27	HHRA	Human health risk assessment
28	HI	Hazard index
29	ILCR	Incremental lifetime cancer risk
30	IM	Interim measure

1 Acronyms and Abbreviations, Continued

2	lin ft	Linear feet
3	LNAPL	Light non-aqueous phase liquid
4	LUC	Land use control
5	MCL	Maximum contaminant level
6	MCS	Media Cleanup Standard
7	MDL	Method detection limit
8	µg/kg	Micrograms per kilogram
9	µg/L	Micrograms per liter
10	mg/kg	Milligrams per kilogram
11	NAVBASE	Naval Base
12	NFA	No Further Action
13	OSWER	Office of Solid Waste and Emergency Response
14	OWS	Oil/water separator
15	PAH	Polycyclic aromatic hydrocarbon
16	PCA	Tetrachloroethane
17	RAO	Remedial Action Objective
18	RGO	Remedial Goal Option
19	PCB	Polychlorinated biphenyl
20	RBC	Risk-based concentration
21	RCRA	Resource Conservation and Recovery Act
22	RFI	RCRA Facility Investigation
23	SCDHEC	South Carolina Department of Health and Environmental Control
24	SPLP	Synthetic precipitation leaching procedure
25	SSL	Soil screening level
26	SWMU	Solid waste management unit
27	SVOC	Semivolatile organic compound
28	TCA	Trichloroethane
29	TPH	Total petroleum hydrocarbon
30	UCL ₉₅	95-percent upper confidence limit

1 **Acronyms and Abbreviations, Continued**

- | | | |
|---|-----|---------------------------|
| 2 | UST | Underground storage tank |
| 3 | UXO | Unexploded ordnance |
| 4 | VOC | Volatile organic compound |

Section 1.0

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 Solid Waste Management Unit (SWMU)
14 8 and Area of Concern (AOC) 636. This report also contains a Corrective Measures Study
15 (CMS) Work Plan for the SWMU 8/AOC 636 site, which will evaluate corrective measure
16 alternatives that are proposed for the soil and groundwater at the site. Figure 1-1 presents
17 the location of SWMU 8/AOC 636 and Zone G within the CNC.

18 1.1 Background

19 AOC 636, which is located immediately east of Brumby Street, lies within the western
20 boundary of SWMU 8. SWMU 8 and AOC 636 are bounded by Hobson Avenue to the
21 north, Dyess Avenue to the south, Brumby Street to the west, and Building X-10 and AOC
22 642 to the east. AOC 642, a former pistol range located south of Building X-10, was
23 investigated separately from SWMU 8/AOC 636. The RFI Report Addendum for AOC 642,
24 issued by CH2M-Jones on February 1, 2002, recommended No Further Action (NFA) status
25 for the site. This recommendation was subsequently approved by SCDHEC on March 6,
26 2002.

27 SWMU 8 contained three unlined oil sludge pits that were used to dispose oil sludge from
28 1944 to 1977. The pits were later filled and, in 1997, were removed as part of an interim
29 measure (IM) conducted at this site. The results of the IM are summarized in Section 3.0 of
30 this report. The area is currently an open, unpaved area with gravel and soil cover. Figure 1-

1 2 shows the location of the SWMU 8/AOC 636 site within Zone G and its geographic
2 proximity to AOC 642. In addition, Figure 1-2 depicts the IM soil excavation areas.

3 AOC 636 is a former torpedo magazine, where torpedoes and munitions were stored in the
4 1940s. According to the *Zone G RFI Report, Revision 0* (EnSafe Inc. [EnSafe], 1998a), there is
5 no historical evidence of repair operations or disposal occurring at this facility. An
6 unexploded ordnance (UXO) subcontractor performed geophysical screening of the RFI
7 sampling locations for buried UXO, but found no anomalies. In addition, no UXO, torpedo
8 parts, or other visual evidence of disposal were observed during the soil excavation IM
9 completed at SWMU 8 in the southwest corner of AOC 636. Based on this information, the
10 CNC Project Team and the Environmental Detachment Charleston (DET) determined that
11 there was no need for a formal UXO survey. Currently, the AOC 636 area contains Building
12 161 and an asphalt-paved parking lot.

13 1.2 Purpose of the RFI Report Addendum/CMS Work Plan

14 This RFI Report Addendum contains two RCRA submittals – the RFI Report Addendum
15 and the CMS Work Plan for SWMU 8/AOC 636. Sections 2.0 through 6.0 of this document
16 address topics associated with the RFI Report Addendum. This portion of the submittal
17 provides information concerning SWMU 8/AOC 636 and documents the conclusions from
18 the *Zone G RFI Report, Revision 0* (EnSafe, 1998a). Appendix A provides CH2M-Jones’
19 responses to SCDHEC comments regarding the portion of *Zone G RFI Report, Revision 0* that
20 discusses this site.

21 This RFI Report Addendum also provides the results of additional sampling performed
22 after completion of the *Zone G RFI Report, Revision 0* to complete the nature and extent
23 investigation for chemicals of potential concern (COPCs) that were identified in surface soil,
24 subsurface soil, and groundwater. This document evaluates these additional data, and
25 provides conclusions regarding further RCRA activities at SWMU 8/AOC 636.

26 The CMS Work Plan, presented in Section 8.0 of this submittal, evaluates and refines the
27 findings for SWMU 8/AOC 636, as presented in the *Zone G RFI Report, Revision 0* and
28 subsequent investigations, particularly as they relate to the chemicals of concern (COCs)
29 identified at SWMU 8/AOC 636.

30 Prior to changing the status of any site to NFA status in the CNC RCRA CA permit, the
31 BRAC Cleanup Team (BCT) agreed that the following issues should be considered:

- 32 • Status of the RFI

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

8 Information regarding these issues is provided in Section 6.0 of this submittal. At this time,
9 SWMU 8/AOC 636 is not being recommended for NFA. However, the above information is
10 presented in this report to accelerate the decision-making process for the site.

11 **1.3 Report Organization**

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

14 **1.0 Introduction** — Presents the purpose of the report and background information
15 regarding the SWMU 8/AOC 636 area.

16 **2.0 Summary of RFI Conclusions for SWMU 8/AOC 636** — Summarizes the conclusions
17 from the RFI investigations for the area comprising SWMU 8/AOC 636.

18 **3.0 Interim Measures and UST/AST Removals** – Summarizes the IM completed at SWMU
19 8.

20 **4.0 Summary of Additional Investigations** — Summarizes information collected at SWMU
21 8/AOC 636 after completion of the *Zone G RFI Report, Revision 0*.

22 **5.0 COPC/COC Refinement** —Provides further evaluation of COPCs based on the RFI
23 report and additional data to assess them as COCs.

24 **6.0 Summary of Information Related to Site Closeout Issues**—Discusses the various site
25 closeout issues that the BCT agreed to evaluate prior to site closeout.

26 **7.0 Conclusions and Recommendations**—Presents a summary of the conclusions from the
27 RFI and recommendations for further RCRA CA activities.

28 **8.0 CMS Work Plan for SWMU 8/AOC 636** – This section presents the CMS Work Plan for
29 SWMU 8/AOC 636, defines the remedial action objectives (RAOs) and associated media
30 cleanup standards (MCSs) for the COCs that are identified in Section 5.0. This section also

1 presents the nature and extent of COCs for the SWMU 8/ AOC 636 area, along with the
2 CMS procedures that will be used to evaluate and compare relevant remedial approaches to
3 achieving RAOs and MCSs for the COCs.

4 **9.0 References** — Lists the references used in this document.

5 **Appendix A** contains responses to SCHDHEC comments on the *Zone G RFI Report, Revision*
6 *0*.

7 **Appendix B** provides excerpts from the *Zone G RFI Report, Revision 0*, including a summary
8 of detected chemicals in soil and groundwater samples, and various figures showing
9 contaminant plume maps.

10 **Appendix C** contains a copy of the *Completion Report, Interim Measure for SWMU 8 (DET,*
11 *November 19, 1999)*.

12 **Appendix D** contains the analytical data for the post-RFI soil and groundwater collection
13 events conducted at SWMU 8/AOC 636.

14 **Appendix E** contains the data validation report for the post-RFI soil and groundwater
15 collection events.

16 **Appendix F** contains the well log and construction diagram for G008GW04D.

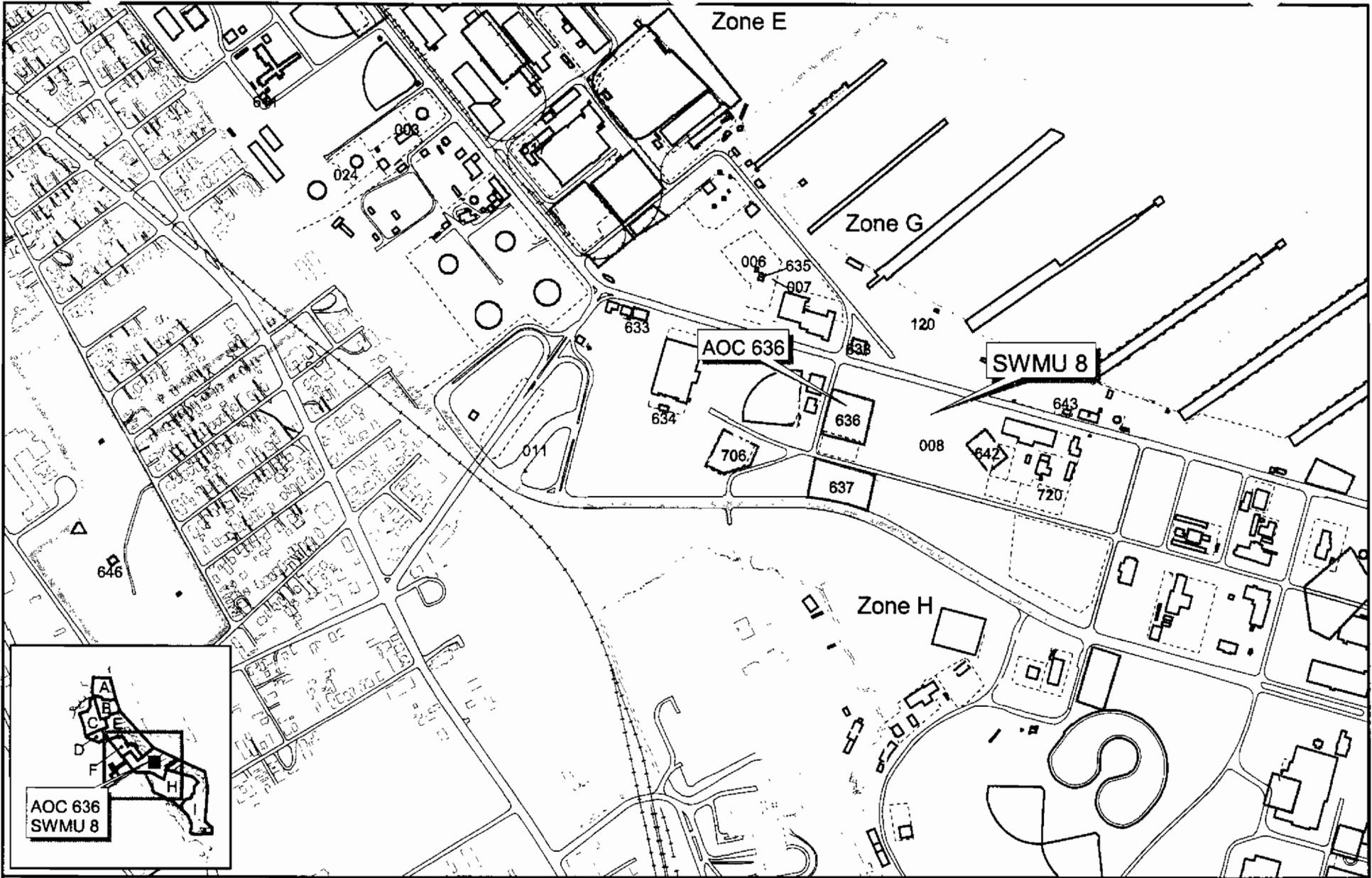
17 **Appendix G** presents the Technical Memorandum *Hydrazine Analytical Methods and Results*
18 (CH2M-Jones, 2002).

19 **Appendix H** contains summaries from the UCL₉₅ surface soil COPC calculations.

20 **Appendix I** contains a summary of the concentrations of the seven individual PAH
21 constituents used for BEQ calculation, including the data set used to calculate the mean
22 concentrations.

23 **Appendix J** contains the site-specific SSL and DAF Calculations for benzene and 1,1,2-
24 trichloroethane.

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



- Fence
- Railroads
- Roads
- Shoreline
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary
- Zone G

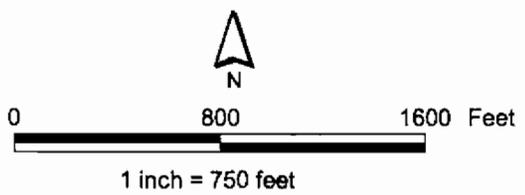


Figure 1-1
 Site Location
 SWMU 8/AOC 636, Zone G
 Charleston Naval Complex

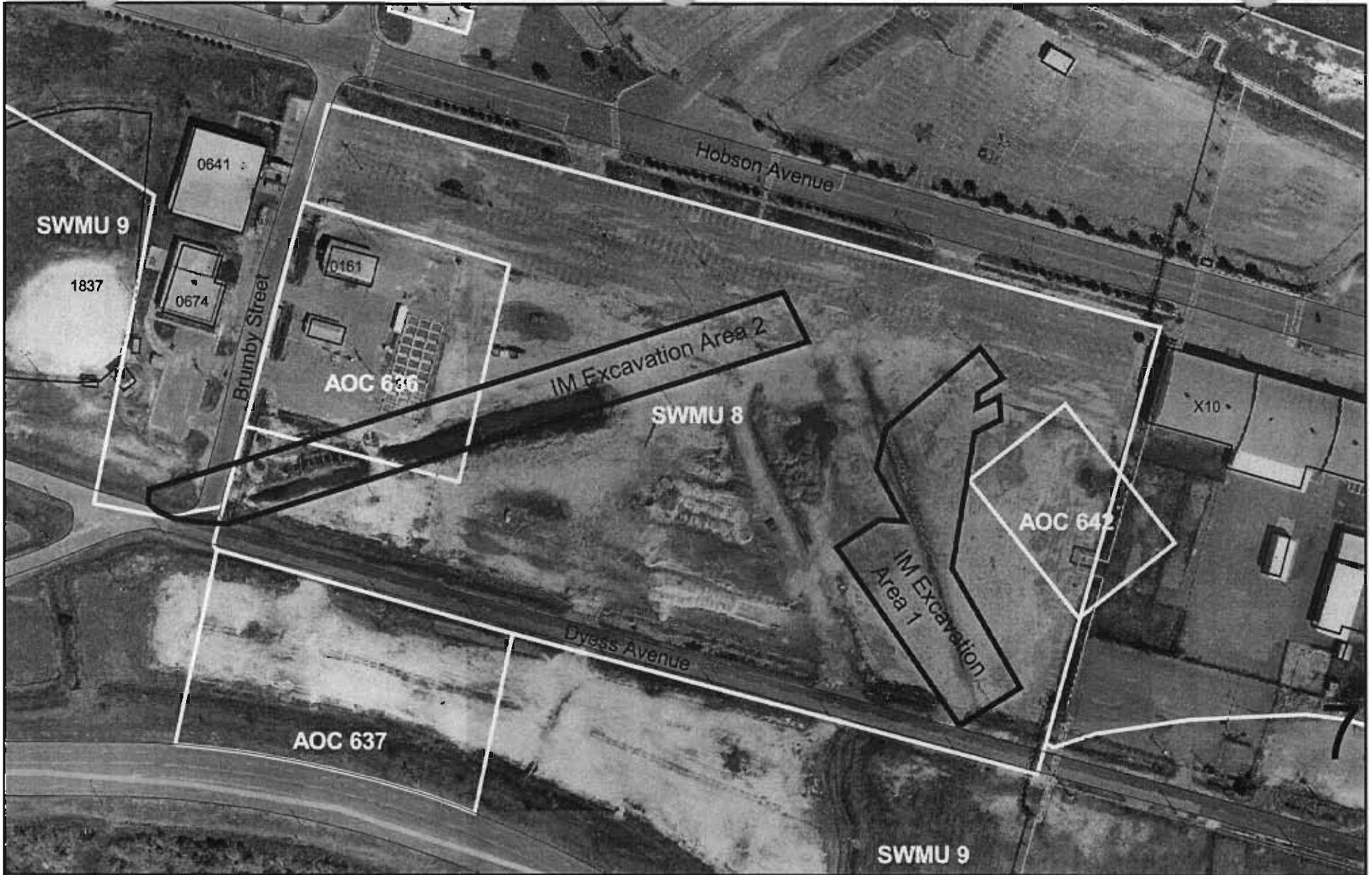


Figure 1-2
Site Layout
SWMU 8/AOC 636, Zone G
Charleston Naval Complex

1 2.0 Summary of RFI Conclusions for SWMU 8/ 2 AOC 636

3 Section 10.6 of the *Zone G RFI Report, Revision 0* (EnSafe, 1998a) presented the results of the
4 soil and groundwater investigations, including conclusions concerning site geology and
5 hydrogeology, nature and extent of contamination, and risk assessment for SWMU 8/AOC
6 636. Conclusions from the *Zone G RFI Report, Revision 0* are summarized as part of this
7 section.

8 2.1 Site Geology and Hydrogeology

9 A detailed description of Zone G geology and hydrogeology are summarized in Section 2.0
10 of the *Zone G RFI Report, Revision 0*. The lowermost stratigraphic unit identified in Zone G is
11 the Ashley Formation (Ta) member of the Mid-Tertiary age Cooper Group. According to the
12 *Zone G RFI Report, Revision 0*, the Ta was encountered throughout Zone G at elevations
13 ranging from -16.6 to -49 feet mean sea level (ft msl) and is higher in the eastern portion of
14 Zone G than in the western and southern portions. The Ta is a tight, slightly calcareous,
15 clayey silt with varying amounts of fine-grained sand which decreases rapidly with depth.

16 Overlying the Ta are younger Upper-Tertiary and Quaternary-age stratigraphic units. The
17 Quaternary-age sediments range from 25 to 55 feet thick. During the RFI field activities
18 three distinct Quaternary-age litho-stratigraphic units were identified as Quaternary Clay
19 (Qc), Quaternary Marsh (Qm), and Quaternary Sand (Qs). The Qc deposits consist of a stiff
20 very fine to fine grained sandy and silty clay. The Qc unit was commonly found in the
21 upper 10 to 15 feet of the shallow subsurface. The Qm is a soft, sticky clay, occasionally
22 laminated with sand, silt, and shelly lenses. It has a high organic content, low plasticity, and
23 a distinctive hydrogen sulfide odor. According to the *Zone G RFI Report, Revision 0*, the Qm
24 is approximately 45 feet thick in the southeastern portion of Zone G and decreases to
25 approximately 7 feet thick in the western portion. The uppermost unit, Qs, is primarily very
26 fine to medium silty sand, well to moderately well sorted and loose. The Qs deposits in
27 Zone G range from thin lenses ranging from 0.5 to 1.7 feet thick to thicker lenses of four feet
28 thick.

29 Groundwater elevations in the immediate area of SWMU 8/AOC 636 are tidal influenced
30 and range widely from -0.5 to 5 ft msl. As reported in the *Zone G RFI Report, Revision 0*,
31 groundwater flow in the surficial aquifer is highly variable in gradient and direction with a

1 groundwater depression existing outside the north corner boundary of AOC 636. Figure 2-1
2 presents a potentiometric surface map using groundwater elevation data collected on
3 March 15, 2002.

4 **2.2 Surface Soil Sampling and Analysis**

5 **2.2.1 RFI Surface Soil Results**

6 In September and October 1993 prior to the scheduled RFI field activities, 31 soil sample
7 locations identified as G008SB01 through G008SB31 were used to characterize the surface (0
8 to 1 feet below land surface [ft bls]) soil throughout SWMU 8. As part of the original RFI
9 field work, three soil sample locations identified as G008SB001 through G008SB003 were
10 advanced in September 1996 at SWMU 8 to confirm the results from the 1993 sampling
11 event. As part of the 1996 sampling event, nine soil sample locations identified as
12 G636SB001 through G636SB009 were used to characterize the surface soil (0 to 1 ft bls) in the
13 immediate area of AOC 636. Finally, in January 1997, five additional soil sample locations
14 identified as G636SB010 through G636SB014 were advanced at AOC 636 to further delineate
15 contaminants identified from the 1996 event. These 48 soil sample locations are depicted in
16 Figure 2-2.

17 The 43 samples collected during the pre-RFI (i.e., 1993) and the initial RFI sampling event
18 (i.e., 1996) were analyzed for volatile organic compounds (VOCs), semivolatile organic
19 compounds (SVOCs), metals, pesticides, polychlorinated biphenyls (PCBs), and
20 propellants/explosives. The five samples collected during the second RFI sampling event
21 conducted in 1997 were analyzed for SVOCs, metals, pesticides, and PCBs. Table 10.6.5 of
22 the *Zone G RFI Report, Revision 0* presents a summary of the concentrations of analytes
23 detected during the three soil sampling events. A copy of this table is provided in Appendix
24 B.

25 Surface soil sample analytical results were compared to their corresponding U.S.
26 Environmental Protection Agency (EPA) Region III residential risk-based concentration
27 (RBC) (hazard index [HI]=0.1), and the Zone G background reference concentration (BRC)
28 for metals. Surface soil analytical results were not compared to the EPA Office of Solid
29 Waste and Emergency Response (OSWER) soil screening levels (SSLs) in the *Zone G RFI*
30 *Report, Revision 0*.

31 **Benzo[a]Pyrene Equivalents**

32 Calculated benzo[a]pyrene equivalent (BEQ) concentrations in 17 of the 48 surface soil
33 samples were greater than the EPA Region III residential RBC of 87 micrograms per

1 kilogram ($\mu\text{g}/\text{kg}$). Six of these were collected from AOC 636. Figure 10.6.7 in the *Zone G RFI*
2 *Report, Revision 0* presents the soil sample locations with the detected concentrations of
3 BEQs in surface soil. A copy of figure 10.6.7 is provided in Appendix B.

4 Benzo[a]anthracene and benzo[b] fluoranthene were detected in five of the 48 samples
5 above their EPA Region III residential RBC of $0.87 \mu\text{g}/\text{kg}$. Benzo[k]fluoranthene was
6 detected at a concentration of $20.75 \mu\text{g}/\text{kg}$ from the sample collected from G008SB11, which
7 is above EPA Region III residential RBC of $8.7 \mu\text{g}/\text{kg}$. Benzo[a]pyrene was detected in 16 of
8 the 48 samples collected above its EPA Region III residential RBC of $0.087 \mu\text{g}/\text{kg}$, and
9 dibenz[a,h]anthracene were detected in 4 of the 48 samples above its EPA Region III
10 residential RBC of $0.087 \mu\text{g}/\text{kg}$. Six of the 14 benzo[a]pyrene concentrations were from
11 samples collected at AOC 636. Indeno[1,2,3-c,d]pyrene was detected in three samples above
12 its EPA Region III residential RBC of $0.87 \mu\text{g}/\text{kg}$.

13 **Pesticides/Polychlorinated Biphenyls/Hydrazine**

14 The pesticide, dieldrin, was detected in the sample collected from G008SB11 at a
15 concentration of $46 \mu\text{g}/\text{kg}$ which is slightly above its EPA Region III residential RBC of 40
16 $\mu\text{g}/\text{kg}$. Aroclor-1260 was detected in two of the 48 samples above its EPA Region III
17 residential RBC of $320 \mu\text{g}/\text{kg}$. These two samples were collected from AOC 636. In addition,
18 hydrazine was reportedly detected in one sample collected from SWMU 8 above its EPA
19 Region III residential RBC of $210 \mu\text{g}/\text{kg}$. Figures 10.6.9, 10.6.10, and 10.6.12 in the *Zone G*
20 *RFI Report, Revision 0* present the sample locations with the detected surface soil
21 concentrations of dieldrin, Aroclor-1260, and hydrazine, respectively. A copy of each figure
22 is provided in Appendix B.

23 **Inorganics**

24 Antimony (three of 48 pre-RFI and RFI samples), arsenic (four samples), chromium (four
25 samples), lead (one sample), thallium (one sample) were detected above their EPA Region
26 III residential RBCs (HI=0.1) and Zone G background reference concentrations. Figures
27 10.6.14 through 10.6.18 in the *Zone G RFI Report, Revision 0* present the surface soil
28 concentration distribution of each of the five metals. A copy of each figure is provided in
29 Appendix B.

30 Iron was detected in 39 of the 48 surface soil samples above the EPA Region III residential
31 RBC (HI=0.1) value of 2,300 milligrams per kilogram (mg/kg). According to the *Zone G RFI*
32 *Report, Revision 0*, a background concentration for iron was not established because it is
33 considered an essential nutrient.

1 **VOCs**

2 Detected concentrations of VOCs did not exceed their corresponding EPA Region III
3 residential RBCs.

4 The *Zone G RFI Report, Revision 0* identified Aroclor-1260, BEQs, hydrazine, antimony,
5 arsenic, chromium, and thallium as COCs in the surface soil at SWMU 8/AOC 636. The
6 metals were identified as soil pathway COCs based on their contribution to cumulative
7 residential HI projections. According to the *Zone G RFI Report, Revision 0* hydrazine did not
8 exceed EPA's acceptable threshold of 1E-06 in any of the three individual exposure
9 pathways (i.e., incidental ingestion, dermal contact, and inhalation), however, it was
10 identified as a COC due to a cumulative incremental lifetime cancer risk (ILCR) exceeding
11 1E-06. A summary of the *Zone G RFI Report, Revision 0* human health risk assessment is
12 provided in Section 2.5.

13 **2.2.2 Fuel Distribution System Surface Soil Results**

14 Three surface soil locations identified as GFDSSC012, GFDSSC014, and GFDSSC016 within
15 the SWMU 8/AOC 636 boundary were used to characterize the soil in the immediate area
16 of the fuel distribution lines. On December 4-5, 1996, one surface soil sample (0 to 1 ft bls)
17 was collected from each of the three locations and analyzed for VOCs, SVOCs, PCBs,
18 pesticides, metals, cyanide, and total petroleum hydrocarbons. The three fuel distribution
19 system (FDS) surface soil sample locations are presented in Figure 2-2. The *Zone G RFI*
20 *Report, Revision 0* did not provide a comparison of the detected concentrations from the FDS
21 samples against screening criteria. CH2M-Jones compared the analytical results from these
22 samples to their corresponding EPA Region III RBC (HI=0.1), the EPA SSL, and the Zone G
23 BRC for metals.

24 Aroclor-1260, detected at a concentration of 0.84 J mg/kg in the sample collected from
25 GFDSSC012, is slightly greater than its EPA Region III residential RBC of 0.32 µg/kg. In
26 addition, arsenic and chromium were detected at concentrations of 28.8 and 40.8 mg/kg,
27 respectively, in the sample collected from GFDSSC016 which are above their corresponding
28 EPA Region III residential RBCs and Zone G background range for metals. Aroclor-1260,
29 arsenic, and chromium were identified in *Zone G RFI Report, Revision 0* as COCs in the
30 surface soil at SWMU 8/AOC 636. Pesticides and cyanide were not detected above method
31 detection limits (MDLs). Thus, no additional COPCs were identified from the three FDS
32 surface soil samples.

2.3 Subsurface Soil Sampling and Analysis

During the pre-RFI field sampling event subsurface soil samples (3 to 5 ft bls) were collected from only 16 of the 31 sample locations (i.e., G008SB02, G008SB03, G008SB11, G008SB12, G008SB19 through G008SB28, G008SB30, and G008SB31). Because shallow groundwater was encountered during the RFI sampling investigations, subsurface soil samples were collected from only five of the 12 locations (G636SB002 through G636SB005 and G636SB009) during the September 1996 event and from only two of the five locations (G636SB013 and G636SB014) during the January 1997 event. Subsurface soil samples were analyzed for the same constituents as the surface soil samples collected from the same locations. The soil sample locations are provided in Figure 2-2.

Subsurface soil sample analytical results were compared to their corresponding SSLs with a dilution attenuation factor of 20 (DAF=20) and their Zone G BRC for metals.

VOCs

The VOCs 1,1,2,2-trichloroethane (1,1,2,2-TCA) and 1,1,2-trichloroethane (1,1,2-TCA) were each detected in one sample above their corresponding SSL (DAF=20) of 3 micrograms per liter ($\mu\text{g}/\text{L}$) and 20 $\mu\text{g}/\text{L}$, respectively. 1,1,2,2-TCA was detected at a concentration of 10 $\mu\text{g}/\text{L}$ in the sample collected from G636SB009 and 1,1,2-TCA was detected at a concentration of 92 $\mu\text{g}/\text{L}$ in the sample collected from G008SB22. A plan view of these subsurface soil sample locations with the concentration distribution of 1,1,2,2-TCA and 1,1,2-TCA were provided in the *Zone G RFI Report, Revision 0* as Figures 10.6.5 and 10.6.6, respectively. A copy of each figure is provided in Appendix B.

BEQs and SVOCs

Benzo[a]anthracene, the only SVOC detected above its screening criteria, was detected at a concentration of 2,400 $\mu\text{g}/\text{L}$ in the sample collected from G008SB28, which exceeds its SSL (DAF=20) of 2,000 $\mu\text{g}/\text{L}$. Subsurface soil BEQ concentrations were not calculated in the *Zone G RFI Report, Revision 0*.

Pesticides/PCBs/Hydrazine

The pesticide dieldrin was detected in three pre-RFI samples at concentrations above its SSL (DAF=20) of 4 $\mu\text{g}/\text{kg}$. Hydrazine was reportedly detected in three subsurface soil samples collected from AOC 636 during the September 1996 investigation above its SSL (DAF=20) of 0.088 $\mu\text{g}/\text{kg}$. Figures 10.6.11 and 10.6.13 in the *Zone G RFI Report, Revision 0* depict dieldrin and hydrazine concentration distribution in subsurface soil, respectively. A copy of each

1 figure is provided in Appendix B. The detected concentrations of PCBs did not exceed their
2 corresponding SSL (DAF=20).

3 **Inorganics**

4 Antimony (four of 23 pre-RFI and RFI samples), copper (two samples), lead (two samples),
5 manganese (one sample), mercury (one sample), and thallium (one sample) were detected
6 above their SSLs (DAF=20) and Zone G BRCs. Figures 10.6.19 through 10.6.24 in the *Zone G*
7 *RFI Report, Revision 0* present the subsurface soil concentration distribution of each of the six
8 metals. A copy of each figure is provided in Appendix B.

9 No subsurface soil COPCs were identified for SWMU 8/AOC 636 in the *Zone G RFI Report,*
10 *Revision 0.*

11 **2.4 Groundwater Sampling and Analysis**

12 **2.4.1 Groundwater Screening Results**

13 Five direct-push technology (DPT) borings were advanced within SWMU 8 to investigate
14 potential impacts from the portion of the sanitary sewer system identified as SWMU 37. On
15 June 15, 1997, one sample was collected from each of the five borings identified as
16 LG037GP023 through LG037GP027. The five DPT borings are presented in Figure 2-3.

17 Section 10, Volume 2 of 12 of the *Zone L RFI Report* (EnSafe, 1998b) indicates that DPT
18 groundwater samples were collected up to a depth of approximately 15 ft bls. Based on
19 information obtained from the sewer line surveys conducted during the Zone L
20 investigations, the invert elevations ranged from 6 to 13 ft bls. Groundwater DPT samples
21 were collected at or below the pipe invert elevation. The sample locations were determined
22 based on the sampling scheme provided in the *Zone L RFI Work Plan* (EnSafe, 1995). For the
23 basewide investigation samples were collected at manhole locations, and approximately
24 every 200 ft along the sewer line. At SWMU 8 the locations of LG037GP023 through
25 LG037GP027 are adjacent to manholes.

26 The five DPT samples were analyzed for VOCs, metals, and cyanide. VOCs and cyanide
27 were not detected above MDLs. The *Zone G RFI Report, Revision 0* did not provide a
28 comparison of detected metal concentrations from the DPT samples against screening
29 criteria due to elevated turbidity in the samples that rendered them non-representative of
30 groundwater quality.

2.4.2 Groundwater Monitoring Results

SWMU 8/AOC 636 Monitoring Well Results

During the original RFI field activities, six shallow groundwater monitoring wells identified as G008GW001 through G008GW006 were installed at SWMU 8. One shallow monitoring well, identified as G636GW001, was installed at AOC 636. These wells were installed to characterize the nature of potential contaminants in the saturated zone above the Ashley Formation from operations associated with the former sludge pits (SWMU 8) and the former torpedo magazine (AOC 636). The locations of these wells are shown in Figure 2-3.

With the exception of monitoring wells G008GW001 and G008GW003, each shallow monitoring well was designed to intersect the groundwater table and consisted of a 10-ft well screen, with the top of the well screen placed at a range of approximately 2.3 to 5.4 ft bls. Monitoring wells G008GW001 and G008GW003 were constructed with a 10-ft well screen and installed with the top of the well screen at approximately 10.2 and 10.3 ft bls, respectively. They were designed to monitor shallow groundwater at a deeper elevation. Groundwater samples were collected from the seven wells during three sampling events conducted on November 15, 1996, May 20-23, 1997, and September 13-16, 1997. Samples collected during the initial November 1996 sampling event were analyzed for VOCs, SVOCs, metals, pesticides, and PCBs. The groundwater sample collected from monitoring well G636GW001 was also analyzed for explosives and propellants. Groundwater samples collected during the second (i.e., May 1997) and third (i.e., September 1997) event were analyzed for VOCs, SVOCs, metals, pesticides, PCBs, explosives, and hydrazine. Table 10.6.10 of the *Zone G RFI Report, Revision 0* presents a summary of the concentrations of analytes detected in the groundwater samples collected from the seven monitoring wells during the original RFI. A copy of this table is provided in Appendix B.

Detected chemicals in the shallow groundwater samples were compared with their respective maximum contaminant levels (MCLs), EPA Region III tap water RBCs, and Zone G BRCs for metals in groundwater.

Bis(2-ethylhexyl)phthalate (BEHP) was detected at a concentration of 46 µg/L in the sample collected from G008GW004 during the November 1996 sampling event. This concentration exceeds its EPA Region III tap water RBC of 4.8 µg/L. Hydrazine was reportedly detected in two samples during the May 1997 sampling event and in five samples during the September 1997 sampling event above its EPA Region III tap water RBC of 0.022 µg/L.

Antimony, iron, thallium, and vanadium were the only metals detected at concentrations above their screening criteria. Antimony was detected at concentrations of 22.6 and 12.6

1 $\mu\text{g}/\text{L}$ in samples collected from G008GW003 during the November 1996 and May 1997
2 sampling events, respectively. These concentrations are greater than the MCL of 6 $\mu\text{g}/\text{L}$.

3 Iron was detected in each sample collected from the seven monitoring wells during the
4 three RFI sampling events at concentrations ranging from 1,100 $\mu\text{g}/\text{L}$ (G008GW003;
5 November 1996) to 56,100 $\mu\text{g}/\text{L}$ (G636GW001; May 1997). Except for the sample collected
6 from G008GW003 during the November 1996 sampling event, these concentrations are
7 above the EPA Region III tap water RBC (HI=0.1) of 1,100 $\mu\text{g}/\text{L}$. These concentrations were
8 not screened against a background concentration, since according to the *Zone G RFI Report,*
9 *Revision 0*, a background concentration for iron was not established because it is an essential
10 nutrient.

11 Thallium was detected in two samples during the November 1996 event and in three
12 samples during the May 1997 event at concentrations ranging from 3.9 $\mu\text{g}/\text{L}$ (G008GW002;
13 November 1996) to 7.4 $\mu\text{g}/\text{L}$ (G008GW003; May 1997). These concentrations are greater than
14 the MCL of 2.0 $\mu\text{g}/\text{L}$. Figure 10.6.29 in the *Zone G RFI Report, Revision 0* depicts the detected
15 concentrations of thallium in the samples collected from the seven shallow monitoring
16 wells. A copy of this figure is presented in Appendix B.

17 During the three RFI sampling events, vanadium was detected in only one sample
18 (G008GW003; 49 $\mu\text{g}/\text{L}$ – November 1996) above its EPA Region III tap water RBC of 26
19 $\mu\text{g}/\text{L}$ and Zone G BRC of 15.4 $\mu\text{g}/\text{L}$.

20 VOCs were not detected at concentrations above their corresponding screening criteria.
21 Pesticides and PCBs were not detected above MDLs.

22 The *Zone G RFI Report, Revision 0* identified BEHP, antimony, barium, thallium, and
23 vanadium as COCs in the groundwater at SWMU 8/AOC 636.

24 **Fuel Distribution System Monitoring Well Results**

25 Five FDS monitoring wells identified as GFDSGW02A, GFDSGW02C, GFDSGW02D,
26 GFDSGW03B, and GFDSGW03C within the SWMU 8/AOC 636 boundary were installed to
27 monitor the groundwater in the immediate area of the fuel distribution lines. The locations
28 of these five wells are shown in Figure 2-3. Except for monitoring well GFDSGW02D, each
29 of the four remaining FDS wells are constructed with a 5-ft well screen placed at an
30 elevation of approximately 7 to 11.5 ft bls. Monitoring well GFDSGW02D designed to
31 intersect the groundwater table consists of a 10-ft well screen, with the top of the well
32 screen placed at approximately 2.9 ft bls.

1 With the exception of monitoring well GFDSGW02D, groundwater samples were collected
2 from the four wells during two sampling events conducted on January 15-16, 1997 and May
3 30-June 4, 1997. Samples collected during these sampling events were analyzed for VOCs,
4 SVOCs, metals, and cyanide. One sample was collected from monitoring well GFDSGW02D
5 on March 3, 1999 and analyzed for SVOCs, metals, and the VOCs benzene, ethylbenzene,
6 toluene, and xylenes. The *Zone G RFI Report, Revision 0* did not provide a comparison of
7 detected concentrations from the samples collected from the FDS wells against screening
8 criteria. Screening of detected chemicals for COPCs in groundwater against current
9 screening criteria was conducted by CH2M-Jones.

10 Detected chemicals in the groundwater samples were compared with their respective
11 MCLs, EPA Region III tap water RBCs, and Zone G BRCs for metals in groundwater. Iron
12 and thallium were the only constituents detected above their screening criteria in the
13 samples collected from the four FDS wells (i.e., GFDSGW02A, GFDSGW02C, GFDSGW03B,
14 and GFDSGW03C) during the two 1997 sampling events.

15 Iron was detected in each sample collected during the two 1997 sampling events (i.e.,
16 GFDSGW02A, GFDSGW02C, GFDSGW03B, and GFDSGW03C) at concentrations ranging
17 from 974 $\mu\text{g/L}$ (GFDSGW03B; January 1997) to 5,410 $\mu\text{g/L}$ (GFDSGW02C; May 1997).
18 Except for the sample collected from GFDSGW03B collected during the January 1997
19 sampling event, these concentrations are above the EPA Region III tap water RBC (HI=0.1)
20 of 1,100 $\mu\text{g/L}$. Seven of the 21 iron concentrations in the samples collected from the SWMU
21 8/AOC 636 wells during the RFI were an order of magnitude greater than this maximum
22 concentration of 5,410 $\mu\text{g/L}$. According to the *Zone G RFI Report, Revision 0*, a background
23 concentration for iron was not established because it is an essential nutrient. As a result,
24 iron was not identified as a COC in groundwater.

25 Thallium was detected in each of the four samples collected during the January 1997 event
26 at concentrations ranging from 3.0J (GFDSGW03B) to 5.8J (GFDSGW02A) $\mu\text{g/L}$. These
27 concentrations are greater than the MCL of 2.0 $\mu\text{g/L}$. However, thallium was not detected
28 above its MDL of 5.0 $\mu\text{g/L}$ in any of the samples collected during the May 1997 event. The
29 *Zone G RFI Report, Revision 0* identified thallium as a COC in the groundwater at
30 SWMU 8/AOC 636.

31 **2.5 Human Health Risk Assessment**

32 As part of the *Zone G RFI Report, Revision 0*, EnSafe conducted a human health risk
33 assessment (HHRA) for the COPCs identified in surface soil (i.e., aroclor-1260, BEQs,

1 antimony, arsenic, chromium, lead, thallium, aldrin, dieldrin, and hydrazine) and
2 groundwater (i.e., antimony, barium, thallium, vanadium, and BEHP). Exposure was
3 evaluated for a future residential receptor scenario and a current and future site worker
4 scenario, using the incidental ingestion, dermal contact, and inhalation exposure pathways.
5 However, since no VOCs were identified as COPCs at SWMU 8/AOC 636, the inhalation
6 pathway was not addressed for groundwater. For noncarcinogenic contaminants evaluated
7 for future site residents, hazard was computed separately to address child and adult
8 exposure.

9 These COPCs were further evaluated in the fixed-point risk evaluation (FRE) to evaluate
10 which of these parameters was considered a COC at SWMU 8/AOC 636. COCs were
11 identified on cumulative pathway risk and hazard projections for SWMU 8/AOC 636 on a
12 medium-specific basis. EPA has established a generally acceptable risk range of 1E-04 to 1E-
13 06 and a HI index threshold of 1.0. According to the *Zone G RFI Report, Revision 0*, a COC, as
14 recommended by SCDHEC, is any chemical contributing to a cumulative risk level of 1E-06
15 or greater and/or a cumulative HI above 1.0, and if an individual ILCR exceeds 1E-06 or an
16 individual HI exceeds 0.1. For carcinogens, this approach is conservative since a cumulative
17 risk level of 1E-04 and individual ILCR of 1E-06 is recommended by EPA Region IV as the
18 calculated values for establishing COCs.

19 Antimony, Aroclor-1260, arsenic, BEQs, chromium, hydrazine, and thallium were identified
20 in the *Zone G RFI Report, Revision 0* as surface soil COCs at SWMU 8/AOC 636. No
21 subsurface soil COPCs were identified for SWMU 8/AOC 636 in the *Zone G RFI Report,*
22 *Revision 0*. Antimony, barium, thallium, vanadium, and BEHP were identified as
23 groundwater COCs. Table 2-1 presents cumulative and COC-specific exposure risks and
24 hazard quotients for each of the soil and groundwater pathway COCs. Section 5.0 of this
25 RFI Report Addendum/CMS Work Plan further addresses the surface soil and
26 groundwater COCs that were identified in the *Zone G RFI Report, Revision 0* by evaluating
27 whether they are COCs based on the current CNC project criteria. In addition, Section 5.0
28 evaluates whether surface, subsurface, or groundwater COPCs identified as a result of the
29 additional RFI sampling investigations that were completed subsequent to the *Zone G RFI*
30 *Report, Revision 0* are COCs based on the current CNC project criteria.

31 **2.6 Conclusions and Recommendations**

32 The *Zone G RFI Report, Revision 0* concluded that the primary risk in surface soil was from
33 arsenic and BEQs for the ingestion and dermal pathways, and the primary risk in shallow
34 groundwater was from BEHP. The *Zone G RFI Report, Revision 0* recommended a CMS for
35 these COCs identified at the site.

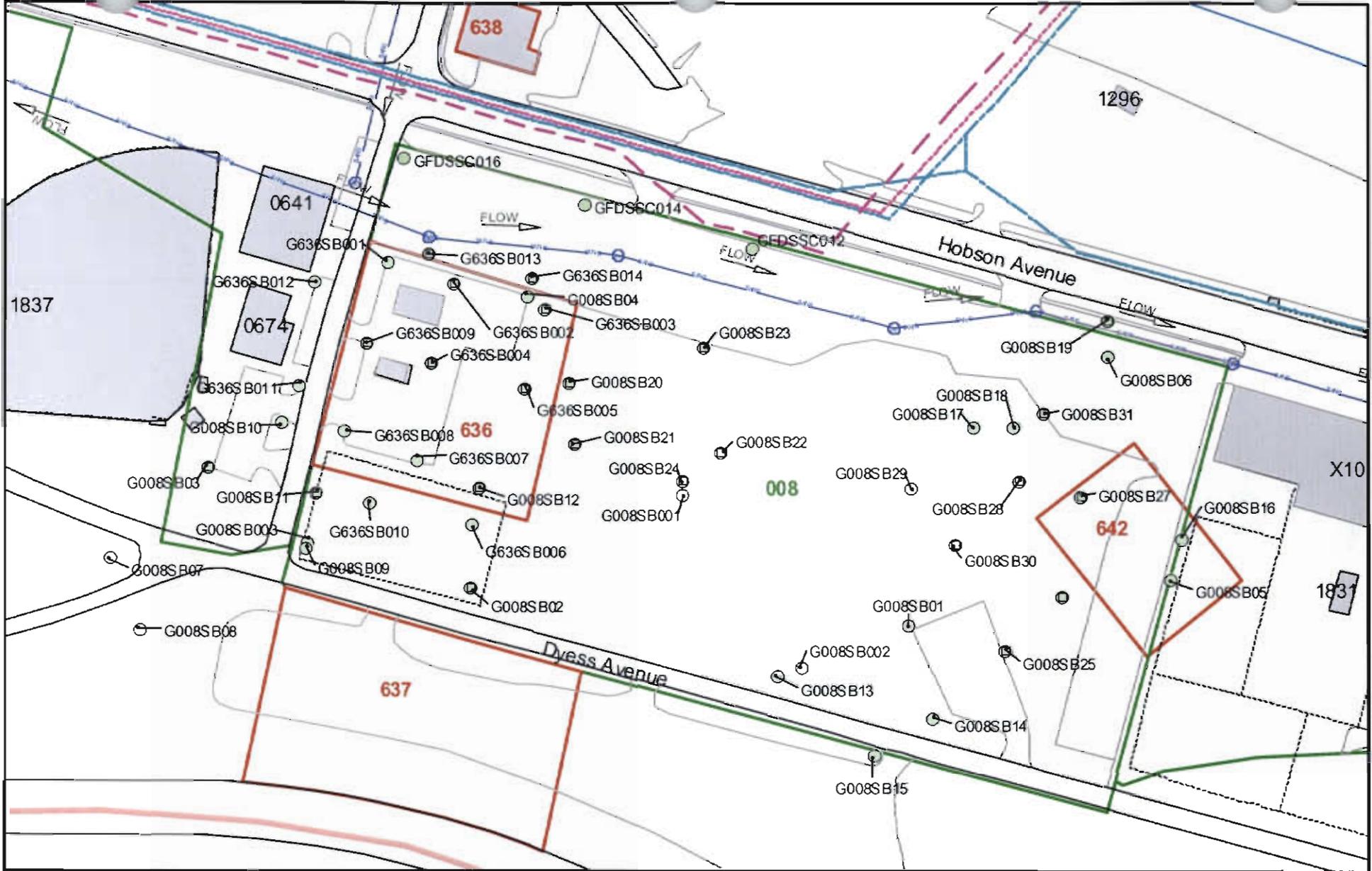
TABLE 2-1
 COC Exposure Risk and Hazard Summary at SWMU 8/AOC 636
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Chemical	Risk (ILCR)		Hazard (HI)	
	Industrial	Residential	Industrial	Residential
Soil				
Antimony	ND	ND	0.008	0.17
Aroclor-1260	4.9E-07	2.5E-06	ND	ND
Arsenic	4.0E-06	2.8E-05	0.025	.49
BEQs	6.3E-06	3.1E-05	ND	ND
Chromium	ND	ND	0.027	0.25
Hydrazine	2.1E-07	1.0E-06	ND	ND
Thallium	ND	ND	0.014	0.29
Cumulative	1.1E-05	6.2E-05	0.075	1.21
Groundwater				
Antimony	ND	ND	0.55	3.6
Barium	ND	ND	0.21	1.4
Thallium	ND	ND	0.56	3.7
Vanadium	ND	ND	0.068	0.45
Bis(2-ethylhexyl) phthalate	2.3E-06	9.7E-06	0.023	0.15
Cumulative	2.3E-06	9.7E-06	1.41	9.3

Source: Table 10.6.34. Zone G RFI Report, Revision 0 (EnSafe, 1998a)

ND Not Determined

NOTE: Original figure In color



- Subsurface Soil Sample
- Surface Soil Sample
- Sanitary Sewer Manhole
- Sanitary Sewer Line
- Fuel Line
- Diesel Line
- Sludge Line
- Shoreline
- Fence
- Roads
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary

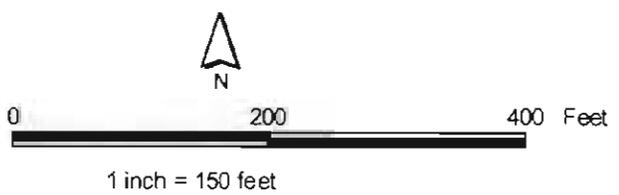


Figure 2-2
RFI Soil Sample Location Plan
SWMU 8/AOC 636
Charleston Naval Complex

CH2MHILL

NOTE: Original Redlined In color

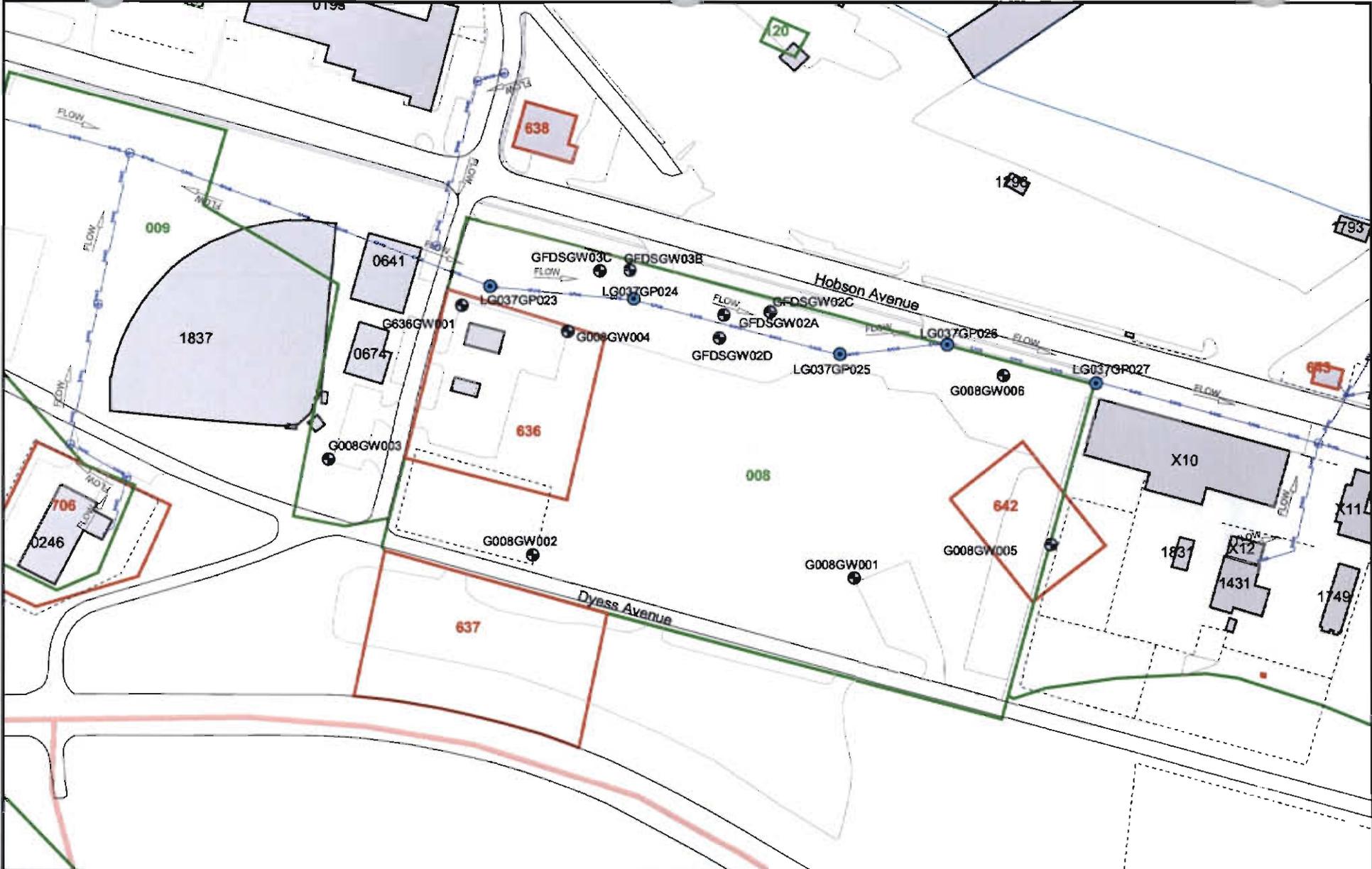


Figure 2-3
RFI Groundwater Sample Location Plan
SWMU 8/AOC 636
Charleston Naval Complex

CH2MHILL

1 **3.0 Interim Measures and UST/AST Removals**

2 **3.1 Interim Measures Summary**

3 From March to September 1997, the DET removed 26,533 tons of non-hazardous oil-
4 impacted soil and 50,000 gallons of recovered oil in two separate areas of the SWMU
5 8/AOC 636 site. The objective of the IM was to remove through excavation the source of
6 contamination (i.e., visible sludge), heavily contaminated soil, and light non-aqueous phase
7 liquid (LNAPL). As there were no MCSs for the excavated material, the excavation of oil-
8 impacted soil was verified through visual inspection. As part of the IM objective, AOC 636
9 was investigated for buried UXO.

10 IM execution was separated into separate areas. Area 1 contained two smaller oil sludge
11 pits, and Area 2 contained LNAPL. According to the *Completion Report, Interim Measure for*
12 *SWMU 8* Area 1 was dewatered in 1974 and covered with clean fill material. Area 2 was
13 filled with debris and covered in 1955. Figure 3-1 depicts these two areas and a copy of the
14 *Completion Report, Interim Measure for SWMU 8*, dated November 19, 1999, is presented in
15 Appendix C.

16 In November 1996 soil borings advanced in Area 1 were used to define the limits of the
17 planned soil excavation at approximately 51,000 square feet (ft²). During excavation the
18 gravel fill material was removed and asbestos-containing material (ACM) in the form of
19 thermal pipe installation was found around 12-inch piping. According to the IM
20 Completion Report for SWMU 8 some of the ACM was removed in-place and
21 approximately 437 linear feet (lin ft) of pipe was delivered to a Subtitle D waste landfill
22 permitted to accept ACM. Excavation was to an approximate depth of 4 to 5 ft bls (i.e.,
23 groundwater elevation) at which a 6-inch layer of oil sludge was encountered and removed.
24 Approximately 500 tons of visible oil-impacted soil was removed and delivered to a Subtitle
25 D landfill permitted to accept special waste. Backfill activities began on July 23, 1997 and
26 Area 1 was filled, compacted, and graded on September 2, 1997.

27 The Area 2 excavation, which was approximately 845-ft long, 65-ft wide, and 10 to 12-ft
28 deep, was initiated on March 3, 1997. Groundwater was encountered at an approximate
29 depth of 4 to 5 ft bls. Approximately 26,000 tons of petroleum-impacted soil was removed
30 and delivered to a Subtitle D landfill permitted to accept special waste. From October 21,
31 1997 to September 3, 1999, approximately 50,000 gallons of LNAPL was recovered from

1 Area 2. In addition, approximately 242 lin ft of pipe with ACM thermal installation was
2 removed from Area 2 delivered to a Subtitle D waste landfill permitted to accept ACM.
3 Area 2 was filled with Number 57 granite from the bottom to an elevation of approximately
4 5 ft bls (i.e., groundwater elevation). A layer of geofabric was then installed followed by 5
5 feet of soil fill with a 4-inch gravel layer at the surface. Eighteen 12-inch diameter
6 groundwater sumps, identified as G008GSP001 through G008GSP018, placed on 50-ft
7 centers and installed to an approximate depth of 10 ft bls can be used for LNAPL recovery.
8 The locations of these 18 groundwater sumps are depicted on Figure 3-1.

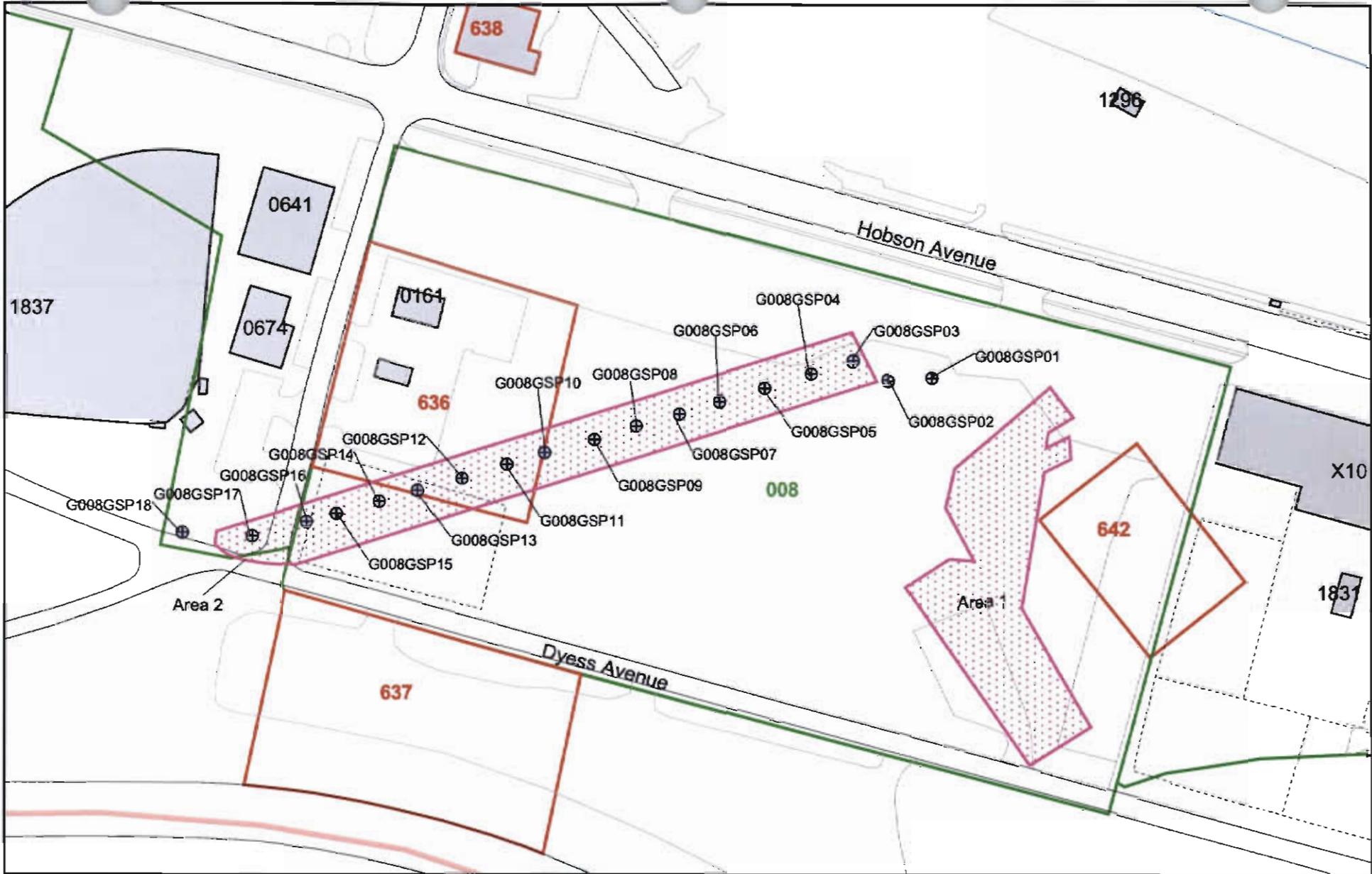
9 According to the *Completion Report, Interim Measure for SWMU 8*, the soil and groundwater
10 samples collected from AOC 636 during the RFI substantiated that no target chemicals
11 associated with torpedoes or munitions were detected. No evidence of UXO disposal was
12 found and it was agreed during the February 1997 BCT meeting that UXO was not a threat
13 and no further investigation was required.

14 According to the *Completion Report, Interim Measure for SWMU 8*, approximately 25,000
15 pounds of steel debris was recovered from the two areas and delivered to a recycling
16 facility. During the IM activities, oil-impacted soil, recovery LNAPL, and groundwater
17 recovered during dewatering activities was sampled for proper characterization prior to
18 disposal and/or treatment.

19 **3.2 UST/AST Removals**

20 There were no documented uses of an underground storage tank (UST) or aboveground
21 storage tank (AST) within the SWMU 8 and AOC 636 boundaries, based on review of the
22 UST program files. In addition, there were no other UST/AST-related investigations under
23 the SCDHEC UST program.

NOTE: Original file saved in color



- Groundwater Sumps
- IM Excavation Areas
- Fence
- Roads
- Pavement
- Shoreline
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary

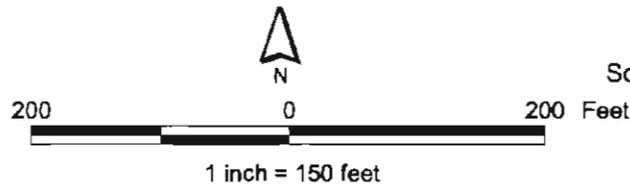


Figure 3-1
 Interim Measures Results
 Soil Excavation Areas and Groundwater Sump Locations
 SWMU 8/AOC 636, Zone G
 Charleston Naval Complex

CH2MHILL

4.0 Summary of Additional Investigations

Additional investigations conducted subsequent to the *Zone G RFI Report, Revision 0* (EnSafe, 1998a) to characterize the nature and extent of SVOCs, metals, and hydrazine in surface and subsurface soil are summarized in this section. In addition, this section summarizes the additional groundwater sampling events conducted from December 1997 through August 2002.

4.1 Additional Soil Investigations

According to the *Zone G RFI Work Plan Addendum* (EnSafe, 2000), six additional surface (0 to 1 ft bls) and subsurface soil (3 to 5 ft bls) samples were proposed west, northwest, and northeast of AOC 636 to further delineate the extent of SVOCs, metals, and hydrazine. Three surface soil samples collected from locations G636SB015 through G636SB017 were collected on December 17, 1999 and analyzed for SVOCs, metals, metals using the synthetic precipitation leaching procedure (SPLP), and hydrazine. Surface soil samples collected on January 26, 2000 from locations G636SB018 through G636SB020 were analyzed for metals. Subsurface soil samples were collected from four of these locations (i.e., G636SB015, G636SB016, G636SB018, and G636SB019) and analyzed for the same parameters as the surface soil samples. The locations of the six soil samples are depicted in Figure 4-1.

As recommended in the *Sampling and Analysis Plan, AOC 636, Zone G, Revision 0* (CH2M-Jones, 2001), additional subsurface soil samples were collected to further delineate metals and 1,1,2,2-tetrachloroethane (1,1,2,2-PCA) near borings G636SB015 and G636SB019, and hydrazine near borings G636SB002, G636SB004, and G636SB005. On July 12, 2001 subsurface soil samples were collected from locations G636SB024 through G636SB027 and analyzed for antimony, cadmium, lead, and thallium. The sample collected from G636SB028 was analyzed for thallium and 1,1,2,2-PCA only. Hydrazine analysis was performed on the samples collected from G636SB021 through G636SB023. These three samples were collected on August 21, 2001. The locations of these eight subsurface soil samples are presented in Figure 4-1.

4.1.1 Surface Soil

Detected concentrations of contaminants in surface soil samples were compared to their corresponding EPA Region III residential RBCs and the Zone G background range for metals. In addition, detected surface soil concentrations were compared to SSLs from Table

1 A-1 of the *EPA Soil Screening Guidance: Technical Background Document* (EPA, 1996) with a
2 DAF of 10. Detected concentrations of VOCs were compared to SSLs with a DAF of 1. If the
3 EPA OSWER SSL was not available, the EPA Region III SSL (DAF=1) was used for
4 screening. Individual polycyclic aromatic hydrocarbon (PAH) constituents and the total
5 calculated BEQ concentrations were compared to their reference concentrations developed
6 by the CNC BCT as documented in *CH2M-Jones' Background PAHs Study Report: Technical
7 Information for the Development of Background BEQ Values* (CH2M-Jones, 2001a). The
8 calculated basewide BEQ reference concentration for surface soil is 1,304 µg/kg.

9 Analytes estimated or detected in the surface soil samples above the MDLs are summarized
10 in Table 4-1. None of the detected contaminant concentrations in the six soil samples
11 collected as part of the additional RFI investigation (as outlined in the *Zone G RFI Work Plan
12 Addendum* [EnSafe, 2000]) exceeded their COPC screening criteria. The analytical data from
13 the samples collected from the six surface soil sample locations are provided in Appendix
14 D-1. The data validation reports from the additional RFI sampling investigation completed
15 by EnSafe are provided in Appendix E.

16 **4.1.2 Subsurface Soil**

17 Detected concentrations of contaminants in surface soil samples were compared to their
18 corresponding SSLs (EPA, 1996) with a DAF of 10 (VOCs with a DAF of 1) and the Zone G
19 background range for metals. If the EPA OSWER SSL was not available, the EPA Region III
20 SSL (DAF=1) was used for screening. In addition, if the Zone G background range of
21 concentrations was not available for the referenced compound, the Zone H background
22 range was used for screening because of its close proximity to Zone G and the SWMU
23 8/AOC 636 site. Individual PAH constituents and total BEQ concentrations were compared
24 to their reference concentrations (CH2M-Jones, 2001). The calculated basewide BEQ
25 reference concentration for subsurface soil is 1,400 µg/kg.

26 Six metals were the only contaminants detected above their COPC screening criteria in the
27 four subsurface soil samples collected during the additional RFI sampling event conducted
28 by EnSafe in December 1999 and January 2000. These six metals (antimony [47.5 mg/kg],
29 cadmium [9.2 mg/kg], chromium [91.8 mg/kg], lead [1,250 mg/kg], nickel [76.7 mg/kg],
30 and thallium [3.8 mg/kg]) were detected in the subsurface soil sample collected from
31 G636SB019 at concentrations above their corresponding SSLs and Zone G background
32 range. Antimony (4 mg/kg) and lead (883 mg/kg) were also detected in the subsurface soil
33 sample collected from G636SB015 at concentrations above their respective screening criteria.

1 Chemicals detected in the eight samples collected during the July and August 2001
2 sampling event did not exceed their respective COPC screening criteria. The analytical data
3 from the samples collected from the 12 subsurface soil sample locations are provided in
4 Appendix D-2. Analytes estimated or detected in the subsurface soil samples above the
5 MDLs are summarized in Table 4-2. Values that exceed screening criteria are in bold text
6 and outlined within the table. The data validation reports from the additional RFI sampling
7 investigation completed by EnSafe and CH2M-Jones are provided in Appendix E.

8 **4.2 Additional Groundwater Investigations**

9 **4.2.1 Groundwater Sampling**

10 Subsequent to the submittal of the *Zone G RFI Report, Revision 0* (EnSafe, 1998a), one or a
11 series of the site monitoring wells (i.e., G008GW001 through G008GW006 and G636GW001),
12 groundwater sumps (i.e., G008GSP01 through G008GSP018), and FDS wells (i.e., as
13 GFDSGW02A, GFDSGW02C, GFDSGW02D, GFDSGW03B, and GFDSGW03C) were
14 sampled during 10 events from December 1997 to August 2002. Each sample collection
15 event including the monitoring wells sampled, collection dates, and analysis performed are
16 summarized in Table 4-3. The locations of site monitoring wells sampled during the 10
17 events are depicted in Figure 4-2. These sampling events including any additional
18 groundwater investigations were not part of the *Zone G RFI Work Plan Addendum* (EnSafe,
19 2000). According to the *Zone G RFI Work Plan Addendum* no data gaps in groundwater
20 quality are evident at SWMU 8/AOC 636, and thus no additional monitoring wells are
21 recommended.

22 Monitoring well G004GW04D was installed on August 22, 2002, and was constructed with a
23 10-ft well screen and installed with the top of the well screen at approximately 10.2 and 10.3
24 ft bls. A sample was collected from G004GW04D on August 22, 2002 and analyzed for
25 VOCs and SVOCs. The well log and construction diagram for G004GW04D are presented in
26 Appendix F.

27 Detected groundwater contaminant concentrations from the samples collected during the 10
28 post-RFI sampling events were compared to their corresponding MCLs, or for those
29 chemicals that have no MCL, the EPA Region III tap water RBC (HI=0.1). In addition,
30 metals were compared to their corresponding Zone G background range of concentrations.
31 If the Zone G background range was not available for the referenced compound, the Zone
32 H background range was used for screening because of its close proximity to Zone G and
33 the SWMU 8/AOC 636 site.

1 Five SVOCs (i.e., benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis(2-
2 ethylhexyl)phthalate, and naphthalene) were detected above their respective screening
3 criteria during the various post-RFI sampling events. Benzo[a]anthracene was detected at
4 concentrations of 2J and 1J $\mu\text{g/L}$ in the samples collected from G008GSP11 and G008GSP12,
5 respectively, during the August 1999 sampling event. These estimated concentrations are
6 above its EPA Region III tap water RBC (HI=0.1) of 0.092 $\mu\text{g/L}$. In addition, benzo[a]pyrene
7 and benzo[b]fluoranthene were detected at concentrations of 1J $\mu\text{g/L}$ in the sample
8 collected from G008GSP11 during the August 1999 sampling event. These estimated
9 concentrations are above the 0.0092 $\mu\text{g/L}$ and 0.092 $\mu\text{g/L}$ EPA Region III tap water RBCs
10 (HI=0.1) established for benzo[a]pyrene and benzo[b]fluoranthene, respectively. During the
11 June 21, 2002 sampling event benzo[a]pyrene and benzo[b]fluoranthene were detected in
12 the samples collected from G008GW001 (benzo[a]pyrene: 0.65J $\mu\text{g/L}$ and
13 benzo[b]fluoranthene: 0.47J $\mu\text{g/L}$) and G008GW005 (benzo[a]pyrene: 0.47J $\mu\text{g/L}$ and
14 benzo[b]fluoranthene: 0.35J $\mu\text{g/L}$) at concentrations greater than their EPA Region III tap
15 water RBC (HI=0.1).

16 BEHP was detected at concentrations of 7J $\mu\text{g/L}$ and 8J $\mu\text{g/L}$ in the samples collected from
17 G008GSP10 and G008GSP15, respectively, during the August 1999 sampling event. These
18 estimated concentrations slightly exceed the MCL of 6 $\mu\text{g/L}$. Naphthalene was detected in
19 four groundwater sump samples (G008GSP09: 1J $\mu\text{g/L}$; G008GSP13: 3J $\mu\text{g/L}$; G008GSP15:
20 28 $\mu\text{g/L}$; G008GSP16: 5J $\mu\text{g/L}$) during the August 1999 sampling event at concentrations
21 greater than its EPA Region III tap water RBC (HI=0.1) of 0.65 $\mu\text{g/L}$.

22 Three metals (i.e., antimony, iron, and vanadium) were detected above their screening
23 criteria during the various post-RFI sampling events. Antimony, detected at a concentration
24 of 11J $\mu\text{g/L}$ in the sample collected from G008GW003 during the March 2002 sampling
25 event, exceeded its corresponding MCL (6 $\mu\text{g/L}$), EPA Region III tap water RBC (1.5 $\mu\text{g/L}$),
26 and Zone G background range of concentrations (3 to 6 $\mu\text{g/L}$). Iron was detected in the
27 sample collected from G008GW001 at a concentration of 41,000 $\mu\text{g/L}$ during the July 2000
28 sampling event. This concentration exceeds the EPA Region III tap water RBC (HI=0.1) of
29 1,100 $\mu\text{g/L}$ and the Zone G background range of 2,000 to 35,700 $\mu\text{g/L}$. Vanadium, detected
30 at a concentration of 44J $\mu\text{g/L}$ in the sample collected from G008GW003 during the March
31 2002 sampling event, slightly exceeded its EPA Region III tap water RBC (26 $\mu\text{g/L}$), and
32 Zone G background range of concentrations (3 to 30 $\mu\text{g/L}$).

33 Hydrazine was reportedly detected in 30 samples collected during the post-RFI sampling
34 events ranging in concentration from 5 to 100 $\mu\text{g/L}$. Each reported detected concentration

1 exceeds the EPA Region III tap water RBC of 0.022 µg/L. However, because it was analyzed
2 using a colorimetric method, its results are subject to false positives and are not reliable. The
3 reported detected concentrations are not presented in Table 4-3. Hydrazine in groundwater
4 is further discussed in Section 5.4.11. A Technical Memorandum describing the results of an
5 evaluation of hydrazine detections and the false positive results that have occurred is
6 provided in Appendix G of this report.

7 VOCs were not detected above their corresponding MCLs or the EPA Region III tap water
8 RBCs (HI=0.1). Explosives, pesticides, and PCBs were not detected above MDLs in any of
9 the samples collected during the post-RFI sampling events.

10 The analytical data from the groundwater samples collected during the 10 post RFI
11 sampling events are provided in Appendix D-3. Analytes that were estimated or detected in
12 the groundwater samples above the MDLs are summarized in Table 4-4. Values that exceed
13 screening criteria are in bold text and outlined within the table. The data validation reports
14 from the additional groundwater sampling events completed by EnSafe and CH2M-Jones
15 are provided in Appendix E.

16 **4.2.2 LNAPL**

17 In December 2001, LNAPL was measured in groundwater sumps G008GSP04 and
18 G008GSP11 at 12 and 36 inches, respectively. Locations of the groundwater sumps
19 G008GSP04 and G008GSP11 are provided in Figure 4-2. In March 2002, LNAPL thickness
20 was measured in G008GSP11 at approximately 1.2 inches. A measurement was not collected
21 from G008GSP04. To identify the nature and type of LNAPL at SWMU 8, samples were
22 collected from G008GSP04 and G008GSP11 during the March 2002 sample collection event
23 and analyzed for PCBs; fingerprint analysis (hydrocarbons as heavy oil, diesel oil, and
24 gasoline; mineral spirits; kerosene; naphtha); hydrocarbons as diesel oil and gasoline; and
25 hydrazine. Aroclor-1260 was detected at estimated concentrations of 7.7 and 4.2 mg/kg in
26 the samples collected from G008GSP04 and G008GSP11, respectively. Because the detected
27 concentrations are less than 50 mg/kg, the LNAPL is not considered a regulated material
28 under the Toxic Substance Control Act (TSCA): 40 *Code of Federal Regulations*, Part 761.3).

29 The LNAPL is considered a diesel oil or heavy-end fuel oil based on the elevated
30 concentrations of hydrocarbons as heavy oil (G008GSP04: 260,000 mg/kg and G008GSP11:
31 200,000 mg/kg) and diesel oil (G008GSP04: 300,000 mg/kg and G008GSP11: 220,000
32 mg/kg). This identification is consistent with the general lack of detection of benzene,
33 toluene, ethylbenzene, and xylenes (BTEX) in groundwater that are associated with lighter
34 fuels such as gasoline.

1 On October 18, 2002, the 18 groundwater sumps (i.e., G008GSP01 through G008GSP18)
2 were gauged for LNAPL. A LNAPL thickness of 2.91 and 0.01 feet was measured in
3 groundwater sumps G008GSP04 and G008GSP11, respectively.

4 The analytical data from the LNAPL samples collected during March 2002 sampling event
5 are provided in Appendix D-4. Analytes that were estimated or detected in the LNAPL
6 samples above the MDLs are summarized in Table 4-5. The data validation report from the
7 LNAPL sampling event completed by CH2M-Jones is provided in Appendix E.

8 **4.3 Summary of COPCs Identified**

9 **4.3.1 Surface Soil**

10 No additional surface soil COPCs were identified in the soil samples collected as part of the
11 additional investigations conducted subsequent to the *Zone G RFI Report, Revision 0*. None
12 of the detected contaminant concentrations in the six soil samples collected as part of the
13 additional RFI investigation (as outlined in the *Zone G RFI Work Plan Addendum [EnSafe,*
14 *2000]*) were above COPC screening criteria.

15 **4.3.2 Subsurface Soil**

16 During the additional RFI sampling investigations conducted subsequent to the *Zone G RFI*
17 *Report, Revision 0*, six metals (antimony, cadmium, chromium, lead, nickel, and thallium)
18 were detected in subsurface soil samples at concentrations above their corresponding SSLs
19 and Zone G background ranges. As a result, these six metals are considered COPCs.

20 **4.3.3 Groundwater**

21 Five SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis[2-
22 ethylhexyl]phthalate, and naphthalene) and three metals (antimony, iron, and vanadium)
23 were detected above their screening criteria during the various post-RFI sampling events.
24 As a result these chemicals are considered COPCs.

TABLE 4-1

Analytes Detected in Surface Soil, RFI Addendum Investigation

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration	Qualifier	Units	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b
Metals								
Aluminum	G636SB015	4,390	=	mg/kg	12/17/99	7,800	NA	2,190-17,800
	G636SB016	5,020	=	mg/kg	12/17/99			
	G636SB017	7,370	=	mg/kg	12/17/99			
	G636SB018	3,920	=	mg/kg	01/26/00			
	G636SB019	3,730	=	mg/kg	01/26/00			
	G636SB020	2,940	=	mg/kg	01/26/00			
Arsenic	G636SB015	1.9	=	mg/kg	12/17/99	0.43	14.5	0.64-18
	G636SB016	1.5	=	mg/kg	12/17/99			
	G636SB017	3.6	=	mg/kg	12/17/99			
	G636SB018	2.3	=	mg/kg	01/26/00			
	G636SB019	0.63	J	mg/kg	01/26/00			
	G636SB020	1.6	J	mg/kg	01/26/00			
Barium	G636SB015	8.1	J	mg/kg	12/17/99	550	800	11-129
	G636SB016	16.5	J	mg/kg	12/17/99			
	G636SB017	22.8	=	mg/kg	12/17/99			
	G636SB018	18.6	=	mg/kg	01/26/00			
	G636SB019	5.9	=	mg/kg	01/26/00			
	G636SB020	3.4	=	mg/kg	01/26/00			
Beryllium	G636SB015	0.17	J	mg/kg	12/17/99	16	31.5	0.47-1.1
	G636SB016	0.11	J	mg/kg	12/17/99			
	G636SB017	0.21	J	mg/kg	12/17/99			
	G636SB018	0.22	J	mg/kg	01/26/00			
	G636SB019	0.11	J	mg/kg	01/26/00			
	G636SB020	0.22	J	mg/kg	01/26/00			
Chromium, Total	G636SB015	1.4	J	µg/L	12/17/99	23 ^c	19	7-39
	G636SB015	5.9	=	mg/kg	12/17/99			
	G636SB016	5.1	=	mg/kg	12/17/99			

TABLE 4-1

Analytes Detected in Surface Soil, RFI Addendum Investigation

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration	Qualifier	Units	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b
Chromium, Total	G636SB016	0.6	J	µg/L	12/17/99	23 ^c	19	7-39
	G636SB017	13.7	=	mg/kg	12/17/99			
	G636SB017	3.6	J	µg/L	12/17/99			
	G636SB018	7.8	=	mg/kg	01/26/00			
	G636SB019	5.7	=	mg/kg	01/26/00			
	G636SB020	5.3	=	mg/kg	01/26/00			
Cobalt	G636SB015	0.84	J	mg/kg	12/17/99	470	NA	1.1-6.2
	G636SB016	0.47	J	mg/kg	12/17/99			
	G636SB017	1.8	J	mg/kg	12/17/99			
	G636SB018	1.3	J	mg/kg	01/26/00			
	G636SB019	0.8	J	mg/kg	01/26/00			
	G636SB020	2.5	J	mg/kg	01/26/00			
Copper	G636SB015	8.3	J	mg/kg	12/17/99	310	5,500 ^d	23-431
	G636SB016	3.4	J	mg/kg	12/17/99			
	G636SB017	46.4	J	mg/kg	12/17/99			
	G636SB018	38.8	=	mg/kg	01/26/00			
	G636SB019	7.3	=	mg/kg	01/26/00			
	G636SB020	1.3	J	mg/kg	01/26/00			
Iron	G636SB015	3,250	J	mg/kg	12/17/99	2,300	NA	4,300-32,700
	G636SB016	4,100	J	mg/kg	12/17/99			
	G636SB017	5,710	J	mg/kg	12/17/99			
	G636SB018	4,110	=	mg/kg	01/26/00			
	G636SB019	2,000	=	mg/kg	01/26/00			
	G636SB020	2,360	=	mg/kg	01/26/00			
Lead	G636SB015	5.3	=	mg/kg	12/17/99	NA	400 ^e	3.5-275
	G636SB016	6.9	=	mg/kg	12/17/99			
	G636SB017	57.7	=	mg/kg	12/17/99			
	G636SB018	38.1	=	mg/kg	01/26/00			

TABLE 4-1

Analytes Detected in Surface Soil, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration	Qualifier	Units	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b
Lead	G636SB019	4.9	=	mg/kg	01/26/00	NA	400 ^e	3.5-275
	G636SB020	2.7	=	mg/kg	01/26/00			
Manganese	G636SB015	9.4	=	mg/kg	12/17/99	160	475 ^d	39-359
	G636SB016	14.4	=	mg/kg	12/17/99			
	G636SB017	50.6	=	mg/kg	12/17/99			
	G636SB018	41.2	=	mg/kg	01/26/00			
	G636SB019	19.9	=	mg/kg	01/26/00			
	G636SB020	55.3	=	mg/kg	01/26/00			
Mercury	G636SB015	0.04	J	mg/kg	12/17/99	NA	1	0.06-2
	G636SB016	0.04	J	mg/kg	12/17/99			
	G636SB017	0.06	J	mg/kg	12/17/99			
	G636SB019	0.02	J	mg/kg	01/26/00			
Nickel	G636SB015	1.9	J	mg/kg	12/17/99	160	65	2-27
	G636SB016	1.8	J	mg/kg	12/17/99			
	G636SB017	6.7	J	mg/kg	12/17/99			
	G636SB018	4	J	mg/kg	01/26/00			
	G636SB019	2	J	mg/kg	01/26/00			
	G636SB020	3.6	J	mg/kg	01/26/00			
Vanadium	G636SB015	5.9	=	mg/kg	12/17/99	55	3,000	7.2-57
	G636SB016	7.8	=	mg/kg	12/17/99			
	G636SB017	14.8	=	mg/kg	12/17/99			
	G636SB018	7.8	=	mg/kg	01/26/00			
	G636SB019	4.3	=	mg/kg	01/26/00			
	G636SB020	3.7	=	mg/kg	01/26/00			
Zinc	G636SB015	18	J	mg/kg	12/17/99	2,300	6,000	18-1,650
	G636SB016	6.7	J	mg/kg	12/17/99			
	G636SB017	71	J	mg/kg	12/17/99			
	G636SB018	88.4	=	mg/kg	01/26/00			

TABLE 4-1
 Analytes Detected in Surface Soil, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration	Qualifier	Units	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b
Zinc	G636SB019	9.6	=	mg/kg	01/26/00			
	G636SB020	9.7	=	mg/kg	01/26/00			
Semivolatile Organic Compounds								
Di-n-butyl Phthalate	G636SB015	0.57	=	mg/kg	12/17/99	780	1,150	NA
Pyrene	G636SB017	0.075	J	mg/kg	12/17/99	230	2,100	NA

^a Generic soil-to-groundwater soil screening level (SSL) with a DAF=10 used, except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from Table A-1 of the *EPA Soil Screening Guidance: Technical Background Document* (1996).

^b Zone G Background Ranges of Concentrations are obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^c The conservative EPA Region III residential RBC (HI=0.1) of 23 mg/kg for Chromium VI was used as the screening criteria for Total Chromium.

^d EPA Region III SSL.

^e A screening level of 400 mg/kg has been established for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* (EPA, 1994).

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

HI Hazard Index

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

mg/kg milligrams per kilogram

NA Screening criteria not available for the referenced compound.

TABLE 4-2
 Analytes Detected in Subsurface Soil, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b
Metals						
Aluminum	G636SB015	7,140	=	12/17/99	NA	2,630-36,800
	G636SB016	11,900	=	12/17/99		
	G636SB018	5,050	=	01/26/00		
	G636SB019	9,850	=	01/26/00		
Antimony	G636SB015	4	J	12/17/99	2.5	1.5-19 ^c
	G636SB019	47.5	=	01/26/00		
	G636SB025	1.2	J	07/12/01		
Arsenic	G636SB015	5.4	=	12/17/99	14.5	1.4-36
	G636SB016	9.9	=	12/17/99		
	G636SB018	2.1	J	01/26/00		
	G636SB019	25	=	01/26/00		
Barium	G636SB015	225	=	12/17/99	800	7.7-63
	G636SB016	25.9	=	12/17/99		
	G636SB018	7	=	01/26/00		
	G636SB019	437	=	01/26/00		
Beryllium	G636SB015	0.31	J	12/17/99	31.5	0.45-2.4
	G636SB016	0.65	J	12/17/99		
	G636SB018	0.26	J	01/26/00		
	G636SB019	0.63	J	01/26/00		
Cadmium	G636SB019	9.2	=	01/26/00	4	0.08-0.52
	G636SB025	0.91	J	07/12/01		
Chromium, Total	G636SB015	18.2	=	12/17/99	19	7.4-65
	G636SB016	27.8	=	12/17/99		
	G636SB018	5.8	=	01/26/00		
	G636SB019	91.8	=	01/26/00		

TABLE 4-2
 Analytes Detected in Subsurface Soil, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b
Cobalt	G636SB015	2.1	J	12/17/99	NA	0.9-15
	G636SB016	4.1	J	12/17/99		
	G636SB018	1.5	J	01/26/00		
	G636SB019	9.1	=	01/26/00		
Copper	G636SB015	247	J	12/17/99	5,500 ^d	4.5-46
	G636SB016	19.3	J	12/17/99		
	G636SB018	1.4	J	01/26/00		
	G636SB019	1,940	=	01/26/00		
Iron	G636SB015	11,700	J	12/17/99	NA	3,110-58,100
	G636SB016	15,100	J	12/17/99		
	G636SB018	3,080	=	01/26/00		
	G636SB019	53,500	=	01/26/00		
Lead	G636SB015	883	=	12/17/99	400 ^e	2.4-76
	G636SB016	30.3	=	12/17/99		
	G636SB018	2.8	=	01/26/00		
	G636SB019	1,250	=	01/26/00		
	G636SB024	3.7	=	07/12/01		
	G636SB025	170	=	07/12/01		
	G636SB026	3.1	=	07/12/01		
	G636SB026	2.6	=	07/12/01		
	G636SB027	2.7	=	07/12/01		
Manganese	G636SB015	97.4	=	12/17/99	475 ^d	20-409
	G636SB016	172	=	12/17/99		
	G636SB018	20	=	01/26/00		
	G636SB019	478	=	01/26/00		
Mercury	G636SB015	0.97	J	12/17/99	1	0.05-0.37
	G636SB016	0.18	J	12/17/99		
	G636SB019	0.38	=	01/26/00		

TABLE 4-2
 Analytes Detected in Subsurface Soil, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b
Nickel	G636SB015	12.1	J	12/17/99	65	1.9-22
	G636SB016	9.1	J	12/17/99		
	G636SB018	2.2	J	01/26/00		
	G636SB019	76.7	=	01/26/00		
Selenium	G636SB015	0.99	J	12/17/99	2.5	0.54-1.0
	G636SB016	1.4	J	12/17/99		
	G636SB019	0.9	=	01/26/00		
Thallium	G636SB019	3.8	=	01/26/00	0.35	1.0
Tin (Sn)	G636SB019	99.5	=	01/26/00	NA	1.1-2.9
Vanadium	G636SB015	21.6	=	12/17/99	3,000	5.9-112
	G636SB016	36.8	=	12/17/99		
	G636SB018	4.9	=	01/26/00		
	G636SB019	74.5	=	01/26/00		
Zinc	G636SB015	451	J	12/17/99	6,000	20-198
	G636SB016	77.3	J	12/17/99		
	G636SB018	5.9	=	01/26/00		
	G636SB019	2,210	=	01/26/00		
General Chemistry						
Hydrazine	636SB021	0.02500	=	08/21/01	NA	NA
	636SB023	0.03470	=	08/21/01		
	636SB022	0.05690	=	08/21/01		
Semivolatile Organic Compounds						
BEQs	G636SB015	0.41	=	12/17/99	NA	1.4 ^f
Benzo[a]Anthracene	G636SB015	0.12	J	12/17/99	1	0.627 ^f
Benzo[a]Pyrene	G636SB015	0.16	J	12/17/99	4	0.623 ^f
Benzo[b]Fluoranthene	G636SB015	0.2	J	12/17/99	2.5	0.631 ^f
Benzo[k]Fluoranthene	G636SB015	0.2	J	12/17/99	24.5	0.609 ^f

TABLE 4-2
 Analytes Detected in Subsurface Soil, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b
Chrysene	G636SB015	0.17	J	12/17/99	80	0.616 ^f
Fluoranthene	G636SB015	0.21	J	12/17/99	2,150	NA
Phenanthrene	G636SB015	0.15	J	12/17/99	NA	NA
Pyrene	G636SB015	0.3	J	12/17/99	2,100	NA

Concentrations in bold and outlined text exceed the appropriate screening criteria.

^a Generic soil-to-groundwater soil screening level (SSL) with a DAF=10 used, except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from Table A-1 of the *EPA Soil Screening Guidance: Technical Background Document* (1996).

^b Except as noted by footnote "d", the Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions -Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^c Zone G Background Range of Concentrations were not available for the referenced compound. Therefore, Zone H Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions -Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^d EPA Region III SSL

^e A screening level of 400 mg/kg has been established for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* (EPA, 1994).

^f Basewide PAH background concentrations were obtained from the *Background PAHs Study Report: Technical Information for Development of Background BEQ Values* (CH2M-Jones, February 2001).

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

HI Hazard Index

mg/kg milligrams per kilogram

NA Screening criteria not available for the referenced compound.

TABLE 4-3
 Post-RFI Groundwater Sampling Event Summary
RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Collection Date	Monitoring Wells Sampled	Sample Analysis Performed
December 08-11, 1997	G008GW001 through G008GW006 G636GW001	VOCs, SVOCs, Explosives, Metals, PCBs, Pesticides, Hydrazine
March 11, 1998	G636GW001	VOCs
September 27, 1998	G008GW002	VOCs
March 3, 1999	GFDSGW02D	Benzene, Ethylbenzene, Toluene, Xylenes, SVOCs, Metals
August 4-5, 1999	G008GSP01 through G008GSP18	VOCs, SVOCs, Hydrazine
July 19, 2000	G008GW001	VOCs, SVOCs, Hydrazine, Metals, PCBs, Pesticides
June 13, 2001	GFDSGW02A	Benzene, Ethylbenzene, Toluene, Xylenes, SVOCs
March 28-30, 2002	G008GW001 through G008GW006 G636GW001 G008GSP01 through G008GSP18	Metals (G008GW001 through G008GW006), Hydrazine
June 20-21, 2002	G008GW001, G008GW004, G008GW005, G636GW001	VOCs, SVOCs, Metals, Hydrazine
August 22, 2002	G008GW04D	VOCs, SVOCs
PCB	Polychlorinated biphenyl	
SVOC	Semivolatile organic compound	
VOC	Volatile organic compound	

TABLE 4-4

Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
Metals							
Aluminum	G008GW001	56	J	03/30/02	NA	3,700	136-1,770
	G008GW002	60	J	03/30/02			
	G008GW003	510	J	03/29/02			
	G008GW003	105	=	12/11/97			
	G008GW004	107	=	12/09/97			
	G008GW004	460	J	03/28/02			
Antimony	G008GW003	11	J	03/29/02	6	1.5	3-6
Arsenic	G008GW001	23	J	06/21/02	50	0.045	8-166
	G008GW001	55	=	07/19/00			
	G008GW003	17	=	03/29/02			
	G008GW004	17	=	03/28/02			
	G008GW004	22	J	06/20/02			
	G008GW006	48	=	03/30/02			
	G008GW006	24.7	=	12/09/97			
	G636GW001	27	J	06/20/02			
Barium	G008GW001	57	J	06/21/02	2,000	260	14-937
	G008GW001	33.9	J	12/08/97			
	G008GW001	74	=	07/19/00			
	G008GW001	57	J	03/30/02			
	G008GW002	404	J	12/09/97			
	G008GW002	480	=	03/30/02			
	G008GW003	57.1	J	12/11/97			
	G008GW003	75	J	03/29/02			
	G008GW004	89	J	06/20/02			
	G008GW004	88	J	03/28/02			
	G008GW004	67.6	J	12/09/97			
	G008GW005	140	J	06/21/02			

TABLE 4-4
 Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
Barium	G008GW005	15.6	J	12/08/97	2,000	260	14-937
	G008GW005	120	J	03/30/02			
	G008GW006	7.9	J	12/09/97			
	G008GW006	100	J	03/30/02			
	G636GW001	77.8	J	12/11/97			
	G636GW001	62	J	06/20/02			
Beryllium	G008GW001	0.33	J	12/08/97	4	7.3	1 ^b
	G008GW003	0.32	J	12/11/97			
	G008GW004	0.28	J	12/09/97			
Cadmium	G008GW001	1.8	J	07/19/00	5	1.8	0.4-2
	G008GW004	0.44	J	12/09/97			
	G008GW004	1.3	J	06/20/02			
	G008GW004	1.8	J	03/28/02			
	G008GW005	1.8	J	06/21/02			
	G008GW005	2.5	J	03/30/02			
	G008GW005	0.35	J	12/08/97			
	G008GW006	3	J	03/30/02			
	G636GW001	2.1	J	12/11/97			
	G636GW001	3	J	06/20/02			
	Chromium, Total	G008GW001	1.7	J			
G008GW002		1.1	J	12/09/97			
G008GW003		3	J	12/11/97			
G008GW005		1.4	J	12/08/97			
Cobalt	G008GW001	0.91	J	12/08/97	NA	220	1.2-8
	G008GW004	1.1	J	12/09/97			
	G636GW001	0.89	J	12/11/97			
Copper	G008GW002	16	J	03/30/02	1,300	150	12-87
	G008GW002	5.6	J	12/09/97			

TABLE 4-4
 Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
Copper	G008GW003	3.9	J	12/11/97	1,300	150	12-87
	G636GW001	2.8	J	12/11/97			
Iron	G008GW001	41,000	=	07/19/00	NA	1,100	2,000-35,700
	G008GW001	970	=	03/30/02			
	G008GW001	1,620	J	12/08/97			
	G008GW002	5,100	=	03/30/02			
	G008GW002	558	J	12/09/97			
	G008GW003	482	J	12/11/97			
	G008GW003	710	=	03/29/02			
	G008GW004	23,000	=	03/28/02			
	G008GW004	8,050	J	12/09/97			
	G008GW005	7,390	J	12/08/97			
	G008GW005	32,000	=	03/30/02			
	G008GW006	27,000	=	03/30/02			
	G008GW006	4,010	J	12/09/97			
	G636GW001	34,200	J	12/11/97			
	Lead	G008GW002	1.3	J	12/09/97	15	NA
G008GW003		1.1	J	12/11/97			
Manganese	G008GW001	180	=	03/30/02	NA	73	149-7,980
	G008GW001	108	J	12/08/97			
	G008GW001	690	=	07/19/00			
	G008GW002	130	=	03/30/02			
	G008GW002	175	J	12/09/97			
	G008GW003	35	=	03/29/02			
	G008GW003	93.6	J	12/11/97			
	G008GW004	260	=	03/28/02			
	G008GW004	185	J	12/09/97			
	G008GW005	731	J	12/08/97			

TABLE 4-4
 Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
Manganese	G008GW005	2,400	=	03/30/02	NA	73	149-7,980
	G008GW006	3,500	=	03/30/02			
	G008GW006	987	J	12/09/97			
	G636GW001	624	J	12/11/97			
Nickel	G008GW002	0.89	J	12/09/97	NA	73	1.2-20
	G008GW003	0.94	J	12/11/97			
	G008GW005	1.4	J	12/08/97			
	G008GW006	1.1	J	12/09/97			
Vanadium	G008GW001	4.8	J	03/30/02	NA	26	3-30
	G008GW001	10	=	07/19/00			
	G008GW001	5.2	J	12/08/97			
	G008GW002	1.4	J	12/09/97			
	G008GW002	2.9	J	03/30/02			
	G008GW003	29.5	=	12/11/97			
	G008GW003	44	J	03/29/02			
	G008GW005	3.2	J	12/08/97			
	G008GW006	2.4	J	12/09/97			
	G636GW001	3	J	12/11/97			
Zinc	G008GW001	8.6	J	03/30/02	NA	1,100	18-124
	G008GW002	32	=	03/30/02			
	G008GW002	9.5	J	12/09/97			
	G008GW003	20	J	03/29/02			
	G008GW003	17	J	12/11/97			
	G008GW004	7.8	J	12/09/97			
	G008GW004	8.4	J	03/28/02			
	G008GW005	6.8	J	03/30/02			
G008GW006	14	J	03/30/02				

TABLE 4-4
 Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
Volatile Organic Compounds							
1,2-Dichlorobenzene	G008GW001	0.59	J	06/21/02	600	55	NA
	G008GW004	1.3	J	06/20/02			
	G008GW005	1	J	06/21/02			
	G636GW001	1.9	J	06/20/02			
1,4-Dichlorobenzene	G008GSP09	1	J	08/04/99	75	0.47	NA
	G636GW001	0.67	J	06/20/02			
Acetone	G008GW005	2	J	12/08/97	NA	61	NA
	G636GW001	15	J	06/20/02			
Carbon Disulfide	G008GW001	3	J	06/21/02	NA	100	NA
	G008GW003	4	J	12/11/97			
Chlorobenzene	G636GW001	0.78	J	06/20/02	100	11	NA
Chloroform	G008GSP18	3	J	08/05/99	80 ^c	0.15	NA
	G636GW001	1.3	J	06/20/02			
Chloromethane	G008GW004	2.2	J	06/20/02	80 ^c	2.1	NA
	G636GW001	2.7	J	06/20/02			
Ethylbenzene	G008GW002	2	J	12/09/97	700	130	NA
PCE	G008GSP01	1	J	08/03/99	5	1.1	NA
Xylenes, Total	G008GSP06	2	J	08/04/99	10,000	1,200	NA
	G008GW002	2	J	12/09/97			
	G636GW001	3	SJ	03/11/98			
Semivolatile Organic Compounds							
Acenaphthene	G008GSP01	2	J	08/03/99	NA	37	NA
	G008GSP02	2	J	08/03/99			
	G008GSP03	1	J	08/03/99			
	G008GSP04	1	J	08/03/99			
	G008GSP05	1	J	08/03/99			

TABLE 4-4
 Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
Acenaphthene	G008GSP06	1	J	08/04/99	NA	37	NA
	G008GSP07	1	J	08/04/99			
	G008GSP08	1	J	08/04/99			
	G008GSP09	1	J	08/04/99			
	G008GSP13	2	J	08/05/99			
	G008GSP15	2	J	08/05/99			
Anthracene	G008GSP01	1	J	08/03/99	NA	180	NA
	G008GSP07	1	J	08/04/99			
	G008GSP11	1	J	08/05/99			
	G008GSP12	1	J	08/05/99			
	G008GSP13	1	J	08/05/99			
	G008GSP15	1	J	08/05/99			
Benzo[a]Anthracene	G008GSP11	2	J	08/05/99	NA	0.092	NA
	G008GSP12	1	J	08/05/99			
Benzo[a]Pyrene	G008GSP11	1	J	08/05/99	0.2	0.0092	NA
	G008GW001	0.65	J	06/21/02			
	G008GW005	0.47	J	06/21/02			
Benzo[b]Fluoranthene	G008GSP11	1	J	08/05/99	NA	0.092	NA
	G008GW001	0.47	J	06/21/02			
	G008GW005	0.35	J	06/21/02			
Benzo[g,h,i]Perylene	G008GSP11	1	J	08/05/99	NA	NA	NA
	G008GW04D	1.2	J	08/22/02			
Benzoic acid	G008GSP01	1	J	08/03/99	NA	15,000	NA
	G008GSP02	1	J	08/03/99			
	G008GSP05	1	J	08/03/99			
	GFDSGW02D	0.6	J	03/03/99			
Benzyl Butyl Phthalate	G008GSP13	3	J	08/05/99	NA	NA	NA

TABLE 4-4

Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
bis(2-Ethylhexyl) Phthalate	G008GSP10	7	J	08/05/99	6	4.8	NA
	G008GSP11	4	J	08/05/99			
	G008GSP12	1	J	08/05/99			
	G008GSP13	5	J	08/05/99			
	G008GSP14	4	J	08/05/99			
	G008GSP15	8	J	08/05/99			
	G008GSP16	5	J	08/05/99			
	G008GSP18	5	J	08/05/99			
	GFDSGW02D	1	J	03/03/99			
Chrysene	G008GSP10	1	J	08/05/99	NA	9.2	NA
	G008GSP11	3	J	08/05/99			
	G008GSP12	1	J	08/05/99			
Dibenzofuran	G008GSP01	1	J	08/03/99	NA	2.4	NA
	G008GSP02	1	J	08/03/99			
	G008GSP09	1	J	08/04/99			
	G008GSP13	1	J	08/05/99			
	G008GSP15	2	J	08/05/99			
Di-n-butyl Phthalate	G008GSP01	1	J	08/03/99	NA	NA	NA
	G008GSP02	1	J	08/03/99			
	G008GSP03	1	J	08/03/99			
	G008GSP04	1	J	08/03/99			
	G008GSP05	1	J	08/03/99			
	G008GSP07	1	J	08/04/99			
	G008GSP08	1	J	08/04/99			
	G008GSP09	1	J	08/04/99			
	G008GSP10	1	J	08/05/99			
	G008GSP11	1	J	08/05/99			
	G008GSP13	1	J	08/05/99			

TABLE 4-4
 Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
Di-n-butyl Phthalate	G008GSP15	1	J	08/05/99	NA	NA	NA
	G008GSP16	1	J	08/05/99			
	G008GSP18	1	J	08/05/99			
	G636GW001	0.4	J	06/20/02			
Fluoranthene	G008GSP11	2	J	08/05/99	NA	150	NA
	G008GSP12	1	J	08/05/99			
	G008GSP13	1	J	08/05/99			
Fluorene	G008GSP01	2	J	08/03/99	NA	24	NA
	G008GSP02	2	J	08/03/99			
	G008GSP03	1	J	08/03/99			
	G008GSP04	1	J	08/03/99			
	G008GSP05	1	J	08/03/99			
	G008GSP06	1	J	08/04/99			
	G008GSP07	1	J	08/04/99			
	G008GSP08	1	J	08/04/99			
	G008GSP09	2	J	08/04/99			
	G008GSP11	1	J	08/05/99			
	G008GSP12	1	J	08/05/99			
	G008GSP13	2	J	08/05/99			
	G008GSP15	3	J	08/05/99			
	Naphthalene	G008GSP09	1	J	08/04/99	NA	0.65
G008GSP13		3	J	08/05/99			
G008GSP15		28	=	08/05/99			
G008GSP16		5	J	08/05/99			
Phenanthrene	G008GSP01	1	J	08/03/99	NA	NA	NA
	G008GSP02	1	J	08/03/99			
	G008GSP06	1	J	08/04/99			
	G008GSP07	1	J	08/04/99			

TABLE 4-4
 Analytes Detected in Groundwater, RFI Addendum Investigation
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration ($\mu\text{g/L}$)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
Phenanthrene	G008GSP08	1	J	08/04/99	NA	NA	NA
	G008GSP09	2	J	08/04/99			
	G008GSP10	1	J	08/05/99			
	G008GSP12	1	J	08/05/99			
	G008GSP13	2	J	08/05/99			
	G008GSP15	3	J	08/05/99			
	G008GSP16	1	J	08/05/99			
Pyrene	G008GSP01	1	J	08/03/99	NA	18	NA
	G008GSP03	1	J	08/03/99			
	G008GSP06	1	J	08/04/99			
	G008GSP07	1	J	08/04/99			
	G008GSP08	1	J	08/04/99			
	G008GSP09	1	J	08/04/99			
	G008GSP10	1	J	08/05/99			
	G008GSP11	7	J	08/05/99			
	G008GSP12	2	J	08/05/99			
	G008GSP13	1	J	08/05/99			
	G008GSP14	1	J	08/05/99			
	G008GSP15	1	J	08/05/99			

Concentrations in bold and outlined text exceed the appropriate screening criteria.

^a The Zone G Background Ranges of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^b Zone G Background Range of Concentrations was not available for the referenced compound. Therefore, Zone H Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^c The maximum contaminant level (MCL) for total trihalomethanes (TTHMs) is 80 micrograms per liter ($\mu\text{g/L}$).

^d The conservative EPA Region III Tap Water RBC (HI=0.1) of 11 $\mu\text{g/L}$ for Chromium VI was used as the screening criterion for Total Chromium.

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

HI Hazard Index

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

NA Screening criteria not available for the referenced compound.

TABLE 4-5
 Analytes Detected in LNAPL Samples Above Method Detection Limits
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC, Zone G, Charleston Naval Complex

Analyte	Location	Concentration (mg/kg)	Qualifier
PCB			
PCB-1260 (Aroclor-1260)	G008GSP04	7.7	J
PCB-1260 (Aroclor-1260)	G008GSP11	4.2	J
TPH			
Hydrocarbons as Heavy Oil	G008GSP04	260,000	=
Hydrocarbons as DRO (Diesel)	G008GSP04	350,000	=
Hydrocarbons as DRO (Diesel)	G008GSP04	300,000	=
Hydrocarbons as GRO (Gasoline)	G008GSP04	220	=
Hydrocarbons as Heavy Oil	G008GSP11	200,000	=
Hydrocarbons as DRO (Diesel)	G008GSP11	250,000	=
Hydrocarbons as DRO (Diesel)	G008GSP11	220,000	=
General Chemistry			
Hydrazine	G008GSP04	7.9	=

mg/kg milligrams per kilogram

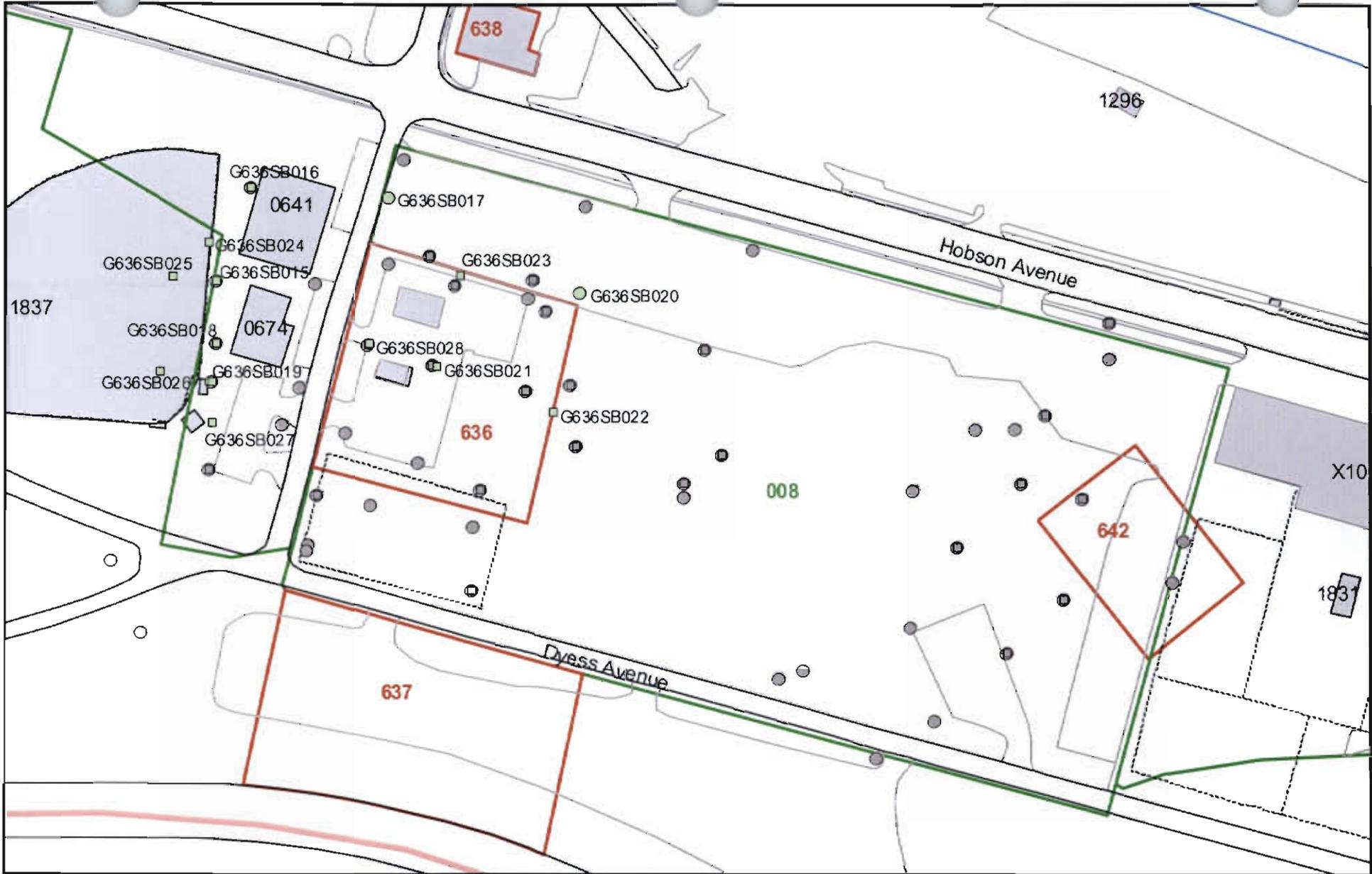
PCB Polychlorinated biphenyl

TPH Total petroleum hydrocarbon

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

NOTE: Original figure in color



- Previous Subsurface Soil Sample
- Previous Surface Soil Sample
- Post RFI Subsurface Soil Sample
- Post RFI Surface Soil Sample
- ⋈ Fence
- ⋈ Roads
- ⋈ Sidewalk
- ⋈ Shoreline
- ⋈ AOC Boundary
- ⋈ SWMU Boundary
- ⋈ Buildings
- ⋈ Zone Boundary

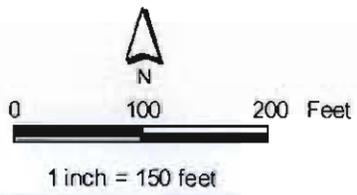
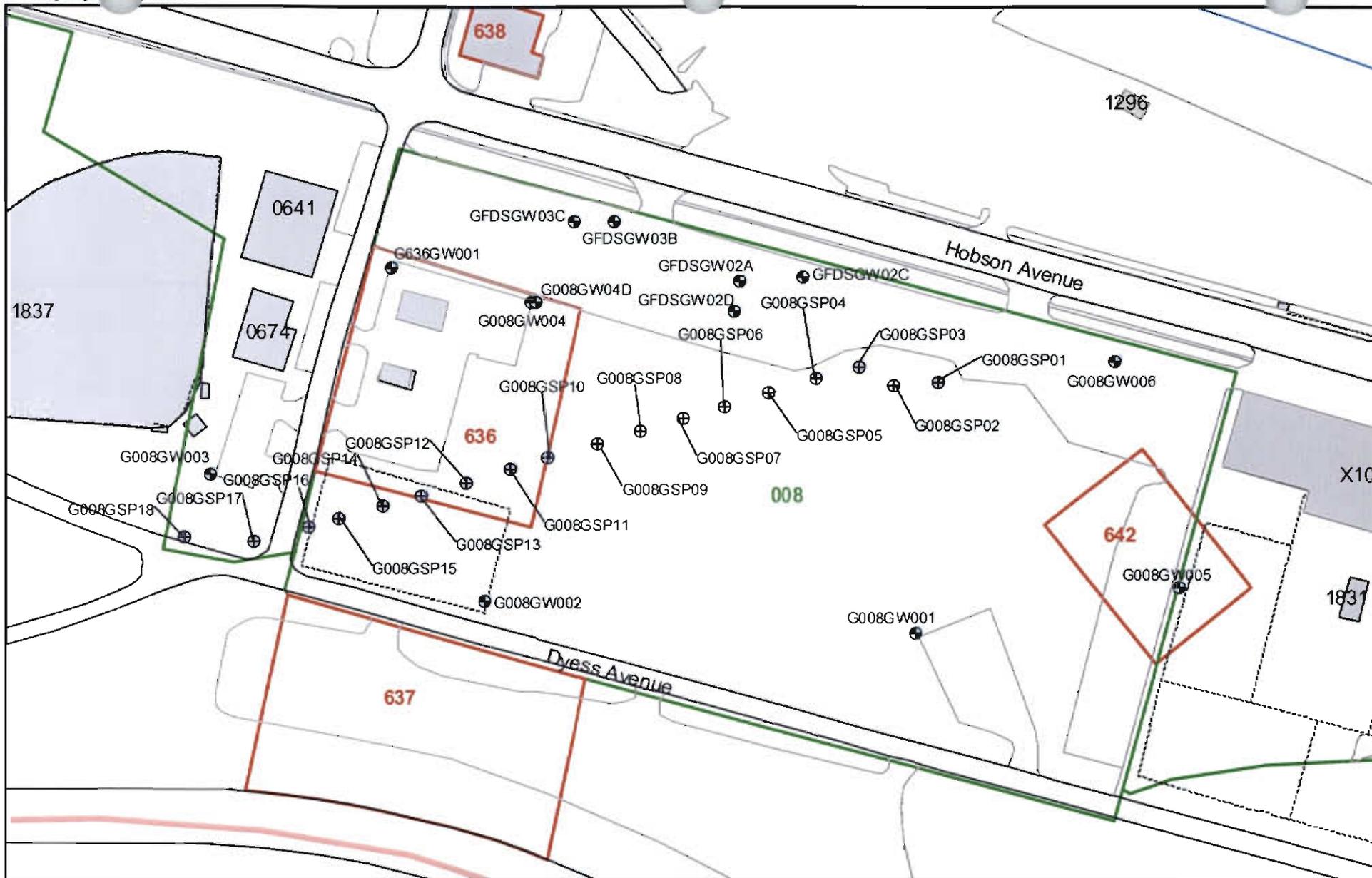
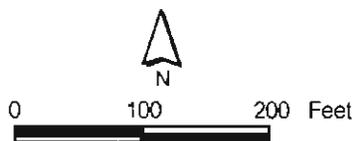


Figure 4-1
Post RFI Soil Sample Location Plan
SWMU 8/AOC 636, Zone G
Charleston Naval Complex

CH2MHILL



- Groundwater Well
- ⊕ Groundwater Sump
- - - Fence
- ≡ Roads
- ▬ Pavement
- ⋈ Shoreline
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary



1 inch = 150 feet

Figure 4-2
Groundwater Sample Location Plan
SWMU 8/AOC 636, Zone G
Charleston Naval Complex

1 **5.0 COPC/COC Refinement**

2 This section provides a further evaluation of the COCs that were identified in the *Zone G*
3 *RFI Report, Revision 0* (EnSafe, 1998a) and the COPCs that have been identified in Section 4.0
4 of this RFI Report Addendum. In addition, VOCs in soil are rescreened using an SSL based
5 on a DAF=1.

6 **5.1 Soil VOCs Rescreening using SSL (DAF=1)**

7 The detected concentrations from the 46 surface soil samples and the 21 subsurface soil
8 samples that were collected during the original RFI sampling investigations and analyzed
9 for VOCs were rescreened using their SSL (DAF=1) to evaluate if remaining vadose zone
10 soil (i.e., surface and subsurface) presents a continuing or future leaching threat to the site
11 groundwater. If the EPA OSWER SSL was not available, the EPA Region III SSL (DAF=1)
12 was used for screening. Table 5-1 presents the detected VOCs in the surface soil samples
13 collected during the original RFI sampling investigations.

14 Benzene and ethylbenzene were detected at concentrations of 100 µg/kg and 740 µg/kg,
15 respectively, in the FDS surface soil sample collected from GFDSSC012. These detected
16 concentrations are greater than the SSL (DAF=1) of 2 µg/kg and 700 µg/kg established for
17 benzene and ethylbenzene, respectively. However, these detected concentrations do not
18 exceed their corresponding EPA Region III residential RBC (HI=0.1). Benzene and
19 ethylbenzene are identified as COPCs in surface soil and will be further evaluated in this
20 section to determine if they meet the criteria for being considered a COC in surface soil.

21 In the *Zone G RFI Report, Revision 0* analytical results from the subsurface soil samples (3 to 5
22 ft bls) were screened using SSLs with a DAF=20. During this screening analysis two
23 chlorinated VOCs, 1,1,2,2-PCA (G636SB009: 10 J µg/kg) and 1,1,2-Trichloroethane (1,1,2-
24 TCA) (G008SB22: 92 µg/kg), were detected above their corresponding SSLs (DAF=20) but
25 were not identified in the *Zone G RFI Report, Revision 0* as COPCs. In addition, the detected
26 acetone concentration of 1,100 µg/kg in the subsurface soil sample collected from G008SB23
27 is greater than its SSL (DAF=1) of 800 µg/kg. Table 5-2 presents the detected VOC
28 concentrations from the subsurface soil samples collected during the original RFI sampling
29 investigations. Acetone, 1,1,2,2-PCA, and 1,1,2-TCA are identified as COPCs in subsurface
30 soil and will be further evaluated in this section to determine if they meet the criteria for
31 being considered a COC in subsurface soil.

5.2 Surface Soil COCs

Aroclor-1260, BEQs, hydrazine, antimony, arsenic, chromium, and thallium were identified as surface soil COCs in the *Zone G RFI Report, Revision 0*. No additional surface soil COCs were identified as a result of the additional sampling investigations conducted at SWMU 8/AOC 636. However, benzene and ethylbenzene were identified as COCs in surface soil as a result of the VOC rescreening process using a SSL with a DAF=1.

Surface soil sample analytical results from G008SB09, G008SB11, G008SB12, G008SB18, G008SB21, G008SB25, G008SB28, G008SB31, G008SB003, G636SB007, and G636SB010 were not included in calculating mean and 95-percent upper confidence limit (UCL₉₅) concentrations. These locations were omitted from use in the calculations because they were within the IM soil excavation boundaries. Figure 5-1 depicts the IM soil excavation areas and the soil samples that were within the boundaries.

5.2.1 Aroclor-1260

The PCB Aroclor-1260 was detected in two of the 40 samples (GFDSSC012: 0.84 mg/kg and G636SB008: 0.92 mg/kg) above its EPA Region III residential RBC of 0.32 mg/kg. These concentrations are below the industrial RBC of 2.9 mg/kg, and the preliminary remediation goal of 1 mg/kg established for PCBs based on the *Guidance on Remedial Actions for Superfund Sites with PCB Contamination* (EPA, 1990). Aroclor-1260 was detected in only eight of the 40 surface soil samples (i.e., 20-percent occurrence) collected from the SWMU 8/AOC 636 site and outside the IM excavation areas. The Aroclor-1260 surface soil results are presented in Table 5-3. Figure 5-2 depicts Aroclor-1260 in surface soil at SWMU 8/AOC 636.

Using both the Aroclor-1260 detected concentrations and non-detects at half the MDLs, a UCL₉₅ of 0.129 mg/kg was calculated. This value is less than the EPA Region III residential RBC (HI=0.1). A UCL₉₅ was calculated for a subset of samples from within a one-acre square surrounding the maximum detected concentration (i.e., G636SB008: 0.92 mg/kg). The calculated UCL₉₅ for Exposure Box 1, identified in Figure 5-2, was 0.292 mg/kg. The second Aroclor-1260 concentration (GFDSSC012: 0.84 mg/kg), which was above its EPA Region III residential RBC of 0.32 mg/kg, was not included in Exposure Box 1. Therefore, a second one-acre box surrounding GFDSSC012 was used to calculate a UCL₉₅. The UCL₉₅ concentration for Exposure Box 2, identified in Figure 5-2, which included only six samples, was estimated at 0.429 mg/kg. This value is above the EPA Region III residential RBC (HI=0.1) of 0.32 mg/kg, but below the EPA Region III industrial RBC (HI=0.1) of 2.9 mg/kg. While the site mean and UCL₉₅ calculated for the entire site and Exposure Box 1 are less than the EPA Region III RBC (HI=0.1), the UCL₉₅ for Exposure Box 2, due to its limited

1 number of samples, is greater than the EPA Region III residential RBC (HI=0.1) value
2 acceptable for unrestricted land use. Neither of the two detected concentrations exceeded
3 the EPA action level of 1.0 mg/kg established for high density population (residential)
4 areas. A summary of these calculated UCL₉₅ concentrations are provided in Appendix H.

5 Because the calculated UCL₉₅ concentration for Exposure Box 2 was above the EPA Region
6 III residential RBC, Aroclor-1260 is retained as a surface soil COC at SWMU 8/AOC 636
7 under the residential land use scenario.

8 **5.2.2 BEQs**

9 A total of 54 surface soil samples were collected at SWMU 8/AOC 636 and analyzed for
10 PAHs. Calculated BEQ concentrations in the remaining 43 samples representative of the
11 existing site conditions (i.e., 11 surface soil samples within the IM soil excavation
12 boundaries were omitted) ranged from 0.25034 to 11.5512 mg/kg, when non-detects are
13 included at half the MDLs. The calculated concentrations of BEQs are presented in Table 5-
14 4. Figure 5-3 depicts BEQs in surface soil at SWMU 8/AOC 636.

15 Forty-one of the 43 surface soil samples have calculated concentrations less than the
16 basewide reference concentration of 1.304 mg/kg. Soil sample location GFDSSC012, with a
17 calculated BEQ concentration of 11.5512 mg/kg, is located 45 feet south of Hobson Avenue.
18 Of the seven individual PAH constituents used in calculating total BEQs only chrysene,
19 detected at a concentration of 1.2 J mg/kg, was reported above MDLs. The remaining six
20 individual PAH constituents had a reported MDL of 10 mg/kg. As a result, the calculated
21 BEQ concentration of 11.5512 mg/kg when non-detects are included at half the MDLs
22 influences the elevated result. The chrysene concentration of 1.2 J mg/kg is an order of
23 magnitude less than its EPA Region III RBC (HI=0.1) of 87 mg/kg and its SSL (DAF=10) of
24 80 mg/kg. Soil sample location G008SB17, with a calculated BEQ concentration of 1.3657
25 mg/kg, is slightly greater than the basewide reference concentration of 1.304 mg/kg.
26 G008SB17 is located immediately adjacent to the former IM soil excavation, and as a result,
27 it is unclear if the soil in the area was removed as part of the IM activities. Nevertheless, the
28 calculated value is less than 5 percent greater than the basewide reference concentration of
29 1.304 mg/kg.

30 To evaluate if surface soil BEQs pose a leachability concern to the subsurface soil, the seven
31 individual PAH constituents used in calculating total BEQs were compared to their
32 corresponding SSL (DAF=10). Benzo[a]anthracene was the only constituent that was
33 detected above its corresponding SSL (DAF=10). This detected concentration of 1.1 mg/kg
34 in the surface soil sample collected from G008SB17 slightly exceeded its SSL (DAF=10) of 1.0

1 mg/kg. The calculated mean concentration for this chemical is 0.37 mg/kg when non-
2 detects are included at half the MDLs, which is below the SSL. The concentrations of the
3 seven individual PAH constituents, including the data set used to calculate the mean
4 concentrations, are presented as Appendix I. Because only one of the 43 samples collected
5 from the SWMU 8/AOC 636 site exceeds the basewide reference concentration of 1.304
6 mg/kg by 4.7 percent, BEQs are not considered COCs in the surface soil at SWMU 8/AOC
7 636 under the residential land use scenario.

8 **5.2.3 Antimony**

9 Antimony was detected in two of the 44 samples (G008SB14: 7.6 J mg/kg and G636SB009:
10 6.4 J mg/kg) above its EPA Region III residential RBC of 3.1 mg/kg, the Zone G
11 background range of 0.79 to 5.7 mg/kg, and its SSL (DAF=10) of 2.5 mg/kg. These
12 concentrations are below the industrial RBC (HI=0.1) of 82 mg/kg. Therefore, antimony is
13 not considered an industrial land use COC.

14 Antimony was detected in only three of the 44 surface soil samples (i.e., 6.8-percent
15 occurrence) collected from the SWMU 8/AOC 636 site outside the former IM excavation
16 areas. Antimony surface soil results are presented in Table 5-5. Figure 5-4 depicts antimony
17 in surface soil at SWMU 8/AOC 636.

18 A site UCL₉₅ value was calculated at 2.22 mg/kg. A summary of the calculated UCL₉₅
19 concentration is provided in Appendix H. The UCL₉₅ value is less than the EPA Region III
20 residential RBC (HI=0.1) of 3.1 mg/kg.

21 Because the site UCL₉₅ concentration is below the EPA Region III residential RBC (HI=0.1),
22 antimony is not considered a COC in surface soil at SWMU 8/AOC 636 for the unrestricted
23 land use scenario.

24 **5.2.4 Arsenic**

25 Arsenic was detected in four of the 46 samples (G008SB02: 20 mg/kg, G008SB24: 150
26 mg/kg, G636SB005: 22.8 J mg/kg, and GFDSSC016: 28.8 mg/kg) above its EPA Region III
27 residential and industrial RBCs (HI=0.1) of 0.43 mg/kg and 3.8 mg/kg, respectively, the
28 Zone G background range of 0.64 to 18 mg/kg, and its SSL (DAF=10) of 14.5 mg/kg. In
29 addition, surface soil samples collected from G636SB013 (17.2 mg/kg) and GFDSSC014 (15.3
30 mg/kg) slightly exceed the SSL (DAF=10). Arsenic surface soil results are presented in
31 Table 5-6. Figure 5-5 depicts arsenic in surface soil at SWMU 8/AOC 636. Arsenic was not
32 detected in subsurface soil samples above its SSL (DAF=10) or Zone G background range,
33 nor was it detected in groundwater samples above its MCL or Zone G background range.

1 As a result, arsenic was not identified as a COPC in subsurface soil or groundwater at
2 SWMU 8/AOC 636.

3 A UCL_{95} value was calculated at 11.6 mg/kg which is greater than the EPA Region III
4 residential and industrial RBC (HI=0.1) of 0.43 mg/kg and 3.8 mg/kg, respectively. The
5 UCL_{95} concentration summary is presented in Appendix H.

6 The Zone G background arsenic concentrations in surface soils in Zone G ranged from 0.64
7 to 18 mg/kg, which is well above the EPA Region III residential RBC. For sites where
8 background arsenic levels exceed RBCs, EPA Region IV typically considers arsenic
9 concentrations in surface soil of up to 20 mg/kg and 270 mg/kg as acceptable for
10 unrestricted and industrial land uses, respectively (EPA, 2001). Based on these criteria and
11 the UCL_{95} exposure concentration estimate of 11.6 mg/kg, arsenic would not be considered
12 a COC for either the unrestricted or industrial land use scenarios. As a result, arsenic is not
13 considered a COC in surface soil at SWMU 8/AOC 636 under the residential land use
14 scenario.

15 **5.2.5 Chromium**

16 Chromium was detected in three of the 46 samples (G008SB17: 53 mg/kg, G636SB009: 64.2
17 mg/kg, and GFDSSC016: 40.8 J mg/kg) above its EPA Region III residential RBC (HI=0.1)
18 of 23 mg/kg and Zone G background range of 7 to 39 mg/kg. The chromium surface soil
19 results are presented in Table 5-7. Figure 5-6 depicts chromium in surface soil at SWMU
20 8/AOC 636.

21 All chromium concentrations are below the industrial RBC (HI=0.1) of 610 mg/kg. Thus,
22 chromium is not considered a COC for the industrial land use scenario.

23 A UCL_{95} estimate for chromium for surface soil at this site was calculated at 17.8 mg/kg. A
24 summary of the UCL_{95} calculation is presented in Appendix H. This value is below the
25 residential RBC for chromium of 23 mg/kg (HI=0.1). Therefore, chromium is not considered
26 a COC under the unrestricted land use scenario.

27 Detected chromium concentrations were compared to its SSL of 19 mg/kg (DAF=10) to
28 evaluate if chromium in surface soil poses a leachability concern. The mean chromium
29 concentration in surface soil is 14.5 mg/kg when non-detects are included at half the MDLs.
30 Therefore, chromium is not considered a leaching hazard since its mean concentration is
31 less than its SSL (DAF=10). The data set used in calculating the mean concentration is
32 provided in Table 5-7.

1 Chromium was not detected in groundwater samples above its MCL or Zone G background
2 range, and as a result was not identified as a COPC in groundwater at SWMU 8/AOC 636.
3 Based on these considerations, chromium is not considered a COC in surface soil at
4 SWMU 8/AOC 636.

5 **5.2.6 Thallium**

6 Thallium was detected in one of the 46 samples (G636SB003: 0.92 J mg/kg) above its EPA
7 Region III residential RBC of 0.55 mg/kg and the Zone G background range of 0.55 to 0.91
8 mg/kg.

9 This detected concentration is similar to background, and is two orders of magnitude less
10 than the EPA Region III industrial RBC (HI=0.1) of 14 mg/kg. Thallium was detected in
11 only four of the 46 surface soil samples (i.e., 8.7-percent occurrence) collected from the
12 SWMU 8/AOC 636 site outside the former IM excavation areas. These four concentrations
13 ranging from 0.42 J (G636SB002) to 0.92 J (G636SB003) were above its SSL (DAF=10) of 0.35
14 mg/kg. The mean thallium concentration in surface soil is 0.84 mg/kg when non-detects
15 are included at half the MDLs. Therefore, thallium may be considered a potential leaching
16 threat since its mean concentration is greater than its SSL (DAF=10). Thallium surface soil
17 results are presented in Table 5-8, including the data set used in calculating the mean
18 concentration. Figure 5-7 depicts thallium in surface soil at SWMU 8/AOC 636.

19 A site UCL_{95} concentration for thallium in surface soil was calculated at 1.08 mg/kg. The
20 calculated UCL_{95} concentration defaulted to a value above the maximum detected value due
21 to the high values of some of the MDLs (i.e., 23 were equal to or greater than 1.1 mg/kg),
22 and due to the low frequency of detection. A summary of the UCL_{95} calculation is provided
23 in Appendix H.

24 Thallium was identified as a COPC as a result of the additional RFI sampling investigation.
25 Section 5.3.6 presents an evaluation to determine if thallium meets the criteria for being
26 considered a COC in subsurface soil. The *Zone G RFI Report, Revision 0* identified thallium as
27 a COC in the groundwater at SWMU 8/AOC 636. Section 5.4.9 presents a summary of
28 thallium detected in groundwater and an evaluation to determine whether it meets the
29 criteria for being considered a COC.

30 Although thallium was detected in only one sample slightly above its Zone G background
31 range, it is identified as a COC in surface soil at SWMU 8/AOC 636 under the unrestricted
32 land use scenario.

1 **5.2.7 Hydrazine**

2 Because hydrazine was reportedly detected in one surface soil sample collected from
3 SWMU 8/AOC 636 above its EPA Region III residential RBC of 210 $\mu\text{g}/\text{kg}$, it was identified
4 as a surface soil COC in the *Zone G RFI Report, Revision 0*. This detected concentration of 274
5 $\mu\text{g}/\text{kg}$ (G008SB001) was slightly higher than the EPA Region III residential RBC. However,
6 because it was analyzed using a colorimetric method, its results are subject to false positives
7 and are not reliable. Appendix G presents the Technical Memorandum *Hydrazine Analytical*
8 *Methods and Results* (CH2M-Jones, 2002) that outlines the methods used for hydrazine
9 analysis at the site and its chemical properties and uses. The Technical Memorandum
10 focuses on historic groundwater analysis, but since both groundwater and soil samples
11 were analyzed using the colorimetric method, the findings and conclusions presented in the
12 Technical Memorandum can be applied to both media.

13 Environmental releases of hydrazine are not expected to be persistent, and releases to soil
14 would be expected to attenuate quickly. As a result and based on analysis of groundwater
15 samples using different laboratory methods, the reported detection of hydrazine in soil
16 based on a colorimetric method is considered suspect.

17 Hydrazine is a highly oxidative chemical that reacts quickly with the substrate material
18 with which it is in contact, and therefore dissipates within a very short time after release. As
19 a result, hydrazine is not expected to last at measurable levels in environmental media after
20 the lapsed time following the occurrence of any suspect release or spill at the site.

21 **5.2.8 Benzene**

22 Benzene was identified as a COPC in surface soil because its detected concentration of 100
23 $\mu\text{g}/\text{kg}$ in the sample collected from GFDSSC012 is above the SSL (DAF=1) of 2 $\mu\text{g}/\text{kg}$.
24 However, this detected concentration is less than its EPA Region III residential RBC
25 (HI=0.1) of 12,000 $\mu\text{g}/\text{kg}$. This is the only detected benzene concentration in any of the
26 surface or subsurface (3 to 5 ft bls) soil samples collected from the SWMU 8/AOC 636 site.
27 Benzene surface soil results are presented in Table 5-9.

28 Using both the single benzene detected concentration and non-detects at half the MDLs, a
29 mean concentration of 5.8 $\mu\text{g}/\text{kg}$ was calculated. This value is above the SSL (DAF=1) of 2
30 $\mu\text{g}/\text{kg}$ because the laboratory detection limits range from 5.3 U $\mu\text{g}/\text{kg}$ to 8 UJ $\mu\text{g}/\text{kg}$. These
31 MDLs at half their value remain above the SSL (DAF=1). Table 5-9 presents the data set
32 used to calculate the mean concentration.

33 A site-specific SSL was calculated to evaluate if benzene remains a leaching hazard based
34 on the single detection of 100 $\mu\text{g}/\text{kg}$ in surface soil. This site-specific SSL was calculated by

1 CH2M-Jones in accordance with the Technical Memorandum *Application of Soil Screening*
2 *Levels (SSLs) at Charleston Naval Complex* (CH2M-Jones, 2001b), and using site- and zone-
3 specific information as presented in Appendix J of this report. A site-specific SSL for
4 unpaved surfaces of 7.8 µg/kg with a site-specific DAF of 1.52 was calculated for benzene.
5 The mean concentration of 5.8 µg/kg is less than the site-specific SSL of 7.8 µg/kg. The
6 methods and results of the site-specific SSL calculation are provided in Appendix J.

7 Benzene was not detected in any of the 23 subsurface soil samples above the MDLs or in the
8 63 groundwater samples collected from site monitoring wells above its MCL of 5 µg/L.
9 Because the mean concentration is less than the site-specific SSL (DAF=1.52), and since it
10 was not detected above MDLs in subsurface soil samples or above its MCL in historic
11 groundwater samples collected from the site, benzene is not considered a leaching threat
12 and as a result is not a COC in surface soil at SWMU 8/AOC 636.

13 **5.2.9 Ethylbenzene**

14 Ethylbenzene was identified as a COPC in surface soil because its detected concentration of
15 740 µg/kg in the sample collected from GFDSSC012 is above the SSL (DAF=1) of 700 µg/kg.
16 However, this detected concentration is less than its EPA Region III residential RBC
17 (HI=0.1) of 780 µg/kg. This is the only detected ethylbenzene concentration in any of the
18 surface or subsurface (3 to 5 ft bls) soil samples collected from the SWMU 8/AOC 636 site.
19 Ethylbenzene surface soil results are presented in Table 5-10.

20 Using both the single ethylbenzene detected concentration and non-detects at half the
21 MDLs, a mean concentration of 23.6 µg/kg was calculated. This value is an order of
22 magnitude less than the SSL (DAF=1) of 700 µg/kg. Table 5-10 presents the data set used to
23 calculate the mean concentration.

24 Ethylbenzene was not detected in any of the 20 subsurface soil samples above the MDLs or
25 in the 63 groundwater samples collected from site monitoring wells above its MCL of 700
26 µg/L. Because the mean concentration is less than the SSL (DAF=1), and since it was not
27 detected above MDLs in subsurface soil samples or above its MCL in historic groundwater
28 samples collected from the site, ethylbenzene is not considered a leaching threat and as a
29 result is not a COC in surface soil at SWMU 8/AOC 636.

30 **5.3 Subsurface Soil COCs**

31 During the additional RFI sampling investigation, six metals (i.e., antimony, cadmium,
32 chromium, lead, nickel, and thallium) were detected in subsurface soil at concentrations
33 above their corresponding screening criteria. As a result, these constituents are considered

1 COPCs. In addition, acetone, 1,1,2,2-PCA, and 1,1,2-TCA were identified as COPCs in
2 subsurface soil as a result of the VOC rescreening process using a SSL based on a DAF=1.
3 These metals are further evaluated to determine if they meet the criteria for being
4 considered a COC. No subsurface soil COPCs were identified in the *Zone G RFI Report*,
5 *Revision 0*.

6 Subsurface soil sample analytical results from G008SB11, G008SB12, G008SB21, G008SB25,
7 G008SB28, and G008SB31 were not included in calculating mean and site-specific SSL
8 concentrations. These locations were omitted from use in the calculations because they were
9 within the IM soil excavation boundaries.

10 **5.3.1 Antimony**

11 During the additional RFI sampling investigation completed by EnSafe, antimony was
12 detected at concentrations of 4 J and 47.5 mg/kg in the subsurface soil samples collected
13 from sample locations G636SB015 and G636SB019, respectively. In addition, during the 1993
14 pre-RFI sampling event, antimony was detected at concentrations of 32 mg/kg, 23 J mg/kg,
15 and 21 J mg/kg in the subsurface soil samples collected from locations G008SB03,
16 G008SB22, and G008SB24, respectively. These concentrations are above the corresponding
17 SSL (DAF=10) of 2.5 mg/kg. With the exception of the sample collected from G008SB015 (4 J
18 mg/kg), these concentrations were also greater than the Zone H background range of 1.5 to
19 19 mg/kg. A Zone G background range was not established for antimony in subsurface soil.
20 However, because of its close proximity to Zone G and the SWMU 8/AOC 636 site, the
21 Zone H background range of concentrations was used for screening. The site mean
22 antimony concentration in subsurface soil is 6.14 mg/kg when non-detects are used at half
23 the MDLs.

24 Antimony was detected in only seven of the 25 subsurface soil samples (i.e., 28-percent
25 occurrence) collected from the SWMU 8/AOC 636 site outside the former IM excavation
26 areas. Antimony subsurface soil results, including the data used in calculating the site mean
27 concentration, are presented in Table 5-11. Figure 5-8 depicts antimony in subsurface soil at
28 SWMU 8/AOC 636. The locations of detected subsurface concentrations above the
29 screening criteria for antimony show a non-uniform pattern of distribution throughout the
30 site, indicating that the material was released to the environment from natural sources.

31 The greatest concentration of antimony in the background soil samples at the CNC (23
32 mg/kg) occurred in Zone B, which is located in the northern part of the base. Little to no
33 industrial activity occurred in Zone B and the antimony concentrations in these background
34 samples likely reflect naturally occurring background conditions. Antimony, identified as a

1 COPC in groundwater, was detected at concentrations greater than its MCL and Zone G
2 background range in samples collected from monitoring well G008GW003 during three
3 sample collection events. This indicates that antimony may have leached from the
4 subsurface soil to the groundwater. The location of monitoring well G008GW003 is located
5 in the immediate area of subsurface soil sample G636SB019, which had the maximum site
6 detection of 47.5 mg/kg. This area is located west of Brumby Street and AOC 636, outside a
7 former baseball/softball field.

8 Because antimony was detected in subsurface soil samples above its SSL (DAF=10) and the
9 site mean concentration, and since antimony was detected in groundwater samples above
10 its MCL and Zone G background range, it has been identified as a COC in subsurface soil at
11 SWMU 8/AOC 636.

12 **5.3.2 Cadmium**

13 Cadmium was detected above its screening criteria in two of the 25 subsurface soil samples
14 collected from the SWMU 8/AOC 636 site outside the former IM excavation areas.

15 Cadmium subsurface soil results are presented in Table 5-12. Cadmium was detected at a
16 concentration of 9.2 mg/kg in the subsurface soil sample collected from G636SB019 during
17 the additional RFI sampling investigation, and at a concentration of 5.9 mg/kg in the
18 subsurface soil sample collected from G008SB03 during the 1993 pre-RFI sampling
19 investigation. These concentrations are above its corresponding SSL (DAF=10) of 4 mg/kg
20 and the Zone G background range of 0.08 to 0.52 mg/kg.

21 The site mean cadmium concentration in subsurface soil is 1.06 mg/kg when non-detects
22 are used at half the MDLs, which is well below the generic SSL of 4 mg/kg. Cadmium was
23 not detected at concentrations above its MCL or Zone G background range in site
24 groundwater samples. Therefore, site concentrations of cadmium do not represent a
25 significant leaching hazard and cadmium is not considered a subsurface soil COC at SWMU
26 8/AOC 636. The data set used in calculating the mean concentration is provided in Table 5-
27 12.

28 **5.3.3 Chromium**

29 Chromium was detected above its screening criteria in only two of the 23 subsurface soil
30 samples collected from the SWMU 8/AOC 636 site outside the former IM excavation areas.

31 Chromium was detected at a concentration of 91.8 mg/kg in the subsurface soil sample
32 collected from G636SB019 during the additional RFI sampling investigation, and at a
33 concentration of 103 mg/kg in the subsurface soil sample collected from G008SB03 during
34 the 1993 pre-RFI sampling investigation. These concentrations are above its corresponding

1 SSL (DAF=10) of 19 mg/kg, and the Zone G background range of 7.4 to 65 mg/kg. It should
2 be noted that the SSL (DAF=10) is based on chromium being present in the hexavalent state.

3 The site mean concentration for chromium in subsurface soil is 29 mg/kg when non-detects
4 are used at half the MDLs. The subsurface soil sample locations G636SB019 and G008SB03,
5 separated by approximately 100 feet, are located west of Brumby Street and AOC 636,
6 outside a former baseball/softball field. Chromium subsurface soil results including the
7 data set used in calculating the mean concentration are presented in Table 5-13. Figure 5-9
8 depicts chromium in subsurface soil at SWMU 8/AOC 636.

9 The conservative generic EPA SSL (DAF=10) of 19 mg/kg for total chromium is identical to
10 the generic EPA SSL (DAF=10) for chromium VI. This conservative value assumes the total
11 chromium concentration is comprised entirely of chromium VI. Because there is no known
12 use of chromium VI at the site, the generic EPA SSL (DAF=10) for total chromium is not
13 considered a conservative screening criterion for total chromium in subsurface soil.

14 Chromium III occurs naturally in the environment and is an essential nutrient.

15 Chromium was not detected at concentrations above its MCL or Zone G background range
16 of concentrations in groundwater samples collected from site monitoring wells, and as a
17 result, chromium leachability is not considered a potential concern.

18 Chromium is not related to past activities or uses of the site, it was detected at a low
19 frequency of detection above its screening criteria in the subsurface soil samples collected
20 from the site, the generic EPA SSL (DAF=10) for total chromium is considered conservative,
21 and leachability to groundwater is not a concern. Based on these considerations, chromium
22 is not retained as a subsurface soil COC at SWMU 8/AOC 636.

23 **5.3.4 Lead**

24 Lead was detected in all 25 subsurface soil samples collected from the SWMU 8/AOC 636
25 site outside the former IM excavation areas. During the additional RFI sampling
26 investigation, lead was detected at concentrations of 883 and 1,250 mg/kg in the subsurface
27 soil samples collected from sample locations G636SB015 and G636SB019, respectively. In
28 addition, during the 1993 pre-RFI sampling event, lead was detected at a concentration of
29 1,400 mg/kg in the subsurface soil sample collected from location G008SB03. These
30 concentrations are above its corresponding EPA screening level of 400 mg/kg and the Zone
31 G background range of 2.4 to 76 mg/kg.

1 The site mean lead concentration in subsurface soil is of 201.3 mg/kg when non-detects are
2 used at half the MDLs. The subsurface soil results for lead including the data set used in
3 calculating the mean concentration are presented in Table 5-14.

4 Lead was not detected at concentrations above its MCL or Zone G background range of
5 concentrations in groundwater samples collected from site monitoring wells. As a result,
6 lead leachability is not considered a potential concern. Because the leaching of lead to the
7 groundwater is not an apparent concern, and since the site mean subsurface soil
8 concentration is less than the EPA screening level of 400 mg/kg, lead is not retained as a
9 COC in the subsurface soil at SWMU 8/AOC 636.

10 **5.3.5 Nickel**

11 Nickel was detected in 19 of the 21 subsurface soil samples (i.e., 90-percent occurrence)
12 collected from the SWMU 8/AOC 636 site outside the former IM excavation areas. Nickel
13 was detected at concentrations of 79 and 76.7 mg/kg in the subsurface soil samples
14 collected from G008SB03 and G636SB019, respectively. These concentrations are slightly
15 above its corresponding SSL (DAF=10) of 65 mg/kg and the Zone G background range of
16 1.9 to 22 mg/kg.

17 The site mean concentration of nickel in subsurface soil is 17 mg/kg when non-detects are
18 used at half the MDLs. The subsurface soil results for nickel including the data set used in
19 calculating the site mean concentration are presented in Table 5-15.

20 Nickel was not detected at concentrations above its EPA Region III tap water RBC or Zone
21 G background range of concentrations in the groundwater samples collected from site
22 monitoring wells. As a result, nickel leachability to groundwater is not considered a
23 potential concern.

24 Nickel is not considered a COC in the subsurface soil at SWMU 8/AOC 636 since the site
25 mean subsurface soil concentration is less than the SSL (DAF=10), and because of the fact
26 that nickel leaching to the groundwater is not a concern based on analytical results from the
27 samples collected from site monitoring wells.

28 **5.3.6 Thallium**

29 Thallium was detected in one subsurface soil sample above its screening criteria. This
30 subsurface soil sample collected from G636SB019 had a detected concentration of 3.8
31 mg/kg, which is above its corresponding SSL (DAF=10) of 0.35 mg/kg and the Zone G
32 background concentration of 1 mg/kg. Thallium was detected in only six of the 26

1 subsurface soil samples (i.e., 23-percent occurrence) collected from the SWMU 8/AOC 636
2 site outside the former IM excavation areas.

3 The site mean concentration of thallium in subsurface soil is 0.85 mg/kg. This value is
4 above the generic SSL (DAF=10) of 0.35 mg/kg. The subsurface soil results for thallium are
5 presented in Table 5-16. Figure 5-10 depicts thallium in subsurface soil at SWMU 8/AOC
6 636.

7 Thallium detected in nine groundwater samples at concentrations greater than its MCL was
8 identified as a COPC in groundwater at SWMU 8/AOC 636. These nine samples were
9 collected from eight site groundwater monitoring wells. One of the samples was collected
10 from monitoring well G008GW003, which is approximately 175 feet south of subsurface soil
11 sample G636SB019. However, thallium was not detected in subsequent samples collected
12 from the eight monitoring wells in which thallium was detected at estimated concentrations
13 above its MCL of 2.0 µg/L. A summary of thallium detected in groundwater and its
14 elevation to determine if it meets the criteria for being considered a COC is provided in
15 Section 5.4.9.

16 Thallium was detected in one subsurface soil sample at a concentration above its SSL
17 (DAF=10), the Zone G background range concentration, and site mean concentration. As a
18 result it is identified as a COC in subsurface soil at SWMU 8/AOC 636.

19 **5.3.7 Acetone**

20 Acetone was identified as a COPC in subsurface soil because it was detected at a
21 concentration of 1,100 µg/kg in the sample collected from G008SB23. This concentration is
22 greater than the SSL (DAF=1) of 800 µg/kg. Using both the acetone detected concentrations
23 and non-detects at half the MDLs, a mean concentration of 199.3 µg/kg was calculated. This
24 value is less than the SSL (DAF=1) of 800 µg/kg. Table 5-17 presents the acetone subsurface
25 results including the data set used to calculate the mean concentration.

26 Acetone was not detected in any of the 44 groundwater samples collected from site
27 monitoring wells above its EPA Region III tap-water RBC (HI=0.1) of 61 µg/L. Acetone is
28 not considered a COC in subsurface soil at SWMU 8/AOC 636 since its mean concentration
29 is less than the SSL (DAF=1) and because it was not detected in historic groundwater
30 samples above the EPA Region III tap-water RBC.

31 **5.3.8 1,1,2,2-PCA**

32 1,1,2,2-PCA was identified as a COPC in subsurface soil because its detected concentration
33 of 10 µg/kg in the sample collected from G636SB009 was above the SSL (DAF=1) of 0.2

1 µg/kg. This is the only detected 1,1,2,2-PCA concentration in any of the surface or
2 subsurface soil samples collected from the SWMU 8/AOC 636 site. 1,1,2,2-PCA subsurface
3 soil results are presented in Table 5-18.

4 Using both the single 1,1,2,2-PCA detected concentration and non-detects at half the MDLs,
5 a mean concentration of 4.5 µg/kg was calculated. This value is an order of magnitude
6 above the SSL (DAF=1) of 0.2 µg/kg because the laboratory detection limits range from 5.1
7 U µg/kg to 37 U µg/kg. These MDLs at half their value remain an order of magnitude
8 above the SSL (DAF=1). Table 5-18 presents the data set used to calculate the mean
9 concentration.

10 As recommended in the *Sampling and Analysis Plan, AOC 636, Zone G, Revision 0* (CH2M-
11 Jones, 2001), an additional subsurface soil sample was collected immediately adjacent to
12 sample location G636SB009 to evaluate the presence/absence of 1,1,2,2-PCA in subsurface
13 soil. On July 12, 2001 a subsurface soil sample was collected from location G636SB028 and
14 analyzed for thallium and 1,1,2,2-PCA. 1,1,2,2-PCA was not detected above its laboratory
15 detection limit of 5.1 U µg/kg.

16 1,1,2,2-PCA was not detected above MDLs in any of the 62 groundwater samples collected
17 from site monitoring wells. Because its presence in subsurface soil during the original RFI
18 sampling investigation can not be confirmed based on the 2001 sampling event, and since it
19 was not detected in site groundwater samples detected above MDLs, 1,1,2,2-PCA is not
20 considered a leaching threat and as a result is not a COC in subsurface soil at SWMU
21 8/AOC 636.

22 **5.3.9 1,1,2-TCA**

23 1,1,2-TCA was identified as a COPC in subsurface soil because its detected concentration of
24 92 µg/kg in the sample collected from G008SB22 is above the SSL (DAF=1) of 0.9 µg/kg.
25 This is the only detected 1,1,2-TCA concentration in any of the surface or subsurface soil
26 samples collected from the SWMU 8/AOC 636 site. 1,1,2-TCA subsurface soil results are
27 presented in Table 5-19.

28 Using both the single 1,1,2-TCA detected concentration and non-detects at half the MDLs, a
29 mean concentration of 10.3 µg/kg was calculated. This value is two orders of magnitude
30 above the SSL (DAF=1) of 0.9 µg/kg because the laboratory detection limits range from 5.4
31 U µg/kg to 37 U µg/kg. These MDLs at half their value remain above the SSL (DAF=1).
32 Table 5-19 presents the data set used to calculate the mean concentration.

33 A site-specific SSL was calculated to evaluate if 1,1,2-TCA remains a leaching hazard based
34 on the single detection of 92 µg/kg in subsurface soil. This site-specific SSL was calculated

1 by CH2M-Jones in accordance with the Technical Memorandum *Application of Soil Screening*
2 *Levels (SSLs) at Charleston Naval Complex* (CH2M-Jones, 2001b), and using site- and zone-
3 specific information as presented in Appendix J of this report. A site-specific SSL for
4 unpaved surfaces of 15.7 µg/kg with a site-specific DAF of 2.66 was calculated for 1,1,2-
5 TCA. The mean concentration of 10.3 µg/kg is less than the site specific SSL of 15.7 µg/kg.
6 The methods and results of the site-specific SSL calculation are provided in Appendix J.
7 1,1,2-TCA was not detected above MDLs in any of the 62 groundwater samples collected
8 from site monitoring wells. Because the mean concentration is less than the site-specific SSL
9 (DAF=2.66) and since it was not detected above MDLs in historic groundwater samples
10 collected from the site, 1,1,2-TCA is not considered a leaching threat and as a result is not a
11 COC in subsurface soil at SWMU 8/AOC 636.

12 **5.4 Groundwater COCs**

13 The *Zone G RFI Report, Revision 0* identified BEHP, antimony, barium, thallium, and
14 vanadium as a COCs in the groundwater at SWMU 8/AOC 636. Five SVOCs (i.e.,
15 benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis[2-ethylhexyl]phthalate, and
16 naphthalene), three metals (i.e., antimony, iron, and vanadium), and hydrazine were
17 detected above their screening criteria during the various post RFI sampling events. As a
18 result, these chemicals are considered COPCs. Groundwater contaminant concentrations
19 were compared to their corresponding MCLs, or for those chemicals that have no MCL, the
20 EPA Region III tap water RBC. In addition, detected concentrations of metals were
21 compared to their corresponding Zone G background reference range of concentrations.
22 These constituents are further evaluated to determine if they meet the criteria for being
23 considered COCs.

24 **5.4.1 BEHP**

25 BEHP was detected at concentrations of 7 J, 8 J, and 46 µg/L in the samples collected from
26 monitoring wells G008GSP10, G008GSP15, and G008GW004, respectively. These detected
27 concentrations were above its corresponding MCL of 6 µg/L and EPA Region III tap water
28 RBC of 4.8 µg/L. As a result, BEHP was identified in the *Zone G RFI Report, Revision 0* as a
29 COC in groundwater. BEHP groundwater results are presented in Table 5-20.

30 BEHP, a common laboratory contaminant that is associated with plastics, was not detected
31 above the MDLs in the four samples collected from G008GW004, preceding the sample with
32 the detected concentration of 46 µg/L collected on November 15, 1996.

1 Estimated BEHP concentrations detected in the samples collected from G008GSP10 and
2 G008GSP15 slightly exceed the MCL of 6 $\mu\text{g}/\text{L}$. BEHP was detected at an estimated
3 concentration of 1 J $\mu\text{g}/\text{L}$ in the laboratory quality control (QC) sample during the method
4 analysis of samples collected from G008GSP10 and G008GSP15 (SDG No. 39843). Site
5 sample concentrations from a known laboratory contaminant such as BEHP that are also
6 detected in the laboratory QC sample and within 10 times or 110 percent of the reported
7 laboratory QC concentration are considered suspect due to the laboratory contamination.
8 As a result, the estimated BEHP concentrations from the samples collected from G008GSP10
9 and G008GSP15 are not considered to be representative of site groundwater. BEHP is not
10 considered a COC in groundwater at SWMU 8/AOC 636 since it was detected in the
11 laboratory QC sample at a concentration within 110 percent of the reported values from the
12 samples collected from G008GSP10 and G008GSP15. In addition, BEHP was not detected
13 above MDLs in the four subsequent samples collected from G008GW004 following the
14 initial sample in which BEHP was detected at a concentration of 46 $\mu\text{g}/\text{L}$.

15 **5.4.2 Benzo[a]anthracene**

16 Benzo[a]anthracene was detected at estimated concentrations in two of the 60 groundwater
17 samples collected from the SWMU 8/AOC 636 monitoring wells. These two estimated
18 concentrations of 2 J and 1 J $\mu\text{g}/\text{L}$ detected in the samples collected from G008GSP11 and
19 G008GSP12, respectively were above its EPA Region III tap water RBC (HI=0.1) of 0.092
20 $\mu\text{g}/\text{L}$. Benzo[a]anthracene groundwater results are presented in Table 5-21. Figure 5-11
21 depicts a historic representation of benzo[a]anthracene in groundwater at SWMU 8/AOC
22 636.

23 As documented in Section 3.1 of this RFI report addendum, approximately 26,533 tons of
24 petroleum-impacted soil were removed from the Area 2 excavation. These groundwater
25 sumps were installed in the former Area 2 excavation footprint. Because these groundwater
26 sumps were installed in the former Area 2 petroleum-impacted soil excavation, and because
27 of the infrequent detection of benzo[a]anthracene in the groundwater samples collected at
28 the site (i.e., two out of 60 samples), it is not considered a COC in groundwater
29 SWMU 8/AOC 636. However, since benzo[a]anthracene was detected at concentrations
30 slightly exceeding an RBC-based criterion, and it can likely be linked to material removed
31 from the former unlined oil sludge pits, it is identified as a COC in groundwater at
32 SWMU 8/AOC 636.

1 **5.4.3 Benzo[a]pyrene**

2 Benzo[a]pyrene was detected at estimated concentrations in three of the 60 groundwater
3 samples collected from the SWMU 8/AOC 636 monitoring wells. These three estimated
4 concentrations of 1 J $\mu\text{g/L}$, 0.65 J $\mu\text{g/L}$, and 0.47 J $\mu\text{g/L}$, detected in the samples collected
5 from G008GSP11, G008GW006, and G008GW005, respectively, were above its MCL of 0.2
6 $\mu\text{g/L}$. Benzo[a]pyrene groundwater results are presented in Table 5-22. Figure 5-12 depicts
7 a historic representation of benzo[a]pyrene in groundwater at SWMU 8/AOC 636.

8 Groundwater sump G008GSP11 was installed in the former Area 2 excavation footprint
9 where approximately 26,533 tons of petroleum-impacted soil were removed. Estimated
10 benzo[a]pyrene concentrations in the June 2002 samples collected from monitoring wells
11 G008GW006 and G008GW005 are the same order of magnitude as its MCL of 0.2 $\mu\text{g/L}$.
12 Because these three estimated concentrations are equal to or less than 1 $\mu\text{g/L}$, and its
13 infrequent detection in the groundwater samples collected at the site (i.e., three out of 60
14 samples), it is not considered a COC in groundwater SWMU 8/AOC 636. However, since
15 benzo[a] pyrene was detected at concentrations slightly exceeding its MCL and it can likely
16 be linked to the material removed from the former unlined oil sludge pits, it is identified as
17 a COC in groundwater at SWMU 8/AOC 636.

18 **5.4.4 Benzo[b]fluoranthene**

19 Benzo[b]fluoranthene was detected at estimated concentrations in three of the 60
20 groundwater samples collected from the SWMU 8/AOC 636 monitoring wells. These three
21 estimated concentrations of 1 J $\mu\text{g/L}$, 0.47 J $\mu\text{g/L}$, and 0.35 J $\mu\text{g/L}$ detected in the samples
22 collected from G008GSP11, G008GW006, and G008GW005, respectively, were above its EPA
23 Region III tap water RBC (HI=0.1) of 0.092 $\mu\text{g/L}$. These estimated concentrations are very
24 similar to the benzo[a]pyrene groundwater results from the samples collected from the
25 same monitoring wells during the same events. Benzo[b]fluoranthene groundwater results
26 are presented in Table 5-23. Figure 5-13 depicts a historic representation of
27 benzo[b]fluoranthene in groundwater at SWMU 8/AOC 636.

28 Groundwater sump G008GSP11 was installed in the former Area 2 excavation footprint
29 where approximately 26,533 tons of petroleum-impacted soil were removed. Estimated
30 benzo[b]fluoranthene concentrations in the June 2002 samples collected from monitoring
31 wells G008GW006 and G008GW005 are slightly less than its EPA Region III tap-water RBC
32 (HI=1.0) of 0.92 $\mu\text{g/L}$. Because these three estimated concentrations are equal to or less than
33 1.0 $\mu\text{g/L}$ and its infrequent detection in the groundwater samples collected at the site (i.e.,
34 three out of 60 samples), it is not considered a COC in groundwater SWMU 8/AOC 636.

1 However, since benzo[b]fluoranthene was detected at concentrations slightly exceeding its
2 EPA Region III tap water RBC (HI=0.1), and it can likely be linked to the material removed
3 from the former unlined oil sludge pits, it is identified as a COC in groundwater at
4 SWMU 8/AOC 636.

5 **5.4.5 Naphthalene**

6 Naphthalene was detected above its screening criteria in seven of the 60 groundwater
7 samples collected from the SWMU 8/AOC 636 monitoring wells. Except for the detected
8 concentration of 28 $\mu\text{g/L}$ in the sample collected from G008GSP15, the detected
9 concentrations in the remaining six samples range from 1 J to 5 J $\mu\text{g/L}$. These six estimated
10 concentrations do not exceed the EPA Region III tap water RBC (HI=1.0) of 6.5 $\mu\text{g/L}$. Five of
11 the seven concentrations were from groundwater sump samples. As documented in Section
12 3.1, approximately 26,533 tons of petroleum-impacted soil was removed from the Area 2
13 excavation. These groundwater sumps were installed in the former Area 2 excavation
14 footprint. Naphthalene was not detected in subsequent samples collected from monitoring
15 wells G008GW002 and G008GW006 in which naphthalene had been detected at estimated
16 concentrations above its EPA Region III tap water RBC (HI=0.1) of 0.65 $\mu\text{g/L}$. Naphthalene
17 groundwater results are presented in Table 5-24. Figure 5-14 depicts a historic
18 representation of naphthalene in groundwater at SWMU 8/AOC 636. Because these
19 groundwater sumps were installed in the former Area 2 petroleum-impacted soil
20 excavation, and because of its infrequent detection in the groundwater samples collected at
21 the site (i.e., seven out of 60 samples), it is not considered a COC in groundwater
22 SWMU 8/AOC 636. However, since naphthalene was detected at concentrations slightly
23 exceeding an RBC-based criteria, and it can likely be linked to the material removed from
24 the former unlined oil sludge pits, it is identified as a COC in groundwater at
25 SWMU 8/AOC 636.

26 **5.4.6 Antimony**

27 Antimony was detected at estimated concentrations of 11J $\mu\text{g/L}$ (March 29, 2002), 12.6 $\mu\text{g/L}$
28 (May 21, 1997), and 22.6 J $\mu\text{g/L}$ (November 15, 1996) in samples collected from G008GW003.
29 These detected concentrations exceed its corresponding MCL of 6 $\mu\text{g/L}$ and Zone G
30 background range of 3 to 6 $\mu\text{g/L}$. However, except for the initial sample collected in
31 November 1996, antimony did not exceed the EPA Region III tap water RBC (HI=1.0) of 15
32 $\mu\text{g/L}$. Antimony was detected above MDLs in only one other groundwater sample (2.1
33 $\mu\text{g/L}$; GFDSGW02C) collected during the site sampling events. Table 5-25 presents the
34 results of antimony in the groundwater samples collected during the site sampling events.

1 Figure 5-15 depicts a historic representation of antimony in groundwater at SWMU 8/AOC
2 636.

3 As previously indicated in Section 5.2.1, antimony has been identified as a COC in
4 subsurface soil. The location of monitoring well G008GW003 is located in the immediate
5 area of subsurface soil sample G636SB019, which had the maximum site detection of 47.5
6 mg/kg. This indicates that antimony may have leached from subsurface soil to
7 groundwater. Because of the potential leaching concern, and since it was detected at
8 concentrations above its MCL during three sample collection events, it has been identified
9 as a COC in groundwater at SWMU 8/AOC 636.

10 **5.4.7 Barium**

11 Barium was identified in the *Zone G RFI Report, Revision 0* as a COC in groundwater. It was
12 detected in 46 of the 47 samples collected from site groundwater wells with a maximum
13 concentration of 1,520 $\mu\text{g/L}$ in the initial sample collected from G008GW002 on November
14 15, 1996. Table 5-26 presents the barium results in the groundwater samples collected
15 during the site sampling events. Each detected barium concentration is less than its MCL of
16 2,000 $\mu\text{g/L}$, and with the exception of the initial sample collected from G008GW002, all of
17 the detected concentrations are within the Zone G background range of 14 to 937 $\mu\text{g/L}$. As a
18 result, barium is not considered a COC in groundwater at for SWMU 8/AOC 636.

19 **5.4.8 Iron**

20 Iron was detected in each of the 43 groundwater samples collected from site groundwater
21 wells and analyzed for iron. These detected concentrations range from 482 J $\mu\text{g/L}$
22 (G008GW003; December 11, 1997) to 56,100 J $\mu\text{g/L}$ (G636GW001; May 22, 1997). Two of
23 these detected concentrations (i.e., 41,000 $\mu\text{g/L}$; G008GW001 and 56,100 J $\mu\text{g/L}$;
24 G636GW001) were above its EPA Region III tap-water RBC (HI=0.1) of 1,100 $\mu\text{g/L}$ and
25 Zone G background range of 2,000 to 35,700 $\mu\text{g/L}$. Iron was not detected above its Zone G
26 background range in subsequent samples collected from monitoring wells G008GW001 and
27 G636GW001, in which iron was detected at concentrations above its screening criteria. Table
28 5-27 presents the iron results in the groundwater samples collected during the site sampling
29 events.

30 Because iron was detected in each of the 43 samples collected from site monitoring wells, it
31 appears to be ubiquitous and naturally occurring in the groundwater. Given its ubiquitous
32 nature, and because iron was not detected above its Zone G background range in
33 subsequent samples collected from monitoring wells G008GW001 and G636GW001, iron is
34 not considered a COC in groundwater at SWMU 8/AOC 636.

1 **5.4.9 Thallium**

2 Thallium was detected at estimated concentrations above its screening criteria in nine of the
3 43 groundwater samples collected from the SWMU 8/AOC 636 monitoring wells. The nine
4 groundwater samples collected from eight monitoring wells range in concentration from 3 J
5 $\mu\text{g/L}$ (GFDSGW03B) to 7.4 J $\mu\text{g/L}$ (G008GW003). These thallium concentrations are above
6 its MCL of 2.0 $\mu\text{g/L}$ and EPA Region III tap water RBC (HI=0.1) of 0.26 $\mu\text{g/L}$. The detected
7 concentrations are within the Zone H background range of 2 to 105 $\mu\text{g/L}$, and are less than
8 the Zone H mean concentration of 16 $\mu\text{g/L}$. A Zone G background range for thallium in
9 groundwater was not established. However, because of its close proximity to Zone G and
10 the SWMU 8/AOC 636 site, the Zone H background range was used for screening.

11 Four of the nine concentrations were from groundwater samples collected from FDS wells
12 located in the northern portion of the site. Thallium was not detected in subsequent samples
13 collected from the eight monitoring wells in which thallium was detected at estimated
14 concentrations above its MCL of 2.0 $\mu\text{g/L}$. Thallium groundwater results are presented in
15 Table 5-28.

16 Given its low frequency of detection (i.e., nine out of 43 groundwater samples) above its
17 MCL, and because these nine detected concentrations are within the Zone H background
18 range and less than the Zone H mean concentration, thallium is not considered a COC in
19 groundwater at for SWMU 8/AOC 636.

20 **5.4.10 Vanadium**

21 Vanadium was detected at concentrations of 44 J $\mu\text{g/L}$ (March 29, 2002) and 49 $\mu\text{g/L}$
22 (November 15, 1996) in samples collected from G008GW003. These detected concentrations
23 are above its Zone G background range of 3 to 30 $\mu\text{g/L}$ but below its EPA Region III tap
24 water RBC (HI=1.0) of 260 $\mu\text{g/L}$. Vanadium groundwater results are presented in Table 5-
25 29.

26 Vanadium was detected in 36 of the 43 groundwater samples collected from site monitoring
27 wells. It is unlikely that vanadium is site-related, since it was not detected in surface or
28 subsurface soil samples above its screening criteria. Given its ubiquitous nature, because its
29 presence in groundwater is not related to historic site operations, and since its detected
30 concentrations are below the EPA Region III tap water RBC (HI=1.0), vanadium is not
31 considered a COC in groundwater at for SWMU 8/AOC 636.

1 **5.4.11 Hydrazine**

2 During the post-RFI sampling events, hydrazine was detected in 30 samples ranging in
3 concentration from 5 to 100 $\mu\text{g}/\text{L}$. These 30 detected concentrations were from samples
4 collected during five sampling events (i.e., December 1997, February 1998, October 1999,
5 March 2002, and June 2002) from 1997 through 2002. Each detected concentration exceeds
6 its EPA Region III tap water RBC (HI=0.1) of 0.022 $\mu\text{g}/\text{L}$. As a result, it was identified as a
7 COPC in groundwater. Hydrazine was detected in the groundwater samples using a
8 colorimetric method. However, the results may not be reliable, as false positives are
9 possible when using this method. The detections of hydrazine at low concentrations across
10 the SWMU 8/AOC 636 site were not consistent with its fate and transport properties.
11 Environmental releases of hydrazine are not expected to be persistent, and releases to soil
12 would be expected to attenuate quickly. Hydrazine released to groundwater systems would
13 evaporate or undergo degradation. As a result, and based on analysis of groundwater
14 samples using different laboratory methods, the reported detection of hydrazine based on a
15 colorimetric method is considered suspect.

16 Hydrazine is a highly oxidative chemical that reacts quickly with the substrate material in
17 contact, and therefore dissipates within a very short time after release. As a result,
18 hydrazine is not expected to last in measurable levels in environmental media after the
19 lapsed time following any suspect release or spill at the SWMU 8 site, if one occurred.

20 Because of the colorimetric method used for hydrazine analysis, and the fact that its fate
21 and transport properties are not consistent with the presence of a low-level long term
22 groundwater presence over a large area, hydrazine is not considered a COC in groundwater
23 at SWMU 8/AOC 636. Appendix G presents the Technical Memorandum *Hydrazine*
24 *Analytical Methods and Results* (CH2M-Jones, 2002) that outlines the methods used for
25 hydrazine analysis at the site and its chemical properties and uses.

TABLE 5-1
 Detected Concentrations of VOCs in Surface Soil
 RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration ($\mu\text{g}/\text{kg}$)	Qualifier	Date Collected	SSL ^a
Acetone	G008SB01	130	=	09/24/1993	800
	G008SB17	57	J	10/20/1993	
	G008SB26	220	=	10/27/1993	
Benzene	GFDSSC012	100	=	12/04/1996	2
Carbon Disulfide	GFDSSC014	5	J	12/05/1996	2,000
	GFDSSC016	7	J	12/04/1996	
Chlorobenzene	G008SB01	18	=	09/24/1993	70
	G008SB05	53	J	09/29/1993	
	G008SB07	11	=	10/18/1993	
	G008SB13	66	=	10/19/1993	
	G008SB14	16	=	10/19/1993	
	G008SB15	56	=	10/19/1993	
	G008SB16	30	=	10/20/1993	
	G008SB17	19	=	10/20/1993	
	G008SB19	17	=	10/20/1993	
	G008SB20	19	=	10/27/1993	
	G008SB22	9.2	=	10/27/1993	
	G008SB24	33	=	10/26/1993	
	G008SB26	26	=	10/27/1993	
	G008SB27	6.6	=	10/27/1993	
Ethylbenzene	GFDSSC012	740	=	12/04/1996	700
Methyl ethyl ketone (2- Butanone)	G008SB001	2	J	09/12/1996	400 ^b
	G008SB003	6	J	09/13/1996	
	G636SB002	30	=	09/11/1996	
1,1,1-Trichloroethane	G008SB24	8.7	=	10/26/1993	100
Toluene	G008SB01	8.2	=	09/24/1993	600
	G008SB05	9.3	J	09/29/1993	
	G008SB24	8.6	=	10/26/1993	

TABLE 5-1
 Detected Concentrations of VOCs in Surface Soil
RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration ($\mu\text{g}/\text{kg}$)	Qualifier	Date Collected	SSL ^a
Toluene	GFDSSC012	430	=	12/04/1996	600
	GFDSSC014	17	J	12/05/1996	
Xylenes, Total	GFDSSC012	3,700	=	12/04/1996	9,000 ^c
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area					
Chlorobenzene	G008SB09	8.5	=	10/18/1993	
	G008SB11	60	=	10/19/1993	
	G008SB12	14	=	10/19/1993	
	G008SB18	12	=	10/20/1993	
	G008SB25	7.6	=	10/27/1993	
	G008SB28	9.1	=	10/27/1993	

^a Generic soil to groundwater soil screening level (SSL) with a DAF=1. SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b EPA Region III SSL (DAF=1).

^c Generic SSL (DAF=1) for o-Xylene

Concentrations in bold and outlined text exceed the appropriate screening criteria.

$\mu\text{g}/\text{kg}$ milligrams per kilogram

- = Indicates that the analyte is detected at the concentration shown.
- J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

TABLE 5-2
 Detected Concentrations of VOCs in Subsurface Soil
 RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/kg)	Qualifier	Date Collected	SSL ^a
Acetone	G008SB03	160	=	09/25/1993	800
	G008SB19	29	J	10/20/1993	
	G008SB20	170	=	10/27/1993	
	G008SB22	200	=	10/26/1993	
	G008SB23	1,100	=	10/26/1993	
	G008SB24	220	=	10/26/1993	
	G008SB26	220	=	10/27/1993	
Chlorobenzene	G008SB02	50	=	09/25/1993	70
	G008SB03	7.3	=	09/25/1993	
	G008SB20	41	=	10/27/1993	
	G008SB22	28	=	10/26/1993	
	G008SB30	28	=	10/27/1993	
1,1,2,2-Tetrachloroethane	G636SB009	10	J	09/12/1996	0.2
1,1,2-Trichloroethane	G008SB22	92	=	10/26/1993	0.9
Toluene	G008SB22	5.8	=	10/26/1993	600
Vinyl acetate	G008SB22	17	=	10/26/1993	8,000
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area					
Acetone	G008SB11	170	=	10/19/1993	
	G008SB21	76	=	10/27/1993	
	G008SB25	140	=	10/27/1993	
	G008SB31	160	=	10/27/1993	
Carbon Disulfide	G008SB11	7.9	=	10/19/1993	
Chlorobenzene	G008SB11	35	=	10/19/1993	
	G008SB31	33	=	10/27/1993	

^a Generic soil to groundwater soil screening level (SSL) with a DAF=1. SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

µg/kg milligrams per kilogram

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

TABLE 5-3

Aroclor-1260 Results in Surface Soil

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations
G008SB01	0.038	U	09/24/1993	0.32	1.0	NA
G008SB02	0.038	U	09/25/1993			
G008SB03	0.038	U	09/25/1993			
G008SB04	0.038	U	09/27/1993			
G008SB05	0.046	U	09/29/1993			
G008SB06	0.036	U	09/30/1993			
G008SB07	0.041	U	10/18/1993			
G008SB08	0.077	=	10/18/1993			
G008SB10	0.04	U	10/18/1993			
G008SB13	0.044	U	10/19/1993			
G008SB14	0.039	U	10/19/1993			
G008SB15	0.042	U	10/19/1993			
G008SB16	0.084	U	10/20/1993			
G008SB17	0.077	U	10/20/1993			
G008SB19	0.035	U	10/20/1993			
G008SB20	0.035	U	10/27/1993			
G008SB22	0.038	U	10/27/1993			
G008SB23	0.038	U	10/26/1993			
G008SB24	0.036	U	10/26/1993			
G008SB26	0.041	U	10/27/1993			
G008SB27	0.036	U	10/27/1993			
G008SB29	0.036	U	10/27/1993			
G008SB30	0.036	U	10/27/1993			
G008SB001	0.082	U	09/12/1996			
G008SB002	0.082	U	09/16/1996			
G636SB001	0.08	U	09/11/1996			
G636SB002	0.081	U	09/11/1996			
G636SB003	0.088	U	09/11/1996			
G636SB004	0.081	U	09/11/1996			
G636SB005	0.32	=	09/11/1996			
G636SB006	0.078	U	09/12/1996			
G636SB008	0.92	=	09/12/1996			
G636SB009	0.069	J	09/12/1996			

TABLE 5-3
 Aroclor-1260 Results in Surface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations
G636SB011	0.036	J	01/07/1997	0.32	1.0	NA
G636SB012	0.0085	J	01/07/1997			
G636SB013	0.028	J	01/10/1997			
G636SB014	0.08	U	01/10/1997			
GFDSSC012	0.84	J	12/04/1996			
GFDSSC014	0.13	U	12/05/1996			
GFDSSC016	0.16	U	12/04/1996			
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB09	0.042	U	10/18/1993			
G008SB11	0.42	U	10/19/1993			
G008SB12	0.04	U	10/19/1993			
G008SB18	0.038	U	10/20/1993			
G008SB21	0.036	U	10/27/1993			
G008SB25	0.036	U	10/27/1993			
G008SB28	0.035	U	10/27/1993			
G008SB31	0.2	U	10/27/1993			
G008SB003	0.092	U	09/13/1996			
G636SB007	0.35	=	09/12/1996			
G636SB010	0.012	J	01/07/1997			

^a Preliminary remediation goal of 1.0 mg/kg established for PCBs based on *Guidance on Remedial Actions for Superfund Sites with PCB Contamination* (EPA, 1990).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-4
 BEQ Results in Surface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008SB01	2.9409	=	09/24/1993	0.43	1.304
G008SB02	0.4449	=	09/25/1993		
G008SB03	0.42515	=	09/25/1993		
G008SB04	0.28654	=	09/27/1993		
G008SB05	0.323	=	09/29/1993		
G008SB06	0.41598	=	09/30/1993		
G008SB07	0.47375	=	10/18/1993		
G008SB08	0.49686	=	10/18/1993		
G008SB10	0.4622	=	10/18/1993		
G008SB13	0.50842	=	10/19/1993		
G008SB14	0.35486	=	10/19/1993		
G008SB15	0.41342	=	10/19/1993		
G008SB16	0.33248	=	10/20/1993		
G008SB17	1.3657	=	10/20/1993		
G008SB19	0.27456	=	10/20/1993		
G008SB20	0.40442	=	10/27/1993		
G008SB22	0.43909	=	10/27/1993		
G008SB23	0.43909	=	10/26/1993		
G008SB24	0.42753	=	10/26/1993		
G008SB26	0.48531	=	10/27/1993		
G008SB27	0.42683	=	10/27/1993		
G008SB29	0.42753	=	10/27/1993		
G008SB30	0.41598	=	10/27/1993		
G008SB001	0.4622	=	09/12/1996		
G008SB002	0.4622	=	09/16/1996		
G636SB001	0.29678	=	09/11/1996		
G636SB002	0.28318	=	09/11/1996		
G636SB003	0.50906	=	09/11/1996		
G636SB004	0.4622	=	09/11/1996		
G636SB005	0.40905	=	09/11/1996		
G636SB006	0.26184	=	09/12/1996		
G636SB008	0.46379	=	09/12/1996		
G636SB009	0.25034	=	09/12/1996		

TABLE 5-4
 BEQ Results in Surface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G636SB011	0.3807	=	01/07/1997	0.43	1.304
G636SB012	0.43909	=	01/07/1997		
G636SB013	0.45065	=	01/10/1997		
G636SB014	0.45065	=	01/10/1997		
G636SB015	0.45065	=	12/17/1999		
G636SB016	0.45065	=	12/17/1999		
G636SB017	0.42754	=	12/17/1999		
GFDSSC012	11.5512	=	12/04/1996		
GFDSSC014	0.51371	=	12/05/1996		
GFDSSC016	0.86765	=	12/04/1996		
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area					
G008SB09	0.36630	=	10/18/1993		
G008SB11	162.96300	=	10/19/1993		
G008SB12	1.04620	=	10/19/1993		
G008SB18	9.51560	=	10/20/1993		
G008SB21	0.41598	=	10/27/1993		
G008SB25	0.42753	=	10/27/1993		
G008SB28	0.41598	=	10/27/1993		
G008SB31	22.57700	=	10/27/1993		
G008SB003	1.13240	=	09/13/1996		
G636SB007	0.33262	=	09/12/1996		
G636SB010	0.42740	=	01/07/1997		

^a Basewide PAH background concentration for surface soil is 1.304 mg/kg as outlined in the *Technical Memorandum: PAHs Background Study* (CH2M-Jones, February 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

TABLE 5-5
 Antimony Results in Surface Soil
RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b
G008SB01	5.7	U	09/24/1993	3.1	2.5	0.79-5.7
G008SB02	5.7	U	09/25/1993			
G008SB03	5.7	U	09/25/1993			
G008SB06	5.4	UJ	09/30/1993			
G008SB07	6.9	UJ	10/18/1993			
G008SB08	6.5	UJ	10/18/1993			
G008SB10	6	UJ	10/18/1993			
G008SB13	6.6	UJ	10/19/1993			
G008SB14	7.6	J	10/19/1993			
G008SB15	6.1	UJ	10/19/1993			
G008SB16	6.3	UJ	10/20/1993			
G008SB17	4.8	UJ	10/20/1993			
G008SB19	5.3	UJ	10/20/1993			
G008SB20	5.4	UJ	10/27/1993			
G008SB22	5.7	UJ	10/27/1993			
G008SB23	5.7	UJ	10/26/1993			
G008SB24	5.6	UJ	10/26/1993			
G008SB26	6.3	UJ	10/27/1993			
G008SB27	5.6	UJ	10/27/1993			
G008SB29	5.6	UJ	10/27/1993			
G008SB30	5.4	UJ	10/27/1993			
G008SB001	0.58	U	09/12/1996			
G008SB002	0.37	UJ	09/16/1996			
G636SB001	1.1	UJ	09/11/1996			
G636SB002	0.36	UJ	09/11/1996			
G636SB003	0.4	UJ	09/11/1996			
G636SB004	0.36	UJ	09/11/1996			
G636SB005	0.35	UJ	09/11/1996			
G636SB006	0.41	U	09/12/1996			
G636SB008	0.96	U	09/12/1996			
G636SB009	6.4	J	09/12/1996			
G636SB011	1.5	J	01/07/1997			
G636SB012	0.34	U	01/07/1997			

TABLE 5-5
 Antimony Results in Surface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b
G636SB013	0.36	U	01/10/1997	3.1	2.5	0.79-5.7
G636SB014	0.36	U	01/10/1997			
G636SB015	0.43	UJ	12/17/1999			
G636SB016	0.33	UJ	12/17/1999			
G636SB017	0.94	UJ	12/17/1999			
G636SB018	0.5	U	01/26/2000			
G636SB019	0.32	U	01/26/2000			
G636SB020	0.31	U	01/26/2000			
GFDSSC012	0.62	UJ	12/04/1996			
GFDSSC014	0.49	UJ	12/05/1996			
GFDSSC016	0.71	UJ	12/04/1996			
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB09	6.4	UJ	10/18/1993			
G008SB11	7.4	J	10/19/1993			
G008SB12	6.2	UJ	10/19/1993			
G008SB18	5.7	UJ	10/20/1993			
G008SB21	5.4	UJ	10/27/1993			
G008SB25	5.6	UJ	10/27/1993			
G008SB28	5.4	UJ	10/27/1993			
G008SB31	6	UJ	10/27/1993			
G008SB003	0.35	UJ	09/13/1996			
G636SB007	0.59	U	09/12/1996			
G636SB010	0.66	J	01/07/1997			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-6
 Arsenic Results in Surface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b
G008SB01	10	=	09/24/1993	0.43	14.5	0.64-18
G008SB02	20	=	09/25/1993			
G008SB03	3.5	=	09/25/1993			
G008SB04	5.6	J	09/27/1993			
G008SB05	1.6	J	09/29/1993			
G008SB06	5	J	09/30/1993			
G008SB07	1.9	J	10/18/1993			
G008SB08	6.9	J	10/18/1993			
G008SB10	3.1	J	10/18/1993			
G008SB13	8.6	J	10/19/1993			
G008SB14	6.2	J	10/19/1993			
G008SB15	2.2	J	10/19/1993			
G008SB16	3.5	J	10/20/1993			
G008SB17	7.2	=	10/20/1993			
G008SB19	5.9	=	10/20/1993			
G008SB20	8.4	=	10/27/1993			
G008SB22	2.6	=	10/27/1993			
G008SB23	1.1	U	10/26/1993			
G008SB24	150	=	10/26/1993			
G008SB26	7.6	J	10/27/1993			
G008SB27	4	J	10/27/1993			
G008SB29	2.1	J	10/27/1993			
G008SB30	3	J	10/27/1993			
G008SB001	12.7	=	09/12/1996			
G008SB002	1.5	=	09/16/1996			
G636SB001	7.1	J	09/11/1996			
G636SB002	8.6	J	09/11/1996			
G636SB003	11.4	J	09/11/1996			
G636SB004	2.7	J	09/11/1996			
G636SB005	22.8	J	09/11/1996			
G636SB006	2.3	=	09/12/1996			
G636SB008	6.7	=	09/12/1996			
G636SB009	5.5	=	09/12/1996			
G636SB011	4.7	=	01/07/1997			
G636SB012	2.1	=	01/07/1997			

TABLE 5-6
Arsenic Results in Surface Soil
RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential		Zone G Background Range of Concentrations ^b
				RBC (HI=0.1)	SSL ^a	
G636SB013	17.2	=	01/10/1997	0.43	14.5	0.64-18
G636SB014	1.2	J	01/10/1997			
G636SB015	1.9	=	12/17/1999			
G636SB016	1.5	=	12/17/1999			
G636SB017	3.6	=	12/17/1999			
G636SB018	2.3	=	01/26/2000			
G636SB019	0.63	J	01/26/2000			
G636SB020	1.6	J	01/26/2000			
GFDSSC012	4.1	=	12/04/1996			
GFDSSC014	15.3	=	12/05/1996			
GFDSSC016	28.8	=	12/04/1996			
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB09	5.9	J	10/18/1993			
G008SB11	6.5	UJ	10/19/1993			
G008SB12	2.2	J	10/19/1993			
G008SB18	3.8	J	10/20/1993			
G008SB21	3.6	=	10/27/1993			
G008SB25	9.7	J	10/27/1993			
G008SB28	3.8	J	10/27/1993			
G008SB31	11	J	10/27/1993			
G008SB003	6.7	=	09/13/1996			
G636SB007	5.1	=	09/12/1996			
G636SB010	22.4	=	01/07/1997			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001)*.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

Hi Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-7
 Total Chromium Results in Surface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
G008SB01	21	=	09/24/1993	23 ^d	19	7-39	14.5
G008SB02	6.5	=	09/25/1993				
G008SB03	6.5	=	09/25/1993				
G008SB04	6.6	J	09/27/1993				
G008SB05	8	J	09/29/1993				
G008SB06	7.8	J	09/30/1993				
G008SB07	6.5	=	10/18/1993				
G008SB08	20	=	10/18/1993				
G008SB10	8.2	=	10/18/1993				
G008SB13	27	=	10/19/1993				
G008SB14	37	=	10/19/1993				
G008SB15	11	=	10/19/1993				
G008SB16	10	U	10/20/1993				
G008SB17	53	=	10/20/1993				
G008SB19	25	=	10/20/1993				
G008SB20	4.2	=	10/27/1993				
G008SB22	3.7	=	10/27/1993				
G008SB23	4.5	=	10/26/1993				
G008SB24	5.4	=	10/26/1993				
G008SB26	24	=	10/27/1993				
G008SB27	11	=	10/27/1993				
G008SB29	4.1	=	10/27/1993				
G008SB30	5	=	10/27/1993				
G008SB001	4.9	=	09/12/1996				
G008SB002	5.8	=	09/16/1996				
G636SB001	19.2	J	09/11/1996				
G636SB002	14.2	J	09/11/1996				
G636SB003	24.2	J	09/11/1996				
G636SB004	5.8	J	09/11/1996				
G636SB005	4.6	J	09/11/1996				
G636SB006	6.5	=	09/12/1996				
G636SB008	26	=	09/12/1996				
G636SB009	64.2	=	09/12/1996				
G636SB011	8.6	=	01/07/1997				
G636SB012	5	=	01/07/1997				
G636SB013	19.2	=	01/10/1997				
G636SB014	7.3	=	01/10/1997				

TABLE 5-7

Total Chromium Results in Surface Soil

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
G636SB015	5.9	=	12/17/1999	23 ^d	19	7-39	14.5
G636SB016	5.1	=	12/17/1999				
G636SB017	13.7	=	12/17/1999				
G636SB018	7.8	=	01/26/2000				
G636SB019	5.7	=	01/26/2000				
G636SB020	5.3	=	01/26/2000				
GFDSSC012	25.5	J	12/04/1996				
GFDSSC014	30.8	J	12/05/1996				
GFDSSC016	40.8	J	12/04/1996				
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area							
G008SB09	17	=	10/18/1993				
G008SB11	48	=	10/19/1993				
G008SB12	18	=	10/19/1993				
G008SB18	48	=	10/20/1993				
G008SB21	4.5	=	10/27/1993				
G008SB25	6.5	=	10/27/1993				
G008SB28	5.6	=	10/27/1993				
G008SB31	96	=	10/27/1993				
G008SB003	12.3	=	09/13/1996				
G636SB007	13.8	=	09/12/1996				
G636SB010	15.9	=	01/07/1997				

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001)*.

^c Mean value is calculated when using non-detects at half the laboratory detection limit.

^d The conservative EPA Region III residential RBC (HI=0.1) of 23 mg/kg for Chromium VI was used as the screening criteria for Chromium, Total.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-8
 Thallium Results in Surface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III	SSL ^a	Zone G	Mean Value ^c
				Residential RBC (HI=0.1)		Background Range of Concentrations ^b	
G008SB01	1.1	U	09/24/1993	0.55	0.35	0.55 - 0.91	0.84
G008SB02	1.2	UJ	09/25/1993				
G008SB03	1.1	UJ	09/25/1993				
G008SB04	5.9	UJ	09/27/1993				
G008SB05	1.4	UJ	09/29/1993				
G008SB06	1.1	UJ	09/30/1993				
G008SB07	1.2	U	10/18/1993				
G008SB08	1.3	U	10/18/1993				
G008SB10	1.2	U	10/18/1993				
G008SB13	1.3	U	10/19/1993				
G008SB14	1.2	U	10/19/1993				
G008SB15	6.1	U	10/19/1993				
G008SB16	6.3	U	10/20/1993				
G008SB17	1.2	U	10/20/1993				
G008SB19	1.1	U	10/20/1993				
G008SB20	5.4	U	10/27/1993				
G008SB22	5.7	U	10/27/1993				
G008SB23	1.1	U	10/26/1993				
G008SB24	5.6	U	10/26/1993				
G008SB26	1.3	U	10/27/1993				
G008SB27	1.1	U	10/27/1993				
G008SB29	5.5	UJ	10/27/1993				
G008SB30	5.5	UJ	10/27/1993				
G008SB001	0.43	U	09/12/1996				
G008SB002	0.41	U	09/16/1996				
G636SB001	0.82	J	09/11/1996				
G636SB002	0.42	J	09/11/1996				
G636SB003	0.92	J	09/11/1996				
G636SB004	0.41	UJ	09/11/1996				
G636SB005	0.39	UJ	09/11/1996				
G636SB006	0.4	U	09/12/1996				
G636SB008	0.39	U	09/12/1996				
G636SB009	0.73	J	09/12/1996				
G636SB011	0.42	U	01/07/1997				

TABLE 5-8

Thallium Results in Surface Soil

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
G636SB012	0.39	U	01/07/1997	0.55	0.35	0.55 - 0.91	0.84
G636SB013	0.41	U	01/10/1997				
G636SB014	0.41	U	01/10/1997				
G636SB015	0.22	UJ	12/17/1999				
G636SB016	0.23	UJ	12/17/1999				
G636SB017	0.21	UJ	12/17/1999				
G636SB018	0.4	U	01/26/2000				
G636SB019	0.41	U	01/26/2000				
G636SB020	0.4	U	01/26/2000				
GFDSSC012	0.71	U	12/04/1996				
GFDSSC014	0.56	U	12/05/1996				
GFDSSC016	0.81	U	12/04/1996				
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area							
G008SB09	1.3	U	10/18/1993				
G008SB11	1.3	U	10/19/1993				
G008SB12	6.2	U	10/19/1993				
G008SB18	5.7	U	10/20/1993				
G008SB21	1.1	U	10/27/1993				
G008SB25	5.5	U	10/27/1993				
G008SB28	11	U	10/27/1993				
G008SB31	6	U	10/27/1993				
G008SB003	0.65	J	09/13/1996				
G636SB007	0.54	U	09/12/1996				
G636SB010	0.59	J	01/07/1997				

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001)*.

^c Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-9
Benzene Results in Surface Soil
RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration ($\mu\text{g}/\text{kg}$)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL^a	Mean Value^b
G008SB01	5.7	U	09/24/1993	12,000	2	5.8
G008SB02	6	U	09/25/1993			
G008SB03	5.7	U	09/25/1993			
G008SB04	5.9	U	09/27/1993			
G008SB05	7	UJ	09/29/1993			
G008SB06	5.4	U	09/30/1993			
G008SB07	6.2	U	10/18/1993			
G008SB08	6.5	U	10/18/1993			
G008SB10	6	U	10/18/1993			
G008SB13	6.7	U	10/19/1993			
G008SB14	6	U	10/19/1993			
G008SB15	6.4	U	10/19/1993			
G008SB16	6.3	U	10/20/1993			
G008SB17	5.8	U	10/20/1993			
G008SB19	5.3	U	10/20/1993			
G008SB20	5.4	U	10/27/1993			
G008SB22	5.7	U	10/27/1993			
G008SB23	5.7	U	10/26/1993			
G008SB24	5.6	U	10/26/1993			
G008SB26	6.3	U	10/27/1993			
G008SB27	5.6	U	10/27/1993			
G008SB29	5.6	U	10/27/1993			
G008SB30	5.4	U	10/27/1993			
G008SB001	6	U	09/12/1996			
G008SB002	6	U	09/16/1996			
G636SB001	6	U	09/11/1996			
G636SB002	6	U	09/11/1996			
G636SB003	6	U	09/11/1996			
G636SB004	6	U	09/11/1996			
G636SB005	6	UJ	09/11/1996			

TABLE 5-9
Benzene Results in Surface Soil
RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration ($\mu\text{g}/\text{kg}$)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Mean Value ^b
G636SB006	6	U	09/12/1996			
G636SB008	6	U	09/12/1996			
G636SB009	6	U	09/12/1996			
GFDSSC012	100	=	12/04/1996			
GFDSSC014	8	UJ	12/05/1996			
GFDSSC016	12	UJ	12/04/1996			
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB09	6.4	U	10/18/1993			
G008SB11	6.4	U	10/19/1993			
G008SB12	6.1	U	10/19/1993			
G008SB18	5.7	U	10/20/1993			
G008SB21	5.4	U	10/27/1993			
G008SB25	5.6	U	10/27/1993			
G008SB28	5.4	U	10/27/1993			
G008SB31	6	U	10/27/1993			
G008SB003	6	UJ	09/16/1996			
G636SB007	8	U	09/12/1996			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=1. SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Mean value is calculated when using non-detects at half the laboratory detection limit.

$\mu\text{g}/\text{kg}$ Micrograms per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-10
 Ethylbenzene Results in Surface Soil
 RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (µg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Mean Value ^b
G008SB01	5.7	U	09/24/1993	780	700	23.6
G008SB02	6	U	09/25/1993			
G008SB03	5.7	U	09/25/1993			
G008SB04	5.9	U	09/27/1993			
G008SB05	7	UJ	09/29/1993			
G008SB06	5.4	U	09/30/1993			
G008SB07	6.2	U	10/18/1993			
G008SB08	6.5	U	10/18/1993			
G008SB10	6	U	10/18/1993			
G008SB13	6.7	U	10/19/1993			
G008SB14	6	U	10/19/1993			
G008SB15	6.4	U	10/19/1993			
G008SB16	6.3	U	10/20/1993			
G008SB17	5.8	U	10/20/1993			
G008SB19	5.3	U	10/20/1993			
G008SB20	5.4	U	10/27/1993			
G008SB22	5.7	U	10/27/1993			
G008SB23	5.7	U	10/26/1993			
G008SB24	5.6	U	10/26/1993			
G008SB26	6.3	U	10/27/1993			
G008SB27	5.6	U	10/27/1993			
G008SB29	5.6	U	10/27/1993			
G008SB30	5.4	U	10/27/1993			
G008SB001	6	U	09/12/1996			
G008SB002	6	U	09/16/1996			
G636SB001	6	U	09/11/1996			
G636SB002	6	U	09/11/1996			
G636SB003	6	U	09/11/1996			
G636SB004	6	U	09/11/1996			
G636SB005	6	UJ	09/11/1996			

TABLE 5-10
 Ethylbenzene Results in Surface Soil
 RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration ($\mu\text{g}/\text{kg}$)	Qualifier	Date Collected	EPA Region III Residential RBC (HI=0.1)	SSL ^a	Mean Value ^b
G636SB006	6	U	09/12/1996	780	700	23.6
G636SB008	6	U	09/12/1996			
G636SB009	6	U	09/12/1996			
GFDSSC012	740	=	12/04/1996			
GFDSSC014	8	UJ	12/05/1996			
GFDSSC016	12	UJ	12/04/1996			
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB09	6.4	U	10/18/1993			
G008SB11	6.4	U	10/19/1993			
G008SB12	6.1	U	10/19/1993			
G008SB18	5.7	U	10/20/1993			
G008SB21	5.4	U	10/27/1993			
G008SB25	5.6	U	10/27/1993			
G008SB28	5.4	U	10/27/1993			
G008SB31	6	U	10/27/1993			
G008SB003	6	UJ	09/16/1996			
G636SB007	8	U	09/12/1996			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=1. SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Mean value is calculated when using non-detects at half the laboratory detection limit.

$\mu\text{g}/\text{kg}$ Micrograms per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-11
 Antimony Results in Subsurface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G	Mean Value ^c
					Background Range of Concentrations ^b	
G008SB02	6.6	U	09/25/1993	2.5	1.5 - 19	6.14
G008SB03	32	=	09/25/1993			
G008SB19	6.1	UJ	10/20/1993			
G008SB20	6.2	UJ	10/27/1993			
G008SB22	23	J	10/26/1993			
G008SB23	5.7	UJ	10/26/1993			
G008SB24	21	J	10/26/1993			
G008SB26	6.1	UJ	10/27/1993			
G008SB27	6.7	UJ	10/27/1993			
G008SB30	6.3	UJ	10/27/1993			
G636SB002	0.38	UJ	09/11/1996			
G636SB003	0.41	UJ	09/11/1996			
G636SB004	1.3	UJ	09/11/1996			
G636SB005	0.39	UJ	09/11/1996			
G636SB009	0.71	U	09/12/1996			
G636SB013	0.65	J	01/10/1997			
G636SB014	0.39	U	01/10/1997			
G636SB015	4	J	12/17/1999			
G636SB016	0.74	UJ	12/17/1999			
G636SB018	0.32	U	01/26/2000			
G636SB019	47.5	=	01/26/2000			
G636SB024	0.53	U	07/12/2001			
G636SB025	1.2	J	07/12/2001			
G636SB026	0.53	U	07/12/2001			
G636SB027	0.52	U	07/12/2001			
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB11	8.6	UJ	10/19/1993			
G008SB12	5.7	UJ	10/19/1993			
G008SB21	5.9	UJ	10/27/1993			
G008SB25	5.7	UJ	10/27/1993			
G008SB28	6	UJ	10/27/1993			
G008SB31	7.6	J	10/27/1993			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

TABLE 5-11

Antimony Results in Subsurface Soil

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G	Mean Value ^c
					Background Range of Concentrations ^b	

^b Zone G Background Range of Concentrations were not available for antimony. Therefore, Zone H Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions -Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^c Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

NA Screening criteria not available for the referenced compound.

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-12
 Cadmium Results in Subsurface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
G008SB02	0.66	=	09/25/1993	4	0.08 - 0.52	1.06
G008SB03	5.9	=	09/25/1993			
G008SB19	0.61	U	10/20/1993			
G008SB20	1.6	=	10/27/1993			
G008SB22	1.2	=	10/26/1993			
G008SB23	2	=	10/26/1993			
G008SB24	1.2	=	10/26/1993			
G008SB26	0.61	U	10/27/1993			
G008SB27	0.67	U	10/27/1993			
G008SB30	0.63	U	10/27/1993			
G636SB002	0.05	U	09/11/1996			
G636SB003	0.29	J	09/11/1996			
G636SB004	0.39	J	09/11/1996			
G636SB005	0.67	=	09/11/1996			
G636SB009	0.46	J	09/12/1996			
G636SB013	0.1	J	01/10/1997			
G636SB014	0.19	J	01/10/1997			
G636SB015	0.58	U	12/17/1999			
G636SB016	0.03	U	12/17/1999			
G636SB018	0.18	U	01/26/2000			
G636SB019	9.2	=	01/26/2000			
G636SB024	0.09	U	07/12/2001			
G636SB025	0.91	J	07/12/2001			
G636SB026	0.09	U	07/12/2001			
G636SB027	0.12	U	07/12/2001			
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB11	0.86	U	10/19/1993			
G008SB12	2	=	10/19/1993			
G008SB21	1	=	10/27/1993			
G008SB25	0.57	U	10/27/1993			
G008SB28	0.6	U	10/27/1993			
G008SB31	0.76	U	10/27/1993			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical*

TABLE 5-12
 Cadmium Results in Subsurface Soil
RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
-----------------	-----------------------	-----------	----------------	------------------	--	-------------------------

Background Document (EPA, 1996).

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001)*.

^c Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-13
 Total Chromium Results in Subsurface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
G008SB02	34	=	09/25/1993	19	7.4 - 65	29
G008SB03	103	=	09/25/1993			
G008SB19	14	=	10/20/1993			
G008SB20	33	=	10/27/1993			
G008SB22	26	=	10/26/1993			
G008SB23	49	=	10/26/1993			
G008SB24	32	=	10/26/1993			
G008SB26	9.9	=	10/27/1993			
G008SB27	5.1	=	10/27/1993			
G008SB30	5.1	=	10/27/1993			
G636SB002	12.4	J	09/11/1996			
G636SB003	24.1	J	09/11/1996			
G636SB004	23.1	J	09/11/1996			
G636SB005	36.4	J	09/11/1996			
G636SB009	54.4	=	09/12/1996			
G636SB013	27	=	01/10/1997			
G636SB014	25.4	=	01/10/1997			
G636SB015	18.2	=	12/17/1999			
G636SB016	27.8	=	12/17/1999			
G636SB018	5.8	=	01/26/2000			
G636SB019	91.8	=	01/26/2000			
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB11	23	=	10/19/1993			
G008SB12	22	=	10/19/1993			
G008SB21	35	=	10/27/1993			
G008SB25	5.1	=	10/27/1993			
G008SB28	60	=	10/27/1993			
G008SB31	29	=	10/27/1993			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^c Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

TABLE 5-13
 Total Chromium Results in Subsurface Soil
RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
=	Indicates that the analyte is detected at the concentration shown.					
J	Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.					
U	Indicates the analyte was not detected above the laboratory detection limit.					

TABLE 5-14
 Lead Results in Subsurface Soil
 RFI Report and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
G008SB02	9.8	=	09/25/1993	400	2.4-76	201.3
G008SB03	1,400	=	09/25/1993			
G008SB19	120	J	10/20/1993			
G008SB20	47	=	10/27/1993			
G008SB22	390	J	10/26/1993			
G008SB23	38	=	10/26/1993			
G008SB24	310	J	10/26/1993			
G008SB26	19	J	10/27/1993			
G008SB27	2.4	J	10/27/1993			
G008SB30	5	J	10/27/1993			
G636SB002	13.7	J	09/11/1996			
G636SB003	40.1	J	09/11/1996			
G636SB004	93.2	J	09/11/1996			
G636SB005	19	J	09/11/1996			
G636SB009	60.1	=	09/12/1996			
G636SB013	42.1	=	01/10/1997			
G636SB014	78	=	01/10/1997			
G636SB015	883	=	12/17/1999			
G636SB016	30.3	=	12/17/1999			
G636SB018	2.8	=	01/26/2000			
G636SB019	1,250	=	01/26/2000			
G636SB024	3.7	=	07/12/2001			
G636SB025	170	=	07/12/2001			
G636SB026	3.1	=	07/12/2001			
G636SB027	2.7	=	07/12/2001			

Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area

G008SB11	40	J	10/19/1993
G008SB12	630	J	10/19/1993
G008SB21	37	=	10/27/1993
G008SB25	3	J	10/27/1993
G008SB28	140	J	10/27/1993
G008SB31	20	J	10/27/1993

TABLE 5-14
 Lead Results in Subsurface Soil
RFI Report and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
-----------------	-----------------------	-----------	----------------	------------------	--	-------------------------

^a A screening level of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* (USEPA, 1994).

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001)*.

^c Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-15
 Nickel Results in Subsurface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
G008SB02	16	=	09/25/1993	65	1.9-22	17
G008SB03	79	=	09/25/1993			
G008SB19	5.8	=	10/20/1993			
G008SB20	11	=	10/27/1993			
G008SB22	32	=	10/26/1993			
G008SB23	16	=	10/26/1993			
G008SB24	21	=	10/26/1993			
G008SB26	4.9	U	10/27/1993			
G008SB27	5.3	U	10/27/1993			
G008SB30	5.1	=	10/27/1993			
G636SB002	1.6	J	09/11/1996			
G636SB003	9	=	09/11/1996			
G636SB004	9	=	09/11/1996			
G636SB005	11.9	=	09/11/1996			
G636SB009	17.1	=	09/12/1996			
G636SB013	8.3	=	01/10/1997			
G636SB014	8.7	=	01/10/1997			
G636SB015	12.1	J	12/17/1999			
G636SB016	9.1	J	12/17/1999			
G636SB018	2.2	J	01/26/2000			
G636SB019	76.7	=	01/26/2000			
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB11	8.9	=	10/19/1993			
G008SB12	22	=	10/19/1993			
G008SB21	14	=	10/27/1993			
G008SB25	4.5	U	10/27/1993			
G008SB28	14	=	10/27/1993			
G008SB31	10	=	10/27/1993			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

^c Mean value is calculated when using non-detects at half the laboratory detection limit. Concentrations in bold and outlined text exceed the appropriate screening criteria.

TABLE 5-15
 Nickel Results in Subsurface Soil
RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL^a	Zone G Background Range of Concentrations^b	Mean Value^c
mg/kg	milligrams per kilogram					
=	Indicates that the analyte is detected at the concentration shown.					
J	Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.					
U	Indicates the analyte was not detected above the laboratory detection limit.					

TABLE 5-16
 Thallium Results in Subsurface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Zone G Background Range of Concentrations ^b	Mean Value ^c
G008SB02	6.6	UJ	09/25/1993	0.35	1.0	0.85
G008SB03	1.3	UJ	09/25/1993			
G008SB19	1.2	U	10/20/1993			
G008SB20	1.2	U	10/27/1993			
G008SB22	1.2	U	10/26/1993			
G008SB23	7.5	U	10/26/1993			
G008SB24	1.1	U	10/26/1993			
G008SB26	1.2	UJ	10/27/1993			
G008SB27	1.3	U	10/27/1993			
G008SB30	1.3	U	10/27/1993			
G636SB002	0.43	UJ	09/11/1996			
G636SB003	0.61	J	09/11/1996			
G636SB004	0.47	UJ	09/11/1996			
G636SB005	0.88	J	09/11/1996			
G636SB009	1	J	09/12/1996			
G636SB013	0.9	J	01/10/1997			
G636SB014	0.54	J	01/10/1997			
G636SB015	0.23	UJ	12/17/1999			
G636SB016	0.25	UJ	12/17/1999			
G636SB018	0.4	U	01/26/2000			
G636SB019	3.8	=	01/26/2000			
G636SB024	0.6	U	07/12/2001			
G636SB025	0.7	U	07/12/2001			
G636SB026	0.61	U	07/12/2001			
G636SB027	0.6	U	07/12/2001			
G636SB028	0.59	U	07/12/2001			
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
G008SB11	1.7	U	10/19/1993			
G008SB12	1.1	U	10/19/1993			
G008SB21	1.2	U	10/27/1993			
G008SB25	1.1	U	10/27/1993			
G008SB28	1.2	UJ	10/27/1993			
G008SB31	1.5	UJ	10/27/1993			

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

TABLE 5-16

Thallium Results in Subsurface Soil

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL^a	Zone G Background Range of Concentrations^b	Mean Value^c
------------------------	------------------------------	------------------	-----------------------	------------------------	--	-------------------------------

^b Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001)*.

^c Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-17
 Acetone Results in Subsurface Soil
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration ($\mu\text{g}/\text{kg}$)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
G008SB02	66	=	09/25/1993	800	199.3
G008SB03	160	=	09/25/1993		
G008SB19	29	J	10/20/1993		
G008SB20	170	=	10/27/1993		
G008SB22	200	=	10/26/1993		
G008SB23	1,100	=	10/26/1993		
G008SB24	220	=	10/26/1993		
G008SB26	220	=	10/27/1993		
G008SB27	67	U	10/27/1993		
G008SB30	663	U	10/27/1993		
G636SB002	48	U	09/11/1996		
G636SB003	100	U	09/11/1996		
G636SB004	620	U	09/11/1996		
G636SB005	65	U	09/11/1996		
G636SB009	85	U	09/12/1996		
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area					
G008SB11	170	=	10/19/1993		
G008SB12	7,400	U	10/19/1993		
G008SB21	76	=	10/27/1993		
G008SB25	140	=	10/27/1993		
G008SB28	60	U	10/27/1993		
G008SB31	160	=	10/27/1993		

^a Generic soil to groundwater soil screening level (SSL) with a DAF=1. SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

$\mu\text{g}/\text{kg}$ Micrograms per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-18
 1,1,2,2-PCA in Subsurface Soil
 RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration ($\mu\text{g}/\text{kg}$)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
G008SB02	6.6	U	09/25/1993	0.2	4.5
G008SB03	6.3	U	09/25/1993		
G008SB19	6.1	U	10/20/1993		
G008SB20	6.2	U	10/27/1993		
G008SB22	5.7	U	10/26/1993		
G008SB23	37	U	10/26/1993		
G008SB24	5.4	U	10/26/1993		
G008SB26	6.2	U	10/27/1993		
G008SB27	6.7	U	10/27/1993		
G008SB30	6.3	U	10/27/1993		
G636SB002	6	U	09/11/1996		
G636SB003	7	U	09/11/1996		
G636SB004	7	UJ	09/11/1996		
G636SB005	6	U	09/11/1996		
G636SB009	10	J	09/12/1996		
G636SB028	5.1	U	07/12/2001		
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area					
G008SB11	7.6	U	10/19/1993		
G008SB12	740	U	10/19/1993		
G008SB21	5.9	U	10/27/1993		
G008SB25	5.7	U	10/27/1993		
G008SB28	6	U	10/27/1993		
G008SB31	7.6	U	10/27/1993		

^a Generic soil to groundwater soil screening level (SSL) with a DAF=1. SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

$\mu\text{g}/\text{kg}$ Micrograms per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-19
1,1,2-TCA Results in Subsurface Soil
RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Concentration ($\mu\text{g}/\text{kg}$)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
G008SB02	6.6	U	09/25/1993	0.9	10.3
G008SB03	6.3	U	09/25/1993		
G008SB19	6.1	U	10/20/1993		
G008SB20	6.2	U	10/27/1993		
G008SB22	92	=	10/26/1993		
G008SB23	37	U	10/26/1993		
G008SB24	5.4	U	10/26/1993		
G008SB26	6.2	U	10/27/1993		
G008SB27	6.7	U	10/27/1993		
G008SB30	6.3	U	10/27/1993		
G636SB002	6	U	09/11/1996		
G636SB003	7	U	09/11/1996		
G636SB004	7	UJ	09/11/1996		
G636SB005	6	U	09/11/1996		
G636SB009	12	U	09/12/1996		
Historic Subsurface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area					
G008SB11	7.6	U	10/19/1993		
G008SB12	740	U	10/19/1993		
G008SB21	5.9	U	10/27/1993		
G008SB25	5.7	U	10/27/1993		
G008SB28	6	U	10/27/1993		
G008SB31	7.6	U	10/27/1993		

^a Generic soil to groundwater soil screening level (SSL) with a DAF=1. SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

$\mu\text{g}/\text{kg}$ Micrograms per kilogram

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-20
 BEHP Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GSP01	008GSP0101a	10	U	08/03/1999	6	4.8	NA
G008GSP02	008GSP0201a	10	U	08/03/1999			
G008GSP03	008GSP0301b	10	U	08/03/1999			
G008GSP04	008GSP0401b	10	U	08/03/1999			
G008GSP05	008GSP0501a	10	U	08/03/1999			
G008GSP06	008GSP0601	12	UJ	08/04/1999			
G008GSP07	008GSP0701	10	U	08/04/1999			
G008GSP08	008GSP0801	10	U	08/04/1999			
G008GSP09	008GSP0901	10	U	08/04/1999			
G008GSP10	008GSP1001	7	J	08/05/1999			
G008GSP11	008GSP1101	4	J	08/05/1999			
G008GSP12	008GSP1201	1	J	08/05/1999			
G008GSP13	008GSP1301	5	J	08/05/1999			
G008GSP14	008GSP1401	4	J	08/05/1999			
G008GSP15	008GSP1501	8	J	08/05/1999			
G008GSP16	008GSP1601	5	J	08/05/1999			
G008GSP18	008GSP1801	5	J	08/05/1999			
G008GW001	008GW001M6	10	U	06/21/2002			
G008GW001	008G000110	10	UJ	07/19/2000			
G008GW001	008GW00104	10	U	12/08/1997			
G008GW001	008GW00103	10	U	09/13/1997			
G008GW001	008GW00102	10	U	05/20/1997			
G008GW001	008GW00101	10	U	11/15/1996			
G008GW002	008GW00204	10	U	12/09/1997			
G008GW002	008GW00203	10	U	09/14/1997			
G008GW002	008GW00202	11	U	05/21/1997			
G008GW002	008GW00201	13	U	11/15/1996			
G008GW003	008GW00304	10	U	12/11/1997			
G008GW003	008GW00303	10	U	09/14/1997			

TABLE 5-20
 BEHP Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW003	008GW00302	55	U	05/21/1997	6	4.8	NA
G008GW003	008GW00301	10	U	11/15/1996			
G008GW004	008GW004M6	10	U	06/20/2002			
G008GW004	008GW00404	10	U	12/09/1997			
G008GW004	008GW00403	10	U	09/13/1997			
G008GW004	008GW00402	10	U	05/22/1997			
G008GW004	008GW00401	46	=	11/15/1996			
G008GW04D	008GW04DM7	1	J	08/22/2002			
G008GW005	008GW005M6	10	U	06/21/2002			
G008GW005	008GW00504	10	U	12/08/1997			
G008GW005	008GW00503	10	U	09/14/1997			
G008GW005	008GW00502	10	U	05/23/1997			
G008GW005	008GW00501	14	U	11/15/1996			
G008GW006	008GW00604	10	U	12/09/1997			
G008GW006	008GW00603	10	U	09/14/1997			
G008GW006	008GW00602	10	U	05/22/1997			
G008GW006	008GW00601	10	U	11/15/1996			
G636GW001	636GW001M6	10	U	06/20/2002			
G636GW001	636GW00104	10	U	12/11/1997			
G636GW001	636GW00103	10	U	09/16/1997			
G636GW001	636GW00102	10	U	05/22/1997			
G636GW001	636GW00101	10	U	11/15/1996			
GFDSGW02A	FDSGW02A02	12	U	05/30/1997			
GFDSGW02A	FDSGW02A01	2	J	01/16/1997			
GFDSGW02C	FDSGW02C02	11	U	05/30/1997			
GFDSGW02C	FDSGW02C01	1	J	01/16/1997			
GFDSGW03B	FDSGW03B02	10	U	06/02/1997			
GFDSGW03B	FDSGW03B01	10	U	01/15/1997			
GFDSGW03C	FDSGW03C02	10	U	06/04/1997			

TABLE 5-20
 BEHP Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
GFDSGW03C	FDSGW03C01	10	U	01/15/1997	6	4.8	NA

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex*,

Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-21
 Benzo[a]Anthracene Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GSP01	008GSP0101a	10	U	08/03/1999	NA	0.092	NA
G008GSP02	008GSP0201a	10	U	08/03/1999			
G008GSP03	008GSP0301b	10	U	08/03/1999			
G008GSP04	008GSP0401b	10	U	08/03/1999			
G008GSP05	008GSP0501a	10	U	08/03/1999			
G008GSP06	008GSP0601	12	UJ	08/04/1999			
G008GSP07	008GSP0701	10	U	08/04/1999			
G008GSP08	008GSP0801	10	U	08/04/1999			
G008GSP09	008GSP0901	10	U	08/04/1999			
G008GSP10	008GSP1001	10	U	08/05/1999			
G008GSP11	008GSP1101	2	J	08/05/1999			
G008GSP12	008GSP1201	1	J	08/05/1999			
G008GSP13	008GSP1301	10	U	08/05/1999			
G008GSP14	008GSP1401	10	U	08/05/1999			
G008GSP15	008GSP1501	10	U	08/05/1999			
G008GSP16	008GSP1601	10	U	08/05/1999			
G008GSP18	008GSP1801	10	U	08/05/1999			
G008GW001	008GW001M6	10	U	06/21/2002			
G008GW001	008G000110	10	U	07/19/2000			
G008GW001	008GW00104	10	U	12/08/1997			
G008GW001	008GW00103	10	U	09/13/1997			
G008GW001	008GW00102	10	U	05/20/1997			
G008GW001	008GW00101	10	U	11/15/1996			
G008GW002	008GW00204	10	U	12/09/1997			
G008GW002	008GW00203	10	U	09/14/1997			
G008GW002	008GW00202	11	U	05/21/1997			
G008GW002	008GW00201	10	U	11/15/1996			
G008GW003	008GW00304	10	U	12/11/1997			
G008GW003	008GW00303	10	U	09/14/1997			

TABLE 5-21
 Benzo[a]Anthracene Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW003	008GW00302	11	U	05/21/1997	NA	0.092	NA
G008GW003	008GW00301	10	U	11/15/1996			
G008GW004	008GW004M6	10	U	06/20/2002			
G008GW004	008GW00404	10	U	12/09/1997			
G008GW004	008GW00403	10	U	09/13/1997			
G008GW004	008GW00402	10	U	05/22/1997			
G008GW004	008GW00401	10	U	11/15/1996			
G008GW04D	008GW04DM7	10	U	08/22/2002			
G008GW005	008GW005M6	10	U	06/21/2002			
G008GW005	008GW00504	10	U	12/08/1997			
G008GW005	008GW00503	10	U	09/14/1997			
G008GW005	008GW00502	10	U	05/23/1997			
G008GW005	008GW00501	10	U	11/15/1996			
G008GW006	008GW00604	10	U	12/09/1997			
G008GW006	008GW00603	10	U	09/14/1997			
G008GW006	008GW00602	10	U	05/22/1997			
G008GW006	008GW00601	10	U	11/15/1996			
G636GW001	636GW001M6	10	U	06/20/2002			
G636GW001	636GW00104	10	U	12/11/1997			
G636GW001	636GW00103	10	U	09/16/1997			
G636GW001	636GW00102	10	U	05/22/1997			
G636GW001	636GW00101	10	U	11/15/1996			
GFDSGW02A	FDSGW02ALA	1.1	U	06/13/2001			
GFDSGW02A	FDSGW02A02	12	U	05/30/1997			
GFDSGW02A	FDSGW02A01	10	U	01/16/1997			
GFDSGW02C	FDSGW02C02	11	U	05/30/1997			
GFDSGW02C	FDSGW02C01	10	U	01/16/1997			
GFDSGW03B	FDSGW03B02	10	U	06/02/1997			
GFDSGW03B	FDSGW03B01	10	U	01/15/1997			

TABLE 5-21

Benzo[a]Anthracene Results in Groundwater

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration ($\mu\text{g/L}$)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
GFDSGW03C	FDSGW03C02	10	U	06/04/1997	NA	0.092	NA
GFDSGW03C	FDSGW03C01	10	U	01/15/1997			

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex*,

Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-22

Benzo[a]Pyrene Results in Groundwater

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GSP01	008GSP0101a	10	U	08/03/1999	0.2	0.00092	NA
G008GSP02	008GSP0201a	10	U	08/03/1999			
G008GSP03	008GSP0301b	10	U	08/03/1999			
G008GSP04	008GSP0401b	10	U	08/03/1999			
G008GSP05	008GSP0501a	10	U	08/03/1999			
G008GSP06	008GSP0601	12	UJ	08/04/1999			
G008GSP07	008GSP0701	10	U	08/04/1999			
G008GSP08	008GSP0801	10	U	08/04/1999			
G008GSP09	008GSP0901	10	U	08/04/1999			
G008GSP10	008GSP1001	10	U	08/05/1999			
G008GSP11	008GSP1101	1	J	08/05/1999			
G008GSP12	008GSP1201	10	U	08/05/1999			
G008GSP13	008GSP1301	10	U	08/05/1999			
G008GSP14	008GSP1401	10	U	08/05/1999			
G008GSP15	008GSP1501	10	U	08/05/1999			
G008GSP16	008GSP1601	10	U	08/05/1999			
G008GSP18	008GSP1801	10	U	08/05/1999			
G008GW001	008GW001M6	0.65	J	06/21/2002			
G008GW001	008G000110	10	U	07/19/2000			
G008GW001	008GW00104	10	U	12/08/1997			
G008GW001	008GW00103	10	U	09/13/1997			
G008GW001	008GW00102	10	U	05/20/1997			
G008GW001	008GW00101	10	U	11/15/1996			
G008GW002	008GW00204	10	U	12/09/1997			
G008GW002	008GW00203	10	U	09/14/1997			
G008GW002	008GW00202	11	U	05/21/1997			
G008GW002	008GW00201	10	U	11/15/1996			
G008GW003	008GW00304	10	U	12/11/1997			
G008GW003	008GW00303	10	U	09/14/1997			

TABLE 5-22

Benzof[a]Pyrene Results in Groundwater

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW003	008GW00302	11	U	05/21/1997	0.2	0.00092	NA
G008GW003	008GW00301	10	U	11/15/1996			
G008GW004	008GW004M6	10	U	06/20/2002			
G008GW004	008GW00404	10	U	12/09/1997			
G008GW004	008GW00403	10	U	09/13/1997			
G008GW004	008GW00402	10	U	05/22/1997			
G008GW004	008GW00401	10	U	11/15/1996			
G008GW04D	008GW04DM7	10	U	08/22/2002			
G008GW005	008GW005M6	0.47	J	06/21/2002			
G008GW005	008GW00504	10	U	12/08/1997			
G008GW005	008GW00503	10	U	09/14/1997			
G008GW005	008GW00502	10	U	05/23/1997			
G008GW005	008GW00501	10	U	11/15/1996			
G008GW006	008GW00604	10	U	12/09/1997			
G008GW006	008GW00603	10	U	09/14/1997			
G008GW006	008GW00602	10	U	05/22/1997			
G008GW006	008GW00601	10	U	11/15/1996			
G636GW001	636GW001M6	10	U	06/20/2002			
G636GW001	636GW00104	10	U	12/11/1997			
G636GW001	636GW00103	10	U	09/16/1997			
G636GW001	636GW00102	10	U	05/22/1997			
G636GW001	636GW00101	10	U	11/15/1996			
GFDSGW02A	FDSGW02ALA	1.1	U	06/13/2001			
GFDSGW02A	FDSGW02A02	12	U	05/30/1997			
GFDSGW02A	FDSGW02A01	10	U	01/16/1997			
GFDSGW02C	FDSGW02C02	11	U	05/30/1997			
GFDSGW02C	FDSGW02C01	10	U	01/16/1997			
GFDSGW03B	FDSGW03B02	10	U	06/02/1997			
GFDSGW03B	FDSGW03B01	10	U	01/15/1997			

TABLE 5-22

Benzo[a]Pyrene Results in Groundwater

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
GFDSGW03C	FDSGW03C02	10	U	06/04/1997	0.2	0.00092	NA
GFDSGW03C	FDSGW03C01	10	U	01/15/1997			

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex*,

Environmental Restoration Project, Revision 1A (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-23

Benzo[a]Fluoranthene Results in Groundwater

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GSP01	008GSP0101a	10	U	08/03/1999	NA	0.092	NA
G008GSP02	008GSP0201a	10	U	08/03/1999			
G008GSP03	008GSP0301b	10	U	08/03/1999			
G008GSP04	008GSP0401b	10	U	08/03/1999			
G008GSP05	008GSP0501a	10	U	08/03/1999			
G008GSP06	008GSP0601	12	UJ	08/04/1999			
G008GSP07	008GSP0701	10	U	08/04/1999			
G008GSP08	008GSP0801	10	U	08/04/1999			
G008GSP09	008GSP0901	10	U	08/04/1999			
G008GSP10	008GSP1001	10	U	08/05/1999			
G008GSP11	008GSP1101	1	J	08/05/1999			
G008GSP12	008GSP1201	10	U	08/05/1999			
G008GSP13	008GSP1301	10	U	08/05/1999			
G008GSP14	008GSP1401	10	U	08/05/1999			
G008GSP15	008GSP1501	10	U	08/05/1999			
G008GSP16	008GSP1601	10	U	08/05/1999			
G008GSP18	008GSP1801	10	U	08/05/1999			
G008GW001	008GW001M6	0.47	J	06/21/2002			
G008GW001	008G000110	10	U	07/19/2000			
G008GW001	008GW00101	10	U	11/15/1996			
G008GW001	008GW00102	10	U	05/20/1997			
G008GW001	008GW00103	10	U	09/13/1997			
G008GW001	008GW00104	10	U	12/08/1997			
G008GW002	008GW00201	10	U	11/15/1996			
G008GW002	008GW00202	11	U	05/21/1997			
G008GW002	008GW00203	10	U	09/14/1997			
G008GW002	008GW00204	10	U	12/09/1997			
G008GW003	008GW00301	10	U	11/15/1996			
G008GW003	008GW00302	11	U	05/21/1997			

TABLE 5-23
 Benzo[a]Fluoranthene Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW003	008GW00303	10	U	09/14/1997	NA	0.092	NA
G008GW003	008GW00304	10	U	12/11/1997			
G008GW004	008GW004M6	10	U	06/20/2002			
G008GW004	008GW00401	10	U	11/15/1996			
G008GW004	008GW00402	10	U	05/22/1997			
G008GW004	008GW00403	10	U	09/13/1997			
G008GW004	008GW00404	10	U	12/09/1997			
G008GW04D	008GW04DM7	10	U	08/22/2002			
G008GW005	008GW005M6	0.35	J	06/21/2002			
G008GW005	008GW00501	10	U	11/15/1996			
G008GW005	008GW00502	10	U	05/23/1997			
G008GW005	008GW00503	10	U	09/14/1997			
G008GW005	008GW00504	10	U	12/08/1997			
G008GW006	008GW00601	10	U	11/15/1996			
G008GW006	008GW00602	10	U	05/22/1997			
G008GW006	008GW00603	10	U	09/14/1997			
G008GW006	008GW00604	10	U	12/09/1997			
G636GW001	636GW001M6	10	U	06/20/2002			
G636GW001	636GW00101	10	U	11/15/1996			
G636GW001	636GW00102	10	U	05/22/1997			
G636GW001	636GW00103	10	U	09/16/1997			
G636GW001	636GW00104	10	U	12/11/1997			
GFDSGW02A	FDSGW02ALA	1.1	UJ	06/13/2001			
GFDSGW02A	FDSGW02A01	10	U	01/16/1997			
GFDSGW02A	FDSGW02A02	12	U	05/30/1997			
GFDSGW02C	FDSGW02C01	10	U	01/16/1997			
GFDSGW02C	FDSGW02C02	11	U	05/30/1997			
GFDSGW03B	FDSGW03B01	10	U	01/15/1997			
GFDSGW03B	FDSGW03B02	10	U	06/02/1997			

TABLE 5-23
 Benzo[a]Fluoranthene Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
GFDSGW03C	FDSGW03C01	10	U	01/15/1997	NA	0.092	NA
GFDSGW03C	FDSGW03C02	10	U	06/04/1997			

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-24
 Naphthalene Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GSP01	008GSP0101a	10	U	08/03/1999	NA	0.65	NA
G008GSP02	008GSP0201a	10	U	08/03/1999			
G008GSP03	008GSP0301b	10	U	08/03/1999			
G008GSP04	008GSP0401b	10	U	08/03/1999			
G008GSP05	008GSP0501a	10	U	08/03/1999			
G008GSP06	008GSP0601	12	UJ	08/04/1999			
G008GSP07	008GSP0701	10	U	08/04/1999			
G008GSP08	008GSP0801	10	U	08/04/1999			
G008GSP09	008GSP0901	1	J	08/04/1999			
G008GSP10	008GSP1001	10	U	08/05/1999			
G008GSP11	008GSP1101	10	U	08/05/1999			
G008GSP12	008GSP1201	10	U	08/05/1999			
G008GSP13	008GSP1301	3	J	08/05/1999			
G008GSP14	008GSP1401	10	U	08/05/1999			
G008GSP15	008GSP1501	28	=	08/05/1999			
G008GSP16	008GSP1601	5	J	08/05/1999			
G008GSP18	008GSP1801	10	U	08/05/1999			
G008GW001	008GW001M6	10	U	06/21/2002			
G008GW001	008G000110	10	U	07/19/2000			
G008GW001	008GW00104	10	U	12/08/1997			
G008GW001	008GW00103	10	U	09/13/1997			
G008GW001	008GW00102	10	U	05/20/1997			
G008GW001	008GW00101	10	U	11/15/1996			
G008GW002	008GW00204	10	U	12/09/1997			
G008GW002	008GW00203	10	U	09/14/1997			
G008GW002	008GW00202	1	J	05/21/1997			
G008GW002	008GW00201	2	J	11/15/1996			
G008GW003	008GW00304	10	U	12/11/1997			
G008GW003	008GW00303	10	U	09/14/1997			

TABLE 5-24
 Naphthalene Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW003	008GW00302	11	U	05/21/1997	NA	0.65	NA
G008GW003	008GW00301	10	U	11/15/1996			
G008GW004	008GW004M6	10	U	06/20/2002			
G008GW004	008GW00404	10	U	12/09/1997			
G008GW004	008GW00403	10	U	09/13/1997			
G008GW004	008GW00402	10	U	05/22/1997			
G008GW004	008GW00401	10	U	11/15/1996			
G008GW04D	008GW04DM7	10	U	08/22/2002			
G008GW005	008GW005M6	10	U	06/21/2002			
G008GW005	008GW00504	10	U	12/08/1997			
G008GW005	008GW00503	10	U	09/14/1997			
G008GW005	008GW00502	10	U	05/23/1997			
G008GW005	008GW00501	10	U	11/15/1996			
G008GW006	008GW00604	10	U	12/09/1997			
G008GW006	008GW00603	5	J	09/14/1997			
G008GW006	008GW00602	10	U	05/22/1997			
G008GW006	008GW00601	10	U	11/15/1996			
G636GW001	636GW001M6	10	U	06/20/2002			
G636GW001	636GW00104	10	U	12/11/1997			
G636GW001	636GW00103	10	U	09/16/1997			
G636GW001	636GW00102	10	U	05/22/1997			
G636GW001	636GW00101	10	U	11/15/1996			
GFDSGW02A	FDSGW02ALA	1.1	U	06/13/2001			
GFDSGW02A	FDSGW02A02	12	U	05/30/1997			
GFDSGW02A	FDSGW02A01	10	U	01/16/1997			
GFDSGW02C	FDSGW02C02	11	U	05/30/1997			
GFDSGW02C	FDSGW02C01	10	U	01/16/1997			
GFDSGW03B	FDSGW03B02	10	U	06/02/1997			
GFDSGW03B	FDSGW03B01	10	U	01/15/1997			

TABLE 5-24

Naphthalene Results in Groundwater

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
GFDSGW03C	FDSGW03C02	10	U	06/04/1997	NA	0.65	NA
GFDSGW03C	FDSGW03C01	10	U	01/15/1997			

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001). Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-25
 Antimony Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW001	008GW001M1	5	U	03/30/2002	6	1.5	3-6
G008GW001	008G000110	5	U	07/19/2000			
G008GW001	008GW00104	5.7	U	12/08/1997			
G008GW001	008GW00103	5.93	U	09/13/1997			
G008GW001	008GW00102	8.1	U	05/20/1997			
G008GW001	008GW00101	2.1	U	11/15/1996			
G008GW002	008GW002M1	5	U	03/30/2002			
G008GW002	008GW00204	2.6	U	12/09/1997			
G008GW002	008GW00203	1.6	U	09/14/1997			
G008GW002	008GW00202	3.4	U	05/21/1997			
G008GW002	008GW00201	2.1	U	11/15/1996			
G008GW003	008GW003M1	11	J	03/29/2002			
G008GW003	008GW00304	15.4	U	12/11/1997			
G008GW003	008GW00303	9.7	U	09/14/1997			
G008GW003	008GW00302	12.6	J	05/21/1997			
G008GW003	008GW00301	22.6	J	11/15/1996			
G008GW004	008GW004M1	5	U	03/28/2002			
G008GW004	008GW00404	5.4	U	12/09/1997			
G008GW004	008GW00403	1.6	U	09/13/1997			
G008GW004	008GW00402	1.7	U	05/22/1997			
G008GW004	008GW00401	2.1	U	11/15/1996			
G008GW005	008GW005M1	5	U	03/30/2002			
G008GW005	008GW00504	3.1	U	12/08/1997			
G008GW005	008GW00503	1.6	U	09/14/1997			
G008GW005	008GW00502	2.8	U	05/23/1997			
G008GW005	008GW00501	2.1	U	11/15/1996			
G008GW006	008GW006M1	5	U	03/30/2002			
G008GW006	008GW00604	1.6	U	12/09/1997			
G008GW006	008GW00603	1.6	U	09/14/1997			

TABLE 5-25
Antimony Results in Groundwater
RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW006	008GW00602	2.7	U	05/22/1997	6	1.5	3-6
G008GW006	008GW00601	2.1	U	11/15/1996			
G636GW001	636GW00104	6.5	U	12/11/1997			
G636GW001	636GW00103	3.6	U	09/16/1997			
G636GW001	636GW00102	3.7	U	05/22/1997			
G636GW001	636GW00101	2.1	U	11/15/1996			
GFDSGW02A	FDSGW02A02	1.6	U	05/30/1997			
GFDSGW02A	FDSGW02A01	2.1	U	01/16/1997			
GFDSGW02C	FDSGW02C02	1.6	U	05/30/1997			
GFDSGW02C	FDSGW02C01	2.1	J	01/16/1997			
GFDSGW03B	FDSGW03B02	1.6	U	06/02/1997			
GFDSGW03B	FDSGW03B01	2.1	U	01/15/1997			
GFDSGW03C	FDSGW03C02	3.1	U	06/04/1997			
GFDSGW03C	FDSGW03C01	2.1	U	01/15/1997			

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L. micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-26
 Barium Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC(HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW001	008GW001M6	57	J	06/21/2002	2,000	260	14-937
G008GW001	008GW001M1	57	J	03/30/2002			
G008GW001	008G000110	74	=	07/19/2000			
G008GW001	008GW00104	33.9	J	12/08/1997			
G008GW001	008GW00103	38.3	J	09/13/1997			
G008GW001	008GW00102	66.8	J	05/20/1997			
G008GW001	008GW00101	40.6	=	11/15/1996			
G008GW002	008GW002M1	480	=	03/30/2002			
G008GW002	008GW00204	404	J	12/09/1997			
G008GW002	008GW00203	645	J	09/14/1997			
G008GW002	008GW00202	739	J	05/21/1997			
G008GW002	008GW00201	1,520	=	11/15/1996			
G008GW003	008GW003M1	75	J	03/29/2002			
G008GW003	008GW00304	57.1	J	12/11/1997			
G008GW003	008GW00303	93.9	J	09/14/1997			
G008GW003	008GW00302	69.6	J	05/21/1997			
G008GW003	008GW00301	67.5	=	11/15/1996			
G008GW004	008GW004M6	89	J	06/20/2002			
G008GW004	008GW004M1	88	J	03/28/2002			
G008GW004	008GW00404	67.6	J	12/09/1997			
G008GW004	008GW00403	78.8	J	09/13/1997			
G008GW004	008GW00402	70	J	05/22/1997			
G008GW004	008GW00401	74.5	=	11/15/1996			
G008GW005	008GW005M6	140	J	06/21/2002			
G008GW005	008GW005M1	120	J	03/30/2002			
G008GW005	008GW00504	15.6	J	12/08/1997			
G008GW005	008GW00503	23.8	J	09/14/1997			
G008GW005	008GW00502	18.9	J	05/23/1997			
G008GW005	008GW00501	23.5	=	11/15/1996			

TABLE 5-26

Barium Results in Groundwater

RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC(HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW006	008GW006M1	100	J	03/30/2002	2,000	260	14-937
G008GW006	008GW00604	7.9	J	12/09/1997			
G008GW006	008GW00603	17.8	U	09/14/1997			
G008GW006	008GW00602	12.5	J	05/22/1997			
G008GW006	008GW00601	11.9	=	11/15/1996			
G636GW001	636GW001M6	62	J	06/20/2002			
G636GW001	636GW00104	77.8	J	12/11/1997			
G636GW001	636GW00103	106	=	09/16/1997			
G636GW001	636GW00102	35.5	J	05/22/1997			
G636GW001	636GW00101	56.7	=	11/15/1996			
GFDSGW02A	FDSGW02A02	115	=	05/30/1997			
GFDSGW02A	FDSGW02A01	40	J	01/16/1997			
GFDSGW02C	FDSGW02C02	24.8	=	05/30/1997			
GFDSGW02C	FDSGW02C01	38	J	01/16/1997			
GFDSGW03B	FDSGW03B02	25	=	06/02/1997			
GFDSGW03B	FDSGW03B01	36.3	J	01/15/1997			
GFDSGW03C	FDSGW03C02	23.8	=	06/04/1997			
GFDSGW03C	FDSGW03C01	38.4	J	01/15/1997			

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-27
Iron Results in Groundwater
RFI Report and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW001	008GW001M1	970	=	03/30/2002	NA	1,100	2,000-35,700
G008GW001	008G000110	41,000	=	07/19/2000			
G008GW001	008GW00104	1,620	J	12/08/1997			
G008GW001	008GW00103	2,000	J	09/13/1997			
G008GW001	008GW00102	1,400	J	05/20/1997			
G008GW001	008GW00101	6,200	=	11/15/1996			
G008GW002	008GW002M1	5,100	=	03/30/2002			
G008GW002	008GW00204	558	J	12/09/1997			
G008GW002	008GW00203	3,090	J	09/14/1997			
G008GW002	008GW00202	1,380	J	05/21/1997			
G008GW002	008GW00201	3,830	=	11/15/1996			
G008GW003	008GW003M1	710	=	03/29/2002			
G008GW003	008GW00304	482	J	12/11/1997			
G008GW003	008GW00303	1,530	J	09/14/1997			
G008GW003	008GW00302	1,250	J	05/21/1997			
G008GW003	008GW00301	1,100	=	11/15/1996			
G008GW004	008GW004M1	23,000	=	03/28/2002			
G008GW004	008GW00404	8,050	J	12/09/1997			
G008GW004	008GW00403	7,620	J	09/13/1997			
G008GW004	008GW00402	14,400	J	05/22/1997			
G008GW004	008GW00401	11,400	=	11/15/1996			
G008GW005	008GW005M1	32,000	=	03/30/2002			
G008GW005	008GW00504	7,390	J	12/08/1997			
G008GW005	008GW00503	8,330	J	09/14/1997			
G008GW005	008GW00502	8,760	J	05/23/1997			
G008GW005	008GW00501	15,800	=	11/15/1996			
G008GW006	008GW006M1	27,000	=	03/30/2002			
G008GW006	008GW00604	4,010	J	12/09/1997			
G008GW006	008GW00603	10,400	J	09/14/1997			

TABLE 5-27
 Iron Results in Groundwater
 RFI Report and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW006	008GW00602	6,010	J	05/22/1997	NA	1,100	2,000-35,700
G008GW006	008GW00601	6,190	=	11/15/1996			
G636GW001	636GW00104	34,200	J	12/11/1997			
G636GW001	636GW00103	27,300	=	09/16/1997			
G636GW001	636GW00102	56,100	J	05/22/1997			
G636GW001	636GW00101	22,700	=	11/15/1996			
GFDSGW02A	FDSGW02A02	2,120	J	05/30/1997			
GFDSGW02A	FDSGW02A01	2,630	J	01/16/1997			
GFDSGW02C	FDSGW02C02	5,410	=	05/30/1997			
GFDSGW02C	FDSGW02C01	2,130	J	01/16/1997			
GFDSGW03B	FDSGW03B02	4,340	=	06/02/1997			
GFDSGW03B	FDSGW03B01	974	J	01/15/1997			
GFDSGW03C	FDSGW03C02	3,600	=	06/04/1997			
GFDSGW03C	FDSGW03C01	2,540	J	01/15/1997			

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-28
 Thallium Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone H Background Range of Concentrations ^a
G008GW001	008GW001M1	4.9	U	03/30/2002	2	0.26	2-105
G008GW001	008G000110	4.9	U	07/19/2000			
G008GW001	008GW00104	5.0	U	12/08/1997			
G008GW001	008GW00103	5.0	U	09/13/1997			
G008GW001	008GW00102	5.0	UJ	05/20/1997			
G008GW001	008GW00101	2.7	U	11/15/1996			
G008GW002	008GW002M1	4.9	U	03/30/2002			
G008GW002	008GW00204	5.0	U	12/09/1997			
G008GW002	008GW00203	5.0	U	09/14/1997			
G008GW002	008GW00202	5.0	UJ	05/21/1997			
G008GW002	008GW00201	3.9	J	11/15/1996			
G008GW003	008GW003M1	9.8	U	03/29/2002			
G008GW003	008GW00304	5.0	U	12/11/1997			
G008GW003	008GW00303	5.0	U	09/14/1997			
G008GW003	008GW00302	7.4	J	05/21/1997			
G008GW003	008GW00301	2.7	U	11/15/1996			
G008GW004	008GW004M1	4.9	U	03/28/2002			
G008GW004	008GW00404	5.0	U	12/09/1997			
G008GW004	008GW00403	5.0	U	09/13/1997			
G008GW004	008GW00402	6.4	J	05/22/1997			
G008GW004	008GW00401	4.6	J	11/15/1996			
G008GW005	008GW005M1	4.9	U	03/30/2002			
G008GW005	008GW00504	5.0	U	12/08/1997			
G008GW005	008GW00503	5.0	U	09/14/1997			
G008GW005	008GW00502	5.8	J	05/23/1997			
G008GW005	008GW00501	2.7	U	11/15/1996			
G008GW006	008GW006M1	5.9	U	03/30/2002			
G008GW006	008GW00604	5.0	U	12/09/1997			
G008GW006	008GW00603	5.0	U	09/14/1997			

TABLE 5-28
 Thallium Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone H Background Range of Concentrations ^a
G008GW006	008GW00602	5.0	UJ	05/22/1997	2	0.26	NA
G008GW006	008GW00601	2.7	U	11/15/1996			
G636GW001	636GW00104	5.0	U	12/11/1997			
G636GW001	636GW00103	5.0	U	09/16/1997			
G636GW001	636GW00102	5.0	UJ	05/22/1997			
G636GW001	636GW00101	2.7	U	11/15/1996			
GFDSGW02A	FDSGW02A02	5.0	U	05/30/1997			
GFDSGW02A	FDSGW02A01	5.8	J	01/16/1997			
GFDSGW02C	FDSGW02C02	5.0	U	05/30/1997			
GFDSGW02C	FDSGW02C01	5.1	J	01/16/1997			
GFDSGW03B	FDSGW03B02	5.0	U	06/02/1997			
GFDSGW03B	FDSGW03B01	3.0	J	01/15/1997			
GFDSGW03C	FDSGW03C02	5.0	U	06/04/1997			
GFDSGW03C	FDSGW03C01	5.7	J	01/15/1997			

^a Zone G Background Range of Concentrations were not available for the referenced compound. Therefore, Zone H Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions – Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).– Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

TABLE 5-29
 Vanadium Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW001	008GW001M1	4.8	J	03/30/2002	NA	26	3-30
G008GW001	008G000110	10	=	07/19/2000			
G008GW001	008GW00104	5.2	J	12/08/1997			
G008GW001	008GW00103	24	=	09/13/1997			
G008GW001	008GW00102	18.3	J	05/20/1997			
G008GW001	008GW00101	6.8	J	11/15/1996			
G008GW002	008GW002M1	2.9	J	03/30/2002			
G008GW002	008GW00204	1.4	J	12/09/1997			
G008GW002	008GW00203	3.1	J	09/14/1997			
G008GW002	008GW00202	1.9	J	05/21/1997			
G008GW002	008GW00201	1.3	J	11/15/1996			
G008GW003	008GW003M1	44	J	03/29/2002			
G008GW003	008GW00304	29.5	=	12/11/1997			
G008GW003	008GW00303	19.5	J	09/14/1997			
G008GW003	008GW00302	12.4	J	05/21/1997			
G008GW003	008GW00301	49	=	11/15/1996			
G008GW004	008GW004M1	2.2	U	03/28/2002			
G008GW004	008GW00404	1.1	U	12/09/1997			
G008GW004	008GW00403	1.7	J	09/13/1997			
G008GW004	008GW00402	1.6	J	05/22/1997			
G008GW004	008GW00401	0.5	U	11/15/1996			
G008GW005	008GW005M1	2.2	U	03/30/2002			
G008GW005	008GW00504	3.2	J	12/08/1997			
G008GW005	008GW00503	5.2	J	09/14/1997			
G008GW005	008GW00502	3.6	J	05/23/1997			
G008GW005	008GW00501	2.5	J	11/15/1996			
G008GW006	008GW006M1	2.2	U	03/30/2002			
G008GW006	008GW00604	2.4	J	12/09/1997			
G008GW006	008GW00603	3.5	J	09/14/1997			

TABLE 5-29
 Vanadium Results in Groundwater
 RFI Report Addendum and CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Sample Location	Sample Identification	Concentration (µg/L)	Qualifier	Date Collected	MCL	EPA Region III Tap Water RBC (HI=0.1)	Zone G Background Range of Concentrations ^a
G008GW006	008GW00602	2.2	J	05/22/1997	NA	26	3-30
G008GW006	008GW00601	2.9	J	11/15/1996			
G636GW001	636GW00104	3	J	12/11/1997			
G636GW001	636GW00103	5.7	J	09/16/1997			
G636GW001	636GW00102	5	J	05/22/1997			
G636GW001	636GW00101	2.9	J	11/15/1996			
GFDSGW02A	FDSGW02A02	11.2	J	05/30/1997			
GFDSGW02A	FDSGW02A01	9.5	J	01/16/1997			
GFDSGW02C	FDSGW02C02	1.1	U	05/30/1997			
GFDSGW02C	FDSGW02C01	4.4	J	01/16/1997			
GFDSGW03B	FDSGW03B02	1.1	U	06/02/1997			
GFDSGW03B	FDSGW03B01	2.7	J	01/15/1997			
GFDSGW03C	FDSGW03C02	2.0	J	06/04/1997			
GFDSGW03C	FDSGW03C01	5.0	J	01/15/1997			

^a The Zone G Background Range of Concentrations were obtained from Appendix J of the *Project Team Notebook and Instructions - Charleston Naval Complex, Environmental Restoration Project, Revision 1A* (CH2M-Jones, December 2001).

Concentrations in bold and outlined text exceed the appropriate screening criteria.

ug/L micrograms per liter

NA Screening criteria not available for the referenced compound.

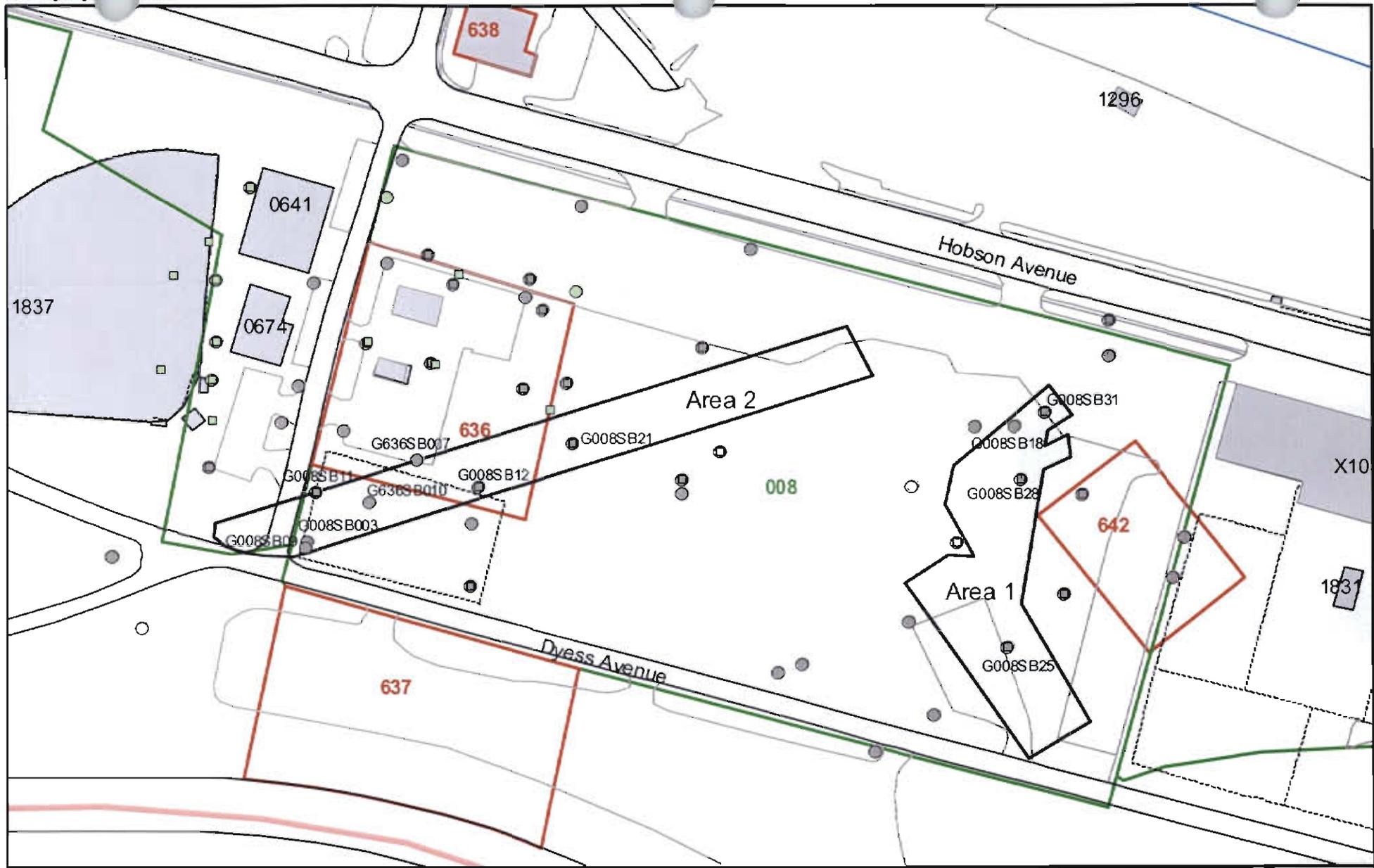
HI Hazard Index

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

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

U Indicates the analyte was not detected above the laboratory detection limit.

NOTE: Original figure in color



- Previous Subsurface Soil Sample
- Previous Surface Soil Sample
- Post RFI Subsurface Soil Sample
- Post RFI Surface Soil Sample
- ⚡ Fence
- ⚡ Sidewalk
- ⚡ Roads
- ⚡ Shoreline
- ▭ IM Excavation Area
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary

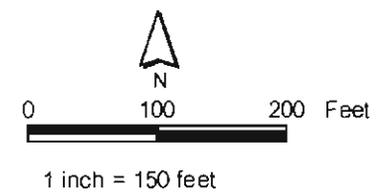
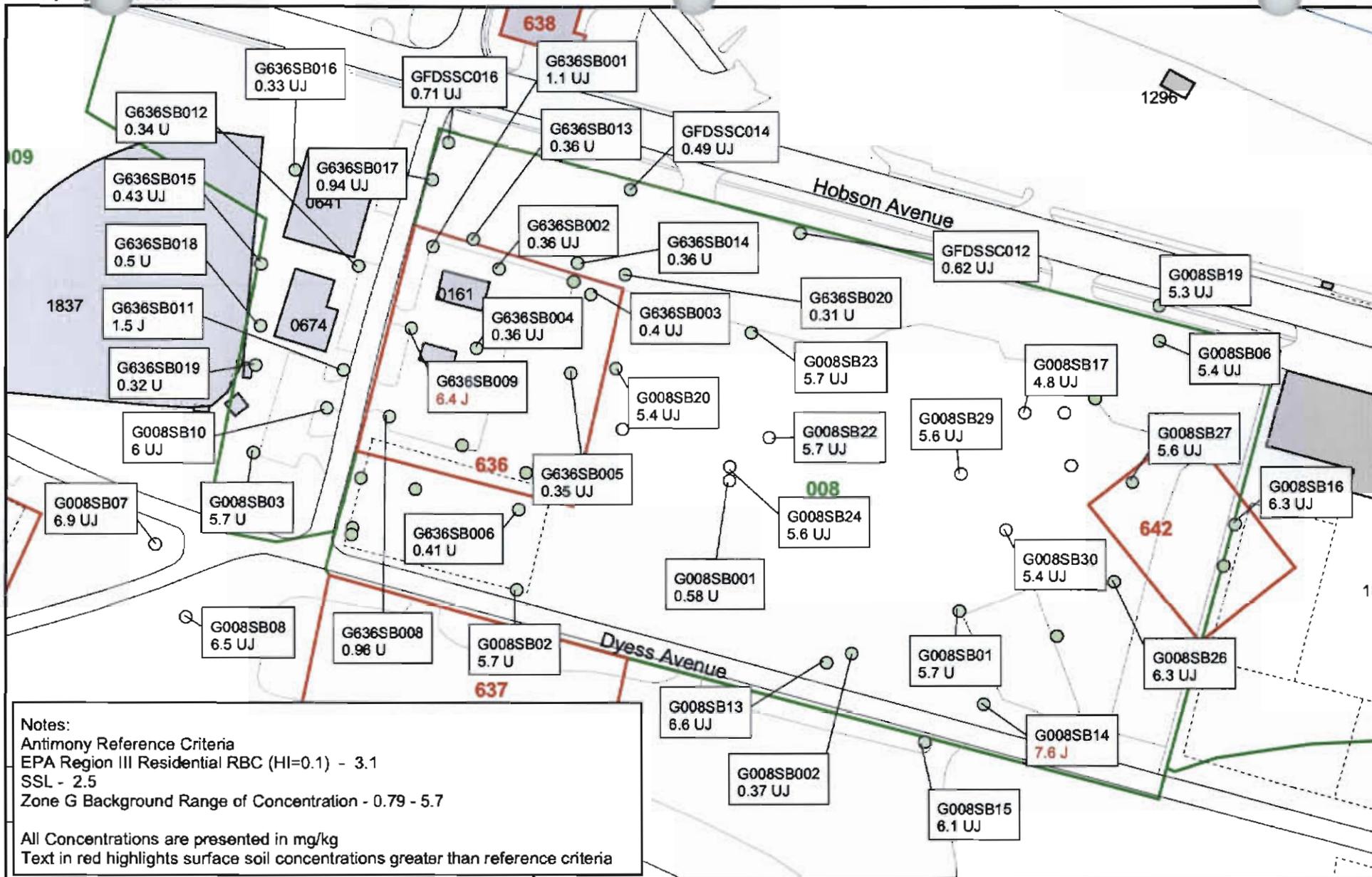


Figure 5-1
RFI Soil Sample Locations
Within the IM Soil Excavation Areas
SWMU 8/AOC 636, Zone G
Charleston Naval Complex

CH2MHILL

NOTE: Original file in color



- Surface Soil Sample Location
- ▤ Fence
- ▬ Shoreline
- ▬ Roads
- ▬ Pavement
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary

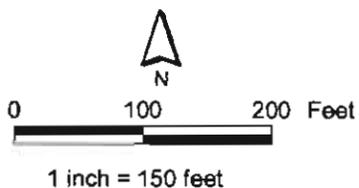
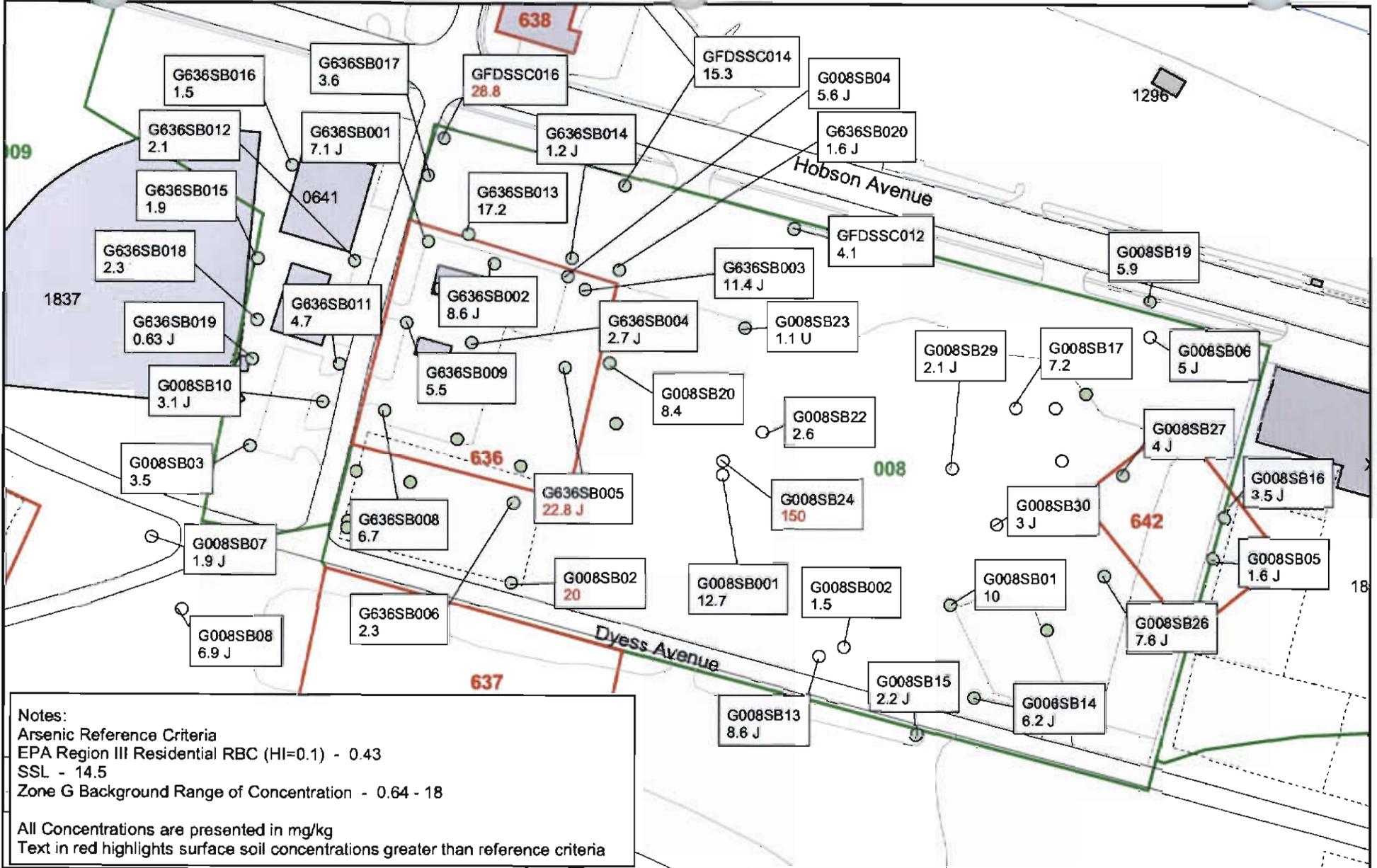


Figure 5-4
 Antimony In Surface Soil
 SWMU 8/AOC 636
 Charleston Naval Complex

NOTE: Original figure is in color



- Surface Soil Sample Location
- ▭ Fence
- ▭ Shoreline
- ▭ Roads
- ▭ Pavement
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary

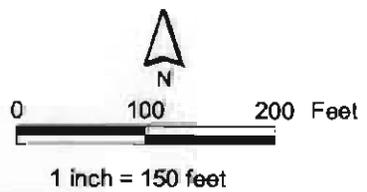
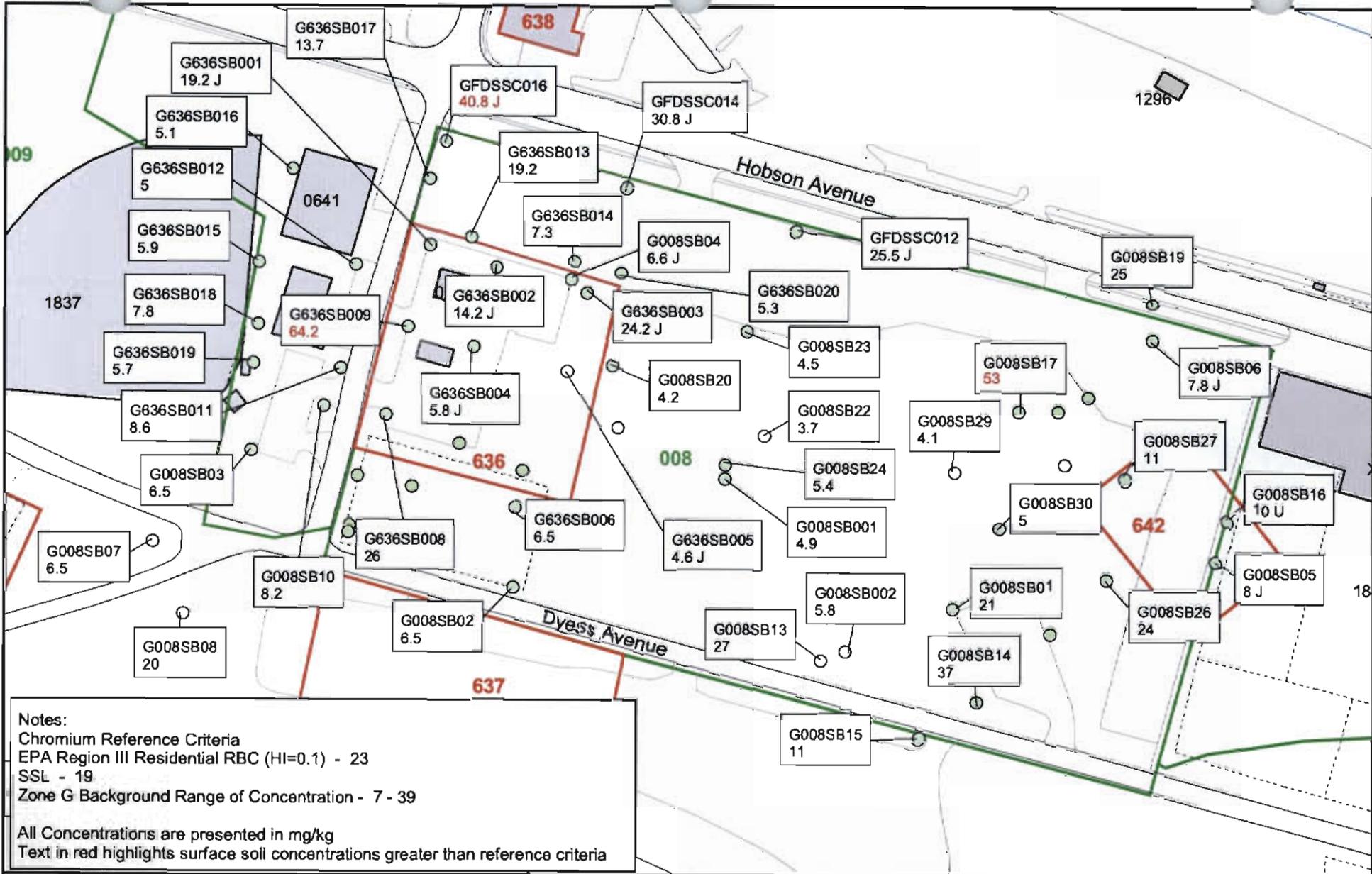


Figure 5-5
 Arsenic In Surface Soil
 SWMU 8/AOC 636
 Charleston Naval Complex

NOTE: Original figure in color



- Surface Soil Sample Location
- ▬ Fence
- ▬ Shoreline
- ▬ Roads
- ▬ Pavement
- ▬ AOC Boundary
- ▬ SWMU Boundary
- ▬ Buildings
- ▬ Zone Boundary

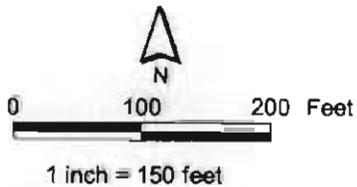
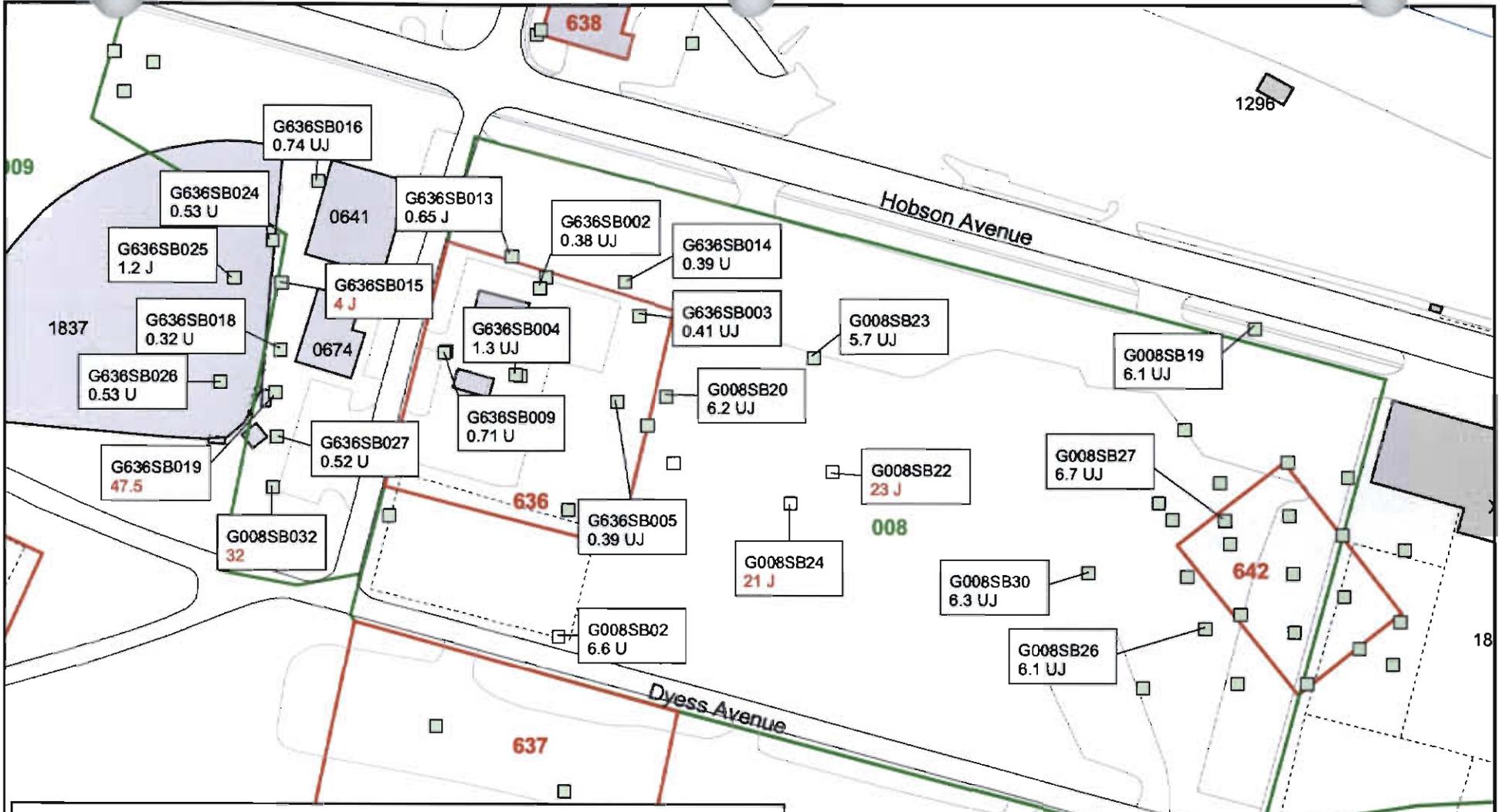


Figure 5-6
 Chromium In Surface Soil
 SWMU 8/AOC 636
 Charleston Naval Complex

NOTE: Original file in color



Notes:
 Antimony Reference Criteria
 SSL - 2.5
 Zone G Background Range of Concentration - Not available for the referenced compound
 All Concentrations are presented in mg/kg
 Text in red highlights subsurface soil concentrations greater than reference criteria

- Subsurface Soil Sample Location
- ▤ Fence
- ▬ Shoreline
- ▬ Roads
- ▬ Pavement
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary

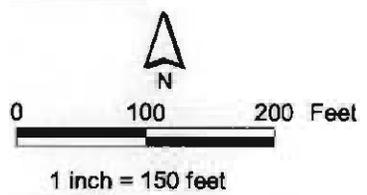
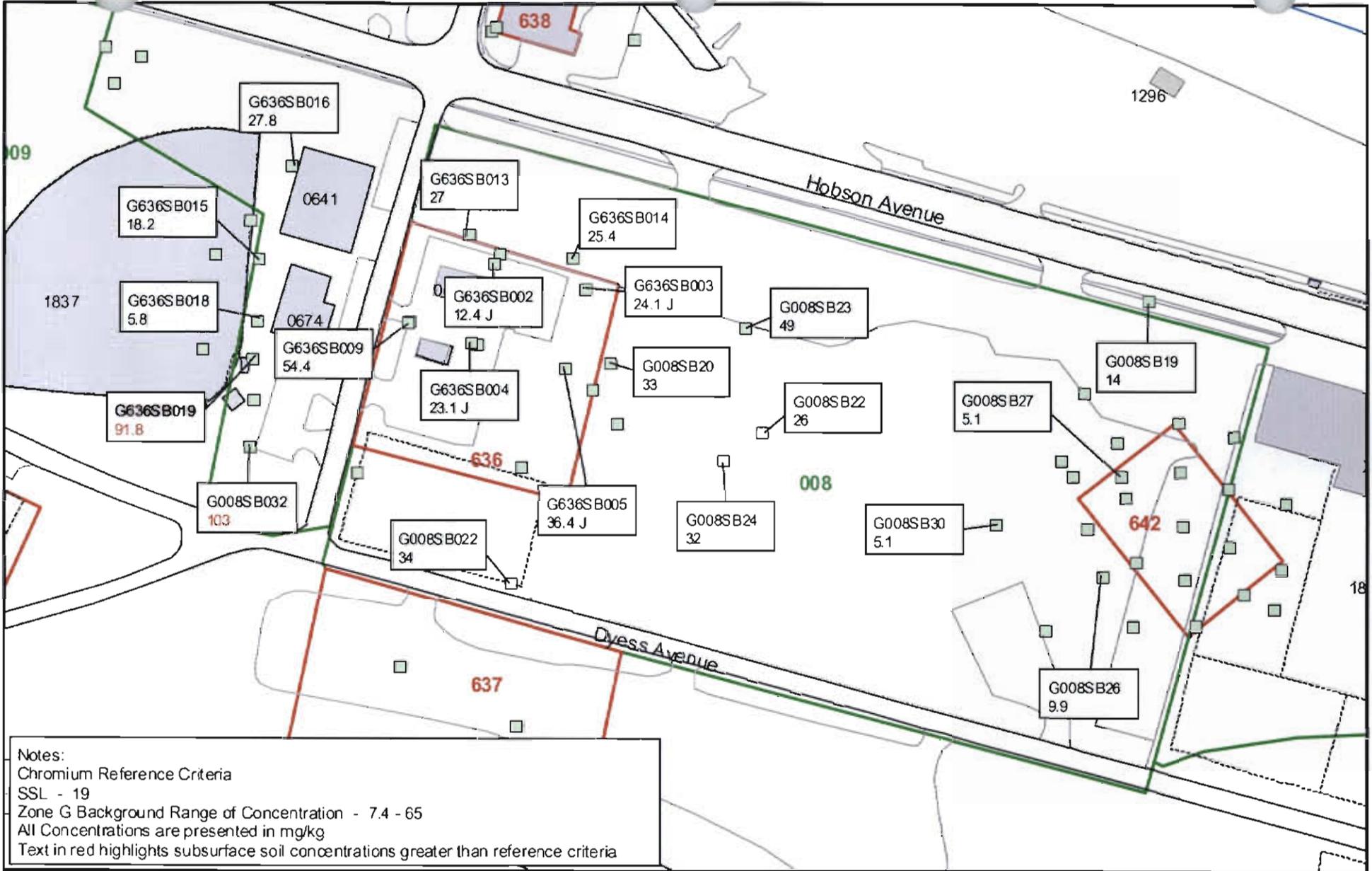


Figure 5-8
 Antimony in Subsurface Soil
 SWMU 8/AOC 636
 Charleston Naval Complex

NOTE: Original figure in color



Notes:
 Chromium Reference Criteria
 SSL - 19
 Zone G Background Range of Concentration - 7.4 - 65
 All Concentrations are presented in mg/kg
 Text in red highlights subsurface soil concentrations greater than reference criteria

- Subsurface Soil Sample Location
- ▤ Fence
- ▬ Shoreline
- ▬ Roads
- ▬ Pavement
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary

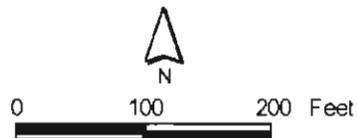
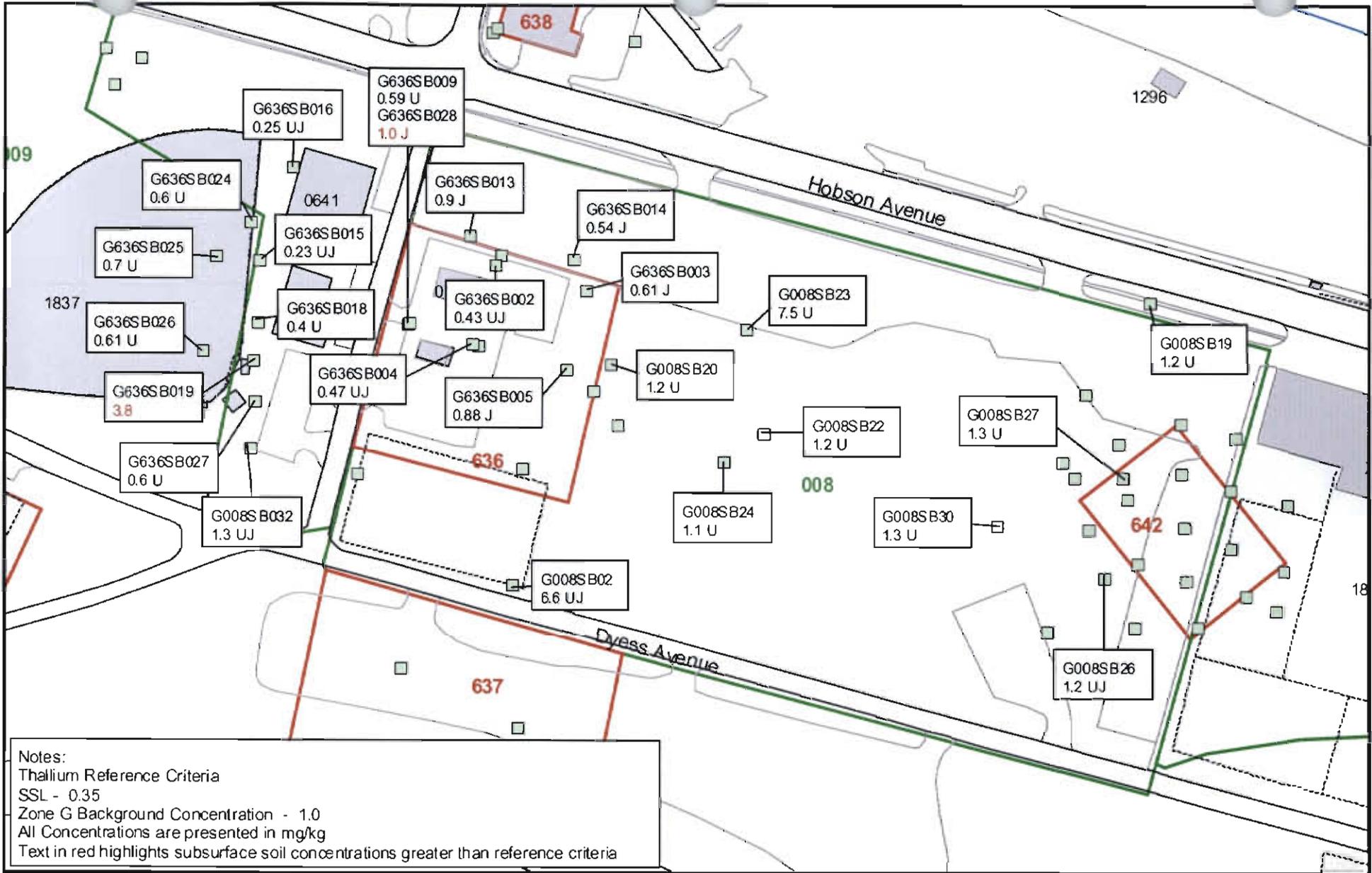


Figure 5-9
 Chromium In Subsurface Soil
 SWMU 8/AOC 636
 Charleston Naval Complex

NOTE: Original figure in color



Notes:
 Thallium Reference Criteria
 SSL - 0.35
 Zone G Background Concentration - 1.0
 All Concentrations are presented in mg/kg
 Text in red highlights subsurface soil concentrations greater than reference criteria

- Subsurface Soil Sample Location
- ▤ Fence
- ▬ Shoreline
- ▬ Roads
- ▬ Pavement
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary

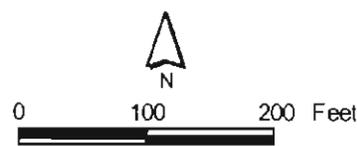


Figure 5-10
 Thallium In Subsurface Soil
 SWMU 8/AOC 636
 Charleston Naval Complex

NOTE: Original figure in color

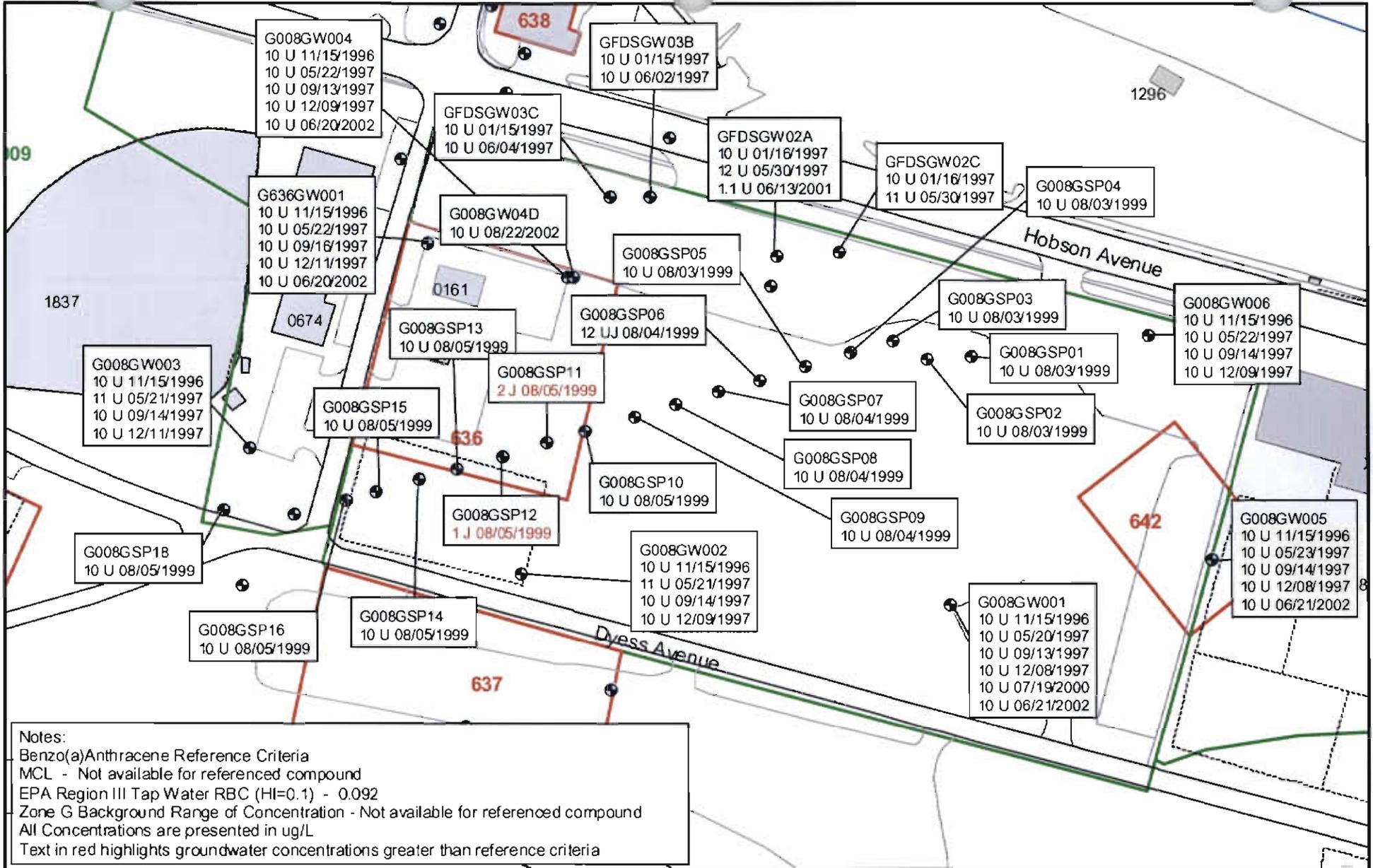
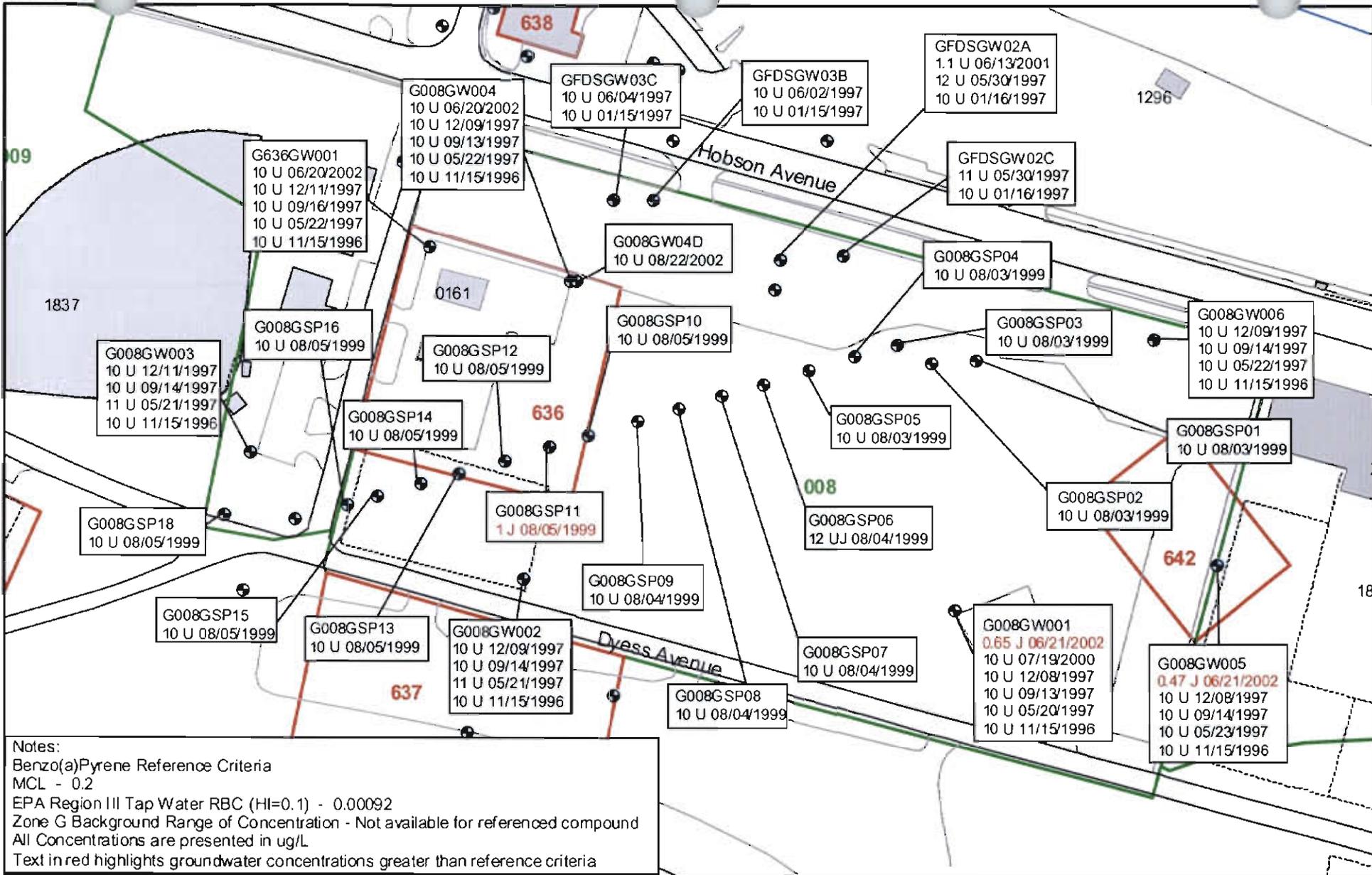


Figure 5-11
 Benzo(a)Anthracene in Groundwater
 SWMU 8/AOC 636
 Charleston Naval Complex



NOTE: Original figure in color



- Groundwater Sample Location
- ▤ Fence
- ▬ Shoreline
- ▬ Roads
- ▬ Pavement
- ▭ AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary

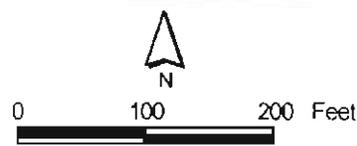
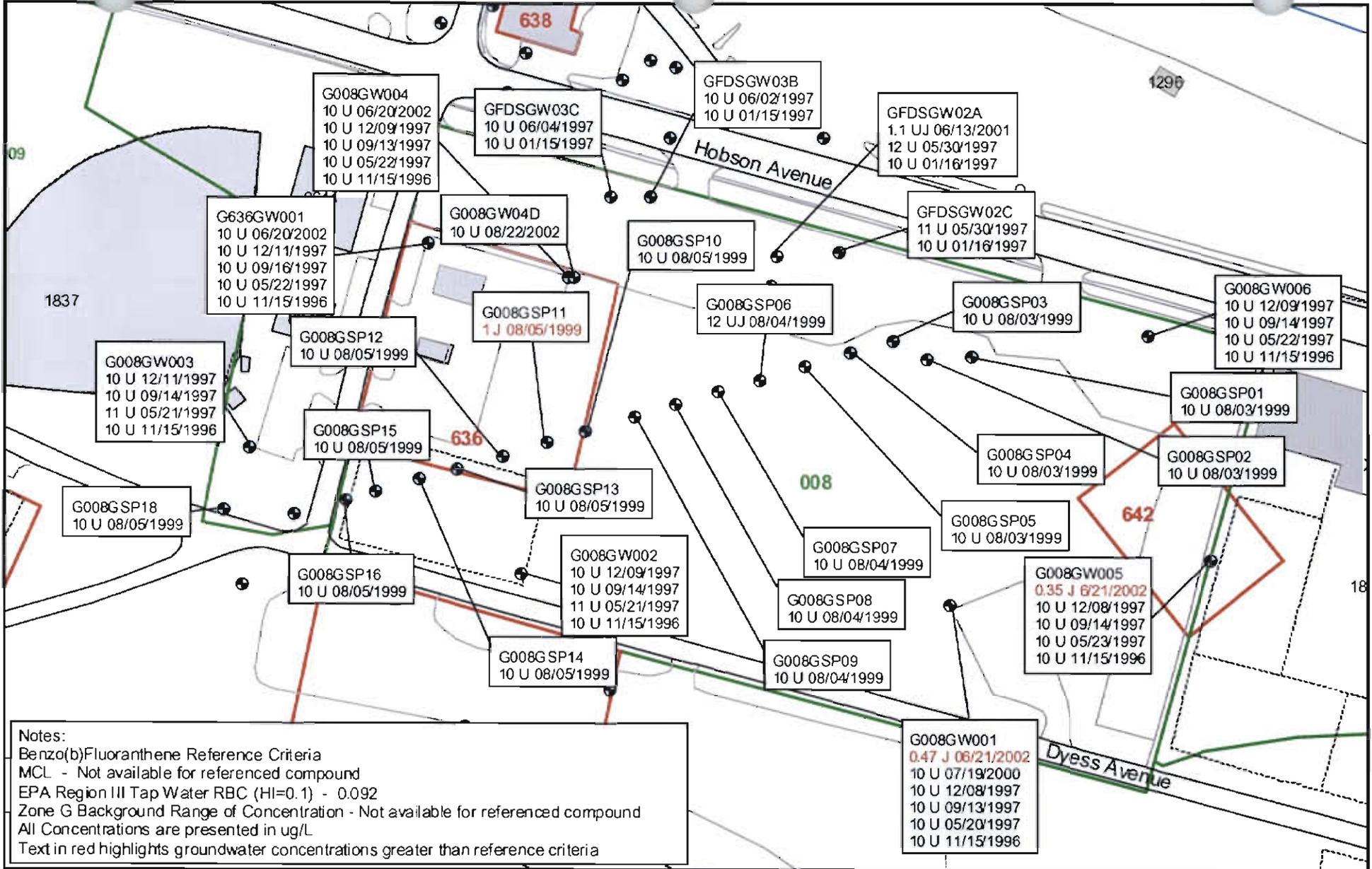


Figure 5-12
 Benzo(a)Pyrene In Groundwater
 SWMU 8/AOC 636
 Charleston Naval Complex

CH2MHILL

NOTE: Original figure in color



- Groundwater Sample Location
- ▬ Fence
- ▬ Shoreline
- ▬ Roads
- ▬ Pavement
- ▬ AOC Boundary
- ▬ SWMU Boundary
- ▬ Buildings
- ▬ Zone Boundary

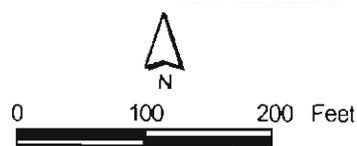
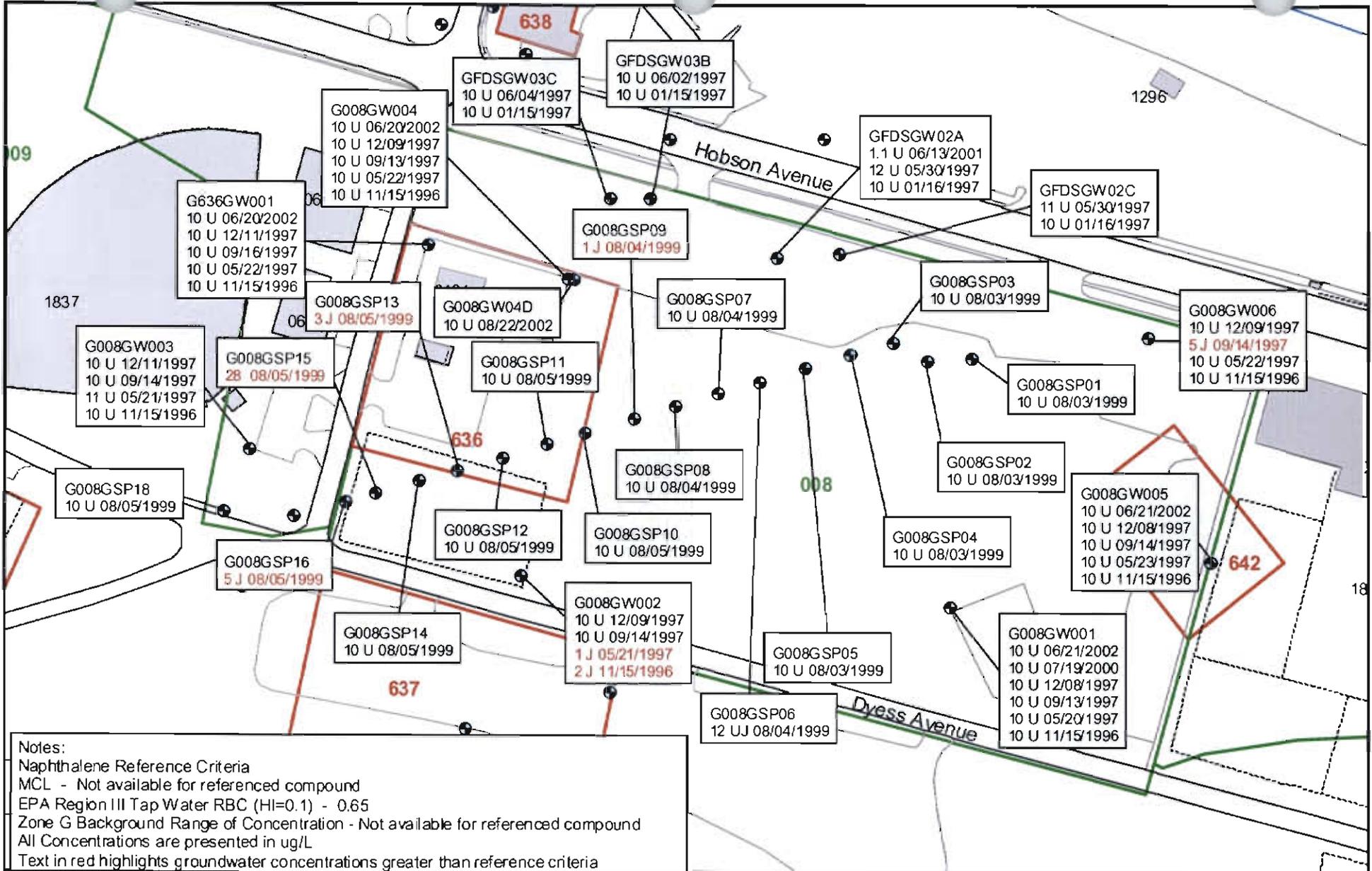


Figure 5-13
 Benzo(b)Fluoranthene In Groundwater
 SWMU 8/AOC 636
 Charleston Naval Complex

NOTE: Original figure in color



Notes:
 Naphthalene Reference Criteria
 MCL - Not available for referenced compound
 EPA Region III Tap Water RBC (HI=0.1) - 0.65
 Zone G Background Range of Concentration - Not available for referenced compound
 All Concentrations are presented in ug/L
 Text in red highlights groundwater concentrations greater than reference criteria

- Groundwater Sample Location
- Fence
- Shoreline
- Roads
- Pavement
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary

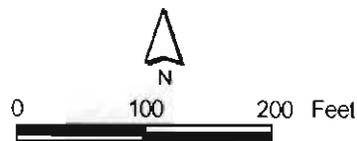
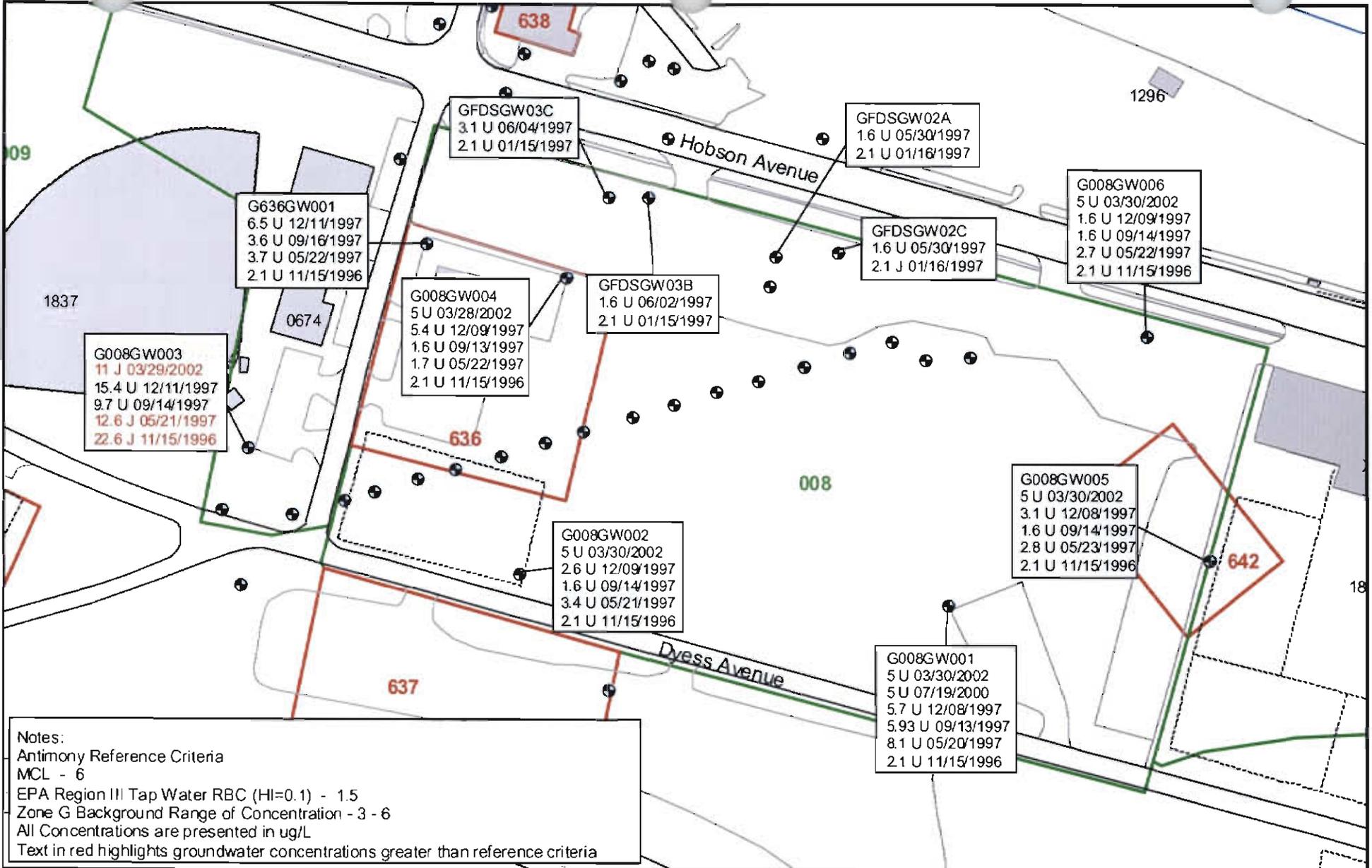


Figure 5-14
 Naphthalene In Groundwater
 SWMU 8/AOC 636
 Charleston Naval Complex

NOTE: Original figure in color



- Groundwater Sample Location
- ▬ Fence
- ▬ Shoreline
- ▬ Roads
- ▬ Pavement
- ▬ AOC Boundary
- ▬ SWMU Boundary
- ▬ Buildings
- ▬ Zone Boundary

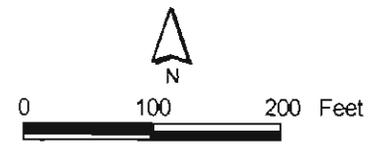


Figure 5-15
 Antimony In Groundwater
 SWMU 8/AOC 636
 Charleston Naval Complex

6.0 Summary of Information Related to Site Closeout Issues

6.1 RFI Status

The *Zone G RFI Report, Revision 0* (EnSafe, 1998a) presented the results of initial investigations at SWMU 8/AOC 636. This document presents the results of subsequent investigations at the site. Responses to SCDHEC comments on the *Zone G RFI Report, Revision 0* are provided in Appendix A. Based on an evaluation of the data collected during the original and subsequent investigations, the RFI is considered to be complete.

6.2 Presence of Inorganics in Groundwater

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

Antimony, barium, thallium, and vanadium were identified in the *Zone G RFI Report, Revision 0* as COCs in groundwater. In addition, antimony, iron, and vanadium were detected above their screening criteria during the various post RFI sampling events. These five metals were further evaluated in Section 5.0 of this RFI Report Addendum to determine if they meet the criteria for being considered COCs.

Antimony and thallium were not considered COCs in groundwater due their infrequent detection and because their presence in groundwater is not related to historic site operations. Barium was not detected above its MCL in any of the groundwater samples collected from SWMU 8/AOC 636 monitoring wells, and as a result, was not considered a COC in groundwater. Iron and vanadium were detected in only two groundwater samples above their corresponding screening criteria but were detected at a high rate of occurrence. Because of their ubiquitous nature and because their presence in groundwater is not related to historic site operations, iron and vanadium were not considered COCs in groundwater. In addition, barium, vanadium, and iron were not detected above screening criteria in surface or subsurface soil samples collected from the site and as a result, leachability to

1 groundwater was not identified as a potential concern. As a result, further groundwater
2 investigation for antimony, barium, thallium, iron, and vanadium is not warranted.

3 **6.3 Potential Linkage to SWMU 37, Investigated Sanitary** 4 **Sewers at the CNC**

5 None of the groundwater data collected at the site from the monitoring wells or from the
6 five samples collected from Geoprobe borings advanced to investigate the sanitary sewer
7 system indicate that groundwater impacts have occurred. Therefore, there is no reason to
8 believe that a contamination linkage exists between this site and the investigated portion of
9 the sanitary sewer (SWMU 37). Further evaluation of this issue is not warranted.

10 **6.4 Potential Linkage to AOC 699, Investigated Storm Sewers** 11 **at the CNC**

12 Potential linkage of a SWMU or AOC to a storm sewer refers to the possibility of a
13 groundwater plume at a SWMU or AOC migrating into a storm sewer from which it would
14 subsequently migrate to the water bodies around the CNC, or to the presence of a cross
15 connection between the sanitary sewer and storm sewer.

16 None of the groundwater data collected at site indicate that groundwater impacts have
17 occurred. Therefore, there is no reason to suspect that a contamination linkage exists
18 between the site and the storm sewers (AOC 699). Further evaluation of this issue is not
19 warranted.

20 **6.5 Potential Linkage to AOC 504, Investigated Railroad Lines** 21 **at the CNC**

22 The nearest investigated railroad line is approximately 1,250 feet northwest from the
23 northwest corner of the SWMU 8/AOC 636 boundary. This railroad line runs along the
24 southeast side of AOC 628. Due to the location of the nearest railroad, and given that there
25 are no known railroad activities that can be linked to the former torpedo magazine and
26 storage facility (AOC 636) or the former oil storage pits (SWMU 8), further evaluation of
27 this issue is not warranted.

1 **6.6 Potential Migration Pathways to Surface Water Bodies at** 2 **the CNC**

3 Surface water was studied separately as part of the *Zone J RFI Report, Revision 0* (EnSafe,
4 2000). The *Zone J RFI Report, Revision 0* includes the investigated surface water bodies. The
5 nearest named surface water body is the Cooper River, which is located approximately 375
6 feet northeast from the SWMU 8 boundary. Two potential migration pathways from a site
7 to surface water are overland flow via stormwater runoff and subsurface flow via
8 groundwater.

9 No surface soil or groundwater COCs were identified at SWMU 8/AOC 636. There do not
10 appear to be any surface water migration pathways of concern at this site; therefore, further
11 evaluation of this issue is not warranted.

12 **6.7 Potential Contamination in Oil/Water Separators (OWSs)**

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

15 Neither the RFA nor the *Zone G RFI Report, Revision 0* refer to the presence or possible
16 presence of an OWS at SWMU 8/AOC 636. In addition, there is no reference made to an
17 OWS at this facility in the basewide *Oil Water Separator Data* report (Navy, 2000). Therefore,
18 further evaluation of this issue is not warranted.

19 **6.8 Land Use Controls (LUCs)**

20 This site is zoned M-2, for light industrial use, and will likely be designated for non-
21 residential use. Since there were no COCs identified in surface soil, LUCs restricting the site
22 to industrial type uses and limiting potential for direct contact with soil (i.e., deed
23 restrictions/engineering controls) are not required. However, until the LNAPL is removed
24 and the site is identified by SCDHEC as requiring NFA, the use of LUCs may be required.

1 **7.0 Conclusions and Recommendations**

2 SWMU 8 contained three unlined oil sludge pits that were used to dispose oil sludge from
3 1944 to 1977. The pits were later filled and, in 1997, were removed as part of an IM
4 conducted at this site. The area is currently an open, unpaved area with gravel and soil
5 cover. AOC 636 is a former torpedo magazine, where torpedoes and munitions were stored
6 in the 1940s. There is no historical evidence of repair operations or disposal occurring at this
7 facility. In addition, no UXO, torpedo parts, or other visual evidence of disposal were
8 observed during the soil excavation IM completed at SWMU 8 in the southwest corner of
9 AOC 636. Currently, the AOC 636 area contains Building 161 and an asphalt-paved parking
10 lot.

11 Surface soils, subsurface soils, and the shallow portion of the surficial aquifer at SWMU
12 8/AOC 636 were investigated during the period from September 1993 to September 1997.
13 Included in this investigation were portions of the sanitary sewer (SWMU 37) and the FDS
14 that transverses through the northern portion of SWMU 8. The findings and conclusions
15 from the original RFI, which detailed the sampling investigations conducted through
16 September 1997, are provided in *Zone G RFI Report, Revision 0*. Additional RFI sampling
17 investigations completed subsequent to September 1997 are summarized in this RFI Report
18 Addendum.

19 Aroclor-1260, BEQs, hydrazine, antimony, arsenic, chromium, and thallium were identified
20 as surface soil COCs in the *Zone G RFI Report, Revision 0*. No additional surface soil COPCs
21 were identified as a result of the additional sampling investigations conducted at SWMU
22 8/AOC 636. Benzene and ethylbenzene were identified as COPCs in surface soil as a result
23 of the VOC rescreening process using a SSL with a DAF=1.

24 Based on an evaluation of the data in Section 5.0 of this report, Aroclor-1260 and thallium
25 were retained as COCs in surface soil for the unrestricted land use scenario. BEQs were only
26 detected in one sample slightly above its reference concentration. The UCL_{95} for antimony
27 and chromium were less than its corresponding EPA Region III residential RBC (HI=0.1).
28 Detected concentrations of arsenic in surface soil were less than what EPA Region IV
29 typically considers as acceptable levels for unrestricted land use. The site-specific SSL
30 calculated for benzene and the EPA SSL (DAF=1) for ethylbenzene were greater than their
31 respective mean concentration. As a result, these chemicals were not identified as COCs in
32 surface soil at SWMU 8/AOC 636.

1 No subsurface soil COCs were identified in the *Zone G RFI Report, Revision 0*. Six metals (i.e.,
2 antimony, cadmium, chromium, lead, nickel, and thallium) were identified as new COPCs
3 as a result of the additional RFI sampling investigations. Acetone, 1,1,2,2-PCA, and 1,1,2-
4 TCA were identified as COPCs in subsurface soil as a result of the VOC rescreening process
5 using a SSL with a DAF=1. Based on the COPC refinement process, only antimony and
6 thallium were retained as COCs in subsurface soil. Cadmium, lead, nickel, acetone, and
7 1,1,2-TCA were not identified as COCs in subsurface soil because their mean concentration
8 was less than their corresponding EPA or site-specific SSL or in the case of lead, its EPA
9 screening level. Chromium was not retained as a COC in subsurface soil since it was
10 detected at a low frequency of detection above its screening criteria and the generic EPA
11 SSL (DAF=10) for total chromium used for screening is considered conservative. 1,1,2,2-
12 PCA was not identified as a COC because its single detection in subsurface soil during the
13 original RFI sampling investigation could not be confirmed by a second sample collected
14 from the same location during a 2001 sampling event.

15 The *Zone G RFI Report, Revision 0* identified BEHP, antimony, barium, thallium, and
16 vanadium as COCs in the groundwater at SWMU 8/AOC 636. Five SVOCs (i.e.,
17 benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis[2-ethylhexyl]phthalate, and
18 naphthalene), three metals (i.e., antimony, iron, and vanadium), and hydrazine were
19 detected above their screening criteria during the various post RFI sampling events. As a
20 result, these chemicals were considered COPCs.

21 Benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, and naphthalene were retained
22 as COCs because they were detected in site groundwater at concentrations above their
23 corresponding screening criteria and each of these chemicals can be linked to the material
24 removed from the former unlined oil sludge pits. In addition, antimony was identified as a
25 COC in groundwater since it was detected at concentrations exceeding its MCL.

26 BEHP was not considered a COC in groundwater since it was detected in laboratory QC
27 samples during analysis of site samples which detected BEHP at concentrations exceeding
28 its MCL. Barium and thallium were not retained as COCs in groundwater because they
29 were not detected above their corresponding screening criteria (i.e., barium MCL and
30 thallium Zone H mean concentration). Because of their high frequency of detection and
31 given the fact that they are not related to historic site operations but rather naturally
32 occurring, iron and vanadium were not identified as COCs in groundwater.

33 Hydrazine is not considered a COC in groundwater because of the colorimetric method
34 used for hydrazine analysis, and the fact that its fate and transport properties are not

1 consistent with the presence of a low-level long term groundwater presence over a large
2 area.

3 In the *Zone G RFI Report, Revision 0*, SWMU 8/ AOC 636 was recommended for a CMS based
4 on the primary risk in surface soil from arsenic and BEQs for the ingestion and dermal
5 pathways, and the primary risk in shallow groundwater was from BEHP. Even though
6 these COCs identified in the *Zone G RFI Report, Revision 0*, were not identified as COCs
7 based on an evaluation of the data in Section 5.0 of this report, CH2M-Jones recommends a
8 CMS for the two surface soil COCs (i.e., Aroclor-1260 and thallium), the two subsurface soil
9 COCs (i.e., antimony and thallium), and the five groundwater COCs (i.e.,
10 benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, naphthalene, and antimony). A
11 CMS Work Plan is included in Section 8.0 of this report.

1 **8.0 CMS Work Plan for SWMU 8/AOC 636**

2 This section discusses the RAOs of the CMS that is proposed for SWMU 8/AOC 636, and
3 presents the proposed MCS for LNAPL. Once the RAOs and MCSs are established, the
4 candidate remedial technologies and alternatives can be developed to meet these objectives.

5 **8.1 Remedial Action Objectives**

6 RAOs are medium-specific goals that the remedial actions are designed to accomplish to
7 protect human health and the environment by preventing or reducing exposures under
8 current and future land use conditions. The RAOs identified for LNAPL at SWMU 8/AOC
9 636 are: 1) to prevent ingestion and direct/dermal contact, and 2) to restore the aquifer to
10 beneficial use. An additional RAO is to control LNAPL migration. Remedial actions are not
11 required for groundwater, surface, or subsurface soil at SWMU 8/AOC 636.

12 **8.2 Remedial Goal Options and Proposed Media Cleanup** 13 **Standards**

14 Throughout the process of remediating a hazardous waste site, a risk manager uses a
15 progression of increasingly acceptable site-specific media levels in considering remedial
16 alternatives. Remedial goal options (RGOs) and MCSs under RCRA are developed at the
17 end of the risk assessment in the RFI/Remedial Investigation (RI)/State programs.

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

25 LNAPL is the exposure medium of concern at SWMU 8/AOC 636 for which a specific RGO
26 and MCS is required. There is no standard for the removal of LNAPL to a measurable
27 thickness in SCDHEC regulations or guidance. Technical standards and corrective action
28 requirements for owners and operators of USTs as outlined in Chapter 61-92, Part 280 under
29 the SCDHEC Bureau of Land and Waste Management, UST Program, addresses the
30 removal of free product (Code of Regulation 61-92, Section 280.64). The regulation states

1 that "At sites where investigations under Section 280.62(a)(6) indicate the presence of free product,
2 owners and operators must remove free product to the maximum extent practicable as determined by
3 the Department..." However, through telephone correspondence with the technical section
4 of the UST program, LNAPL removal at UST sites is to 0.01 feet (i.e., 1/8 -inch) as required
5 by SCDHEC during the corrective action phase. This standard is documented in the site-
6 specific corrective action plan prepared and submitted to the UST program. As a result, the
7 MCS for LNAPL removal at SWMU 8/AOC 636 is to a measurable thickness of less than or
8 equal to 0.01 feet.

9 **8.3 Identification of Potential Corrective Measure** 10 **Technologies**

11 A key element of the remedial approach to be developed for SWMU 8/AOC 636 corrective
12 measures will be the overall strategy for achieving the various RAOs. Potential applicable
13 technologies include LNAPL recovery without groundwater depression. These recovery
14 technologies are generally used in settings where long-term hydraulic control of the LNAPL
15 is not required. The goal is to remove LNAPL with little recovery of groundwater. Some of
16 the technologies such as Aggressive Fluid Vapor Recovery (AFVR) and skimmers or
17 pneumatic pumps are more applicable to sites where the measured LNAPL thickness is
18 greater than one foot. As a result, some of the technologies may be combined or used in
19 succession to achieve complete LNAPL recovery.

- 20 • Bailing
- 21 • Skimmers or Pneumatic Pumps
- 22 • Absorbent Filters
- 23 • Aggressive Fluid Vapor Recovery (AFVR)
- 24 • Butane Biosparging™

25 The following preliminary list of technologies, presented below, was developed based upon
26 the known site RGOs desired for the site:

27 **8.3.1 Bailing**

28 This method of LNAPL recovery involves removal using a bailer. A small volume of
29 groundwater is also recovered using this method. Usually the LNAPL and groundwater
30 mixture is placed in a 55-gallon drum. This manual method can be employed at any
31 schedule but due to the number of bailing events required has a limited effectiveness when
32 a large volume of LNAPL is present in a well.

1 **8.3.2 Skimmers or Pneumatic Pumps**

2 Skimming systems rely on pumps (surface mounted or floating) to actively extract LNAPL.
3 The more common forms of skimmers used include floating skimmers, belt skimmers or
4 pneumatic pumps. Floating skimmers are placed on the water table where a hydrophobic
5 screen or floating screen inlet allows only LNAPL to enter the pump device or bailer. Belt
6 skimmers use a continuous loop of hydrophobic material to remove LNAPL as it is cycled
7 into and out of the well. Pneumatic skimmers may have a top intake that allows skimming
8 of fluids from the free product/water interface, or they may have a density sensitive float
9 valve that permits the passing of water before the valve seats.

10 **8.3.3 Absorbent Filters**

11 Absorbent filters are placed in the well across the surface of the LNAPL. Since the material
12 retains product from the water surface, it must be replaced periodically and properly
13 disposed of. However, this method of LNAPL recovery is one of the least labor intensively
14 technologies.

15 **8.3.4 Aggressive Fluid Vapor Recovery (AFVR)**

16 AFVR is a cost effective and rapid approach for the removal of LNAPL floating on the
17 groundwater surface. A vacuum is applied to the site groundwater sumps to recover
18 LNAPL, groundwater, and petroleum hydrocarbon vapor. AFVR is conducted by utilizing
19 vacuum trucks that produce elevated vacuum pressures and volumetric flow rates. LNAPL
20 and dissolved petroleum hydrocarbons will volatilize during the AFVR events due to the
21 air circulation in the vacuum tank and elevated volumetric flow rates achieved. The
22 vacuum truck tank contents will be sampled and the contents will be delivered to a facility
23 permitted to accept petroleum-impacted groundwater.

24 **8.3.5 Butane Biosparging™**

25 This technology involves the delivery of compressed air mixed with butane to the saturated
26 zone near the LNAPL/groundwater interface. It is viable LNAPL removal technology when
27 the measured thickness is less than a few inches. The air/butane delivery system injects low
28 volumes of butane gas at a predetermined rate into the air stream from an air compressor.
29 The butane/air mixture is distributed into the groundwater via injection wells. The butane
30 dissolves into the groundwater and provides a food source for butane and petroleum
31 degrading bacteria, and with increased dissolved oxygen, stimulates an increase biomass
32 and treatment by direct metabolism of hydrocarbons and cometabolism of more recalcitrant
33 compounds.

1 **8.3.6 Land Use Controls (LUCs)**

2 Land use controls may be needed during the period before the MCSs are achieved. Such
3 restrictions are likely to relate to control of zoning and groundwater use restrictions.

4 **8.4 Focused CMS Approach**

5 Based on the analytical results from the LNAPL samples collected from G008GSP04 and
6 G008GSP11 during the March 2002 sample collection event the LNAPL is considered a
7 diesel oil or heavy-end fuel oil. The most recent gauging event conducted on October 18,
8 2002, measured LNAPL at a thickness of 2.91 and 0.01 feet in groundwater sumps
9 G008GSP04 and G008GSP11, respectively.

10 The CMS will consist of the following tasks that will be performed in the order presented
11 below:

- 12 1. Review existing and new site data and technical literature to identify and screen the
13 various corrective measure alternatives for applicability. In addition to those listed
14 above, other corrective measure alternatives may also be evaluated in the CMS.
- 15 2. The preferred corrective measure alternative will then be selected.
- 16 3. The CMS methods and the preferred corrective measure alternative will be documented
17 in the CMS report.

18 **8.5 Approach to Evaluating Corrective Measure Alternatives**

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

- 21 1. Protect human health and the environment.
- 22 2. Attain MCSs, which will generally be the RGOs.
- 23 3. Control the source of releases to minimize future releases that may pose a threat to
24 human health and the environment.
- 25 4. Comply with applicable standards for the management of wastes generated by remedial
26 activities.
- 27 5. Other factors include (a) long-term reliability and effectiveness; (b) reduction in toxicity,
28 mobility, or volume of wastes; (c) short-term effectiveness; (d) implementability; and (e)
29 cost.

1 Each of the five criteria is defined in more detail below:

2 **8.5.1 Protect Human Health and the Environment**

3 The alternatives will be evaluated on the basis of their ability to protect human health and
4 the environment. The ability of an alternative to achieve this criterion may or may not be
5 independent of its ability to achieve the other standards. For example, an alternative may be
6 protective of human health, but may not be able to attain the MCSs if the MCSs are not
7 directly tied to protecting human health.

8 **8.5.2 Attain Media Cleanup Standards**

9 The alternatives will be evaluated on the basis of their ability to achieve the RGOs defined
10 in this CMS Work Plan. Another aspect of this criterion is the time frame to achieve the
11 RGOs. Estimates of the time frame for the alternatives to achieve RGOs will be provided.

12 **8.5.3 Control the Source of Releases**

13 This criterion deals with the control of releases of contamination from the source (the area
14 in which the contamination originated).

15 **8.5.4 Comply with Applicable Standards for Management of Wastes**

16 This criterion deals with the management of wastes derived from implementing the
17 alternatives; for example, treatment or disposal of well cuttings, contaminated
18 groundwater, or excavated material from a source area.

19 **8.5.5 Other Factors**

20 Five other factors are to be considered if an alternative is found to meet the four criteria
21 described above. These other factors are as follows:

22 a. Long-term reliability and effectiveness

23 The various alternatives will be evaluated on the basis of their reliability, and the
24 potential impact should the alternative fail. In other words, a qualitative assessment
25 will be made as to the chance of the alternative's failing and the consequences of
26 that failure.

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

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

1 c. Short-term effectiveness

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

5 d. Implementability

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

10 e. Cost

11 A net present value of each alternative will be developed. These cost estimates will
12 be used for the relative evaluation of the alternatives, not to bid or budget the work.
13 The estimates will be based on information available at the time of the CMS and on a
14 conceptual design of the alternative. They will be "order-of-magnitude" estimates
15 with a generally expected accuracy of -30 percent to +50 percent for the scope of
16 action described for each alternative. The estimates will be categorized into capital
17 costs and operations and maintenance costs for each alternative.

18 **8.6 CMS Report**

19 The CMS report will be prepared to present the identification, development, and evaluation
20 of potential corrective measures for SWMU 8/AOC 636. A proposed outline of the report,
21 as shown in Table 8-1, provides an example of the report format and content organization.

TABLE 8-1
 Outline of Focused CMS Report for Combined SWMU 8/AOC 636, Zone G
CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Section No.	Section Title
1.0	Introduction
1.1	Corrective Measures Study Purpose and Scope
1.2	Background Information
1.2.1	Facility Description
1.2.2	Site History
1.2.3	Site Hydrogeology
1.2.4	Nature and Extent of Contamination
1.2.5	Summary of Risk Assessment
1.3	Report Organization
2.0	RAOs, Proposed MCSs, and Alternative Evaluation Criteria
2.1	Remedial Action Objectives
2.2	Remedial Goal Options and Proposed Media Cleanup Standards
2.3	Evaluation Criteria
2.3.1	Protect Human Health and the Environment
2.3.2	Attain MCSs
2.3.3	Control the Source of Releases
2.3.4	Comply with Applicable Standards for Management of Wastes
2.3.5	Other Factors
3.0	Description of Candidate Corrective Measure Alternatives
3.1	Evaluation Approach
3.2	Description of Alternatives
4.0	Detailed Analysis of Alternatives
4.1	Analysis of LNAPL Alternatives ^a
4.1.1	Bailing
4.1.2	Skimmers or Pneumatic Pumps
4.1.3	Absorbent Filters
4.1.4	Aggressive Fluid Vapor Recovery (AFVR)
4.1.5	Butane Biosparging TM
4.2	Comparative Analysis of Alternatives
5.0	Recommended Corrective Measure Alternative
6.0	References
Appendix A	Corrective Measure Alternative Cost Estimates^b

TABLE 8-1
Outline of Focused CMS Report for Combined SWMU 8/AOC 636, Zone G
CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Section No.	Section Title
	List of Tables
	List of Figures

- ^a Additional alternatives will be analyzed as found necessary.
- ^b Additional appendices will be added, if necessary.

9.0 References

- 1
- 2 Agency for Toxic Substances and Disease Registry (ATSDR). *Toxicological Profile for*
3 *Antimony, Cadmium, Copper, Manganese, Nickel, Thallium, and Tin*. U.S. Department of Health
4 and Human Services, A Public Health Service. Atlanta, Georgia. 1997.
- 5 CH2M-Jones. *Background PAHs Study Report - Technical Information for Development of*
6 *Background BEQ Values*. February 2001a.
- 7 CH2M-Jones. *Application of Soil-Screening Levels (SSLs) at Charleston Naval Complex*.
8 Technical Memorandum. March 9, 2001b.
- 9 CH2M-Jones. *An Overview of Arsenic Geochemistry, Terminal Electron Accepting Processes in*
10 *Groundwater Systems, and Implications for the CNC Hydrogeologic Environment*. Technical
11 Memorandum. August 17, 2001c.
- 12 CH2M-Jones. *Project Team Notebook and Instructions, Charleston Naval Complex, Environmental*
13 *Restoration Project*. Revision 1A. December 4, 2001d.
- 14 CH2M-Jones. *Sampling and Analysis Plan, AOC 636, Zone G, Revision 0*. 2001e.
- 15 EnSafe, Inc. / Allen & Hoshall. *Zone G RFA Report*. June 6, 1985.
- 16 EnSafe Inc. *Zone L RFI Workplan, NAVBASE Charleston*. 1995.
- 17 EnSafe, Inc. *Zone G RFI Report NAVBASE Charleston*. Revision 0. February 20, 1998a.
- 18 EnSafe Inc. *Zone L RFI Report, NAVBASE Charleston*. Revision 0. December 18, 1998b.
- 19 EnSafe, Inc. *Zone G RFI Report Work Plan Addendum, NAVBASE Charleston*. Revision 0.
20 January 17, 2000.
- 21 South Carolina Department of Health and Environmental Control, Bureau of Land and
22 Waste Management, UST Program. Code of Regulations, Code of Regulation 61-92, Section
23 280.
- 24 Supervisor of Shipbuilding, Conversion and Repair, United States Navy, Environmental
25 Detachment Charleston. *Completion Report, Interim Measure for SWMU 8, Naval Base*
26 *Charleston, SC*. November 19, 1999.
- 27 U.S. Environmental Protection Agency. *EPA Soil Screening Guidance: Technical Background*
28 *Document (Table A-1)*, EPA/540/R-95/128. May 1996.

SWMU 8/AOC 636 Comments

This document presents CH2M-Jones' response to specific comments related to SWMU 8/AOC 636 made by the South Carolina Department of Health and Environmental Control (SCDHEC) on the basis of its review of the *Zone G RCRA Facility Investigation (RFI) Report, Revision 0* (EnSafe, 1998).

Comments Made by Stacey French

SCDHEC Comment:

1. Section 10.6 SWMU 8 Oil Sludge Pit; AOC 636 Torpedo Magazine, Page 10.6.1. Line 9-11

This sentence states that subsurface disposal of unused torpedoes and munitions allegedly occurred prior to 1944. Has an investigation been conducted to determine if there are any unexploded ordnance (UXO) located at this site? This is important when considering that subsurface construction activities could occur at this site after transfer. Please include the response to this comment in the text of the document.

CH2M-Jones Response:

The statement in the RFA which states "the unit was used prior to 1944 for the subsurface disposal of torpedoes and ammunition" cannot be confirmed and does not appear to be accurate. The Environmental Detachment Charleston (DET) conducted a research investigation regarding the site history and the claim of torpedo and ammunition disposal. They were unable to find any indication that the site was used for disposal purposes. The research investigation including its findings are presented in the Completion Report, Interim Measure for SWMU 8, dated November 19, 1999, which is presented in Appendix C of the RFI Report Addendum/CMS Work Plan. Based on this investigation, the CNC Project Team and the DET determined that a formal UXO survey was not required. Therefore, no comprehensive UXO investigation was conducted. However, during the RFI field activities, a subcontractor specializing in UXO detection and clearing, surveyed the surface of the site and cleared all subsurface soil boring sample locations using geophysical techniques. No anomalies were identified. In addition, during the IM soil excavation in the immediate area of AOC 636 torpedoes, torpedo parts, or other UXO were not identified.

SCDHEC Comment:

2. Figure 10.6-1 Soil Sampling Location Map SWMU 8 and AOC 636

This figure lacks enough detail to draw any conclusions about the sample locations and the impact of SWMU 8 and AOC 636. The location of the Oil Sludge Pit (SWMU 8) and the Torpedo Magazine (AOC 636) should be shown on the map. The location of the gravel parking area should be indicated on the map. Please revise the figure in order for the Department to draw conclusions. This comment also supplies to the other figures in this section of the RFI.

CH2M-Jones Response:

Areas of pavement including roadways, driveways, and parking lots and SWMU and AOC boundaries are depicted in each figure presented in the RFI Report Addendum/ CMS Work Plan. Figure 2-1 from this report presents an aerial photograph of the SWMU 8/AOC 636 site.

SCDHEC Comment:

3. Figure 10.6-3 Shallow Groundwater Low Tide Potentiometric Map SWMU 8 and AOC 636

There are two shaded excavated pits shown on this map, however, they are not described in the text of the report. These pits should be defined in the Legend and discussed in the text of the report. The pits were included on Figures 10.6-3 and 10.6-4, however, they were not included on Figures 10.6-1 and 10.6-2. Please explain the discrepancies and revise the figures as appropriate.

CH2M-Jones Response:

The shaded regions depicted on Figures 10.6-3 and 10.6-4 show the approximate location of the soil excavation areas completed as part of an Interim Measures (IM). Excavation of petroleum-impacted soil separated in two areas was completed from March to September 1997. Figure 3-1 presented in the RFI Report Addendum/ CMS Work Plan depicts these two areas and the Completion Report, Interim Measure for SWMU 8, dated November 19, 1999, which presents a summary of the IM is presented in Appendix C.

Comments Made by Susan Byrd

SCDHEC Comment:

1. Section 10.6.3.3. Page 10.6.149. Lines 10 and 11

The residential adult exposure duration used in the CDI calculations was 24 years, and 25 years was used for the site worker exposure duration. Please explain why the residential duration is less than the worker duration.

CH2M-Jones Response:

The residential exposure duration and site worker exposure duration are the standard exposure durations used for each receptor and were taken directly from RAGS Part A and EPA Region 4 supplemental guidance. These exposure durations represent the upper bound number of years spent at a residence as an adult (residential) and number of years spent at one occupation (site worker).

Comments Made by Michael Danielsen

SCDHEC Comment:

1. SWMU 8/AOC 636

There is an Interim Measure in process at this site to remove free petroleum product from the soil. From a recent visit (5-13-99) it is obvious that the subsurface soil has also been impacted from the contamination. The CMS that is planned for the surface soil and groundwater in this areas needs to include the subsurface soil as well.

CH2M-Jones Response:

The CMS will address all identified chemicals of concern (COCs) in the impacted media as outlined in RFI Report Addendum/ CMS Work Plan. The only COC identified at the SWMU 8/AOC 636 site was light non-aqueous phase liquid (LNAPL). COCs were not identified in surface soil, subsurface soil, or groundwater.

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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 ($\mu\text{g}/\text{kg}$)							
Acetone	S08B01	130	780000	NA	NT	16000	NA
	S08B03	ND			160		
	S08B11	ND			170		
	S08B17	53			ND		
	S08B19	ND			29		
	S08B20	ND			170		
	S08B21	ND			76		
	S08B22	ND			200		
	S08B23	ND			1100		
	S08B24	ND			220		
	S08B25	56			140		
	S08B26	220			220		
	S08B30	ND			100		
	S08B31	120			160		
Carbon disulfide	S08B11	ND	780000	NA	7.9	32000	NA
	S08B31	2.1			ND		
2-Butanone	S08B25	7.8	4700000	NA	ND	7900	NA
	S08B30	ND			10		
	S08B31	12			ND		
	008SB001	2			NT		
	008SB003	6			NT		
	636SB002	30			ND		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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					
Chlorobenzene	S08B01	18	160000	NA	ND	1000	NA					
	S08B02	ND			50							
	S08B03	ND			7.3							
	S08B05	53			NT							
	S08B07	11			NT							
	S08B09	8.5			NT							
	S08B11	185			35							
	S08B12	14			NT							
	S08B13	66			NT							
	S08B14	16			NT							
	S08B15	56			NT							
	S08B16	30			NT							
	S08B17	19			NT							
	S08B18	12			NT							
	S08B19	17			ND							
	S08B20	19			41							
	S08B22	9.2			28							
	S08B24	33			ND							
	S08B25	7.6			ND							
	S08B26	26			ND							
	S08B27	6.6			ND							
	S08B28	9.1			ND							
	S08B30	ND			46							
	S08B31	20			33							
	Ethylbenzene	S08B11			840			780000	NA	ND	13000	NA
		S08B30			ND					6.6		
	1,1,2,2-Tetrachloroethene	636SB009			ND			3200	NA	10	3	NA

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
1,1,2-Trichloroethane	S08B22	ND	11	NA	92	20	NA
1,1,1-Trichloroethane	S08B11	1600	160000	NA	ND	2000	NA
	S08B17	1.4			NT		
	S08B24	8.7			ND		
	S08B25	2.9			ND		
	S08B30	ND			3.8		
	S08B31	3.9			ND		
Toluene	S08B01	8.2	1600000	NA	NT	12000	NA
	S08B05	9.3			NT		
	S08B11	580			ND		
	S08B22	ND			5.8		
	S08B24	8.6			ND		
	S08B25	1.5			ND		
	S08B30	ND			6		
Vinyl acetate	S08B22	ND	7800000	NA	17	170000	NA
Xylene (total)	S08B11	3400	16000000	NA	ND	148000	NA
	S08B25	1.7			ND		
	S08B30	ND			14		
	S08B31	2.2			ND		
Semivolatile Organic Compounds (µg/kg)							
2,4-Dinitrotoluene	S08B12	130	16000	NA	ND	0.8	NA

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
BEQs ¹	S08B01	450.0	88.0	NA	NA	NA	NA
	S08B02	2.7			NA		
	S08B03	5.51			NA		
	S08B04	50.40			NA		
	S08B05	44.70			NA		
	S08B09	133.20			NA		
	S08B11	85437.50			NA		
	S08B12	826.20			NA		
	S08B14	120.86			NA		
	S08B15	182.42			NA		
	S08B16	78.38			NA		
	S08B17	2309.90			NA		
	S08B18	9515.60			NA		
	S08B19	68.86			NA		
	S08B25	0.68			NA		
	S08B26	172.32			NA		
	S08B27	1.33			NA		
	S08B28	ND			NA		
	S08B30	66.15			NA		
	S08B31	20588.50			NA		
	008SB003	942.40			NA		
	636SB001	296.78			NA		
	636SB002	327.81			NA		
	636SB003	509.06			NA		
	636SB004	ND			NA		
	636SB005	8.15			NA		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
BEQs ¹ (continued)	636SB006	71.84	88.0	NA	NA	NA	NA
	636SB007	127.62			NA		
	636SB008	273.79			NA		
	636SB009	46.84			NA		
	636SB010	0.045			NA		
	636SB011	180.70			NA		
	636SB014	ND			NA		
Benzoic acid	636SB003	ND	3100000	NA	64	400000	NA
	636SB004	ND			63		
	636SB009	40			ND		
Naphthalene	S08B02	110	310000	NA	ND	84000	NA
	S08B03	ND			72		
	S08B04	38			NT		
	S08B12	ND			12000		
	S08B14	200			NT		
	S08B17	130			NT		
	S08B18	430			NT		
	S08B20	90			ND		
	S08B21	ND			670		
	S08B24	130			220		
	S08B28	ND			250		
	008SB001	320			ND		
	636SB004	77			130		
	636SB005	300			ND		
	636SB008	43			NT		
4-Chloroaniline	S08B14	780	31000	NA	NT	700	NA
Acenaphthylene	S08B12	100	230000	NA	ND	293000	NA

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
2-Methylnaphthalene	S08B02	160	310000	NA	ND	126000	NA
	S08B03	ND			46		
	S08B04	60			ND		
	S08B12	ND			63000		
	S08B13	37			NT		
	S08B14	330			NT		
	S08B17	180			NT		
	S08B18	500			NT		
	S08B20	110			ND		
	S08B21	ND			1000		
	S08B22	ND			380		
	S08B24	180			320		
	S08B26	ND			180		
	S08B30	ND			125		
	008SB001	370			NT		
	636SB002	42			ND		
	636SB005	510			ND		
636SB010	52	NT					
Acenaphthene	S08B11	5800	470000	NA	ND	570000	NA
	S08B12	130			ND		
	S08B15	140			NT		
	S08B17	530			NT		
	S08B18	2200			NT		
	S08B28	ND			830		
	S08B30	ND			93		
	S08B31	4700			ND		
	008SB003	51			NT		
	636SB008	81			NT		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Dibenzofuran	S08B03	ND	31000	NA	52	50000	NA
	S08B11	2065			ND		
	S08B14	68			NT		
	S08B15	280			NT		
	S08B17	190.5			NT		
	S08B18	950			NT		
	S08B24	42			ND		
	S08B31	1400			ND		
	008SB001	62			NT		
	636SB005	120			ND		
	636SB008	76			NT		
Fluorene	S08B03	ND	310000	NA	52	560000	NA
	S08B11	5380			NT		
	S08B12	240			ND		
	S08B15	150			NT		
	S08B17	445			NT		
	S08B18	1900			NT		
	S08B28	ND			780		
	S08B31	3700			ND		
	008SB003	52			NT		
	636SB008	170			NT		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Phenanthrene	S08B02	94	230000	NA	ND	1380000	NA
	S08B03	30			810		
	S08B04	67			NT		
	S08B06	46			NT		
	S08B09	110			NT		
	S08B11	65000			110		
	S08B12	3500			42000		
	S08B13	78			NT		
	S08B14	220			NT		
	S08B15	3000			NT		
	S08B17	2600			NT		
	S08B18	10000			NT		
	S08B19	44			NT		
	S08B20	55			ND		
	S08B21	ND			1700		
	S08B22	ND			790		
	S08B24	95			300		
	S08B25	87.5			39		
	S08B28	ND			4500		
	S08B30	140			590		
	S08B31	21500			ND		
	008SB001	130			NT		
	008SB003	1200			NT		
	636SB001	200			NT		
	636SB002	99			ND		
	636SB003	140			52		
	636SB004	ND			75		
	636SB005	270			48		
	636SB007	47			NT		
	636SB008	1700			NT		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Anthracene	S08B03	ND	2300000	NA	180	12000000	NA
	S08B11	16600			32		
	S08B12	210			7100		
	S08B14	36			NT		
	S08B15	90			NT		
	S08B17	1200			NT		
	S08B18	3500			NT		
	S08B21	ND			600		
	S08B22	ND			480		
	S08B24	ND			73		
	S08B28	ND			1200		
	S08B30	ND			110		
	S08B31	7200			ND		
	008SB003	220			NT		
	636SB001	79			NT		
	636SB002	51			ND		
	636SB003	50			ND		
	636SB008	100			NT		
	636SB011	48			NT		
	Carbazole	S08B03			ND		
S08B11		3595	NT				
S08B15		190	NT				
S08B17		260	NT				
S08B18		1200	NT				
S08B28		ND	320				
S08B31		1900	ND				

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Fluoranthene	S08B03	59.5	310000	NA	1100	4300000	NA
	S08B04	44			NT		
	S08B05	130			NT		
	S08B06	39			NT		
	S08B07	46			NT		
	S08B09	310			NT		
	S08B10	46			NT		
	S08B11	110500			400		
	S08B12	5300			7500		
	S08B13	60			NT		
	S08B14	290			NT		
	S08B15	2200			NT		
	S08B16	210			NT		
	S08B17	2750			NT		
	S08B18	12000			NT		
	S08B19	69			24		
	S08B20	ND			78		
	S08B21	ND			350		
	S08B22	ND			1100		
	S08B23	ND			68		
	S08B24	ND			670		
	S08B25	195			ND		
	S08B26	35			ND		
	S08B27	150			ND		
	S08B28	64			3700		
	S08B29	41			NT		
	S08B30	170			83		
	S08B31	29500			42		
	008SB003	1900			NT		
	636SB001	270			NT		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Fluoranthene (continued)	636SB002	275	310000	NA	ND	4300000	NA
	636SB003	480			130		
	636SB004	ND			150		
	636SB005	53			130		
	636SB006	57			NT		
	636SB007	130			NT		
	636SB008	2700			NT		
	636SB009	41			ND		
	636SB010	42			NT		
	636SB011	370			NT		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Pyrene	S08B01	490	230000	NA	NT	4200000	NA
	S08B03	49			1100		
	S08B04	88			NT		
	S08B05	140			NT		
	S08B07	48			NT		
	S08B09	310			NT		
	S08B10	49			NT		
	S08B11	107500			400		
	S08B12	5600			30000		
	S08B13	180			NT		
	S08B14	620			NT		
	S08B15	3700			NT		
	S08B16	360			NT		
	S08B17	3000			NT		
	S08B18	13000			NT		
	S08B19	150			64		
	S08B21	ND			2300		
	S08B22	ND			2900		
	S08B23	ND			53		
	S08B24	ND			2300		
	S08B25	210			54		
	S08B26	49			1300		
	S08B27	280			67		
	S08B28	64			5800		
	S08B29	47			NT		
	S08B30	150			290		
	S08B31	27000			53		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Pyrene (continued)	008SB001	42	230000	NA	NT	4200000	NA
	008SB003	2500			NT		
	636SB001	220			NT		
	636SB002	280			ND		
	636SB003	550			120		
	636SB004	ND			130		
	636SB005	52			110		
	636SB006	120			NT		
	636SB007	180			NT		
	636SB008	2600			NT		
	636SB009	49			120		
	636SB010	47			NT		
636SB011	250	NT					
Butylbenzylphthalate	S08B05	62	1600000	NA	NT	930000	NA
	S08B14	52			NT		
	636SB006	130			NT		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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)anthracene	S08B03	ND	880	NA	590	2000	NA
	S08B09	140			NT		
	S08B11	430200			180		
	S08B12	660			ND		
	S08B15	200			NT		
	S08B17	1950			NT		
	S08B18	7700			NT		
	S08B21	ND			200		
	S08B24	ND			460		
	S08B28	ND			2400		
	S08B31	16000			ND		
	008SB003	940			NT		
	636SB001	130			NT		
	636SB002	182			ND		
	636SB003	270			62		
	636SB004	ND			67		
	636SB005	39			56		
	636SB006	47			NT		
	636SB007	83			NT		
	636SB008	240			NT		
636SB011	170	NT					
636SB014	ND	49					

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Chrysene	S08B03	55.5	88000	NA	660	160000	NA
	S08B05	100			NT		
	S08B09	200			NT		
	S08B11	45000			ND		
	S08B12	2600			9300		
	S08B14	260			NT		
	S08B15	620			NT		
	S08B16	380			NT		
	S08B17	2150			NT		
	S08B18	7600			NT		
	S08B19	64			ND		
	S08B23	ND			46		
	S08B24	ND			670		
	S08B25	68			ND		
	S08B26	ND			320		
	S08B27	130			ND		
	S08B28	ND			2300		
S08B30	ND	120					
S08B31	19000	ND					

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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
Chrysene (continued)	008SB003	1100	88000	NA	NT	160000	NA
	636SB001	180			NT		
	636SB002	210			ND		
	636SB003	360			76		
	636SB004	ND			130		
	636SB005	52			88		
	636SB006	62			NT		
	636SB007	120			NT		
	636SB008	790			NT		
	636SB009	38			ND		
	636SB010	45			NT		
	636SB011	200			NT		
	636SB014	ND			65		
	bis(2-Ethylhexyl)phthalate	S08B04			50		
S08B05		320	NT				
S08B07		80	NT				
S08B10		110	NT				
S08B14		370	NT				
S08B16		140	NT				
S08B19		78	ND				
636SB002		420	NT				

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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(b)fluoranthene	S08B02	27	880	NA	ND	5000	NA
	S08B03	54.5			1300		
	S08B04	44			NT		
	S08B05	86			NT		
	S08B09	190			NT		
	S08B11	41750			210		
	S08B12	2700			ND		
	S08B15	400			NT		
	S08B16	130			NT		
	S08B17	2000			NT		
	S08B18	9200			NT		
	S08B19	98			84		
	S08B22	ND			760		
	S08B23	ND			67		
	S08B24	ND			630		
	S08B26	ND			120		
	S08B28	ND			2400		
	S08B31	18000			ND		
	008SB003	800			NT		
	636SB001	270			NT		
	636SB002	215			ND		
	636SB003	490			85		
	636SB004	ND			130		
	636SB005	42			120		
	636SB006	54			NT		
	636SB007	120			NT		
	636SB008	420			NT		
	636SB009	46			ND		
	636SB011	140			NT		

Table 10.6.5
 Zone G
 SWMU B and AOC 636
 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(k)fluoranthene	S08B03	ND	8800	NA	370	49000	NA
	S08B11	20750			100		
	S08B12	760			5100		
	S08B14	70			NT		
	S08B15	180			NT		
	S08B17	775			NT		
	S08B18	2800			NT		
	S08B27	120			ND		
	S08B28	ND			730		
	S08B31	7400			ND		
	008SB003	830			NT		
	636SB001	160			NT		
	636SB002	180			ND		
	636SB003	270			70		
	636SB004	ND			110		
	636SB005	ND			71		
	636SB006	48			NT		
	636SB007	100			NT		
	636SB008	300			NT		
	636SB009	40			ND		
636SB011	100	NT					
636SB014	ND	56					

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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	S08B01	450	88	NA	NT	8000	NA
	S08B03	ND			790		
	S08B04	46			NT		
	S08B05	36			NT		
	S08B09	100			NT		
	S08B11	31600			140		
	S08B12	480			3800		
	S08B14	110			NT		
	S08B15	120			NT		
	S08B16	65			NT		
	S08B17	1560			NT		
	S08B18	6700			NT		
	S08B19	59			ND		
	S08B21	ND			490		
	S08B22	ND			850		
	S08B23	ND			35		
	S08B26	ND			160		
	S08B28	ND			1600		
	S08B30	ND			57.5		
	S08B31	14000			ND		
	008SB003	730			NT		
	636SB001	200			NT		
	636SB002	187			ND		
	636SB003	360			78		
	636SB004	ND			72		
	636SB005	ND			69		
	636SB006	56			NT		
	636SB007	98			NT		
	636SB008	190			NT		
	636SB009	38			ND		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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 (continued)	636SB011	140	88	NA	NT	8000	NA																																																																																						
	636SB014	ND			50			Indeno(1,2,3-cd)pyrene	S08B03	ND	880	NA	540	14000	NA	S08B11	18400	ND	S08B14	99	NT	S08B17	850	NT	S08B18	2600	NT	S08B24	ND	250	S08B28	ND	760	S08B31	6950	ND	008SB003	290	NT	636SB001	130	NT	636SB002	190	ND	636SB003	170	ND	636SB004	ND	58	636SB005	ND	45	636SB006	52	NT	636SB007	82	NT	636SB008	140	NT	636SB009	38	ND	636SB011	85	NT	Dibenz(a,h)anthracene	S08B03	ND	88	NA	150	2000	NA	S08B11	4555	ND	S08B17	260	NT	S08B18	830	NT	S08B31	2400	ND	636SB001	42	NT	636SB002
Indeno(1,2,3-cd)pyrene	S08B03	ND	880	NA	540	14000	NA																																																																																						
	S08B11	18400			ND																																																																																								
	S08B14	99			NT																																																																																								
	S08B17	850			NT																																																																																								
	S08B18	2600			NT																																																																																								
	S08B24	ND			250																																																																																								
	S08B28	ND			760																																																																																								
	S08B31	6950			ND																																																																																								
	008SB003	290			NT																																																																																								
	636SB001	130			NT																																																																																								
	636SB002	190			ND																																																																																								
	636SB003	170			ND																																																																																								
	636SB004	ND			58																																																																																								
	636SB005	ND			45																																																																																								
	636SB006	52			NT																																																																																								
	636SB007	82			NT																																																																																								
	636SB008	140			NT																																																																																								
636SB009	38	ND																																																																																											
636SB011	85	NT																																																																																											
Dibenz(a,h)anthracene	S08B03	ND	88	NA	150	2000	NA																																																																																						
	S08B11	4555			ND																																																																																								
	S08B17	260			NT																																																																																								
	S08B18	830			NT																																																																																								
	S08B31	2400			ND																																																																																								
	636SB001	42			NT																																																																																								
	636SB002	80			ND																																																																																								
	636SB003	53			ND																																																																																								

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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(g,h,i)perylene	S08B03	ND	230000	NA	570	4.66E08	NA
	S08B11	15850			ND		
	S08B14	120			NT		
	S08B15	94			NT		
	S08B17	740			NT		
	S08B18	2100			NT		
	S08B24	ND			160		
	S08B28	ND			750		
	S08B31	5750			ND		
	008SB003	320			NT		
	636SB001	120			NT		
	636SB002	175			ND		
	636SB003	160			ND		
	636SB004	ND			60		
	636SB005	ND			44		
	636SB006	89			NT		
	636SB007	87			NT		
636SB008	150	NT					
636SB009	38	ND					
636SB011	90	NT					

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Pesticides/PCBs (µg/kg)							
Dieldrin	S08B01	8.5	40	NA	NT	4	NA
	S08B03	ND			610		
	S08B11	46			ND		
	S08B22	ND			66		
	S08B28	ND			7.9		
	008SB002	5.2			NT		
Aldrin	S08B11	41	380000	NA	ND	500	NA
	S08B12	ND			7.6		
Hepachlor	S08B09	3.9	140	NA	NT	23000	NA
Hepachlor epoxide	S08B01	5.1	70	NA	NT	700	NA
	S08B03	ND			250		
	S08B06	2.2			NT		
	S08B09	11			NT		
	S08B19	1.8			ND		
	S08B31	2.6			ND		
Endrin	S08B21	ND	2300	NA	47	1000	NA
	636SB005	ND			8.7		
Endrin aldehyde	S08B12	ND	2300	NA	71	1000	NA
	S08B14	4			NT		
	S08B22	ND			55		
	S08B24	ND			25		
Endrin ketone	S08B01	4.5	2300	NA	NT	1000	NA
	S08B28	ND			6		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Endosulfan II	S08B22	ND	47000	NA	19	18000	NA
4,4'-DDE	S08B01	13	1900.0	NA	NT	54000	NA
	S08B03	ND			43		
	S08B06	15			NT		
	S08B14	12			NT		
	S08B16	28			NT		
	S08B17	17			NT		
	S08B18	5.2			NT		
	S08B19	35			110		
	S08B22	ND			38		
	S08B24	ND			47		
	S08B27	ND			4.4		
	S08B28	ND			27		
	S08B31	77			ND		
	636SB001	11			NT		
	636SB002	117.5			ND		
	636SB003	5.7			ND		
636SB004	ND	120					
636SB005	14	ND					
636SB006	45	NT					
636SB007	5.2	NT					
636SB008	22	NT					
636SB009	17	ND					
636SB011	6.5	NT					
636SB013	3.1	ND					

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
4,4'-DDD	S08B01	45	2700	NA	NT	16000	NA
	S08B04	8.4			NT		
	S08B14	38			NT		
	S08B16	24			NT		
	S08B17	7.8			NT		
	S08B22	ND			71		
	S08B24	ND			130		
	S08B26	ND			23		
	S08B28	ND			58		
	S08B31	28.5			ND		
	636SB001	7.3			NT		
	636SB002	179			ND		
	636SB004	ND			180		
	636SB006	12			NT		
	636SB007	9.6			NT		
636SB008	20	NT					
636SB009	24	NT					
636SB011	5	NT					
636SB014	3.1	ND					

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
4,4'-DDT	S08B06	6.6	1900	NA	NT	32000	NA
	S08B19	29			200		
	S08B31	25			ND		
	008SB003	6.3			NT		
	636SB002	16			ND		
	636SB003	3.8			ND		
	636SB004	ND			34		
	636SB006	8.7			NT		
	636SB007	15			NT		
	636SB008	38			NT		
	636SB011	8.7			NT		
alpha-Chlordane	S08B03	ND	1800	NA	240	10000	NA
	S08B09	11			NT		
	S08B12	2.8			21		
	S08B16	7.3			NT		
	S08B17	7.3			NT		
	S08B24	ND			4.2		
	S08B31	11			ND		
	636SB002	3.2			ND		
	636SB005	3.8			ND		
	636SB006	3.4			NT		
	636SB007	2.2			NT		
	636SB008	3.1			NT		
	636SB009	6.3			ND		
	636SB011	4.2			NT		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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	S08B01	3.7	1800	NA	NT	10000	NA
	S08B03	3			ND		
	S08B06	4.4			NT		
	S08B07	2.8			NT		
	S08B08	4.5			NT		
	S08B09	51			NT		
	S08B12	4.4			ND		
	S08B16	22			NT		
	S08B17	33			NT		
	S08B19	5.1			8.4		
	S08B22	ND			34		
	S08B24	ND			19		
	S08B26	ND			8		
	S08B27	ND			2.8		
	S08B28	ND			14		
	S08B31	95.5			ND		
	008SB003	9.2			NT		
	636SB001	5.4			NT		
	636SB002	11.8			ND		
	636SB003	2.1			ND		
	636SB004	3.6			24		
	636SB005	20			ND		
	636SB006	4.6			NT		
	636SB007	11			NT		
	636SB008	19			NT		
	636SB009	51			ND		
	636SB011	5.3			NT		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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	
Aroclor-1260	S08B08	77	320	NA	NT	1000	NA	
	S08B12	ND			570			
	636SB004	ND			410			
	636SB005	320			ND			
	636SB007	350			NT			
	636SB008	920			NT			
	636SB009	69			ND			
	636SB010	12			NT			
	636SB011	36			NT			
	636SB012	8.5			NT			
	636SB013	28			ND			
	Explosives/Propellants (µg/kg)							
	Hydrazine	008SB001	274	210	NA	NT	0.088	NA
008SB002		88.4			NT			
008SB003		76.4			NT			
636SB002		19.1			67			
636SB003		19.3			ND			
636SB004		ND			13.9			
636SB005		ND			19.1			
636SB006		12.8			NT			
636SB008	14.4			NT				
Dioxins (ng/kg)								
Dioxin (2,3,7,8-TCDD TEQs) ¹	636SB002	3.8765	1000	NA	NT	1900	NA	

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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)							
Aluminium (Al)	S08B01	1700	7800.0	18700	NA	1000000	23600
	S08B02	4500			5600		
	S08B03	3650			8700		
	S08B04	2700			NT		
	S08B05	4000			NT		
	S08B06	2500			NT		
	S08B07	3900			NT		
	S08B08	4400			NT		
	S08B09	5100			NT		
	S08B10	2600			NT		
	S08B11	6705			9400		
	S08B12	2200			4700		
	S08B13	8100			NT		
	S08B14	1300			NT		
	S08B15	2400			NT		
	S08B16	1900			NT		
	S08B17	3625			NT		
	S08B18	2200			NT		
	S08B19	3100			3700		
	S08B20	2000			9900		
	S08B21	3900			7700		
	S08B22	2800			3400		
	S08B23	4200			17000		
	S08B24	1300			3600		
	S08B25	1130			3200		
	S08B26	12000			3900		
	S08B27	860			820		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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
Aluminum (Al) (continued)	S08B28	600	7800.0	18700	5900	100000	23600
	S08B29	640			NT		
	S08B30	710			3175		
	S08B31	4605			14000		
	008SB001	3970			NT		
	008SB002	5230			NT		
	008SB003	3440			NT		
	636SB001	5900			NT		
	636SB002	6435			8110		
	636SB003	12100			12300		
	636SB004	2690			10100		
	636SB005	2200			11700		
	636SB006	3950			NT		
	636SB007	7450			NT		
	636SB008	10100			NT		
636SB009	5360	36500					
636SB010	6770	NT					
636SB011	3890	NT					
636SB012	1840	NT					
636SB013	9510	12800					
636SB014	8330	16600					

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Antimony (Sb)	S08B03	ND	3.1	2.89	32	5	NL
	S08B11	7.4			ND		
	S08B14	7.6			NT		
	S08B22	ND			23		
	S08B24	ND			21		
	S08B31	ND			7.6		
	636SB009	6.4			ND		
	636SB010	0.66			NT		
	636SB011	1.5			NT		
	636SB013	ND			0.65		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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)	S08B01	10	0.43	17.2 ^a	NT	29	15.5 ^a
	S08B02	20			8		
	S08B03	2.95			21		
	S08B04	5.6			NT		
	S08B05	1.6			NT		
	S08B06	5			NT		
	S08B07	1.9			NT		
	S08B08	6.9			NT		
	S08B09	5.9			NT		
	S08B10	3.1			NT		
	S08B11	9.3			9.6		
	S08B12	2.2			2.2		
	S08B13	8.6			NT		
	S08B14	6.2			NT		
	S08B15	2.2			NT		
	S08B16	3.5			NT		
	S08B17	7.05			NT		
	S08B18	3.8			NT		
	S08B19	5.9			5.7		
	S08B20	8.4			12		
	S08B21	3.6			ND		
	S08B22	2.6			6.6		
	S08B23	ND			12		
	S08B24	150			7.9		
	S08B25	7.9			ND		
	S08B26	7.6			2.8		
	S08B27	4			3		
	S08B28	3.8			6.5		
	S08B29	2.1			NT		
	S08B30	3			1.45		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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) (continued)	S08B31	8.85	0.43	17.2*	7.6	29	15.5*
	008SB001	12.7			NT		
	008SB002	1.5			NT		
	008SB003	6.7			NT		
	636SB001	7.1			NT		
	636SB002	7.05			5.1		
	636SB003	11.4			13.5		
	636SB004	2.7			9.2		
	636SB005	22.8			12.3		
	636SB006	2.3			NT		
	636SB007	5.1			NT		
	636SB008	6.7			NT		
	636SB009	5.5			18.4		
	636SB010	22.4			NT		
	636SB011	4.7			NT		
636SB012	2.1			NT			
636SB013	17.2			13.2			
636SB014	1.2			8.4			

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Barium (Ba)	S08B01	29	550.0	109	NT	1600	64.5
	S08B02	63			27		
	S08B03	11.15			500		
	S08B04	15			NT		
	S08B05	7.6			NT		
	S08B06	52			NT		
	S08B07	9.1			NT		
	S08B08	28			NT		
	S08B09	28			NT		
	S08B10	14			NT		
	S08B11	58.1			93		
	S08B12	14			69		
	S08B13	28			NT		
	S08B14	36			NT		
	S08B15	13			NT		
	S08B16	13			NT		
	S08B17	50.6			NT		
	S08B18	34			NT		
	S08B19	45			13		
	S08B20	42			40		
	S08B21	12			35		
	S08B22	15			100		
	S08B23	3.7			39		
	S08B24	120			77		
	S08B25	7.0			4.8		
	S08B26	20			12		
	S08B27	4.8			5.6		
	S08B28	4.3			62		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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
Barium (Ba) (continued)	S08B29	5	550.0	109	NT	1600	64.5
	S08B30	5			7.1		
	S08B31	67.1			40		
	008SB001	16.2			NT		
	008SB002	7.9			NT		
	008SB003	24.5			NT		
	636SB001	35.7			NT		
	636SB002	48.1			25.7		
	636SB003	26.3			35.8		
	636SB004	10.4			37.6		
	636SB005	52.4			29.4		
	636SB006	10.9			NT		
	636SB007	99.1			NT		
	636SB008	48.0			NT		
	636SB009	39.0			43.6		
636SB010	43.7	NT					
636SB011	28.8	NT					
636SB012	11.9	NT					
636SB013	34.3	40.7					
636SB014	7.1	72.2					

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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)	S08B11	ND	0.15	1.20	1.0	63	1.63
	S08B22	ND			0.6		
	S08B23	ND			1.2		
	S08B24	0.69			ND		
	008SB001	0.23			ND		
	008SB002	0.13			ND		
	008SB003	0.35			ND		
	636SB001	0.38			ND		
	636SB002	0.41			0.28		
	636SB003	0.66			0.71		
	636SB004	0.25			0.57		
	636SB005	0.51			0.82		
	636SB006	0.18			NT		
	636SB007	0.35			NT		
	636SB008	0.48			NT		
636SB009	1.0	1.6					
636SB010	0.53	NT					
636SB011	0.22	NT					
636SB012	0.18	NT					
636SB013	0.85	0.91					
636SB014	0.14	0.77					

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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
Cadmium (Cd)	S08B03	ND	3.9	1.07	5.9	8	0.48
	S08B08	0.7			NT		
	S08B11	1.85			ND		
	S08B12	0.63			2.0		
	S08B14	1.1			NT		
	S08B17	0.77			NT		
	S08B19	0.59			ND		
	S08B20	ND			1.6		
	S08B21	ND			1.0		
	S08B22	ND			1.2		
	S08B23	ND			2.0		
	S08B24	ND			1.2		
	S08B29	0.6			NT		
	008SB003	0.21			NT		
	636SB001	0.56			NT		
	636SB002	0.33			ND		
	636SB003	0.20			0.29		
	636SB004	0.26			0.39		
	636SB005	0.12			0.67		
	636SB006	0.22			NT		
	636SB007	0.41			NT		
	636SB008	0.41			NT		
	636SB009	0.49			0.46		
	636SB010	0.24			NT		
636SB011	0.32	NT					
636SB012	0.37	NT					
636SB013	0.11	0.1					
636SB014	ND	0.19					

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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)	S08B01	11000	NL	NL	NT	NL	NL
	S08B02	11000			17000		
	S08B03	23500			11000		
	S08B04	19000			NT		
	S08B05	10000			NT		
	S08B06	88000			NT		
	S08B07	7500			NT		
	S08B08	19000			NT		
	S08B09	18000			NT		
	S08B10	43000			NT		
	S08B11	9950			5000		
	S08B12	210000			74000		
	S08B13	58000			NT		
	S08B14	38000			NT		
	S08B15	140000			NT		
	S08B16	65000			NT		
	S08B17	43850			NT		
	S08B18	160000			NT		
	S08B19	57000			39000		
	S08B20	79000			45000		
	S08B21	8800			43000		
	S08B22	56000			47000		
	S08B23	5800			16000		
	S08B24	50000			20000		
	S08B25	257500			8700		
	S08B26	41000			24000		
	S08B27	330000			18000		
	S08B28	320000			81000		
	S08B29	330000			NT		
	S08B30	330000			35450		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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) (continued)	S08B3101	98500	NL	NL	55000	NL	NL
	008SB001	4760			NT		
	008SB002	6270			NT		
	008SB003	9470			NT		
	636SB001	39400			NT		
	636SB002	23900			1660		
	636SB003	35900			32000		
	636SB004	156000			25300		
	636SB005	7920			51300		
	636SB006	34300			NT		
	636SB007	10000			NT		
	636SB008	26500			NT		
	636SB009	15700			14700		
	636SB010	54400			NT		
	636SB011	50700			NT		
636SB012	236000			NT			
636SB013	18400			18400			
636SB014	4090			9890			

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Chromium (Cr)	S08B01	21	39 VI	42.8	NT	1000000	43.4*
	S08B02	6.5	7800 III		34		
	S08B03	6.1			103		
	S08B04	6.6			NT		
	S08B05	8			NT		
	S08B06	7.8			NT		
	S08B07	6.5			NT		
	S08B08	20			NT		
	S08B09	17			NT		
	S08B10	8.2			NT		
	S08B11	40.9			23		
	S08B12	18			22		
	S08B13	27			NT		
	S08B14	37			NT		
	S08B15	11			NT		
	S08B17	52			NT		
	S08B18	48			NT		
	S08B19	25			14		
	S08B20	4.2			33		
	S08B21	4.5			35		
	S08B22	3.7			26		
	S08B23	4.5			49		
	S08B24	5.4			32		
	S08B25	6.25			5.1		
	S08B26	24			9.9		
	S08B27	11			5.1		
	S08B28	5.6			60		
	S08B29	4.1			NT		
	S08B30	5			5.75		
	S08B31	103			29		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Chromium (Cr) (continued)	008SB001	4.9	39 VI	42.8	NT	1000000	43.4 ^a
	008SB002	5.8	7800 III		NT		
	008SB003	12.3			NT		
	636SB001	19.2			NT		
	636SB002	13.25			12.4		
	636SB003	24.2			24.1		
	636SB004	5.8			23.1		
	636SB005	4.6			36.4		
	636SB006	6.5			NT		
	636SB007	13.8			NT		
	636SB008	26.0			NT		
	636SB009	64.2			54.4		
	636SB010	15.9			NT		
	636SB011	8.6			NT		
636SB012	5.0		NT				
636SB013	19.2		27.0				
636SB014	7.3		25.4				

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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)	S08B01	7.3	470.0	6.60	NT	2000	8.14
	S08B02	1.4			1.5		
	S08B03	1.2			12		
	S08B04	2.1			NT		
	S08B06	1.4			NT		
	S08B08	1.9			NT		
	S08B09	1.5			NT		
	S08B11	4.95			4.7		
	S08B12	3.4			3.5		
	S08B13	3.2			NT		
	S08B14	3.2			NT		
	S08B15	2.2			NT		
	S08B17	2.9			NT		
	S08B20	1.9			3.9		
	S08B21	ND			2.8		
	S08B22	ND			7		
	S08B23	1.2			7.9		
	S08B24	3			3.5		
	S08B25	2.35			ND		
	S08B26	3.6			ND		
	S08B27	2.4			ND		
	S08B28	2.3			3.6		
	S08B29	2.7			NT		
	S08B30	2.1			1.5		
	S08B31	7.35			4.3		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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) (continued)	008SB002	0.55	470.0	6.60	NT	2000	8.14
	008SB003	2.20			NT		
	636SB001	1.8			NT		
	636SB002	9.95			1.9		
	636SB003	3.1			3.2		
	636SB004	14.0			2.7		
	636SB005	3.0			2.9		
	636SB006	0.95			NT		
	636SB007	1.5			NT		
	636SB008	5.7			NT		
	636SB009	11.9			9.4		
	636SB010	2.6			NT		
	636SB011	1.6			NT		
	636SB012	2.1			NT		
	636SB013	9.6			4.2		
636SB014	0.96	4.2					

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Copper (Cu)	S08B01	400	27000	260	NT	920	32.6
	S08B02	11			40		
	S08B03	20.5			2700		
	S08B04	17			NT		
	S08B05	7.9			NT		
	S08B06	12			NT		
	S08B07	4.7			NT		
	S08B08	120			NT		
	S08B09	96			NT		
	S08B10	33			NT		
	S08B11	159			84		
	S08B12	39			14000		
	S08B13	250			NT		
	S08B14	150			NT		
	S08B15	37			NT		
	S08B17	74.7			NT		
	S08B20	9.1			27		
	S08B21	ND			46		
	S08B22	ND			400		
	S08B23	ND			64		
	S08B24	17			350		
	S08B25	9.3			ND		
	S08B26	13			9.7		
	S08B27	3.1			ND		
	S08B28	3.5			71		
	S08B29	4.4			ND		
	S08B30	6.6			3.2		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Copper (Cu) (continued)	S08B31	81.55	27000	260	13	920	32.6
	008SB001	5.0			NT		
	008SB002	6.5			NT		
	008SB003	60.4			NT		
	636SB001	1330			NT		
	636SB002	19.5			2.4		
	636SB003	18.0			30.6		
	636SB004	15.3			109.0		
	636SB005	12.8			134.0		
	636SB006	45.7			NT		
	636SB007	515.0			NT		
	636SB008	68.5			NT		
	636SB009	235			33.7		
	636SB010	13.6			NT		
	636SB011	60.4			NT		
636SB012	10.6			NT			
636SB013	160			15.6			
636SB014	0.76			26.6			
Cyanide (CN)	008SB003	0.3	160	0.38	NT	40	0.22
	636SB002	0.22			NT		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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)	S08B01	8600	2300	NL	NT	NL	NL
	S08B02	2200			53000		
	S08B03	2900			78000		
	S08B04	3600			NT		
	S08B05	1700			NT		
	S08B06	3800			NT		
	S08B07	3400			NT		
	S08B08	7700			NT		
	S08B09	7900			NT		
	S08B10	2900			NT		
	S08B11	26900			16000		
	S08B12	4100			15000		
	S08B13	8800			NT		
	S08B14	5500			NT		
	S08B15	3500			NT		
	S08B16	4100			NT		
	S08B17	6065			NT		
	S08B18	4200			NT		
	S08B19	5700			6100		
	S08B20	3300			76000		
	S08B21	2100			9400		
	S08B22	1600			11000		
	S08B23	1900			37000		
	S08B24	3400			7500		
	S08B25	3325			2300		
	S08B26	14000			3000		
	S08B27	3800			3500		
	S08B28	2900			6900		
	S08B29	2100			NT		
	S08B30	2500			3365		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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) (continued)	S08B31	6730	2300.0	NL	15000	NL	NL
	008SB001	1650			NT		
	008SB002	2070			NT		
	008SB003	6760			NT		
	636SB001	7560			NT		
	636SB002	7400			11300		
	636SB003	14600			14700		
	636SB004	3460			10800		
	636SB005	4470			14100		
	636SB006	2770			NT		
	636SB007	8600			NT		
	636SB008	10500			NT		
	636SB009	12200			37500		
	636SB010	6730			NT		
	636SB011	4900			NT		
636SB012	2450			NT			
636SB013	10200			16800			
636SB014	1790			14400			

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Lead (Pb)	S08B01	310	400.0	181	NT	400	66.3
	S08B02	11			9.8		
	S08B03	8.15			1400		
	S08B04	19			NT		
	S08B05	19			NT		
	S08B06	41			NT		
	S08B07	6.8			NT		
	S08B08	76			NT		
	S08B09	53			NT		
	S08B10	21			NT		
	S08B11	187			40		
	S08B12	29			630		
	S08B13	34			NT		
	S08B14	230			NT		
	S08B15	41			NT		
	S08B16	340			NT		
	S08B17	160			NT		
	S08B18	23			NT		
	S08B19	180			120		
	S08B20	6.3			47		
	S08B21	6.1			37		
	S08B22	2.3			390		
	S08B23	29			38		
	S08B24	11			310		
	S08B25	11.4			3		
	S08B26	56			19		
	S08B27	15			2.4		
	S08B28	9.4			140		
	S08B29	4.4			NT		
	S08B30	8.5			7.0		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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
Lead (Pb) (continued)	S08B31	95.1	400.0	181	20	400	66.3
	008SB001	10.6			NT		
	008SB002	6.6			NT		
	008SB003	48.3			NT		
	636SB001	102			NT		
	636SB002	453.5			13.7		
	636SB003	42.2			40.1		
	636SB004	14.1			93.2		
	636SB005	6.9			19.0		
	636SB006	16.3			NT		
	636SB007	97.1			NT		
	636SB008	87.5			NT		
	636SB009	394			60.1		
	636SB010	51.8			NT		
	636SB011	43.9			NT		
636SB012	5.9			NT			
636SB013	66.2			42.1			
636SB014	4.9			78.0			

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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)	S08B01	420	NL	NL	NT	NL	NL
	S08B02	270			4400		
	S08B03	405			3800		
	S08B04	2000			NT		
	S08B05	260			NT		
	S08B06	1200			NT		
	S08B07	440			NT		
	S08B08	1400			NT		
	S08B09	1200			ND		
	S08B10	550			NT		
	S08B11	1570			2800		
	S08B12	2300			1000		
	S08B13	2200			NT		
	S08B14	610			NT		
	S08B15	2600			NT		
	S08B16	800			NT		
	S08B17	1890			NT		
	S08B18	3200			NT		
	S08B19	1100			2200		
	S08B20	990			2400		
	S08B21	260			1900		
	S08B22	670			1300		
	S08B23	140			4700		
	S08B24	620			1000		
	S08B25	2450			320		
	S08B26	2300			1000		
	S08B27	3200			420		
	S08B28	3100			3100		
	S08B29	3300			ND		
	S08B30	3100			669.5		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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) (continued)	S08B31	4100	NL	NL	4500	NL	NL
	008SB001	218			NT		
	008SB002	300			NT		
	008SB003	774			NT		
	636SB001	1700			NT		
	636SB002	1073.5			522		
	636SB003	2350			3090		
	636SB004	1610			2010		
	636SB005	250			3940		
	636SB006	830			NT		
	636SB007	1070			NT		
	636SB008	1990			NT		
	636SB009	1330			7770		
	636SB010	1530			NT		
	636SB011	702			NT		
636SB012	2550			NT			
636SB013	1370			2980			
636SB014	262			2860			

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Manganese (Mn)	S08B01	41	180.0	325	NT	1100	291
	S08B02	13			81		
	S08B03	25.5			520		
	S08B04	90			NT		
	S08B05	22			NT		
	S08B06	79			NT		
	S08B07	24			NT		
	S08B08	78			NT		
	S08B09	50			NT		
	S08B10	29			NT		
	S08B11	282			130		
	S08B12	150			90		
	S08B13	130			NT		
	S08B14	54			NT		
	S08B15	150			NT		
	S08B16	52			NT		
	S08B17	53.3			NT		
	S08B18	110			NT		
	S08B19	82			140		
	S08B20	69			210		
	S08B21	13			120		
	S08B22	36			100		
	S08B23	5.7			1600		
	S08B24	33			72		
	S08B25	133			18		
	S08B26	270			42		
	S08B27	180			69		
	S08B28	160			80		
	S08B29	270			NT		
	S08B30	170			30.4		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Manganese (Mn) (continued)	S08B31	113	180.0	325	140	1100	291
	008SB001	16.0			NT		
	008SB002	19.5			NT		
	008SB003	113			NT		
	636SB001	86.8			NT		
	636SB002	60.95			23.0		
	636SB003	253			186		
	636SB004	86.4			107		
	636SB005	21.8			425		
	636SB006	40.8			NT		
	636SB007	71.4			NT		
	636SB008	82.5			NT		
	636SB009	106			706		
	636SB010	80.7			NT		
	636SB011	75.9			NT		
636SB012	154			NT			
636SB013	37.3			229			
636SB014	7.2			244			

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Mercury (Hg)	S08B01	0.63	2.3	1.03	NT	2.1	0.31
	S08B02	0.03			0.067		
	S08B03	0.075			6.9		
	S08B04	0.023			NT		
	S08B05	0.044			NT		
	S08B06	0.065			NT		
	S08B07	0.042			NT		
	S08B08	0.62			NT		
	S08B09	0.2			NT		
	S08B10	0.086			NT		
	S08B11	0.63			0.12		
	S08B12	0.021			5.1		
	S08B13	0.13			NT		
	S08B14	0.19			NT		
	S08B15	0.11			NT		
	S08B16	0.033			NT		
	S08B17	0.14			NT		
	S08B18	0.027			NT		
	S08B19	0.037			0.056		
	S08B20	0.014			0.15		
	S08B21	0.027			0.073		
	S08B22	0.018			0.25		
	S08B23	0.017			0.15		
	S08B24	0.012			2.1		
	S08B25	0.03			ND		
	S08B26	0.074			0.058		
	S08B28	ND			0.13		
	S08B30	0.012			0.435		
	S08B31	0.15			0.058		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Mercury (Hg) (continued)	636SB001	0.07	2.3	1.03	NT	2.1	0.31
	636SB002	0.085			ND		
	636SB003	0.12			1.1		
	636SB004	0.13			0.35		
	636SB005	ND			0.19		
	636SB006	0.04			NT		
	636SB007	0.34			NT		
	636SB008	0.41			NT		
	636SB009	0.21			0.31		
	636SB010	0.26			NT		
	636SB011	0.32			NT		
	636SB012	0.25			NT		
	636SB013	0.06			0.21		
	636SB014	0.04			1.1		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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)	S08B01	13	160.0	20.6	NT	130	18.3
	S08B02	ND			16		
	S08B03	ND			79		
	S08B04	6.9			NT		
	S08B06	5.8			NT		
	S08B08	8.1			NT		
	S08B09	9.3			ND		
	S08B11	20.15			8.9		
	S08B12	13			22		
	S08B13	25			NT		
	S08B14	13			NT		
	S08B15	8.5			NT		
	S08B16	5.6			NT		
	S08B17	13.95			NT		
	S08B18	9.9			NT		
	S08B19	13			5.8		
	S08B20	5.3			11		
	S08B21	ND			14		
	S08B22	ND			32		
	S08B23	ND			16		
	S08B24	6.5			21		
	S08B25	7.3			ND		
	S08B26	8.8			ND		
	S08B27	8.4			ND		
	S08B28	7.7			14		
	S08B29	8			NT		
	S08B30	7.4			5.1		
	S08B31	25.1			10		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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) (continued)	008SB001	2.7	160.0	20.6	NT	130	18.3
	008SB002	2.2			NT		
	008SB003	8.2			NT		
	636SB001	7.8			NT		
	636SB002	5.9			1.6		
	636SB003	9.2			9.0		
	636SB004	5.5			9.0		
	636SB005	8.1			11.9		
	636SB006	27.0			NT		
	636SB007	5.1			NT		
	636SB008	8.4			NT		
	636SB009	34.4			17.1		
	636SB010	8.8			NT		
	636SB011	5.1			NT		
636SB012	6.3			NT			
636SB013	20.1			8.3			
636SB014	1.9			8.7			

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Potassium (K)	S08B01	130	NL	NL	NT	NL	NL
	S08B02	110			730		
	S08B03	130			1200		
	S08B04	270			NT		
	S08B06	210			NT		
	S08B07	140			NT		
	S08B08	540			NT		
	S08B09	410			NT		
	S08B10	140			NT		
	S08B11	545			1400		
	S08B12	290			780		
	S08B13	630			NT		
	S08B14	150			NT		
	S08B15	320			NT		
	S08B16	160			NT		
	S08B17	603.5			NT		
	S08B18	660			NT		
	S08B19	230			330		
	S08B20	210			840		
	S08B21	120			1000		
	S08B22	140			410		
	S08B23	ND			2300		
	S08B24	190			390		
	S08B25	309			ND		
	S08B26	990			330		
	S08B27	440			170		
	S08B28	310			1200		
	S08B29	320			ND		
	S08B30	280			159		
	S08B31	1365			1700		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Potassium (K) (continued)	008SB003	318	NL	NL	NT	NL	NL
	636SB001	510			NT		
	636SB002	274			ND		
	636SB003	990			1420		
	636SB004	313			923		
	636SB005	ND			1260		
	636SB006	247			NT		
	636SB007	463			NT		
	636SB008	599			NT		
	636SB009	634			3970		
	636SB010	652			NT		
	636SB011	264			NT		
	636SB012	522			NT		
	636SB013	709			1560		
636SB014	ND			1690			
Selenium (Se)	008SB001	0.48	39.0	1.22	NT	5	1.26
	008SB003	0.51			NT		
	636SB001	0.38			NT		
	636SB002	0.56			0.66		
	636SB003	0.73			0.59		
	636SB004	ND			0.81		
	636SB005	0.50			0.79		
	636SB008	0.74			ND		
	636SB009	ND			2.2		
	636SB010	0.35			NT		
	636SB013	0.85			0.90		
	636SB014	0.89			0.84		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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	S08B01	1.2	39	NL	NT	34	NL
	S08B03	ND			3.4		
	636SB009	ND			0.81		
Sodium (Na)	S08B01	110	NL	NL	NT	NL	NL
	S08B02	ND			1100		
	S08B03	435			3200		
	S08B04	290			NT		
	S08B06	170			NT		
	S08B07	370			NT		
	S08B08	650			NT		
	S08B09	310			NT		
	S08B10	690			NT		
	S08B11	301.5			3300		
	S08B12	240			450		
	S08B13	950			NT		
	S08B14	210			NT		
	S08B15	220			NT		
	S08B16	370			NT		
	S08B17	176.5			NT		
	S08B18	410			NT		
	S08B19	150			190		
	S08B20	150			2700		
	S08B21	220			1400		
	S08B22	150			920		
	S08B23	ND			3900		
	S08B24	140			710		
	S08B25	422			170		

Table 10.6.5
 Zone G
 SWMU 8 and AOC 636
 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
Sodium (Na) (continued)	S08B26	1000	NL	NL	1200	NL	NL
	S08B27	240			870		
	S08B28	240			1100		
	S08B29	220			NT		
	S08B30	310			399		
	S08B31	662.5			4200		
	008SB002	240			NT		
	008SB003	275			NT		
	636SB001	635			NT		
	636SB003	748			3700		
	636SB004	ND			2260		
	636SB005	ND			2770		
	636SB007	1180			NT		
	636SB008	802			NT		
	636SB009	1580			11600		
636SB010	553			NT			
636SB011	793			NT			
636SB012	342			NT			
636SB013	646			3470			
636SB014	723			2160			

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Thallium (Tl)	008SB003	0.65	0.63	0.85	NT	0.95	0.95
	636SB001	0.82			NT		
	636SB002	0.42			ND		
	636SB003	0.92			0.61		
	636SB005	ND			0.88		
	636SB009	0.73			1.0		
	636SB010	0.59			NT		
	636SB013	ND			0.90		
	636SB014	ND			0.54		
	Tin (Sn)	636SB009			34.2		
636SB010		1.1	NT				
636SB011		4.2	NT				
636SB012		1.1	NT				
636SB014		0.75	ND				

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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)	S08B01	6.5	55.0	60.9	NT	6000	72.5
	S08B02	8.4			22		
	S08B03	6.7			96		
	S08B04	6.1			NT		
	S08B05	13			NT		
	S08B06	6.9			NT		
	S08B07	6.3			NT		
	S08B08	18			NT		
	S08B09	13			NT		
	S08B10	6.2			NT		
	S08B11	28.3			25		
	S08B12	14			15		
	S08B13	28			NT		
	S08B14	8			NT		
	S08B15	20			NT		
	S08B16	15			NT		
	S08B17	24.25			NT		
	S08B18	9			NT		
	S08B19	13			13		
	S08B20	6.8			30		
	S08B21	4.3			27		
	S08B22	3.3			58		
	S08B23	4.2			16		
	S08B24	8.7			26		
	S08B25	5.25			4		
	S08B26	28			9.3		
	S08B27	8.1			4.9		
	S08B28	4.4			20		
	S08B29	5.8			NT		
	S08B30	4			5.15		

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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) (continued)	S08B31	17.75	55.0	60.9	33	6000	72.5
	008SB001	4.2			NT		
	008SB002	5.0			NT		
	008SB003	13.3			NT		
	636SB001	20.7			NT		
	636SB002	15.6			19.6		
	636SB003	30.4			31.7		
	636SB004	5.5			25.7		
	636SB005	12.7			30.8		
	636SB006	7.6			NT		
	636SB007	16.8			NT		
	636SB008	21.2			NT		
	636SB009	15.8			82.0		
	636SB010	18.5			NT		
	636SB011	9.5			NT		
636SB012	9.5			NT			
636SB013	23.6			30.6			
636SB014	6.9			33.7			

Table 10.6.5
Zone G
SWMU 8 and AOC 636
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
Zinc (Zn)	S08B01	500	2300.0	519	NT	12000	145
	S08B02	8.7			110		
	S08B03	27.5			2300		
	S08B04	19			NT		
	S08B05	39			NT		
	S08B06	53			NT		
	S08B07	13			NT		
	S08B08	190			NT		
	S08B09	120			NT		
	S08B10	44			NT		
	S08B11	609.5			130		
	S08B12	110			3300		
	S08B13	170			NT		
	S08B14	640			NT		
	S08B15	54			NT		
	S08B16	87			NT		
	S08B17	157			NT		
	S08B18	93			NT		
	S08B19	130			50		
	S08B20	16			62		
	S08B21	2.8			69		
	S08B22	4.9			810		
	S08B23	5.7			110		
	S08B24	9.7			550		
	S08B25	23.9			4.9		
	S08B26	40			26		
	S08B27	23			6.7		
	S08B28	16			160		
	S08B29	14			NT		
	S08B30	18			10.4		

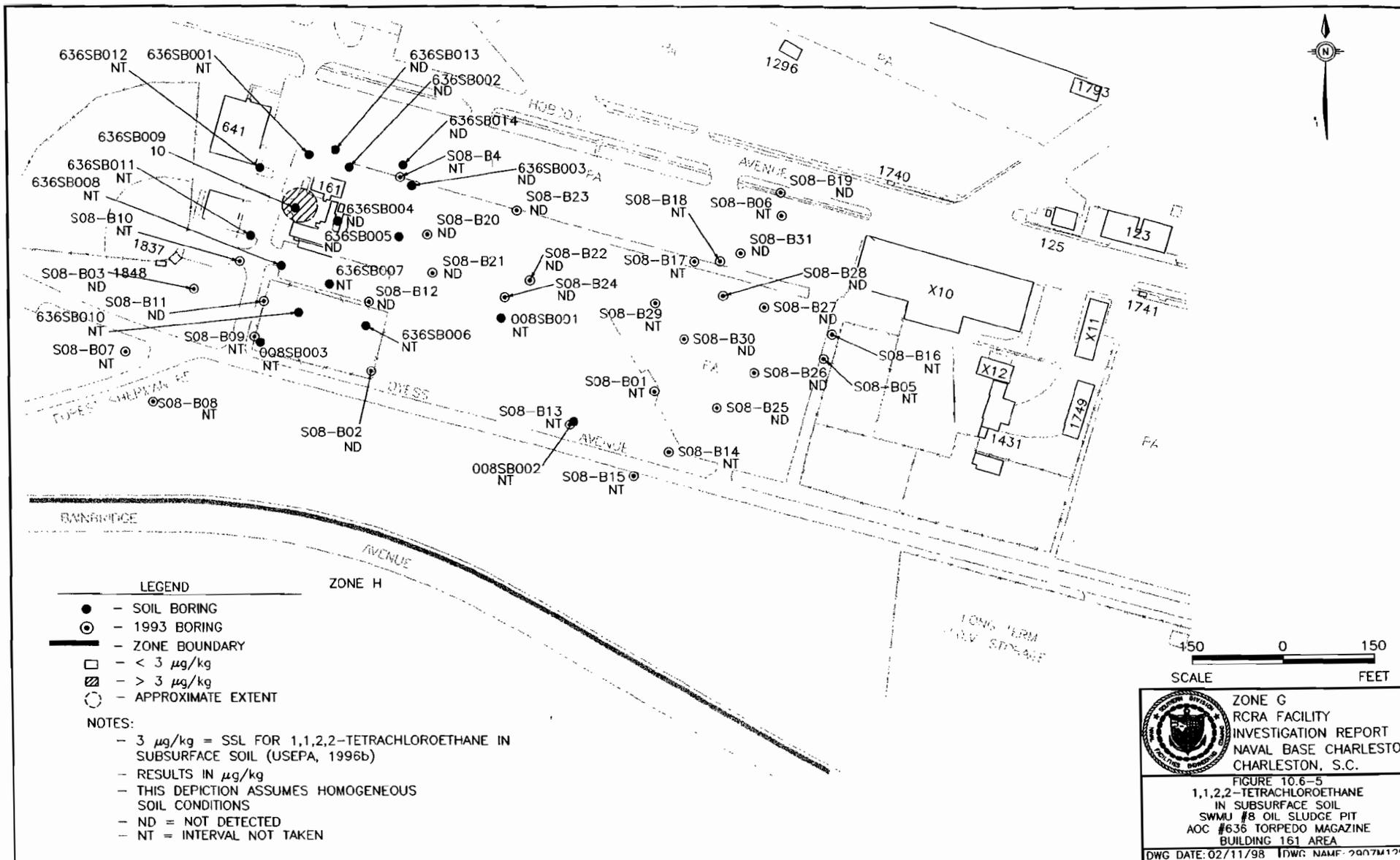
Table 10.6.5
Zone G
SWMU 8 and AOC 636
Analytes Detected in Surface and Subsurface Soil

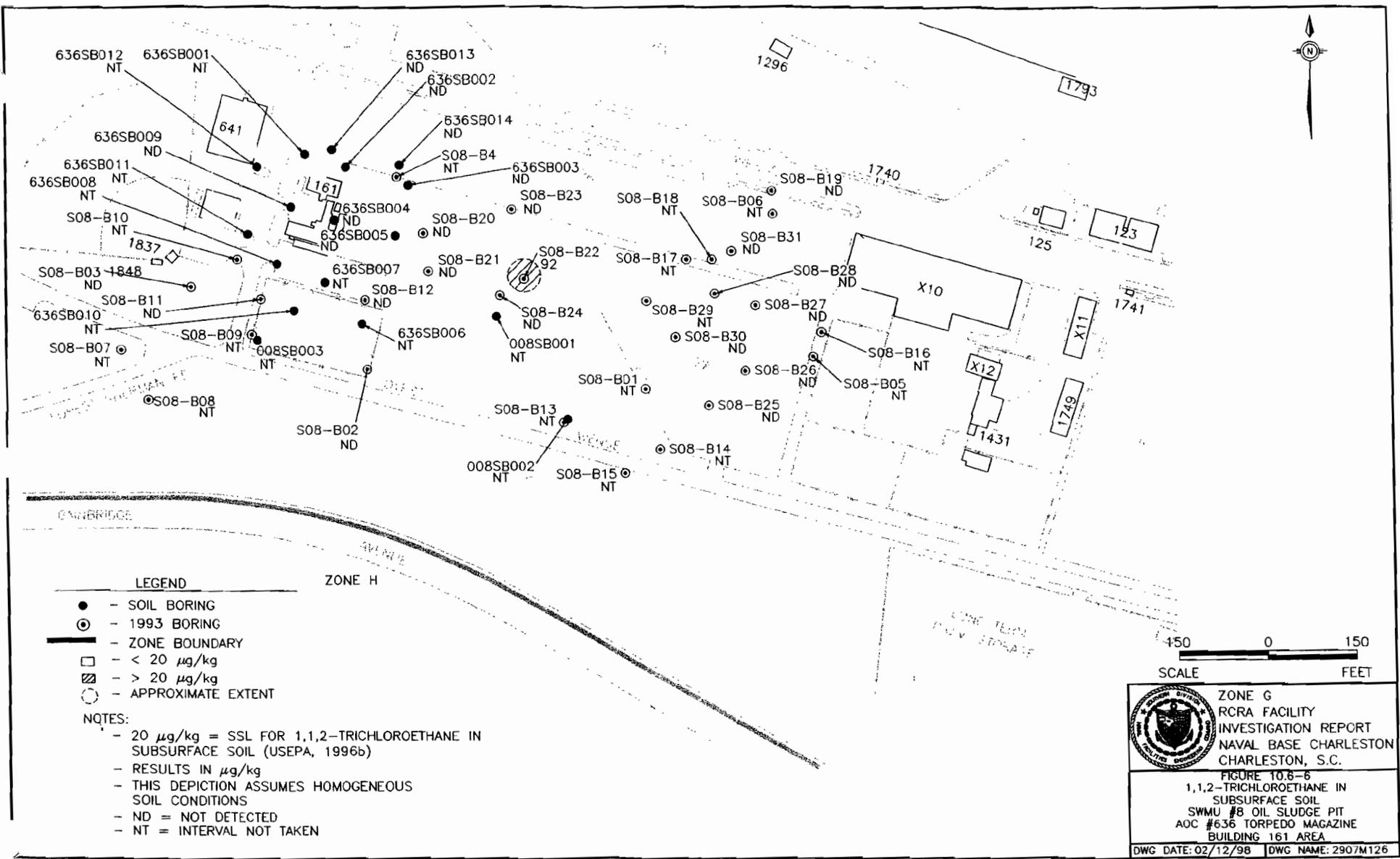
Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Zinc (Zn) (continued)	S08B31	223	2300.0	519	54	12000	145
	008SB001	6.5			NT		
	008SB002	13.4			NT		
	008SB003	124			NT		
	636SB001	179			NT		
	636SB002	271.5			15.7		
	636SB003	50.6			88.1		
	636SB004	33.7			231		
	636SB005	15.7			87.5		
	636SB006	38.3			NT		
	636SB007	196			NT		
	636SB008	140			NT		
	636SB009	1270			150		
	636SB010	35.9			NT		
	636SB011	195			NT		
	636SB012	30.5			NT		
	636SB013	109			75.7		
	636SB014	3.1			98.6		

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 Document* (USEPA, 1996b) were used as a reference concentration for lower interval samples
- 1** = 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

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





LEGEND ZONE H

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 20 µg/kg
- ▨ - > 20 µg/kg
- - APPROXIMATE EXTENT

NOTES:

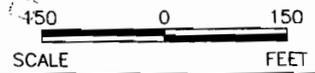
- 20 µg/kg = SSL FOR 1,1,2-TRICHLOROETHANE IN SUBSURFACE SOIL (USEPA, 1996b)
- RESULTS IN µg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED
- NT = INTERVAL NOT TAKEN

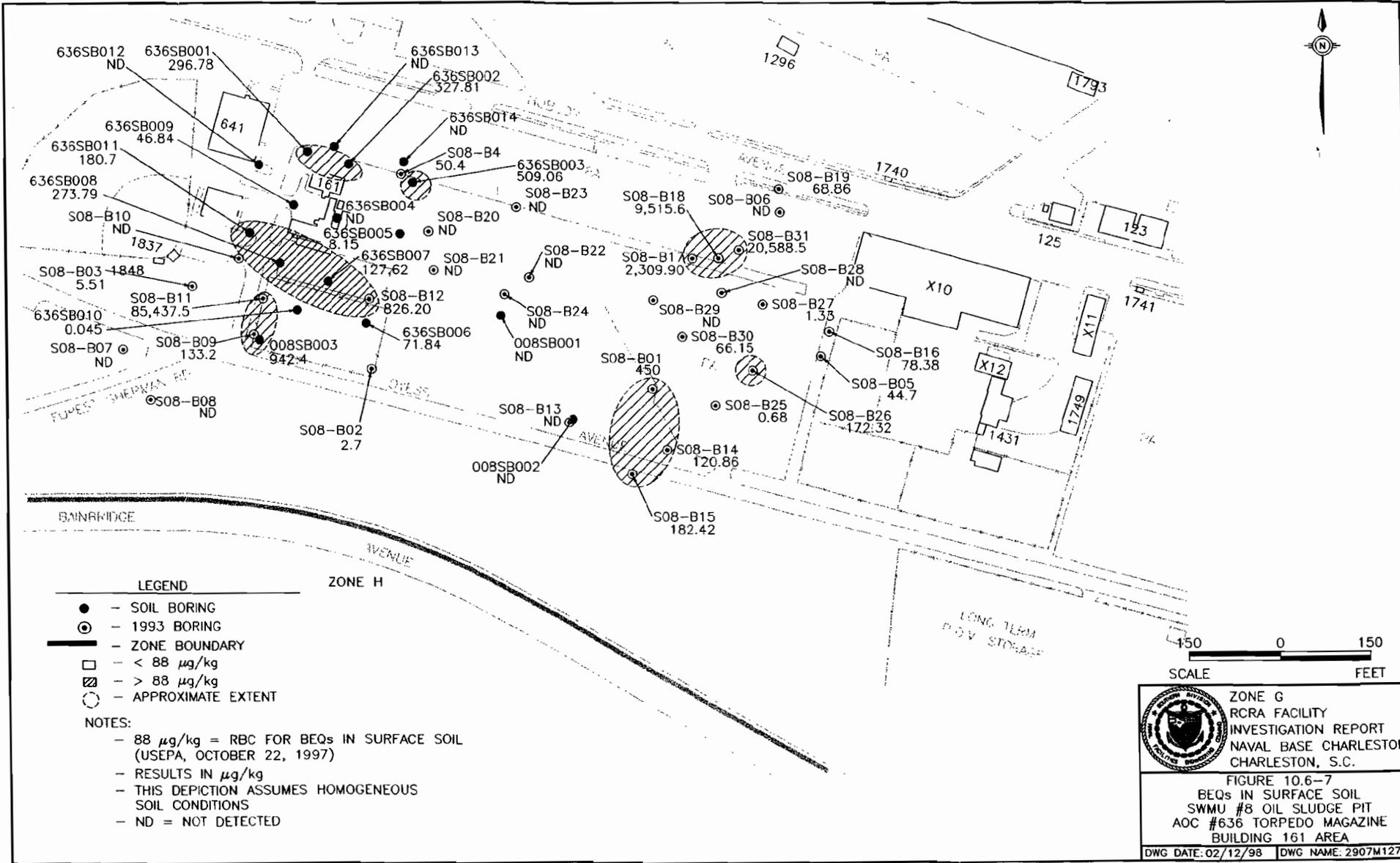


ZONE G
 RCRA FACILITY
 INVESTIGATION REPORT
 NAVAL BASE CHARLESTON
 CHARLESTON, S.C.

FIGURE 10.6-6
 1,1,2-TRICHLOROETHANE IN
 SUBSURFACE SOIL
 SWMU #8 OIL SLUDGE PIT
 AOC #636 TORPEDO MAGAZINE
 BUILDING 161 AREA

DWG DATE: 02/12/98 DWG NAME: 2907M126



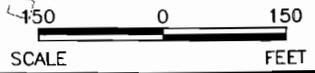


LEGEND

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 88 µg/kg
- ▨ - > 88 µg/kg
- - APPROXIMATE EXTENT

NOTES:

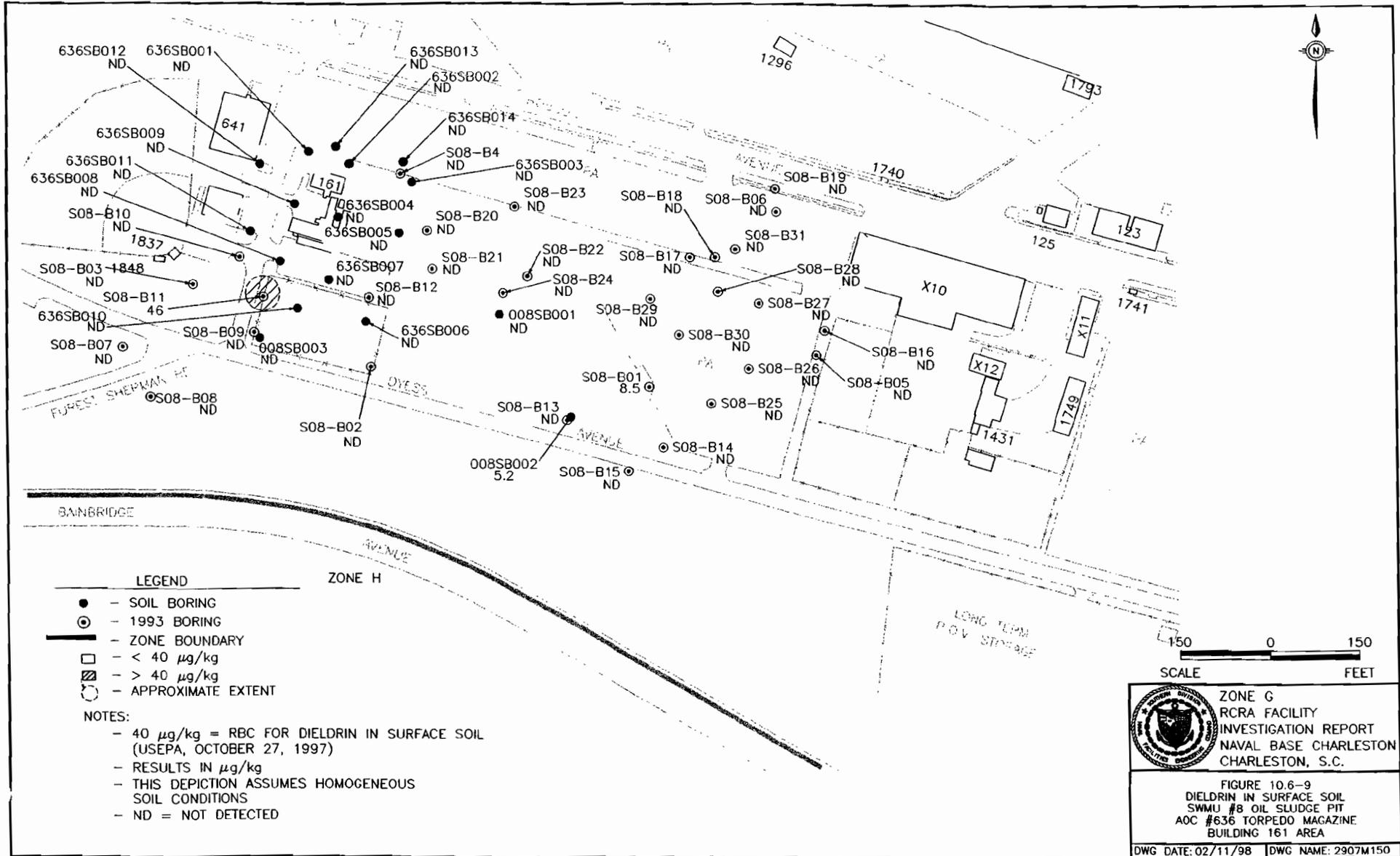
- 88 µg/kg = RBC FOR BEQs IN SURFACE SOIL (USEPA, OCTOBER 22, 1997)
- RESULTS IN µg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED



ZONE G
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 10.6-7
BEQs IN SURFACE SOIL
SWMU #8 OIL SLUDGE PIT
AOC #636 TORPEDO MAGAZINE
BUILDING 161 AREA

DWG DATE: 02/12/98 DWG NAME: 2907M127

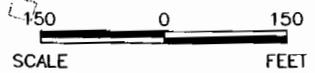


LEGEND **ZONE H**

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 40 µg/kg
- ▨ - > 40 µg/kg
- - APPROXIMATE EXTENT

NOTES:

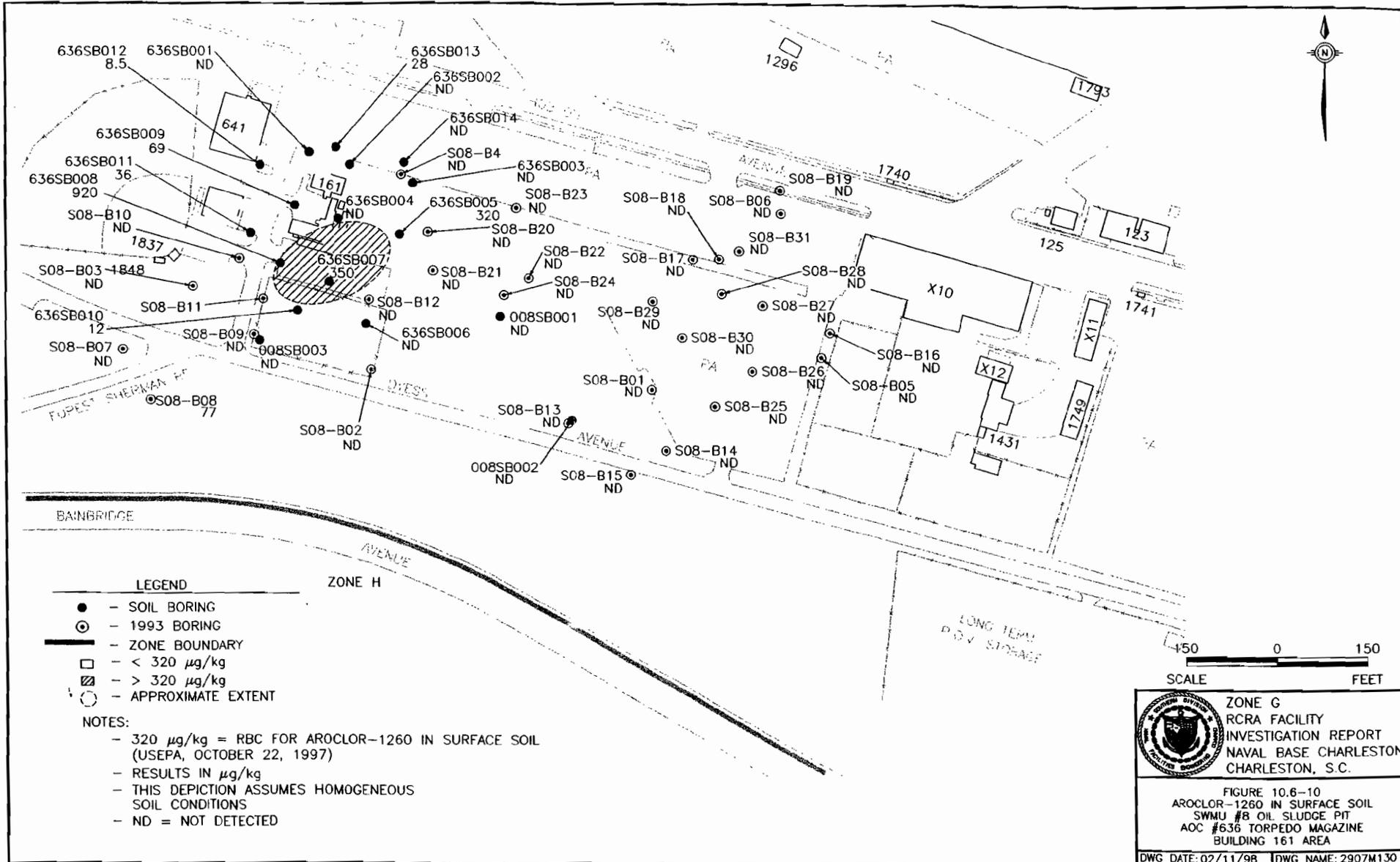
- 40 µg/kg = RBC FOR DIELDRIN IN SURFACE SOIL (USEPA, OCTOBER 27, 1997)
- RESULTS IN µg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED

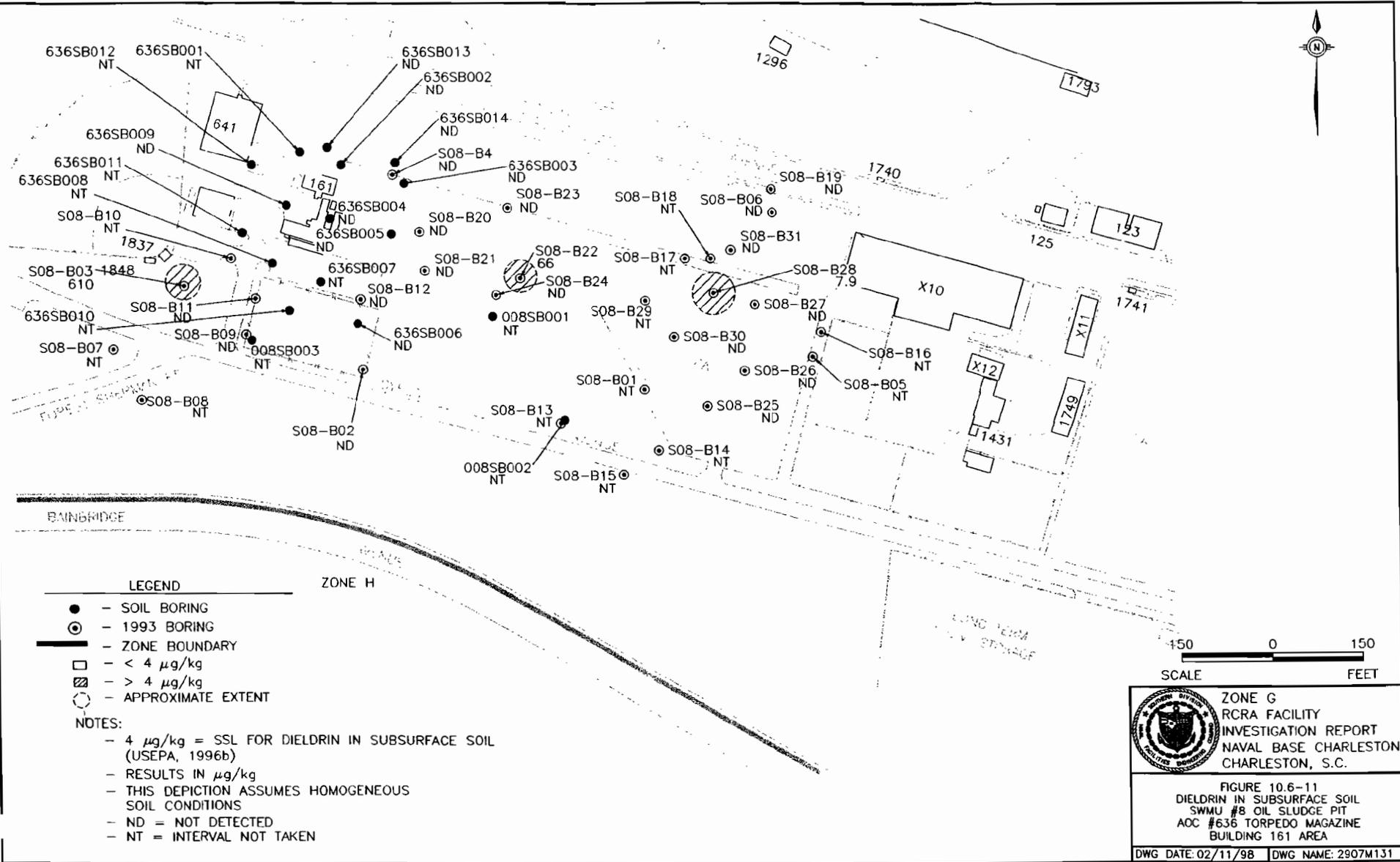


ZONE G
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 10.6-9
DIELDRIN IN SURFACE SOIL
SWMU #8 OIL SLUDGE PIT
AOC #636 TORPEDO MAGAZINE
BUILDING 161 AREA

DWG DATE: 02/11/98 DWG NAME: 2907M150





LEGEND

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 4 µg/kg
- ▨ - > 4 µg/kg
- - APPROXIMATE EXTENT

NOTES:

- 4 µg/kg = SSL FOR DIELDRIN IN SUBSURFACE SOIL (USEPA, 1996b)
- RESULTS IN µg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED
- NT = INTERVAL NOT TAKEN

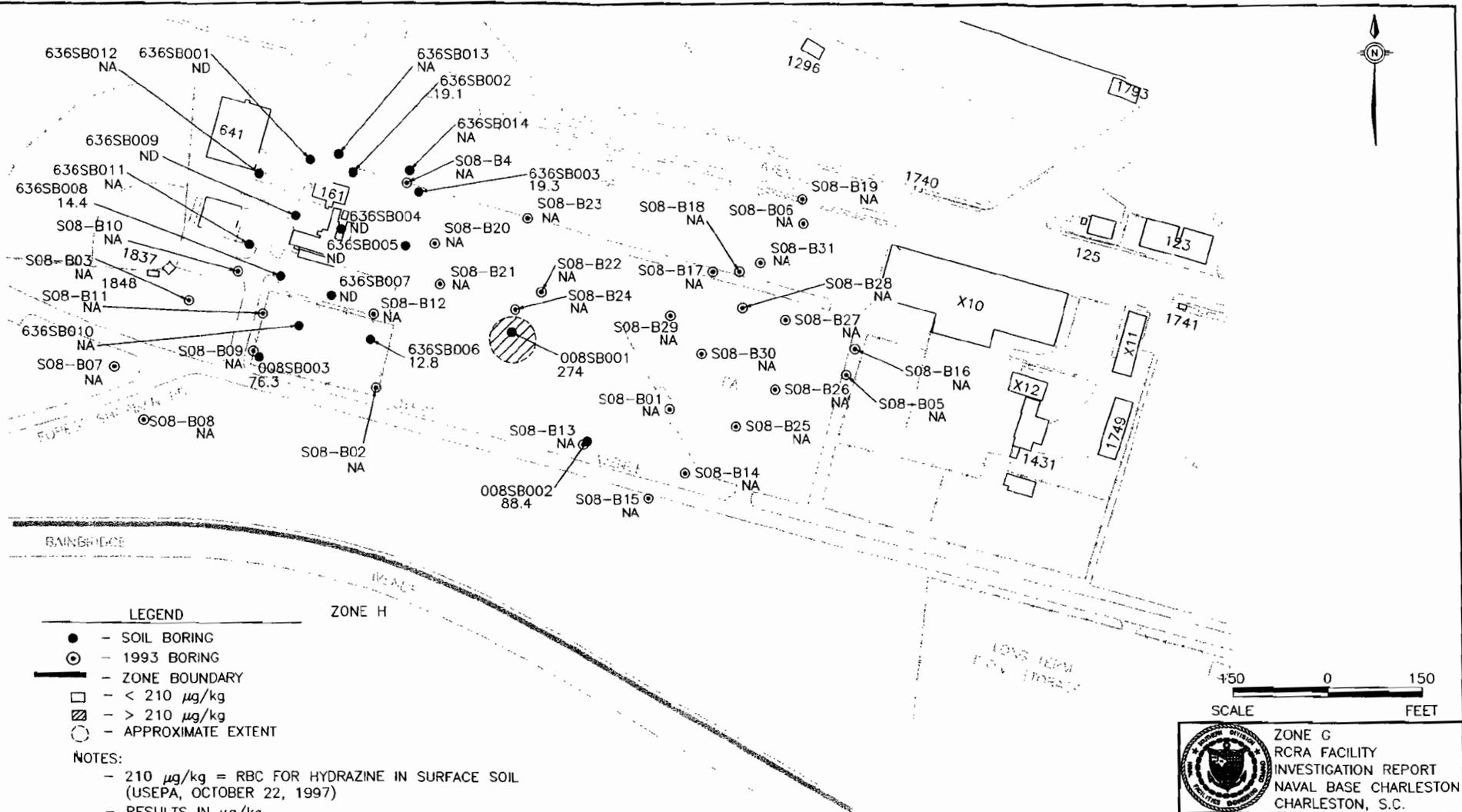


SCALE FEET

 ZONE G
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 10.6-11
DIELDRIN IN SUBSURFACE SOIL
SWMU #8 OIL SLUDGE PIT
AOC #636 TORPEDO MAGAZINE
BUILDING 161 AREA

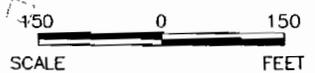
DWG DATE: 02/11/98 | DWG NAME: 2907M131



- LEGEND**
- - SOIL BORING
 - ⊙ - 1993 BORING
 - - ZONE BOUNDARY
 - - < 210 µg/kg
 - ▨ - > 210 µg/kg
 - - APPROXIMATE EXTENT

ZONE H

- NOTES:**
- 210 µg/kg = RBC FOR HYDRAZINE IN SURFACE SOIL (USEPA, OCTOBER 22, 1997)
 - RESULTS IN µg/kg
 - THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
 - NA = NOT ANALYZED FOR HYDRAZINE
 - ND = NOT DETECTED

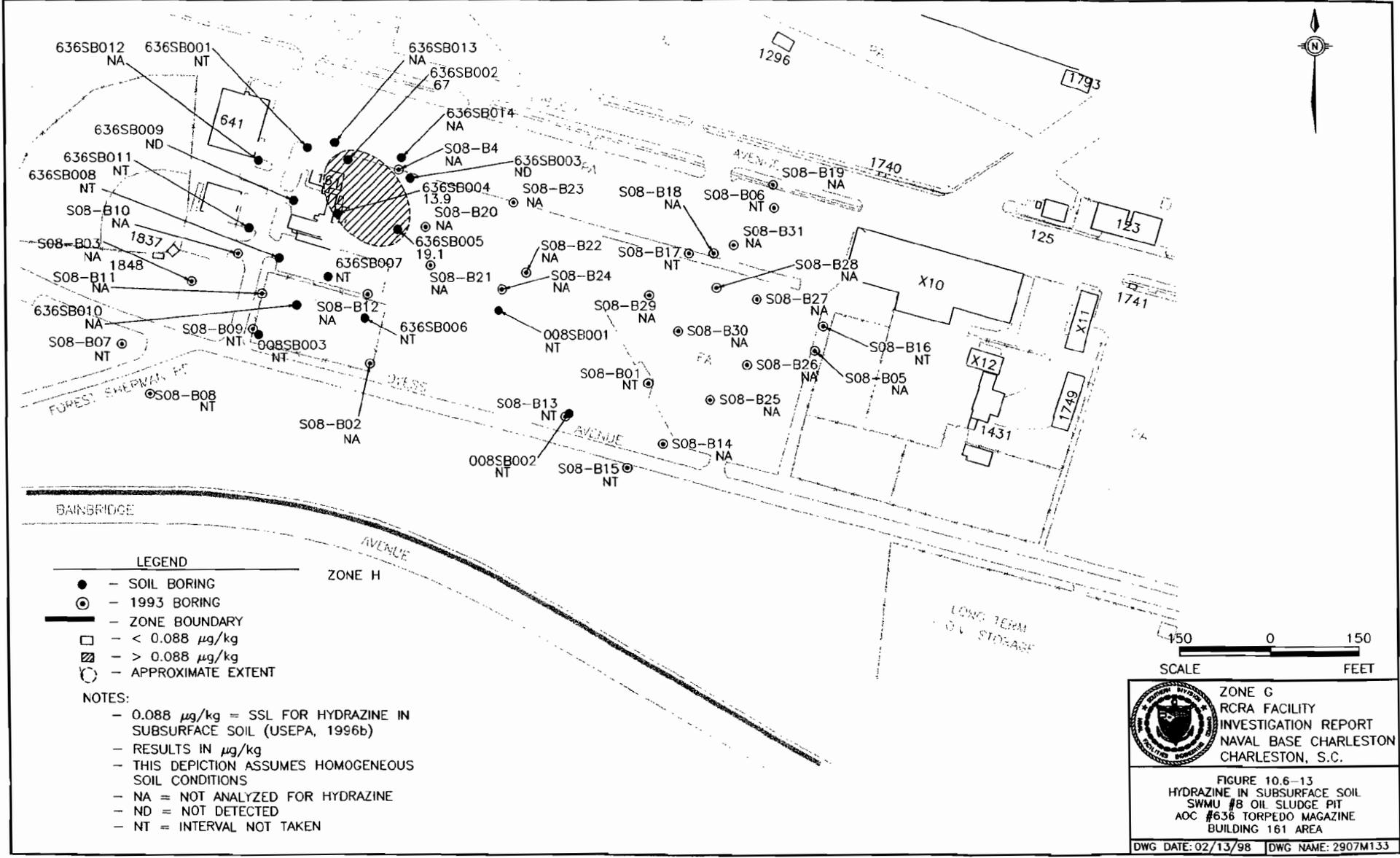




ZONE G
 RCRA FACILITY
 INVESTIGATION REPORT
 NAVAL BASE CHARLESTON
 CHARLESTON, S.C.

FIGURE 10.6-12
 HYDRAZINE IN SURFACE SOIL
 SWMU #8 OIL SLUDGE PIT
 ACC #636 TORPEDO MAGAZINE
 BUILDING 161 AREA

DWG DATE: 02/11/98 | DWG NAME: 2907M132

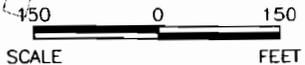


LEGEND

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 0.088 µg/kg
- ▨ - > 0.088 µg/kg
- - APPROXIMATE EXTENT

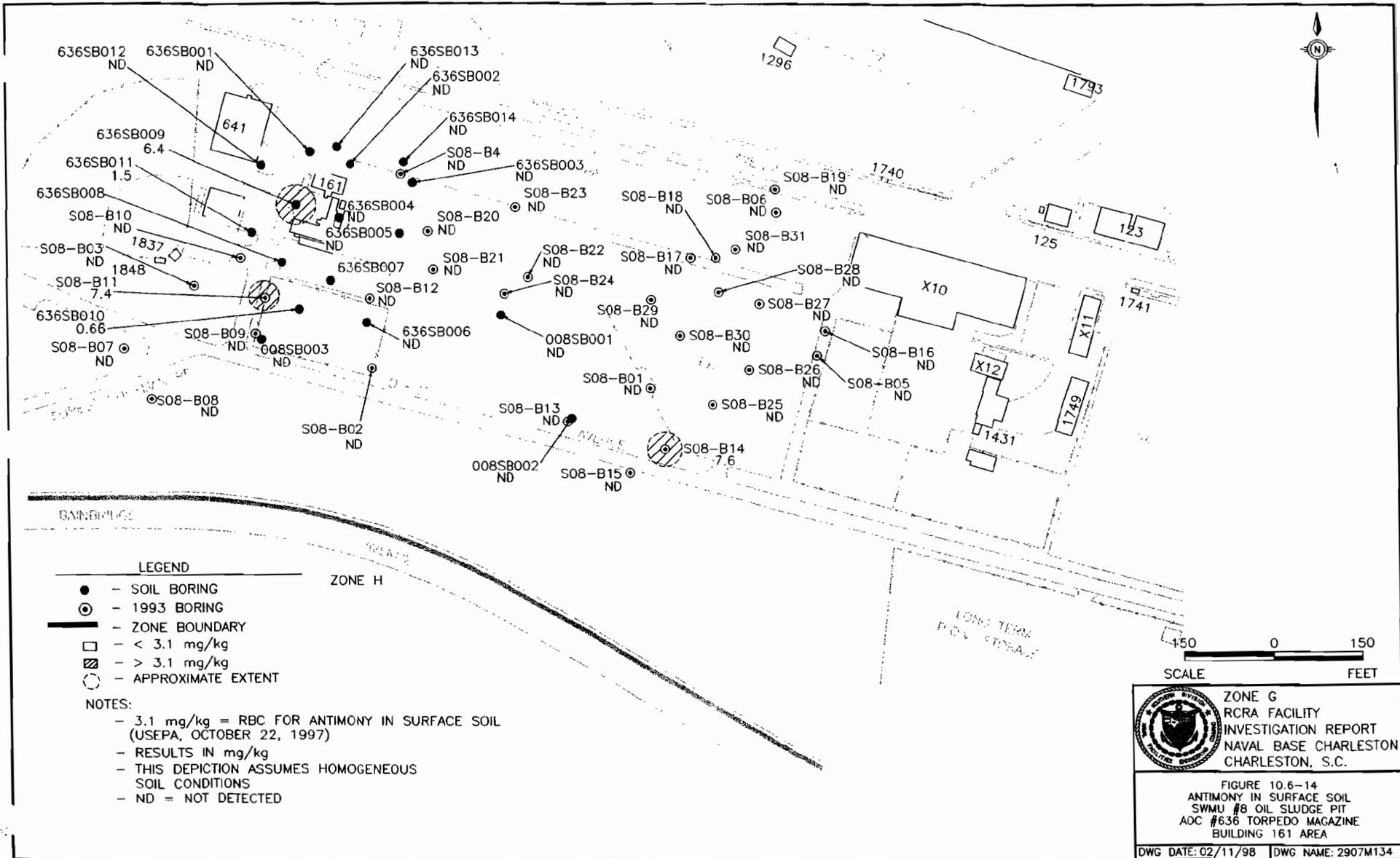
NOTES:

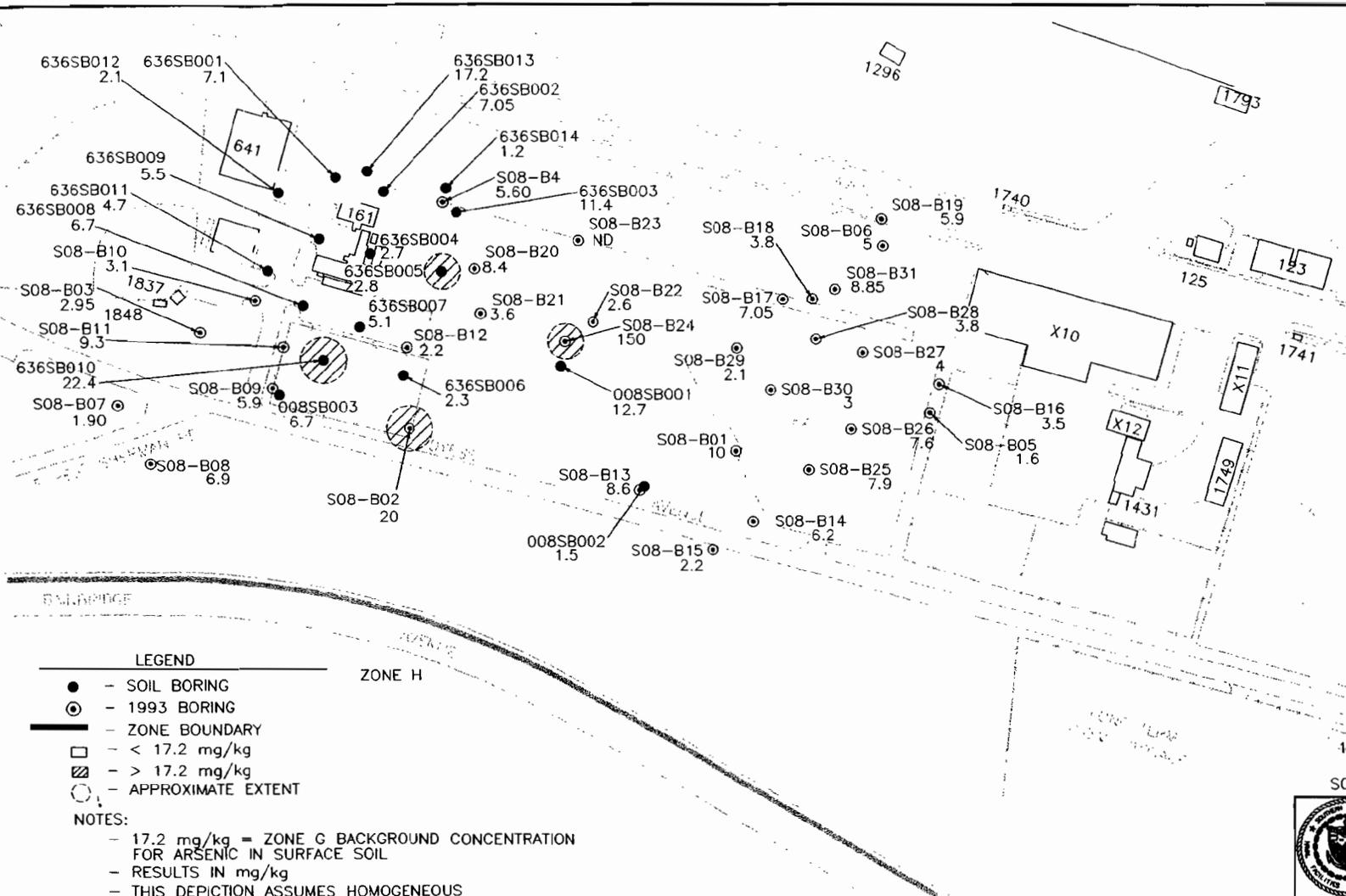
- 0.088 µg/kg = SSL FOR HYDRAZINE IN SUBSURFACE SOIL (USEPA, 1996b)
- RESULTS IN µg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- NA = NOT ANALYZED FOR HYDRAZINE
- ND = NOT DETECTED
- NT = INTERVAL NOT TAKEN



ZONE G
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

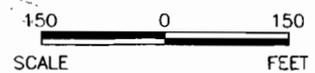
FIGURE 10.6-13
HYDRAZINE IN SUBSURFACE SOIL
SWMU #8 OIL SLUDGE PIT
AOC #636 TORPEDO MAGAZINE
BUILDING 161 AREA
DWG DATE: 02/13/98 | DWG NAME: 2907M133





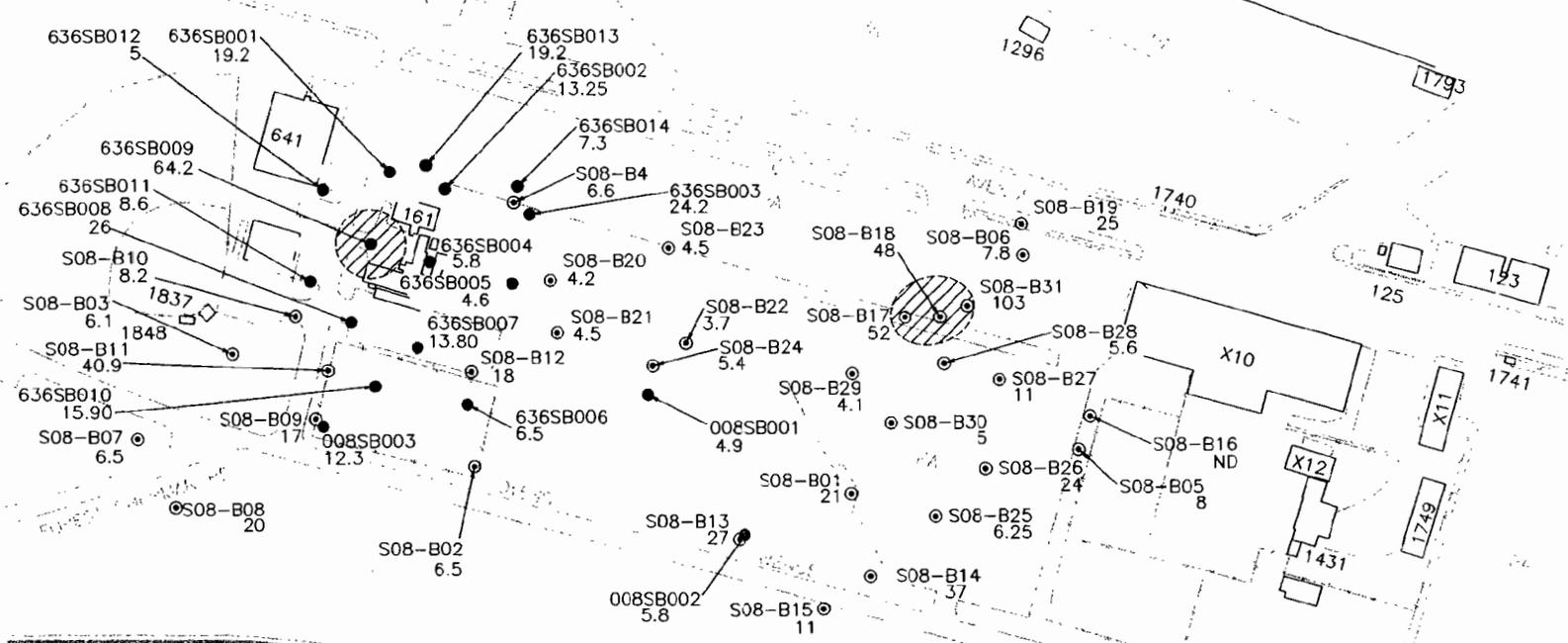
- LEGEND**
- - SOIL BORING
 - ⊙ - 1993 BORING
 - (thick line) - ZONE BOUNDARY
 - - < 17.2 mg/kg
 - ▨ - > 17.2 mg/kg
 - (dashed) - APPROXIMATE EXTENT

- NOTES:**
- 17.2 mg/kg = ZONE G BACKGROUND CONCENTRATION FOR ARSENIC IN SURFACE SOIL
 - RESULTS IN mg/kg
 - THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
 - ND = NOT DETECTED



 **ZONE G**
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 10.6-15
ARSENIC IN SURFACE SOIL
SWMU #8 OIL SLUDGE PIT
AOC #636 TORPEDO MAGAZINE
BUILDING 161 AREA
DWG DATE: 02/11/98 | DWG NAME: 2907M135



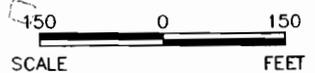
LEGEND

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 42.8 mg/kg
- ▨ - > 42.8 mg/kg
- - APPROXIMATE EXTENT

ZONE H

NOTES:

- 42.8 mg/kg = ZONE G BACKGROUND CONCENTRATION FOR CHROMIUM IN SURFACE SOIL
- RESULTS IN mg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED

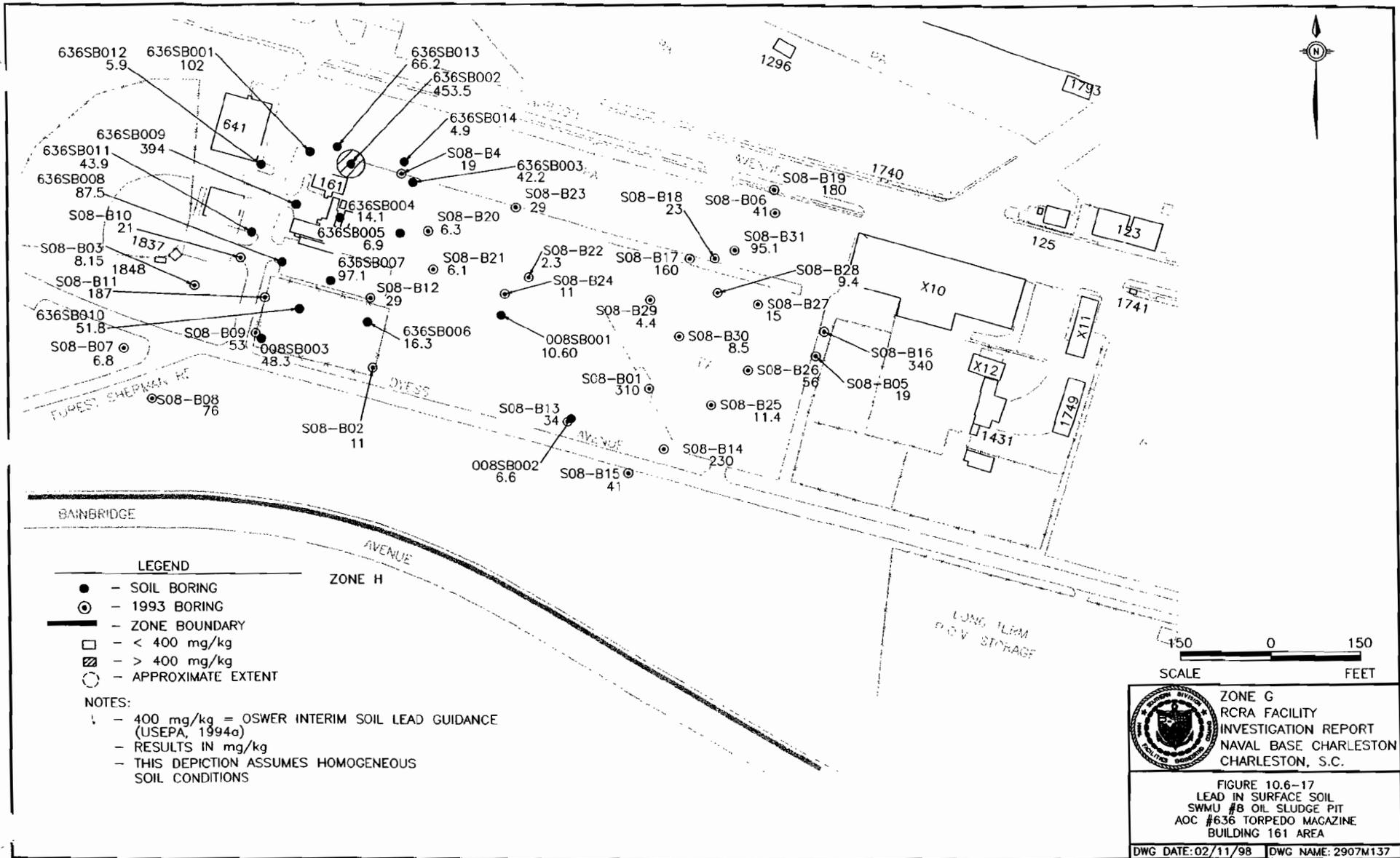


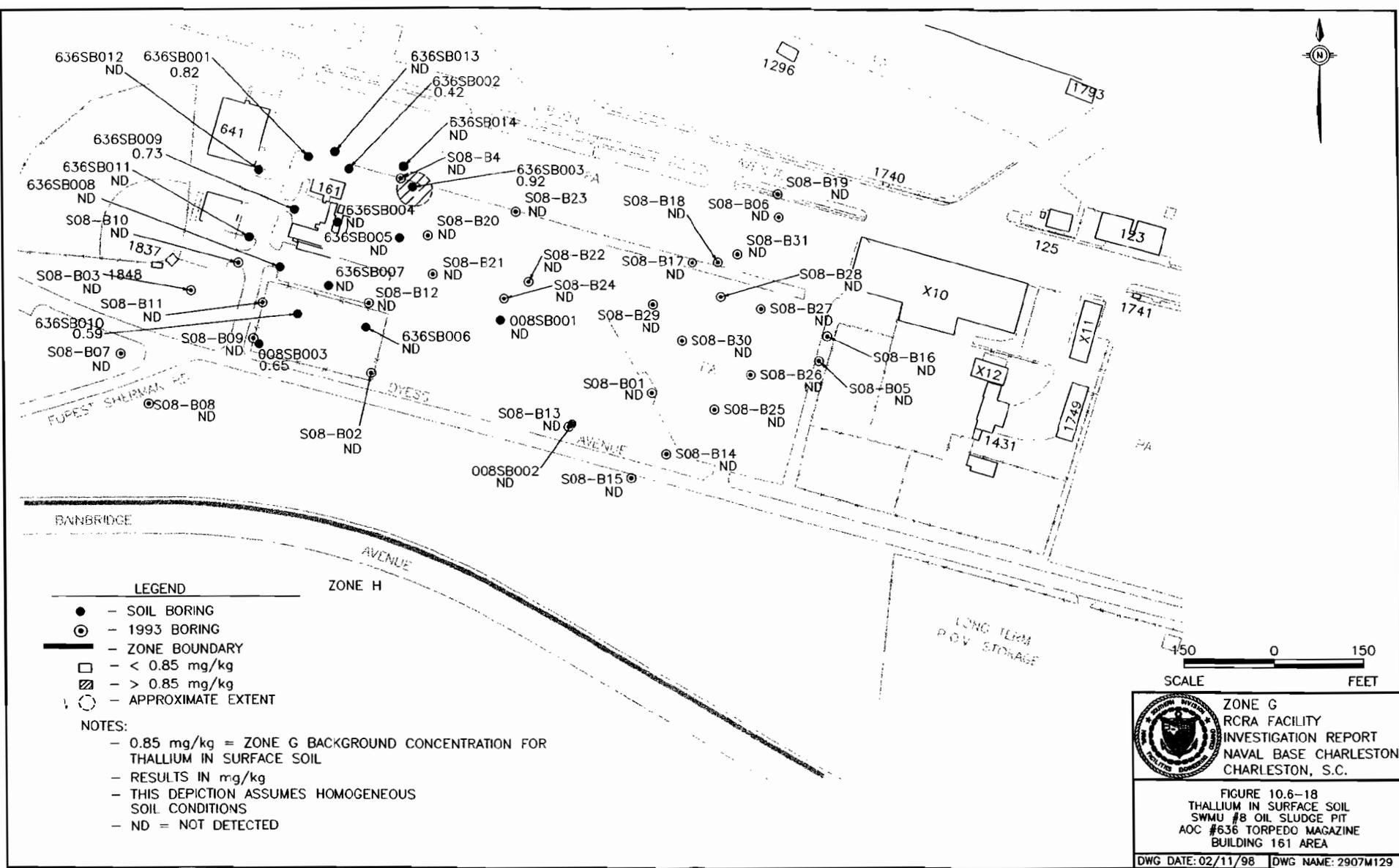
SCALE FEET

ZONE G
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.



FIGURE 10.6-16
CHROMIUM IN SURFACE SOIL
SWMU #8 OIL SLUDGE PIT
AOC #636 TORPEDO MAGAZINE
BUILDING 161 AREA
DWG DATE: 02/11/98 DWG NAME: 2907M136



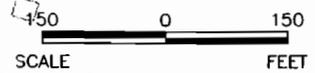


LEGEND

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 0.85 mg/kg
- ▨ - > 0.85 mg/kg
- - APPROXIMATE EXTENT

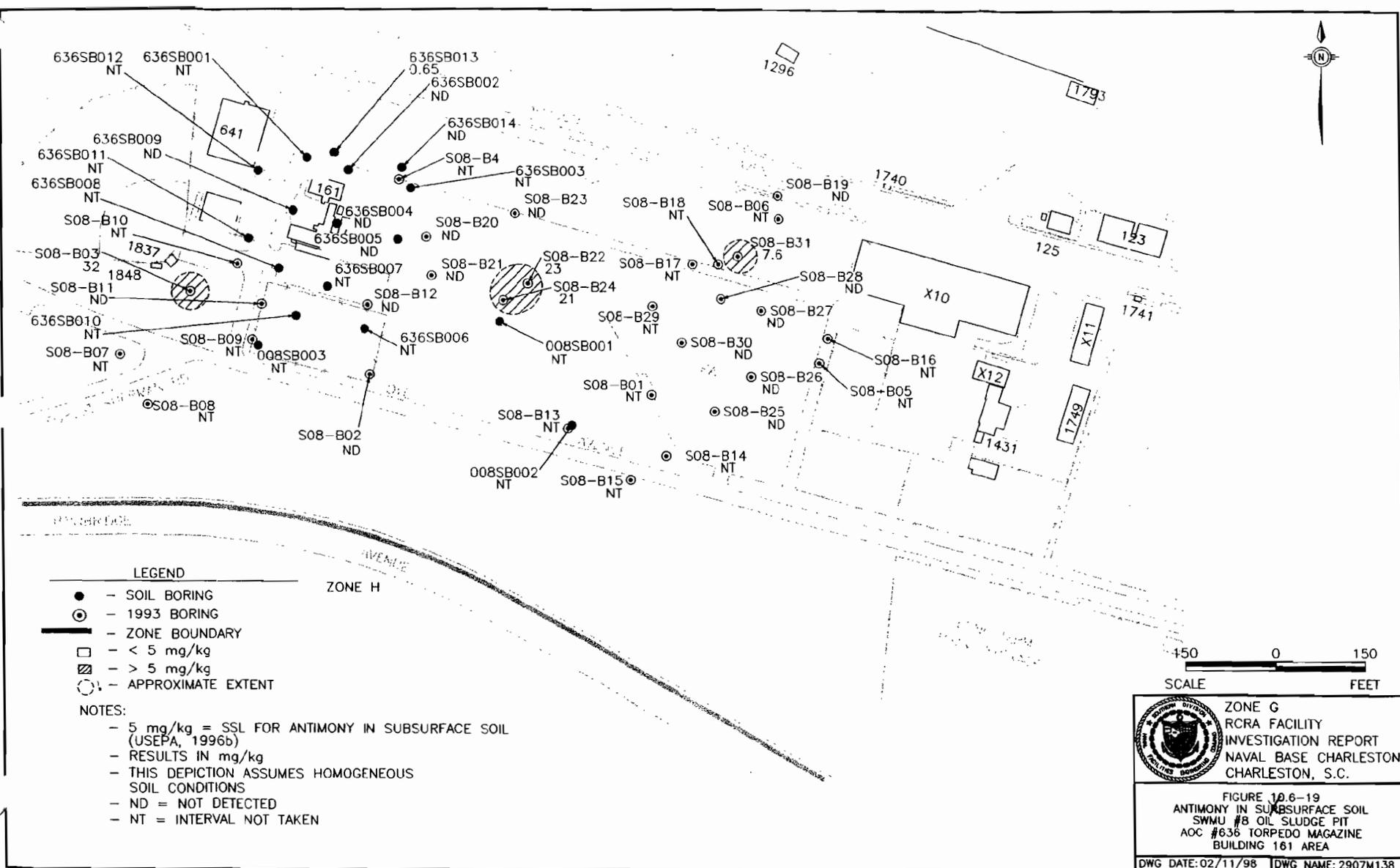
NOTES:

- 0.85 mg/kg = ZONE G BACKGROUND CONCENTRATION FOR THALLIUM IN SURFACE SOIL
- RESULTS IN mg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED



ZONE G
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 10.6-18
THALLIUM IN SURFACE SOIL
SWMU #8 OIL SLUDGE PIT
AOC #636 TORPEDO MAGAZINE
BUILDING 161 AREA
DWG DATE: 02/11/98 DWG NAME: 2907M129

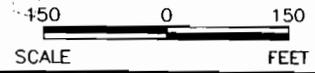


LEGEND

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 5 mg/kg
- ▨ - > 5 mg/kg
- - APPROXIMATE EXTENT

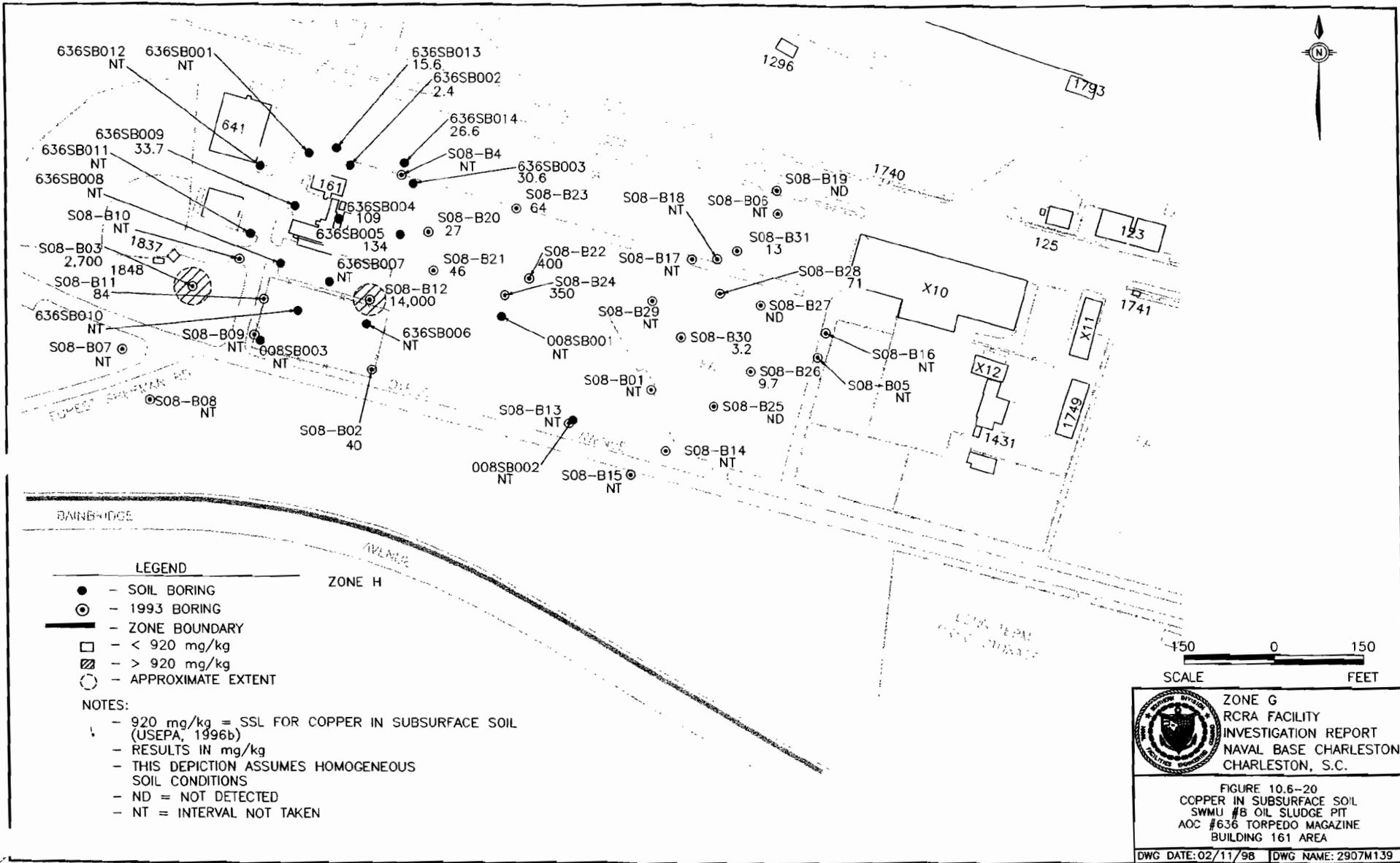
NOTES:

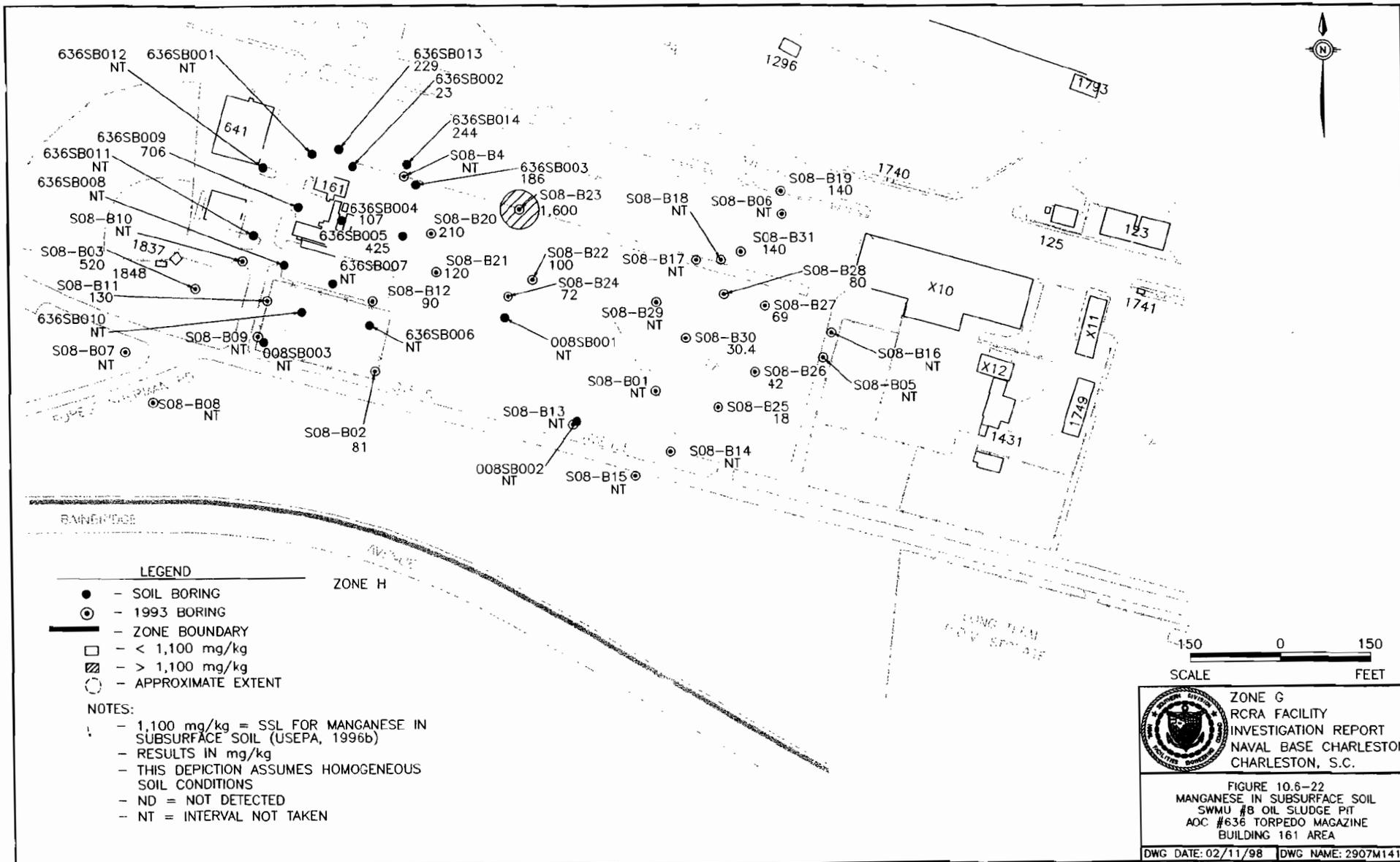
- 5 mg/kg = SSL FOR ANTIMONY IN SUBSURFACE SOIL (USEPA, 1996b)
- RESULTS IN mg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED
- NT = INTERVAL NOT TAKEN

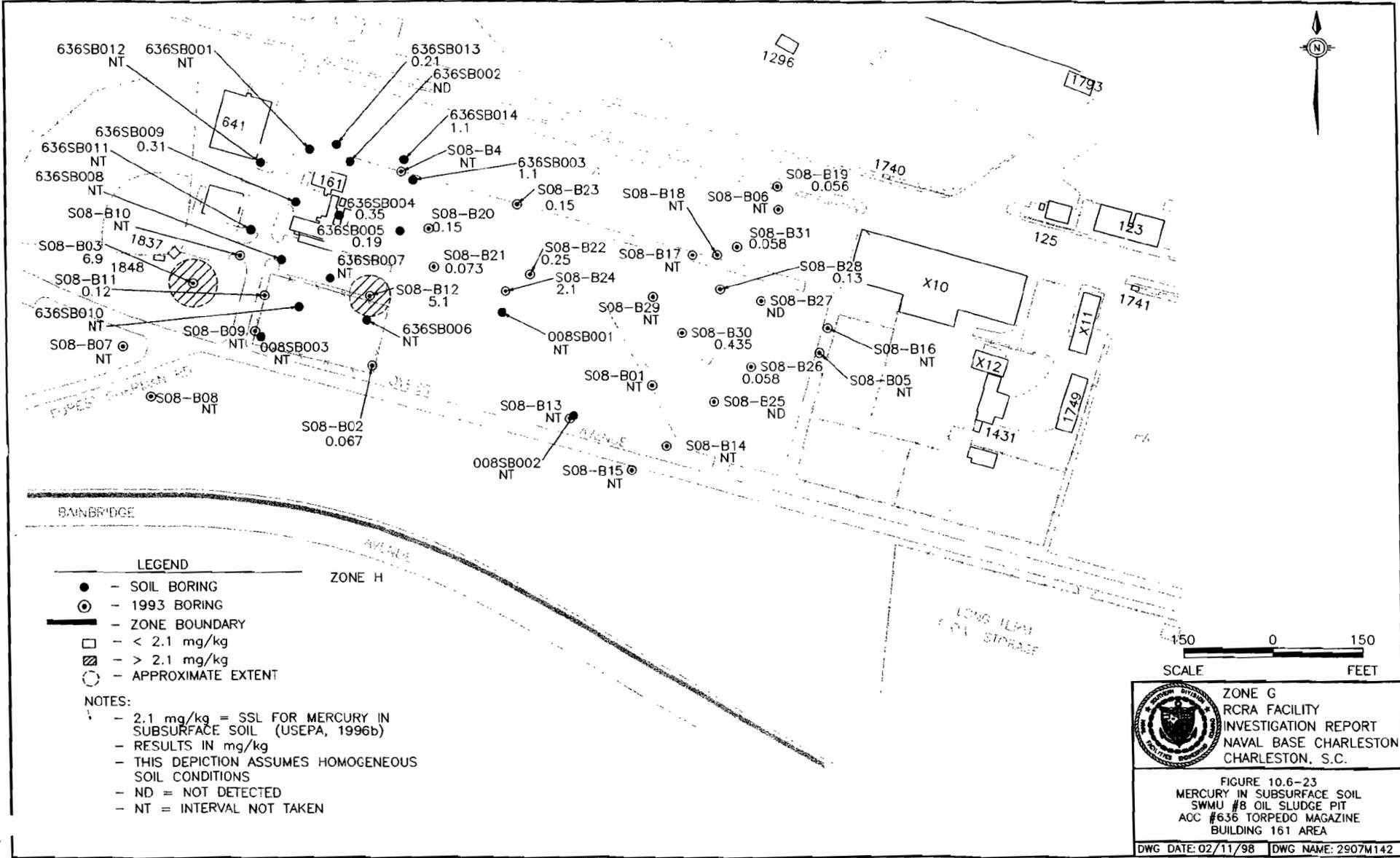



ZONE G
 RCRA FACILITY
 INVESTIGATION REPORT
 NAVAL BASE CHARLESTON
 CHARLESTON, S.C.

FIGURE 10.6-19
 ANTIMONY IN SUBSURFACE SOIL
 SWMU #8 OIL SLUDGE PIT
 AOC #636 TORPEDO MAGAZINE
 BUILDING 161 AREA
 DWG DATE: 02/11/98 DWG NAME: 2907M138







LEGEND

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 2.1 mg/kg
- ▨ - > 2.1 mg/kg
- - APPROXIMATE EXTENT

ZONE H

NOTES:

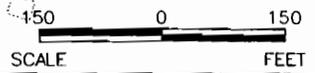
- 2.1 mg/kg = SSL FOR MERCURY IN SUBSURFACE SOIL (USEPA, 1996b)
- RESULTS IN mg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED
- NT = INTERVAL NOT TAKEN

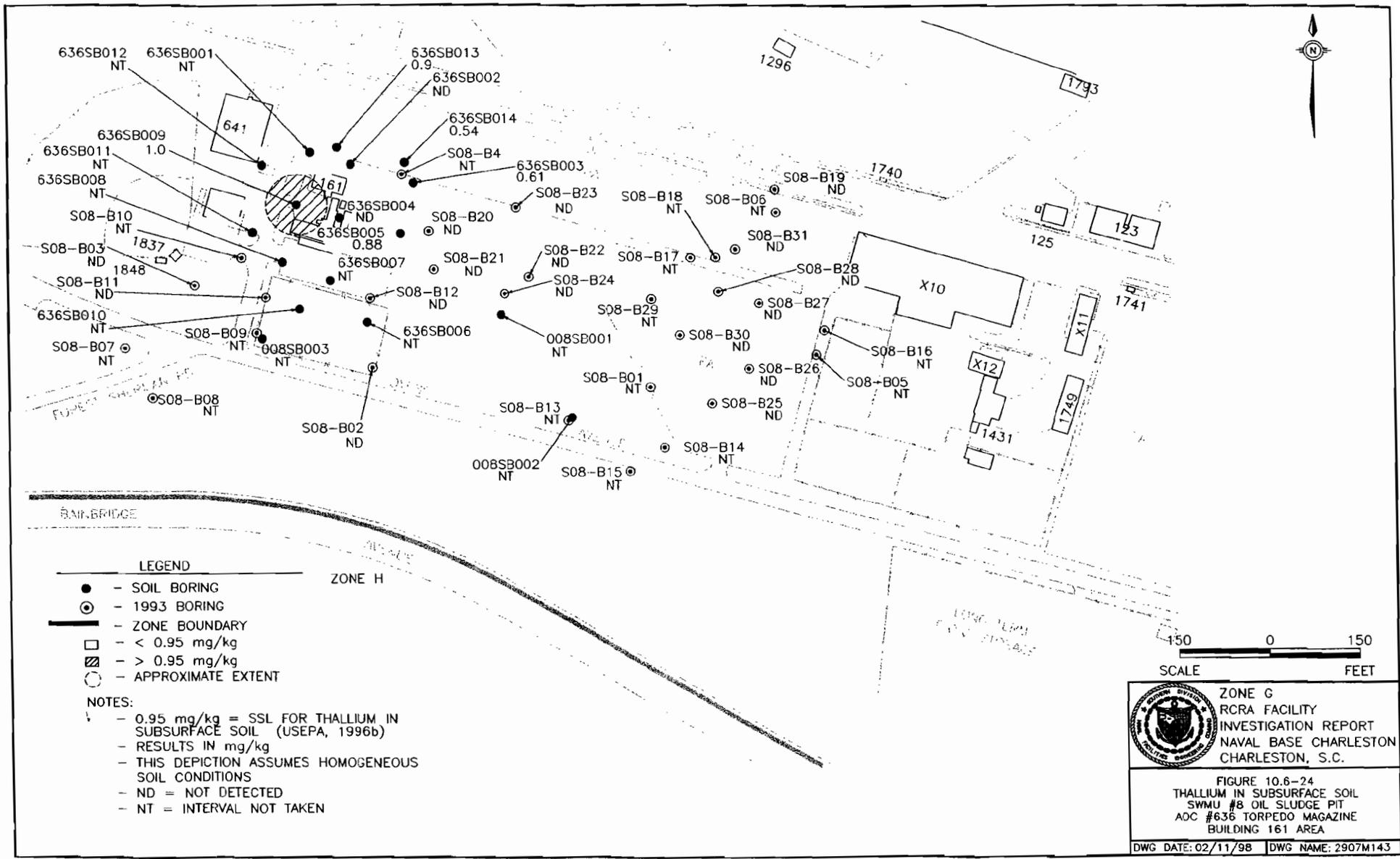


ZONE G
RCRA FACILITY
INVESTIGATION REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 10.6-23
MERCURY IN SUBSURFACE SOIL
SWMU #8 OIL SLUDGE PIT
ACC #636 TORPEDO MAGAZINE
BUILDING 161 AREA

DWG DATE: 02/11/98 DWG NAME: 2907M142





LEGEND

- - SOIL BORING
- ⊙ - 1993 BORING
- - ZONE BOUNDARY
- - < 0.95 mg/kg
- ▨ - > 0.95 mg/kg
- - APPROXIMATE EXTENT

NOTES:

- 0.95 mg/kg = SSL FOR THALLIUM IN SUBSURFACE SOIL (USEPA, 1996b)
- RESULTS IN mg/kg
- THIS DEPICTION ASSUMES HOMOGENEOUS SOIL CONDITIONS
- ND = NOT DETECTED
- NT = INTERVAL NOT TAKEN

SCALE 0 150 FEET

	ZONE G RCRA FACILITY INVESTIGATION REPORT NAVAL BASE CHARLESTON CHARLESTON, S.C.
	FIGURE 10.6-24 THALLIUM IN SUBSURFACE SOIL SWMU #8 OIL SLUDGE PIT AOC #636 TORPEDO MAGAZINE BUILDING 161 AREA
DWG DATE: 02/11/98	DWG NAME: 2907M143

Table 10.6.10
 Zone G
 SWMU 8, AOC 636
 Analytes Detected in Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Volatile Organic Compounds (µg/L)							
Carbon disulfide	008003	ND	6.00	ND	100	NL	NA
Ethylbenzene	008002	3.00	3.00	ND	130	700	NA
	008003	2.00	ND	ND			
Xylene (Total)	008002	ND	8.000	ND	1200	10000	NA
Semivolatile Organic Compounds (µg/L)							
Benzoic Acid	008006	ND	1.000	ND	15000	NL	NA
	636001	2.000	1.000	ND			
bis(2-Ethylhexyl)phthalate (BEHP)	008004	46.000	ND	ND	4.8	NL	NA
Butylbenzylphthalate	008003	ND	2.000	ND	730	NL	NA
	008004	ND	3.000	ND			
1,4-Dichlorobenzene	008006	ND	ND	1.000	0.44	75	NA
Diethylphthalate	008005	ND	ND	1.00	2900	NL	NA
2,4-Dimethylphenol	008002	1.000	1.000	ND	73	NL	NA
	008006	ND	ND	6.000			
Di-n-butylphthalate	008003	ND	ND	2.00	370	NL	NA
	008004	ND	ND	1.00			
2-Methylphenol (o-Cresol)	008006	ND	ND	2.000	180	NL	NA

Table 10.6.10
 Zone G
 SWMU 8, AOC 636
 Analytes Detected in Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC [*] (µg/L)	MCL/SMCL [*] (µg/L)	Shallow Background
4-Methylphenol (p-Cresol)	008003	ND	3.000	ND	18	NL	NA
Naphthalene	008002	2.000	1.000	ND	150	NL	NA
	008006	ND	ND	5.000			
Explosives/Propellant (µg/L)							
Hydrazine	008001	NT	ND	16.700	0.022	NL	NA
	008002	NT	7.300	ND			
	008003	NT	23.600	ND			
	008004	NT	ND	9.090			
	008005	NT	ND	10.200			
	008006	NT	ND	5.100			
	636001	ND	ND	16.000			
Inorganics (µg/L)							
Aluminum (Al)	S08W01	1000.000	NT	NT	3700	50	692
	S08W03	710.000	NT	NT			
	S08W05	1400.000	NT	NT			
	008001	129.000	ND	509.000			
	008002	34.000	43.900	ND			
	008003	720.000	750.000	888.000			
	008004	49.500	61.300	ND			
	008005	120.000	113.000	130.000			
	008006	144.000	ND	ND			
	636001	468.000	45.100	1200.000			
Antimony (Sb)	008003	22.600	12.600	ND	1.5	6	4.85

Table 10.6.10
 Zone G
 SWMU 8, AOC 636
 Analytes Detected in Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC [*] (µg/L)	MCL/SMCL [*] (µg/L)	Shallow Background				
Arsenic (As)	S08W03	15.000	NT	NT	0.045	50	17.8				
	S08W06	11.000	NT	NT							
	008001	6.400	5.000	5.600							
	008003	8.000	13.000	10.200							
	008004	4.330	9.400	2.300							
	008005	6.800	2.800	4.500							
	008006	17.700	17.200	31.700							
	636001	ND	10.200	3.600							
Barium (Ba)	S08W01	33.000	NT	NT	260	2000	31				
	S08W02	530.000	NT	NT							
	S08W03	68.000	NT	NT							
	S08W04	70.000	NT	NT							
	S08W05	12.000	NT	NT							
	S08W06	11.000	NT	NT							
	008001	40.600	66.800	38.300							
	008002	1520.900	739.000	645.000							
	008003	67.500	69.600	93.900							
	008004	74.500	70.000	78.800							
	008005	23.500	18.900	23.800							
	008006	11.900	12.500	ND							
	636001	56.700	35.500	106.000							
	Beryllium (Be)	008001	ND	0.710				1.190	0.016	4	NL
		008002	ND	ND				0.230			
008003		ND	3.700	1.300							
008004		ND	0.670	1.100							
008005		ND	ND	0.280							
008006		ND	0.270	ND							
636001		ND	0.410	ND							

Table 10.6.10
 Zone G
 SWMU 8, AOC 636
 Analytes Detected in Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Cadmium (Cd)	636001	ND	0.710	1.400	1.8	5	0.53
Calcium (Ca)	S08W01	120000.000	NT	NT	NL	NL	NL
	S08W02	110000.000	NT	NT			
	S08W03	280000.000	NT	NT			
	S08W04	110000.000	NT	NT			
	S08W05	94000.000	NT	NT			
	S08W06	93000.000	NT	NT			
	008001	127000.000	110000.000	124000.000			
	008002	206000.000	117000.000	230000.000			
	008003	282000.000	221000.000	242000.000			
	008004	159000.000	152000.000	131000.000			
	008005	182000.000	99800.000	100000.000			
	008006	160000.000	107000.000	123000.000			
	636001	157000.000	83400.000	165000.000			
	Chromium (Cr)	008001	4.600	1.700			
008002		ND	1.300	ND			
008003		ND	9.400	6.700			
008004		ND	2.600	ND			
008005		ND	1.500	1.100			
636001		ND	1.700	3.200			
Cobalt (Co)	008001	1.500	ND	1.260	220	NL	1.45
	008003	ND	ND	0.990			
	008004	1.300	ND	1.900			
	008005	0.910	ND	0.880			
	008006	1.300	ND	1.100			
	636001	1.800	ND	1.000			

Table 10.6.10
 Zone G
 SWMU 8, AOC 636
 Analytes Detected in Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Copper (Cu)	008001	ND	ND	3.300	13000	1300	8.33
	008002	22.300	10.900	7.000			
	008003	44.800	14.100	18.100			
Iron (Fe)	S08W01	2600.000	NT	NT	1100	300	NL
	S08W02	5800.000	NT	NT			
	S08W03	2600.000	NT	NT			
	S08W04	7000.000	NT	NT			
	S08W05	3200.000	NT	NT			
	S08W06	2300.000	NT	NT			
	008001	6200.000	1400.000	2000.000			
	008002	3830.000	1380.000	3090.000			
	008003	1100.000	1250.000	1530.000			
	008004	11400.000	14400.000	7620.000			
	008005	15800.000	8760.000	8330.000			
	008006	6190.000	6010.000	10400.000			
	636001	22700.000	56100.000	27300.000			
	Lead (Pb)	008002	9.100	5.200			
008003		3.000	7.400	ND			
008006		10.200	ND	ND			

Table 10.6.10
 Zone G
 SWMU 8, AOC 636
 Analytes Detected in Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Magnesium (Mg)	S08W01	82000.000	NT	NT	NL	NL	NL
	S08W02	78000.000	NT	NT			
	S08W03	92000.000	NT	NT			
	S08W04	92000.000	NT	NT			
	S08W05	25000.000	NT	NT			
	S08W06	75000.000	NT	NT			
	008001	867000.000	760000.000	740000.000			
	008002	159000.000	78600.000	120000.000			
	008003	1060000.000	945000.000	921000.000			
	008004	836000.000	719000.000	733000.000			
	008005	190000.000	165000.000	185000.000			
	008006	107000.000	80700.000	139000.000			
	636001	714000.000	146000.000	380000.000			
	Manganese (Mn)	S08W01	87.000	NT	NT	84	50
S08W02		120.000	NT	NT			
S08W03		84.000	NT	NT			
S08W04		140.000	NT	NT			
S08W05		1100.000	NT	NT			
S08W06		750.000	NT	NT			
008001		180.000	186.000	90.600			
008002		217.000	183.000	258.000			
008003		39.000	ND	ND			
008004		239.000	201.000	162.000			
008005		1120.000	809.000	774.000			
008006		1620.000	885.000	1470.000			
636001		648.000	679.000	487.000			
Mercury (Hg)		636001	ND	ND	0.280	1.1	2.0

Table 10.6.10
 Zone G
 SWMU 8, AOC 636
 Analytes Detected in Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Nickel (Ni)	008001	3.000	1.600	1.010	73	100	4.08
	008002	2.000	1.400	0.910			
	008003	ND	4.300	2.000			
	008004	ND	0.770	ND			
	008005	2.200	1.900	1.200			
	008006	2.900	1.200	2.000			
	636001	ND	ND	1.900			
Potassium (K)	S08W01	27000.000	NT	NT	NL	NL	NL
	S08W02	33000.000	NT	NT			
	S08W03	28000.000	NT	NT			
	S08W04	26000.000	NT	NT			
	S08W05	9000.000	NT	NT			
	S08W06	3600.000	NT	NT			
	008001	28800.000	26000.000	26100.000			
	008002	5640.000	5860.000	3940.000			
	008003	32200.000	28400.000	27600.000			
	008004	25300.000	21100.000	23500.000			
	008005	7140.000	10200.000	8760.000			
	008006	5010.000	4770.000	6070.000			
	636001	22400.000	6670.000	12000.000			
	Selenium (Se)	636001	2.900	3.500			
Silver (Ag)	008001	1.400	ND	ND	18	100	1.65
	008003	ND	ND	1.200			
	008005	1.700	ND	ND			
	008006	ND	ND	1.500			

Table 10.6.10
 Zone G
 SWMU 8, AOC 636
 Analytes Detected in Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background	
Sodium (Na)	S08W01	650000.000	NT	NT	NL	NL	NL	
	S08W02	650000.000	NT	NT				
	S08W03	770000.000	NT	NT				
	S08W04	750000.000	NT	NT				
	S08W05	230000.000	NT	NT				
	S08W06	790000.000	NT	NT				
	008001	842000.000	751000.000	776000.000				
	008002	140000.000	108000.000	103000.000				
	008003	885000.000	817000.000	801000.000				
	008004	788000.000	684000.000	740000.000				
	008005	205000.000	228000.000	214000.000				
	008006	104000.000	804000.000	138000.000				
	636001	631000.000	151000.000	359000.000				
	Thallium (Tl)	008002	3.900	ND	ND	0.29	2	NL
		008003	ND	7.400	ND			
008004		4.600	6.400	ND				
008005		ND	5.800	ND				
008003		3.400	ND	ND	2200	NL	NL	
Tin (Sn)	008003	3.400	ND	ND	2200	NL	NL	
Vanadium (V)	S08W01	17.000	NT	NT	26	NL	15.4	
	S08W03	25.000	NT	NT				
	008001	6.800	18.300	24.000				
	008002	1.300	1.900	3.100				
	008003	49.000	12.400	19.500				
	008004	ND	1.600	1.700				
	008005	2.500	3.600	5.200				
	008006	2.900	2.200	3.500				
	636001	2.900	5.000	5.700				

Table 10.6.10
Zone G
SWMU 8, AOC 636
Analytes Detected in Groundwater

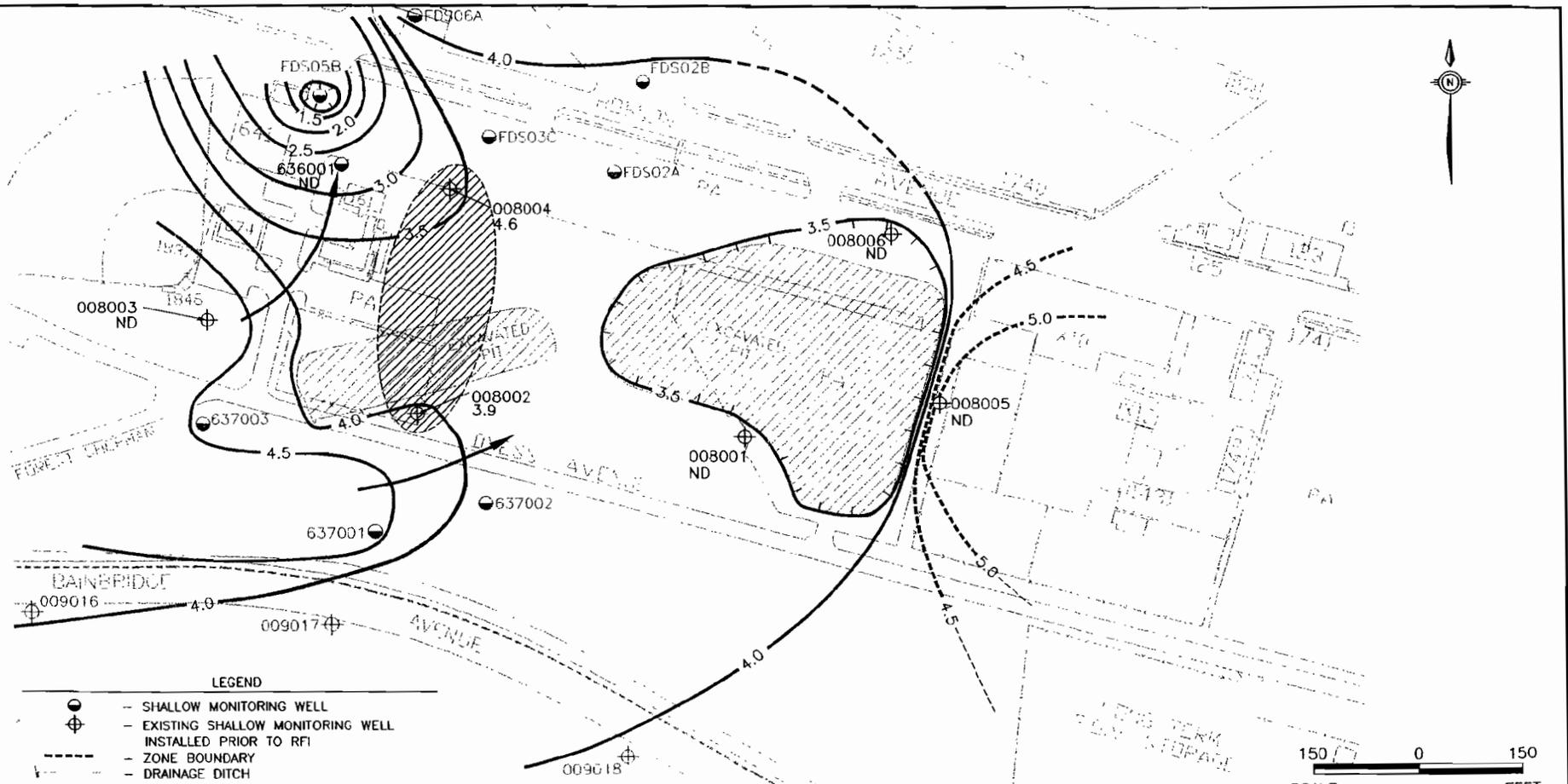
Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Zinc (Zn)	S08W01	40.000	NT	NT	1100	5000	15.6
	S08W03	29.000	NT	NT			
	008002	ND	18.400	ND			
	008003	181.000	14.800	ND			
	636001	ND	ND	9.000			

Notes:

- NL = Not listed
- NA = Not applicable
- NT = Not taken
- 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, 1996d)

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

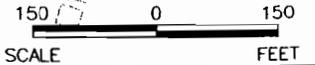


LEGEND

- - SHALLOW MONITORING WELL
- ⊕ - EXISTING SHALLOW MONITORING WELL INSTALLED PRIOR TO RFI
- - - - ZONE BOUNDARY
- - - - DRAINAGE DITCH
- CONTOUR INTERVAL = 0.5 FEET
- - ARROWS INDICATE FLOW DIRECTION
- - < 0.29 µg/L
- ▨ - > 0.29 µg/L
- - APPROXIMATE EXTENT

NOTES:

- 0.29 µg/L = TAP WATER RBC FOR THALLIUM (OCTOBER 22, 1997)
- RESULTS IN µg/L
- ND = NOT DETECTED



	<p>ZONE G RCRA FACILITY INVESTIGATION REPORT NAVAL BASE CHARLESTON CHARLESTON, S.C.</p>
	<p>FIGURE 10.6-29 THALLIUM IN SHALLOW GROUNDWATER SWMU #8 OIL SLUDGE AOC #636 TORPEDO MAGAZINE BUILDING 161 AREA</p>
<p>DWG DATE: 02/12/98 DWG NAME: 2907M148</p>	

COMPLETION REPORT Interim Measure for SWMU 8 Naval Base Charleston Charleston, SC

Engineering Branch Head: *J. M. Tunstall*

Date: 11-19-99

Prepared By: *Alan J. Meyer*

Date: 11/17/99

Site work for this Interim Measure was completed by SUPSHIP, Environmental Detachment Charleston. This report is being submitted by South Carolina Research Authority (SCRA) Environmental Enterprise Group (EEG) established as a result of the US Navy's privatization of SUPSHIP Environmental Detachment Charleston on 13 September 1999.

**DOCUMENT GENERATED BY:
SOUTH CAROLINA RESEARCH AUTHORITY
Environmental Enterprise Group
1899 NORTH HOBSON AVENUE
NORTH CHARLESTON, SC 29405**

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Table of Contents	ii
List of Appendices	iii
Acronyms, Abbreviations and Symbols	iv
1. Introduction	1-1
1.1 Installation Restoration Program	1-1
1.1.1 Naval Base Charleston Installation Restoration Program	1-1
1.2 Interim Measures	1-1
1.3 Solid Waste Management Unit 8	1-1
1.4 SWMU 8 Interim Measure	1-2
1.4.1 SWMU 8 Interim Measure Execution Summary	1-2
1.4.1.1 AREA 1 Summary	1-2
1.4.1.2 AREA 2 & AOC 636 Summary	1-3
1.4.2 SWMU 8 Interim Measure Conclusion	1-4
2. Interim Measure Execution	2-1
2.1 Actions Required by Interim Measure Work Plan	2-1
2.2 Observations Noted	2-2
2.2.1 Soil Conditions	2-2
2.2.2 Groundwater	2-2
2.3 Plan Modifications and Justification	2-2
3. Interim Measure Outcome	3-1
3.1 Site Conditions Following Completion of Work	3-1

TABLE OF CONTENTS (cont'd)

<u>Section</u>	<u>Page</u>
4. Sampling	4-1
4.1 Waste Characterization Sampling	4-1
5. Waste Generation	5-1
5.1 Asbestos Waste	5-1
5.2 Recovered Oil for Recycling	5-1
5.3 Non-Hazardous Waste	5-1
Appendix A Figures	A-1
Appendix B Photographs	B-1
Appendix C Sampling Documentation	C-1
Appendix D Asbestos Waste Manifest	D-1
Appendix E Oil Recycling Manifest	E-1
Appendix F Non-Hazardous Waste Manifest	F-1

ACRONYMS, ABBREVIATIONS and SYMBOL

ACM	Asbestos Containing Material
AOC	Area of Concern
BLS	Below Land Surface
CMS	Corrective Measures Study
DERP	Defense Environmental Restoration Program
DET	Environmental Detachment Charleston
DON	Department of the Navy
FO	Fuel Oil
IM	Interim Measure
IR	Installation Restoration
NBCECPT	Naval Base Charleston Environmental Cleanup Project Team
PPM	Parts Per Million
PVC	Polyvinyl Chloride
RBC	Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
ROC	Run of Crush
SARA	Superfund Amendments and Reauthorization Act
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SUPSHIP	Supervisor of Shipbuilding, Conversion and Repair, USN
SWMU	Solid Waste Management Unit
TPH	Total Petroleum Hydrocarbons
USN	United States Navy

1. INTRODUCTION

1.1 INSTALLATION RESTORATION PROGRAM The purpose of the Department of the Navy (DON) Installation Restoration (IR) Program is to identify, assess, characterize and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills at Navy and Marine Corps activities. The Defense Environmental Restoration Program (DERP) is codified in the Superfund Amendments and Reauthorization Act (SARA) Section 211 (10 USC 2701). The IR Program is a component of DERP.

1.1.1 NAVAL BASE CHARLESTON IR PROGRAM At Naval Base Charleston, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was prepared which divided the Naval Base into zones and identified Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) within each zone. The RFA evaluated each SWMU and AOC and determined which sites required further investigation. Based on the RFA, a RCRA Facility Investigation (RFI) work plan has been or is being prepared for each zone containing SWMUs and AOCs requiring further investigation. On completion of the RFI for each Zone, a RFI report will be prepared for that zone. The RFI reports will identify SWMUs and AOCs containing wastes requiring remediation. Eventually, Corrective Measures Studies (CMSs) will be prepared to determine the best means of remediating each site.

1.2 INTERIM MEASURES Interim Measures (IM) performed as part of the IR Program are intended to eliminate sources of environmental contamination or limit the spread of environmental contaminants prior to the completion of the RFI CMSs.

1.3 SWMU 8 Past investigations documented in the Zone G RCRA Facility Investigation Report for NAVBASE Charleston have identified waste oil, metals and oil sludge as contaminants of concern at this site. SWMU 8 consisted of three unlined pits that were used for the disposal of waste oil sludge produced during industrial activities at the shipyard from 1944 to 1977. Area 1 was pumped down in 1974 and covered with clean fill material. Area 2 was filled with debris and

covered in 1955 trapping oil in the subsurface. SWMU 8 also encompasses (geographically) AOC 636 – Torpedo Magazine, Building 161 (Figure 1, Appendix A). AOC 636 is the former torpedo magazine where subsurface disposal of unused torpedoes and munitions allegedly occurred prior to 1944.

1.4 SWMU 8 INTERIM MEASURE During the interval between the RFI and the completion of the CMS, it was decided by Southern Division Naval Facilities Engineering Command (SOUTHDIV) that an IM would be performed by Supervisor of Shipbuilding, Conversion and Repair (SUPSHIP), United States Navy (USN), Portsmouth Va., Environmental Detachment Charleston (SPORTENVDETCNASN). The objective of this IM was to perform soil borings to locate and delineate the oil contaminated soil boundaries, and to excavate and remove the source of contamination (visible sludge), heavily contaminated soil, and free product. Additionally, AOC 636 (former torpedo magazine) was to be investigated for buried explosives or propellants. This IM is consistent with the ultimate cleanup of SWMU 8 and is not intended to circumvent the public participation process inherent within environmental cleanup under RCRA authority.

1.4.1 SWMU 8 INTERIM MEASURE EXECUTION SUMMARY The execution of this IM consisted of separating SWMU 8 into two work areas by performing soil screenings. The first area (Area 1) contained two smaller pits and the second area (Area 2) contained free product waste oil (Figure 1, Appendix A). Excavation and proper disposal/recycling of materials and site restoration was performed in each area. A recovery system was installed in Area 2. Summaries of each area are detailed in section 1.4.1.1. Additionally Area 2 was investigated for unexploded ordnance.

1.4.1.1 AREA 1 SUMMARY

Project execution began on 1 November 1996 with investigating Area 1 to identify the size of the area surveyed. Soil borings began on 8 November 1996 to define the soil contamination boundaries. The contaminated area was determined to be approximately 51,000 square feet. Following the removal of Run of Crush (ROC) and gravel; 12" sludge piping was discovered at

approximately two feet below ground surface. The piping was found to run in an east to west direction and intersected with four additional feed lines, which possibly were the transfer lines of the abandoned oil pits. The pipe's surface wrapping was sampled and found to contain asbestos. Asbestos was removed from some sections of the pipe, with other sections of pipe removed with the asbestos attached. Approximately four hundred thirty seven (437) linear feet of pipe was disposed as asbestos containing waste material. Excavation of the area was to a depth of 4 to 5 feet below ground surface where an approximate 6 inch oil sludge layer was encountered. All visible oil/sludge impacted soil was removed resulting in approximately five hundred (500) tons of soil being disposed of to a permitted Subtitle "D" landfill. Additionally, scrap metal, timbers, glass and other miscellaneous debris was removed. Groundwater was encountered at approximately 4 to 5 feet. Back filling of Area 1 began on 23 July 1997. The site was filled, compacted and graded, and completed on 2 September 1997.

1.4.1.2 AREA 2 & AOC 636 SUMMARY

AOC 636 was investigated utilizing historical data and the former torpedo facility was found to be a torpedo storage area not a disposal site. RFI soil borings and one shallow monitoring well sample data further substantiated that no target chemicals (typical heavy metals associated with military explosives) associated with torpedoes or munitions were detected. It was determined unexploded ordnance was not a threat and no further action was required as agreed upon at the February 97 Naval Base Charleston Environmental Cleanup Project Team meeting (NBCECPT). Execution of Area 2 was started on 2 February 1997. Excavation of Area 2 began on 3 March 1997. Area 2 was further delineated by soil borings and digging test trenches to define the impacted soils. The total size of excavation increased the dimensions of the area to approximately eight hundred forty five (845) feet long by sixty five (65) feet wide to a depth of ten (10) to twelve (12) feet deep (Figure 2, Appendix A). Groundwater was encountered at approximately 4 to 5 feet. Approximately twenty six thousand (26,000) tons of petroleum contaminated soil was removed and disposed of in a Subtitle "D" landfill. Oil skimmer operations began 21 October 97. Additionally, scrap metal, timbers, glass, brick and other miscellaneous debris was removed. Approximately fifty thousand (50,000) gallons of oil was recovered and recycled. Approximately two hundred forty two

(242) linear feet of 12" asbestos lagged oil sludge piping was removed and disposed of as asbestos containing waste material. Piping was removed outside of excavation and plugged (see Figure 2, Appendix A).

The Area 2 excavation was filled with #57 granite from the bottom up to 5 foot below land surface (ground water level). A layer of geofabric was then installed. The remaining 5 feet was filled with clean soil and a 4 inch layer of run of crush (ROC). A total of eighteen (18) 12" diameter PVC recovery pipes (Figure 3, Appendix A) were installed approximately 50 foot apart to a depth of 10-12 feet to facilitate recovery of any free product or alternative remedial remedies (Figure 2, Appendix A).

1.4.2 SWMU 8 INTERIM MEASURE CONCLUSION

This IM effectively removed all visible sludge/contaminated soil from Areas 1 and 2. AOC 636 was investigated and determined that no further action was required.

2. INTERIM MEASURE EXECUTION

2.1 ACTIONS REQUIRED BY INTERIM MEASURE WORK PLAN Required actions are listed below:

- Perform soil screening in Area 1 to define the boundaries of the sludge pits and spread of petroleum products
- Perform a geophysics study to screen Area 2 for unexploded ordnance (AOC 636)
- Perform soil screening in Area 2 to define the boundaries of the contaminated soil
- Removal and disposal of the asphalt and gravel covering Area 1 and Area 2
- Perform waste characterization samples of oil sludge impacted soils in Area 1 and Area 2, and characterize for proper disposal
- Excavation and disposal of sludge impacted soils in Area 1 and Area 2
- Restoration of Area 1 by backfilling and grading to surrounding area
- Restoration of Area 2 by backfilling, installation of recovery system, and grading to surrounding area

2 OBSERVATIONS NOTED

2.2.1 SOIL CONDITIONS The land surface to approximately 6" below ground surface was made up of gravel (ROC). From 6" below ground surface to the bottom of the excavation consisted of oil/sludge impacted soils and other debris (metal, glass, brick, etc. that had been previously disposed of as backfill). The bottom of the excavation (10-12 feet) was a gray clay region that exhibited no oil/sludge characteristics.

2.2.2 GROUNDWATER Groundwater was encountered at approximately 4 to 5 feet.

2.3 PLAN MODIFICATIONS AND JUSTIFICATION

The actual size of the excavations increased due to visible oil product in soil screenings (soil borings and test trenches).

The unexpected discovery of asbestos lagged piping that required special removal and disposal.

Recycling of approximately 25,000 pounds of steel recovered as debris during excavation.

Excavation continuing through the intersection of Dyess Avenue and Brumby Street.

3. INTERIM MEASURE OUTCOME

3.1 SITE CONDITIONS FOLLOWING COMPLETION OF WORK. Following completion of all site work on 03 September 1999, the DET had removed 26,533 tons of waste oil contaminated soil. Additionally, the DET recovered and recycled approximately 50,000 gallons of oil. Area 1 was backfilled, compacted, covered with ROC and graded to existing conditions. Area 2 was backfilled, recovery system installed, compacted, covered with ROC and graded to existing conditions. Site Photographs are included in Appendix B.

4. SAMPLING

4.1 WASTE CHARACTERIZATION SAMPLING

Waste characterization samples SPORT0257, SPORT275, SPORT0316, SPORT321, SPORT0341, SPORT0391, SPORT0395, SPORT0399, SPORT0433, SPORT0438, SPORT0726, and SPORT0727 were obtained for proper characterization of soils for disposal. Waste characterization samples SPORT0609 and SPORT0617 were obtained for proper recovered oil recycling. Waste characterization samples SPORT0880 and SPORT0881 were obtained for proper dewatering of excavation. See Appendix C for sampling documentation.

5. WASTE GENERATION

5.1 ASBESTOS WASTE

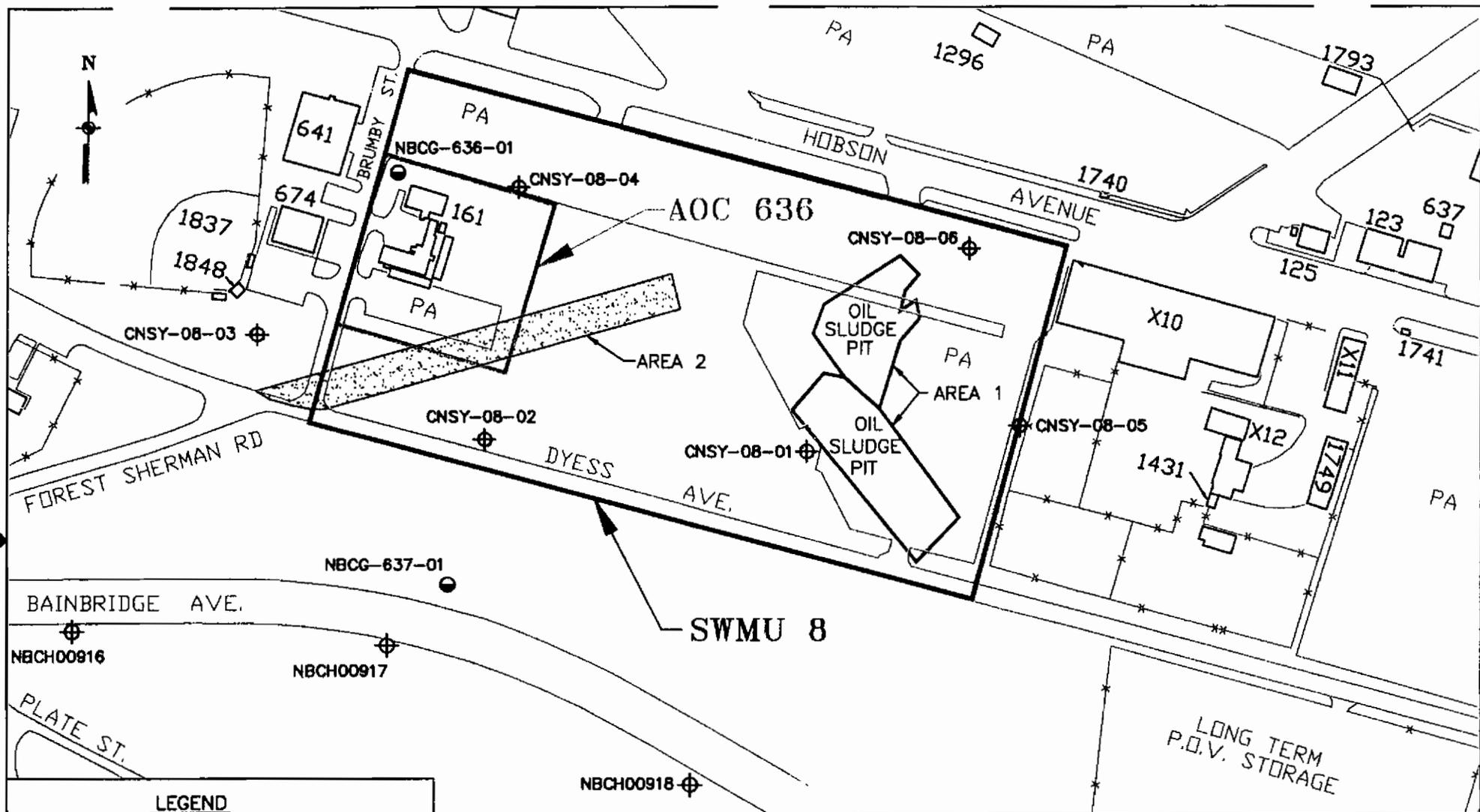
A total of 679 linear feet of asbestos lagged 12" piping was disposed of to a permitted treatment, storage and disposal facility. See Appendix D for waste manifest.

5.2 RECOVERED OIL FOR RECYCLING

Approximately 50,000 gallons of recovered oil was transported to a recycling facility. See Appendix E for manifest.

5.3 NON-HAZARDOUS WASTE

A total of 26,533 tons of non-hazardous contaminated soil was disposed to a permitted Subtitle D facility. See Appendix F for waste manifest.



LEGEND

-  - LOCATION OF OIL BODY
-  - SOIL BORING/SHALLOW MONITORING WELL
-  - EXISTING WELL



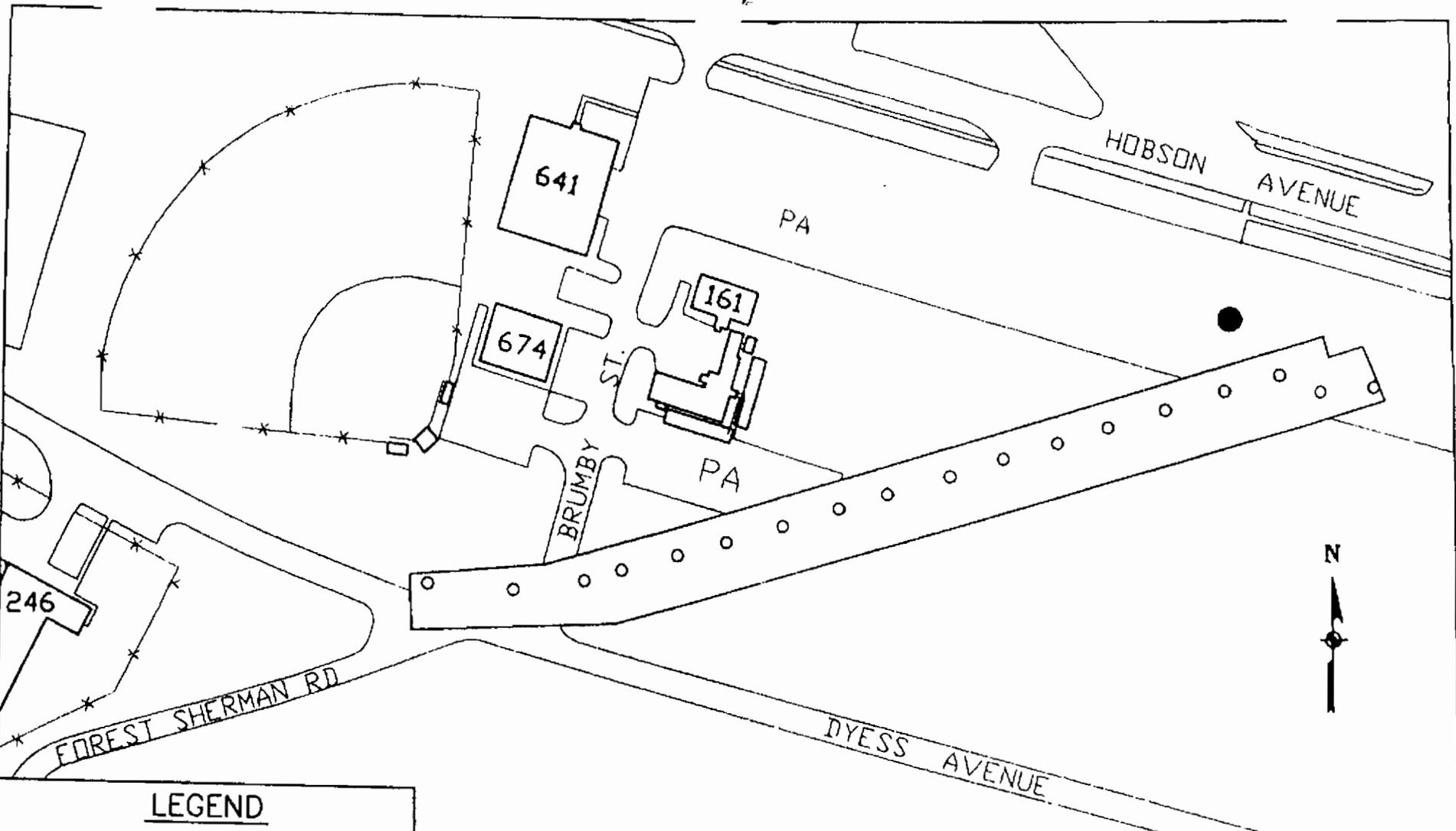
GRAPHIC SCALE (FEET)



ENVIRONMENTAL ENTERPRISE GROUP
 1899 NORTH HOBSON AVENUE - BUILDING 30
 NORTH CHARLESTON, SOUTH CAROLINA 29405-2106

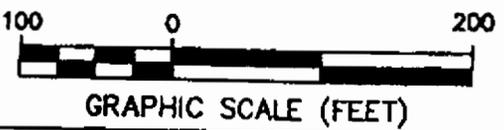
FIGURE 1
SWMU 8 SITE MAP

DATE: 05 OCTOBER 1999	PREPARED BY: J.I. BROWNLEE	REV -
SCALE: -	SHEET: A-1	

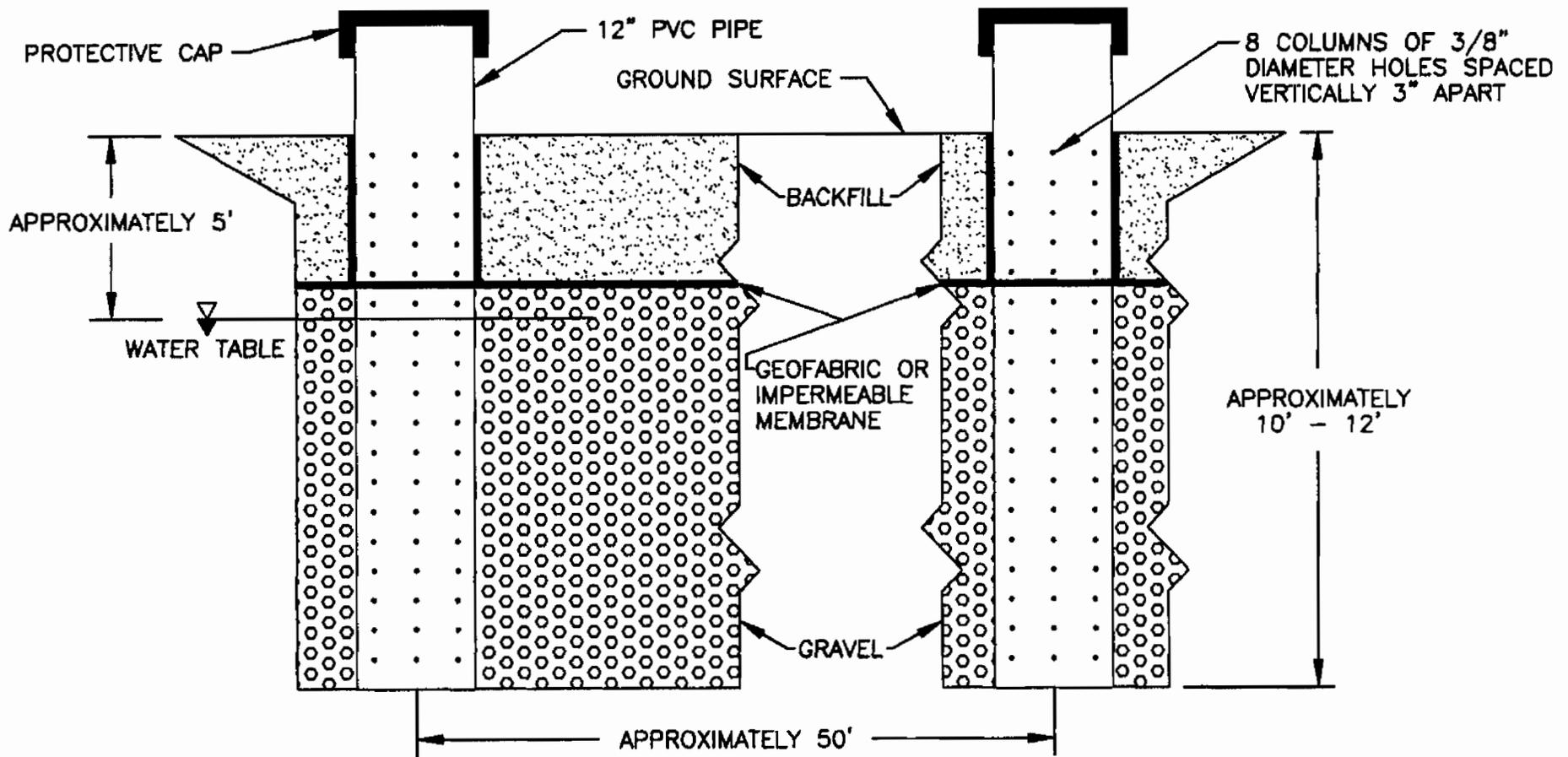


LEGEND

-  AREA 2 EXCAVATION BOUNDARY
-  12" DIAMETER RECOVERY PIPE
-  PLUGGED 12" ASBESTOS LAGGED PIPING LOCATION



ENVIRONMENTAL ENTERPRISE GROUP 1899 NORTH HOBSON AVENUE - BUILDING 30 NORTH CHARLESTON, SOUTH CAROLINA 29405-2106		
FIGURE 2 SWMU 8 EXCAVATION AREA AND RECOVERY PIPE LOCATIONS		
DATE: 05 OCTOBER 1999	PREPARED BY: J.I. BROWNLEE	REV -
SCALE: -	SHEET: A-2	

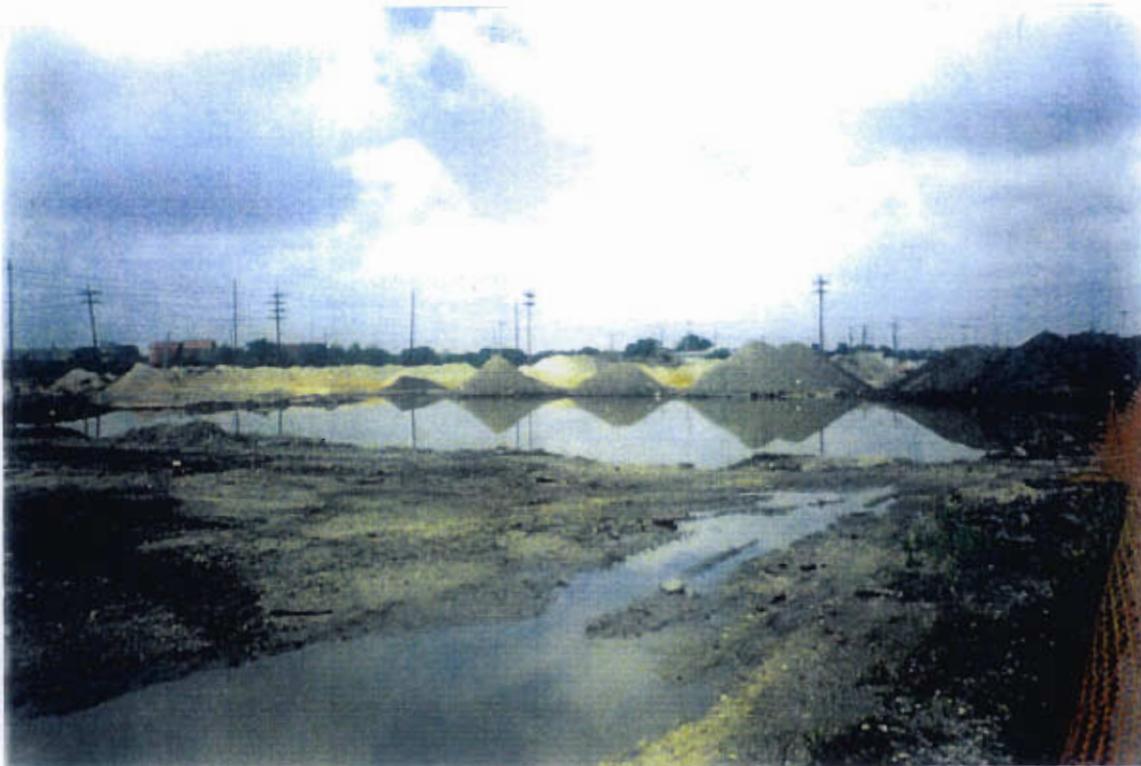


ENVIRONMENTAL ENTERPRISE GROUP
 1899 NORTH HOBSON AVENUE - BUILDING 30
 NORTH CHARLESTON, SOUTH CAROLINA 29405-2108



FIGURE 3
 SWMU 8 PRODUCT RECOVERY SYSTEM

DATE: 06 OCTOBER 1999	PREPARED BY: J.I. BROWNLEE	REV -
SCALE: NONE	SHEET: A-3	



Area 1 Excavation



Area 1 Excavation



Area 1 Soil Recovery Operations



Area 1 Covered Piles of Excavated Soil



Area 1 Excavated ROC Stockpiled for Reuse



Area 1 Sludge Oil Piping



Area 2 Excavating Soil onto Lined Berm



Area 2 Excavated Debris



Area 2 Excavated Debris



Area 2 Excavated Debris



Area 2 Excavated Debris



Area 2 Excavated Debris



Area 2 Excavating onto Lined Berm



Loading Trucks with Oil Contaminated Soil/Debris



Oil Skimmer in Operation



Filling Excavation with Gravel



Installation of Recovery System



Installation of Geotextile Fabric



Backfilling Over Geotextile Fabric



Site after Grading and Protective Posts Installed

Analytical Data Summary

11/11/2000 3:57 PM

StationID	G636SB015	G636SB015	G636SB016	G636SB016	
SampleID	636SB01501 (0-1ft)	636SB01501 (0-1ft)	636SB01601 (0-1ft)	636SB01601 (0-1ft)	
DateCollected	12/17/1999	12/17/1999	12/17/1999	12/17/1999	
DateExtracted		01/13/2000		01/13/2000	
DateAnalyzed	01/10/2000	01/13/2000	01/10/2000	01/13/2000	
SDGNumber	NBCG01	EN036	NBCG01	EN036	
Parameter	Units				
Hydrazine	ug/Kg	56.6	U	57.7	U
Total Organic Carbon	%, DR		0.5	=	0.4
					=

Analytical Data Summary

11/11/2002 3:57 PM

		G636SB017		G636SB017		G636SB017	
		636SB01701 (0-1ft)		636SB01701 (0-1ft)		636SB01701DL (0-1ft)	
		12/17/1999		12/17/1999		12/17/1999	
				01/13/2000			
		01/10/2000		01/13/2000		01/10/2000	
		NBCG01		EN036		NBCG01	
Parameter	Units						
Hydrazine	ug/Kg	27.7	U			27.7	U
Total Organic Carbon	%, DR			0.8	=		

Analytical Data Summary

11/11/2002 3:57 PM

StationID	G636SB015		G636SB015		G636SB016		G636SB016		
SampleID	636SB015S1 (0-1ft)		636SB015T1 (0-1ft)		636SB016S1 (0-1ft)		636SB016T1 (0-1ft)		
DateCollected	12/17/1999		12/17/1999		12/17/1999		12/17/1999		
DateExtracted	12/23/1999		01/06/2000		12/23/1999		01/06/2000		
DateAnalyzed	01/04/2000		01/07/2000		01/04/2000		01/07/2000		
SDGNumber	EN035		EN036		EN035		EN036		
Parameter	Units								
Aluminum	mg/Kg		4390	=			5020	=	
Antimony	mg/Kg		0.43	UJ			0.33	UJ	
Arsenic	mg/Kg		1.9	=			1.5	=	
Barium	mg/Kg		8.1	J			16.5	J	
Beryllium	mg/Kg		0.17	J			0.11	J	
Cadmium	mg/Kg		0.03	U			0.03	U	
Calcium	mg/Kg		7150	J			1290	J	
Chromium, Total	mg/Kg		5.9	=			5.1	=	
Cobalt	mg/Kg		0.84	J			0.47	J	
Copper	mg/Kg		8.3	J			3.4	J	
Iron	mg/Kg		3250	J			4100	J	
Lead	mg/Kg		5.3	=			6.9	=	
Magnesium	mg/Kg		192	J			194	J	
Manganese	mg/Kg		9.4	=			14.4	=	
Mercury	mg/Kg		0.04	J			0.04	J	
Nickel	mg/Kg		1.9	J			1.8	J	
Potassium	mg/Kg		81.8	J			68.8	J	
Selenium	mg/Kg		0.51	U			0.58	U	
Silver	mg/Kg		0.05	U			0.05	U	
Sodium	mg/Kg		150	J			95.5	J	
Thallium	mg/Kg		0.22	UJ			0.23	UJ	
Tin (Sn)	mg/Kg		2.5	U			2.6	U	
Vanadium	mg/Kg		5.9	=			7.8	=	
Zinc	mg/Kg		18	J			6.7	J	
Aluminum, SPLP	ug/L	1970	=		1270	J			
Antimony, SPLP	ug/L	2.4	U		2.4	U			
Arsenic, SPLP	ug/L	2	U		2	U			
Barium, SPLP	ug/L	494	=		490	=			
Beryllium, SPLP	ug/L	0.9	U		0.9	U			
Cadmium, SPLP	ug/L	3.8	U		2.3	U			

Analytical Data Summary

11/11/2002 3:57 PM

StationID	G636SB017	G636SB017	G636SB018	G636SB019			
SampleID	636SB017S1 (0-1ft)	636SB017T1 (0-1ft)	636SB01801 (0-1ft)	636SB01901 (0-1ft)			
DateCollected	12/17/1999	12/17/1999	01/26/2000	01/26/2000			
DateExtracted	12/23/1999	01/06/2000	01/31/2000	01/31/2000			
DateAnalyzed	01/04/2000	01/07/2000	01/31/2000	01/31/2000			
SDGNumber	EN035	EN036	41874	41874			
Parameter	Units						
Aluminum	mg/Kg	7370	=	3920	=	3730	=
Antimony	mg/Kg	0.94	UJ	0.5	U	0.32	U
Arsenic	mg/Kg	3.6	=	2.3	=	0.63	J
Barium	mg/Kg	22.8	=	18.6	=	5.9	=
Beryllium	mg/Kg	0.21	J	0.22	J	0.11	J
Cadmium	mg/Kg	0.18	U	0.37	U	0.15	U
Calcium	mg/Kg	30500	J	53300	=	1260	=
Chromium, Total	mg/Kg	13.7	=	7.8	=	5.7	=
Cobalt	mg/Kg	1.8	J	1.3	J	0.8	J
Copper	mg/Kg	46.4	J	38.8	=	7.3	=
Iron	mg/Kg	5710	J	4110	=	2000	=
Lead	mg/Kg	57.7	=	38.1	=	4.9	=
Magnesium	mg/Kg	989	J	689	=	241	=
Manganese	mg/Kg	50.6	=	41.2	=	19.9	=
Mercury	mg/Kg	0.06	J	0.02	UJ	0.02	J
Nickel	mg/Kg	6.7	J	4	J	2	J
Potassium	mg/Kg	390	J	136	J	93	J
Selenium	mg/Kg	0.67	U	0.39	U	0.39	U
Silver	mg/Kg	0.04	U	0.33	U	0.22	U
Sodium	mg/Kg	266	J	893	=	306	J
Thallium	mg/Kg	0.21	UJ	0.4	U	0.41	U
Tin (Sn)	mg/Kg	4.2	U	5.8	U	4.6	U
Vanadium	mg/Kg	14.8	=	7.8	=	4.3	=
Zinc	mg/Kg	71	J	88.4	=	9.6	=
Aluminum, SPLP	ug/L	3070	=				
Antimony, SPLP	ug/L	6.8	J				
Arsenic, SPLP	ug/L	3.3	J				
Barium, SPLP	ug/L	633	=				
Beryllium, SPLP	ug/L	0.9	U				
Cadmium, SPLP	ug/L	3.8	U				

	StationID	G636SB020	
	SampleID	636SB02001 (0-1ft)	
	DateCollected	01/26/2000	
	DateExtracted	01/31/2000	
	DateAnalyzed	01/31/2000	
	SDGNumber	41874	
Parameter	Units		
Aluminum	mg/Kg	2940	=
Antimony	mg/Kg	0.31	U
Arsenic	mg/Kg	1.6	J
Barium	mg/Kg	3.4	=
Beryllium	mg/Kg	0.22	J
Cadmium	mg/Kg	0.45	U
Calcium	mg/Kg	132000	=
Chromium, Total	mg/Kg	5.3	=
Cobalt	mg/Kg	2.5	J
Copper	mg/Kg	1.3	J
Iron	mg/Kg	2360	=
Lead	mg/Kg	2.7	=
Magnesium	mg/Kg	1390	=
Manganese	mg/Kg	55.3	=
Mercury	mg/Kg	0.02	UJ
Nickel	mg/Kg	3.6	J
Potassium	mg/Kg	233	J
Selenium	mg/Kg	0.38	U
Silver	mg/Kg	0.2	U
Sodium	mg/Kg	467	=
Thallium	mg/Kg	0.4	U
Tin (Sn)	mg/Kg	3.8	U
Vanadium	mg/Kg	3.7	=
Zinc	mg/Kg	9.7	=
Aluminum, SPLP	ug/L		
Antimony, SPLP	ug/L		
Arsenic, SPLP	ug/L		
Barium, SPLP	ug/L		
Beryllium, SPLP	ug/L		
Cadmium, SPLP	ug/L		

Analytical Data Summary

11/11/2002 3:57 PM

StationID	G636SB015		G636SB015		G636SB016		G636SB016		
SampleID	636SB015S1 (0-1ft)		636SB015T1 (0-1ft)		636SB016S1 (0-1ft)		636SB016T1 (0-1ft)		
DateCollected	12/17/1999		12/17/1999		12/17/1999		12/17/1999		
DateExtracted	12/23/1999		01/06/2000		12/23/1999		01/06/2000		
DateAnalyzed	01/04/2000		01/07/2000		01/04/2000		01/07/2000		
SDGNumber	EN035		EN036		EN035		EN036		
Parameter	Units								
Calcium, SPLP	ug/L	13500	=			1890	J		
Chromium, Total	ug/L	1.4	J			0.6	J		
Cobalt, SPLP	ug/L	0.5	UJ			0.5	UJ		
Copper, SPLP	ug/L	0.6	UJ			1.2	J		
Iron, SPLP	ug/L	932	=			764	=		
Lead, SPLP	ug/L	2.4	J			4.3	J		
Magnesium, SPLP	ug/L	528	J			205	J		
Manganese, SPLP	ug/L	1.5	J			1.6	J		
Mercury, SPLP	ug/L	0.2	U			0.2	U		
Nickel, SPLP	ug/L	1.1	J			1.1	U		
Potassium, SPLP	ug/L	121	J			79.3	J		
Selenium, SPLP	ug/L	1.7	UJ			1.7	UJ		
Silver, SPLP	ug/L	0.5	U			0.5	U		
Sodium, SPLP	ug/L	4320	J			4950	J		
Thallium, SPLP	ug/L	2.4	UJ			2.4	UJ		
Tin (Sn), SPLP	ug/L	2.7	U			2.7	U		
Vanadium, SPLP	ug/L	2.9	J			2.6	J		
Zinc, SPLP	ug/L	23.2	=			25.5	=		

Analytical Data Summary

11/11/2002 3:57 PM

StationID	G636SB017		G636SB017		G636SB018		G636SB019	
SampleID	636SB017S1 (0-1ft)		636SB017T1 (0-1ft)		636SB01801 (0-1ft)		636SB01901 (0-1ft)	
DateCollected	12/17/1999		12/17/1999		01/26/2000		01/26/2000	
DateExtracted	12/23/1999		01/06/2000		01/31/2000		01/31/2000	
DateAnalyzed	01/04/2000		01/07/2000		01/31/2000		01/31/2000	
SDGNumber	EN035		EN036		41874		41874	
Parameter	Units							
Calcium, SPLP	ug/L	16700	=					
Chromium, Total	ug/L	3.6	J					
Cobalt, SPLP	ug/L	0.5	UJ					
Copper, SPLP	ug/L	5.3	J					
Iron, SPLP	ug/L	1660	=					
Lead, SPLP	ug/L	6.3	J					
Magnesium, SPLP	ug/L	866	J					
Manganese, SPLP	ug/L	4.5	J					
Mercury, SPLP	ug/L	0.2	U					
Nickel, SPLP	ug/L	2.1	J					
Potassium, SPLP	ug/L	440	J					
Selenium, SPLP	ug/L	1.7	UJ					
Silver, SPLP	ug/L	0.5	U					
Sodium, SPLP	ug/L	6150	=					
Thallium, SPLP	ug/L	2.4	UJ					
Tin (Sn), SPLP	ug/L	2.7	U					
Vanadium, SPLP	ug/L	7	J					
Zinc, SPLP	ug/L	33.9	=					

Analytical Data Summary

11/11/2002 3:57 PM

StationID G636SB020
SampleID 636SB02001 (0-1ft)
DateCollected 01/26/2000
DateExtracted 01/31/2000
DateAnalyzed 01/31/2000
SDGNumber 41874

Parameter	Units		
Calcium, SPLP	ug/L		
Chromium, Total	ug/L		
Cobalt, SPLP	ug/L		
Copper, SPLP	ug/L		
Iron, SPLP	ug/L		
Lead, SPLP	ug/L		
Magnesium, SPLP	ug/L		
Manganese, SPLP	ug/L		
Mercury, SPLP	ug/L		
Nickel, SPLP	ug/L		
Potassium, SPLP	ug/L		
Selenium, SPLP	ug/L		
Silver, SPLP	ug/L		
Sodium, SPLP	ug/L		
Thallium, SPLP	ug/L		
Tin (Sn), SPLP	ug/L		
Vanadium, SPLP	ug/L		
Zinc, SPLP	ug/L		

Analytical Data Summary

11/11/2002 3:57 PM

StationID	G636SB015		G636SB016		G636SB017		
SampleID	636SB01501 (0-1ft)		636SB01601 (0-1ft)		636SB01701 (0-1ft)		
DateCollected	12/17/1999		12/17/1999		12/17/1999		
DateExtracted	12/21/1999		12/21/1999		12/21/1999		
DateAnalyzed	12/28/1999		12/29/1999		12/29/1999		
SDGNumber	EN036		EN036		EN036		
Parameter	Units						
2,2'-Oxybis(1-chloro)propane	ug/Kg	390	U	390	UJ	370	UJ
4-Methylphenol (p-Cresol)	ug/Kg	390	U	390	U	370	U
N-Nitrosodiphenylamine	ug/Kg	390	U	390	U	370	U
Phenol	ug/Kg	390	U	390	U	370	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/Kg	390	U	390	U	370	U
2-Chlorophenol	ug/Kg	390	U	390	U	370	U
1,3-Dichlorobenzene	ug/Kg	390	U	390	U	370	U
1,4-Dichlorobenzene	ug/Kg	390	U	390	U	370	U
Benzyl alcohol	ug/Kg	390	U	390	U	370	U
1,2-Dichlorobenzene	ug/Kg	390	U	390	U	370	U
2-Methylphenol (o-Cresol)	ug/Kg	390	U	390	U	370	U
N-Nitrosodi-n-propylamine	ug/Kg	390	U	390	U	370	U
Hexachloroethane	ug/Kg	390	U	390	U	370	U
Nitrobenzene	ug/Kg	390	U	390	U	370	U
Isophorone	ug/Kg	390	U	390	U	370	U
2-Nitrophenol	ug/Kg	390	U	390	U	370	U
2,4-Dimethylphenol	ug/Kg	390	U	390	U	370	U
bis(2-Chloroethoxy) Methane	ug/Kg	390	U	390	U	370	U
2,4-Dichlorophenol	ug/Kg	390	U	390	U	370	U
Benzoic acid	ug/Kg	1900	U	2000	U	1800	U
Naphthalene	ug/Kg	390	U	390	U	370	U
4-Chloroaniline	ug/Kg	390	U	390	U	370	U
Hexachlorobutadiene	ug/Kg	390	U	390	U	370	U
4-Chloro-3-methylphenol	ug/Kg	390	U	390	U	370	U
2-Methylnaphthalene	ug/Kg	390	U	390	U	370	U
Hexachlorocyclopentadiene	ug/Kg	390	U	390	U	370	U
2,4,6-Trichlorophenol	ug/Kg	390	U	390	U	370	U
2,4,5-Trichlorophenol	ug/Kg	390	U	390	U	370	U
2-Chloronaphthalene	ug/Kg	390	U	390	U	370	U
2-Nitroaniline	ug/Kg	390	U	390	U	370	U

Analytical Data Summary

11/11/2002 3:57 PM

StationID	G636SB015		G636SB016		G636SB017		
SampleID	636SB01501 (0-1ft)		636SB01601 (0-1ft)		636SB01701 (0-1ft)		
DateCollected	12/17/1999		12/17/1999		12/17/1999		
DateExtracted	12/21/1999		12/21/1999		12/21/1999		
DateAnalyzed	12/28/1999		12/29/1999		12/29/1999		
SDGNumber	EN036		EN036		EN036		
Parameter	Units						
3-Nitroaniline	ug/Kg	390	U	390	U	370	U
Dimethyl Phthalate	ug/Kg	390	U	390	U	370	U
2,6-Dinitrotoluene	ug/Kg	390	U	390	U	370	U
Acenaphthylene	ug/Kg	390	U	390	U	370	U
Acenaphthene	ug/Kg	390	U	390	U	370	U
2,4-Dinitrophenol	ug/Kg	780	U	780	U	730	U
Dibenzofuran	ug/Kg	390	U	390	U	370	U
2,4-Dinitrotoluene	ug/Kg	390	U	390	U	370	U
Diethyl Phthalate	ug/Kg	390	U	390	U	370	U
4-Nitrophenol	ug/Kg	780	U	780	U	730	U
Fluorene	ug/Kg	390	U	390	U	370	U
4-Chlorophenyl Phenyl Ether	ug/Kg	390	U	390	U	370	U
4,6-Dinitro-2-methylphenol	ug/Kg	780	U	780	U	730	U
4-Nitroaniline	ug/Kg	390	U	390	U	370	U
4-Bromophenyl Phenyl Ether	ug/Kg	390	U	390	U	370	U
Hexachlorobenzene	ug/Kg	390	U	390	U	370	U
Pentachlorophenol	ug/Kg	780	U	780	U	730	U
Phenanthrene	ug/Kg	390	U	390	U	370	U
Anthracene	ug/Kg	390	U	390	U	370	U
Di-n-butyl Phthalate	ug/Kg	570	=	390	U	370	U
Fluoranthene	ug/Kg	390	U	390	U	370	U
Pyrene	ug/Kg	390	U	390	U	75	J
Benzyl Butyl Phthalate	ug/Kg	390	U	390	U	370	U
Benzo(a)Anthracene	ug/Kg	390	U	390	U	370	U
3,3'-Dichlorobenzidine	ug/Kg	780	U	780	U	730	U
Chrysene	ug/Kg	390	U	390	U	370	U
bis(2-Ethylhexyl) Phthalate	ug/Kg	390	U	390	U	370	U
Di-n-octylphthalate	ug/Kg	390	U	390	U	370	UJ
Benzo(b)Fluoranthene	ug/Kg	390	U	390	U	370	UJ
Benzo(k)Fluoranthene	ug/Kg	390	U	390	U	370	UJ

Analytical Data Summary

11/11/2002 3:57 PM

	StationID	G636SB015	G636SB016	G636SB017
	SampleID	636SB01501 (0-1ft)	636SB01601 (0-1ft)	636SB01701 (0-1ft)
	DateCollected	12/17/1999	12/17/1999	12/17/1999
	DateExtracted	12/21/1999	12/21/1999	12/21/1999
	DateAnalyzed	12/28/1999	12/29/1999	12/29/1999
	SDGNumber	EN036	EN036	EN036
Parameter	Units			
Benzo(a)Pyrene	ug/Kg	390	U	370 UJ
Indeno(1,2,3-c,d)pyrene	ug/Kg	390	U	370 UJ
Dibenz(a,h)anthracene	ug/Kg	390	U	370 UJ
Benzo(g,h,i)Perylene	ug/Kg	390	U	370 UJ

Analytical Data Summary

11/11/2002 3:57 PM

	StationID	G636SB015	G636SB016	G636SB017
	SampleID	636SB01501 (0-1ft)	636SB01601 (0-1ft)	636SB01701 (0-1ft)
	DateCollected	12/17/1999	12/17/1999	12/17/1999
	DateExtracted	12/21/1999	12/21/1999	12/21/1999
	DateAnalyzed	12/28/1999	12/29/1999	12/29/1999
	SDGNumber	EN036	EN036	EN036
Parameter	Units			
1,2,4-Trichlorobenzene	ug/Kg	390 U	390 U	370 U

Analytical Data Summary

11/11/2002 4:01 PM

StationID	G636SB015	G636SB015	G636SB016	G636SB016				
SampleID	636SB01502 (3-5ft)	636SB01502 (3-5ft)	636SB01602 (3-5ft)	636SB01602 (3-5ft)				
DateCollected	12/17/1999	12/17/1999	12/17/1999	12/17/1999				
DateExtracted		01/13/2000		01/13/2000				
DateAnalyzed	01/10/2000	01/13/2000	01/10/2000	01/13/2000				
SDGNumber	NBCG01	EN036	NBCG01	EN036				
Parameter	Units							
Hydrazine	ug/Kg	59.9	U	65.6	U			
Total Organic Carbon	%, DR			2	=		1.8	=

Analytical Data Summary

11/11/2002 4:01 PM

Parameter	Units	StationID	G636SB015	G636SB015
		SampleID	636SB015S2 (3-5ft)	636SB015T2 (3-5ft)
		DateCollected	12/17/1999	12/17/1999
		DateExtracted	12/23/1999	01/06/2000
		DateAnalyzed	01/04/2000	01/07/2000
		SDGNumber	EN035	EN036
Aluminum	mg/Kg		7140	=
Antimony	mg/Kg		4	J
Arsenic	mg/Kg		5.4	=
Barium	mg/Kg		225	=
Beryllium	mg/Kg		0.31	J
Cadmium	mg/Kg		0.58	U
Calcium	mg/Kg		19300	J
Chromium, Total	mg/Kg		18.2	=
Cobalt	mg/Kg		2.1	J
Copper	mg/Kg		247	J
Iron	mg/Kg		11700	J
Lead	mg/Kg		883	=
Magnesium	mg/Kg		1010	J
Manganese	mg/Kg		97.4	=
Mercury	mg/Kg		0.97	J
Nickel	mg/Kg		12.1	J
Potassium	mg/Kg		454	J
Selenium	mg/Kg		0.99	J
Silver	mg/Kg		0.16	U
Sodium	mg/Kg		763	=
Thallium	mg/Kg		0.23	UJ
Tin (Sn)	mg/Kg		8.7	U
Vanadium	mg/Kg		21.6	=
Zinc	mg/Kg		451	J
Aluminum, SPLP	ug/L	3090	=	
Antimony, SPLP	ug/L	36.7	J	
Arsenic, SPLP	ug/L	4.3	J	
Barium, SPLP	ug/L	767	=	
Beryllium, SPLP	ug/L	0.9	U	
Cadmium, SPLP	ug/L	2.8	U	

	StationID	G636SB016	G636SB016
	SampleID	636SB016S2 (3-5ft)	636SB016T2 (3-5ft)
	DateCollected	12/17/1999	12/17/1999
	DateExtracted	12/23/1999	01/06/2000
	DateAnalyzed	01/04/2000	01/07/2000
	SDGNumber	EN035	EN036
Parameter	Units		
Aluminum	mg/Kg		11900 =
Antimony	mg/Kg		0.74 UJ
Arsenic	mg/Kg		9.9 =
Barium	mg/Kg		25.9 =
Beryllium	mg/Kg		0.65 J
Cadmium	mg/Kg		0.03 U
Calcium	mg/Kg		12400 J
Chromium, Total	mg/Kg		27.8 =
Cobalt	mg/Kg		4.1 J
Copper	mg/Kg		19.3 J
Iron	mg/Kg		15100 J
Lead	mg/Kg		30.3 =
Magnesium	mg/Kg		1890 J
Manganese	mg/Kg		172 =
Mercury	mg/Kg		0.18 J
Nickel	mg/Kg		9.1 J
Potassium	mg/Kg		945 J
Selenium	mg/Kg		1.4 J
Silver	mg/Kg		0.05 U
Sodium	mg/Kg		756 =
Thallium	mg/Kg		0.25 UJ
Tin (Sn)	mg/Kg		3.7 U
Vanadium	mg/Kg		36.8 =
Zinc	mg/Kg		77.3 J
Aluminum, SPLP	ug/L	3200	=
Antimony, SPLP	ug/L	2.4	U
Arsenic, SPLP	ug/L	4.1	J
Barium, SPLP	ug/L	770	=
Beryllium, SPLP	ug/L	0.9	U
Cadmium, SPLP	ug/L	2.6	U

Analytical Data Summary

11/11/2002 4:01 PM

	StationID	G636SB018		G636SB019	
	SampleID	636SB01802 (3-5ft)		636SB01902 (3-5ft)	
	DateCollected	01/26/2000		01/26/2000	
	DateExtracted	01/31/2000		01/31/2000	
	DateAnalyzed	01/31/2000		01/31/2000	
	SDGNumber	41874		41874	
Parameter	Units				
Aluminum	mg/Kg	5050	=	9850	=
Antimony	mg/Kg	0.32	U	47.5	=
Arsenic	mg/Kg	2.1	J	25	=
Barium	mg/Kg	7	=	437	=
Beryllium	mg/Kg	0.26	J	0.63	J
Cadmium	mg/Kg	0.18	U	9.2	=
Calcium	mg/Kg	2450	=	10400	=
Chromium, Total	mg/Kg	5.8	=	91.8	=
Cobalt	mg/Kg	1.5	J	9.1	=
Copper	mg/Kg	1.4	J	1940	=
Iron	mg/Kg	3080	=	53500	=
Lead	mg/Kg	2.8	=	1250	=
Magnesium	mg/Kg	262	=	3330	=
Manganese	mg/Kg	20	=	478	=
Mercury	mg/Kg	0.02	UJ	0.38	=
Nickel	mg/Kg	2.2	J	76.7	=
Potassium	mg/Kg	113	J	963	=
Selenium	mg/Kg	0.39	U	0.9	=
Silver	mg/Kg	0.17	U	1.9	U
Sodium	mg/Kg	474	=	2110	=
Thallium	mg/Kg	0.4	U	3.8	=
Tin (Sn)	mg/Kg	4.2	U	99.5	=
Vanadium	mg/Kg	4.9	=	74.5	=
Zinc	mg/Kg	5.9	=	2210	=
Aluminum, SPLP	ug/L				
Antimony, SPLP	ug/L				
Arsenic, SPLP	ug/L				
Barium, SPLP	ug/L				
Beryllium, SPLP	ug/L				
Cadmium, SPLP	ug/L				

	StationID	G636SB024		G636SB025	
	SampleID	636SB02402 (3-5ft)		636SB02502 (3-5ft)	
	DateCollected	07/12/2001		07/12/2001	
	DateExtracted	07/19/2001		07/19/2001	
	DateAnalyzed	07/21/2001		07/21/2001	
	SDGNumber	CNC25		CNC25	
Parameter	Units				
Aluminum	mg/Kg				
Antimony	mg/Kg	0.53	U	1.2	J
Arsenic	mg/Kg				
Barium	mg/Kg				
Beryllium	mg/Kg				
Cadmium	mg/Kg	0.092	U	0.91	J
Calcium	mg/Kg				
Chromium, Total	mg/Kg				
Cobalt	mg/Kg				
Copper	mg/Kg				
Iron	mg/Kg				
Lead	mg/Kg	3.7	=	170	=
Magnesium	mg/Kg				
Manganese	mg/Kg				
Mercury	mg/Kg				
Nickel	mg/Kg				
Potassium	mg/Kg				
Selenium	mg/Kg				
Silver	mg/Kg				
Sodium	mg/Kg				
Thallium	mg/Kg	0.6	U	0.7	U
Tin (Sn)	mg/Kg				
Vanadium	mg/Kg				
Zinc	mg/Kg				
Aluminum, SPLP	ug/L				
Antimony, SPLP	ug/L				
Arsenic, SPLP	ug/L				
Barium, SPLP	ug/L				
Beryllium, SPLP	ug/L				
Cadmium, SPLP	ug/L				

Analytical Data Summary

11/11/2002 4:01 PM

	StationID	G636SB026		G636SB026	
	SampleID	636CB02602 (3-5ft)		636SB02602 (3-5ft)	
	DateCollected	07/12/2001		07/12/2001	
	DateExtracted	07/19/2001		07/19/2001	
	DateAnalyzed	07/21/2001		07/21/2001	
	SDGNumber	CNC25		CNC25	
Parameter	Units				
Aluminum	mg/Kg				
Antimony	mg/Kg	0.6	U	0.53	U
Arsenic	mg/Kg				
Barium	mg/Kg				
Beryllium	mg/Kg				
Cadmium	mg/Kg	0.14	U	0.093	U
Calcium	mg/Kg				
Chromium, Total	mg/Kg				
Cobalt	mg/Kg				
Copper	mg/Kg				
Iron	mg/Kg				
Lead	mg/Kg	2.6	=	3.1	=
Magnesium	mg/Kg				
Manganese	mg/Kg				
Mercury	mg/Kg				
Nickel	mg/Kg				
Potassium	mg/Kg				
Selenium	mg/Kg				
Silver	mg/Kg				
Sodium	mg/Kg				
Thallium	mg/Kg	0.68	U	0.61	U
Tin (Sn)	mg/Kg				
Vanadium	mg/Kg				
Zinc	mg/Kg				
Aluminum, SPLP	ug/L				
Antimony, SPLP	ug/L				
Arsenic, SPLP	ug/L				
Barium, SPLP	ug/L				
Beryllium, SPLP	ug/L				
Cadmium, SPLP	ug/L				

Analytical Data Summary

11/11/2002 4:01 PM

	StationID	G636SB027		G636SB028	
	SampleID	636SB02702 (3-5ft)		636SB02802 (3-5ft)	
	DateCollected	07/12/2001		07/12/2001	
	DateExtracted	07/19/2001		07/19/2001	
	DateAnalyzed	07/21/2001		07/21/2001	
	SDGNumber	CNC25		CNC25	
Parameter	Units				
Aluminum	mg/Kg				
Antimony	mg/Kg	0.52	U		
Arsenic	mg/Kg				
Barium	mg/Kg				
Beryllium	mg/Kg				
Cadmium	mg/Kg	0.12	U		
Calcium	mg/Kg				
Chromium, Total	mg/Kg				
Cobalt	mg/Kg				
Copper	mg/Kg				
Iron	mg/Kg				
Lead	mg/Kg	2.7	=		
Magnesium	mg/Kg				
Manganese	mg/Kg				
Mercury	mg/Kg				
Nickel	mg/Kg				
Potassium	mg/Kg				
Selenium	mg/Kg				
Silver	mg/Kg				
Sodium	mg/Kg				
Thallium	mg/Kg	0.6	U	0.59	U
Tin (Sn)	mg/Kg				
Vanadium	mg/Kg				
Zinc	mg/Kg				
Aluminum, SPLP	ug/L				
Antimony, SPLP	ug/L				
Arsenic, SPLP	ug/L				
Barium, SPLP	ug/L				
Beryllium, SPLP	ug/L				
Cadmium, SPLP	ug/L				

Analytical Data Summary

11/11/2002 4:01 PM

	StationID	G636SB015	G636SB015
	SampleID	636SB015S2 (3-5ft)	636SB015T2 (3-5ft)
	DateCollected	12/17/1999	12/17/1999
	DateExtracted	12/23/1999	01/06/2000
	DateAnalyzed	01/04/2000	01/07/2000
	SDGNumber	EN035	EN036
Parameter	Units		
Calcium, SPLP	ug/L	10800	=
Chromium, Total	ug/L	5.5	J
Cobalt, SPLP	ug/L	0.5	UJ
Copper, SPLP	ug/L	103	=
Iron, SPLP	ug/L	2900	=
Lead, SPLP	ug/L	33.4	=
Magnesium, SPLP	ug/L	2300	J
Manganese, SPLP	ug/L	12.1	J
Mercury, SPLP	ug/L	0.2	U
Nickel, SPLP	ug/L	4.4	J
Potassium, SPLP	ug/L	3900	J
Selenium, SPLP	ug/L	1.7	UJ
Silver, SPLP	ug/L	0.5	U
Sodium, SPLP	ug/L	24400	=
Thallium, SPLP	ug/L	2.4	UJ
Tin (Sn), SPLP	ug/L	2.7	U
Vanadium, SPLP	ug/L	13.7	J
Zinc, SPLP	ug/L	100	=

Analytical Data Summary

11/11/2002 4:01 PM

	StationID	G636SB016	G636SB016
	SampleID	636SB016S2 (3-5ft)	636SB016T2 (3-5ft)
	DateCollected	12/17/1999	12/17/1999
	DateExtracted	12/23/1999	01/06/2000
	DateAnalyzed	01/04/2000	01/07/2000
	SDGNumber	EN035	EN036
Parameter	Units		
Calcium, SPLP	ug/L	12100	=
Chromium, Total	ug/L	4	J
Cobalt, SPLP	ug/L	0.5	UJ
Copper, SPLP	ug/L	3.6	J
Iron, SPLP	ug/L	2100	=
Lead, SPLP	ug/L	5.1	J
Magnesium, SPLP	ug/L	2040	J
Manganese, SPLP	ug/L	11	J
Mercury, SPLP	ug/L	0.2	U
Nickel, SPLP	ug/L	2.2	J
Potassium, SPLP	ug/L	3340	J
Selenium, SPLP	ug/L	1.7	UJ
Silver, SPLP	ug/L	0.5	U
Sodium, SPLP	ug/L	22200	=
Thallium, SPLP	ug/L	2.4	UJ
Tin (Sn), SPLP	ug/L	2.7	U
Vanadium, SPLP	ug/L	9.9	J
Zinc, SPLP	ug/L	33	=

Analytical Data Summary

11/11/2002 4:01 PM

StationID	G636SB018	G636SB019
SampleID	636SB01802 (3-5ft)	636SB01902 (3-5ft)
DateCollected	01/26/2000	01/26/2000
DateExtracted	01/31/2000	01/31/2000
DateAnalyzed	01/31/2000	01/31/2000
SDGNumber	41874	41874

Parameter	Units			
Calcium, SPLP	ug/L			
Chromium, Total	ug/L			
Cobalt, SPLP	ug/L			
Copper, SPLP	ug/L			
Iron, SPLP	ug/L			
Lead, SPLP	ug/L			
Magnesium, SPLP	ug/L			
Manganese, SPLP	ug/L			
Mercury, SPLP	ug/L			
Nickel, SPLP	ug/L			
Potassium, SPLP	ug/L			
Selenium, SPLP	ug/L			
Silver, SPLP	ug/L			
Sodium, SPLP	ug/L			
Thallium, SPLP	ug/L			
Tin (Sn), SPLP	ug/L			
Vanadium, SPLP	ug/L			
Zinc, SPLP	ug/L			

	StationID	G636SB024	G636SB025
	SampleID	636SB02402 (3-5ft)	636SB02502 (3-5ft)
	DateCollected	07/12/2001	07/12/2001
	DateExtracted	07/19/2001	07/19/2001
	DateAnalyzed	07/21/2001	07/21/2001
	SDGNumber	CNC25	CNC25
Parameter	Units		
Calcium, SPLP	ug/L		
Chromium, Total	ug/L		
Cobalt, SPLP	ug/L		
Copper, SPLP	ug/L		
Iron, SPLP	ug/L		
Lead, SPLP	ug/L		
Magnesium, SPLP	ug/L		
Manganese, SPLP	ug/L		
Mercury, SPLP	ug/L		
Nickel, SPLP	ug/L		
Potassium, SPLP	ug/L		
Selenium, SPLP	ug/L		
Silver, SPLP	ug/L		
Sodium, SPLP	ug/L		
Thallium, SPLP	ug/L		
Tin (Sn), SPLP	ug/L		
Vanadium, SPLP	ug/L		
Zinc, SPLP	ug/L		

Analytical Data Summary

11/11/2002 4:01 PM

StationID	G636SB026	G636SB026
SampleID	636CB02602 (3-5ft)	636SB02602 (3-5ft)
DateCollected	07/12/2001	07/12/2001
DateExtracted	07/19/2001	07/19/2001
DateAnalyzed	07/21/2001	07/21/2001
SDGNumber	CNC25	CNC25
Parameter	Units	
Calcium, SPLP	ug/L	
Chromium, Total	ug/L	
Cobalt, SPLP	ug/L	
Copper, SPLP	ug/L	
Iron, SPLP	ug/L	
Lead, SPLP	ug/L	
Magnesium, SPLP	ug/L	
Manganese, SPLP	ug/L	
Mercury, SPLP	ug/L	
Nickel, SPLP	ug/L	
Potassium, SPLP	ug/L	
Selenium, SPLP	ug/L	
Silver, SPLP	ug/L	
Sodium, SPLP	ug/L	
Thallium, SPLP	ug/L	
Tin (Sn), SPLP	ug/L	
Vanadium, SPLP	ug/L	
Zinc, SPLP	ug/L	

StationID	G636SB027	G636SB028
SampleID	636SB02702 (3-5ft)	636SB02802 (3-5ft)
DateCollected	07/12/2001	07/12/2001
DateExtracted	07/19/2001	07/19/2001
DateAnalyzed	07/21/2001	07/21/2001
SDGNumber	CNC25	CNC25

Parameter	Units			
Calcium, SPLP	ug/L			
Chromium, Total	ug/L			
Cobalt, SPLP	ug/L			
Copper, SPLP	ug/L			
Iron, SPLP	ug/L			
Lead, SPLP	ug/L			
Magnesium, SPLP	ug/L			
Manganese, SPLP	ug/L			
Mercury, SPLP	ug/L			
Nickel, SPLP	ug/L			
Potassium, SPLP	ug/L			
Selenium, SPLP	ug/L			
Silver, SPLP	ug/L			
Sodium, SPLP	ug/L			
Thallium, SPLP	ug/L			
Tin (Sn), SPLP	ug/L			
Vanadium, SPLP	ug/L			
Zinc, SPLP	ug/L			

Analytical Data Summary

11/11/2002 4:01 PM

	StationID	G636SB015		G636SB015		G636SB016	
	SampleID	636SB01502 (3-5ft)		636SB01502DL (3-5ft)		636SB01602 (3-5ft)	
	DateCollected	12/17/1999		12/17/1999		12/17/1999	
	DateExtracted	12/21/1999		12/21/1999		12/21/1999	
	DateAnalyzed	12/29/1999		01/03/2000		12/29/1999	
	SDGNumber	EN036		EN036		EN036	
Parameter	Units						
2,2'-Oxybis(1-chloro)propane	ug/Kg	400	UJ	800	R	420	UJ
4-Methylphenol (p-Cresol)	ug/Kg	400	U	800	R	420	U
N-Nitrosodiphenylamine	ug/Kg	400	U	800	R	420	U
Phenol	ug/Kg	400	U	800	R	420	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/Kg	400	U	800	R	420	U
2-Chlorophenol	ug/Kg	400	U	800	R	420	U
1,3-Dichlorobenzene	ug/Kg	400	U	800	R	420	U
1,4-Dichlorobenzene	ug/Kg	400	U	800	R	420	U
Benzyl alcohol	ug/Kg	400	U	800	R	420	U
1,2-Dichlorobenzene	ug/Kg	400	U	800	R	420	U
2-Methylphenol (o-Cresol)	ug/Kg	400	U	800	R	420	U
N-Nitrosodi-n-propylamine	ug/Kg	400	U	800	R	420	U
Hexachloroethane	ug/Kg	400	U	800	R	420	U
Nitrobenzene	ug/Kg	400	U	800	R	420	U
Isophorone	ug/Kg	400	U	800	R	420	U
2-Nitrophenol	ug/Kg	400	U	800	R	420	U
2,4-Dimethylphenol	ug/Kg	400	U	800	R	420	U
bis(2-Chloroethoxy) Methane	ug/Kg	400	U	800	R	420	U
2,4-Dichlorophenol	ug/Kg	400	U	800	R	420	U
Benzoic acid	ug/Kg	2000	U	4000	R	2100	U
Naphthalene	ug/Kg	400	U	800	R	420	U
4-Chloroaniline	ug/Kg	400	U	800	R	420	U
Hexachlorobutadiene	ug/Kg	400	U	800	R	420	U
4-Chloro-3-methylphenol	ug/Kg	400	U	800	R	420	U
2-Methylnaphthalene	ug/Kg	400	U	800	R	420	U
Hexachlorocyclopentadiene	ug/Kg	400	U	800	R	420	U
2,4,6-Trichlorophenol	ug/Kg	400	U	800	R	420	U
2,4,5-Trichlorophenol	ug/Kg	400	U	800	R	420	U
2-Chloronaphthalene	ug/Kg	400	U	800	R	420	U
2-Nitroaniline	ug/Kg	400	U	800	R	420	U

Analytical Data Summary

11/11/2000 4:01 PM

StationID	G636SB015		G636SB015		G636SB016		
SampleID	636SB01502 (3-5ft)		636SB01502DL (3-5ft)		636SB01602 (3-5ft)		
DateCollected	12/17/1999		12/17/1999		12/17/1999		
DateExtracted	12/21/1999		12/21/1999		12/21/1999		
DateAnalyzed	12/29/1999		01/03/2000		12/29/1999		
SDGNumber	EN036		EN036		EN036		
Parameter	Units						
3-Nitroaniline	ug/Kg	400	U	800	R	420	U
Dimethyl Phthalate	ug/Kg	400	U	800	R	420	U
2,6-Dinitrotoluene	ug/Kg	400	U	800	R	420	U
Acenaphthylene	ug/Kg	400	U	800	R	420	U
Acenaphthene	ug/Kg	400	U	800	R	420	U
2,4-Dinitrophenol	ug/Kg	800	U	1600	R	840	U
Dibenzofuran	ug/Kg	400	U	800	R	420	U
2,4-Dinitrotoluene	ug/Kg	400	U	800	R	420	U
Diethyl Phthalate	ug/Kg	400	U	800	R	420	U
4-Nitrophenol	ug/Kg	800	U	1600	R	840	U
Fluorene	ug/Kg	400	U	800	R	420	U
4-Chlorophenyl Phenyl Ether	ug/Kg	400	U	800	R	420	U
4,6-Dinitro-2-methylphenol	ug/Kg	800	U	1600	R	840	U
4-Nitroaniline	ug/Kg	400	U	800	R	420	U
4-Bromophenyl Phenyl Ether	ug/Kg	400	U	800	R	420	U
Hexachlorobenzene	ug/Kg	400	U	800	R	420	U
Pentachlorophenol	ug/Kg	800	U	1600	R	840	U
Phenanthrene	ug/Kg	150	J	800	R	420	U
Anthracene	ug/Kg	400	U	800	R	420	U
Di-n-butyl Phthalate	ug/Kg	400	U	800	R	420	U
Fluoranthene	ug/Kg	210	J	240	R	420	U
Pyrene	ug/Kg	300	J	280	R	420	U
Benzyl Butyl Phthalate	ug/Kg	400	U	800	R	420	U
Benzo(a)Anthracene	ug/Kg	120	J	800	R	420	U
3,3'-Dichlorobenzidine	ug/Kg	800	U	1600	R	840	U
Chrysene	ug/Kg	170	J	190	R	420	U
bis(2-Ethylhexyl) Phthalate	ug/Kg	400	U	800	R	420	U
Di-n-octylphthalate	ug/Kg	400	UJ	800	R	420	U
Benzo(b)Fluoranthene	ug/Kg	200	J	240	R	420	U
Benzo(k)Fluoranthene	ug/Kg	200	J	800	R	420	U

Analytical Data Summary

11/11/2002 4:01 PM

	StationID	G636SB015		G636SB015		G636SB016	
	SampleID	636SB01502 (3-5ft)		636SB01502DL (3-5ft)		636SB01602 (3-5ft)	
	DateCollected	12/17/1999		12/17/1999		12/17/1999	
	DateExtracted	12/21/1999		12/21/1999		12/21/1999	
	DateAnalyzed	12/29/1999		01/03/2000		12/29/1999	
	SDGNumber	EN036		EN036		EN036	
Parameter	Units						
Benzo(a)Pyrene	ug/Kg	160	J	160	R	420	U
Indeno(1,2,3-c,d)pyrene	ug/Kg	400	UJ	800	R	420	U
Dibenz(a,h)anthracene	ug/Kg	400	UJ	800	R	420	U
Benzo(g,h,i)Perylene	ug/Kg	400	UJ	800	R	420	U

Analytical Data Summary

11/11/2002 4:01 PM

StationID	G636SB015		G636SB015		G636SB016		G636SB028		
SampleID	636SB01502 (3-5ft)		636SB01502DL (3-5ft)		636SB01602 (3-5ft)		636SB02802 (3-5ft)		
DateCollected	12/17/1999		12/17/1999		12/17/1999		07/12/2001		
DateExtracted	12/21/1999		12/21/1999		12/21/1999		07/17/2001		
DateAnalyzed	12/29/1999		01/03/2000		12/29/1999		07/17/2001		
SDGNumber	EN036		EN036		EN036		CNC25		
Parameter	Units								
1,2,4-Trichlorobenzene	ug/Kg	400	U	800	R	420	U		
1,1,2,2-Tetrachloroethane	ug/Kg							5.1	U

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW001	G008GW002	G008GW003		
SampleID	008GW00104	008GW00204	008GW00304		
DateCollected	12/08/1997	12/09/1997	12/11/1997		
DateExtracted	12/10/1997	12/11/1997	12/16/1997		
DateAnalyzed	12/11/1997	12/12/1997	12/17/1997		
SDGNumber	32103	32103	32103		
Parameter	Units				
1,3-Dinitrobenzene	ug/L	4	U	4	U
2-Am-DNT	ug/L	12	U	12	U
4-AM-DNT	ug/L	7	U	7	U
HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	ug/L	14	U	14	U
HMX	ug/L	13	U	13	U
m-Nitrotoluene	ug/L	7.9	U	7.9	U
o-Nitrotoluene	ug/L	12	U	12	U
p-Nitrotoluene	ug/L	8	U	8	U
Tetryl	ug/L	10	U	10	U
Trinitrotoluene, 2,4,6- (TNT)	ug/L	6.4	U	6.4	U
Nitrobenzene	ug/L	7	U	7	U
2,4-Dinitrotoluene	ug/L	5.7	U	5.7	U

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW004		G008GW005		G008GW006		
SampleID	008GW00404		008GW00504		008GW00604		
DateCollected	12/09/1997		12/08/1997		12/09/1997		
DateExtracted	12/11/1997		12/10/1997		12/11/1997		
DateAnalyzed	12/12/1997		12/11/1997		12/11/1997		
SDGNumber	32103		32103		32103		
Parameter	Units						
1,3-Dinitrobenzene	ug/L	4	U	4	U	4	U
2-Am-DNT	ug/L	12	U	12	U	12	U
4-AM-DNT	ug/L	7	U	7	U	7	U
HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	ug/L	14	U	14	U	14	U
HMX	ug/L	13	U	13	U	13	U
m-Nitrotoluene	ug/L	7.9	U	7.9	U	7.9	U
o-Nitrotoluene	ug/L	12	U	12	U	12	U
p-Nitrotoluene	ug/L	8	U	8	U	8	U
Tetryl	ug/L	10	U	10	U	10	U
Trinitrotoluene, 2,4,6- (TNT)	ug/L	6.4	U	6.4	U	6.4	U
Nitrobenzene	ug/L	7	U	7	U	7	U
2,4-Dinitrotoluene	ug/L	5.7	U	5.7	U	5.7	U

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G636GW001
SampleID	636GW00104
DateCollected	12/11/1997
DateExtracted	12/16/1997
DateAnalyzed	12/17/1997
SDGNumber	32103

Parameter	Units		
1,3-Dinitrobenzene	ug/L	4	U
2-Am-DNT	ug/L	12	U
4-AM-DNT	ug/L	7	U
HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	ug/L	14	U
HMX	ug/L	13	U
m-Nitrotoluene	ug/L	7.9	U
o-Nitrotoluene	ug/L	12	U
p-Nitrotoluene	ug/L	8	U
Tetryl	ug/L	10	U
Trinitrotoluene, 2,4,6- (TNT)	ug/L	6.4	U
Nitrobenzene	ug/L	7	U
2,4-Dinitrotoluene	ug/L	5.7	U

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GSP01	G008GSP01	G008GSP01	G008GSP02	
SampleID	008GSP0101b	008GSP01M1	008GSP01M1	008GSP0201b	
DateCollected	08/04/1999	03/29/2002	03/29/2002	08/04/1999	
DateExtracted		04/02/2002	05/07/2002		
DateAnalyzed	08/26/1999	04/02/2002	05/07/2002	08/26/1999	
SDGNumber	39825	CNC86	CNC86A	39825	
Parameter	Units				
Chloride	mg/L				
Hydrazine	mg/l		0.005 S	0.031 J	
Hydrazine	ug/L	76.6 =			5 U
Nitrate-Nitrite-N	mg/L				
Nitrogen, Nitrate (as N)	mg/L				
Nitrogen	mg/L				
Phosphorus	mg/L				
Sulfate (as SO4)	mg/L				
Sulfide	mg/L				
Total Organic Carbon	mg/L				

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GSP03		G008GSP04		G008GSP05		G008GSP06		
SampleID	008GSP0301a		008GSP0401a		008GSP0501b		008GSP0601		
DateCollected	08/04/1999		08/04/1999		08/04/1999		08/04/1999		
DateExtracted									
DateAnalyzed	08/26/1999		08/26/1999		08/26/1999		08/26/1999		
SDGNumber	39825		39825		39825		39825		
Parameter	Units								
Chloride	mg/L								
Hydrazine	mg/l								
Hydrazine	ug/L	14.6	=	5	U	5.6	=	5	U
Nitrate-Nitrite-N	mg/L								
Nitrogen, Nitrate (as N)	mg/L								
Nitrogen	mg/L								
Phosphorus	mg/L								
Sulfate (as SO4)	mg/L								
Sulfide	mg/L								
Total Organic Carbon	mg/L								

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GSP06	G008GSP06	G008GSP07	G008GSP08			
SampleID	008GSP06M1	008GSP06M1	008GSP0701	008GSP0801			
DateCollected	03/29/2002	03/29/2002	08/04/1999	08/04/1999			
DateExtracted	04/02/2002	05/07/2002					
DateAnalyzed	04/02/2002	05/07/2002	08/26/1999	08/26/1999			
SDGNumber	CNC86	CNC86A	39825	39825			
Parameter	Units						
Chloride	mg/L						
Hydrazine	mg/l	0.1	S	0.005	UJ		
Hydrazine	ug/L					6.7	= 5 U
Nitrate-Nitrite-N	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Nitrogen	mg/L						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L						
Sulfide	mg/L						
Total Organic Carbon	mg/L						

Analytic Data Summary

01/07/2003 1:07 PM

StationID	G008GSP09		G008GSP09		G008GSP09		G008GSP10	
SampleID	008GSP0901		008GSP09M1		008GSP09M1		008GSP1001	
DateCollected	08/04/1999		03/29/2002		03/29/2002		08/05/1999	
DateExtracted			04/02/2002		05/07/2002			
DateAnalyzed	08/26/1999		04/02/2002		05/07/2002		08/26/1999	
SDGNumber	39825		CNC86		CNC86A		39843	
Parameter	Units							
Chloride	mg/L							
Hydrazine	mg/l		0.1 S		0.008 J			
Hydrazine	ug/L		5 U				5 U	
Nitrate-Nitrite-N	mg/L							
Nitrogen, Nitrate (as N)	mg/L							
Nitrogen	mg/L							
Phosphorus	mg/L							
Sulfate (as SO4)	mg/L							
Sulfide	mg/L							
Total Organic Carbon	mg/L							

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GSP11		G008GSP12		G008GSP13		G008GSP14	
SampleID	008GSP1101		008GSP1201		008GSP1301		008GSP1401	
DateCollected	08/05/1999		08/05/1999		08/05/1999		08/05/1999	
DateExtracted								
DateAnalyzed	08/26/1999		08/26/1999		08/26/1999		08/26/1999	
SDGNumber	39843		39843		39843		39843	
Parameter	Units							
Chloride	mg/L							
Hydrazine	mg/l							
Hydrazine	ug/L	5	=	10.1	=	6.7	=	5.6
Nitrate-Nitrite-N	mg/L							
Nitrogen, Nitrate (as N)	mg/L							
Nitrogen	mg/L							
Phosphorus	mg/L							
Sulfate (as SO4)	mg/L							
Sulfide	mg/L							
Total Organic Carbon	mg/L							

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GSP14	G008GSP14	G008GSP15	G008GSP16	
SampleID	008GSP14M1	008GSP14M1	008GSP1501	008GSP1601	
DateCollected	03/29/2002	03/29/2002	08/05/1999	08/05/1999	
DateExtracted	04/02/2002	05/07/2002			
DateAnalyzed	04/02/2002	05/07/2002	08/26/1999	08/26/1999	
SDGNumber	CNC86	CNC86A	39843	39843	
Parameter	Units				
Chloride	mg/L				
Hydrazine	mg/l	0.1	S	0.006	J
Hydrazine	ug/L			7	= 6 =
Nitrate-Nitrite-N	mg/L				
Nitrogen, Nitrate (as N)	mg/L				
Nitrogen	mg/L				
Phosphorus	mg/L				
Sulfate (as SO4)	mg/L				
Sulfide	mg/L				
Total Organic Carbon	mg/L				

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GSP17	G008GSP18	G008GSP18	G008GSP18
SampleID	008GSP1701	008GSP1801	008GSP18M1	008GSP18M1
DateCollected	08/05/1999	08/05/1999	03/29/2002	03/29/2002
DateExtracted			04/02/2002	05/07/2002
DateAnalyzed	08/26/1999	08/26/1999	04/02/2002	05/07/2002
SDGNumber	39843	39843	CNC86	CNC86A
Parameter	Units			
Chloride	mg/L			
Hydrazine	mg/l			0.1 S
Hydrazine	ug/L	5.6 =	7.4 =	0.008 J
Nitrate-Nitrite-N	mg/L			
Nitrogen, Nitrate (as N)	mg/L			
Nitrogen	mg/L			
Phosphorus	mg/L			
Sulfate (as SO4)	mg/L			
Sulfide	mg/L			
Total Organic Carbon	mg/L			

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW001	G008GW001	G008GW001	G008GW001
SampleID	008G000110	008GW00104	008GW001M1	008GW001M1
DateCollected	07/19/2000	12/08/1997	03/30/2002	03/30/2002
DateExtracted	08/01/2000		04/03/2002	05/07/2002
DateAnalyzed	08/01/2000	01/04/1998	04/03/2002	05/07/2002
SDGNumber	CNC04	32103	CNC89	CNC89A
Parameter	Units			
Chloride	mg/L			
Hydrazine	mg/l	0.0053	=	
Hydrazine	ug/L		8	=
Nitrate-Nitrite-N	mg/L			
Nitrogen, Nitrate (as N)	mg/L			
Nitrogen	mg/L			
Phosphorus	mg/L			
Sulfate (as SO4)	mg/L			
Sulfide	mg/L			
Total Organic Carbon	mg/L			

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW001	G008GW001	G008GW001	G008GW002
SampleID	008GW001M6	008GW001M6	008H000110	008GW00202a
DateCollected	06/21/2002	06/21/2002	07/19/2000	09/27/1998
DateExtracted		06/26/2002	08/01/2000	
DateAnalyzed	07/03/2002	06/26/2002	08/01/2000	
SDGNumber	CNC123	CNC118	CNC04	MNA
Parameter	Units			
Chloride	mg/L			
Hydrazine	mg/l	0.11	=	0.0053 =
Hydrazine	ug/L	10	U	
Nitrate-Nitrite-N	mg/L			0.1 SU
Nitrogen, Nitrate (as N)	mg/L			
Nitrogen	mg/L			9.5 S=
Phosphorus	mg/L			0.18 S=
Sulfate (as SO4)	mg/L			58 S=
Sulfide	mg/L			8.2 S=
Total Organic Carbon	mg/L			17 S=

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW002	G008GW002	G008GW002	G008GW003
SampleID	008GW00204	008GW002M1	008GW002M1	008GW00304
DateCollected	12/09/1997	03/30/2002	03/30/2002	12/11/1997
DateExtracted		04/03/2002	05/07/2002	
DateAnalyzed	01/04/1998	04/03/2002	05/07/2002	01/04/1998
SDGNumber	32103	CNC89	CNC89A	32103
Parameter	Units			
Chloride	mg/L			
Hydrazine	mg/l		0.1 S	0.009 J
Hydrazine	ug/L	5.1 =		22.1 =
Nitrate-Nitrite-N	mg/L			
Nitrogen, Nitrate (as N)	mg/L			
Nitrogen	mg/L			
Phosphorus	mg/L			
Sulfate (as SO4)	mg/L			
Sulfide	mg/L			
Total Organic Carbon	mg/L			

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW003	G008GW003	G008GW003	G008GW004
SampleID	008GW003M1	008GW003M1	008HW003M1	008GW00404
DateCollected	03/29/2002	03/29/2002	03/29/2002	12/09/1997
DateExtracted	04/02/2002	05/09/2002	04/02/2002	
DateAnalyzed	04/02/2002	05/09/2002	04/02/2002	01/04/1998
SDGNumber	CNC85	CNC85A	CNC85	32103
Parameter	Units			
Chloride	mg/L			
Hydrazine	mg/l	0.076	S	0.061
Hydrazine	ug/L			J
Nitrate-Nitrite-N	mg/L			0.14
Nitrogen, Nitrate (as N)	mg/L			=
Nitrogen	mg/L			7.6
Phosphorus	mg/L			=
Sulfate (as SO4)	mg/L			
Sulfide	mg/L			
Total Organic Carbon	mg/L			

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW004	G008GW004	G008GW004	G008GW004	
SampleID	008GW004M1	008GW004M1	008GW004M6	008GW004M6	
DateCollected	03/28/2002	03/28/2002	06/20/2002	06/20/2002	
DateExtracted	04/02/2002	05/09/2002		06/21/2002	
DateAnalyzed	04/02/2002	05/09/2002	07/03/2002	06/21/2002	
SDGNumber	CNC85	CNC85A	CNC123	CNC118	
Parameter	Units				
Chloride	mg/L				
Hydrazine	mg/l	0.1	S	0.02	J
Hydrazine	ug/L				
Nitrate-Nitrite-N	mg/L				
Nitrogen, Nitrate (as N)	mg/L				
Nitrogen	mg/L				
Phosphorus	mg/L				
Sulfate (as SO4)	mg/L				
Sulfide	mg/L				
Total Organic Carbon	mg/L				
				10	U

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW005	G008GW005	G008GW005	G008GW005	
SampleID	008GW00504	008GW005M1	008GW005M1	008GW005M6	
DateCollected	12/08/1997	03/30/2002	03/30/2002	06/21/2002	
DateExtracted		04/03/2002	05/09/2002		
DateAnalyzed	01/04/1998	04/03/2002	05/09/2002	07/03/2002	
SDGNumber	32103	CNC89	CNC89A	CNC123	
Parameter	Units				
Chloride	mg/L				
Hydrazine	mg/l		0.1 S	0.006 J	
Hydrazine	ug/L	8.4 =			10 U
Nitrate-Nitrite-N	mg/L				
Nitrogen, Nitrate (as N)	mg/L				
Nitrogen	mg/L				
Phosphorus	mg/L				
Sulfate (as SO4)	mg/L				
Sulfide	mg/L				
Total Organic Carbon	mg/L				

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G008GW005	G008GW006	G008GW006	G008GW006
SampleID	008GW005M6	008GW00604	008GW006M1	008GW006M1
DateCollected	06/21/2002	12/09/1997	03/30/2002	03/30/2002
DateExtracted	06/26/2002		04/03/2002	05/09/2002
DateAnalyzed	06/26/2002	01/04/1998	04/03/2002	05/09/2002
SDGNumber	CNC118	32103	CNC89	CNC89A
Parameter	Units			
Chloride	mg/L			
Hydrazine	mg/l	0.005	U	0.1 S 0.005 UJ
Hydrazine	ug/L		5 U	
Nitrate-Nitrite-N	mg/L			
Nitrogen, Nitrate (as N)	mg/L			
Nitrogen	mg/L			
Phosphorus	mg/L			
Sulfate (as SO4)	mg/L			
Sulfide	mg/L			
Total Organic Carbon	mg/L			

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G636GW001	G636GW001	G636GW001	G636GW001
SampleID	636GW00101a	636GW00104	636GW001M1	636GW001M1
DateCollected	03/11/1998	12/11/1997	03/28/2002	03/28/2002
DateExtracted			04/02/2002	05/07/2002
DateAnalyzed		01/04/1998	04/02/2002	05/07/2002
SDGNumber	MNA	32103	CNC86	CNC86A
Parameter	Units			
Chloride	mg/L	4000	S=	
Hydrazine	mg/l			0.042 J
Hydrazine	ug/L		5.8 =	0.005 R
Nitrate-Nitrite-N	mg/L			
Nitrogen, Nitrate (as N)	mg/L	0.1	SU	
Nitrogen	mg/L			
Phosphorus	mg/L			
Sulfate (as SO4)	mg/L	2.4	S=	
Sulfide	mg/L			
Total Organic Carbon	mg/L	46.3	S=	

Analytical Data Summary

01/07/2003 1:07 PM

StationID	G636GW001	G636GW001	
SampleID	636GW001M6	636GW001M6	
DateCollected	06/20/2002	06/20/2002	
DateExtracted		06/21/2002	
DateAnalyzed	07/03/2002	06/21/2002	
SDGNumber	CNC123	CNC118	
Parameter	Units		
Chloride	mg/L		
Hydrazine	mg/l		0.005 U
Hydrazine	ug/L	10	U
Nitrate-Nitrite-N	mg/L		
Nitrogen, Nitrate (as N)	mg/L		
Nitrogen	mg/L		
Phosphorus	mg/L		
Sulfate (as SO4)	mg/L		
Sulfide	mg/L		
Total Organic Carbon	mg/L		

StationID	G008GW001	G008GW001	G008GW001	G008GW001	G008GW001			
SampleID	008G000110	008G000110	008GW00104	008GW001M1	008GW001M1			
DateCollected	07/19/2000	07/19/2000	12/08/1997	03/30/2002	03/30/2002			
DateExtracted	07/26/2000	07/27/2000	12/20/1997	04/04/2002	04/05/2002			
DateAnalyzed	08/02/2000	07/29/2000	12/23/1997	04/10/2002	04/10/2002			
SDGNumber	CNC04	CNC04	32103	CNC89	CNC89			
Parameter	Units							
Aluminum	mg/l	0.16	U		0.056	J		
Antimony	mg/l	0.005	U		0.005	U		
Arsenic	mg/l	0.055	=		0.0032	U		
Barium	mg/l	0.074	=		0.057	J		
Beryllium	mg/L	0.00054	U		0.00054	U		
Cadmium	mg/L	0.0018	J		0.00071	U		
Calcium	mg/l	140	=		150	=		
Chromium, Total	mg/l	0.0017	U		0.0017	U		
Cobalt	mg/L	0.0014	U		0.0014	U		
Copper	mg/l	0.0012	U		0.0009	U		
Iron	mg/L	41	=		0.97	=		
Lead	mg/l	0.0015	U		0.003	U		
Magnesium	mg/L	460	=		960	=		
Manganese	mg/l	0.69	=		0.18	=		
Mercury	mg/l			0.000072	U		0.000072	U
Nickel	mg/l	0.0047	U		0.0047	U		
Potassium	mg/l	180	=		410	J		
Selenium	mg/L	0.0042	U		0.0042	U		
Silver	mg/l	0.0019	U		0.0019	U		
Sodium	mg/L	3900	=		8900	=		
Thallium	mg/l	0.0049	U		0.0049	U		
Tin (Sn)	mg/L	0.0064	U					
Vanadium	mg/L	0.01	=		0.0048	J		
Zinc	mg/l	0.0059	U		0.0086	J		
Aluminum	ug/L			8	U			
Antimony	ug/L			5.7	U			
Arsenic	ug/L			6.3	U			
Barium	ug/L			33.9	J			
Beryllium	ug/L			0.33	J			
Cadmium	ug/L			0.3	U			

StationID	G008GW001	G008GW001	G008GW001	G008GW001	G008GW002
SampleID	008GW001M6	008GW001M6	008H000110	008H000110	008GW00204
DateCollected	06/21/2002	06/21/2002	07/19/2000	07/19/2000	12/09/1997
DateExtracted	06/26/2002	06/27/2002	07/26/2000	07/27/2000	12/20/1997
DateAnalyzed	07/03/2002	07/08/2002	08/02/2000	07/29/2000	12/23/1997
SDGNumber	CNC118	CNC118	CNC04	CNC04	32103
Parameter	Units				
Aluminum	mg/l			0.19	U
Antimony	mg/l			0.005	U
Arsenic	mg/l	0.023	J	0.07	=
Barium	mg/l	0.057	J	0.086	=
Beryllium	mg/L			0.00054	U
Cadmium	mg/L	0.00036	U	0.002	J
Calcium	mg/l			150	=
Chromium, Total	mg/l	0.0014	U	0.0017	J
Cobalt	mg/L			0.0014	U
Copper	mg/l			0.0011	U
Iron	mg/L			47	=
Lead	mg/l	0.0015	U	0.0015	U
Magnesium	mg/L			460	=
Manganese	mg/l			0.77	=
Mercury	mg/l	0.000072	U		0.000072 U
Nickel	mg/l			0.0047	U
Potassium	mg/l			190	=
Selenium	mg/L	0.0042	UJ	0.0042	U
Silver	mg/l	0.00095	U	0.0019	U
Sodium	mg/L			4000	=
Thallium	mg/l			0.0049	U
Tin (Sn)	mg/L			0.0064	U
Vanadium	mg/L			0.0094	J
Zinc	mg/l			0.0059	U
Aluminum	ug/L				29.6 U
Antimony	ug/L				2.6 U
Arsenic	ug/L				2.3 U
Barium	ug/L				404 J
Beryllium	ug/L				0.2 U
Cadmium	ug/L				0.3 U

StationID	G008GW002	G008GW002	G008GW003	G008GW003	G008GW003				
SampleID	008GW002M1	008GW002M1	008GW00304	008GW003M1	008GW003M1				
DateCollected	03/30/2002	03/30/2002	12/11/1997	03/29/2002	03/29/2002				
DateExtracted	04/04/2002	04/05/2002	12/20/1997	04/04/2002	04/05/2002				
DateAnalyzed	04/10/2002	04/10/2002	12/23/1997	04/10/2002	04/10/2002				
SDGNumber	CNC89	CNC89	32103	CNC85	CNC85				
Parameter	Units								
Aluminum	mg/l	0.06	J			0.51	J		
Antimony	mg/l	0.005	U			0.011	J		
Arsenic	mg/l	0.0032	U			0.017	=		
Barium	mg/l	0.48	=			0.075	J		
Beryllium	mg/L	0.00054	U			0.00054	U		
Cadmium	mg/L	0.00071	U			0.00071	U		
Calcium	mg/l	200	=			320	=		
Chromium, Total	mg/l	0.0017	U			0.0051	U		
Cobalt	mg/L	0.0014	U			0.0014	U		
Copper	mg/l	0.016	J			0.0045	U		
Iron	mg/L	5.1	=			0.71	=		
Lead	mg/l	0.0041	U			0.0047	U		
Magnesium	mg/L	250	=			1200	=		
Manganese	mg/l	0.13	=			0.035	=		
Mercury	mg/l			0.000072	U			0.000072	UJ
Nickel	mg/l	0.0047	U			0.0047	U		
Potassium	mg/l	93	J			430	=		
Selenium	mg/L	0.0042	U			0.013	U		
Silver	mg/l	0.0019	U			0.0019	U		
Sodium	mg/L	2300	=			9400	=		
Thallium	mg/l	0.0049	U			0.0098	U		
Tin (Sn)	mg/L								
Vanadium	mg/L	0.0029	J			0.044	J		
Zinc	mg/l	0.032	=			0.02	J		
Aluminum	ug/L					105	=		
Antimony	ug/L					15.4	U		
Arsenic	ug/L					12.1	U		
Barium	ug/L					57.1	J		
Beryllium	ug/L					0.32	J		
Cadmium	ug/L					0.3	U		

StationID	G008GW003	G008GW003	G008GW004	G008GW004	G008GW004			
SampleID	008HW003M1	008HW003M1	008GW00404	008GW004M1	008GW004M1			
DateCollected	03/29/2002	03/29/2002	12/09/1997	03/28/2002	03/28/2002			
DateExtracted	04/04/2002	04/05/2002	12/20/1997	04/04/2002	04/05/2002			
DateAnalyzed	04/10/2002	04/10/2002	12/23/1997	04/10/2002	04/10/2002			
SDGNumber	CNC85	CNC85	32103	CNC85	CNC85			
Parameter	Units							
Aluminum	mg/l	0.79	J		0.46	J		
Antimony	mg/l	0.014	J		0.005	U		
Arsenic	mg/l	0.02	=		0.017	=		
Barium	mg/l	0.072	J		0.088	J		
Beryllium	mg/L	0.00054	U		0.00054	U		
Cadmium	mg/L	0.00071	U		0.0018	J		
Calcium	mg/l	320	=		200	=		
Chromium, Total	mg/l	0.0045	U		0.0017	U		
Cobalt	mg/L	0.0014	U		0.0014	U		
Copper	mg/l	0.0068	U		0.0012	U		
Iron	mg/L	1.1	=		23	=		
Lead	mg/l	0.0047	U		0.0015	U		
Magnesium	mg/L	1100	=		580	=		
Manganese	mg/l	0.051	=		0.26	=		
Mercury	mg/l			0.000072	UJ		0.000072	UJ
Nickel	mg/l	0.0047	U		0.0047	U		
Potassium	mg/l	440	=		230	=		
Selenium	mg/L	0.0084	U		0.0052	U		
Silver	mg/l	0.0019	U		0.0019	U		
Sodium	mg/L	9300	=		5100	=		
Thallium	mg/l	0.0098	U		0.0049	U		
Tin (Sn)	mg/L							
Vanadium	mg/L	0.066	=		0.0022	U		
Zinc	mg/l	0.028	J		0.0084	J		
Aluminum	ug/L			107	=			
Antimony	ug/L			5.4	U			
Arsenic	ug/L			4.4	U			
Barium	ug/L			67.6	J			
Beryllium	ug/L			0.28	J			
Cadmium	ug/L			0.44	J			

StationID	G008GW004	G008GW004	G008GW005	G008GW005	G008GW005
SampleID	008GW004M6	008GW004M6	008GW00504	008GW005M1	008GW005M1
DateCollected	06/20/2002	06/20/2002	12/08/1997	03/30/2002	03/30/2002
DateExtracted	06/25/2002	06/25/2002	12/20/1997	04/04/2002	04/05/2002
DateAnalyzed	06/27/2002	07/02/2002	12/23/1997	04/10/2002	04/10/2002
SDGNumber	CNC118	CNC118	32103	CNC89	CNC89
Parameter	Units				
Aluminum	mg/l				0.027 U
Antimony	mg/l				0.005 U
Arsenic	mg/l	0.022 J			0.0032 U
Barium	mg/l	0.089 J			0.12 J
Beryllium	mg/L				0.00054 U
Cadmium	mg/L	0.0013 J			0.0025 J
Calcium	mg/l				530 =
Chromium, Total	mg/l	0.00087 U			0.0017 U
Cobalt	mg/L				0.0014 U
Copper	mg/l				0.0014 U
Iron	mg/L				32 =
Lead	mg/l	0.00075 U			0.0017 U
Magnesium	mg/L				330 =
Manganese	mg/l				2.4 =
Mercury	mg/l		0.000072 U		0.000072 U
Nickel	mg/l				0.0047 U
Potassium	mg/l				150 J
Selenium	mg/L	0.0024 UJ			0.0049 U
Silver	mg/l	0.00095 U			0.0019 U
Sodium	mg/L				4200 J
Thallium	mg/l				0.0049 U
Tin (Sn)	mg/L				
Vanadium	mg/L				0.0022 U
Zinc	mg/l				0.0068 J
Aluminum	ug/L			33 U	
Antimony	ug/L			3.1 U	
Arsenic	ug/L			5.4 U	
Barium	ug/L			15.6 J	
Beryllium	ug/L			0.2 U	
Cadmium	ug/L			0.35 J	

StationID	G008GW005	G008GW005	G008GW006	G008GW006	G008GW006
SampleID	008GW005M6	008GW005M6	008GW00604	008GW006M1	008GW006M1
DateCollected	06/21/2002	06/21/2002	12/09/1997	03/30/2002	03/30/2002
DateExtracted	06/26/2002	06/27/2002	12/20/1997	04/04/2002	04/05/2002
DateAnalyzed	07/03/2002	07/08/2002	12/23/1997	04/10/2002	04/10/2002
SDGNumber	CNC118	CNC118	32103	CNC89	CNC89
Parameter	Units				
Aluminum	mg/l				0.027 U
Antimony	mg/l				0.005 U
Arsenic	mg/l	0.0043	U		0.048 =
Barium	mg/l	0.14	J		0.1 J
Beryllium	mg/L				0.00054 U
Cadmium	mg/L	0.0018	J		0.003 J
Calcium	mg/l				600 =
Chromium, Total	mg/l	0.0012	U		0.0017 U
Cobalt	mg/L				0.0014 U
Copper	mg/l				0.0009 U
Iron	mg/L				27 =
Lead	mg/l	0.0013	U		0.0015 U
Magnesium	mg/L				210 =
Manganese	mg/l				3.5 =
Mercury	mg/l	0.000072	U		0.000072 U
Nickel	mg/l				0.0047 U
Potassium	mg/l				87 J
Selenium	mg/L	0.0021	UJ		0.0042 U
Silver	mg/l	0.00095	U		0.0019 U
Sodium	mg/L				8500 =
Thallium	mg/l				0.0059 U
Tin (Sn)	mg/L				
Vanadium	mg/L				0.0022 U
Zinc	mg/l				0.014 J
Aluminum	ug/L			19.3	U
Antimony	ug/L			1.6	U
Arsenic	ug/L			24.7	=
Barium	ug/L			7.9	J
Beryllium	ug/L			0.2	U
Cadmium	ug/L			0.3	U

StationID	G636GW001	G636GW001	G636GW001	GFDSGW02D
SampleID	636GW00104	636GW001M6	636GW001M6	FDSGW02D01
DateCollected	12/11/1997	06/20/2002	06/20/2002	3/3/1999
DateExtracted	12/20/1997	06/25/2002	06/25/2002	
DateAnalyzed	12/23/1997	06/27/2002	07/02/2002	
SDGNumber	32103	CNC118	CNC118	37602

Parameter	Units					
Aluminum	mg/l					
Antimony	mg/l					
Arsenic	mg/l		0.027	J		
Barium	mg/l		0.062	J		
Beryllium	mg/L					
Cadmium	mg/L		0.003	J		
Calcium	mg/l					
Chromium, Total	mg/l		0.0024	U		
Cobalt	mg/L					
Copper	mg/l					
Iron	mg/L					
Lead	mg/l		0.00075	U		
Magnesium	mg/L					
Manganese	mg/l					
Mercury	mg/l				0.000072	U
Nickel	mg/l					
Potassium	mg/l					
Selenium	mg/L		0.0026	UJ		
Silver	mg/l		0.00095	U		
Sodium	mg/L					
Thallium	mg/l					
Tin (Sn)	mg/L					
Vanadium	mg/L					
Zinc	mg/l					
Aluminum	ug/L	46.9	U			
Antimony	ug/L	6.5	U			
Arsenic	ug/L	8.2	U			
Barium	ug/L	77.8	J			
Beryllium	ug/L	0.2	U			
Cadmium	ug/L	2.1	J			0.3 U

StationID	G008GW001	G008GW001	G008GW001	G008GW001	G008GW001
SampleID	008G000110	008G000110	008GW00104	008GW001M1	008GW001M1
DateCollected	07/19/2000	07/19/2000	12/08/1997	03/30/2002	03/30/2002
DateExtracted	07/26/2000	07/27/2000	12/20/1997	04/04/2002	04/05/2002
DateAnalyzed	08/02/2000	07/29/2000	12/23/1997	04/10/2002	04/10/2002
SDGNumber	CNC04	CNC04	32103	CNC89	CNC89
Parameter	Units				
Calcium	ug/L		124000	J	
Chromium, Total	ug/L		1.7	J	
Cobalt	ug/L		0.91	J	
Copper	ug/L		1.4	U	
Iron	ug/L		1620	J	
Lead	ug/L		0.9	U	
Magnesium	ug/L		838000	=	
Manganese	ug/L		108	J	
Mercury	ug/L		0.17	U	
Nickel	ug/L		0.7	U	
Potassium	ug/L		287000	=	
Selenium	ug/L		3.4	U	
Silver	ug/L		1	U	
Sodium	ug/L		7140000	J	
Thallium	ug/L		5	U	
Tin (Sn)	ug/L		14	U	
Vanadium	ug/L		5.2	J	
Zinc	ug/L		5.8	U	

	StationID	G008GW001	G008GW001	G008GW001	G008GW001	G008GW002		
	SampleID	008GW001M6	008GW001M6	008H000110	008H000110	008GW00204		
	DateCollected	06/21/2002	06/21/2002	07/19/2000	07/19/2000	12/09/1997		
	DateExtracted	06/26/2002	06/27/2002	07/26/2000	07/27/2000	12/20/1997		
	DateAnalyzed	07/03/2002	07/08/2002	08/02/2000	07/29/2000	12/23/1997		
	SDGNumber	CNC118	CNC118	CNC04	CNC04	32103		
Parameter	Units							
Calcium	ug/L					178000	J	
Chromium, Total	ug/L					1.1	J	
Cobalt	ug/L					0.8	U	
Copper	ug/L					5.6	J	
Iron	ug/L					558	J	
Lead	ug/L					1.3	J	
Magnesium	ug/L					72500	=	
Manganese	ug/L					175	J	
Mercury	ug/L					0.18	U	
Nickel	ug/L					0.89	J	
Potassium	ug/L					41400	=	
Selenium	ug/L					3.4	U	
Silver	ug/L					1	U	
Sodium	ug/L					757000	J	
Thallium	ug/L					5	U	
Tin (Sn)	ug/L					14	U	
Vanadium	ug/L					1.4	J	
Zinc	ug/L					9.5	J	

	StationID	G008GW002	G008GW002	G008GW003	G008GW003	G008GW003
	SampleID	008GW002M1	008GW002M1	008GW00304	008GW003M1	008GW003M1
	DateCollected	03/30/2002	03/30/2002	12/11/1997	03/29/2002	03/29/2002
	DateExtracted	04/04/2002	04/05/2002	12/20/1997	04/04/2002	04/05/2002
	DateAnalyzed	04/10/2002	04/10/2002	12/23/1997	04/10/2002	04/10/2002
	SDGNumber	CNC89	CNC89	32103	CNC85	CNC85
Parameter	Units					
Calcium	ug/L			259000	J	
Chromium, Total	ug/L			3	J	
Cobalt	ug/L			0.8	U	
Copper	ug/L			3.9	J	
Iron	ug/L			482	J	
Lead	ug/L			1.1	J	
Magnesium	ug/L			1020000	=	
Manganese	ug/L			93.6	J	
Mercury	ug/L			0.18	U	
Nickel	ug/L			0.94	J	
Potassium	ug/L			308000	=	
Selenium	ug/L			3.4	U	
Silver	ug/L			1	U	
Sodium	ug/L			7190000	J	
Thallium	ug/L			5	U	
Tin (Sn)	ug/L			14	U	
Vanadium	ug/L			29.5	=	
Zinc	ug/L			17	J	

StationID	G008GW003	G008GW003	G008GW004	G008GW004	G008GW004
SampleID	008HW003M1	008HW003M1	008GW00404	008GW004M1	008GW004M1
DateCollected	03/29/2002	03/29/2002	12/09/1997	03/28/2002	03/28/2002
DateExtracted	04/04/2002	04/05/2002	12/20/1997	04/04/2002	04/05/2002
DateAnalyzed	04/10/2002	04/10/2002	12/23/1997	04/10/2002	04/10/2002
SDGNumber	CNC85	CNC85	32103	CNC85	CNC85
Parameter	Units				
Calcium	ug/L		135000	J	
Chromium, Total	ug/L		1	U	
Cobalt	ug/L		1.1	J	
Copper	ug/L		1.4	U	
Iron	ug/L		8050	J	
Lead	ug/L		0.9	U	
Magnesium	ug/L		805000	=	
Manganese	ug/L		185	J	
Mercury	ug/L		0.19	U	
Nickel	ug/L		0.7	U	
Potassium	ug/L		258000	=	
Selenium	ug/L		3.4	U	
Silver	ug/L		1	U	
Sodium	ug/L		6650000	J	
Thallium	ug/L		5	U	
Tin (Sn)	ug/L		14	U	
Vanadium	ug/L		1.1	U	
Zinc	ug/L		7.8	J	

StationID	G008GW004	G008GW004	G008GW005	G008GW005	G008GW005
SampleID	008GW004M6	008GW004M6	008GW00504	008GW005M1	008GW005M1
DateCollected	06/20/2002	06/20/2002	12/08/1997	03/30/2002	03/30/2002
DateExtracted	06/25/2002	06/25/2002	12/20/1997	04/04/2002	04/05/2002
DateAnalyzed	06/27/2002	07/02/2002	12/23/1997	04/10/2002	04/10/2002
SDGNumber	CNC118	CNC118	32103	CNC89	CNC89
Parameter	Units				
Calcium	ug/L		93800	J	
Chromium, Total	ug/L		1.4	J	
Cobalt	ug/L		0.8	U	
Copper	ug/L		1.4	U	
Iron	ug/L		7390	J	
Lead	ug/L		0.9	U	
Magnesium	ug/L		152000	=	
Manganese	ug/L		731	J	
Mercury	ug/L		0.2	U	
Nickel	ug/L		1.4	J	
Potassium	ug/L		75600	=	
Selenium	ug/L		3.4	U	
Silver	ug/L		1	U	
Sodium	ug/L		1720000	J	
Thallium	ug/L		5	U	
Tin (Sn)	ug/L		14	U	
Vanadium	ug/L		3.2	J	
Zinc	ug/L		5.8	U	

StationID	G008GW005	G008GW005	G008GW006	G008GW006	G008GW006
SampleID	008GW005M6	008GW005M6	008GW00604	008GW006M1	008GW006M1
DateCollected	06/21/2002	06/21/2002	12/09/1997	03/30/2002	03/30/2002
DateExtracted	06/26/2002	06/27/2002	12/20/1997	04/04/2002	04/05/2002
DateAnalyzed	07/03/2002	07/08/2002	12/23/1997	04/10/2002	04/10/2002
SDGNumber	CNC118	CNC118	32103	CNC89	CNC89
Parameter	Units				
Calcium	ug/L			93700	J
Chromium, Total	ug/L			1	U
Cobalt	ug/L			0.8	U
Copper	ug/L			1.4	U
Iron	ug/L			4010	J
Lead	ug/L			0.9	U
Magnesium	ug/L			73500	=
Manganese	ug/L			987	J
Mercury	ug/L			0.17	U
Nickel	ug/L			1.1	J
Potassium	ug/L			46600	=
Selenium	ug/L			3.4	U
Silver	ug/L			1	U
Sodium	ug/L			879000	J
Thallium	ug/L			5	U
Tin (Sn)	ug/L			14	U
Vanadium	ug/L			2.4	J
Zinc	ug/L			5.8	U

	StationID	G636GW001	G636GW001	G636GW001	GFDSGW02D	
	SampleID	636GW00104	636GW001M6	636GW001M6	FDSGW02D01	
	DateCollected	12/11/1997	06/20/2002	06/20/2002	3/3/1999	
	DateExtracted	12/20/1997	06/25/2002	06/25/2002		
	DateAnalyzed	12/23/1997	06/27/2002	07/02/2002		
	SDGNumber	32103	CNC118	CNC118	37602	
Parameter	Units					
Calcium	ug/L	127000	J			
Chromium, Total	ug/L	1	U			0.7 U
Cobalt	ug/L	0.89	J			
Copper	ug/L	2.8	J			
Iron	ug/L	34200	J			
Lead	ug/L	0.9	U			1.5 U
Magnesium	ug/L	429000	=			
Manganese	ug/L	624	J			
Mercury	ug/L	0.2	U			0.1 U
Nickel	ug/L	0.7	U			
Potassium	ug/L	142000	=			
Selenium	ug/L	3.4	U			3.1 U
Silver	ug/L	1	U			1.4 U
Sodium	ug/L	3440000	J			
Thallium	ug/L	5	U			
Tin (Sn)	ug/L	14	U			
Vanadium	ug/L	3	J			
Zinc	ug/L	5.8	U			

Analytical Data Summary

01/07/2003 1:07 PM

	StationID	G008GW001		G008GW001		G008GW001	
	SampleID	008G000110		008GW00104		008H000110	
	DateCollected	07/19/2000		12/08/1997		07/19/2000	
	DateExtracted	07/24/2000		12/12/1997		07/24/2000	
	DateAnalyzed	08/02/2000		12/23/1997		08/02/2000	
	SDGNumber	CNC04		32103		CNC04	
Parameter	Units						
PCB-1016 (Arochlor 1016)	ug/L	1	UJ	1.2	UJ	1	UJ
PCB-1221 (Arochlor 1221)	ug/L	2	UJ	1.2	UJ	2	UJ
PCB-1232 (Arochlor 1232)	ug/L	1	UJ	1.2	UJ	1	UJ
PCB-1242 (Arochlor 1242)	ug/L	1	UJ	1.2	UJ	1	UJ
PCB-1248 (Arochlor 1248)	ug/L	1	UJ	1.2	UJ	1	UJ
PCB-1254 (Arochlor 1254)	ug/L	1	UJ	2.4	UJ	1	UJ
PCB-1260 (Arochlor 1260)	ug/L	1	UJ	2.4	UJ	1	UJ

Analytical Data Summary

01/07/2003 1:07 PM

	StationID	G008GW002		G008GW003		G008GW004	
	SampleID	008GW00204		008GW00304		008GW00404	
	DateCollected	12/09/1997		12/11/1997		12/09/1997	
	DateExtracted	12/12/1997		12/13/1997		12/12/1997	
	DateAnalyzed	12/23/1997		12/22/1997		12/23/1997	
	SDGNumber	32103		32103		32103	
Parameter	Units						
PCB-1016 (Arochlor 1016)	ug/L	1.1	UJ	1	UJ	1.1	UJ
PCB-1221 (Arochlor 1221)	ug/L	1.1	UJ	1	UJ	1.1	UJ
PCB-1232 (Arochlor 1232)	ug/L	1.1	UJ	1	UJ	1.1	UJ
PCB-1242 (Arochlor 1242)	ug/L	1.1	UJ	1	UJ	1.1	UJ
PCB-1248 (Arochlor 1248)	ug/L	1.1	UJ	1	UJ	1.1	UJ
PCB-1254 (Arochlor 1254)	ug/L	2.1	UJ	2	UJ	2.2	UJ
PCB-1260 (Arochlor 1260)	ug/L	2.1	UJ	2	UJ	2.2	UJ

Analytical Data Summary

01/07/2003 1:07 PM

	StationID	G008GW005		G008GW006		G636GW001	
	SampleID	008GW00504		008GW00604		636GW00104	
	DateCollected	12/08/1997		12/09/1997		12/11/1997	
	DateExtracted	12/12/1997		12/12/1997		12/13/1997	
	DateAnalyzed	12/23/1997		12/23/1997		12/22/1997	
	SDGNumber	32103		32103		32103	
Parameter	Units						
PCB-1016 (Arochlor 1016)	ug/L	1.1	UJ	1.2	UJ	1	UJ
PCB-1221 (Arochlor 1221)	ug/L	1.1	UJ	1.2	UJ	1	UJ
PCB-1232 (Arochlor 1232)	ug/L	1.1	UJ	1.2	UJ	1	UJ
PCB-1242 (Arochlor 1242)	ug/L	1.1	UJ	1.2	UJ	1	UJ
PCB-1248 (Arochlor 1248)	ug/L	1.1	UJ	1.2	UJ	1	UJ
PCB-1254 (Arochlor 1254)	ug/L	2.2	UJ	2.4	UJ	2	UJ
PCB-1260 (Arochlor 1260)	ug/L	2.2	UJ	2.4	UJ	2	UJ

Analytical Data Summary

01/07/2003 1:07 PM

	StationID	G008GW001	G008GW001	G008GW001	
	SampleID	008G000110	008GW00104	008H000110	
	DateCollected	07/19/2000	12/08/1997	07/19/2000	
	DateExtracted	07/24/2000	12/12/1997	07/24/2000	
	DateAnalyzed	08/02/2000	12/23/1997	08/02/2000	
	SDGNumber	CNC04	32103	CNC04	
Parameter	Units				
Aldrin	ug/L	0.05	UJ	0.047	UJ
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/L	0.05	UJ	0.047	UJ
Alpha-chlordane	ug/L	0.05	UJ	0.047	UJ
Beta BHC (Beta Hexachlorocyclohexane)	ug/L	0.05	UJ	0.047	UJ
Delta BHC (Delta Hexachlorocyclohexane)	ug/L	0.05	UJ	0.047	UJ
Dieldrin	ug/L	0.1	UJ	0.094	UJ
Endosulfan I	ug/L	0.05	UJ	0.047	UJ
Endosulfan II	ug/L	0.1	UJ	0.094	UJ
Endosulfan Sulfate	ug/L	0.1	UJ	0.094	UJ
Endrin Aldehyde	ug/L	0.1	UJ	0.094	UJ
Endrin Ketone	ug/L	0.1	UJ	0.094	UJ
Endrin	ug/L	0.1	UJ	0.094	UJ
Gamma BHC (Lindane)	ug/L	0.05	UJ	0.047	UJ
Gamma-chlordane	ug/L	0.05	UJ	0.047	UJ
Heptachlor Epoxide	ug/L	0.05	UJ	0.047	UJ
Heptachlor	ug/L	0.05	UJ	0.047	UJ
Methoxychlor	ug/L	0.5	UJ	0.45	UJ
p,p'-DDD	ug/L	0.1	UJ	0.094	UJ
p,p'-DDE	ug/L	0.1	UJ	0.094	UJ
p,p'-DDT	ug/L	0.1	UJ	0.094	UJ
Toxaphene	ug/L	5	UJ	2.9	UJ

Analytical Data Summary

01/07/2003 1:07 PM

	StationID	G008GW002		G008GW003		G008GW004	
	SampleID	008GW00204		008GW00304		008GW00404	
	DateCollected	12/09/1997		12/11/1997		12/09/1997	
	DateExtracted	12/12/1997		12/13/1997		12/12/1997	
	DateAnalyzed	12/23/1997		12/22/1997		12/23/1997	
	SDGNumber	32103		32103		32103	
Parameter	Units						
Aldrin	ug/L	0.042	U	0.04	U	0.043	U
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/L	0.042	U	0.04	U	0.043	U
Alpha-chlordane	ug/L	0.042	U	0.04	U	0.043	U
Beta BHC (Beta Hexachlorocyclohexane)	ug/L	0.042	U	0.04	U	0.043	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/L	0.042	U	0.04	U	0.043	U
Dieldrin	ug/L	0.085	U	0.08	U	0.087	U
Endosulfan I	ug/L	0.042	U	0.04	U	0.043	U
Endosulfan II	ug/L	0.085	U	0.08	U	0.087	U
Endosulfan Sulfate	ug/L	0.085	U	0.08	U	0.087	U
Endrin Aldehyde	ug/L	0.085	U	0.08	U	0.087	U
Endrin Ketone	ug/L	0.085	U	0.08	U	0.087	U
Endrin	ug/L	0.085	U	0.08	U	0.087	U
Gamma BHC (Lindane)	ug/L	0.042	U	0.04	U	0.043	U
Gamma-chlordane	ug/L	0.042	U	0.04	U	0.043	U
Heptachlor Epoxide	ug/L	0.042	U	0.04	U	0.043	U
Heptachlor	ug/L	0.042	U	0.04	U	0.043	U
Methoxychlor	ug/L	0.4	U	0.38	U	0.41	U
p,p'-DDD	ug/L	0.085	U	0.08	U	0.087	U
p,p'-DDE	ug/L	0.085	U	0.08	U	0.087	U
p,p'-DDT	ug/L	0.085	U	0.08	U	0.087	U
Toxaphene	ug/L	2.6	U	2.5	U	2.7	U

Analytical Data Summary

01/07/2003 1:07 PM

	StationID	G008GW005	G008GW006	G636GW001			
	SampleID	008GW00504	008GW00604	636GW00104			
	DateCollected	12/08/1997	12/09/1997	12/11/1997			
	DateExtracted	12/12/1997	12/12/1997	12/13/1997			
	DateAnalyzed	12/23/1997	12/23/1997	12/22/1997			
	SDGNumber	32103	32103	32103			
Parameter	Units						
Aldrin	ug/L	0.044	UJ	0.048	U	0.04	U
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/L	0.044	UJ	0.048	U	0.04	U
Alpha-chlordane	ug/L	0.044	UJ	0.048	U	0.04	U
Beta BHC (Beta Hexachlorocyclohexane)	ug/L	0.044	UJ	0.048	U	0.04	U
Delta BHC (Delta Hexachlorocyclohexane)	ug/L	0.044	UJ	0.048	U	0.04	U
Dieldrin	ug/L	0.089	UJ	0.096	U	0.08	U
Endosulfan I	ug/L	0.044	UJ	0.048	U	0.04	U
Endosulfan II	ug/L	0.089	UJ	0.096	U	0.08	U
Endosulfan Sulfate	ug/L	0.089	UJ	0.096	U	0.08	U
Endrin Aldehyde	ug/L	0.089	UJ	0.096	U	0.08	U
Endrin Ketone	ug/L	0.089	UJ	0.096	U	0.08	U
Endrin	ug/L	0.089	UJ	0.096	U	0.08	U
Gamma BHC (Lindane)	ug/L	0.044	UJ	0.048	U	0.04	U
Gamma-chlordane	ug/L	0.044	UJ	0.048	U	0.04	U
Heptachlor Epoxide	ug/L	0.044	UJ	0.048	U	0.04	U
Heptachlor	ug/L	0.044	UJ	0.048	U	0.04	U
Methoxychlor	ug/L	0.42	UJ	0.46	U	0.38	U
p,p'-DDD	ug/L	0.089	UJ	0.096	U	0.08	U
p,p'-DDE	ug/L	0.089	UJ	0.096	U	0.08	U
p,p'-DDT	ug/L	0.089	UJ	0.096	U	0.08	U
Toxaphene	ug/L	2.8	UJ	3	U	2.5	U

StationID	G008GSP01		G008GSP02		G008GSP03		G008GSP04		G008GSP05		
SampleID	008GSP0101a		008GSP0201a		008GSP0301b		008GSP0401b		008GSP0501a		
DateCollected	08/03/1999		08/03/1999		08/03/1999		08/03/1999		08/03/1999		
DateExtracted	08/05/1999		08/05/1999		08/05/1999		08/05/1999		08/05/1999		
DateAnalyzed	08/20/1999		08/20/1999		08/20/1999		08/20/1999		08/20/1999		
SDGNumber	39785		39785		39785		39785		39785		
Parameter	Units										
1,3,5-Trinitrobenzene	ug/L										
2,2'-Oxybis(1-chloro)propane	ug/L	10	U	10	U	10	U	10	U	10	U
4-Methylphenol (p-Cresol)	ug/L	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine	ug/L	10	U	10	U	10	U	10	U	10	U
Phenol	ug/L	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol	ug/L	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	ug/L	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	ug/L	10	U	10	U	10	U	10	U	10	U
Benzyl alcohol	ug/l	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	ug/L	10	U	10	U	10	U	10	U	10	U
Bis(2-Chloroisopropyl)Ether	ug/l										
2-Methylphenol (o-Cresol)	ug/L	10	U	10	U	10	U	10	U	10	U
N-Nitrosodi-n-propylamine	ug/L	10	U	10	U	10	U	10	U	10	U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/l										
Hexachloroethane	ug/L	10	U	10	U	10	U	10	U	10	U
Nitrobenzene	ug/L	10	U	10	U	10	U	10	U	10	U
Isophorone	ug/L	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol	ug/L	10	U	10	U	10	U	10	U	10	U
2,4-Dimethylphenol	ug/L	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethoxy) Methane	ug/L	10	U	10	U	10	U	10	U	10	U
2,4-Dichlorophenol	ug/L	10	U	10	U	10	U	10	U	10	U
Benzoic acid	ug/l	1	J	1	J	10	U	10	U	1	J
1,2,4-Trichlorobenzene	ug/L										
Naphthalene	ug/L	10	U	10	U	10	U	10	U	10	U
4-Chloroaniline	ug/L	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene	ug/L	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-methylphenol	ug/L	10	U	10	U	10	U	10	U	10	U
2-Methylnaphthalene	ug/l	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	ug/L	10	U	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol	ug/L	10	U	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol	ug/L	25	U	25	U	25	U	25	U	25	U
2-Chloronaphthalene	ug/L	10	U	10	U	10	U	10	U	10	U
2-Nitroaniline	ug/L	25	U	25	U	25	U	25	U	25	U
3-Nitroaniline	ug/l	25	U	25	U	25	U	25	U	25	U
Dimethyl Phthalate	ug/l	10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	ug/L	10	U	10	U	10	U	10	U	10	U
Acenaphthylene	ug/L	10	U	10	U	10	U	10	U	10	U

	StationID	G008GSP06		G008GSP07		G008GSP08		G008GSP09		G008GSP10	
	SampleID	008GSP0601RE		008GSP0701		008GSP0801		008GSP0901		008GSP1001	
	DateCollected	08/04/1999		08/04/1999		08/04/1999		08/04/1999		08/05/1999	
	DateExtracted	08/23/1999		08/06/1999		08/06/1999		08/06/1999		08/07/1999	
	DateAnalyzed	08/25/1999		08/24/1999		08/24/1999		08/24/1999		08/26/1999	
	SDGNumber	39825		39825		39825		39825		39843	
Parameter	Units										
1,3,5-Trinitrobenzene	ug/L										
2,2'-Oxybis(1-chloro)propane	ug/L	12	UJ	10	U	10	U	10	U	10	U
4-Methylphenol (p-Cresol)	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
N-Nitrosodiphenylamine	ug/L	12	UJ	10	U	10	U	10	U	10	U
Phenol	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L	12	UJ	10	U	10	U	10	U	10	U
2-Chlorophenol	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
1,3-Dichlorobenzene	ug/L	12	UJ	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	ug/L	12	UJ	10	U	10	U	1	J	10	U
Benzyl alcohol	ug/l	12	UJ	10	U	10	U	10	U	10	UJ
1,2-Dichlorobenzene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Bis(2-Chloroisopropyl)Ether	ug/l										
2-Methylphenol (o-Cresol)	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
N-Nitrosodi-n-propylamine	ug/L	12	UJ	10	U	10	U	10	U	10	U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/l										
Hexachloroethane	ug/L	12	UJ	10	U	10	U	10	U	10	U
Nitrobenzene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Isophorone	ug/L	12	UJ	10	U	10	U	10	U	10	U
2-Nitrophenol	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
2,4-Dimethylphenol	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
bis(2-Chloroethoxy) Methane	ug/L	12	UJ	10	U	10	U	10	U	10	U
2,4-Dichlorophenol	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
Benzoic acid	ug/l	12	UJ	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	ug/L										
Naphthalene	ug/L	12	UJ	10	U	10	U	1	J	10	U
4-Chloroaniline	ug/L	12	UJ	10	U	10	U	10	U	10	U
Hexachlorobutadiene	ug/L	12	UJ	10	U	10	U	10	U	10	U
4-Chloro-3-methylphenol	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
2-Methylnaphthalene	ug/l	12	UJ	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	ug/L	12	UJ	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol	ug/L	12	UJ	10	U	10	U	10	U	10	UJ
2,4,5-Trichlorophenol	ug/L	29	UJ	25	U	25	U	25	U	25	UJ
2-Chloronaphthalene	ug/L	12	UJ	10	U	10	U	10	U	10	U
2-Nitroaniline	ug/L	29	UJ	25	U	25	U	25	U	25	U
3-Nitroaniline	ug/l	29	UJ	25	U	25	U	25	U	25	U
Dimethyl Phthalate	ug/l	12	UJ	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Acenaphthylene	ug/L	12	UJ	10	U	10	U	10	U	10	U

StationID	G008GSP11	G008GSP12	G008GSP13	G008GSP14	G008GSP15
SampleID	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
DateCollected	08/05/1999	08/05/1999	08/05/1999	08/05/1999	08/05/1999
DateExtracted	08/07/1999	08/07/1999	08/07/1999	08/07/1999	08/07/1999
DateAnalyzed	08/31/1999	08/31/1999	08/31/1999	08/26/1999	08/26/1999
SDGNumber	39843	39843	39843	39843	39843

Parameter	Units	G008GSP11		G008GSP12		G008GSP13		G008GSP14		G008GSP15	
1,3,5-Trinitrobenzene	ug/L										
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	10	U								
1,2,4-Trichlorobenzene	ug/L										
Naphthalene	ug/L	10	U	10	U	3	J	10	U	28	=
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								
2,4,5-Trichlorophenol	ug/L	25	U								
2-Chloronaphthalene	ug/L	10	U								
2-Nitroaniline	ug/L	25	U								
3-Nitroaniline	ug/l	25	U								
Dimethyl Phthalate	ug/l	10	U								
2,6-Dinitrotoluene	ug/L	10	U								
Acenaphthylene	ug/L	10	U								

	StationID	G008GSP1L	G008GSP18	G008GW001	G008GW001	G008GW001		
	SampleID	008GSP1601	008GSP1801	008G000110	008GW00104	008GW00104		
	DateCollected	08/05/1999	08/05/1999	07/19/2000	12/08/1997	12/08/1997		
	DateExtracted	08/07/1999	08/07/1999	07/24/2000	12/09/1997	12/10/1997		
	DateAnalyzed	08/26/1999	08/26/1999	07/28/2000	12/12/1997	12/11/1997		
	SDGNumber	39843	39843	CNC04	32103	32103		
Parameter	Units							
1,3,5-Trinitrobenzene	ug/L						7.3	U
2,2'-Oxybis(1-chloro)propane	ug/L	10	U	10	U			
4-Methylphenol (p-Cresol)	ug/L	10	U	10	U	10	U	
N-Nitrosodiphenylamine	ug/L	10	U	10	U	10	U	
Phenol	ug/L	10	U	10	U	10	U	
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L	10	U	10	U	10	U	
2-Chlorophenol	ug/L	10	U	10	U	10	U	
1,3-Dichlorobenzene	ug/L	10	U	10	U	10	U	
1,4-Dichlorobenzene	ug/L	10	U	10	U	10	U	
Benzyl alcohol	ug/l	10	U	10	U	10	U	
1,2-Dichlorobenzene	ug/L	10	U	10	U	10	U	
Bis(2-Chloroisopropyl)Ether	ug/l			10	U			
2-Methylphenol (o-Cresol)	ug/L	10	U	10	U	10	U	
N-Nitrosodi-n-propylamine	ug/L	10	U	10	U	10	U	
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/l							
Hexachloroethane	ug/L	10	U	10	U	10	U	
Nitrobenzene	ug/L	10	U	10	U	10	U	
Isophorone	ug/L	10	U	10	U	10	U	
2-Nitrophenol	ug/L	10	U	10	U	10	U	
2,4-Dimethylphenol	ug/L	10	U	10	U	10	U	
bis(2-Chloroethoxy) Methane	ug/L	10	U	10	U	10	U	
2,4-Dichlorophenol	ug/L	10	U	10	U	10	U	
Benzoic acid	ug/l	10	U	10	U	50	U	
1,2,4-Trichlorobenzene	ug/L			10	U			
Naphthalene	ug/L	5	J	10	U	10	U	
4-Chloroaniline	ug/L	10	U	10	U	20	U	
Hexachlorobutadiene	ug/L	10	U	10	U	10	U	
4-Chloro-3-methylphenol	ug/L	10	U	10	U	10	U	
2-Methylnaphthalene	ug/l	10	U	10	U	10	U	
Hexachlorocyclopentadiene	ug/L	10	U	10	U	10	U	
2,4,6-Trichlorophenol	ug/L	10	U	10	U	10	U	
2,4,5-Trichlorophenol	ug/L	25	U	25	U	10	U	50
2-Chloronaphthalene	ug/L	10	U	10	U	10	U	
2-Nitroaniline	ug/L	25	U	25	U	50	U	50
3-Nitroaniline	ug/l	25	U	25	U	50	U	50
Dimethyl Phthalate	ug/l	10	U	10	U	10	U	10
2,6-Dinitrotoluene	ug/L	10	U	10	U	10	U	10
Acenaphthylene	ug/L	10	U	10	U	10	U	10

StationID	G008GW001	G008GW001	G008GW002	G008GW002	G008GW003
SampleID	008GW001M6	008H000110	008GW00204	008GW00204	008GW00304
DateCollected	06/21/2002	07/19/2000	12/09/1997	12/09/1997	12/11/1997
DateExtracted	06/26/2002	07/24/2000	12/11/1997	12/11/1997	12/13/1997
DateAnalyzed	06/30/2002	07/28/2000	12/12/1997	12/19/1997	12/19/1997
SDGNumber	CNC118	CNC04	32103	32103	32103

Parameter	Units								
1,3,5-Trinitrobenzene	ug/L			7.3	U				
2,2'-Oxybis(1-chloro)propane	ug/L					10	U	10	U
4-Methylphenol (p-Cresol)	ug/L		10	U		10	U	10	U
N-Nitrosodiphenylamine	ug/L	10	U	10	U	10	U	10	U
Phenol	ug/L	10	U	10	U	10	U	10	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L	10	U	10	U	10	U	10	U
2-Chlorophenol	ug/L	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	ug/L	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	ug/L	10	U	10	U	10	U	10	U
Benzyl alcohol	ug/l	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	ug/L	0.59	J	10	U	10	U	10	U
Bis(2-Chloroisopropyl)Ether	ug/l	10	U	10	U				
2-Methylphenol (o-Cresol)	ug/L	10	U	10	U	10	U	10	U
N-Nitrosodi-n-propylamine	ug/L	10	U	10	U	10	U	10	U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/l	10	U						
Hexachloroethane	ug/L	10	U	10	U	10	U	10	U
Nitrobenzene	ug/L	10	U	10	U	10	U	10	U
Isophorone	ug/L	10	U	10	U	10	U	10	U
2-Nitrophenol	ug/L	10	U	10	U	10	U	10	U
2,4-Dimethylphenol	ug/L	10	U	10	U	10	U	10	U
bis(2-Chloroethoxy) Methane	ug/L	10	U	10	U	10	U	10	U
2,4-Dichlorophenol	ug/L	10	U	10	U	10	U	10	U
Benzoic acid	ug/l	50	UJ	50	U	50	U	10	U
1,2,4-Trichlorobenzene	ug/L	10	U	10	U				
Naphthalene	ug/L	10	U	10	U	10	U	10	U
4-Chloroaniline	ug/L	10	U	20	U	10	U	10	U
Hexachlorobutadiene	ug/L	10	U	10	U	10	U	10	U
4-Chloro-3-methylphenol	ug/L	10	U	10	U	10	U	10	U
2-Methylnaphthalene	ug/l	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	ug/L	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol	ug/L	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol	ug/L	50	U	10	U	50	U	50	U
2-Chloronaphthalene	ug/L	10	U	10	U	10	U	10	U
2-Nitroaniline	ug/L	50	U	50	U	50	U	50	U
3-Nitroaniline	ug/l	50	U	50	U	50	U	50	U
Dimethyl Phthalate	ug/l	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	ug/L	10	UJ	10	U	9.4	U	10	U
Acenaphthylene	ug/L	10	U	10	U			10	U

StationID	G008GW003	G008GW004	G008GW004	G008GW004	J008GW005		
SampleID	008GW00304	008GW00404	008GW00404	008GW004M6	008GW00504		
DateCollected	12/11/1997	12/09/1997	12/09/1997	06/20/2002	12/08/1997		
DateExtracted	12/16/1997	12/11/1997	12/11/1997	06/25/2002	12/09/1997		
DateAnalyzed	12/17/1997	12/12/1997	12/19/1997	06/30/2002	12/12/1997		
SDGNumber	32103	32103	32103	CNC118	32103		
Parameter	Units						
1,3,5-Trinitrobenzene	ug/L	7.3	U	7.3	U		
2,2'-Oxybis(1-chloro)propane	ug/L				10	U	10
4-Methylphenol (p-Cresol)	ug/L				10	U	10
N-Nitrosodiphenylamine	ug/L				10	U	10
Phenol	ug/L				10	U	10
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L				10	U	10
2-Chlorophenol	ug/L				10	U	10
1,3-Dichlorobenzene	ug/L				10	U	10
1,4-Dichlorobenzene	ug/L				10	U	10
Benzyl alcohol	ug/l				10	U	10
1,2-Dichlorobenzene	ug/L				10	U	1.3
Bis(2-Chloroisopropyl)Ether	ug/l					U	10
2-Methylphenol (o-Cresol)	ug/L				10	U	10
N-Nitrosodi-n-propylamine	ug/L				10	U	10
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/l					U	10
Hexachloroethane	ug/L				10	U	10
Nitrobenzene	ug/L				10	U	10
Isophorone	ug/L				10	U	10
2-Nitrophenol	ug/L				10	U	10
2,4-Dimethylphenol	ug/L				10	U	10
bis(2-Chloroethoxy) Methane	ug/L				10	U	10
2,4-Dichlorophenol	ug/L				10	U	10
Benzoic acid	ug/l				50	U	50
1,2,4-Trichlorobenzene	ug/L					U	10
Naphthalene	ug/L				10	U	10
4-Chloroaniline	ug/L				10	U	10
Hexachlorobutadiene	ug/L				10	U	10
4-Chloro-3-methylphenol	ug/L				10	U	10
2-Methylnaphthalene	ug/l				10	U	10
Hexachlorocyclopentadiene	ug/L				10	U	10
2,4,6-Trichlorophenol	ug/L				10	U	10
2,4,5-Trichlorophenol	ug/L				50	U	50
2-Chloronaphthalene	ug/L				10	U	10
2-Nitroaniline	ug/L				50	U	50
3-Nitroaniline	ug/l				50	U	50
Dimethyl Phthalate	ug/l				10	U	10
2,6-Dinitrotoluene	ug/L	9.4	U	9.4	10	U	10
Acenaphthylene	ug/L				10	U	10

StationID	G008GW005	G008GW005	G008GW006	G008GW006	G008GW04D
SampleID	008GW00504	008GW005M6	008GW00604	008GW00604	008GW04DM7
DateCollected	12/08/1997	06/21/2002	12/09/1997	12/09/1997	08/22/2002
DateExtracted	12/10/1997	06/26/2002	12/11/1997	12/11/1997	08/28/2002
DateAnalyzed	12/11/1997	06/30/2002	12/11/1997	12/19/1997	09/06/2002
SDGNumber	32103	CNC118	32103	32103	CNC142

Parameter	Units	G008GW005		G008GW006		G008GW006		G008GW04D	
1,3,5-Trinitrobenzene	ug/L	7.3	U		7.3	U			
2,2'-Oxybis(1-chloro)propane	ug/L						10	U	
4-Methylphenol (p-Cresol)	ug/L						10	U	
N-Nitrosodiphenylamine	ug/L			10	U		10	U	10 U
Phenol	ug/L			10	U		10	U	10 U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L			10	U		10	U	10 U
2-Chlorophenol	ug/L			10	U		10	U	10 U
1,3-Dichlorobenzene	ug/L			10	U		10	U	
1,4-Dichlorobenzene	ug/L			10	U		10	U	
Benzyl alcohol	ug/l			10	U		10	U	10 U
1,2-Dichlorobenzene	ug/L			1	J		10	U	
Bis(2-Chloroisopropyl)Ether	ug/l			10	U				10 UJ
2-Methylphenol (o-Cresol)	ug/L			10	U		10	U	10 U
N-Nitrosodi-n-propylamine	ug/L			10	U		10	U	10 U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/l			10	U				10 U
Hexachloroethane	ug/L			10	U		10	U	10 U
Nitrobenzene	ug/L			10	U		10	U	10 U
Isophorone	ug/L			10	U		10	U	10 U
2-Nitrophenol	ug/L			10	U		10	U	10 U
2,4-Dimethylphenol	ug/L			10	U		10	U	10 U
bis(2-Chloroethoxy) Methane	ug/L			10	U		10	U	10 U
2,4-Dichlorophenol	ug/L			10	U		10	U	10 U
Benzoic acid	ug/l			50	UJ		50	U	50 U
1,2,4-Trichlorobenzene	ug/L			10	U				
Naphthalene	ug/L			10	U		10	U	10 U
4-Chloroaniline	ug/L			10	U		10	U	10 U
Hexachlorobutadiene	ug/L			10	U		10	U	10 U
4-Chloro-3-methylphenol	ug/L			10	U		10	U	10 U
2-Methylnaphthalene	ug/l			10	U		10	U	10 U
Hexachlorocyclopentadiene	ug/L			10	U		10	U	10 U
2,4,6-Trichlorophenol	ug/L			10	U		10	U	10 U
2,4,5-Trichlorophenol	ug/L			50	U		50	U	50 U
2-Chloronaphthalene	ug/L			10	U		10	U	10 U
2-Nitroaniline	ug/L			50	U		50	U	50 U
3-Nitroaniline	ug/l			50	U		50	U	50 U
Dimethyl Phthalate	ug/l			10	U		10	U	10 U
2,6-Dinitrotoluene	ug/L	9.4	U	10	UJ	9.4	U	10	U
Acenaphthylene	ug/L			10	U		10	U	10 U

StationID	G636GW00	G636GW001	G636GW001	GFDSGW02A	JFDSGW02D
SampleID	636GW00104	636GW00104	636GW001M6	FDSGW02ALA	FDSGW02D01
DateCollected	12/11/1997	12/11/1997	06/20/2002	6/13/2001	3/3/1999
DateExtracted	12/13/1997	12/16/1997	06/25/2002	6/18/2001	
DateAnalyzed	12/19/1997	12/17/1997	06/30/2002	6/20/2001	
SDGNumber	32103	32103	CNC118	44131	37602

Parameter	Units								
1,3,5-Trinitrobenzene	ug/L			7.3	U				
2,2'-Oxybis(1-chloro)propane	ug/L	10	U						10 U
4-Methylphenol (p-Cresol)	ug/L	10	U						10 U
N-Nitrosodiphenylamine	ug/L	10	U			10	U		10 U
Phenol	ug/L	10	U			10	U		10 U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L	10	U			10	U		10 U
2-Chlorophenol	ug/L	10	U			10	U		10 U
1,3-Dichlorobenzene	ug/L	10	U			10	U		10 U
1,4-Dichlorobenzene	ug/L	10	U			10	U		10 U
Benzyl alcohol	ug/l	10	U			10	U		10 U
1,2-Dichlorobenzene	ug/L	10	U			1.9	J		10 U
Bis(2-Chloroisopropyl)Ether	ug/l					10	U		
2-Methylphenol (o-Cresol)	ug/L	10	U			10	U		10 U
N-Nitrosodi-n-propylamine	ug/L	10	U			10	U		10 U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/l					10	U		
Hexachloroethane	ug/L	10	U			10	U		10 U
Nitrobenzene	ug/L	10	U			10	U		10 U
Isophorone	ug/L	10	U			10	U		10 U
2-Nitrophenol	ug/L	10	U			10	U		10 U
2,4-Dimethylphenol	ug/L	10	U			10	U		10 U
bis(2-Chloroethoxy) Methane	ug/L	10	U			10	U		10 U
2,4-Dichlorophenol	ug/L	10	U			10	U		10 U
Benzoic acid	ug/l	10	U			50	U		0.6 J
1,2,4-Trichlorobenzene	ug/L					10	U		
Naphthalene	ug/L	10	U			10	U	1.1	U
4-Chloroaniline	ug/L	10	U			10	U		10 U
Hexachlorobutadiene	ug/L	10	U			10	U		10 U
4-Chloro-3-methylphenol	ug/L	10	U			10	U		10 U
2-Methylnaphthalene	ug/l	10	U			10	U		10 U
Hexachlorocyclopentadiene	ug/L	10	U			10	U		10 U
2,4,6-Trichlorophenol	ug/L	10	U			10	U		10 U
2,4,5-Trichlorophenol	ug/L	50	U			50	U		25 U
2-Chloronaphthalene	ug/L	10	U			10	U		10 U
2-Nitroaniline	ug/L	50	U			50	U		25 U
3-Nitroaniline	ug/l	50	U			50	U		25 U
Dimethyl Phthalate	ug/l	10	U			10	U		10 U
2,6-Dinitrotoluene	ug/L	10	U	9.4	U	10	U		10 U
Acenaphthylene	ug/L	10	U			10	U	1.1	U

StationID	G008GSP01	G008GSP02	G008GSP03	G008GSP04	G008GSP05
SampleID	008GSP0101a	008GSP0201a	008GSP0301b	008GSP0401b	008GSP0501a
DateCollected	08/03/1999	08/03/1999	08/03/1999	08/03/1999	08/03/1999
DateExtracted	08/05/1999	08/05/1999	08/05/1999	08/05/1999	08/05/1999
DateAnalyzed	08/20/1999	08/20/1999	08/20/1999	08/20/1999	08/20/1999
SDGNumber	39785	39785	39785	39785	39785

Parameter	Units	G008GSP01		G008GSP02		G008GSP03		G008GSP04		G008GSP05	
Acenaphthene	ug/l	2	J	2	J	1	J	1	J	1	J
2,4-Dinitrophenol	ug/L	25	U								
Dibenzofuran	ug/L	1	J	1	J	10	U	10	U	10	U
2,4-Dinitrotoluene	ug/L	10	U								
Diethyl Phthalate	ug/L	10	U								
4-Nitrophenol	ug/L	25	U								
Fluorene	ug/L	2	J	2	J	1	J	1	J	1	J
4-Chlorophenyl Phenyl Ether	ug/L	10	U								
4,6-Dinitro-2-methylphenol	ug/L	25	U								
4-Nitroaniline	ug/l	25	U								
4-Bromophenyl Phenyl Ether	ug/l	10	U								
Hexachlorobenzene	ug/L	10	U								
Pentachlorophenol	ug/L	25	U								
Phenanthrene	ug/L	1	J	1	J	10	U	10	U	10	U
Anthracene	ug/L	1	J	10	U	10	U	10	U	10	U
Di-n-butyl Phthalate	ug/l	1	J	1	J	1	J	1	J	1	J
Fluoranthene	ug/L	10	U								
Pyrene	ug/L	1	J	10	U	1	J	10	U	10	U
Benzyl Butyl Phthalate	ug/l	10	U								
Benzo(a)Anthracene	ug/L	10	U								
3,3'-Dichlorobenzidine	ug/L	10	U								
Chrysene	ug/L	10	U								
bis(2-Ethylhexyl) Phthalate	ug/L	10	U								
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										

	StationID	G008GSP06		G008GSP07		G008GSP08		G008GSP09		G008GSP10	
	SampleID	008GSP0601RE		008GSP0701		008GSP0801		008GSP0901		008GSP1001	
	DateCollected	08/04/1999		08/04/1999		08/04/1999		08/04/1999		08/05/1999	
	DateExtracted	08/23/1999		08/06/1999		08/06/1999		08/06/1999		08/07/1999	
	DateAnalyzed	08/25/1999		08/24/1999		08/24/1999		08/24/1999		08/26/1999	
	SDGNumber	39825		39825		39825		39825		39843	
Parameter	Units										
Acenaphthene	ug/l	1	J	1	J	1	J	1	J	10	U
2,4-Dinitrophenol	ug/L	29	UJ	25	U	25	U	25	U	25	UJ
Dibenzofuran	ug/L	12	UJ	10	U	10	U	1	J	10	U
2,4-Dinitrotoluene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Diethyl Phthalate	ug/L	12	UJ	10	U	10	U	10	U	10	U
4-Nitrophenol	ug/L	29	UJ	25	U	25	U	25	U	25	UJ
Fluorene	ug/L	1	J	1	J	1	J	2	J	10	U
4-Chlorophenyl Phenyl Ether	ug/L	12	UJ	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol	ug/L	29	UJ	25	U	25	U	25	U	25	UJ
4-Nitroaniline	ug/l	29	UJ	25	U	25	U	25	U	25	U
4-Bromophenyl Phenyl Ether	ug/l	12	UJ	10	U	10	U	10	U	10	U
Hexachlorobenzene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Pentachlorophenol	ug/L	29	UJ	25	U	25	U	25	U	25	UJ
Phenanthrene	ug/L	1	J	1	J	1	J	2	J	1	J
Anthracene	ug/L	12	UJ	1	J	10	U	10	U	10	U
Di-n-butyl Phthalate	ug/l	12	UJ	1	J	1	J	1	J	1	J
Fluoranthene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Pyrene	ug/L	1	J	1	J	1	J	1	J	1	J
Benzyl Butyl Phthalate	ug/l	12	UJ	10	U	10	U	10	U	10	U
Benzo(a)Anthracene	ug/L	12	UJ	10	U	10	U	10	U	10	U
3,3'-Dichlorobenzidine	ug/L	12	UJ	10	U	10	U	10	U	10	U
Chrysene	ug/L	12	UJ	10	U	10	U	10	U	1	J
bis(2-Ethylhexyl) Phthalate	ug/L	12	UJ	10	U	10	U	10	U	7	J
Di-n-octylphthalate	ug/L	12	UJ	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Benzo(a)Pyrene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Indeno(1,2,3-c,d)pyrene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Dibenz(a,h)anthracene	ug/l	12	UJ	10	U	10	U	10	U	10	U
Benzo(g,h,i)Perylene	ug/L	12	UJ	10	U	10	U	10	U	10	U
Carbazole	ug/l										

StationID	G008GSP11	G008GSP12	G008GSP13	G008GSP14	G008GSP15
SampleID	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
DateCollected	08/05/1999	08/05/1999	08/05/1999	08/05/1999	08/05/1999
DateExtracted	08/07/1999	08/07/1999	08/07/1999	08/07/1999	08/07/1999
DateAnalyzed	08/31/1999	08/31/1999	08/31/1999	08/26/1999	08/26/1999
SDGNumber	39843	39843	39843	39843	39843

Parameter	Units	G008GSP11		G008GSP12		G008GSP13		G008GSP14		G008GSP15	
Acenaphthene	ug/l	10	U	10	U	2	J	10	U	2	J
2,4-Dinitrophenol	ug/L	25	U								
Dibenzofuran	ug/L	10	U	10	U	1	J	10	U	2	J
2,4-Dinitrotoluene	ug/L	10	U								
Diethyl Phthalate	ug/L	10	U								
4-Nitrophenol	ug/L	25	U								
Fluorene	ug/L	1	J	1	J	2	J	10	U	3	J
4-Chlorophenyl Phenyl Ether	ug/L	10	U								
4,6-Dinitro-2-methylphenol	ug/L	25	U								
4-Nitroaniline	ug/l	25	U								
4-Bromophenyl Phenyl Ether	ug/l	10	U								
Hexachlorobenzene	ug/L	10	U								
Pentachlorophenol	ug/L	25	U								
Phenanthrene	ug/L	2	J	1	J	2	J	10	U	3	J
Anthracene	ug/L	1	J	1	J	1	J	10	U	1	J
Di-n-butyl Phthalate	ug/l	1	J	10	U	1	J	10	U	1	J
Fluoranthene	ug/L	2	J	1	J	1	J	10	U	10	U
Pyrene	ug/L	7	J	2	J	1	J	1	J	1	J
Benzyl Butyl Phthalate	ug/l	10	U	10	U	3	J	10	U	10	U
Benzo(a)Anthracene	ug/L	2	J	1	J	10	U	10	U	10	U
3,3'-Dichlorobenzidine	ug/L	10	U								
Chrysene	ug/L	3	J	1	J	10	U	10	U	10	U
bis(2-Ethylhexyl) Phthalate	ug/L	4	J	1	J	5	J	4	J	8	J
Di-n-octylphthalate	ug/L	10	U								
Benzo(b)Fluoranthene	ug/L	1	J	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene	ug/L	10	U								
Benzo(a)Pyrene	ug/L	1	J	10	U	10	U	10	U	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	1	J	10	U	10	U	10	U	10	U
Carbazole	ug/l										

StationID	G008GSP16	G008GSP18	G008GW001	G008GW001	G008GW001				
SampleID	008GSP1601	008GSP1801	008G000110	008GW00104	008GW00104				
DateCollected	08/05/1999	08/05/1999	07/19/2000	12/08/1997	12/08/1997				
DateExtracted	08/07/1999	08/07/1999	07/24/2000	12/09/1997	12/10/1997				
DateAnalyzed	08/26/1999	08/26/1999	07/28/2000	12/12/1997	12/11/1997				
SDGNumber	39843	39843	CNC04	32103	32103				
Parameter	Units								
Acenaphthene	ug/l	10	U	10	U	10	U	10	U
2,4-Dinitrophenol	ug/L	25	U	25	U	50	UJ	50	U
Dibenzofuran	ug/L	10	U	10	U	10	U	10	U
2,4-Dinitrotoluene	ug/L	10	U	10	U	10	U	10	U
Diethyl Phthalate	ug/L	10	U	10	U	10	U	10	U
4-Nitrophenol	ug/L	25	U	25	U	50	U	50	U
Fluorene	ug/L	10	U	10	U	10	U	10	U
4-Chlorophenyl Phenyl Ether	ug/L	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol	ug/L	25	U	25	U	50	U	50	U
4-Nitroaniline	ug/l	25	U	25	U	50	U	50	U
4-Bromophenyl Phenyl Ether	ug/l	10	U	10	U	10	U	10	U
Hexachlorobenzene	ug/L	10	U	10	U	10	U	10	U
Pentachlorophenol	ug/L	25	U	25	U	50	U	50	U
Phenanthrene	ug/L	1	J	10	U	10	U	10	U
Anthracene	ug/L	10	U	10	U	10	U	10	U
Di-n-butyl Phthalate	ug/l	1	J	1	J	10	U	10	U
Fluoranthene	ug/L	10	U	10	U	10	U	10	U
Pyrene	ug/L	10	U	10	U	10	U	10	U
Benzyl Butyl Phthalate	ug/l	10	U	10	U	10	U	10	U
Benzo(a)Anthracene	ug/L	10	U	10	U	10	U	10	U
3,3'-Dichlorobenzidine	ug/L	10	U	10	U	20	U	20	U
Chrysene	ug/L	10	U	10	U	10	UJ	10	U
bis(2-Ethylhexyl) Phthalate	ug/L	5	J	5	J	10	UJ	10	U
Di-n-octylphthalate	ug/L	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene	ug/L	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene	ug/L	10	U	10	U	10	UJ	10	U
Benzo(a)Pyrene	ug/L	10	U	10	U	10	U	10	U
Indeno(1,2,3-c,d)pyrene	ug/L	10	U	10	U	10	U	10	U
Dibenz(a,h)anthracene	ug/l	10	U	10	U	10	U	10	U
Benzo(g,h,i)Perylene	ug/L	10	U	10	U	10	U	10	U
Carbazole	ug/l								

StationID	G008GW001	G008GW001	G008GW002	G008GW002	G008GW003
SampleID	008GW001M6	008H000110	008GW00204	008GW00204	008GW00304
DateCollected	06/21/2002	07/19/2000	12/09/1997	12/09/1997	12/11/1997
DateExtracted	06/26/2002	07/24/2000	12/11/1997	12/11/1997	12/13/1997
DateAnalyzed	06/30/2002	07/28/2000	12/12/1997	12/19/1997	12/19/1997
SDGNumber	CNC118	CNC04	32103	32103	32103
Parameter	Units				
Acenaphthene	ug/l	10	U	10	U
2,4-Dinitrophenol	ug/L	50	UJ	50	U
Dibenzofuran	ug/L	10	U	10	U
2,4-Dinitrotoluene	ug/L	10	U	10	U
Diethyl Phthalate	ug/L	10	U	10	U
4-Nitrophenol	ug/L	50	U	50	U
Fluorene	ug/L	10	U	10	U
4-Chlorophenyl Phenyl Ether	ug/L	10	U	10	U
4,6-Dinitro-2-methylphenol	ug/L	50	UJ	50	U
4-Nitroaniline	ug/l	50	U	50	U
4-Bromophenyl Phenyl Ether	ug/l	10	U	10	U
Hexachlorobenzene	ug/L	10	U	10	U
Pentachlorophenol	ug/L	50	U	50	U
Phenanthrene	ug/L	10	U	10	U
Anthracene	ug/L	10	U	10	U
Di-n-butyl Phthalate	ug/l	10	U	10	U
Fluoranthene	ug/L	10	U	10	U
Pyrene	ug/L	10	U	10	U
Benzyl Butyl Phthalate	ug/l	10	U	10	U
Benzo(a)Anthracene	ug/L	10	U	10	U
3,3'-Dichlorobenzidine	ug/L	20	U	20	U
Chrysene	ug/L	10	U	10	U
bis(2-Ethylhexyl) Phthalate	ug/L	10	U	10	U
Di-n-octylphthalate	ug/L	10	U	10	U
Benzo(b)Fluoranthene	ug/L	0.47	J	10	U
Benzo(k)Fluoranthene	ug/L	10	U	10	U
Benzo(a)Pyrene	ug/L	0.65	J	10	U
Indeno(1,2,3-c,d)pyrene	ug/L	10	U	10	U
Dibenz(a,h)anthracene	ug/l	10	U	10	U
Benzo(g,h,i)Perylene	ug/l	10	U	10	U
Carbazole	ug/l	10	U		

StationID	G008GW003	G008GW004	G008GW004	G008GW004	G008GW005				
SampleID	008GW00304	008GW00404	008GW00404	008GW004M6	008GW00504				
DateCollected	12/11/1997	12/09/1997	12/09/1997	06/20/2002	12/08/1997				
DateExtracted	12/16/1997	12/11/1997	12/11/1997	06/25/2002	12/09/1997				
DateAnalyzed	12/17/1997	12/12/1997	12/19/1997	06/30/2002	12/12/1997				
SDGNumber	32103	32103	32103	CNC118	32103				
Parameter	Units								
Acenaphthene	ug/l			10	U	10	U	10	U
2,4-Dinitrophenol	ug/L			50	U	50	U	50	U
Dibenzofuran	ug/L			10	U	10	U	10	U
2,4-Dinitrotoluene	ug/L			10	U	10	U	10	U
Diethyl Phthalate	ug/L			10	U	10	U	10	U
4-Nitrophenol	ug/L			50	U	50	U	50	U
Fluorene	ug/L			10	U	10	U	10	U
4-Chlorophenyl Phenyl Ether	ug/L			10	U	10	U	10	U
4,6-Dinitro-2-methylphenol	ug/L			50	U	50	U	50	U
4-Nitroaniline	ug/l			50	U	50	U	50	U
4-Bromophenyl Phenyl Ether	ug/l			10	U	10	U	10	U
Hexachlorobenzene	ug/L			10	U	10	U	10	U
Pentachlorophenol	ug/L			50	U	50	U	50	U
Phenanthrene	ug/L			10	U	10	U	10	U
Anthracene	ug/L			10	U	10	U	10	U
Di-n-butyl Phthalate	ug/l			10	U	10	U	10	U
Fluoranthene	ug/L			10	U	10	U	10	U
Pyrene	ug/L			10	U	10	U	10	U
Benzyl Butyl Phthalate	ug/l			10	U	10	U	10	U
Benzo(a)Anthracene	ug/L			10	U	10	U	10	U
3,3'-Dichlorobenzidine	ug/L			20	U	20	U	20	U
Chrysene	ug/L			10	U	10	U	10	U
bis(2-Ethylhexyl) Phthalate	ug/L			10	U	10	U	10	U
Di-n-octylphthalate	ug/L			10	U	10	U	10	U
Benzo(b)Fluoranthene	ug/L			10	U	10	U	10	U
Benzo(k)Fluoranthene	ug/L			10	U	10	U	10	U
Benzo(a)Pyrene	ug/L			10	U	10	U	10	U
Indeno(1,2,3-c,d)pyrene	ug/L			10	U	10	U	10	U
Dibenz(a,h)anthracene	ug/l			10	U	10	U	10	U
Benzo(g,h,i)Perylene	ug/L			10	U	10	U	10	U
Carbazole	ug/l					10	U		

StationID	G008GW005	G008GW005	G008GW006	G008GW006	G008GW04D
SampleID	008GW00504	008GW005M6	008GW00604	008GW00604	008GW04DM7
DateCollected	12/08/1997	06/21/2002	12/09/1997	12/09/1997	08/22/2002
DateExtracted	12/10/1997	06/26/2002	12/11/1997	12/11/1997	08/28/2002
DateAnalyzed	12/11/1997	06/30/2002	12/11/1997	12/19/1997	09/06/2002
SDGNumber	32103	CNC118	32103	32103	CNC142

Parameter	Units								
Acenaphthene	ug/l		10	U			10	U	
2,4-Dinitrophenol	ug/L		50	UJ			50	U	50
Dibenzofuran	ug/L		10	U			10	U	10
2,4-Dinitrotoluene	ug/L		10	U			10	U	10
Diethyl Phthalate	ug/L		10	U			10	U	10
4-Nitrophenol	ug/L		50	U			50	U	50
Fluorene	ug/L		10	U			10	U	10
4-Chlorophenyl Phenyl Ether	ug/L		10	U			10	U	10
4,6-Dinitro-2-methylphenol	ug/L		50	UJ			50	U	50
4-Nitroaniline	ug/l		50	U			50	U	50
4-Bromophenyl Phenyl Ether	ug/l		10	U			10	U	10
Hexachlorobenzene	ug/L		10	U			10	U	10
Pentachlorophenol	ug/L		50	U			50	U	50
Phenanthrene	ug/L		10	U			10	U	10
Anthracene	ug/L		10	U			10	U	10
Di-n-butyl Phthalate	ug/l		10	U			10	U	10
Fluoranthene	ug/L		10	U			10	U	10
Pyrene	ug/L		10	U			10	U	10
Benzyl Butyl Phthalate	ug/l		10	U			10	U	10
Benzo(a)Anthracene	ug/L		10	U			10	U	10
3,3'-Dichlorobenzidine	ug/L		20	U			20	U	20
Chrysene	ug/L		10	U			10	U	10
bis(2-Ethylhexyl) Phthalate	ug/L		10	U			10	U	10
Di-n-octylphthalate	ug/L		10	U			10	U	10
Benzo(b)Fluoranthene	ug/L		0.35	J			10	U	10
Benzo(k)Fluoranthene	ug/L		10	U			10	U	10
Benzo(a)Pyrene	ug/L		0.47	J			10	U	10
Indeno(1,2,3-c,d)pyrene	ug/L		10	U			10	U	10
Dibenz(a,h)anthracene	ug/l		10	U			10	U	10
Benzo(g,h,i)Perylene	ug/L		10	U			10	U	1.2
Carbazole	ug/l		10	U					10

	StationID	G636GW00	G636GW001	G636GW001	GFDSGW02A	FDSGW02D			
	SampleID	636GW00104	636GW00104	636GW001M6	FDSGW02ALA	FDSGW02D01			
	DateCollected	12/11/1997	12/11/1997	06/20/2002	6/13/2001	3/3/1999			
	DateExtracted	12/13/1997	12/16/1997	06/25/2002	6/18/2001				
	DateAnalyzed	12/19/1997	12/17/1997	06/30/2002	6/20/2001				
	SDGNumber	32103	32103	CNC118	44131	37602			
Parameter	Units								
Acenaphthene	ug/l	10	U	10	U	1.1	U	10	U
2,4-Dinitrophenol	ug/L	50	U	50	U			25	U
Dibenzofuran	ug/L	10	U	10	U			10	U
2,4-Dinitrotoluene	ug/L	10	U	10	U			10	U
Diethyl Phthalate	ug/L	10	U	10	U			10	U
4-Nitrophenol	ug/L	50	U	50	U			25	U
Fluorene	ug/L	10	U	10	U	1.1	U	10	U
4-Chlorophenyl Phenyl Ether	ug/L	10	U	10	U			10	U
4,6-Dinitro-2-methylphenol	ug/L	50	U	50	U			25	U
4-Nitroaniline	ug/l	50	U	50	U			25	U
4-Bromophenyl Phenyl Ether	ug/l	10	U	10	U			10	U
Hexachlorobenzene	ug/L	10	U	10	U			10	U
Pentachlorophenol	ug/L	50	U	50	U			25	U
Phenanthrene	ug/L	10	U	10	U	1.1	U	10	U
Anthracene	ug/L	10	U	10	U	1.1	U	10	U
Di-n-butyl Phthalate	ug/l	10	U	0.4	J			10	U
Fluoranthene	ug/L	10	U	10	U	1.1	U	10	U
Pyrene	ug/L	10	U	10	U	1.1	U	10	U
Benzyl Butyl Phthalate	ug/l	10	U	10	U			10	U
Benzo(a)Anthracene	ug/L	10	U	10	U	1.1	U	10	U
3,3'-Dichlorobenzidine	ug/L	20	U	20	U			10	U
Chrysene	ug/L	10	U	10	U	1.1	U	10	U
bis(2-Ethylhexyl) Phthalate	ug/L	10	U	10	U			1	J
Di-n-octylphthalate	ug/L	10	U	10	U			10	U
Benzo(b)Fluoranthene	ug/L	10	U	10	U	1.1	UJ	10	U
Benzo(k)Fluoranthene	ug/L	10	U	10	UJ	1.1	U	10	U
Benzo(a)Pyrene	ug/L	10	U	10	U	1.1	U	10	U
Indeno(1,2,3-c,d)pyrene	ug/L	10	U	10	UJ	1.1	U	10	U
Dibenz(a,h)anthracene	ug/l	10	U	10	U	1.1	U	10	U
Benzo(g,h,i)Perylene	ug/L	10	U	10	U	1.1	U	10	U
Carbazole	ug/l			10	U				

StationID	G008GSP01		G008GSP01		G008GSP02		G008GSP02	
SampleID	008GSP0101a		008GSP0101a		008GSP0201a		008GSP0201a	
DateCollected	08/03/1999		08/03/1999		08/03/1999		08/03/1999	
DateExtracted			08/05/1999				08/05/1999	
DateAnalyzed	08/05/1999		08/20/1999		08/05/1999		08/20/1999	
SDGNumber	39785		39785		39785		39785	
Parameter	Units							
m-Xylene	ug/l							
Methyl tert-butyl ether	ug/L							
1,2,4-Trichlorobenzene	ug/L		10	U			10	U
Chloromethane	ug/L	5	U		5	U		
Vinyl chloride	ug/L	5	U		5	U		
Bromomethane	ug/L	5	U		5	U		
Chloroethane	ug/L	5	U		5	U		
1,1-Dichloroethene	ug/L	5	U		5	U		
Acetone	ug/L	5	R		5	R		
Carbon Disulfide	ug/L	5	U		5	U		
Methylene Chloride	ug/l	5	U		5	U		
trans-1,2-Dichloroethene	ug/L							
1,1-Dichloroethane	ug/L	5	U		5	U		
Vinyl acetate	ug/L	5	U		5	U		
Methyl ethyl ketone (2-Butanone)	ug/L	5	R		5	R		
cis-1,2-Dichloroethylene	ug/l							
1,2-Dichloroethene (total)	ug/L	5	U		5	U		
Chloroform	ug/L	5	U		5	U		
1,1,1-Trichloroethane	ug/L	5	U		5	U		
Carbon Tetrachloride	ug/l	5	U		5	U		
1,2-Dichloroethane	ug/L	5	U		5	U		
Benzene	ug/l	5	U		5	U		
Trichloroethylene (TCE)	ug/L	5	U		5	U		
1,2-Dichloropropane	ug/L	5	U		5	U		
Bromodichloromethane	ug/L	5	U		5	U		
2-Chloroethyl vinyl ether	ug/L	5	UJ		5	UJ		
cis-1,3-Dichloropropene	ug/L	5	U		5	U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	5	U		5	U		
Toluene	ug/L	5	U		5	U		
trans-1,3-Dichloropropene	ug/L	5	U		5	U		

	StationID	G008GSP03		G008GSP03	G008GSP04	
	SampleID	008GSP0301b		008GSP0301b	008GSP0401b	
	DateCollected	08/03/1999		08/03/1999	08/03/1999	
	DateExtracted			08/05/1999		
	DateAnalyzed	08/05/1999		08/20/1999	08/05/1999	
	SDGNumber	39785		39785	39785	
Parameter	Units					
m-Xylene	ug/l					
Methyl tert-butyl ether	ug/L					
1,2,4-Trichlorobenzene	ug/L			10	U	
Chloromethane	ug/L	5	U			5 U
Vinyl chloride	ug/L	5	U			5 U
Bromomethane	ug/L	5	U			5 U
Chloroethane	ug/L	5	U			5 U
1,1-Dichloroethene	ug/L	5	U			5 U
Acetone	ug/L	5	R			5 R
Carbon Disulfide	ug/L	5	U			5 U
Methylene Chloride	ug/l	5	U			5 U
trans-1,2-Dichloroethene	ug/L					
1,1-Dichloroethane	ug/L	5	U			5 U
Vinyl acetate	ug/L	5	U			5 U
Methyl ethyl ketone (2-Butanone)	ug/L	5	R			5 R
cis-1,2-Dichloroethylene	ug/l					
1,2-Dichloroethene (total)	ug/L	5	U			5 U
Chloroform	ug/L	5	U			5 U
1,1,1-Trichloroethane	ug/L	5	U			5 U
Carbon Tetrachloride	ug/l	5	U			5 U
1,2-Dichloroethane	ug/L	5	U			5 U
Benzene	ug/l	5	U			5 U
Trichloroethylene (TCE)	ug/L	5	U			5 U
1,2-Dichloropropane	ug/L	5	U			5 U
Bromodichloromethane	ug/L	5	U			5 U
2-Chloroethyl vinyl ether	ug/L	5	UJ			5 UJ
cis-1,3-Dichloropropene	ug/L	5	U			5 U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	5	U			5 U
Toluene	ug/L	5	U			5 U
trans-1,3-Dichloropropene	ug/L	5	U			5 U

StationID	G008GSP04	G008GSP05	G008GSP05	G008GSP06	
SampleID	008GSP0401b	008GSP0501a	008GSP0501a	008GSP0601	
DateCollected	08/03/1999	08/03/1999	08/03/1999	08/04/1999	
DateExtracted	08/05/1999		08/05/1999		
DateAnalyzed	08/20/1999	08/05/1999	08/20/1999	08/09/1999	
SDGNumber	39785	39785	39785	39825	
Parameter	Units				
m-Xylene	ug/l				
Methyl tert-butyl ether	ug/L				
1,2,4-Trichlorobenzene	ug/L	10	U	10	U
Chloromethane	ug/L		5 U		5 U
Vinyl chloride	ug/L		5 U		5 U
Bromomethane	ug/L		5 U		5 U
Chloroethane	ug/L		5 U		5 U
1,1-Dichloroethene	ug/L		5 U		5 U
Acetone	ug/L		5 R		5 R
Carbon Disulfide	ug/L		5 U		5 U
Methylene Chloride	ug/l		5 U		5 U
trans-1,2-Dichloroethene	ug/L				
1,1-Dichloroethane	ug/L		5 U		5 U
Vinyl acetate	ug/L		5 U		5 U
Methyl ethyl ketone (2-Butanone)	ug/L		5 R		5 U
cis-1,2-Dichloroethylene	ug/l				
1,2-Dichloroethene (total)	ug/L		5 U		5 U
Chloroform	ug/L		5 U		5 U
1,1,1-Trichloroethane	ug/L		5 U		5 U
Carbon Tetrachloride	ug/l		5 U		5 U
1,2-Dichloroethane	ug/L		5 U		5 U
Benzene	ug/l		5 U		5 U
Trichloroethylene (TCE)	ug/L		5 U		5 U
1,2-Dichloropropane	ug/L		5 U		5 U
Bromodichloromethane	ug/L		5 U		5 U
2-Chloroethyl vinyl ether	ug/L		5 UJ		5 R
cis-1,3-Dichloropropene	ug/L		5 U		5 U
Methyl isobutyl ketone (4-Methyl-2-p	ug/L		5 U		5 U
Toluene	ug/L		5 U		5 U
trans-1,3-Dichloropropene	ug/L		5 U		5 U

StationID	G008GSP06	G008GSP06	G008GSP07		
SampleID	008GSP0601	008GSP0601RE	008GSP0701		
DateCollected	08/04/1999	08/04/1999	08/04/1999		
DateExtracted	08/06/1999	08/23/1999			
DateAnalyzed	08/24/1999	08/25/1999	08/09/1999		
SDGNumber	39825	39825	39825		
Parameter	Units				
m-Xylene	ug/l				
Methyl tert-butyl ether	ug/L				
1,2,4-Trichlorobenzene	ug/L	10	R	12	UJ
Chloromethane	ug/L				5 U
Vinyl chloride	ug/L				5 U
Bromomethane	ug/L				5 U
Chloroethane	ug/L				5 U
1,1-Dichloroethene	ug/L				5 U
Acetone	ug/L				5 R
Carbon Disulfide	ug/L				5 U
Methylene Chloride	ug/l				5 U
trans-1,2-Dichloroethene	ug/L				
1,1-Dichloroethane	ug/L				5 U
Vinyl acetate	ug/L				5 U
Methyl ethyl ketone (2-Butanone)	ug/L				5 U
cis-1,2-Dichloroethylene	ug/l				
1,2-Dichloroethene (total)	ug/L				5 U
Chloroform	ug/L				5 U
1,1,1-Trichloroethane	ug/L				5 U
Carbon Tetrachloride	ug/l				5 U
1,2-Dichloroethane	ug/L				5 U
Benzene	ug/l				5 U
Trichloroethylene (TCE)	ug/L				5 U
1,2-Dichloropropane	ug/L				5 U
Bromodichloromethane	ug/L				5 U
2-Chloroethyl vinyl ether	ug/L				5 U
cis-1,3-Dichloropropene	ug/L				5 U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L				5 U
Toluene	ug/L				5 U
trans-1,3-Dichloropropene	ug/L				5 U

StationID	G008GSP07	G008GSP08	G008GSP08	G008GSP09	
SampleID	008GSP0701	008GSP0801	008GSP0801	008GSP0901	
DateCollected	08/04/1999	08/04/1999	08/04/1999	08/04/1999	
DateExtracted	08/06/1999		08/06/1999		
DateAnalyzed	08/24/1999	08/09/1999	08/24/1999	08/09/1999	
SDGNumber	39825	39825	39825	39825	
Parameter	Units				
m-Xylene	ug/l				
Methyl tert-butyl ether	ug/L				
1,2,4-Trichlorobenzene	ug/L	10	U	10	U
Chloromethane	ug/L		5 U		5 U
Vinyl chloride	ug/L		5 U		5 U
Bromomethane	ug/L		5 U		5 U
Chloroethane	ug/L		5 U		5 U
1,1-Dichloroethene	ug/L		5 U		5 U
Acetone	ug/L		5 R		5 R
Carbon Disulfide	ug/L		5 U		5 U
Methylene Chloride	ug/l		5 U		5 U
trans-1,2-Dichloroethene	ug/L				
1,1-Dichloroethane	ug/L		5 U		5 U
Vinyl acetate	ug/L		5 U		5 U
Methyl ethyl ketone (2-Butanone)	ug/L		5 U		5 U
cis-1,2-Dichloroethylene	ug/l				
1,2-Dichloroethene (total)	ug/L		5 U		5 U
Chloroform	ug/L		5 U		5 U
1,1,1-Trichloroethane	ug/L		5 U		5 U
Carbon Tetrachloride	ug/l		5 U		5 U
1,2-Dichloroethane	ug/L		5 U		5 U
Benzene	ug/l		5 U		5 U
Trichloroethylene (TCE)	ug/L		5 U		5 U
1,2-Dichloropropane	ug/L		5 U		5 U
Bromodichloromethane	ug/L		5 U		5 U
2-Chloroethyl vinyl ether	ug/L		5 U		5 U
cis-1,3-Dichloropropene	ug/L		5 U		5 U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L		5 U		5 U
Toluene	ug/L		5 U		5 U
trans-1,3-Dichloropropene	ug/L		5 U		5 U

	StationID	G008GSP09		G008GSP10		G008GSP10		G008GSP11	
	SampleID	008GSP0901		008GSP1001		008GSP1001		008GSP1101	
	DateCollected	08/04/1999		08/05/1999		08/05/1999		08/05/1999	
	DateExtracted	08/06/1999				08/07/1999			
	DateAnalyzed	08/24/1999		08/09/1999		08/26/1999		08/09/1999	
	SDGNumber	39825		39843		39843		39843	
Parameter	Units								
m-Xylene	ug/l								
Methyl tert-butyl ether	ug/L								
1,2,4-Trichlorobenzene	ug/L	10	U			10	U		
Chloromethane	ug/L			5	U			5	U
Vinyl chloride	ug/L			5	U			5	U
Bromomethane	ug/L			5	U			5	U
Chloroethane	ug/L			5	U			5	U
1,1-Dichloroethene	ug/L			5	U			5	U
Acetone	ug/L			5	R			5	R
Carbon Disulfide	ug/L			5	U			5	U
Methylene Chloride	ug/l			5	U			5	U
trans-1,2-Dichloroethene	ug/L								
1,1-Dichloroethane	ug/L			5	U			5	U
Vinyl acetate	ug/L			5	U			5	U
Methyl ethyl ketone (2-Butanone)	ug/L			5	U			5	U
cis-1,2-Dichloroethylene	ug/l								
1,2-Dichloroethene (total)	ug/L			5	U			5	U
Chloroform	ug/L			5	U			5	U
1,1,1-Trichloroethane	ug/L			5	U			5	U
Carbon Tetrachloride	ug/l			5	U			5	U
1,2-Dichloroethane	ug/L			5	U			5	U
Benzene	ug/l			5	U			5	U
Trichloroethylene (TCE)	ug/L			5	U			5	U
1,2-Dichloropropane	ug/L			5	U			5	U
Bromodichloromethane	ug/L			5	U			5	U
2-Chloroethyl vinyl ether	ug/L			5	U			5	U
cis-1,3-Dichloropropene	ug/L			5	U			5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L			5	U			5	U
Toluene	ug/L			5	U			5	U
trans-1,3-Dichloropropene	ug/L			5	U			5	U

StationID	G008GSP11		G008GSP12		G008GSP12		G008GSP13	
SampleID	008GSP1101		008GSP1201		008GSP1201		008GSP1301	
DateCollected	08/05/1999		08/05/1999		08/05/1999		08/05/1999	
DateExtracted	08/07/1999				08/07/1999			
DateAnalyzed	08/31/1999		08/09/1999		08/31/1999		08/09/1999	
SDGNumber	39843		39843		39843		39843	
Parameter	Units							
m-Xylene	ug/l							
Methyl tert-butyl ether	ug/L							
1,2,4-Trichlorobenzene	10	U			10	U		
Chloromethane	ug/L		5	U			5	U
Vinyl chloride	ug/L		5	U			5	U
Bromomethane	ug/L		5	U			5	U
Chloroethane	ug/L		5	U			5	U
1,1-Dichloroethene	ug/L		5	U			5	U
Acetone	ug/L		5	R			5	R
Carbon Disulfide	ug/L		5	U			5	U
Methylene Chloride	ug/l		5	U			5	U
trans-1,2-Dichloroethene	ug/L							
1,1-Dichloroethane	ug/L		5	U			5	U
Vinyl acetate	ug/L		5	U			5	U
Methyl ethyl ketone (2-Butanone)	ug/L		5	U			5	U
cis-1,2-Dichloroethene	ug/l							
1,2-Dichloroethene (total)	ug/L		5	U			5	U
Chloroform	ug/L		5	U			5	U
1,1,1-Trichloroethane	ug/L		5	U			5	U
Carbon Tetrachloride	ug/l		5	U			5	U
1,2-Dichloroethane	ug/L		5	U			5	U
Benzene	ug/l		5	U			5	U
Trichloroethylene (TCE)	ug/L		5	U			5	U
1,2-Dichloropropane	ug/L		5	U			5	U
Bromodichloromethane	ug/L		5	U			5	U
2-Chloroethyl vinyl ether	ug/L		5	U			5	U
cis-1,3-Dichloropropene	ug/L		5	U			5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L		5	U			5	U
Toluene	ug/L		5	U			5	U
trans-1,3-Dichloropropene	ug/L		5	U			5	U

	StationID	G008GSP13		G008GSP14		G008GSP14	
	SampleID	008GSP1301		008GSP1401		008GSP1401	
	DateCollected	08/05/1999		08/05/1999		08/05/1999	
	DateExtracted	08/07/1999				08/07/1999	
	DateAnalyzed	08/31/1999		08/09/1999		08/26/1999	
	SDGNumber	39843		39843		39843	
Parameter	Units						
m-Xylene	ug/l						
Methyl tert-butyl ether	ug/L						
1,2,4-Trichlorobenzene	ug/L	10	U			10	U
Chloromethane	ug/L			5	U		
Vinyl chloride	ug/L			5	U		
Bromomethane	ug/L			5	U		
Chloroethane	ug/L			5	U		
1,1-Dichloroethene	ug/L			5	U		
Acetone	ug/L			5	R		
Carbon Disulfide	ug/L			5	U		
Methylene Chloride	ug/l			5	U		
trans-1,2-Dichloroethene	ug/L						
1,1-Dichloroethane	ug/L			5	U		
Vinyl acetate	ug/L			5	U		
Methyl ethyl ketone (2-Butanone)	ug/L			5	U		
cis-1,2-Dichloroethylene	ug/l						
1,2-Dichloroethene (total)	ug/L			5	U		
Chloroform	ug/L			5	U		
1,1,1-Trichloroethane	ug/L			5	U		
Carbon Tetrachloride	ug/l			5	U		
1,2-Dichloroethane	ug/L			5	U		
Benzene	ug/l			5	U		
Trichloroethylene (TCE)	ug/L			5	U		
1,2-Dichloropropane	ug/L			5	U		
Bromodichloromethane	ug/L			5	U		
2-Chloroethyl vinyl ether	ug/L			5	U		
cis-1,3-Dichloropropene	ug/L			5	U		
Methyl isobutyl ketone (4-Methyl-2-p	ug/L			5	U		
Toluene	ug/L			5	U		
trans-1,3-Dichloropropene	ug/L			5	U		

StationID	G008GSP15		G008GSP15		G008GSP16	
SampleID	008GSP1501		008GSP1501		008GSP1601	
DateCollected	08/05/1999		08/05/1999		08/05/1999	
DateExtracted			08/07/1999			
DateAnalyzed	08/09/1999		08/26/1999		08/09/1999	
SDGNumber	39843		39843		39843	
Parameter	Units					
m-Xylene	ug/l					
Methyl tert-butyl ether	ug/L					
1,2,4-Trichlorobenzene	ug/L		10	U		
Chloromethane	ug/L	5	U		5 U	
Vinyl chloride	ug/L	5	U		5 U	
Bromomethane	ug/L	5	U		5 U	
Chloroethane	ug/L	5	U		5 U	
1,1-Dichloroethene	ug/L	5	U		5 U	
Acetone	ug/L	5	R		5 R	
Carbon Disulfide	ug/L	5	U		5 U	
Methylene Chloride	ug/l	5	U		5 U	
trans-1,2-Dichloroethene	ug/L					
1,1-Dichloroethane	ug/L	5	U		5 U	
Vinyl acetate	ug/L	5	U		5 U	
Methyl ethyl ketone (2-Butanone)	ug/L	5	U		5 U	
cis-1,2-Dichloroethylene	ug/l					
1,2-Dichloroethene (total)	ug/L	5	U		5 U	
Chloroform	ug/L	5	U		5 U	
1,1,1-Trichloroethane	ug/L	5	U		5 U	
Carbon Tetrachloride	ug/l	5	U		5 U	
1,2-Dichloroethane	ug/L	5	U		5 U	
Benzene	ug/l	5	U		5 U	
Trichloroethylene (TCE)	ug/L	5	U		5 U	
1,2-Dichloropropane	ug/L	5	U		5 U	
Bromodichloromethane	ug/L	5	U		5 U	
2-Chloroethyl vinyl ether	ug/L	5	U		5 U	
cis-1,3-Dichloropropene	ug/L	5	U		5 U	
Methyl isobutyl ketone (4-Methyl-2-p	ug/L	5	U		5 U	
Toluene	ug/L	5	U		5 U	
trans-1,3-Dichloropropene	ug/L	5	U		5 U	

StationID	G008GSP16	G008GSP17	G008GSP17		
SampleID	008GSP1601	008GSP1701	008GSP1701		
DateCollected	08/05/1999	08/05/1999	08/05/1999		
DateExtracted	08/07/1999		08/07/1999		
DateAnalyzed	08/26/1999	08/09/1999	08/26/1999		
SDGNumber	39843	39843	39843		
Parameter	Units				
m-Xylene	ug/l				
Methyl tert-butyl ether	ug/L				
1,2,4-Trichlorobenzene	ug/L	10	U	10	R
Chloromethane	ug/L		5 U		
Vinyl chloride	ug/L		5 U		
Bromomethane	ug/L		5 U		
Chloroethane	ug/L		5 U		
1,1-Dichloroethene	ug/L		5 U		
Acetone	ug/L		5 R		
Carbon Disulfide	ug/L		5 U		
Methylene Chloride	ug/l		5 U		
trans-1,2-Dichloroethene	ug/L				
1,1-Dichloroethane	ug/L		5 U		
Vinyl acetate	ug/L		5 U		
Methyl ethyl ketone (2-Butanone)	ug/L		5 U		
cis-1,2-Dichloroethylene	ug/l				
1,2-Dichloroethene (total)	ug/L		5 U		
Chloroform	ug/L		5 U		
1,1,1-Trichloroethane	ug/L		5 U		
Carbon Tetrachloride	ug/l		5 U		
1,2-Dichloroethane	ug/L		5 U		
Benzene	ug/l		5 U		
Trichloroethylene (TCE)	ug/L		5 U		
1,2-Dichloropropane	ug/L		5 U		
Bromodichloromethane	ug/L		5 U		
2-Chloroethyl vinyl ether	ug/L		5 U		
cis-1,3-Dichloropropene	ug/L		5 U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L		5 U		
Toluene	ug/L		5 U		
trans-1,3-Dichloropropene	ug/L		5 U		

StationID	G008GSP17	G008GSP18	G008GSP18
SampleID	008GSP1701RE	008GSP1801	008GSP1801
DateCollected	08/05/1999	08/05/1999	08/05/1999
DateExtracted	09/01/1999		08/07/1999
DateAnalyzed	09/02/1999	08/09/1999	08/26/1999
SDGNumber	39843	39843	39843
Parameter	Units		
m-Xylene	ug/l		
Methyl tert-butyl ether	ug/L		
1,2,4-Trichlorobenzene	ug/L	10	R
Chloromethane	ug/L		5 U
Vinyl chloride	ug/L		5 U
Bromomethane	ug/L		5 U
Chloroethane	ug/L		5 U
1,1-Dichloroethene	ug/L		5 U
Acetone	ug/L		5 R
Carbon Disulfide	ug/L		5 U
Methylene Chloride	ug/l		5 U
trans-1,2-Dichloroethene	ug/L		
1,1-Dichloroethane	ug/L		5 U
Vinyl acetate	ug/L		5 U
Methyl ethyl ketone (2-Butanone)	ug/L		5 U
cis-1,2-Dichloroethylene	ug/l		
1,2-Dichloroethene (total)	ug/L		5 U
Chloroform	ug/L		3 J
1,1,1-Trichloroethane	ug/L		5 U
Carbon Tetrachloride	ug/l		5 U
1,2-Dichloroethane	ug/L		5 U
Benzene	ug/l		5 U
Trichloroethylene (TCE)	ug/L		5 U
1,2-Dichloropropane	ug/L		5 U
Bromodichloromethane	ug/L		5 U
2-Chloroethyl vinyl ether	ug/L		5 U
cis-1,3-Dichloropropene	ug/L		5 U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L		5 U
Toluene	ug/L		5 U
trans-1,3-Dichloropropene	ug/L		5 U

StationID	G008GW001	G008GW001	G008GW001
SampleID	008G000110	008GW00104	008GW00104
DateCollected	07/19/2000	12/08/1997	12/08/1997
DateExtracted	07/30/2000		12/09/1997
DateAnalyzed	07/30/2000	12/09/1997	12/12/1997
SDGNumber	CNC04	32103	32103
Parameter	Units		
m-Xylene	ug/l		
Methyl tert-butyl ether	ug/L		
1,2,4-Trichlorobenzene	ug/L		10 U
Chloromethane	ug/L	10 U	5 U
Vinyl chloride	ug/L	10 U	5 U
Bromomethane	ug/L	10 U	5 U
Chloroethane	ug/L	10 UJ	5 U
1,1-Dichloroethene	ug/L	5 U	5 U
Acetone	ug/L	10 U	5 UJ
Carbon Disulfide	ug/L	5 U	5 U
Methylene Chloride	ug/l	5 U	5 U
trans-1,2-Dichloroethene	ug/L		
1,1-Dichloroethane	ug/L	5 U	5 U
Vinyl acetate	ug/L	10 UJ	5 U
Methyl ethyl ketone (2-Butanone)	ug/L	10 UJ	5 U
cis-1,2-Dichloroethylene	ug/l		
1,2-Dichloroethene (total)	ug/L	5 U	5 U
Chloroform	ug/L	5 U	5 U
1,1,1-Trichloroethane	ug/L	5 U	5 U
Carbon Tetrachloride	ug/l	5 U	5 U
1,2-Dichloroethane	ug/L	5 U	5 U
Benzene	ug/l	5 U	5 U
Trichloroethylene (TCE)	ug/L	5 U	5 U
1,2-Dichloropropane	ug/L	5 U	5 U
Bromodichloromethane	ug/L	5 U	5 U
2-Chloroethyl vinyl ether	ug/L	10 U	5 U
cis-1,3-Dichloropropene	ug/L	5 U	5 U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10 U	5 U
Toluene	ug/L	5 U	5 U
trans-1,3-Dichloropropene	ug/L	5 U	5 U

StationID	G008GW001		G008GW001		G008GW002		
SampleID	008GW001M6		008H000110		008GW00202a		
DateCollected	06/21/2002		07/19/2000		09/27/1998		
DateExtracted	06/27/2002		07/30/2000				
DateAnalyzed	06/27/2002		07/30/2000				
SDGNumber	CNC118		CNC04		MNA		
Parameter	Units						
m-Xylene	ug/l	5	U				
Methyl tert-butyl ether	ug/L					5	SU
1,2,4-Trichlorobenzene	ug/L	5	U				
Chloromethane	ug/L	10	U	10	U	5	SU
Vinyl chloride	ug/L	10	U	10	U	5	SU
Bromomethane	ug/L	10	UJ	10	U	5	SU
Chloroethane	ug/L	10	U	10	UJ	5	SU
1,1-Dichloroethene	ug/L	5	U	5	U	5	SU
Acetone	ug/L	10	U	15	=	5	SU
Carbon Disulfide	ug/L	3	J	5	U	5	SU
Methylene Chloride	ug/l	5	U	5	U	5	SU
trans-1,2-Dichloroethene	ug/L	5	U			5	SU
1,1-Dichloroethane	ug/L	5	U	5	U	5	SU
Vinyl acetate	ug/L	10	U	10	UJ	5	SU
Methyl ethyl ketone (2-Butanone)	ug/L	10	U	10	UJ	5	SU
cis-1,2-Dichloroethylene	ug/l	5	U			5	SU
1,2-Dichloroethene (total)	ug/L	5	U	5	U		
Chloroform	ug/L	5	U	5	U	5	SU
1,1,1-Trichloroethane	ug/L	5	U	5	U	5	SU
Carbon Tetrachloride	ug/l	5	U	5	U	5	SU
1,2-Dichloroethane	ug/L	5	U	5	U	5	SU
Benzene	ug/l	5	U	5	U	5	SU
Trichloroethylene (TCE)	ug/L	5	U	5	U	5	SU
1,2-Dichloropropane	ug/L	5	U	5	U	5	SU
Bromodichloromethane	ug/L	5	U	5	U	5	SU
2-Chloroethyl vinyl ether	ug/L	10	U	10	U	5	SU
cis-1,3-Dichloropropene	ug/L	5	U	5	U	5	SU
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U	10	U	5	SU
Toluene	ug/L	5	U	5	U	5	SU
trans-1,3-Dichloropropene	ug/L	5	U	5	U	5	SU

StationID	G008GW002	G008GW002	G008GW003		
SampleID	008GW00204	008GW00204	008GW00304		
DateCollected	12/09/1997	12/09/1997	12/11/1997		
DateExtracted		12/11/1997			
DateAnalyzed	12/22/1997	12/19/1997	12/17/1997		
SDGNumber	32103	32103	32103		
Parameter	Units				
m-Xylene	ug/l				
Methyl tert-butyl ether	ug/L				
1,2,4-Trichlorobenzene	ug/L		10 U		
Chloromethane	ug/L	5 U		5 U	
Vinyl chloride	ug/L	5 U		5 U	
Bromomethane	ug/L	5 U		5 U	
Chloroethane	ug/L	5 U		5 R	
1,1-Dichloroethene	ug/L	5 U		5 U	
Acetone	ug/L	5 U		57 U	
Carbon Disulfide	ug/L	5 U		4 J	
Methylene Chloride	ug/l	5 U		5 U	
trans-1,2-Dichloroethene	ug/L				
1,1-Dichloroethane	ug/L	5 U		5 U	
Vinyl acetate	ug/L	5 U		5 U	
Methyl ethyl ketone (2-Butanone)	ug/L	5 UJ		5 U	
cis-1,2-Dichloroethylene	ug/l				
1,2-Dichloroethene (total)	ug/L	5 U		5 U	
Chloroform	ug/L	5 U		5 U	
1,1,1-Trichloroethane	ug/L	5 U		5 U	
Carbon Tetrachloride	ug/l	5 U		5 U	
1,2-Dichloroethane	ug/L	5 U		5 U	
Benzene	ug/l	5 U		5 U	
Trichloroethylene (TCE)	ug/L	5 U		5 U	
1,2-Dichloropropane	ug/L	5 U		5 U	
Bromodichloromethane	ug/L	5 U		5 U	
2-Chloroethyl vinyl ether	ug/L	5 U		5 U	
cis-1,3-Dichloropropene	ug/L	5 U		5 U	
Methyl isobutyl ketone (4-Methyl-2-p	ug/L	5 U		5 U	
Toluene	ug/L	5 U		5 U	
trans-1,3-Dichloropropene	ug/L	5 U		5 U	

StationID	G008GW003	G008GW004	G008GW004
SampleID	008GW00304	008GW00404	008GW00404
DateCollected	12/11/1997	12/09/1997	12/09/1997
DateExtracted	12/13/1997		12/11/1997
DateAnalyzed	12/19/1997	12/22/1997	12/19/1997
SDGNumber	32103	32103	32103
Parameter	Units		
m-Xylene	ug/l		
Methyl tert-butyl ether	ug/L		
1,2,4-Trichlorobenzene	ug/L	10 U	10 U
Chloromethane	ug/L	5 U	
Vinyl chloride	ug/L	5 U	
Bromomethane	ug/L	5 U	
Chloroethane	ug/L	5 U	
1,1-Dichloroethene	ug/L	5 U	
Acetone	ug/L	5 U	
Carbon Disulfide	ug/L	5 U	
Methylene Chloride	ug/l	5 U	
trans-1,2-Dichloroethene	ug/L		
1,1-Dichloroethane	ug/L	5 U	
Vinyl acetate	ug/L	5 U	
Methyl ethyl ketone (2-Butanone)	ug/L	5 UJ	
cis-1,2-Dichloroethylene	ug/l		
1,2-Dichloroethene (total)	ug/L	5 U	
Chloroform	ug/L	5 U	
1,1,1-Trichloroethane	ug/L	5 U	
Carbon Tetrachloride	ug/l	5 U	
1,2-Dichloroethane	ug/L	5 U	
Benzene	ug/l	5 U	
Trichloroethylene (TCE)	ug/L	5 U	
1,2-Dichloropropane	ug/L	5 U	
Bromodichloromethane	ug/L	5 U	
2-Chloroethyl vinyl ether	ug/L	5 U	
cis-1,3-Dichloropropene	ug/L	5 U	
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	5 U	
Toluene	ug/L	5 U	
trans-1,3-Dichloropropene	ug/L	5 U	

	StationID	G008GW004		G008GW005		G008GW005	
	SampleID	008GW004M6		008GW00504		008GW00504	
	DateCollected	06/20/2002		12/08/1997		12/08/1997	
	DateExtracted	06/26/2002				12/09/1997	
	DateAnalyzed	06/26/2002		12/09/1997		12/12/1997	
	SDGNumber	CNC118		32103		32103	
Parameter	Units						
m-Xylene	ug/l	5	U				
Methyl tert-butyl ether	ug/L						
1,2,4-Trichlorobenzene	ug/L	5	U			10	U
Chloromethane	ug/L	2.2	J	5	U		
Vinyl chloride	ug/L	10	U	5	U		
Bromomethane	ug/L	10	UJ	5	U		
Chloroethane	ug/L	10	U	5	U		
1,1-Dichloroethene	ug/L	5	U	5	U		
Acetone	ug/L	10	U	2	J		
Carbon Disulfide	ug/L	5	U	5	U		
Methylene Chloride	ug/l	5	U	5	U		
trans-1,2-Dichloroethene	ug/L	5	U				
1,1-Dichloroethane	ug/L	5	U	5	U		
Vinyl acetate	ug/L	10	U	5	U		
Methyl ethyl ketone (2-Butanone)	ug/L	10	U	5	U		
cis-1,2-Dichloroethylene	ug/l	5	U				
1,2-Dichloroethene (total)	ug/L	5	U	5	U		
Chloroform	ug/L	5	U	5	U		
1,1,1-Trichloroethane	ug/L	5	U	5	U		
Carbon Tetrachloride	ug/l	5	U	5	U		
1,2-Dichloroethane	ug/L	5	U	5	U		
Benzene	ug/l	5	U	5	U		
Trichloroethylene (TCE)	ug/L	5	U	5	U		
1,2-Dichloropropane	ug/L	5	U	5	U		
Bromodichloromethane	ug/L	5	U	5	U		
2-Chloroethyl vinyl ether	ug/L	10	UJ	5	U		
cis-1,3-Dichloropropene	ug/L	5	U	5	U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U	5	U		
Toluene	ug/L	5	U	5	U		
trans-1,3-Dichloropropene	ug/L	5	U	5	U		

StationID	G008GW005		G008GW006		G008GW006	
SampleID	008GW005M6		008GW00604		008GW00604	
DateCollected	06/21/2002		12/09/1997		12/09/1997	
DateExtracted	06/27/2002				12/11/1997	
DateAnalyzed	06/27/2002		12/22/1997		12/19/1997	
SDGNumber	CNC118		32103		32103	
Parameter	Units					
m-Xylene	ug/l	5	U			
Methyl tert-butyl ether	ug/L					
1,2,4-Trichlorobenzene	ug/L	5	U		10	U
Chloromethane	ug/L	10	U	5	U	
Vinyl chloride	ug/L	10	U	5	U	
Bromomethane	ug/L	10	UJ	5	U	
Chloroethane	ug/L	10	U	5	U	
1,1-Dichloroethene	ug/L	5	U	5	U	
Acetone	ug/L	10	U	9	U	
Carbon Disulfide	ug/L	5	U	5	U	
Methylene Chloride	ug/l	5	U	5	U	
trans-1,2-Dichloroethene	ug/L	5	U			
1,1-Dichloroethane	ug/L	5	U	5	U	
Vinyl acetate	ug/L	10	U	5	U	
Methyl ethyl ketone (2-Butanone)	ug/L	10	U	5	UJ	
cis-1,2-Dichloroethylene	ug/l	5	U			
1,2-Dichloroethene (total)	ug/L	5	U	5	U	
Chloroform	ug/L	5	U	5	U	
1,1,1-Trichloroethane	ug/L	5	U	5	U	
Carbon Tetrachloride	ug/l	5	U	5	U	
1,2-Dichloroethane	ug/L	5	U	5	U	
Benzene	ug/l	5	U	5	U	
Trichloroethylene (TCE)	ug/L	5	U	5	U	
1,2-Dichloropropane	ug/L	5	U	5	U	
Bromodichloromethane	ug/L	5	U	5	U	
2-Chloroethyl vinyl ether	ug/L	10	U	5	U	
cis-1,3-Dichloropropene	ug/L	5	U	5	U	
Methyl isobutyl ketone (4-Methyl-2-p	ug/L	10	U	5	U	
Toluene	ug/L	5	U	5	U	
trans-1,3-Dichloropropene	ug/L	5	U	5	U	

StationID	G008GW04D	G636GW001		G636GW001	
SampleID	008GW04DM7	636GW00101a		636GW00104	
DateCollected	08/22/2002	03/11/1998		12/11/1997	
DateExtracted	08/28/2002				
DateAnalyzed	08/28/2002			12/17/1997	
SDGNumber	CNC142	MNA		32103	
Parameter	Units				
m-Xylene	ug/l				
Methyl tert-butyl ether	ug/L				
1,2,4-Trichlorobenzene	ug/L	5	U		
Chloromethane	ug/L	10	U	5	SU
Vinyl chloride	ug/L	10	U	5	SU
Bromomethane	ug/L	10	U	5	SU
Chloroethane	ug/L	10	UJ	5	SU
1,1-Dichloroethene	ug/L	5	U	5	SU
Acetone	ug/L	10	UJ	5	SU
Carbon Disulfide	ug/L	5	U	5	SU
Methylene Chloride	ug/l	5	U	5	SU
trans-1,2-Dichloroethene	ug/L	5	U		
1,1-Dichloroethane	ug/L	5	U	5	SU
Vinyl acetate	ug/L	10	U	5	SU
Methyl ethyl ketone (2-Butanone)	ug/L	10	U	5	SU
cis-1,2-Dichloroethylene	ug/l	5	U		
1,2-Dichloroethene (total)	ug/L	5	U	5	SU
Chloroform	ug/L	5	U	5	SU
1,1,1-Trichloroethane	ug/L	5	U	5	SU
Carbon Tetrachloride	ug/l	5	U	5	SU
1,2-Dichloroethane	ug/L	5	U	5	SU
Benzene	ug/l	5	U	5	SU
Trichloroethylene (TCE)	ug/L	5	U	5	SU
1,2-Dichloropropane	ug/L	5	U	5	SU
Bromodichloromethane	ug/L	5	U	5	SU
2-Chloroethyl vinyl ether	ug/L	10	U	5	SU
cis-1,3-Dichloropropene	ug/L	5	U	5	SU
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U	5	SU
Toluene	ug/L	5	U	5	SU
trans-1,3-Dichloropropene	ug/L	5	U	5	SU

StationID	G636GW001	G636GW001	GFDSWG02A
SampleID	636GW00104	636GW001M6	FDSGW02ALA
DateCollected	12/11/1997	06/20/2002	6/13/2001
DateExtracted	12/13/1997	06/26/2002	6/23/2001
DateAnalyzed	12/19/1997	06/26/2002	6/23/2001
SDGNumber	32103	CNC118	44131

Parameter	Units				
m-Xylene	ug/l			5	U
Methyl tert-butyl ether	ug/L				
1,2,4-Trichlorobenzene	ug/L	10	U	5	U
Chloromethane	ug/L			2.7	J
Vinyl chloride	ug/L			10	U
Bromomethane	ug/L			10	UJ
Chloroethane	ug/L			10	U
1,1-Dichloroethene	ug/L			5	U
Acetone	ug/L			15	J
Carbon Disulfide	ug/L			5	U
Methylene Chloride	ug/l			5	U
trans-1,2-Dichloroethene	ug/L			5	U
1,1-Dichloroethane	ug/L			5	U
Vinyl acetate	ug/L			10	U
Methyl ethyl ketone (2-Butanone)	ug/L			10	U
cis-1,2-Dichloroethylene	ug/l			5	U
1,2-Dichloroethene (total)	ug/L			5	U
Chloroform	ug/L			1.3	J
1,1,1-Trichloroethane	ug/L			5	U
Carbon Tetrachloride	ug/l			5	U
1,2-Dichloroethane	ug/L			5	U
Benzene	ug/l			5	U
Trichloroethylene (TCE)	ug/L			5	U
1,2-Dichloropropane	ug/L			5	U
Bromodichloromethane	ug/L			5	U
2-Chloroethyl vinyl ether	ug/L			10	UJ
cis-1,3-Dichloropropene	ug/L			5	U
Methyl isobutyl ketone (4-Methyl-2-p	ug/L			10	U
Toluene	ug/L			5	U
trans-1,3-Dichloropropene	ug/L			5	U

StationID	GFD SGW02D
SampleID	FDS GW02D01
DateCollected	3/3/1999
DateExtracted	
DateAnalyzed	
SDGNumber	37602

Parameter	Units	
m-Xylene	ug/l	
Methyl tert-butyl ether	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	5 U
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	5 U
trans-1,3-Dichloropropene	ug/L	

	StationID	G008GSP01		G008GSP01		G008GSP02		G008GSP02	
	SampleID	008GSP0101a		008GSP0101a		008GSP0201a		008GSP0201a	
	DateCollected	08/03/1999		08/03/1999		08/03/1999		08/03/1999	
	DateExtracted			08/05/1999				08/05/1999	
	DateAnalyzed	08/05/1999		08/20/1999		08/05/1999		08/20/1999	
	SDGNumber	39785		39785		39785		39785	
Parameter	Units								
1,1,2-Trichloroethane	ug/L	5	U			5	U		
2-Hexanone	ug/L	5	U			5	U		
Tetrachloroethylene (PCE)	ug/L	1	J			5	U		
Dibromochloromethane	ug/L	5	U			5	U		
Chlorobenzene	ug/L	5	U			5	U		
Ethylbenzene	ug/L	5	U			5	U		
m+p Xylene	ug/l								
o-Xylene	ug/l								
Xylenes, Total	ug/L	5	U			5	U		
Styrene	ug/L	5	U			5	U		
Bromoform	ug/L	5	U			5	U		
1,1,2,2-Tetrachloroethane	ug/L	5	U			5	U		
1,3-Dichlorobenzene	ug/l								
1,4-Dichlorobenzene	ug/l								
1,2-Dichlorobenzene	ug/l								
1,2,3-Trichlorobenzene	ug/l								
Naphthalene	ug/L								

	StationID	G008GSP03		G008GSP03		G008GSP04	
	SampleID	008GSP0301b		008GSP0301b		008GSP0401b	
	DateCollected	08/03/1999		08/03/1999		08/03/1999	
	DateExtracted			08/05/1999			
	DateAnalyzed	08/05/1999		08/20/1999		08/05/1999	
	SDGNumber	39785		39785		39785	
Parameter	Units						
1,1,2-Trichloroethane	ug/L	5	U			5	U
2-Hexanone	ug/L	5	U			5	U
Tetrachloroethylene (PCE)	ug/L	5	U			5	U
Dibromochloromethane	ug/L	5	U			5	U
Chlorobenzene	ug/L	5	U			5	U
Ethylbenzene	ug/L	5	U			5	U
m+p Xylene	ug/l						
o-Xylene	ug/l						
Xylenes, Total	ug/L	5	U			5	U
Styrene	ug/L	5	U			5	U
Bromoform	ug/L	5	U			5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U			5	U
1,3-Dichlorobenzene	ug/l						
1,4-Dichlorobenzene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,2,3-Trichlorobenzene	ug/l						
Naphthalene	ug/L						

	StationID	G008GSP04	G008GSP05	G008GSP05	G008GSP06	
	SampleID	008GSP0401b	008GSP0501a	008GSP0501a	008GSP0601	
	DateCollected	08/03/1999	08/03/1999	08/03/1999	08/04/1999	
	DateExtracted	08/05/1999		08/05/1999		
	DateAnalyzed	08/20/1999	08/05/1999	08/20/1999	08/09/1999	
	SDGNumber	39785	39785	39785	39825	
Parameter	Units					
1,1,2-Trichloroethane	ug/L		5	U	5	U
2-Hexanone	ug/L		5	U	5	U
Tetrachloroethylene (PCE)	ug/L		5	U	5	U
Dibromochloromethane	ug/L		5	U	5	U
Chlorobenzene	ug/L		5	U	5	U
Ethylbenzene	ug/L		5	U	5	U
m+p Xylene	ug/l					
o-Xylene	ug/l					
Xylenes, Total	ug/L		5	U	2	J
Styrene	ug/L		5	U	5	U
Bromoform	ug/L		5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L		5	U	5	U
1,3-Dichlorobenzene	ug/l					
1,4-Dichlorobenzene	ug/l					
1,2-Dichlorobenzene	ug/l					
1,2,3-Trichlorobenzene	ug/l					
Naphthalene	ug/L					

	StationID	G008GSP06	G008GSP06	G008GSP07
	SampleID	008GSP0601	008GSP0601RE	008GSP0701
	DateCollected	08/04/1999	08/04/1999	08/04/1999
	DateExtracted	08/06/1999	08/23/1999	
	DateAnalyzed	08/24/1999	08/25/1999	08/09/1999
	SDGNumber	39825	39825	39825
Parameter	Units			
1,1,2-Trichloroethane	ug/L			5 U
2-Hexanone	ug/L			5 U
Tetrachloroethylene (PCE)	ug/L			5 U
Dibromochloromethane	ug/L			5 U
Chlorobenzene	ug/L			5 U
Ethylbenzene	ug/L			5 U
m+p Xylene	ug/l			
o-Xylene	ug/l			
Xylenes, Total	ug/L			5 U
Styrene	ug/L			5 U
Bromoform	ug/L			5 U
1,1,2,2-Tetrachloroethane	ug/L			5 U
1,3-Dichlorobenzene	ug/l			
1,4-Dichlorobenzene	ug/l			
1,2-Dichlorobenzene	ug/l			
1,2,3-Trichlorobenzene	ug/l			
Naphthalene	ug/L			

StationID	G008GSP07	G008GSP08	G008GSP08	G008GSP09
SampleID	008GSP0701	008GSP0801	008GSP0801	008GSP0901
DateCollected	08/04/1999	08/04/1999	08/04/1999	08/04/1999
DateExtracted	08/06/1999		08/06/1999	
DateAnalyzed	08/24/1999	08/09/1999	08/24/1999	08/09/1999
SDGNumber	39825	39825	39825	39825
Parameter	Units			
1,1,2-Trichloroethane	ug/L	5	U	5
2-Hexanone	ug/L	5	U	5
Tetrachloroethylene (PCE)	ug/L	5	U	5
Dibromochloromethane	ug/L	5	U	5
Chlorobenzene	ug/L	5	U	5
Ethylbenzene	ug/L	5	U	5
m+p Xylene	ug/l			
o-Xylene	ug/l			
Xylenes, Total	ug/L	5	U	5
Styrene	ug/L	5	U	5
Bromoform	ug/L	5	U	5
1,1,2,2-Tetrachloroethane	ug/L	5	U	5
1,3-Dichlorobenzene	ug/l			
1,4-Dichlorobenzene	ug/l			
1,2-Dichlorobenzene	ug/l			
1,2,3-Trichlorobenzene	ug/l			
Naphthalene	ug/L			

	StationID	G008GSP09	G008GSP10	G008GSP10	G008GSP11	
	SampleID	008GSP0901	008GSP1001	008GSP1001	008GSP1101	
	DateCollected	08/04/1999	08/05/1999	08/05/1999	08/05/1999	
	DateExtracted	08/06/1999		08/07/1999		
	DateAnalyzed	08/24/1999	08/09/1999	08/26/1999	08/09/1999	
	SDGNumber	39825	39843	39843	39843	
Parameter	Units					
1,1,2-Trichloroethane	ug/L		5	U	5	U
2-Hexanone	ug/L		5	U	5	U
Tetrachloroethylene (PCE)	ug/L		5	U	5	U
Dibromochloromethane	ug/L		5	U	5	U
Chlorobenzene	ug/L		5	U	5	U
Ethylbenzene	ug/L		5	U	5	U
m+p Xylene	ug/l					
o-Xylene	ug/l					
Xylenes, Total	ug/L		5	U	5	U
Styrene	ug/L		5	U	5	U
Bromoform	ug/L		5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L		5	U	5	U
1,3-Dichlorobenzene	ug/l					
1,4-Dichlorobenzene	ug/l					
1,2-Dichlorobenzene	ug/l					
1,2,3-Trichlorobenzene	ug/l					
Naphthalene	ug/L					

StationID	G008GSP11	G008GSP12	G008GSP12	G008GSP13	
SampleID	008GSP1101	008GSP1201	008GSP1201	008GSP1301	
DateCollected	08/05/1999	08/05/1999	08/05/1999	08/05/1999	
DateExtracted	08/07/1999		08/07/1999		
DateAnalyzed	08/31/1999	08/09/1999	08/31/1999	08/09/1999	
SDGNumber	39843	39843	39843	39843	
Parameter	Units				
1,1,2-Trichloroethane	ug/L	5	U	5	U
2-Hexanone	ug/L	5	U	5	U
Tetrachloroethylene (PCE)	ug/L	5	U	5	U
Dibromochloromethane	ug/L	5	U	5	U
Chlorobenzene	ug/L	5	U	5	U
Ethylbenzene	ug/L	5	U	5	U
m+p Xylene	ug/l				
o-Xylene	ug/l				
Xylenes, Total	ug/L	5	U	5	U
Styrene	ug/L	5	U	5	U
Bromoform	ug/L	5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U	5	U
1,3-Dichlorobenzene	ug/l				
1,4-Dichlorobenzene	ug/l				
1,2-Dichlorobenzene	ug/l				
1,2,3-Trichlorobenzene	ug/l				
Naphthalene	ug/L				

	StationID	G008GSP13	G008GSP14	G008GSP14
	SampleID	008GSP1301	008GSP1401	008GSP1401
	DateCollected	08/05/1999	08/05/1999	08/05/1999
	DateExtracted	08/07/1999		08/07/1999
	DateAnalyzed	08/31/1999	08/09/1999	08/26/1999
	SDGNumber	39843	39843	39843
Parameter	Units			
1,1,2-Trichloroethane	ug/L		5	U
2-Hexanone	ug/L		5	U
Tetrachloroethylene (PCE)	ug/L		5	U
Dibromochloromethane	ug/L		5	U
Chlorobenzene	ug/L		5	U
Ethylbenzene	ug/L		5	U
m+p Xylene	ug/l			
o-Xylene	ug/l			
Xylenes, Total	ug/L		5	U
Styrene	ug/L		5	U
Bromoform	ug/L		5	U
1,1,2,2-Tetrachloroethane	ug/L		5	U
1,3-Dichlorobenzene	ug/l			
1,4-Dichlorobenzene	ug/l			
1,2-Dichlorobenzene	ug/l			
1,2,3-Trichlorobenzene	ug/l			
Naphthalene	ug/L			

	StationID	G008GSP15		G008GSP15		G008GSP16	
	SampleID	008GSP1501		008GSP1501		008GSP1601	
	DateCollected	08/05/1999		08/05/1999		08/05/1999	
	DateExtracted			08/07/1999			
	DateAnalyzed	08/09/1999		08/26/1999		08/09/1999	
	SDGNumber	39843		39843		39843	
Parameter	Units						
1,1,2-Trichloroethane	ug/L	5	U			5	U
2-Hexanone	ug/L	5	U			5	U
Tetrachloroethylene (PCE)	ug/L	5	U			5	U
Dibromochloromethane	ug/L	5	U			5	U
Chlorobenzene	ug/L	5	U			5	U
Ethylbenzene	ug/L	5	U			5	U
m+p Xylene	ug/l						
o-Xylene	ug/l						
Xylenes, Total	ug/L	5	U			5	U
Styrene	ug/L	5	U			5	U
Bromoform	ug/L	5	U			5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U			5	U
1,3-Dichlorobenzene	ug/l						
1,4-Dichlorobenzene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,2,3-Trichlorobenzene	ug/l						
Naphthalene	ug/L						

	StationID	G008GSP16	G008GSP17	G008GSP17
	SampleID	008GSP1601	008GSP1701	008GSP1701
	DateCollected	08/05/1999	08/05/1999	08/05/1999
	DateExtracted	08/07/1999		08/07/1999
	DateAnalyzed	08/26/1999	08/09/1999	08/26/1999
	SDGNumber	39843	39843	39843
Parameter	Units			
1,1,2-Trichloroethane	ug/L		5	U
2-Hexanone	ug/L		5	U
Tetrachloroethylene (PCE)	ug/L		5	U
Dibromochloromethane	ug/L		5	U
Chlorobenzene	ug/L		5	U
Ethylbenzene	ug/L		5	U
m+p Xylene	ug/l			
o-Xylene	ug/l			
Xylenes, Total	ug/L		5	U
Styrene	ug/L		5	U
Bromoform	ug/L		5	U
1,1,2,2-Tetrachloroethane	ug/L		5	U
1,3-Dichlorobenzene	ug/l			
1,4-Dichlorobenzene	ug/l			
1,2-Dichlorobenzene	ug/l			
1,2,3-Trichlorobenzene	ug/l			
Naphthalene	ug/L			

	StationID	G008GSP17	G008GSP18	G008GSP18
	SampleID	008GSP1701RE	008GSP1801	008GSP1801
	DateCollected	08/05/1999	08/05/1999	08/05/1999
	DateExtracted	09/01/1999		08/07/1999
	DateAnalyzed	09/02/1999	08/09/1999	08/26/1999
	SDGNumber	39843	39843	39843
Parameter	Units			
1,1,2-Trichloroethane	ug/L		5	U
2-Hexanone	ug/L		5	U
Tetrachloroethylene (PCE)	ug/L		5	U
Dibromochloromethane	ug/L		5	U
Chlorobenzene	ug/L		5	U
Ethylbenzene	ug/L		5	U
m+p Xylene	ug/l			
o-Xylene	ug/l			
Xylenes, Total	ug/L		5	U
Styrene	ug/L		5	U
Bromoform	ug/L		5	U
1,1,2,2-Tetrachloroethane	ug/L		5	U
1,3-Dichlorobenzene	ug/l			
1,4-Dichlorobenzene	ug/l			
1,2-Dichlorobenzene	ug/l			
1,2,3-Trichlorobenzene	ug/l			
Naphthalene	ug/L			

	StationID	G008GW001		G008GW001		G008GW001	
	SampleID	008G000110		008GW00104		008GW00104	
	DateCollected	07/19/2000		12/08/1997		12/08/1997	
	DateExtracted	07/30/2000				12/09/1997	
	DateAnalyzed	07/30/2000		12/09/1997		12/12/1997	
	SDGNumber	CNC04		32103		32103	
Parameter	Units						
1,1,2-Trichloroethane	ug/L	5	U	5	U		
2-Hexanone	ug/L	10	U	5	U		
Tetrachloroethylene (PCE)	ug/L	5	U	5	U		
Dibromochloromethane	ug/L	5	U	5	U		
Chlorobenzene	ug/L	5	U	5	U		
Ethylbenzene	ug/L	5	U	5	U		
m+p Xylene	ug/l						
o-Xylene	ug/l						
Xylenes, Total	ug/L	5	U	5	U		
Styrene	ug/L	5	U	5	U		
Bromoform	ug/L	5	UJ	5	U		
1,1,2,2-Tetrachloroethane	ug/L	5	UJ	5	U		
1,3-Dichlorobenzene	ug/l						
1,4-Dichlorobenzene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,2,3-Trichlorobenzene	ug/l						
Naphthalene	ug/L						

	StationID	G008GW001		G008GW001		G008GW002	
	SampleID	008GW001M6		008H000110		008GW00202a	
	DateCollected	06/21/2002		07/19/2000		09/27/1998	
	DateExtracted	06/27/2002		07/30/2000			
	DateAnalyzed	06/27/2002		07/30/2000			
	SDGNumber	CNC118		CNC04		MNA	
Parameter	Units						
1,1,2-Trichloroethane	ug/L	5	U	5	U	5	SU
2-Hexanone	ug/L	10	U	10	U	5	SU
Tetrachloroethylene (PCE)	ug/L	5	U	5	U	5	SU
Dibromochloromethane	ug/L	5	U	5	U	5	SU
Chlorobenzene	ug/L	5	U	5	U	5	SU
Ethylbenzene	ug/L	5	U	5	U	5	SU
m+p Xylene	ug/l						
o-Xylene	ug/l	5	U				
Xylenes, Total	ug/L	5	U	5	U	5	SU
Styrene	ug/L	5	U	5	U	5	SU
Bromoform	ug/L	5	U	5	UJ	5	SU
1,1,2,2-Tetrachloroethane	ug/L	5	U	5	UJ	5	SU
1,3-Dichlorobenzene	ug/l	5	U				
1,4-Dichlorobenzene	ug/l	5	U				
1,2-Dichlorobenzene	ug/l	5	U				
1,2,3-Trichlorobenzene	ug/l	5	U				
Naphthalene	ug/L						

	StationID	G008GW002		G008GW002		G008GW003	
	SampleID	008GW00204		008GW00204		008GW00304	
	DateCollected	12/09/1997		12/09/1997		12/11/1997	
	DateExtracted			12/11/1997			
	DateAnalyzed	12/22/1997		12/19/1997		12/17/1997	
	SDGNumber	32103		32103		32103	
Parameter	Units						
1,1,2-Trichloroethane	ug/L	5	U			5	U
2-Hexanone	ug/L	5	UJ			5	U
Tetrachloroethylene (PCE)	ug/L	5	U			5	U
Dibromochloromethane	ug/L	5	U			5	U
Chlorobenzene	ug/L	5	U			5	U
Ethylbenzene	ug/L	2	J			5	U
m+p Xylene	ug/l						
o-Xylene	ug/l						
Xylenes, Total	ug/L	2	J			5	U
Styrene	ug/L	5	U			5	U
Bromoform	ug/L	5	U			5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U			5	U
1,3-Dichlorobenzene	ug/l						
1,4-Dichlorobenzene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,2,3-Trichlorobenzene	ug/l						
Naphthalene	ug/L						

StationID	G008GW003	G008GW004	G008GW004
SampleID	008GW00304	008GW00404	008GW00404
DateCollected	12/11/1997	12/09/1997	12/09/1997
DateExtracted	12/13/1997		12/11/1997
DateAnalyzed	12/19/1997	12/22/1997	12/19/1997
SDGNumber	32103	32103	32103
Parameter	Units		
1,1,2-Trichloroethane	ug/L	5	U
2-Hexanone	ug/L	5	UJ
Tetrachloroethylene (PCE)	ug/L	5	U
Dibromochloromethane	ug/L	5	U
Chlorobenzene	ug/L	5	U
Ethylbenzene	ug/L	5	U
m+p Xylene	ug/l		
o-Xylene	ug/l		
Xylenes, Total	ug/L	5	R
Styrene	ug/L	5	U
Bromoform	ug/L	5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U
1,3-Dichlorobenzene	ug/l		
1,4-Dichlorobenzene	ug/l		
1,2-Dichlorobenzene	ug/l		
1,2,3-Trichlorobenzene	ug/l		
Naphthalene	ug/L		

	StationID	G008GW004		G008GW005		G008GW005	
	SampleID	008GW004M6		008GW00504		008GW00504	
	DateCollected	06/20/2002		12/08/1997		12/08/1997	
	DateExtracted	06/26/2002				12/09/1997	
	DateAnalyzed	06/26/2002		12/09/1997		12/12/1997	
	SDGNumber	CNC118		32103		32103	
Parameter	Units						
1,1,2-Trichloroethane	ug/L	5	U	5	U		
2-Hexanone	ug/L	10	U	5	U		
Tetrachloroethylene (PCE)	ug/L	5	U	5	U		
Dibromochloromethane	ug/L	5	U	5	U		
Chlorobenzene	ug/L	5	U	5	U		
Ethylbenzene	ug/L	5	U	5	U		
m+p Xylene	ug/l						
o-Xylene	ug/l	5	U				
Xylenes, Total	ug/L	5	U	5	U		
Styrene	ug/L	5	U	5	U		
Bromoform	ug/L	5	U	5	U		
1,1,2,2-Tetrachloroethane	ug/L	5	U	5	U		
1,3-Dichlorobenzene	ug/l	5	U				
1,4-Dichlorobenzene	ug/l	5	U				
1,2-Dichlorobenzene	ug/l	5	U				
1,2,3-Trichlorobenzene	ug/l	5	U				
Naphthalene	ug/L						

StationID	G008GW005		G008GW006		G008GW006	
SampleID	008GW005M6		008GW00604		008GW00604	
DateCollected	06/21/2002		12/09/1997		12/09/1997	
DateExtracted	06/27/2002				12/11/1997	
DateAnalyzed	06/27/2002		12/22/1997		12/19/1997	
SDGNumber	CNC118		32103		32103	
Parameter	Units					
1,1,2-Trichloroethane	ug/L	5	U	5	U	
2-Hexanone	ug/L	10	U	5	UJ	
Tetrachloroethylene (PCE)	ug/L	5	U	5	U	
Dibromochloromethane	ug/L	5	U	5	U	
Chlorobenzene	ug/L	5	U	5	U	
Ethylbenzene	ug/L	5	U	5	U	
m+p Xylene	ug/l					
o-Xylene	ug/l	5	U			
Xylenes, Total	ug/L	5	U	5	R	
Styrene	ug/L	5	U	5	U	
Bromoform	ug/L	5	U	5	U	
1,1,2,2-Tetrachloroethane	ug/L	5	U	5	U	
1,3-Dichlorobenzene	ug/l	5	U			
1,4-Dichlorobenzene	ug/l	5	U			
1,2-Dichlorobenzene	ug/l	5	U			
1,2,3-Trichlorobenzene	ug/l	5	U			
Naphthalene	ug/L					

	StationID	G008GW04D		G636GW001		G636GW001	
	SampleID	008GW04DM7		636GW00101a		636GW00104	
	DateCollected	08/22/2002		03/11/1998		12/11/1997	
	DateExtracted	08/28/2002					
	DateAnalyzed	08/28/2002				12/17/1997	
	SDGNumber	CNC142		MNA		32103	
Parameter	Units						
1,1,2-Trichloroethane	ug/L	5	U	5	SU	5	U
2-Hexanone	ug/L	10	U	5	SU	5	U
Tetrachloroethylene (PCE)	ug/L	5	U	5	SU	5	U
Dibromochloromethane	ug/L	5	U	5	SU	5	U
Chlorobenzene	ug/L	5	U	5	SU	5	U
Ethylbenzene	ug/L	5	U	5	SU	5	U
m+p Xylene	ug/l	5	U				
o-Xylene	ug/l	5	U				
Xylenes, Total	ug/L	5	U	3	SJ	5	U
Styrene	ug/L	5	U	5	SU	5	U
Bromoform	ug/L	5	U	5	SU	5	U
1,1,2,2-Tetrachloroethane	ug/L	5	U	5	SU	5	U
1,3-Dichlorobenzene	ug/l	5	U				
1,4-Dichlorobenzene	ug/l	5	U				
1,2-Dichlorobenzene	ug/l	5	U				
1,2,3-Trichlorobenzene	ug/l	5	U				
Naphthalene	ug/L						

	StationID	G636GW001	G636GW001	GFDSGW02A	
	SampleID	636GW00104	636GW001M6	FDSGW02ALA	
	DateCollected	12/11/1997	06/20/2002	6/13/2001	
	DateExtracted	12/13/1997	06/26/2002	6/23/2001	
	DateAnalyzed	12/19/1997	06/26/2002	6/23/2001	
	SDGNumber	32103	CNC118	44131	
Parameter	Units				
1,1,2-Trichloroethane	ug/L		5	U	
2-Hexanone	ug/L		10	U	
Tetrachloroethylene (PCE)	ug/L		5	U	
Dibromochloromethane	ug/L		5	U	
Chlorobenzene	ug/L		0.78	J	
Ethylbenzene	ug/L		5	U	5 U
m+p Xylene	ug/l				5 U
o-Xylene	ug/l		5	U	5 U
Xylenes, Total	ug/L		5	U	5 U
Styrene	ug/L		5	U	
Bromoform	ug/L		5	U	
1,1,2,2-Tetrachloroethane	ug/L		5	U	
1,3-Dichlorobenzene	ug/l		5	U	
1,4-Dichlorobenzene	ug/l		0.67	J	
1,2-Dichlorobenzene	ug/l		5	U	
1,2,3-Trichlorobenzene	ug/l		5	U	
Naphthalene	ug/L				5 UJ

StationID	GFDSGW02D
SampleID	FDSGW02D01
DateCollected	3/3/1999
DateExtracted	
DateAnalyzed	
SDGNumber	37602

Parameter	Units	
1,1,2-Trichloroethane	ug/L	
2-Hexanone	ug/L	
Tetrachloroethylene (PCE)	ug/L	
Dibromochloromethane	ug/L	
Chlorobenzene	ug/L	
Ethylbenzene	ug/L	5 U
m+p Xylene	ug/l	
o-Xylene	ug/l	
Xylenes, Total	ug/L	5 U
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	
1,2,3-Trichlorobenzene	ug/l	
Naphthalene	ug/L	10 U

Analytical Data Summary

11/11/2002 4:02 PM

StationID	G008GSP04	G008GSP11	G008GSP11
SampleID	008GSP04M1	008GSP11M1	008GSP11M1
DateCollected	03/29/2002	03/29/2002	03/29/2002
DateExtracted	04/02/2002	04/02/2002	05/07/2002
DateAnalyzed	04/02/2002	04/02/2002	05/09/2002
SDGNumber	CNC87	CNC87	CNC87A
Parameter	Units		
Hydrazine	mg/kg	7.9	= 2 S 0.1 UJ

Analytical Data Summary

11/11/2002 4:02 PM

		G008GSP04		G008GSP11	
		008GSP04M1		008GSP11M1	
		03/29/2002		03/29/2002	
		04/02/2002		04/02/2002	
		04/04/2002		04/04/2002	
		CNC87		CNC87	
Parameter	Units				
PCB-1016 (Arochlor 1016)	mg/kg	1	U	1	U
PCB-1221 (Arochlor 1221)	mg/kg	2	U	2	U
PCB-1232 (Arochlor 1232)	mg/kg	1	U	1	U
PCB-1242 (Arochlor 1242)	mg/kg	1	U	1	U
PCB-1248 (Arochlor 1248)	mg/kg	1	U	1	U
PCB-1254 (Arochlor 1254)	mg/kg	1	U	1	U
PCB-1260 (Arochlor 1260)	mg/kg	7.7	J	4.2	J

Analytical Data Summary

11/11/2004 4:02 PM

StationID	G008GSP04	G008GSP04	G008GSP04	G008GSP04			
SampleID	008GSP04M1	008GSP04M1	008GSP04M1	008GSP04M1			
DateCollected	03/29/2002	03/29/2002	03/29/2002	03/29/2002			
DateExtracted	04/02/2002	04/02/2002	04/05/2002	04/02/2002			
DateAnalyzed	04/03/2002	04/08/2002	04/05/2002	04/03/2002			
SDGNumber	CNC87	CNC87	CNC87	CNC87			
Parameter	Units						
Hydrocarbons as Heavy Oil	mg/kg		260000	=			
Hydrocarbons as DRO (Diesel)	mg/kg	300000	=	350000	=		220000
Hydrocarbons as GRO (Gasoline)	mg/kg					220	=
Kerosene	mg/kg		30000	U			
Mineral Spirits	mg/kg		30000	U			
V M & P Naphtha	mg/kg		30000	U			

Analytical Data Summary

11/11/2002 4:02 PM

StationID	BSP11	G008GSP11	G008GSP11
SampleID	P11M1	008GSP11M1	008GSP11M1
DateCollected	/2002	03/29/2002	03/29/2002
DateExtracted	/2002	04/02/2002	04/05/2002
DateAnalyzed	/2002	04/08/2002	04/05/2002
SDGNumber	C87	CNC87	CNC87

Parameter	Units				
Hydrocabons as Heavy Oil	mg/kg		200000	=	
Hydrocabons as DRO (Diesel)	mg/kg	=	250000	=	
Hydrocabons as GRO (Gasoline)	mg/kg				100 U
Kerosene	mg/kg		30000	U	
Mineral Spirits	mg/kg		30000	U	
V M & P Naphtha	mg/kg		30000	U	

Appendix E

Data Validation Summary - Charleston Naval Complex - Zone G, SWMU 8, AOC 636

TO: Casey Hudson/CH2M HILL/ORL

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

DATE: October 22, 2002

The purpose of this memorandum is to present the results of the data validation process for the samples collected in Zone G, SWMU 8, AOC 636. The samples were collected between the dates of July 19, 2000 and August 22, 2002.

The specific samples and analytical fractions reviewed are summarized below in Table 1 and Table 2.

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 1994) and *National Functional Guidelines for Organic Data Review* (EPA 1999). Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for the following analyses: SW-846 8260 Volatile Organic Compounds (VOC), SW-846 8270 Semivolatile Organic Compounds (SVOC), and EPA method 150.1 pH.

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), SW-846 8081 Organochlorine Pesticides, SW-846 8082 Polychlorinated Biphenyls, SW-846 8100 Fuel Fingerprinting by GC/FID, SW-846 8015 TPH Gasoline/Diesel (GRO/DRO), Metals following SW-846 6010/7000 Series methodology, and ASTM D1385 Hydrazine.

Samples were submitted to CH2M Hill Applied Sciences Laboratory, in Corvallis, Oregon, for the following analyses: ASTM D1385 Hydrazine.

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
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 – Organic Analyses

TABLE 1
Field and Quality Control Samples – Organic Analyses
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	Date Collected	VOC SW8260	SVOC SW8270	Pesticides SW8081	PCBs SW8082	Fuel Fingerprinting by GC/FID SW8100	TPH GRO SW8015	TPH DRO SW8015
44131	GFDSGW02A	FDSGW02ALA	44131001	WG	N				06/13/01	X	X					
44131	FIELDQC	FDSEW06BLA	44131005	WQ	EB				06/14/01	X	X					
44131	FIELDQC	FDSTW06BLA	44131006	WG	TB				06/13/01	X						
44131	LABQC	1200021612	1200021612	WQ	LB						X					
44131	LABQC	1200021615	1200021615	WQ	BS						X					
44131	LABQC	1200025313	1200025313	WQ	LB					X						
44131	LABQC	1200025316	1200025316	WQ	BS					X						
CNC04	G008GW001	008G000110	S004816A*1	WG	N				07/19/00	X	X	X	X			
CNC04	G008GW001	008G000110RE	S004816A*1*RE	WG	LR	RE			07/19/00			X	X			
CNC04	G008GW001	008H000110	S004816A*2	WG	FD				07/19/00	X	X	X	X			
CNC04	G008GW001	008H000110RE	S004816A*2*RE	WG	LR	RE			07/19/00			X	X			
CNC04	FIELDQC	008F000110	S004816A*3	WQ	FB				07/19/00	X	X	X	X			
CNC04	FIELDQC	008E000110	S004816A*4	WQ	EB				07/19/00	X	X	X	X			
CNC04	FIELDQC	008T000110	S004816A*5	WQ	TB				07/19/00	X						
CNC04	LABQC	04816A6LB	S004816A*6	WQ	LB					X	X	X	X			
CNC04	LABQC	04816A7BS	S004816A*7	WQ	BS					X	X	X	X			
CNC04	LABQC	04816A9LB	S004816A*9	WQ	LB					X		X	X			

TABLE 1
 Field and Quality Control Samples – Organic Analyses
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

SDG	Station ID	Sample ID	Lab Sample ID	Mix	Sample Type	LR Type	Upper Depth	Lower Depth	Date Collected	VOC SW8260	SVOC SW8270	Pesticides SW8081	PCBs SW8082	Fuel Fingerprinting by GC/FID SW8100	TRH GRO SW8015	TPH DRO SW8015
CNC04	LABQC	04816A10BS	S004816A*10	WQ	BS					X		X	X			
CNC25	G636SB028	636SB02802	S114423*6	SO	N		3	5	07/12/01	X						
CNC25	FIELDQC	636EA001LA	S114423*7	SQ	EB				07/12/01	X						
CNC25	LABQC	1442310LB	S114423*10	WQ	LB					X						
CNC25	LABQC	1442311BS	S114423*11	WQ	BS					X						
CNC25	LABQC	1442317LB	S114423*17	SQ	LB					X						
CNC25	LABQC	1442318BS	S114423*18	SQ	BS					X						
CNC87	G008GSP04	008GSP04M1	S242233B*1	LO	N				03/29/02				X	X	X	X
CNC87	G008GSP11	008GSP11M1	S242233B*2	LO	N				03/29/02				X	X	X	X
CNC87	LABQC	42233B3LB	S242233B*3	LQ	LB								X	X	X	X
CNC87	LABQC	42233B4BS	S242233B*4	LQ	BS								X		X	
CNC118	G008GW004	008GW004M6	S244366*7	WG	N				06/20/02	X	X					
CNC118	G636GW001	636GW001M6	S244366*9	WG	N				06/20/02	X	X					
CNC118	LABQC	44399A12LB	S244399A*12	WQ	LB					X	X					
CNC118	LABQC	44399A13BS	S244399A*13	WQ	BS					X	X					
CNC118	G008GW001	008GW001M6	S244399A*3	WG	N				06/21/02	X	X					
CNC118	G008GW005	008GW005M6	S244399A*4	WG	N				06/21/02	X	X					
CNC118	G008GW005	008GW005M6RE	S244399A*4*RE	WG	LR	RE			06/21/02		X					

TABLE 1
 Field and Quality Control Samples – Organic Analyses
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	Date Collected	VOC SW8260	SVOC SW8270	Pesticides SW8061	PCBs SW8082	Fuel Fingerprinting by GC/FID SW8100	TPH GRO SW8015	TPH DRO SW8015
CNC118	LABQC	44399A5LB	S244399A*5	WQ	LB					X	X					
CNC118	LABQC	44399A6BS	S244399A*6	WQ	BS					X	X					
CNC118	LABQC	4436619LB	S244366*19	WQ	LB					X	X					
CNC118	LABQC	4436620BS	S244366*20	WQ	BS					X	X					
CNC118	LABQC	4436633LB	S244366*33	WQ	LB					X						
CNC118	LABQC	4436634BS	S244366*34	WQ	BS					X						
CNC142	G008GW04D	008GW04DM7	S246090*1	WG	N				08/22/02	X	X					
CNC142	FIELDQC	008EW04DM7	S246090*3	WQ	EB				08/23/02	X	X					
CNC142	FIELDQC	008TW04DM7	S246090*4	WQ	TB				08/23/02	X						
CNC142	LABQC	460906LB	S246090*6	WQ	LB					X	X					
CNC142	LABQC	460907BS	S246090*7	WQ	BS					X	X					
CNC142	LABQC	4609013LB	S246090*13	WQ	LB					X						
CNC142	LABQC	4609014BS	S246090*14	WQ	BS					X						

TABLE 1
 Field and Quality Control Samples – Organic Analyses
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

SDG	Station ID	Sample ID	Lab Sample ID	Matrix	Sample Type	LR Type	Upper Depth	Lower Depth	Date Collected	VOC SW8260	SVOC SW8270	Pesticides SW8081	PCBs SW8082	Fuel Fingerprinting by GC/FID SW8100	TPH GRO SW8015	TPH DRO SW8015
-----	------------	-----------	---------------	--------	-------------	---------	-------------	-------------	----------------	------------	-------------	-------------------	-------------	--------------------------------------	----------------	----------------

MATRIX CODE
 WG - Groundwater
 WQ - Water QC Sample
 SO - Soil
 SQ - Soil QC Sample
 LO - Oil
 LQ - Oil QC Sample

SAMPLE TYPE CODE
 BS - Blank Spike
 EB - Equipment Blank
 TB - Trip Blank
 FB - Ambient Field Blank
 FD - Field Duplicate
 N - Native Sample
 LB - Laboratory Blank
 LR - Laboratory Replicate

LR TYPE CODE
 RE - Reanalysis

ANALYSIS CODE
 VOC - Volatile Organic Compounds
 SVOC - Semivolatile Organic Compounds
 PCBs - Polychlorinated Biphenyls
 TPH-GRO - Total Petroleum Hydrocarbons - Gasoline Range Organics
 TPH-DRO - Total Petroleum Hydrocarbons - Diesel Range Organics

Table 2 - Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses**TABLE 2**

Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Sample ID	Method	Location	Sample ID	Element	Unit	Frequency	Number of Samples	Number of Analytes	Start Date	End Date	Quality Control	Field	Other
5998	G636SB021	636SB02102	599801	SO	N		3	5	08/21/01			X	
5998	G636SB022	636SB02202	599802	SO	N		3	5	08/21/01			X	
5998	G636SB023	636SB02302	599803	SO	N		3	5	08/21/01			X	
5998	FIELDQC	636EB021L1	599804	WQ	EB				08/21/01			X	
5998	LABQC	BS1S0905	BS1S0905	SQ	BS							X	
5998	LABQC	BS1W0907	BS1W0907	WQ	BS							X	
5998	LABQC	SB1-0905	SB1-0905	SQ	LB							X	
5998	LABQC	WB1-0907	WB1-0907	WQ	LB							X	
44131	GFD SGW02A	FDSGW02ALA	44131001	WG	N				06/13/01				X
44131	GFD SGW02A	FDSGW02ALALR	1200021568	WG	LR				06/13/01				X
44131	FIELDQC	FDSEW06BLA	44131005	WQ	EB				06/14/01				X
44131	LABQC	1200021520	1200021520	WQ	BS								X
CNC04	G008GW001	008G000110	S004816A*1	WG	N				07/19/00	X	X	X	
CNC04	G008GW001	008H000110	S004816A*2	WG	FD				07/19/00	X	X	X	
CNC04	FIELDQC	008F000110	S004816A*3	WQ	FB				07/19/00	X	X	X	
CNC04	FIELDQC	008E000110	S004816A*4	WQ	EB				07/19/00	X	X	X	
CNC04	LABQC	04816A6LB	S004816A*6	WQ	LB					X	X	X	
CNC04	LABQC	04816A7BS	S004816A*7	WQ	BS					X	X	X	

TABLE 2
 Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Site	Sample ID	Sample Name	Sample ID	Matrix	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
CNC25	G636SB024	636SB02402	S114423*1	SO	N		3	5	07/12/01	X			
CNC25	G636SB025	636SB02502	S114423*2	SO	N		3	5	07/12/01	X			
CNC25	G636SB026	636SB02602	S114423*3	SO	N		3	5	07/12/01	X			
CNC25	G636SB026	636CB02602	S114423*4	SO	FD		3	5	07/12/01	X			
CNC25	G636SB027	636SB02702	S114423*5	SO	N		3	5	07/12/01	X			
CNC25	G636SB028	636SB02802	S114423*6	SO	N		3	5	07/12/01	X			
CNC25	FIELDQC	636EA001LA	S114423*7	SQ	EB				07/12/01	X			
CNC25	LABQC	1442310LB	S114423*10	WQ	LB					X			
CNC25	LABQC	1442311BS	S114423*11	WQ	BS					X			
CNC25	LABQC	1442317LB	S114423*17	SQ	LB					X			
CNC25	LABQC	1442318BS	S114423*18	SQ	BS					X			
CNC85	G008GW003	008GW003M1	S242233*1	WG	N				03/29/02	X	X	X	
CNC85	G008GW003	008HW003M1	S242233*2	WG	FD				03/29/02	X	X	X	
CNC85	G008GW004	008GW004M1	S242233*3	WG	N				03/28/02	X	X	X	
CNC85	LABQC	4223317LB	S242233*17	WQ	LB					X	X	X	
CNC85	LABQC	4223318BS	S242233*18	WQ	BS					X	X	X	
CNC85	FIELDQC	008EW001M1	S242233*24	WQ	EB				03/29/02	X	X	X	
CNC85A	G008GW003	008GW003M1	S242233C*1	WG	N				03/29/02				X

TABLE 2

Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

ID#	Sample ID	Sample ID	Sample ID	Type	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
CNC85A	G008GW004	008GW004M1	S242233C*3	WG	N				03/28/02				X
CNC85A	LABQC	42233C17LB	S242233C*17	WQ	LB								X
CNC85A	LABQC	42233C18BS	S242233C*18	WQ	BS								X
CNC85A	FIELDQC	008EW001M1	S242233C*24	WQ	EB				03/29/02				X
CNC86	G636GW001	636GW001M1	S242233A*1	WG	N				03/28/02				X
CNC86	G008GSP01	008GSP01M1	S242233A*9	WG	N				03/29/02				X
CNC86	FIELDQC	008HSP01M1	S242233A*10	WG	FD				03/29/02				X
CNC86	G008GSP06	008GSP06M1	S242233A*11	WG	N				03/29/02				X
CNC86	G008GSP09	008GSP09M1	S242233A*12	WG	N				03/29/02				X
CNC86	G008GSP14	008GSP14M1	S242233A*13	WG	N				03/29/02				X
CNC86	G008GSP18	008GSP18M1	S242233A*14	WG	N				03/29/02				X
CNC86	LABQC	42233A22LB	S242233A*22	WQ	LB								X
CNC86	LABQC	42233A23BS	S242233A*23	WQ	BS								X
CNC86	LABQC	42233A29LB	S242233A*29	WQ	LB								X
CNC86	LABQC	42233A30BS	S242233A*30	WQ	BS								X
CNC86A	G636GW001	636GW001M1	S242233D*1	WG	N				03/28/02				X
CNC86A	G008GSP01	008GSP01M1	S242233D*9	WG	N				03/29/02				X
CNC86A	FIELDQC	008HSP01M1	S242233D*10	WG	FD				03/29/02				X

TABLE 2
Field and Quality Control Samples – Inorganic Analyses
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
CNC86A	G008GSP06	008GSP06M1	S242233D*11	WG	N				03/29/02				X
CNC86A	G008GSP09	008GSP09M1	S242233D*12	WG	N				03/29/02				X
CNC86A	G008GSP14	008GSP14M1	S242233D*13	WG	N				03/29/02				X
CNC86A	G008GSP18	008GSP18M1	S242233D*14	WG	N				03/29/02				X
CNC86A	LABQC	42233D22LB	S242233D*22	WQ	LB								X
CNC86A	LABQC	42233D23BS	S242233D*23	WQ	BS								X
CNC87	G008GSP04	008GSP04M1	S242233B*1	LO	N				03/29/02				X
CNC87	G008GSP11	008GSP11M1	S242233B*2	LO	N				03/29/02				X
CNC87	LABQC	42233B3LB	S242233B*3	LQ	LB								X
CNC87	LABQC	42233B4BS	S242233B*4	LQ	BS								X
CNC87A	G008GSP11	008GSP11M1	S242233E*2	LO	N				03/29/02				X
CNC87A	LABQC	42233E3LB	S242233E*3	LQ	LB								X
CNC87A	LABQC	42233E4BS	S242233E*4	LQ	BS								X
CNC89	G008GW001	008GW001M1	S242264*1	WG	N				03/30/02	X	X	X	
CNC89	G008GW002	008GW002M1	S242264*2	WG	N				03/30/02	X	X	X	
CNC89	G008GW005	008GW005M1	S242264*3	WG	N				03/30/02	X	X	X	
CNC89	G008GW006	008GW006M1	S242264*4	WG	N				03/30/02	X	X	X	
CNC89	FIELDQC	008EW002M1	S242264*5	WQ	EB				03/30/02	X	X	X	

TABLE 2

Field and Quality Control Samples – Inorganic Analyses
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

ID	Sample Type	Sample ID	Location	Depth	Phase	Depth (ft)	Depth (m)	Date	SWMU	AOC	Priority	QC
CNC89	LABQC	422649LB	S242264*9	WQ	LB				X	X	X	
CNC89	LABQC	4226410BS	S242264*10	WQ	BS				X	X	X	
CNC89A	G008GW001	008GW001M1	S242264A*1	WG	N			03/30/02			X	
CNC89A	G008GW002	008GW002M1	S242264A*2	WG	N			03/30/02			X	
CNC89A	G008GW005	008GW005M1	S242264A*3	WG	N			03/30/02			X	
CNC89A	G008GW006	008GW006M1	S242264A*4	WG	N			03/30/02			X	
CNC89A	FIELDQC	008EW002M1	S242264A*5	WQ	EB			03/30/02			X	
CNC89A	LABQC	42264A9LB	S242264A*9	WQ	LB						X	
CNC89A	LABQC	42264A10BS	S242264A*10	WQ	BS						X	
CNC89A	LABQC	42264A16LB	S242264A*16	WQ	LB						X	
CNC89A	LABQC	42264A17BS	S242264A*17	WQ	BS						X	
CNC118	G008GW004	008GW004M6	S244366*7	WG	N			06/20/02	X	X	X	
CNC118	G636GW001	636GW001M6	S244366*9	WG	N			06/20/02	X	X	X	
CNC118	G008GW001	008GW001M6	S244399A*3	WG	N			06/21/02	X	X	X	
CNC118	G008GW005	008GW005M6	S244399A*4	WG	N			06/21/02	X	X	X	
CNC118	LABQC	44399A5LB	S244399A*5	WQ	LB				X	X	X	
CNC118	LABQC	44399A6BS	S244399A*6	WQ	BS				X	X	X	
CNC118	LABQC	4436619LB	S244366*19	WQ	LB				X	X	X	

TABLE 2
 Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Sample ID	Sample Type	Sample Name	Sample ID	Sample Type	Sample Name	Sample ID	Sample Type	Sample Name	Sample ID	Sample Type	Sample Name	Sample ID	Sample Type	Sample Name
CNC118	LABQC	4436620BS	S244366*20	WQ	BS						X	X	X	
CNC123	G008GW001	008GW001M6	D2F250169002	WG	N			06/21/02					X	
CNC123	G008GW004	008GW004M6	D2F250169003	WG	N			06/20/02					X	
CNC123	G008GW005	008GW005M6	D2F250169004	WG	N			06/21/02					X	
CNC123	G636GW001	636GW001M6	D2F250169005	WG	N			06/20/02					X	
CNC123	LABQC	D2G040000144B	D2G040000144B	WQ	LB								X	
CNC123	LABQC	D2G040000144C	D2G040000144C	WQ	BS								X	
CNC123	LABQC	D2G040000144L	D2G040000144L	WQ	BD								X	
CNC142	G008GW04D	008GW04DM7	S246090*1	WG	N			08/22/02	X	X				
CNC142	FIELDQC	008EW04DM7	S246090*3	WQ	EB			08/23/02	X	X				
CNC142	LABQC	460906LB	S246090*6	WQ	LB				X	X				
CNC142	LABQC	460907BS	S246090*7	WQ	BS				X	X				

TABLE 2

Field and Quality Control Samples – Inorganic Analyses
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Sample ID	Matrix Code	Sample Type Code	LR Type Code
MATRIX CODE			
WG – Groundwater			
WQ – Water QC Sample			
SO – Soil			
SQ – Soil QC Sample			
LO – Oil			
LQ – Oil QC Sample			
SAMPLE TYPE CODE			
BS - Blank Spike			
EB - Equipment Blank			
TB - Trip Blank			
FB - Ambient Field Blank			
FD - Field Duplicate			
N - Native Sample			
LB - Laboratory Blank			
LR - Laboratory Replicate			
LR TYPE CODE			
RE – Reanalysis			

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, ambient field 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.
- **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.
- **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.
- **Internal Standards** – The internal standards (retention time and response) are evaluated for method compliance. The internal standards are used in quantitation of the target parameters and monitor the instrument sensitivity and response for stability during each analysis.
- **Confirmation** – If GCMS methodology is not initially used for analysis, SW-846 method 8000 requires confirmation when the composition of samples is not well characterized. Therefore, even when the identification has been confirmed on a dissimilar column or detector, the agreement of the quantitative results on both columns is evaluated. For

Pesticide and PCB analyses covered in this report, confirmation was performed using a dissimilar analytical column. The laboratory analyzed samples with a gas chromatograph (GC) utilizing simultaneous primary and confirmation data acquisition. Per SW-86 method 8000, 40% RPD criteria was used as the acceptance limit.

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 3.

TABLE 3

Equipment Blank Contamination: VOCs
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Site	Sample ID	Reference ID	Sample Type	Compound	Lab Result	Unit	Acceptance Limit
44131	1200025313	1200025313	LB	Naphthalene	0.78	µg/L	3.90 µg/L
44131	FDSEW06BLA	44131005	EB	Toluene	0.22	µg/L	1.10 µg/L
44131	FDSEW06BLA	44131005	EB	Naphthalene	0.33	µg/L	1.70 µg/L
44131	FDSTW06BLA	44131006	TB	Naphthalene	0.20	µg/L	1.0 µg/L
CNC04	04816A6LB	S004816A*6	LB	Methylene chloride	3.0	µg/L	30.0 µg/L
CNC04	008E000110	S004816A*4	EB	Methylene chloride	2.6	µg/L	26.0 µg/L
CNC04	008T000110	S004816A*5	TB	Methylene chloride	0.78	µg/L	7.80 µg/L
CNC118	44399A5LB	S244399A*5	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-Dichlorobenzene	2.0	µg/L	20.0 µg/L
CNC142	460906LB	S246090*6	LB	Methylene chloride	0.77	µg/L	7.7 µg/L
CNC142	460906LB	S246090*6	LB	Naphthalene	3.2	µg/L	16.0 µg/L
CNC142	4609013LB	S246090*13	LB	Methylene chloride	0.73	µg/L	7.3 µg/L
CNC142	4609013LB	S246090*13	LB	Naphthalene	3.3	µg/L	16.5 µg/L
CNC142	008EW04DM7	S246090*3	EB	Methylene chloride	1.0	µg/L	10.0 µg/L

TABLE 3

Equipment Blank Contamination: VOCs
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Site ID	Sample ID	Lab Sample ID	Sample Type	Parameter	Result	Units	Reporting Limit
CNC142	008TW04DM7	S246090*4	TB	Methylene chloride	0.73	µg/L	7.3 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 4 below.

TABLE 4

Surrogate, MS/MSD and LCS/LCSD Recoveries Out of QC Limits: VOCs
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Site ID	Sample ID	Parameter	Reporting Limit	Control Limits	Result	Notes
CNC118	44399A6BS LCS	Bromomethane	52*	70-130	S244336*7,9	Detects-J, non-detects-UJ
		Acetone	140*	70-130	S244336*7,9	
		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		

* - out of control limits

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 5.

TABLE 5

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: VOCs
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Initial Calibration Criteria	Compound	Initial Calibration Criteria	Continuing Calibration Criteria
VOA1-CCAL-06/23/01, 0929	Naphthalene	22.4% low	44131 - All
MSL5972-ICAL-06/2/02, 1618	2-Butanone	R ² =0.988	CNC04 – All
	Chloroethane	RRF=0.816	
	Bromoform	RRF=0.562	
	1,1,2,2-Tetrachloroethane	RRF=0.852	
	Vinyl acetate	RRF=2.701	
MSL5972-CCAL-07/30/02, 1152	Chloroethane	RRF=0.579 29.0% low	CNC04 – All
	Bromoform	RRF=0.453 19.4% low	
	1,1,2,2-Tetrachloroethane	RRF=0.700 17.8% low	
	Vinyl acetate	RRF=2.237 17.2% low	
MSA5973-CCAL-06/26/02, 1234	2-Chloroethyl vinyl ether	RRF=0.048 20.9% low	CNC118 – S244366*7,9,
MSA5973-CCAL-06/27/02, 0757	Bromomethane	42.0% low	CNC118 – S244399A*3,4
MSP5973-ICAL-08/27/02, 1223	Chloroethane	R ² =0.988	CNC142 - All
	Acetone	R ² =0.988	
MSP5973-CCAL-08/28/02, 0919	Vinyl acetate	20.2% high	CNC142 – S246090*1,3,4

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

- When the percent Relative Standard Deviation (%RSD) or correlation coefficient (R²) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.

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

Holding Times

All holding times were met except for sample 008GW005M6RE / CNC118-S244399A*4RE. This sample was re-extracted due to low surrogate recovery and was re-extracted 7 days beyond holding time. Since the re-extracted results matched the original analysis results, the original results were used unqualified.

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 below.

- LCS recoveries for 4-Nitrophenol and 2,4-Dinitrotoluene were above the upper control limits for the LCS in SDG CNC118. All positive results would be qualified "J", but all results for the samples in CNC118 were non-detects. Therefore, no data were qualified due to LCS recoveries.

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 6.

TABLE 6

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOC
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

MSD7-ICAL-06/12/01, 1207	Benzo(b)fluoranthene	R ² =0.986	44131 - All
--------------------------	----------------------	-----------------------	-------------

TABLE 6

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOC
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Initial Calibration Date	Analyte	Relative Standard Deviation (RSD) (%) (CAL) / Relative Standard Deviation (RSD) (%) (QUAL)	Acceptance Criteria
MSE5973-ICAL-07/27/00, 1550	2,4-Dinitrophenol	R ² =0.987	CNC04 - All
	3 + 4 Methyl phenol	RRF=1.387	
	2-Nitroaniline	RRF=0.262	
	3-Nitroaniline	RRF=0.347	
	4-Nitrophenol	RRF=0.194	
	2,4-Dinitrotoluene	RRF=0.381	
	4-Nitroaniline	RRF=0.356	
	Fluoranthene	RRF=0.984	
	Pyrene	RRF=1.448	
	Chrysene	RRF=0.977	
	Bis(2-ethylhexyl)phthalate	RRF=0.914	
	Benzo(k)fluoranthene	RRF=1.264	
MSE5973-CCAL-07/28/00, 1337	3 + 4 Methyl phenol	RRF=1.611 16.1% high	CNC04 - All
	2-Nitroaniline	RRF=0.311 18.4% high	
	3-Nitroaniline	RRF=0.423 22.0% high	
	4-Nitrophenol	RRF=0.252 29.8% high	
	2,4-Dinitrotoluene	RRF=0.464 21.8% high	
	4-Nitroaniline	RRF=0.493 38.4% high	
	Fluoranthene	RRF=1.177 19.6% high	
	Pyrene	RRF=1.676 15.8% high	
	Chrysene	RRF=0.827 15.3% low	

TABLE 6

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOC
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Sample ID	Compound	Initial Calibration Criteria	Continuing Calibration Criteria
MSE5973-CCAL-07/28/00, 1337	Bis(2-ethylhexyl)phthalate	RRF=0.004 100% low	CNC04 - All
	Benzo(k)fluoranthene	RRF=1.048 17.1% low	
MSE5973-ICAL-06/28/02, 1649	Benzoic acid	%RSD=31.9	CNC118 – S244399A*3,4
	2,6-Dinitrotoluene	R ² =0.988	
	2,4-Dinitrophenol	%RSD=44.2	
	4,6-Dinitro-2-methylphenol	%RSD=39.7	
MSG5973-ICAL-06/29/02, 1223	Benzo(k)fluoranthene	R ² =0.989	CNC118 – S244366*7,9
	Indeno(1,2,3-cd)pyrene	R ² =0.989	
MSD5973-ICAL-06/30/02, 1545	Benzo(k)fluoranthene	%RSD=15.2	CNC118 – S244399A*4RE
MSE5973-CCAL-06/30/02, 1326	Benzoic acid	93.7% low RRF=0.009	CNC118 – S244399A*3,4
MSD5973-CCAL-07/03/02, 1432	4-Nitrophenol	23.1% high	CNC118 – S244399A*4RE
	Benzo(g,h,i)perylene	20.1% low	
MSG5973-CCAL-09/05/02, 2106	Bis(2-chloroisopropyl)ether	22.5% low	CNC142 - All
	Benzoic acid	55.0% high	
	2,4-Dinitrophenol	33.4% high	
	4,6-Dinitro-2-methylphenol	30.6% high	
	Fluoranthene	20.5% low	

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

- When the percent Relative Standard Deviation (%RSD) or correlation coefficient (R²) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was high in the continuing calibration standards, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.

- When the Relative Response Factor (RRF) was low in the continuing calibration, detected compounds were flagged "J", and non-detected compounds were flagged "UJ", as estimated.

Organochlorine Pesticide Analyses

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

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 7 below.

TABLE 7

Surrogate, MS/MSD and LCS Recoveries Out of QC Limits: Pesticides
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

ID#	Sample	Compound	Recovery	Recovery Limit	Associated Sample	Flag
CNC04	008G000110	Tetrachloro-m-xylene	26* / 26*	30-150	008G000110	Detects-J, non-detects-UJ
		Decachlorobiphenyl	8* / 8*	30-150		
CNC04	008H000110	Tetrachloro-m-xylene	24* / 24*	30-150	008H000110	Detects-J, non-detects-UJ
		Decachlorobiphenyl	15* / 15*	30-150		
CNC04	008E000110	Tetrachloro-m-xylene	22* / 24*	30-150	008E000110	None (EB)
* - out of control limits						

Polychlorinated Biphenyls (PCBs) Analyses

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

Recoveries - Surrogate, MS/MSD and LCS/LCSD

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), Laboratory Control Sample (LCS), and Laboratory Control Sample Duplicate (LCSD) recoveries were within acceptable quality control limits, except as noted in Table 8 below.

TABLE 8

Surrogate, MS/MSD and LCS Recoveries Out of QC Limits: PCBs
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Sample	Sample ID	Parameter	Recovery	Control Limits	Surrogate	Result
CNC04	008G000110	Tetrachloro-m-xylene	26* / 26*	30-150	008G000110	Detects-J, non-detects-UJ
		Decachlorobiphenyl	8* / 8*	30-150		
CNC04	008H000110	Tetrachloro-m-xylene	24* / 24*	30-150	008H000110	Detects-J, non-detects-UJ
		Decachlorobiphenyl	15* / 15*	30-150		
CNC04	008E000110	Tetrachloro-m-xylene	22* / 24*	30-150	008E000110	None (EB)

* - out of control limits

Second Column Confirmation

The second column confirmation percent difference (%D) for some detected parameters, exceeded the 40 %D criteria. Those results were flagged "J", as estimated. The laboratory reported the lower of the two concentrations. The individual samples and specific compounds that were flagged are listed in Table 9 below.

TABLE 9

Second Column Confirmation out of Criteria: PCBs
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636 Charleston, SC

Sample	Sample ID	Parameter	Surrogate
CNC87	008GSP04M1	S242233B*1	Aroclor-1260
CNC87	008GSP11M1	S242233B*2	Aroclor-1260

Fuel Fingerprinting by GC/FID Analyses

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

Total Petroleum Hydrocarbons – Gasoline Range Organic (TPH-GRO) Analyses

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

Total Petroleum Hydrocarbons – Diesel Range Organic (TPH-DRO) Analyses

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

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

Metals Analyses

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

Blanks

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

TABLE 10
Blank Contamination: Metals
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

SYS#	Sample ID	Lot Number	Sample Type	Parameter	Lab Result	Unit	Target Concentration (max. per 100 gallons)
CNC04	CCB		CCB	Aluminum	57.2	µg/L	286 µg/L
CNC04	CCB		CCB	Barium	1.62	µg/L	8.1 µg/L
CNC04	CCB		CCB	Copper	1.03	µg/L	5.15 µg/L
CNC04	CCB		CCB	Manganese	1.48	µg/L	7.4 µg/L
CNC04	CCB		CCB	Mercury	0.168	µg/L	0.840 µg/L
CNC04	04816A6LB	S004816A*6	LB	Aluminum	31.9	µg/L	159.5 µg/L
CNC04	008E000110	S004816A*4	EB	Aluminum	37.0	µg/L	185 µg/L
CNC04	008E000110	S004816A*4	EB	Calcium	130	µg/L	650 µg/L
CNC04	008E000110	S004816A*4	EB	Sodium	480	µg/L	2400 µg/L
CNC25	CCB		CCB	Cadmium	1.02	µg/L	0.51 mg/Kg
CNC85	CCB		CCB	Barium	2.20	µg/L	0.011 mg/L
CNC85	CCB		CCB	Chromium	2.50	µg/L	0.0125 mg/L
CNC85	CCB		CCB	Copper	1.95	µg/L	0.00975 mg/L
CNC85	CCB		CCB	Lead	2.62	µg/L	0.0131 mg/L
CNC85	CCB		CCB	Manganese	1.75	µg/L	0.00875 mg/L
CNC85	CCB		CCB	Selenium	4.50	µg/L	0.0225 mg/L
CNC85	CCB		CCB	Thallium	8.28	µg/L	0.0414 mg/L
CNC85	4223317LB	S242233*17	LB	Lead	0.00206	mg/L	0.0103 mg/L
CNC85	008EW001M1	S242233*24	EB	Calcium	0.053	mg/L	0.265 mg/L
CNC85	008EW001M1	S242233*24	EB	Lead	0.0016	mg/L	0.008 mg/L
CNC89	CCB		CCB	Barium	2.20	µg/L	0.011 mg/L

TABLE 10
 Blank Contamination: Metals
 Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

Sample ID	Sample Name	Sample Type	Parameter	Lab Result	Unit	QC Result
CNC89	CCB		CCB Chromium	2.50	µg/L	0.0125 mg/L
CNC89	CCB		CCB Copper	1.95	µg/L	0.00975 mg/L
CNC89	CCB		CCB Lead	2.62	µg/L	0.0131 mg/L
CNC89	CCB		CCB Manganese	1.75	µg/L	0.00875 mg/L
CNC89	CCB		CCB Selenium	4.50	µg/L	0.0225 mg/L
CNC89	CCB		CCB Thallium	8.28	µg/L	0.0414 mg/L
CNC89	422649LB	S242264*9	LB Lead	0.00206	mg/L	0.0103 mg/L
CNC89	008EW002M1	S242265*5	EB Antimony	0.0051	mg/L	0.0255 mg/L
CNC89	008EW002M1	S242265*5	EB Calcium	0.061	mg/L	0.305 mg/L
CNC89	008EW002M1	S242265*5	EB Lead	0.0018	mg/L	0.009 mg/L
CNC118	CCB		CCB Barium	2.59	µg/L	0.01295 mg/L
CNC118	CCB		CCB Chromium	2.46	µg/L	0.01230 mg/L
CNC118	CCB		CCB Lead	3.42	µg/L	0.01710 mg/L
CNC118	CCB		CCB Selenium	9.02	µg/L	0.04510 mg/L
CNC118	CCB		CCB Silver	2.28	µg/L	0.01140 mg/L
CNC118	44399A5LB	S244399A*5	LB Arsenic	2.61	µg/L	0.01305 mg/L
CNC118	44399A5LB	S244399A*5	LB Barium	2.40	µg/L	0.012 mg/L
CNC118	44399A5LB	S244399A*5	LB Chromium	2.05	µg/L	0.01025 mg/L
CNC118	44399A5LB	S244399A*5	LB Lead	1.72	µg/L	0.0086 mg/L
CNC142	CCB		CCB Selenium	5.53	µg/L	0.02765 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 - MS/MSD and LCS

All Matrix Spike (MS), Matrix Spike Duplicate (MSD), and Laboratory Control Sample (LCS) recoveries were within acceptable quality control limits, except as noted in Table 11 below.

TABLE 11
MS/MSD, and LCS Recoveries and RPDs Out of QC Limits: Metals
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

SITE	Sample	Parameter	Recovery	Recovery Limit	Associated Sample	Flag
CNC85	S242233*5 MS/MSD	Aluminum	127* / 124*	80-120	CNC85 - All	Detects only - J
		Silver	122* / 120	80-120		
		Zinc	122* / 119	80-120		
		Mercury	76* / 72*	80-120	CNC85 - All	Detects-J, non-detects-UJ
CNC118	S244366*7 MS/MSD	Arsenic	121* / 121*	80-120	CNC118 - All	Detects only - J
		Silver	150* / 151*	80-120		
		Selenium	73* / 68*	80-120	CNC118 - All	Detects-J, non-detects-UJ
CNC142	S246090*2 MS/MSD	Silver	128* / 125*	80-120	CNC142 - All	Detects only - J
* - out of control limits						

Field Duplicate Samples

All Field Duplicate Samples were within acceptable quality control limits, except as noted in Table 12 below. According to EPA *National Functional Guidelines*, no flags are applied due to Field Duplicate precision.

TABLE 12
Field Duplicate RPDs Out of QC Limits: Metals
Charleston Naval Complex, Zone G, SWMU 8, AOC 636, Charleston, SC

SITE	Sample	Parameter	Field Duplicate Concentration	Field Duplicate Concentration	RPD	QC Limit
CNC85	008GW003M1 / 008HW003M1	Aluminum	0.51 mg/L	0.79 mg/L	43.1*	20
		Iron	0.71 mg/L	1.1 mg/L	43.1*	20
		Manganese	0.035 mg/L	0.051 mg/L	37.2*	20
		Selenium	0.013 mg/L	Non-detect	43.0*	20
* - out of control limits						

Serial Dilution

The serial dilution percent difference (%D) for potassium at 16.8 percent, was outside acceptable QC limits of 10 percent in SDG CNC89. Detected results were qualified "J", as estimated and non-detected results were qualified "UJ".

General Chemistry Analyses

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

- For CNC85, CNC86, CNC87, and CNC89, the laboratory reported the hydrazine results run on 4/2/02 and 4/3/02 with a reporting limit of 100 ug/L, which did not meet the project specified reporting limit of 5 ug/L. All samples that did not demonstrate detects in the initial analysis above 100 ug/L were reanalyzed on 5/7/02 and 5/9/02. All original analyses were qualified as screening data, "S-OT", except for sample 636GW001M1. This sample showed a detect of 42 ug/L in the original analysis but was a non-detect in the reanalysis. The original analysis was reported as estimated, "J", and the reanalysis was rejected, "R-OT". The reanalysis for all other samples were reported with flags "J/UJ-HT" since they were reanalyzed beyond the 30 day holding time.

Rejected Data

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

Conclusion

A review of the analytical data submitted regarding the investigation of Zone G, SWMU 8, AOC 636 at the Charleston Naval Complex, Charleston, South Carolina by CH2M HILL has been completed. An overall evaluation of the data indicates that the sample handling, shipment, and analytical procedures have been adequately completed, and that the analytical results should be considered usable as qualified.

The analytical data had minor QC concerns as indicated above, however, it did not affect data usability for those specific results. The validation review demonstrated that the analytical systems were generally in control and the data results can be used in the decision making process.

Attachment 1 - Chartered Qualifiers and Results
 Zone G, SWMU 8 C 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
GENCHEM	ASTM D1385.88	Hydrazine	CNC85	008GW003M1	S242233*1	WG	0.076	B	0.076	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC85A	008GW003M1	S242233C*1	WG	0.061	=	0.061	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC85	008GW004M1	S242233*3	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC85A	008GW004M1	S242233C*3	WG	0.02	=	0.02	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86	008GSP01M1	S242233A*9	WG	0.005	B	0.005	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86A	008GSP01M1	S242233D*9	WG	0.031	=	0.031	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86	008GSP06M1	S242233A*11	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86A	008GSP06M1	S242233D*11	WG	0.005	U	0.005	UJ	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86	008GSP09M1	S242233A*12	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86A	008GSP09M1	S242233D*12	WG	0.008	=	0.008	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86	008GSP14M1	S242233A*13	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86A	008GSP14M1	S242233D*13	WG	0.006	=	0.006	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86	008GSP18M1	S242233A*14	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86A	008GSP18M1	S242233D*14	WG	0.008	=	0.008	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86	008HSP01M1	S242233A*10	WG	0.029	B	0.029	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86A	008HSP01M1	S242233D*10	WG	0.017	=	0.017	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86	636GW001M1	S242233A*1	WG	0.042	J	0.042	J	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC86A	636GW001M1	S242233D*1	WG	0.005	U	0.005	R	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC87	008GSP11M1	S242233B*2	LO	2	U	2	S	mg/kg	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC87A	008GSP11M1	S242233E*2	LO	0.1	U	0.1	UJ	mg/kg	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC89	008GW001M1	S242264*1	WG	0.013	B	0.013	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC89A	008GW001M1	S242264A*1	WG	0.023	=	0.023	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC89	008GW002M1	S242264*2	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC89A	008GW002M1	S242264A*2	WG	0.009	=	0.009	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC89	008GW005M1	S242264*3	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC89A	008GW005M1	S242264A*3	WG	0.006	=	0.006	J	mg/l	HT
GENCHEM	ASTM D1385.88	Hydrazine	CNC89	008GW006M1	S242264*4	WG	0.1	U	0.1	S	mg/l	OT
GENCHEM	ASTM D1385.88	Hydrazine	CNC89A	008GW006M1	S242264A*4	WG	0.005	U	0.005	UJ	mg/l	HT
METAL	SW6010	ALUMINUM	CNC04	008G000110	S004816A*1	WG	0.16	=	0.16	U	mg/L	BL
METAL	SW6010	ALUMINUM	CNC04	008H000110	S004816A*2	WG	0.19	=	0.19	U	mg/L	BL
METAL	SW6010	ALUMINUM	CNC04	008F000110	S004816A*3	WQ	0.033	B	0.033	U	mg/L	BL
METAL	SW6010B	ALUMINUM	CNC85	008GW003M1	S242233*1	WG	0.51	N	0.51	J	mg/l	MS

Attachment 1 - Changed Qualifiers and Results
 Zone G, SWMU 8, AOC 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
METAL	SW6010B	ALUMINUM	CNC85	008HW003M1	S242233*2	WG	0.79	N	0.79	J	mg/l	MS
METAL	SW6010B	ALUMINUM	CNC85	008GW004M1	S242233*3	WG	0.46	N	0.46	J	mg/l	MS
METAL	SW6010B	ALUMINUM	CNC89	008GW001M1	S242264*1	WG	0.056	BN	0.056	J	mg/l	IB
METAL	SW6010B	ALUMINUM	CNC89	008GW002M1	S242264*2	WG	0.06	BN	0.06	J	mg/l	IB
METAL	SW6010A	ANTIMONY	CNC25	636SB02502	S114423*2	SO	1.2	B	1.2	J	mg/Kg	IB
METAL	SW6010B	ANTIMONY	CNC85	008GW003M1	S242233*1	WG	0.011	B	0.011	J	mg/l	IB
METAL	SW6010B	ANTIMONY	CNC85	008HW003M1	S242233*2	WG	0.014	B	0.014	J	mg/l	IB
METAL	SW6010B	ARSENIC	CNC118	008GW004M6	S244366*7	WG	0.022	N	0.022	J	mg/l	MS
METAL	SW6010B	ARSENIC	CNC118	636GW001M6	S244366*9	WG	0.027	N	0.027	J	mg/l	MS
METAL	SW6010B	ARSENIC	CNC118	008GW001M6	S244399A*3	WG	0.023	N	0.023	J	mg/l	MS
METAL	SW6010B	ARSENIC	CNC118	008GW005M6	S244399A*4	WG	0.0043	BN	0.0043	U	mg/l	BL
METAL	SW6010B	ARSENIC	CNC142	008GW04DM7	S246090*1	WG	0.003	B	0.003	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC118	008GW004M6	S244366*7	WG	0.089	B	0.089	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC118	636GW001M6	S244366*9	WG	0.062	B	0.062	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC118	008GW001M6	S244399A*3	WG	0.057	B	0.057	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC118	008GW005M6	S244399A*4	WG	0.14	B	0.14	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC142	008GW04DM7	S246090*1	WG	0.066	B	0.066	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC85	008GW003M1	S242233*1	WG	0.075	B	0.075	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC85	008HW003M1	S242233*2	WG	0.072	B	0.072	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC85	008GW004M1	S242233*3	WG	0.088	B	0.088	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC89	008GW001M1	S242264*1	WG	0.057	B	0.057	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC89	008GW005M1	S242264*3	WG	0.12	B	0.12	J	mg/l	IB
METAL	SW6010B	BARIUM	CNC89	008GW006M1	S242264*4	WG	0.1	B	0.1	J	mg/l	IB
METAL	SW6010	CADMIUM	CNC04	008G000110	S004816A*1	WG	0.0018	B	0.0018	J	mg/L	IB
METAL	SW6010	CADMIUM	CNC04	008H000110	S004816A*2	WG	0.002	B	0.002	J	mg/L	IB
METAL	SW6010B	CADMIUM	CNC118	008GW004M6	S244366*7	WG	0.0013	B	0.0013	J	mg/l	IB
METAL	SW6010B	CADMIUM	CNC118	636GW001M6	S244366*9	WG	0.003	B	0.003	J	mg/l	IB
METAL	SW6010B	CADMIUM	CNC118	008GW005M6	S244399A*4	WG	0.0018	B	0.0018	J	mg/l	IB
METAL	SW6010A	CADMIUM	CNC25	636SB02502	S114423*2	SO	0.91	B	0.91	J	mg/Kg	IB
METAL	SW6010A	CADMIUM	CNC25	636CB02602	S114423*4	SO	0.14	B	0.14	U	mg/Kg	BL
METAL	SW6010A	CADMIUM	CNC25	636SB02702	S114423*5	SO	0.12	B	0.12	U	mg/Kg	BL
METAL	SW6010B	CADMIUM	CNC85	008GW004M1	S242233*3	WG	0.0018	B	0.0018	J	mg/l	IB

Attachment 1 - Changed Qualifiers and Results
 Zone G, SWMU 8 C 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
METAL	SW6010B	CADMIUM	CNC89	008GW005M1	S242264*3	WG	0.0025	B	0.0025	J	mg/l	IB
METAL	SW6010B	CADMIUM	CNC89	008GW006M1	S242264*4	WG	0.003	B	0.003	J	mg/l	IB
METAL	SW6010	CALCIUM	CNC04	008F000110	S004816A*3	WQ	0.12	B	0.12	U	mg/L	BL
METAL	SW6010	CHROMIUM, TOTAL	CNC04	008H000110	S004816A*2	WG	0.0017	B	0.0017	J	mg/L	IB
METAL	SW6010B	CHROMIUM, TOTAL	CNC118	008GW004M6	S244366*7	WG	0.00087	B	0.00087	U	mg/l	BL
METAL	SW6010B	CHROMIUM, TOTAL	CNC118	636GW001M6	S244366*9	WG	0.0024	B	0.0024	U	mg/l	BL
METAL	SW6010B	CHROMIUM, TOTAL	CNC118	008GW001M6	S244399A*3	WG	0.0014	B	0.0014	U	mg/l	BL
METAL	SW6010B	CHROMIUM, TOTAL	CNC118	008GW005M6	S244399A*4	WG	0.0012	B	0.0012	U	mg/l	BL
METAL	SW6010B	CHROMIUM, TOTAL	CNC142	008GW04DM7	S246090*1	WG	0.0055	B	0.0055	J	mg/l	IB
METAL	SW6010B	CHROMIUM, TOTAL	CNC85	008GW003M1	S242233*1	WG	0.0051	B	0.0051	U	mg/l	BL
METAL	SW6010B	CHROMIUM, TOTAL	CNC85	008HW003M1	S242233*2	WG	0.0045	B	0.0045	U	mg/l	BL
METAL	SW6010	COPPER	CNC04	008G000110	S004816A*1	WG	0.0012	B	0.0012	U	mg/L	BL
METAL	SW6010	COPPER	CNC04	008H000110	S004816A*2	WG	0.0011	B	0.0011	U	mg/L	BL
METAL	SW6010B	COPPER	CNC85	008GW003M1	S242233*1	WG	0.0045	B	0.0045	U	mg/l	BL
METAL	SW6010B	COPPER	CNC85	008HW003M1	S242233*2	WG	0.0068	B	0.0068	U	mg/l	BL
METAL	SW6010B	COPPER	CNC85	008GW004M1	S242233*3	WG	0.0012	B	0.0012	U	mg/l	BL
METAL	SW6010B	COPPER	CNC89	008GW002M1	S242264*2	WG	0.016	B	0.016	J	mg/l	IB
METAL	SW6010B	COPPER	CNC89	008GW005M1	S242264*3	WG	0.0014	B	0.0014	U	mg/l	BL
METAL	SW6010B	LEAD	CNC118	008GW005M6	S244399A*4	WG	0.0013	B	0.0013	U	mg/l	BL
METAL	SW6010B	LEAD	CNC85	008GW003M1	S242233*1	WG	0.0047	=	0.0047	U	mg/l	BL
METAL	SW6010B	LEAD	CNC85	008HW003M1	S242233*2	WG	0.0047	=	0.0047	U	mg/l	BL
METAL	SW6010B	LEAD	CNC89	008GW002M1	S242264*2	WG	0.0041	=	0.0041	U	mg/l	BL
METAL	SW6010B	LEAD	CNC89	008GW005M1	S242264*3	WG	0.0017	B	0.0017	U	mg/l	BL
METAL	SW7470A	MERCURY	CNC85	008GW003M1	S242233*1	WG	0.000072	UN	0.000072	UJ	mg/l	MS
METAL	SW7470A	MERCURY	CNC85	008HW003M1	S242233*2	WG	0.000072	UN	0.000072	UJ	mg/l	MS
METAL	SW7470A	MERCURY	CNC85	008GW004M1	S242233*3	WG	0.000072	UN	0.000072	UJ	mg/l	MS
METAL	SW6010B	POTASSIUM	CNC89	008GW001M1	S242264*1	WG	410	E	410	J	mg/l	SD
METAL	SW6010B	POTASSIUM	CNC89	008GW002M1	S242264*2	WG	93	E	93	J	mg/l	SD
METAL	SW6010B	POTASSIUM	CNC89	008GW005M1	S242264*3	WG	150	E	150	J	mg/l	SD
METAL	SW6010B	POTASSIUM	CNC89	008GW006M1	S242264*4	WG	87	E	87	J	mg/l	SD
METAL	SW6010B	SELENIUM	CNC118	008GW004M6	S244366*7	WG	0.0024	BN	0.0024	UJ	mg/l	BL,MS
METAL	SW6010B	SELENIUM	CNC118	636GW001M6	S244366*9	WG	0.0026	BN	0.0026	UJ	mg/l	BL,MS

Attachment 1 - Changed Qualifiers and Results
 Zone G, SWMU 8, AOC 636 - Data Validation

Parameter Class	Analytical Method	Parameter	Site	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
METAL	SW6010B	SELENIUM	CNC118	008GW001M6	S244399A*3	WG	0.0042	UN	0.0042	UJ	mg/l	MS
METAL	SW6010B	SELENIUM	CNC118	008GW005M6	S244399A*4	WG	0.0021	UN	0.0021	UJ	mg/l	MS
METAL	SW6010B	SELENIUM	CNC85	008GW003M1	S242233*1	WG	0.013	=	0.013	U	mg/l	BL
METAL	SW6010B	SELENIUM	CNC85	008GW004M1	S242233*3	WG	0.0052	=	0.0052	U	mg/l	BL
METAL	SW6010B	SELENIUM	CNC89	008GW005M1	S242264*3	WG	0.0049	B	0.0049	U	mg/l	BL
METAL	SW6010	SODIUM	CNC04	008F000110	S004816A*3	WQ	0.53	=	0.53	U	mg/L	BL
METAL	SW6010B	SODIUM	CNC89	008GW005M1	S242264*3	WG	4200	=	4200	J	mg/l	IB
METAL	SW6010B	THALLIUM	CNC89	008GW006M1	S242264*4	WG	0.0059	B	0.0059	U	mg/l	BL
METAL	SW6010B	VANADIUM	CNC85	008GW003M1	S242233*1	WG	0.044	B	0.044	J	mg/l	IB
METAL	SW6010B	VANADIUM	CNC89	008GW001M1	S242264*1	WG	0.0048	B	0.0048	J	mg/l	IB
METAL	SW6010B	VANADIUM	CNC89	008GW002M1	S242264*2	WG	0.0029	B	0.0029	J	mg/l	IB
METAL	SW6010B	ZINC	CNC85	008GW003M1	S242233*1	WG	0.02	N	0.02	J	mg/l	MS
METAL	SW6010B	ZINC	CNC85	008HW003M1	S242233*2	WG	0.028	N	0.028	J	mg/l	MS
METAL	SW6010B	ZINC	CNC85	008GW004M1	S242233*3	WG	0.0084	BN	0.0084	J	mg/l	MS
METAL	SW6010B	ZINC	CNC89	008GW001M1	S242264*1	WG	0.0086	BN	0.0086	J	mg/l	IB
METAL	SW6010B	ZINC	CNC89	008GW005M1	S242264*3	WG	0.0068	BN	0.0068	J	mg/l	IB
METAL	SW6010B	ZINC	CNC89	008GW006M1	S242264*4	WG	0.014	BN	0.014	J	mg/l	IB
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	CNC04	008G000110	S004816A*1	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	CNC04	008G000110RE	S004816A*1*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	CNC04	008H000110	S004816A*2	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	CNC04	008H000110RE	S004816A*2*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	CNC04	008F000110	S004816A*3	WQ	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	CNC04	008G000110	S004816A*1	WG	2	U	2	UJ	ug/L	SS
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	CNC04	008G000110RE	S004816A*1*RE	WG	2	U	2	R	ug/L	RE
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	CNC04	008H000110	S004816A*2	WG	2	U	2	UJ	ug/L	SS
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	CNC04	008H000110RE	S004816A*2*RE	WG	2	U	2	R	ug/L	RE
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	CNC04	008F000110	S004816A*3	WQ	2	U	2	UJ	ug/L	SS
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	CNC04	008G000110	S004816A*1	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	CNC04	008G000110RE	S004816A*1*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	CNC04	008H000110	S004816A*2	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	CNC04	008H000110RE	S004816A*2*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	CNC04	008F000110	S004816A*3	WQ	1	U	1	UJ	ug/L	SS

Attachment 1 - Chartered Qualifiers and Results
 Zone G, SWMU 6 C 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	CNC04	008G000110	S004816A*1	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	CNC04	008G000110RE	S004816A*1*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	CNC04	008H000110	S004816A*2	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	CNC04	008H000110RE	S004816A*2*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	CNC04	008F000110	S004816A*3	WQ	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	CNC04	008G000110	S004816A*1	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	CNC04	008G000110RE	S004816A*1*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	CNC04	008H000110	S004816A*2	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	CNC04	008H000110RE	S004816A*2*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	CNC04	008F000110	S004816A*3	WQ	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	CNC04	008G000110	S004816A*1	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	CNC04	008G000110RE	S004816A*1*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	CNC04	008H000110	S004816A*2	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	CNC04	008H000110RE	S004816A*2*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	CNC04	008F000110	S004816A*3	WQ	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	CNC04	008G000110	S004816A*1	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	CNC04	008G000110RE	S004816A*1*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	CNC04	008H000110	S004816A*2	WG	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	CNC04	008H000110RE	S004816A*2*RE	WG	1	U	1	R	ug/L	RE
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	CNC04	008F000110	S004816A*3	WQ	1	U	1	UJ	ug/L	SS
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	CNC87	008GSP04M1	S242233B*1	LO	7.7	P	7.7	J	mg/kg	2C
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	CNC87	008GSP11M1	S242233B*2	LO	4.2	P	4.2	J	mg/kg	2C
PEST	SW8081	ALDRIN	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ALDRIN	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	ALDRIN	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ALDRIN	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	ALDRIN	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ALPHA BHC	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ALPHA BHC	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	ALPHA BHC	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ALPHA BHC	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	ALPHA BHC	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS

Attachment 1 - Changed Qualifiers and Results
 Zone G, SWMU 8, AOC 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
PEST	SW8081	ALPHA-CHLORDANE	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ALPHA-CHLORDANE	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	ALPHA-CHLORDANE	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ALPHA-CHLORDANE	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	ALPHA-CHLORDANE	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	BETA BHC	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	BETA BHC	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	BETA BHC	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	BETA BHC	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	BETA BHC	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	DELTA BHC	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	DELTA BHC	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	DELTA BHC	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	DELTA BHC	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	DELTA BHC	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	DIELDRIN	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	DIELDRIN	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	DIELDRIN	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	DIELDRIN	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	DIELDRIN	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN I	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN I	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	ENDOSULFAN I	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN I	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	ENDOSULFAN I	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN II	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN II	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDOSULFAN II	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN II	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDOSULFAN II	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN SULFATE	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN SULFATE	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE

Attachment 1 - Charred Qualifiers and Results
 Zone G, SWMU 8 C 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
PEST	SW8081	ENDOSULFAN SULFATE	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDOSULFAN SULFATE	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDOSULFAN SULFATE	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDRIN	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDRIN	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN ALDEHYDE	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN ALDEHYDE	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDRIN ALDEHYDE	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN ALDEHYDE	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDRIN ALDEHYDE	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN KETONE	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN KETONE	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDRIN KETONE	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	ENDRIN KETONE	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	ENDRIN KETONE	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	GAMMA BHC (LINDANE)	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	GAMMA BHC (LINDANE)	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	GAMMA BHC (LINDANE)	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	GAMMA BHC (LINDANE)	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	GAMMA BHC (LINDANE)	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	GAMMA-CHLORDANE	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	GAMMA-CHLORDANE	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	GAMMA-CHLORDANE	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	GAMMA-CHLORDANE	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	GAMMA-CHLORDANE	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	HEPTACHLOR	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	HEPTACHLOR	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	HEPTACHLOR	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	HEPTACHLOR	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE

Attachment 1 - Changed Qualifiers and Results
 Zone G, SWMU 8, AOC 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
PEST	SW8081	HEPTACHLOR	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	HEPTACHLOR EPOXIDE	CNC04	008G000110	S004816A*1	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	HEPTACHLOR EPOXIDE	CNC04	008G000110RE	S004816A*1*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	HEPTACHLOR EPOXIDE	CNC04	008H000110	S004816A*2	WG	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	HEPTACHLOR EPOXIDE	CNC04	008H000110RE	S004816A*2*RE	WG	0.05	U	0.05	R	ug/L	RE
PEST	SW8081	HEPTACHLOR EPOXIDE	CNC04	008F000110	S004816A*3	WQ	0.05	U	0.05	UJ	ug/L	SS
PEST	SW8081	METHOXYCHLOR	CNC04	008G000110	S004816A*1	WG	0.5	U	0.5	UJ	ug/L	SS
PEST	SW8081	METHOXYCHLOR	CNC04	008G000110RE	S004816A*1*RE	WG	0.5	U	0.5	R	ug/L	RE
PEST	SW8081	METHOXYCHLOR	CNC04	008H000110	S004816A*2	WG	0.5	U	0.5	UJ	ug/L	SS
PEST	SW8081	METHOXYCHLOR	CNC04	008H000110RE	S004816A*2*RE	WG	0.5	U	0.5	R	ug/L	RE
PEST	SW8081	METHOXYCHLOR	CNC04	008F000110	S004816A*3	WQ	0.5	U	0.5	UJ	ug/L	SS
PEST	SW8081	p,p'-DDD	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	p,p'-DDD	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	p,p'-DDD	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	p,p'-DDD	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	p,p'-DDD	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	p,p'-DDE	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	p,p'-DDE	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	p,p'-DDE	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	p,p'-DDE	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	p,p'-DDE	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	p,p'-DDT	CNC04	008G000110	S004816A*1	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	p,p'-DDT	CNC04	008G000110RE	S004816A*1*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	p,p'-DDT	CNC04	008H000110	S004816A*2	WG	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	p,p'-DDT	CNC04	008H000110RE	S004816A*2*RE	WG	0.1	U	0.1	R	ug/L	RE
PEST	SW8081	p,p'-DDT	CNC04	008F000110	S004816A*3	WQ	0.1	U	0.1	UJ	ug/L	SS
PEST	SW8081	TOXAPHENE	CNC04	008G000110	S004816A*1	WG	5	U	5	UJ	ug/L	SS
PEST	SW8081	TOXAPHENE	CNC04	008G000110RE	S004816A*1*RE	WG	5	U	5	R	ug/L	RE
PEST	SW8081	TOXAPHENE	CNC04	008H000110	S004816A*2	WG	5	U	5	UJ	ug/L	SS
PEST	SW8081	TOXAPHENE	CNC04	008H000110RE	S004816A*2*RE	WG	5	U	5	R	ug/L	RE
PEST	SW8081	TOXAPHENE	CNC04	008F000110	S004816A*3	WQ	5	U	5	UJ	ug/L	SS
SVOA	SW8270C	1,2,4-TRICHLOROBENZENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE

Attachment 1 - Charred Qualifiers and Results
 Zone G, SWMU 8 C 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
SVOA	SW8270C	1,2-DICHLOROBENZENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	0.96	J	0.96	R	ug/l	RE
SVOA	SW8270C	1,3-DICHLOROBENZENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	1,4-DICHLOROBENZENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,4,5-TRICHLOROPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	2,4,6-TRICHLOROPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,4-DICHLOROPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,4-DIMETHYLPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270	2,4-DINITROPHENOL	CNC04	008G000110	S004816A*1	WG	50	U	50	UJ	ug/L	IC
SVOA	SW8270	2,4-DINITROPHENOL	CNC04	008H000110	S004816A*2	WG	50	U	50	UJ	ug/L	IC
SVOA	SW8270	2,4-DINITROPHENOL	CNC04	008F000110	S004816A*3	WQ	50	U	50	UJ	ug/L	IC
SVOA	SW8270C	2,4-DINITROPHENOL	CNC118	008GW001M6	S244399A*3	WG	50	U	50	UJ	ug/l	IC
SVOA	SW8270C	2,4-DINITROPHENOL	CNC118	008GW005M6	S244399A*4	WG	50	U	50	UJ	ug/l	IC
SVOA	SW8270C	2,4-DINITROPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	2,4-DINITROTOLUENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2,6-DINITROTOLUENE	CNC118	008GW001M6	S244399A*3	WG	10	U	10	UJ	ug/l	IC
SVOA	SW8270C	2,6-DINITROTOLUENE	CNC118	008GW005M6	S244399A*4	WG	10	U	10	UJ	ug/l	IC
SVOA	SW8270C	2,6-DINITROTOLUENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-CHLORONAPHTHALENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-CHLOROPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-METHYLNAPHTHALENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-METHYLPHENOL (o-CRESOL)	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-NITROANILINE	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	2-NITROPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	3,3'-DICHLOROBENZIDINE	CNC118	008GW005M6RE	S244399A*4*RE	WG	20	U	20	R	ug/l	RE
SVOA	SW8270C	3-NITROANILINE	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	4,6-DINITRO-2-METHYLPHENOL	CNC118	008GW001M6	S244399A*3	WG	50	U	50	UJ	ug/l	IC
SVOA	SW8270C	4,6-DINITRO-2-METHYLPHENOL	CNC118	008GW005M6	S244399A*4	WG	50	U	50	UJ	ug/l	IC
SVOA	SW8270C	4,6-DINITRO-2-METHYLPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	4-BROMOPHENYL PHENYL ETHER	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	4-CHLORO-3-METHYLPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	4-CHLOROANILINE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	4-CHLOROPHENYL PHENYL ETHER	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE

Attachment 1 - Changed Qualifiers and Results
 Zone G, SWMU 8, AOC 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
SVOA	SW8270C	4-NITROANILINE	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	4-NITROPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	ACENAPHTHENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	ACENAPHTHYLENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	ANTHRACENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	BENZO(a)ANTHRACENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	0.34	J	0.34	R	ug/l	RE
SVOA	SW8270C	BENZO(a)PYRENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	1.3	J	1.3	R	ug/l	RE
SVOA	SW8270	BENZO(b)FLUORANTHENE	44131	FDSGW02ALA	44131001	WG	1.1	U	1.1	UJ	ug/L	IC
SVOA	SW8270C	BENZO(b)FLUORANTHENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	BENZO(g,h,i)PERYLENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	3	J	3	R	ug/l	RE
SVOA	SW8270	BENZO(k)FLUORANTHENE	CNC04	008G000110	S004816A*1	WG	10	U	10	UJ	ug/L	CC
SVOA	SW8270	BENZO(k)FLUORANTHENE	CNC04	008H000110	S004816A*2	WG	10	U	10	UJ	ug/L	CC
SVOA	SW8270	BENZO(k)FLUORANTHENE	CNC04	008F000110	S004816A*3	WQ	10	U	10	UJ	ug/L	CC
SVOA	SW8270C	BENZO(k)FLUORANTHENE	CNC118	008GW004M6	S244366*7	WG	10	U	10	UJ	ug/l	IC
SVOA	SW8270C	BENZO(k)FLUORANTHENE	CNC118	636GW001M6	S244366*9	WG	10	U	10	UJ	ug/l	IC
SVOA	SW8270C	BENZO(k)FLUORANTHENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	1	J	1	R	ug/l	RE
SVOA	SW8270C	Benzoic acid	CNC118	008GW001M6	S244399A*3	WG	50	U	50	UJ	ug/l	IC,CC
SVOA	SW8270C	Benzoic acid	CNC118	008GW005M6	S244399A*4	WG	50	U	50	UJ	ug/l	IC,CC
SVOA	SW8270C	Benzoic acid	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	Benzyl alcohol	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	BENZYL BUTYL PHTHALATE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	bis(2-CHLOROETHOXY) METHANE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	2-CHLOROETHYL ETHER	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	Bis(2-Chloroisopropyl)Ether	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	Bis(2-Chloroisopropyl)Ether	CNC142	008GW04DM7	S246090*1	WG	10	U	10	UJ	ug/l	CC
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	CNC04	008G000110	S004816A*1	WG	10	U	10	UJ	ug/L	CC
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	CNC04	008H000110	S004816A*2	WG	10	U	10	UJ	ug/L	CC
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	CNC04	008F000110	S004816A*3	WQ	10	U	10	UJ	ug/L	CC
SVOA	SW8270C	bis(2-ETHYLHEXYL) PHTHALATE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	CARBAZOLE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270	CHRYSENE	CNC04	008G000110	S004816A*1	WG	10	U	10	UJ	ug/L	CC
SVOA	SW8270	CHRYSENE	CNC04	008H000110	S004816A*2	WG	10	U	10	UJ	ug/L	CC

Attachment 1 - Characterized Qualifiers and Results
 Zone G, SWMU B, C 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
SVOA	SW8270	CHRYSENE	CNC04	008F000110	S004816A*3	WQ	10	U	10	UJ	ug/L	CC
SVOA	SW8270C	CHRYSENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	DIBENZ(a,h)ANTHRACENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	2.8	J	2.8	R	ug/l	RE
SVOA	SW8270C	DIBENZOFURAN	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	DIETHYL PHTHALATE	CNC118	008GW005M6RE	S244399A*4*RE	WG	0.53	J	0.53	R	ug/l	RE
SVOA	SW8270C	DIMETHYL PHTHALATE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	DI-n-BUTYL PHTHALATE	CNC118	008GW005M6RE	S244399A*4*RE	WG	1.1	J	1.1	R	ug/l	RE
SVOA	SW8270C	DI-n-OCTYLPHTHALATE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	FLUORANTHENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	FLUORANTHENE	CNC142	008GW04DM7	S246090*1	WG	10	U	10	UJ	ug/l	CC
SVOA	SW8270C	FLUORENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	HEXACHLOROBENZENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	HEXACHLOROBUTADIENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	HEXACHLOROCYCLOPENTADIENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	HEXACHLOROETHANE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	INDENO(1,2,3-c,d)PYRENE	CNC118	008GW004M6	S244366*7	WG	10	U	10	UJ	ug/l	IC
SVOA	SW8270C	INDENO(1,2,3-c,d)PYRENE	CNC118	636GW001M6	S244366*9	WG	10	U	10	UJ	ug/l	IC
SVOA	SW8270C	INDENO(1,2,3-c,d)PYRENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	2.4	J	2.4	R	ug/l	RE
SVOA	SW8270C	ISOPHORONE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	m,p-Cresols	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	NAPHTHALENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	NITROBENZENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	N-NITROSODI-n-PROPYLAMINE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	N-NITROSODIPHENYLAMINE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	PENTACHLOROPHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	50	U	50	R	ug/l	RE
SVOA	SW8270C	PHENANTHRENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	PHENOL	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
SVOA	SW8270C	PYRENE	CNC118	008GW005M6RE	S244399A*4*RE	WG	10	U	10	R	ug/l	RE
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	CNC04	008G000110	S004816A*1	WG	5	U	5	UJ	ug/L	CC
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	CNC04	008H000110	S004816A*2	WG	5	U	5	UJ	ug/L	CC
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	CNC04	008F000110	S004816A*3	WQ	5	U	5	UJ	ug/L	CC
VOA	SW8260B	1,2,3-Trichlorobenzene	CNC118	008GW004M6	S244366*7	WG	1.6	JB	5	U	ug/l	BL

Attachment 1 - Changed Qualifiers and Results
 Zone G, SWMU 8, AOC 636 - Data Validation

Parameter Class	Analyte Method	Parameter	Site	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
VOA	SW8260B	1,2,3-Trichlorobenzene	CNC118	636GW001M6	S244366*9	WG	1.3	JB	5	U	ug/l	BL
VOA	SW8260B	1,2,3-Trichlorobenzene	CNC118	008GW001M6	S244399A*3	WG	2	J	5	U	ug/l	BL
VOA	SW8260B	1,2,3-Trichlorobenzene	CNC118	008GW005M6	S244399A*4	WG	1.5	J	5	U	ug/l	BL
VOA	SW8260B	1,2-DICHLOROBENZENE	CNC118	008GW004M6	S244366*7	WG	1.8	J	5	U	ug/l	BL
VOA	SW8260B	1,2-DICHLOROBENZENE	CNC118	636GW001M6	S244366*9	WG	4.5	J	5	U	ug/l	BL
VOA	SW8260B	1,2-DICHLOROBENZENE	CNC118	008GW001M6	S244399A*3	WG	1.2	J	5	U	ug/l	BL
VOA	SW8260B	1,2-DICHLOROBENZENE	CNC118	008GW005M6	S244399A*4	WG	2	J	5	U	ug/l	BL
VOA	SW8260B	2-Chloroethyl vinyl ether	CNC118	008GW004M6	S244366*7	WG	10	U	10	UJ	ug/l	CC
VOA	SW8260B	2-Chloroethyl vinyl ether	CNC118	636GW001M6	S244366*9	WG	10	U	10	UJ	ug/l	CC
VOA	SW8260B	ACETONE	CNC118	636GW001M6	S244366*9	WG	15	=	15	J	ug/l	BS
VOA	SW8260B	ACETONE	CNC142	008GW04DM7	S246090*1	WG	10	U	10	UJ	ug/l	IC
VOA	SW8260	BROMOFORM	CNC04	008G000110	S004816A*1	WG	5	U	5	UJ	ug/L	CC
VOA	SW8260	BROMOFORM	CNC04	008H000110	S004816A*2	WG	5	U	5	UJ	ug/L	CC
VOA	SW8260	BROMOFORM	CNC04	008F000110	S004816A*3	WQ	5	U	5	UJ	ug/L	CC
VOA	SW8260B	BROMOMETHANE	CNC118	008GW004M6	S244366*7	WG	10	U	10	UJ	ug/l	BS
VOA	SW8260B	BROMOMETHANE	CNC118	636GW001M6	S244366*9	WG	10	U	10	UJ	ug/l	BS
VOA	SW8260B	BROMOMETHANE	CNC118	008GW001M6	S244399A*3	WG	10	U	10	UJ	ug/l	CC
VOA	SW8260B	BROMOMETHANE	CNC118	008GW005M6	S244399A*4	WG	10	U	10	UJ	ug/l	CC
VOA	SW8260	CHLOROETHANE	CNC04	008G000110	S004816A*1	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260	CHLOROETHANE	CNC04	008H000110	S004816A*2	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260	CHLOROETHANE	CNC04	008F000110	S004816A*3	WQ	10	U	10	UJ	ug/L	CC
VOA	SW8260B	CHLOROETHANE	CNC142	008GW04DM7	S246090*1	WG	10	U	10	UJ	ug/l	IC
VOA	SW8260	2-BUTANONE (MEK)	CNC04	008G000110	S004816A*1	WG	10	U	10	UJ	ug/L	IC
VOA	SW8260	2-BUTANONE (MEK)	CNC04	008H000110	S004816A*2	WG	10	U	10	UJ	ug/L	IC
VOA	SW8260	2-BUTANONE (MEK)	CNC04	008F000110	S004816A*3	WQ	10	U	10	UJ	ug/L	IC
VOA	SW8260	METHYLENE CHLORIDE	CNC04	008G000110	S004816A*1	WG	0.98	JB	5	U	ug/L	BL
VOA	SW8260	METHYLENE CHLORIDE	CNC04	008H000110	S004816A*2	WG	1.1	JB	5	U	ug/L	BL
VOA	SW8260	METHYLENE CHLORIDE	CNC04	008F000110	S004816A*3	WQ	0.76	JB	5	U	ug/L	BL
VOA	SW8260B	METHYLENE CHLORIDE	CNC118	008GW004M6	S244366*7	WG	0.32	J	5	U	ug/l	BL
VOA	SW8260B	METHYLENE CHLORIDE	CNC118	636GW001M6	S244366*9	WG	0.35	J	5	U	ug/l	BL
VOA	SW8260B	METHYLENE CHLORIDE	CNC118	008GW001M6	S244399A*3	WG	2.7	J	5	U	ug/l	BL
VOA	SW8260B	METHYLENE CHLORIDE	CNC118	008GW005M6	S244399A*4	WG	2.4	J	5	U	ug/l	BL

Attachment 1 - Character Qualifiers and Results
 Zone G, SWMU 8 C 636 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Lab Sample ID	Matrix	Lab Result	Lab Qual	Final Result	Final Qual	Units	Reasons
VOA	SW8260B	METHYLENE CHLORIDE	CNC142	008GW04DM7	S246090*1	WG	0.84	JB	5	U	ug/l	BL
VOA	SW8260	NAPHTHALENE	44131	FDSGW02ALA	44131001	WG	0.37	JB	5	UJ	ug/L	BL,CC
VOA	SW8260	Vinyl acetate	CNC04	008G000110	S004816A*1	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260	Vinyl acetate	CNC04	008H000110	S004816A*2	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260	Vinyl acetate	CNC04	008F000110	S004816A*3	WQ	10	U	10	UJ	ug/L	CC

Chain of Custody/ Laboratory Analysis Form

Lab Batch/SDG ID: _____ page 1 of 3

Laboratory: GEL, Charleston, SC
 Project Name: Charleston Navy Complex Site Name: Zone G, FDS Area 2-6
 Project Number: _____ TAT: 21 day
 Project Manager: Gary Foster/ATL/CCI 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 2nd page of COC EDD: CNC format

Sample ID	Station ID	Depth		Date & Time Collected	Matrix	# of containers	VOCs (SW8260)	pH (E150.1)	SVOCs (SW8270)	3 - 40ml vial, HCl	1 - 250mL HDPE	2 - 1 Liter Amber	Comments
		Begin	End										
FDSGW02ALA	GFDSEW02ALA			6-13-01/1205	WG	6	X	X	X				
FDSGW04BLA	GFDSEW04BLA	6-14-01		6-13-01/1030	WG	6	X	X	X				
FDSGW05BLA	GFDSEW05BLA			6-14-01/1110	WG	6	X	X	X				
FDSGW06BLA	GFDSEW06BLA			6-13-01/1515	WG	6	X	X	X				
FDSEW06BLA	GFDSEW06BLA			6-14-01/1115	WQ	6	X	X	X				EB
FDSTW06BLA	GFDSTW06BLA			Lab Supplied	WQ	3	X						TB

4431
021
022
023
024
025
026

Sampled By Chris Blundy Date/Time 6-14-01/950 Relinquished by: Chris Blundy Date/Time 6-15-01
 Additional Samplers: _____
 Received By Lab: Patricia Dover Date/Time 6/15/01 17:00 Relinquished by: _____ Date/Time _____
 Received: _____ Date/Time _____ Shipped Via: UPS FedEx Hand Other

Laboratory: STL		Site Name:	
Project Name: Charleston Navy Complex		Zone G, SWMU 8 and AOC 636 and 637	
Project Number: 158814.PM.04		TAT: 14 day package	
Project Manager:		QA 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	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
			Hydrazine (ASTM)	Hydrazine (ASTM)				Metals (SW6010B)	GRO	DRO *	Fingerprint	PCBs (SW8015)	
008GW001M1	G008GW001	G008GW001				WG	X		X				
008GW002M1	G008GW002	G008GW002				WG	X		X				
008GW003M1	G008GW003	G008GW003			3/29/02 1120	WG	2	X	X				
008HW003M1	G008GW003	G008GW003			3/29/02 1120	WG	2	X	X				
008GW004M1	G008GW004	G008GW004			3/28/02 1635	WG	2	X	X				
008GW005M1	G008GW005	G008GW005				WG		X	X				
008GW006M1	G008GW006	G008GW006				WG		X	X				
637GW001M1	G637GW001	G637GW001			3/29/02 6W 1305	WG	2	X	X				
637GW003M1	G637GW003	G637GW003			3/29/02 1215	WG	2	X	X				
637GW003M1MS	G637GW003	G637GW003			3/29/02 1215	WG	2	X	X				MS
637GW003M1SD	G637GW003	G637GW003			3/29/02 1215	WG	2	X	X				MSD
FDSGW02AM1	GFDSGW02A	GFDSGW02A			3/28/02 1810	WG	2	X	X				
FDSGW02CM1	GFDSGW02C	GFDSGW02C			3/28/02 1835	WG	2	X	X				
FDSGW03CM1	GFDSGW03C	GFDSGW03C			3/28/02 1740	WG	2	X	X				
FDSGW05BM1	GFDSGW05B	GFDSGW05B			3/28/02 1545	WG	2	X	X				
636GW001M1	G636GW001	G636GW001			3/28/02 1625	WG	1	X					
637GW002M1	G637GW002	G637GW002			3/29/02 1510	WG	1	X					
638GW001M1	G638GW001	G638GW001			3/28/02 1510	WG	1	X					
638HW001M1	G638GW001	G638GW001			3/28/02 1510	WG	1	X					
FDSGW01EM1	GFDSGW01E	GFDSGW01E			3/29/02 1655	WG	1	X					

Sampled By: <i>Angie Willis</i>	Date/Time: 3/29/02	Relinquished by: <i>Angie Willis</i>	Date/Time: 3/29/02
Additional Samplers: <i>Ryan Bittel</i>			1980
Received By Lab: <i>Paul Hill</i>	Date/Time: 033002 1047	Relinquished by:	Date/Time:
Received By:	Date/Time:	Shipped Via: UPS FedEx Hand Other Tracking#:	Temperature:
Remarks:			

Receipt Exceptions: 52 92233

Laboratory: **STL**
 Project Name: **Charleston Navy Complex**
 Site Name: _____
 Project Number: **158814.PM.04** TAT: **14 day package**
 Project Manager: _____ QA 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**

Lot Batch/SDG: _____

Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	1 - 125ml HDPE	1 - 2 ounce jar	1 - 500ml HDPE, HNC3	1 - 2 ounce jar	1 - 2 ounce jar	Fingerprint	PCBs (SW8015)	Comments
			Hydrazine (ASTM)	Hydrazine (ASTM)				Metals (SW6010B)	GRO	DRO *					
653GW003M1	H653GW003	H653GW003				WG		X							
FDSGW02DM1	GFD SGW02D	GFD SGW02D				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 1540	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 1205	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							
008GSP04M1	G008GSP04	Vertical Pipe 04			3/29/02 1805	OL	3		X		X	X	X	X	LNAPL
008GSP11M1	G008GSP11	Vertical Pipe 11			3/29/02 1820	OL	3		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 D'Amico Date/Time: 3/29/02 1830 Relinquished by: Greg D'Amico Date/Time: 3/29/02
 Additional Samplers: Ryan B. Hales
 Received By Lab: [Signature] Date/Time: 0330021042 Relinquished by: _____ Date/Time: _____
 Received By: _____ Date/Time: _____ Shipped Via: UPS FEDEX Hand Other Tracking#: _____
 Remarks: _____ Temperature: _____

Receipt Exceptions: 5242233

CH2M HILL Chain of Custody/Laboratory Analysis Form

Laboratory: STL
 Project Name: Charleston Navy Complex
 Project Number: 158814.PM.04
 Project Manager: _____
 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

Site Name: Zone G, SWMU 8 and AOC 636 and 637
 TAT: 14 day package
 QA Level: 3

Lab Batch/SDG:

Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	# of containers							Comments		
			Begin	End				Hydrazine (ASTM)	Hydrazine (ASTM)	Metals (SW6010B)	GRO	DRO *	Fingerprint	PCBs (SW8015)			
008GW001M1	G008GW001	G008GW001			3/30/02 1250	WG	2	X		X							
008GW002M1	G008GW002	G008GW002			3/30/02 1155	WG	2	X		X							
008GW003M1	G008GW003	G008GW003			3/29/02 1120	WG	2	X		X							
008GW003M1	G008GW003	G008GW003			3/29/02 1120	WG	2	X		X							
008GW004M1	G008GW004	G008GW004			3/26/02 1655	WG	2	X		X							
008GW005M1	G008GW005	G008GW005			3/30/02 1245	WG	2	X		X							
008GW006M1	G008GW006	G008GW006			3/30/02 1345	WG	2	X		X							
637GW001M1	G637GW001	G637GW001			3/29/02 1825	WG	2	X		X							
637GW003M1	G637GW003	G637GW003			3/29/02 1215	WG	2	X		X							
637GW003M1MS	G637GW003	G637GW003			3/29/02 1215	WG	2	X		X							MS
637GW003M1SD	G637GW003	G637GW003			3/29/02 1215	WG	2	X		X							MSD
FDSGW02AM1	GFDSGW02A	GFDSGW02A			3/26/02 1810	WG	2	X		X							
FDSGW02CM1	GFDSGW02C	GFDSGW02C			3/28/02 1835	WG	2	X		X							
FDSGW03CM1	GFDSGW03C	GFDSGW03C			3/28/02 1740	WG	2	X		X							
FDSGW05BM1	GFDSGW05B	GFDSGW05B			3/28/02 1545	WG	2	X		X							
636GW001M1	G636GW001	G636GW001			3/28/02 1625	WG	1	X									
637GW002M1	G637GW002	G637GW002			3/29/02 1810	WG	1	X									
638GW001M1	G638GW001	G638GW001			3/28/02 1510	WG	1	X									
638HW001M1	G638GW001	G638GW001			3/28/02 1510	WG	1	X									
FDSGW01EM1	GFDSGW01E	GFDSGW01E			3/29/02 1655	WG	1	X									

Sampled By: Henry D Willis Date/Time: 3/29/02 Relinquished by: Henry D Willis Date/Time: 3/29/02
 Additional Samplers: Ryan Gately Date/Time: 3/30/02 1500 Relinquished by: _____ Date/Time: 1930
 Received By Lab: Julie Hill Date/Time: 040202 1045 Relinquished by: _____ Date/Time: _____
 Received By: _____ Date/Time: _____ Shipped Via: UPS ~~FedEx~~ Hand Other Tracking#: _____
 Remarks: _____ Temperature: _____

Receipt options: _____
 07 1177 111

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		Project Manager:		QA 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															
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			3/30/02 1110	WG	1	X											
FDSGW02DM1	GFDSGW02D	GFDSGW02D			3/30/02 1410	WG	1	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 1540	WG	1	X											MSD
C16GW005M1	GC16GW005	GCNC16 MW05			3/29/02 1740	WG	1	X											
009GW018M1	H009GW018	H009GW018			3/30/02 1015	WG	1	X											
GDDGW001M1	GDDGGW001	GDDGGW001			3/29/02 1430	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 1430	OL	3		X		X	X	X	X	X				LNAPL
008EW001M1	G008EW001				3/29/02 1600	WQ	2	X		X									EB1
008EW002M1	G008EW002				3/30/02 1500	WQ	2	X		X									EB2

Sampled By: Doug Drells Date/Time: 3/29/02 1830 Relinquished by: Doug Drells Date/Time: 3/29/02
 Additional Samplers: Ryan Bitchley Date/Time: 3/30/02 1500 Relinquished by: Ryan Bitchley Date/Time: 1930
 Received By Lab: CH2M Hill Date/Time: 0402 1045 Relinquished by: _____ Date/Time: _____
 Received By: W Date/Time: _____ Shipped Via: UPS FedEx Hand Other Tracking#: _____
 Remarks: _____ Temperature: _____

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 Beisel/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

Lab Batch/SDG:

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

Sample ID	Sample Description	Depth		Date & Time Collected	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																			
009GW001M6	H009GW001			6-19-02/1110	WG	7	X	X	X	X												R.C.R.A.
009GW004M6	H009GW004			6-19-02/1345	WG	7	X	X	X	X												
009GW013M6	H009GW013				WG		X	X	X	X												
009HW013M6	H009GW013				WG		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				WG		X	X	X	X												
008GW004M6	G008GW004			6-20-02/1015	WG	7	X	X	X	X												
008GW04DM6	G008GW04D				WG		X	X	X	X												
008GW005M6	G008GW005			6-20-02/0845	WG	7	X	X	X	X												NO WELL NOT INSTALLED CORRECTION MADE PER T. CARROLL 6/20/02
636GW001M6	G636GW001			6-20-02/0920	WG	7	X	X	X	X												
706GW001M6	G706GW001			6-20-02/1130	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		X	X	X	X												Correcting mkt PER T. CARROLL 6/20/02
121GW001M6	H121GW001				WG		X	X	X	X												NO 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 Oleson & Kim Lee Date/Time: 6-19 & 6-20-02

Relinquished by: [Signature] Date/Time: 6-20-02/1630

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

Received By Lab: [Signature] Date/Time: 6/2/02 9:10

Relinquished by: _____ Date/Time: _____

Received By: [Signature] Date/Time: 6/2/02 9:10

Shipped Via: UPS FedEx Hand Other Tracking#: _____

Remarks: _____

Temperature: _____

Received Excursions: _____

5244366

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZH009-060602-01 page 1 of 3

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 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 Collected	Matrix	# of containers	Hydrazine	VOCs (SW8260B)	SVOCs (SW8270C)	RCRA Metals								Comments	
		Begin	End																
009GW001M6	H009GW001			6-19-02/1110	WG	7	X	X	X	X									RCRA
009GW004M6	H009GW004			6-19-02/1345	WG	7	X	X	X	X									
009GW013M6	H009GW013				WG		X	X	X	X									
009HW013M6	H009GW013				WG		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				WG		X	X	X	X									
008GW004M6	G008GW004			6-20-02/1015	WG	7	X	X	X	X									
008GW04DM6	G008GW04D				WG		X	X	X	X									
008GW005M6	G008GW005			6-20-02/0845	WG	7	X	X	X	X									Flowell NOT INSTALLED
636GW001M6	G636GW001			6-20-02/0920	WG	7	X	X	X	X									
706GW001M6	G706GW001			6-20-02/1130	WG	7	X	X	X	X									
009GW008M6	H009GW008			6-20-02/0930	WG	7	X	X	X	X									
009GW005M6	H009GW005				WG		X	X	X	X									
121GW001M6	H121GW001				WG		X	X	X	X									NO 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'Keefe & Kim Lee Date/Time: 6-19 & 6-20-02 Relinquished by: [Signature] Date/Time: 6-20-02/1630

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

Received By Lab: [Signature] Date/Time: 6-21-02 9:10 Relinquished by: _____ Date/Time: _____

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

Remarks: _____ Temperature: _____

Receipt Exceptions: _____ (52-44366)



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Tallahassee

STL Tallahassee
 2846 Industrial Plaza Drive
 Tallahassee, Florida 32301
 Website: www.stl-inc.com
 Phone: (850) 878-3994
 Fax: (850) 878-9504
 Alternate Laboratory Name/Location
 Phone:
 Fax:

PROJECT REFERENCE T202453	PROJECT NO.	PROJECT LOCATION (STATE) SC	MATRIX TYPE	REQUIRED ANALYSIS										PAGE	OF		
SAMPLER'S SIGNATURE	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Hydrazine	PRESERVATIVE											STANDARD REPORT DELIVERY	<input type="checkbox"/>
CLIENT (SITE) PM Debra Veegin	CLIENT PHONE 850-878-3994	CLIENT FAX 878-9504														DATE DUE	
CLIENT NAME STL Tallahassee	CLIENT E-MAIL															EXPEDITED REPORT DELIVERY (SURCHARGE)	<input type="checkbox"/>
CLIENT ADDRESS 2846 Industrial Plaza Dr., Tallahassee FL 32301	COMPANY CONTRACTING THIS WORK (if applicable)												DATE DUE				
				NUMBER OF CONTAINERS SUBMITTED										NUMBER OF COOLERS SUBMITTED PER SHIPMENT:			

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	NUMBER OF CONTAINERS SUBMITTED										REMARKS
DATE	TIME							1	2	3	4	5	6	7	8	9	10	
6/21/02	0850	009GW013M6	X					1										H009GW013
6/21/02	1140	008GW001M6	X					1										G 008 G W001
6/20/02	1015	008GW004M6	X					1										G 008 G W004
6/21/02	0955	008GW005M6	X					1										G 008 G W005
6/20/02	0920	636GW001M6	X					1										G 636 G W001
6/20/02	1130	706GW001M6	X					1										G 706 G W001
6/21/02	1215	009EW001M6	X					1										H009EW001

RELINQUISHED BY: (SIGNATURE) EMPTY CONTAINERS	DATE	TIME	RELINQUISHED BY: (SIGNATURE) R. Brockwell	DATE 6/24/02	TIME 1100	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY: (SIGNATURE) EMPTY CONTAINERS	DATE	TIME	RECEIVED BY: (SIGNATURE) [Signature]	DATE 6/25/02	TIME 0900	RECEIVED BY: (SIGNATURE)	DATE	TIME

RECEIVED FOR LABORATORY BY: (SIGNATURE) 21	DATE	TIME	CUSTODY INTACT (YES/NO)	CUSTODY SEAL NO.	STL TALLAHASSEE LOG NO.	LABORATORY REMARKS
--	------	------	-------------------------	------------------	-------------------------	--------------------

CH2M HILL Chain of Custody/ Laboratory Analysis Form

Laboratory: STL Tallahassee		Project Name: Charleston Navy Complex		Site Name: Zone H, SWMU 9		# of containers	1 - 1L amber glass														
Project Number: 158814.PM.04		TAT: standard		Level: Level 3				Hydrazine (IC)													
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 30346-1278																	
Send Report To: see last page of COC		EDD: CNC format																			
Sample ID	Sample Description	Depth		Date & Time					Matrix	Hydrazine (IC)											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			

Lab Batch/SDG:

Sampled By: Andrew O'Connor Date/Time: 6-20/6-21-02 Relinquished by: [Signature] Date/Time: 6-21-02/1600
 Additional Samplers: C. DEAS, J. DEAS, A. STOKES
 Received By Lab: S. Oelslager Date/Time: 6/22/02 0950 Relinquished by: _____ Date/Time: _____
 Received By: _____ Date/Time: _____ Shipped Via: UPS FedEx Hand Other Tracking#: _____
 Remarks: DO2453 Temperature: ()

0022



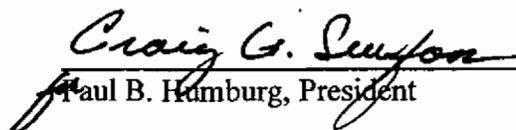
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 37602
Date: July 12, 1999
Client Name: Ensafe
Project/Site Name: Charleston - CTO-0144
Date Sampled: March 3, 1999
Number of Samples: 10 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: DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Semivolatiles

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. Hamburg, President

7 12 99
Date

SDG# 37602

Samples and Fractions Reviewed

Sample Identifications Analytical Fraction

ENSAFE ID	MATRIX	SVOA	
FDSGC04C03	WATER	X	
FDSGW02A03	WATER	X	
FDSGW02C03	WATER	X	
FDSGW02D01	WATER	X	
FDSGW03B03	WATER	X	
FDSGW03C03	WATER	X	
FDSGW04A03	WATER	X	
FDSGW04B03	WATER	X	
FDSGW04C03	WATER	X	
FDSGW05B03	WATER	X	
Total Billable Samples (Water/Soil)			10 0

SVOA= Semivolatiles

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; 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 # 37602

A validation was performed on the Semivolatile Data from SDG 37602. 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.

System Performance and Overall Assessment

The data did not require qualifications/rejections.

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

SAMPLE ID

COMPOUND ID

DL QL

NO QUALIFICATIONS WERE 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

MULTI-MEDIA SEMIVOLATILE ORGANIC FRACTION

CASE NUMBER: _____ SDG NUMBER: 37602

LABORATORY: SWOK

CLIENT: Ensafe PROJECT: CTO-0144

REVIEWER: JACleveland DATE: 7799

QA/QC LEVEL

- NEESA C
- NEESA D
- DQO LEVEL III
- DQO LEVEL IV
- _____

Statement Of Work (SOW)

- CLP 3/90
- CLP 2/88
- SW846 8270C
- SW846 8270 Appendix IX
- _____

ANALYSIS MODIFICATIONS: _____

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA

Contract: ENSAFE

Lab Code: SWOK

Case No.: FDS, RE SAS No.:

SDG No.: 37602

Lab File ID: F1855.D

DFTPP Injection Date: 03/09/99

Instrument ID: F

DFTPP Injection Time: 0927

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	50.3
68	Less than 2.0% of mass 69	1.2 (1.8)1
69	Mass 69 relative abundance	64.2
70	Less than 2.0% of mass 69	0.6 (0.9)1
127	40.0 - 60.0% of mass 198	50.6
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.3
275	10.0 - 30.0% of mass 198	21.8
365	Greater than 1.00% of mass 198	2.53
441	Present, but less than mass 443	9.0
442	Greater than 40.0% of mass 198	66.0
443	17.0 - 23.0% of mass 442	13.2 (20.0)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD080	SSTD080	F1857.D	03/09/99	1031
02	SSTD160	SSTD160	F1858.D	03/09/99	1104
03	SSTD020	SSTD020	F1859.D	03/09/99	1137
04	SSTD050	SSTD050	F1861.D	03/09/99	1350
05	SSTD120	SSTD120	F1862.D	03/09/99	1422
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 09-MAR-99 10:31
 End Cal Date : 09-MAR-99 14:22
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/f.i/f990309a.b/BNA8270C.m
 Cal Date : 09-Mar-1999 17:48 diana

Calibration File Names:

Level 1: /chem/f.i/f990309a.b/f1859.d
 Level 2: /chem/f.i/f990309a.b/f1861.d
 Level 3: /chem/f.i/f990309a.b/f1857.d
 Level 4: /chem/f.i/f990309a.b/f1862.d
 Level 5: /chem/f.i/f990309a.b/f1858.d

Compound	20	50	80	120	160	RRF	% RSD/R ²
	Level 1	Level 2	Level 3	Level 4	Level 5		
1 N-Nitrosodimethylamine	0.52653	0.45542	0.68043	0.69407	0.64289	0.59987	0.983
2 Pyridine	1.22932	1.20854	0.97772	1.31165	1.38880	1.22321	12.649
5 Phenol	1.77328	1.80582	1.73818	1.62376	1.66032	1.72027	4.442
6 Aniline	2.03644	1.81235	1.79745	1.63869	1.73215	1.80342	8.160
7 bis(2-Chloroethyl)ether	1.43685	1.38771	1.28992	1.22432	1.24972	1.31770	6.915
2-Chlorophenol	1.26595	1.29638	1.23207	1.15066	1.11870	1.21275	6.239
9 1,3-Dichlorobenzene	1.45567	1.34514	1.30517	1.26843	1.21644	1.31817	6.851
11 1,4-Dichlorobenzene	1.57074	1.40683	1.34407	1.27975	1.26334	1.37295	9.054
12 Benzyl alcohol	0.87991	0.89863	0.84179	0.84942	0.80466	0.85488	4.243
13 1,2-Dichlorobenzene	1.38878	1.37216	1.28866	1.21109	1.18549	1.28924	7.115
14 2-Methylphenol	1.25316	1.28344	1.23148	1.15921	1.11192	1.20784	5.839
15 bis(2-Chloroisopropyl)ether	2.14739	2.02679	2.10534	1.85520	1.91300	2.00954	6.176
110 2,2-oxybis(1-Chloropropane	2.14739	2.02679	2.10534	1.85520	1.91300	2.00954	6.176
16 4-Methylphenol	1.43087	1.43720	1.31970	1.26873	1.22651	1.33660	7.100
17 N-Nitroso-di-n-propylamine	1.14450	1.07856	1.16388	1.07516	1.05122	1.10266	4.416
18 Hexachloroethane	0.67544	0.66978	0.66729	0.64619	0.62718	0.65718	3.057
19 dl-Pantalactone	++++	++++	++++	++++	++++	0.00000	++++
21 Nitrobenzene	0.42264	0.42142	0.42709	0.38843	0.39559	0.41103	4.300
22 Isophorone	0.76377	0.80570	0.84769	0.68788	0.70943	0.76289	8.672
23 2-Nitrophenol	0.19335	0.19228	0.20445	0.18928	0.19038	0.19395	3.136
24 2,4-Dimethylphenol	0.35207	0.35028	0.36542	0.33647	0.33577	0.34800	3.542
25 bis(2-Chloroethoxy)methane	0.45762	0.47371	0.48251	0.45769	0.45619	0.46554	2.556
26 2,4-Dichlorophenol	0.27149	0.28636	0.28356	0.26668	0.26244	0.27411	3.816
27 1,2,4-Trichlorobenzene	0.33446	0.30656	0.29749	0.30432	0.29183	0.30693	5.358
28 Benzoic Acid	0.37810	0.39605	0.48199	0.42986	0.46462	0.43012	10.232
30 Naphthalene	1.04104	1.02454	0.97614	0.93656	0.91656	0.97897	5.508
31 4-Chloroaniline	0.45544	0.43928	0.45181	0.43356	0.42087	0.44019	3.183
32 Hexachlorobutadiene	0.19095	0.17801	0.18122	0.16602	0.16740	0.17672	5.840
33 4-Chloro-3-methylphenol	0.35145	0.36031	0.37122	0.32570	0.33846	0.34943	5.121

<- R L JA

tes Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 09-MAR-99 10:31
 End Cal Date : 09-MAR-99 14:22
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/f.i/f990309a.b/BNA8270C.m
 Cal Date : 09-Mar-1999 17:48 diana

Calibration File Names:

Level 1: /chem/f.i/f990309a.b/f1859.d
 Level 2: /chem/f.i/f990309a.b/f1861.d
 Level 3: /chem/f.i/f990309a.b/f1857.d
 Level 4: /chem/f.i/f990309a.b/f1862.d
 Level 5: /chem/f.i/f990309a.b/f1858.d

Compound	20 Level 1	50 Level 2	80 Level 3	120 Level 4	160 Level 5	RRF	% RSD/R^2
34 2-Methylnaphthalene	0.94510	0.89329	0.92654	0.83037	0.80615	0.88029	6.839
35 1-Methylnaphthalene	0.58754	0.57688	0.56927	0.54532	0.53971	0.56374	3.642
36 1,2,4,5-Tetrachlorobenzene	0.34176	0.33707	0.31810	0.31354	0.30117	0.32233	5.231
37 Hexachlorocyclopentadiene	0.24369	0.24593	0.30205	0.26558	0.28628	0.26871	9.442
38 2,4,6-Trichlorophenol	0.32842	0.31183	0.33382	0.30920	0.29190	0.31503	5.292
39 2,4,5-Trichlorophenol	0.34322	0.32959	0.35979	0.33571	0.33763	0.34119	3.366
41 2-Chloronaphthalene	1.08160	0.95617	0.97066	0.94622	0.89857	0.97064	6.970
42 2-Nitroaniline	0.33546	0.37700	0.43440	0.36951	0.40172	0.38362	9.639
43 Dimethylphthalate	1.27101	1.14873	1.22092	1.13091	1.11297	1.17691	5.666
44 Acenaphthylene	1.66456	1.62650	1.66460	1.55848	1.54178	1.61118	3.610
45 2,6-Dinitrotoluene	0.20810	0.25551	0.28118	0.26502	0.27347	0.25666	11.213
47 3-Nitroaniline	0.32304	0.35508	0.37658	0.34697	0.35073	0.35048	5.465
48 Acenaphthene	1.18897	1.08853	1.05691	1.03443	0.98870	1.07151	7.005
49 2,4-Dinitrophenol	0.08867	0.13267	0.17136	0.14584	0.16161	0.14003	0.987
50 Dibenzofuran	1.66356	1.52797	1.58453	1.43597	1.40306	1.52302	7.005
51 4-Nitrophenol	0.16631	0.18515	0.19314	0.16618	0.17880	0.17792	6.633
52 2,4-Dinitrotoluene	0.35695	0.37051	0.42950	0.38606	0.40083	0.38877	7.227
53 2,3,4,6-Tetrachlorophenol	0.35656	0.33838	0.35582	0.33040	0.33533	0.34330	3.528
54 Fluorene	1.30363	1.23165	1.24946	1.18928	1.13913	1.22263	5.083
55 Diethylphthalate	1.89127	1.44311	1.44185	1.30443	1.32501	1.48113	0.998 L
56 4-Chlorophenyl-phenylether	0.65240	0.60546	0.59945	0.58045	0.56270	0.60009	5.620
57 4-Nitroaniline	0.36795	0.38596	0.43771	0.40133	0.40873	0.40034	6.518
58 4,6-Dinitro-2-methylphenol	0.08364	0.11257	0.12470	0.12466	0.13091	0.11530	0.999 L
59 N-Nitrosodiphenylamine	0.50918	0.47615	0.47156	0.44798	0.43733	0.46844	5.958
60 Azobenzene	0.97984	0.92520	0.94367	0.87246	0.88036	0.92031	4.859
62 4-Bromophenylphenylether	0.20823	0.18786	0.18701	0.18917	0.18134	0.19072	5.365
63 Hexachlorobenzene	0.25494	0.25229	0.24375	0.23755	0.22784	0.24327	4.543
64 Pentachlorophenol	0.13108	0.14458	0.15771	0.15352	0.15327	0.14803	7.169
66 Phenanthrene	1.04664	1.03915	0.94886	0.96785	0.90660	0.98182	6.117

0.987 R L Jt - Next

<- ites Error R = % RSD or R^2 Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 09-MAR-99 10:31
 End Cal Date : 09-MAR-99 14:22
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/f.i/f990309a.b/BNA8270C.m
 Cal Date : 09-Mar-1999 17:48 diana

Calibration File Names:

Level 1: /chem/f.i/f990309a.b/f1859.d
 Level 2: /chem/f.i/f990309a.b/f1861.d
 Level 3: /chem/f.i/f990309a.b/f1857.d
 Level 4: /chem/f.i/f990309a.b/f1862.d
 Level 5: /chem/f.i/f990309a.b/f1858.d

Compound	20 Level 1	50 Level 2	80 Level 3	120 Level 4	160 Level 5	RRF	% RSD/R ²
67 Anthracene	1.00806	0.97119	0.95006	0.92797	0.87406	0.94627	5.285
58 Carbazole	1.04371	1.00001	0.96964	0.93960	0.90869	0.97233	5.391
59 2-Bromo-6-Methoxynaphthalene	+++++	+++++	+++++	+++++	+++++	0.00000	+++++
70 Di-n-butylphthalate	1.31064	1.24151	1.33633	1.21353	1.19173	1.25875	4.952
71 Fluoranthene	1.13913	1.13360	1.06113	1.05731	1.02145	1.08252	4.764
2 Benzidine	0.33318	0.22546	0.20565	0.16288	0.20034	0.22550	0.953
73 Pyrene	1.25577	1.17744	1.20065	1.13498	1.07454	1.16868	5.848
75 Butylbenzylphthalate	0.62830	0.60116	0.65349	0.62015	0.63398	0.62742	3.051
76 Benzo(a)anthracene	1.13157	1.05734	1.07638	1.06453	1.01948	1.06986	3.789
77 3,3'-Dichlorobenzidine	0.41206	0.40798	0.42292	0.42099	0.42210	0.41721	1.619
79 Chrysene	1.25196	1.13609	1.10432	1.03294	0.99886	1.10483	8.940
80 bis(2-Ethylhexyl)phthalate	0.77120	0.78515	0.86596	0.82868	0.85162	0.82052	5.018
81 Di-n-octylphthalate	1.15948	1.19445	1.53616	1.34820	1.42820	1.33330	11.851
82 Benzo(b)fluoranthene	1.25936	1.42556	1.31145	1.34258	1.19847	1.30748	6.556
83 Benzo(k)fluoranthene	1.47640	1.28542	1.28111	1.20651	1.22653	1.29519	8.253
84 Benzo(a)pyrene	1.09836	1.07217	1.05444	1.09124	1.02552	1.06835	2.756
86 Indeno(1,2,3-cd)pyrene	0.96774	0.93365	1.03760	1.00510	0.99647	0.98811	3.981
87 Dibenz(a,h)anthracene	1.03763	1.04558	1.05043	1.06930	0.96052	1.03269	4.066
88 Benzo(g,h,i)perylene	1.13472	1.12634	1.08222	1.15139	1.03538	1.10601	4.253
\$ 3 2-Fluorophenol	1.09522	1.02270	1.05524	0.95076	0.99909	1.02460	5.353
\$ 4 Phenol-d5	1.62270	1.62521	1.59666	1.56453	1.55432	1.59268	2.044
\$ 114 2-Chlorophenol-d4	1.26815	1.22463	1.10932	1.16711	1.15454	1.18475	5.247
\$ 112 1,2-Dichlorobenzene-d4	0.88885	0.89840	0.82040	0.78012	0.78610	0.83477	6.706
\$ 20 Nitrobenzene-d5	0.38511	0.38414	0.40321	0.37467	0.36791	0.38301	3.482
\$ 40 2-Fluorobiphenyl	1.08800	0.98556	1.02925	0.97204	0.92692	1.00035	6.107
\$ 61 2,4,6-Tribromophenol	0.20825	0.21557	0.23538	0.20606	0.21289	0.21563	5.406
\$ 74 Terphenyl-d14	0.87286	0.78698	0.84497	0.79008	0.75723	0.81042	5.815

← R LNA

ates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA

Contract: ENSAFE

Lab Code: SWOK

Case No.: FDS, RE SAS No.:

SDG No.: 37602

Lab File ID: F1912.D

DFTPP Injection Date: 03/11/99

Instrument ID: F

DFTPP Injection Time: 1147

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	39.5
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	60.2
70	Less than 2.0% of mass 69	0.0 (0.0)1
127	40.0 - 60.0% of mass 198	49.3
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.7
275	10.0 - 30.0% of mass 198	22.1
365	Greater than 1.00% of mass 198	2.07
441	Present, but less than mass 443	9.5
442	Greater than 40.0% of mass 198	69.8
443	17.0 - 23.0% of mass 442	14.2 (20.4)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD080	SSTD080	F1913.D	03/11/99	1206
02	SBLK1	BL0305WB	F1914.D	03/11/99	1238
03	LCS1	LC0305WB	F1915.D	03/11/99	1311
04	LCSD1	LD0305WB	F1916.D	03/11/99	1344
05	FDSGW03C03	37602.02	F1922.D	03/11/99	1700
06	FDSGW03B03	37602.03	F1923.D	03/11/99	1733
07	FDSGW02D01	37602.04	F1924.D	03/11/99	1806
08	FDSGW05B03	37602.05	F1925.D	03/11/99	1838
09	FDSGW02A03	37602.06	F1926.D	03/11/99	1910
10	FDSGW02C03	37602.07	F1927.D	03/11/99	1942
11	FDSGW04A03	37602.08	F1928.D	03/11/99	2015
12	FDSGW04B03	37602.09	F1929.D	03/11/99	2047
13	FDSGW04C03	37602.10	F1930.D	03/11/99	2119
14	FDSGC04C03	37602.11	F1931.D	03/11/99	2151
15					
16					
17					
18					
19					
20					
21					
22					

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: f.i Injection Date: 11-MAR-1999 12:06
 Lab File ID: f1913.d Init. Calibration Date(s): 03/09/99 03/09/99
 Analysis Type: WATER Init. Calibration Times: 10:31 14:22
 Lab Sample ID: SSTD080 Method File: /chem/f.i/f990311a.b/BNA8270C.m
 Quant Type: ISTD

COMPOUND	RRF	RF80	MIN RRF	%D	MAX %D
2 Pyridine	1.223	1.273	0.010	4.1	50.0
1 N-Nitrosodimethylamine	0.710	0.559	0.010	N/A ✓	50.0
\$ 3 2-Fluorophenol	1.025	1.013	0.010	1.1	50.0
\$ 4 Phenol-d5	1.593	1.574	0.010	1.1	50.0
5 Phenol	1.720	1.727	0.010	0.4	20.0
7 bis(2-Chloroethyl)ether	1.318	1.308	0.010	0.8	50.0
8 2-Chlorophenol	1.213	1.221	0.010	0.7	50.0
9 1,3-Dichlorobenzene	1.318	1.342	0.010	1.8	50.0
11 1,4-Dichlorobenzene	1.373	1.372	0.010	0.1	20.0
12 Benzyl alcohol	0.855	0.855	0.010	0.0	50.0
13 1,2-Dichlorobenzene	1.289	1.350	0.010	4.7	50.0
14 2-Methylphenol	1.208	1.225	0.010	1.4	50.0
15 bis(2-Chloroisopropyl)ether	2.010	1.683	0.010	16.3	50.0
16 4-Methylphenol	1.337	1.317	0.010	1.4	50.0
17 N-Nitroso-di-n-propylamine	1.103	1.051	0.050	4.7	50.0
18 Hexachloroethane	0.657	0.665	0.010	1.1	50.0
\$ 20 Nitrobenzene-d5	0.383	0.372	0.010	2.8	50.0
21 Nitrobenzene	0.411	0.378	0.010	8.0	50.0
22 Isophorone	0.763	0.728	0.010	4.6	50.0
23 2-Nitrophenol	0.194	0.210	0.010	8.1	20.0
24 2,4-Dimethylphenol	0.348	0.342	0.010	1.7	50.0
25 bis(2-Chloroethoxy)methane	0.466	0.451	0.010	3.1	50.0
28 Benzoic Acid	0.430	0.491	0.010	14.3	50.0
27 1,2,4-Trichlorobenzene	0.307	0.312	0.010	1.6	50.0
30 Naphthalene	0.979	0.945	0.010	3.5	50.0
31 4-Chloroaniline	0.440	0.442	0.010	0.3	50.0
32 Hexachlorobutadiene	0.177	0.183	0.010	3.7	20.0
33 4-Chloro-3-methylphenol	0.349	0.345	0.010	1.4	20.0
34 2-Methylnaphthalene	0.880	0.873	0.010	0.8	50.0
37 Hexachlorocyclopentadiene	0.269	0.322	0.050	19.9	50.0
38 2,4,6-Trichlorophenol	0.315	0.322	0.010	2.3	20.0
39 2,4,5-Trichlorophenol	0.341	0.364	0.010	6.6	50.0
\$ 40 2-Fluorobiphenyl	1.000	0.996	0.010	0.4	50.0
26 2,4-Dichlorophenol	0.274	0.278	0.010	1.5	20.0
41 2-Chloronaphthalene	0.971	0.946	0.010	2.6	50.0
42 2-Nitroaniline	0.384	0.353	0.010	7.9	50.0
43 Dimethylphthalate	1.177	1.139	0.010	3.2	50.0
44 Acenaphthylene	1.611	1.533	0.010	4.9	50.0
45 2,6-Dinitrotoluene	0.257	0.294	0.010	14.4	50.0
52 2,4-Dinitrotoluene	0.389	0.413	0.010	6.2	50.0
47 3-Nitroaniline	0.350	0.360	0.010	2.7	50.0
48 Acenaphthene	1.072	1.022	0.010	4.6	20.0
49 2,4-Dinitrophenol	0.170	0.184	0.050	N/A ✓	50.0
51 4-Nitrophenol	0.178	0.176	0.050	0.9	50.0

OK
3/17/99 DM

Data File: /chem/f.i/f990311a.b/f1913.d
 Report Date: 12-Mar-1999 10:24

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: f.i Injection Date: 11-MAR-1999 12:06
 Lab File ID: f1913.d Init. Calibration Date(s): 03/09/99 03/09/99
 Analysis Type: WATER Init. Calibration Times: 10:31 14:22
 Lab Sample ID: SSTD080 Method File: /chem/f.i/f990311a.b/BNA8270C.m
 Quant Type: ISTD

COMPOUND	RRF	RF80	MIN RRF	%D	MAX %D
50 Dibenzofuran	1.523	1.433	0.010	5.9	50.0
55 Diethylphthalate	1.238	1.362	0.010	N/A	50.0
54 Fluorene	1.223	1.159	0.010	5.2	50.0
56 4-Chlorophenyl-phenylether	0.600	0.586	0.010	2.3	50.0
57 4-Nitroaniline	0.400	0.393	0.010	1.8	50.0
59 N-Nitrosodiphenylamine	0.468	0.445	0.010	4.9	20.0
58 4,6-Dinitro-2-methylphenol	0.137	0.148	0.010	N/A	50.0
\$ 61 2,4,6-Tribromophenol	0.216	0.232	0.010	7.8	50.0
62 4-Bromophenylphenylether	0.191	0.206	0.010	8.1	50.0
63 Hexachlorobenzene	0.243	0.248	0.010	2.1	50.0
64 Pentachlorophenol	0.148	0.166	0.010	12.3	20.0
66 Phenanthrene	0.982	0.908	0.010	7.5	50.0
67 Anthracene	0.946	0.883	0.010	6.7	50.0
68 Carbazole	0.972	0.867	0.010	10.8	50.0
70 Di-n-butylphthalate	1.259	1.115	0.010	11.4	50.0
71 Fluoranthene	1.083	0.978	0.010	9.7	20.0
73 Pyrene	1.169	1.164	0.010	0.4	50.0
\$ 74 Terphenyl-d14	0.810	0.856	0.010	5.7	50.0
75 Butylbenzylphthalate	0.627	0.616	0.010	1.8	50.0
76 Benzo(a)anthracene	1.070	1.059	0.010	1.0	50.0
77 3,3'-Dichlorobenzidine	0.417	0.414	0.010	0.7	50.0
79 Chrysene	1.105	1.010	0.010	8.6	50.0
80 bis(2-Ethylhexyl)phthalate	0.821	0.801	0.010	2.4	50.0
81 Di-n-octylphthalate	1.333	1.399	0.010	4.9	20.0
82 Benzo(b)fluoranthene	1.307	1.384	0.010	5.9	50.0
83 Benzo(k)fluoranthene	1.295	1.249	0.010	3.6	50.0
84 Benzo(a)pyrene	1.068	1.038	0.010	2.9	20.0
87 Dibenz(a,h)anthracene	1.033	0.951	0.010	7.9	50.0
86 Indeno(1,2,3-cd)pyrene	0.988	0.925	0.010	6.4	50.0
88 Benzo(g,h,i)perylene	1.106	0.954	0.010	13.7	50.0
6 Aniline	1.803	1.683	0.010	6.7	50.0
35 1-Methylnaphthalene	0.564	0.553	0.010	1.9	50.0
36 1,2,4,5-Tetrachlorobenzene	0.322	0.323	0.010	0.1	50.0
53 2,3,4,6-Tetrachlorophenol	0.343	0.359	0.010	4.7	50.0
60 Azobenzene	0.920	0.767	0.010	16.7	50.0
72 Benzidine	0.178	0.128	0.010	N/A	50.0
110 2,2-oxybis(1-Chloropropane	2.010	1.683	0.010	16.3	50.0
\$ 114 2-Chlorophenol-d4	1.185	1.178	0.010	0.5	50.0
\$ 112 1,2-Dichlorobenzene-d4	0.835	0.814	0.010	2.5	50.0

% DRIFT REPORT

Data File : f1913.d
 Lab ID : SST080
 Samp Info : SST080
 Method : /chem/f.i/f990311a.b/BNA8270C.m
 Operator : Annie
 Analyzed : 11-MAR-99 12:06
 Sublist : 8270599
 Instrument : f
 ICAL Analyzed : 09-MAR-99 10:31 to 09-MAR-99 14:22

3/17/99
 * linear regression
 curves only

Compound	Amount	Nominal	% Drift	Flag	RRF
Pyridine	83.26	80.00	4.1		1.273
N-Nitrosodimethylamine	71.88	80.00	-10.2		0.559
2-Fluorophenol	79.11	80.00	-1.1		1.013
Phenol-d5	79.08	80.00	-1.2		1.574
Phenol	80.31	80.00	0.4		1.727
bis(2-Chloroethyl) ether	79.40	80.00	-0.7		1.308
2-Chlorophenol	80.53	80.00	0.7		1.221
1,3-Dichlorobenzene	81.44	80.00	1.8		1.342
1,4-Dichlorobenzene	79.92	80.00	-0.1		1.372
Benzyl alcohol	80.02	80.00	0.0		0.855
1,2-Dichlorobenzene	83.77	80.00	4.7		1.350
2-Methylphenol	81.14	80.00	1.4		1.225
bis(2-Chloroisopropyl) ether	66.98	80.00	-16.3		1.683
4-Methylphenol	78.84	80.00	-1.4		1.317
N-Nitroso-di-n-propylamine	76.27	80.00	-4.7		1.051
Hexachloroethane	80.89	80.00	1.1		0.665
Nitrobenzene-d5	77.75	80.00	-2.8		0.372
Nitrobenzene	73.58	80.00	-8.0		0.378
Isophorone	76.33	80.00	-4.6		0.728
2-Nitrophenol	86.48	80.00	8.1		0.210
2,4-Dimethylphenol	78.62	80.00	-1.7		0.342
bis(2-Chloroethoxy)methane	77.51	80.00	-3.1		0.451
Benzoic Acid	91.40	80.00	14.3		0.491
1,2,4-Trichlorobenzene	81.31	80.00	1.6		0.312
Naphthalene	77.19	80.00	-3.5		0.945
4-Chloroaniline	80.25	80.00	0.3		0.442
Hexachlorobutadiene	82.97	80.00	3.7		0.183
4-Chloro-3-methylphenol	78.88	80.00	-1.4		0.345
2-Methylnaphthalene	79.33	80.00	-0.8		0.873
Hexachlorocyclopentadiene	95.89	80.00	19.9		0.322
2,4,6-Trichlorophenol	81.85	80.00	2.3		0.322
2,4,5-Trichlorophenol	85.24	80.00	6.5		0.364
2-Fluorobiphenyl	79.67	80.00	-0.4		0.996
2,4-Dichlorophenol	81.17	80.00	1.5		0.278
2-Chloronaphthalene	77.94	80.00	-2.6		0.946
2-Nitroaniline	73.69	80.00	-7.9		0.353
Dimethylphthalate	77.45	80.00	-3.2		1.139
Acenaphthylene	76.11	80.00	-4.9		1.533
2,6-Dinitrotoluene	91.51	80.00	14.4		0.294
2,4-Dinitrotoluene	84.93	80.00	6.2		0.413
3-Nitroaniline	82.12	80.00	2.7		0.360
Acenaphthene	76.31	80.00	-4.6		1.022
2,4-Dinitrophenol	95.69	80.00*	19.6		0.184
4-Nitrophenol	79.24	80.00	-1.0		0.176
Dibenzofuran	75.29	80.00	-5.9		1.433
Diethylphthalate	78.09	80.00*	-2.4		1.362

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

% DRIFT REPORT

Data File : f1913.d
 Lab ID : SSTD080
 Samp Info : SSTD080
 Method : /chem/f.i/f990311a.b/BNA8270C.m
 Operator : Annie
 Analyzed : 11-MAR-99 12:06
 Sublist : 8270599
 Instrument : f
 ICAL Analyzed : 09-MAR-99 10:31 to 09-MAR-99 14:22

Compound	Amount	Nominal	% Drift	Flag	RRF
Fluorene	75.82	80.00	-5.2		1.159
4-Chlorophenyl-phenylether	78.13	80.00	-2.3		0.586
4-Nitroaniline	78.57	80.00	-1.8		0.393
N-Nitrosodiphenylamine	76.06	80.00	-4.9		0.445
4,6-Dinitro-2-methylphenol	95.06	80.00	* 18.8		0.148
2,4,6-Tribromophenol	86.21	80.00	7.8		0.232
4-Bromophenylphenylether	86.50	80.00	8.1		0.206
Hexachlorobenzene	81.70	80.00	2.1		0.248
Pentachlorophenol	89.87	80.00	12.3		0.166
Phenanthrene	73.99	80.00	-7.5		0.908
Anthracene	74.61	80.00	-6.7		0.883
Carbazole	71.35	80.00	-10.8		0.867
Di-n-butylphthalate	70.84	80.00	-11.4		1.115
Fluoranthene	72.26	80.00	-9.7		0.978
Pyrene	79.70	80.00	-0.4		1.164
Terphenyl-d14	84.53	80.00	5.7		0.856
Butylbenzylphthalate	78.58	80.00	-1.8		0.616
Benzo(a)anthracene	79.20	80.00	-1.0		1.059
3,3'-Dichlorobenzidine	79.46	80.00	-0.7		0.414
Chrysene	73.12	80.00	-8.6		1.0
bis(2-Ethylhexyl)phthalate	78.07	80.00	-2.4		0.801
Di-n-octylphthalate	83.95	80.00	4.9		1.399
Benzo(b)fluoranthene	84.68	80.00	5.9		1.384
Benzo(k)fluoranthene	77.13	80.00	-3.6		1.249
Benzo(a)pyrene	77.71	80.00	-2.9		1.038
Dibenz(a,h)anthracene	73.70	80.00	-7.9		0.951
Indeno(1,2,3-cd)pyrene	74.87	80.00	-6.4		0.925
Benzo(g,h,i)perylene	69.01	80.00	-13.7		0.954
Aniline	74.65	80.00	-6.7		1.683
1-Methylnaphthalene	78.46	80.00	-1.9		0.553
1,2,4,5-Tetrachlorobenzene	80.09	80.00	0.1		0.323
2,3,4,6-Tetrachlorophenol	83.77	80.00	4.7		0.359
Azobenzene	66.64	80.00	-16.7		0.767
Benzidine	46.76	80.00	-41.6	N/A	0.128
2,2-oxybis(1-Chloropropane	66.98	80.00	-16.3		1.683
2-Chlorophenol-d4	79.56	80.00	-0.5		1.178
1,2-Dichlorobenzene-d4	78.01	80.00	-2.5		0.814

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ENSAFE

Lab Code: SWOK

Case No.: FDS, RE SAS No.:

SDG No.: 37602

Lab File ID (Standard): F1913.D

Date Analyzed: 03/11/99

Instrument ID: F

Time Analyzed: 1206

	IS1 (DCB) AREA #	RT	IS2 (NPT) AREA #	RT	IS3 (ANT) AREA #	RT
12 HOUR STD	547451	3.37	2106250	4.99	1444797	8.20
UPPER LIMIT	1094902	3.87	4212500	5.49	2889594	8.70
LOWER LIMIT	273726	2.87	1053125	4.49	722398	7.70
EPA SAMPLE No.						
01 SBLK1	576946	3.36	2287159	5.00	1670608	8.21
02 LCS1	640157	3.36	2517325	4.99	1772726	8.20
03 LCSD1	617965	3.37	2524605	4.99	1730033	8.20
04 FDSGW03C03	609634	3.36	2278958	4.99	1581999	8.20
05 FDSGW03B03	589385	3.36	2224174	5.00	1569369	8.21
06 FDSGW02D01	662886	3.36	2570395	4.99	1771659	8.20
07 FDSGW05B03	619684	3.36	2360468	4.99	1656526	8.20
08 FDSGW02A03	549383	3.35	2120521	4.99	1496789	8.20
09 FDSGW02C03	585947	3.36	2338732	4.99	1580520	8.20
10 FDSGW04A03	573131	3.36	2154264	4.98	1528846	8.20
11 FDSGW04B03	619281	3.36	2378410	4.99	1609871	8.20
12 FDSGW04C03	600676	3.36	2156372	4.99	1446795	8.20
13 FDSGC04C03	582648	3.36	2155868	4.99	1462298	8.21
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag values outside QC limits with an asterisk.
Page 01 of 01

FORM VIII SV-1

14
019

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ENSAFE

Lab Code: SWOK

Case No.: FDS, RE SAS No.:

SDG No.: 37602

Lab File ID (Standard): F1913.D

Date Analyzed: 03/11/99

Instrument ID: F

Time Analyzed: 1206

	IS4 (PHN) AREA #	RT	IS5 (CRY) AREA #	RT	IS6 (PRY) AREA #	RT
12 HOUR STD	2645818	10.56	2323935	14.68	1948602	16.72
UPPER LIMIT	5291636	11.06	4647870	15.18	3897204	17.22
LOWER LIMIT	1322909	10.06	1161968	14.18	974301	16.22
EPA SAMPLE No.						
01 SBLK1	3097675	10.56	2774878	14.67	2274544	16.73
02 LCS1	3230918	10.56	2839288	14.68	2341680	16.72
03 LCSD1	3256408	10.56	2909905	14.68	2386805	16.72
04 FDSGW03C03	2945811	10.56	2406279	14.68	1885532	16.72
05 FDSGW03B03	2781374	10.56	2272981	14.67	1961548	16.73
06 FDSGW02D01	3102768	10.56	2443404	14.67	2023227	16.73
07 FDSGW05B03	2960407	10.56	2316382	14.68	2001088	16.72
08 FDSGW02A03	2573261	10.55	2121737	14.68	1777186	16.72
09 FDSGW02C03	2828290	10.56	2431041	14.67	2078355	16.72
10 FDSGW04A03	2656010	10.56	2196413	14.67	1932527	16.73
11 FDSGW04B03	2783041	10.55	2333986	14.68	1992896	16.72
12 FDSGW04C03	2727304	10.55	2284379	14.67	1985283	16.72
13 FDSGC04C03	2585322	10.55	2234789	14.67	1975778	16.72
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%
of internal standard area.
AREA LOWER LIMIT = - 50%
of internal standard area.

Column used to flag values outside QC limits with an asterisk.
je 01 of 01

FORM VIII SV-2

020

**BLANK SUMMARY
SEMIVOLATILE ORGANIC FRACTION**

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 (other than listed below) 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. For the following four (4) compounds, the results are qualified by elevating the limit of detection or adjusting the limit of detection to the sample result, when the sample concentration is less than ten (10) times the blank concentration.

Common laboratory contaminants: phthalates

- 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 ten times (10X) 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 ten times (10X) the blank value. Reject the sample result, cross out the "B" flag, and report the CRQL.

greater
No Action - The sample result is greater than the CRQL and than ten times (10X) the blank value.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK1

Name: SWL-TULSA

Contract: ENSAFE

Lab Code: SWOK

Case No.: FDS, RE SAS No.:

SDG No.: 37602

Lab File ID: F1914.D

Lab Sample ID: BL0305WB

Date Extracted: 03/05/99

Extraction: (SepF/Cont/Sonc) CONT

Date Analyzed: 03/11/99

Time Analyzed: 1238

Matrix: (soil/water) WATER

Level: (low/med) LOW

Instrument ID: F

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	LCS1	LC0305WB	F1915.D	03/11/99
02	LCSD1	LD0305WB	F1916.D	03/11/99
03	FDSGW03C03	37602.02	F1922.D	03/11/99
04	FDSGW03B03	37602.03	F1923.D	03/11/99
05	FDSGW02D01	37602.04	F1924.D	03/11/99
06	FDSGW05B03	37602.05	F1925.D	03/11/99
07	FDSGW02A03	37602.06	F1926.D	03/11/99
08	FDSGW02C03	37602.07	F1927.D	03/11/99
09	FDSGW04A03	37602.08	F1928.D	03/11/99
10	FDSGW04B03	37602.09	F1929.D	03/11/99
11	FDSGW04C03	37602.10	F1930.D	03/11/99
12	FDSGC04C03	37602.11	F1931.D	03/11/99
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

No Contamination

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: SWL-TULSA

Contract: ENSAFE

Lab Code: SWOK

Case No.: FDS, RE SAS No.:

SDG No.: 37602

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOI OUT
01	SBLK1	66	66	80	70	73	76	80	60	0
02	LCS1	68	74	89	74	78	85	72	61	0
03	LCSD1	64	76	85	73	77	87	74	62	0
04	FDSGW03C03	66	77	54	68	70	91	78	63	0
05	FDSGW03B03	66	76	80	65	72	89	75	64	0
06	FDSGW02D01	66	74	76	64	68	87	71	57	0
07	FDSGW05B03	66	76	65	65	68	90	74	57	0
08	FDSGW02A03	66	75	70	70	72	92	74	58	0
09	FDSGW02C03	64	74	55	66	69	91	74	62	0
10	FDSGW04A03	66	71	57	64	74	85	75	63	0
11	FDSGW04B03	65	74	60	66	69	82	69	60	0
12	FDSGW04C03	62	71	46	54	58	79	61	54	0
13	FDSGC04C03	65	75	50	64	71	82	71	61	0
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 (35-114)
 S2 (FBP) = 2-Fluorobiphenyl (43-116)
 S3 (TPH) = Terphenyl-d14 (33-141)
 S4 (PHL) = Phenol-d5 (10- 94)
 S5 (2FP) = 2-Fluorophenol (21-100)
 S6 (TBP) = 2,4,6-Tribromophenol (10-123)
 S7 (2CP) = 2-Chlorophenol-d4 (33-110) (advisory)
 S8 (DCB) = 1,2-Dichlorobenzene-d4 (16-110) (advisory)

Column to be used to flag recovery values
 * Values outside of contract required QC limits
 D Surrogate diluted out

3C
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA

Contract: ENSAFE

Lab Code: SWOK

Case No.: FDS, RE SAS No.:

SDG No.: 37602

Matrix Spike - EPA Sample No.: LCS1

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Phenol	75	0	46	61	10-102
2-Chlorophenol	75	0	55	73	27- 94
1,4-Dichlorobenzene	50	0	32	64	30- 81
N-Nitroso-di-n-prop. (1)	50	0	32	64	28- 95
1,2,4-Trichlorobenzene	50	0	35	70	32- 86
4-Chloro-3-methylphenol	75	0	58	77	32- 92
Acenaphthene	50	0	37	74	41- 93
2,4-Dinitrotoluene	50	0	35	70	39- 94
4-Nitrophenol	75	0	55	73	10-135
Pentachlorophenol	75	0	64	85	10-118
Pyrene	50	0	40	80	40-112

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Phenol	75	47	63	3	24	10-102
2-Chlorophenol	75	56	75	3	23	27- 94
1,4-Dichlorobenzene	50	34	68	6	37	30- 81
N-Nitroso-di-n-prop. (1)	50	32	64	0	35	28- 95
1,2,4-Trichlorobenzene	50	36	72	3	31	32- 86
4-Chloro-3-methylphenol	75	55	73	5	22	32- 92
Acenaphthene	50	37	74	0	20	41- 93
2,4-Dinitrotoluene	50	35	70	0	32	39- 94
4-Nitrophenol	75	56	75	3	30	10-135
Pentachlorophenol	75	62	83	2	65	10-118
Pyrene	50	39	78	2	23	40-112

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

COMMENTS:

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

SDG NARRATIVE

June 22, 1999

CONTRACT: ENSAFE
PROJECT: FDS, RELEASE 82
SDG NO: 37602

SEMIVOLATILE FRACTION

Ten water samples were submitted for Semivolatile Organic analyses. The samples were analyzed by GC/MS following method SW846-8270C.

As of 3/1/99, SWLO went to using a 2uL injection for method SW846-8270C as allowed by the method. At this time SWLO also added two extract "advisory surrogates (one acid and one base/neutral)" to the surrogate spiking mix. These surrogates are 1,2-dichlorobenzene-d4 and 2-chlorophenol-d4 and have advisory control limits as noted on the FORM II. The surrogates, laboratory control spikes and matrix spikes are spiked at 75 ug/L (waters) and 2500ug/Kg (soils) for the acid surrogates and 50 ug/L (waters) and 1700 (actual 1667) ug/Kg (soils) for base/neutral surrogates. The instrument calibration range is from 10 ug/L to 80 ug/L for waters and 330 ug/Kg to 2700 ug/Kg for soils, which relates to 20 ng on column (low cal. std.) up to 160 ng on column (high cal. std.).

No major problems occurred during the analyses of these samples.

Blanks: No Problems.

Surrogates: No Problems.

Matrix Spikes: No matrix spikes were analyzed on these samples. There was a matrix spike and matrix spike duplicate analyzed with this extraction batch on SWLO episode # 37599.

Laboratory Control Spikes: No Problems.

Internal Standards: No Problems.

Harry M. Borg
Harry M. Borg
Organic Program Manager
Hb

June 22, 1999

ref col
12-Mar-98
MLM
ver
5.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Semivolatile
Test Code MS500
Method SW846 8270C
Matrix Water-Soil
Extract Volume 1000 mL - 30g
Initial Calibration 10 20 50 80 100 ng, %RSD for CCC compounds=30% SPCC=RF > 0.05
Continuing Calibration 50 ng, %D = 20% for CCC Compounds SPCC = RF > 0.05

PAGE 1 OF 2

COMPOUND	CAS NUMBE	PQL's		MDL's	
		WATER	SOIL	WATER	SOIL
		ug/L	ug/Kg	ug/L	ug/Kg
1,2,4-Trichlorobenzene	120-82-1	10	330	3.7	65
1,2-Dichlorobenzene	95-50-1	10	330	3.7	74
1,3-Dichlorobenzene	541-73-1	10	330	4.1	31
1,4-Dichlorobenzene	106-46-7	10	330	4.2	58
2,3,4,6-Tetrachlorophenol	58-90-2	10	330	8.2	71
2,4,5-Trichlorophenol	95-95-4	50	1600	6.1	120
2,4,6-Trichlorophenol	88-06-2	10	330	4.6	85
2,4-Dichlorophenol	120-83-2	10	330	4.7	70
2,4-Dimethylphenol	105-67-9	10	330	4.0	210
2,4-Dinitrophenol	51-28-5	50	1600	7.1	64
2,4-Dinitrotoluene	121-14-2	10	330	2.9	74
2,6-Dinitrotoluene	606-20-2	10	330	3.1	85
2-Chloronaphthalene	91-58-7	10	330	3.3	63
2-Chlorophenol	95-57-8	10	330	5.0	92
2-Methylnaphthalene	91-57-6	10	330	3.2	43
2-Methylphenol	95-48-7	10	330	5.1	170
2-Nitroaniline	88-74-4	10	1600	3.4	57
2-Nitrophenol	88-75-5	10	330	7.7	93
3,3'-Dichlorobenzidine	91-94-1	20	660	3.3	6.4
3-Nitroaniline	99-09-2	50	1600	57	3.6
4,6-Dinitro-2-methylphenol	534-52-1	50	1600	7.3	93
4-Bromophenyl-phenylether	101-55-3	10	330	3.1	72
4-Chloro-3-methylphenol	59-50-7	10	330	4.1	75
4-Chloroaniline	106-47-8	10	330	4.6	87
4-Chlorophenyl-phenylether	7005-72-3	10	330	4.1	49
4-Methylphenol	106-44-5	10	330	6.0	220
4-Nitroaniline	100-01-6	50	1600	2.5	62
4-Nitrophenol	100-02-7	50	1600	7.1	93
Acenaphthene	83-32-9	10	330	3.4	65
Acenaphthylene	208-96-8	10	330	3.5	69
Anthracene	120-12-7	10	330	2.7	47
Benzo(a)anthracene	56-55-3	10	330	2	56
Benzo(a)pyrene	50-32-8	10	330	2.6	38
Benzo(b)fluoranthene	205-99-2	10	330	2.8	160
Benzo(g,h,i)perylene	191-24-2	10	330	2.8	81
Benzo(k)fluoranthene	207-08-9	10	330	4.2	96
Benzoic acid	65-85-0	50	1600	7.9	440
Benzyl alcohol	100-51-6	10	330	5.2	98
Butylbenzylphthalate	85-68-7	10	330	0.3	87

WATER MDLS PERFORMED ON INST V <01/09/98>

SOIL MDL'S PERFORMED ON INST P <01/08/98>

NR = NonRoutine Compounds. Analyzed only upon request.

ref col
12-Mar-98
MLM
ver
5.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Test Code
Method
Matrix
Extract Volume
Initial Calibration
Continuing Calibration

Semivolatile
MS500
SW846 8270C
Water-Soil
1000 mL - 30g
10, 20, 50, 90, 100 ng, %RSD for CCC compounds=30% SPCC=RF > 0.05
50 ng, %D = 20% for CCC Compounds SPCC = RF > 0.05
PAGE 2 OF 2

COMPOUND	CAS NUMBE	PQL's		MDL's	
		WATER	SOIL	WATER	SOIL
		ug/L	ug/Kg	ug/L	ug/Kg
Carbazole	86-74-8	10	330	2.3	89
Chrysene	218-1-9	10	330	2.5	51
Di-n-octylphthalate	* 117-84-0	10	330	1.8	46
Dibenz(a,h)anthracene	53-70-3	10	330	3.0	150
Dibenzofuran	132-64-9	10	330	3.3	50
Diethylphthalate	84-66-2	10	330	0.4	64
Fluoranthene	* 206-44-0	10	330	2.2	71
Fluorene	86-73-7	10	330	3.2	40
Hexachlorobenzene	118-74-1	10	330	2.8	59
Hexachlorobutadiene	* 87-68-3	10	333	3.3	56
Hexachlorocyclopentadiene	** 77-47-4	10	330	0.6	73
Hexachloroethane	67-72-1	10	330	3.6	120
Indeno(1,2,3-cd)pyrene	193-39-5	10	330	3.3	280
Isophorone	78-59-1	10	330	4.1	69
N-Nitroso-di-n-propylamine	** 621-64-7	10	330	4.1	110
N-Nitrosodiphenylamine	* 86-30-6	10	330	2.0	56
Naphthalene	91-20-3	10	330	3.7	30
Nitrobenzene	98-95-3	10	330	3.8	74
Pentachlorophenol	* 87-86-5	50	1600	8.4	130
Phenanthrene	85-01-8	10	330	2.9	42
Phenol	* 108-95-2	10	330	4.2	66
Pyrene	129-00-2	10	330	2.4	47
bis(2-Chloroethoxy)methane	111-91-1	10	330	4.0	69
bis(2-Chloroethyl)ether	111-44-4	10	330	3.5	61
bis(2-Chloroisopropyl)ether	108-60-1	10	330	4.5	73
bis(2-Ethylhexyl)phthalate	117-81-7	10	330	1.9	80

* CCC compounds **SPCC compounds
WATER MDLS PERFORMED ON INST. H <01/09/98>
SOIL MDLS PERFORMED ON INST. H <01/08/98>



800-88-7868
MEMPHIS, TENNESSEE
CHARLESTON, SC; CHATTANOOGA, TN; DALLAS, TX; JACKSONVILLE, FL; KNOXVILLE, TN
LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PHOENIX, AZ; PORTLAND, ME; RICHMOND, VA
WILSON, NC; WYOMING, WY

CHAIN OF CUSTODY RECORD

37602

PAGE 1 of 1
PROJECT/JOB NO: 014 01-09-00
COC NO: 4
PO NO: 82
REL NO:
LAB NAME: SWC

CLIENT: CLEAN PROJECT MANAGER: C Smith
LOCATION: FDS CNC TELE/FAX NO: 850-434-2230
SAMPLERS: (SIGNATURE) [Signature]

ANALYSIS REQUESTED
NO. OF CONTAINERS
VOC-BTEX only
SWC
Metals & PCBs

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	ANALYSIS REQUESTED	REMARKS
					TEMP.	CHEMICAL			
FDSTW04A01	3/3/99	1620	W	40 ML VIAL	4C	ACL	2	X	
FDS6W03C03	"	1045	"	9-FL OUNCES - (RAMON) 1-18-99	4C	Lab Preserv	5	X X X X	VOC-BTEX only
FDS6W03B03	"	1020	"				5	X X X X	
FDS6W102D01	"	1030	"				5	X X X X	
FDS6W05B03	"	1215	"				5	X X X X	
FDS6W02A03	"	1230	"				5	X X X X	
FDS6W02C03	"	1200	"				5	X X X X	
FDS6W04A03	"	1515	"				5	X X X X	
FDS6W04B03	"	1530	"				5	X X X X	
FDS6W04C03	"	1540	"				5	X X X X	
FDS6C04C03	"	1540	"				5	X X X X	

RELINQUISHED: [Signature] DATE: 3/3/99 RECEIVER: _____ DATE: _____
 PRINTED: C. Smith TIME: 1645 PRINTED: _____ TIME: _____
 COMPANY: Clean SWC COMPANY: _____ COMPANY: _____

METHOD OF SHIPMENT: Fed Ex COMMENTS: _____
 SHIPMENT NO. 808625948642
 SEND RESULTS TO: C. Veeney

07/08/99 07:43 TX/RX NO. 9257 P. 003

029

DO NOT WRITE IN THESE SPACES

Data Validation Report

ENSAFE
Charleston - Zone G
SDG #: 39843



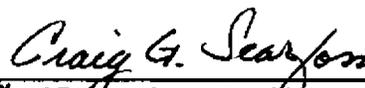
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 39843
Date: September 30, 1999
Client Name: Ensafe
Project/Site Name: Charleston - Zone G
Date Sampled: August 5, 1999
Number of Samples: 10 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: DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, Semivolatiles and Hydrazine

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

10-7-99.

Date

SDG# 39843

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA	SVOA	HYD			
008GSP1001	WATER	X	X	X			
008GSP1101	WATER	X	X	X			
008GSP1201	WATER	X	X	X			
008GSP1301	WATER	X	X	X			
008GSP1401	WATER	X	X	X			
008GSP1501	WATER	X	X	X			
008GSP1601	WATER	X	X	X			
008GSP1701	WATER	X	X	X			
008GSP1801	WATER	X	X	X			
008TSP1801	WATER	X					
Total Billable Samples (Water/Soil)		10	0	9	0	9	0

VOA= Volatiles

SVOA= Semivolatiles

HYD= Hydrazine

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT AND NARRATIVE

VOLATILE 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 SW846 Method 8260B; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 39843

A validation was performed on the Volatile Data from SDG 39843. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- Calibrations
- * Internal Standard Performance
- * Blanks
- * Surrogate Recoveries
- * Laboratory Control Samples
- * Field Duplicates
- * Compound Identification /Quantitation

* - All criteria were met for this parameter

DATA ASSESSMENT AND NARRATIVE

VOLATILE ANALYSIS

PAGE - 2

Continuing Calibration

The continuing calibration, I52555, contained compounds with RRFs less than 0.050. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (UR).

All Samples acetone (0.048)

System Performance and Overall Assessment

The data as presented requires qualifications.

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 10X 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 10X 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 10X 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>
All Samples	acetone	+/-	J/UR

- * 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 AND 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 SW846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 39843

A validation was performed on the Semivolatile Data from SDG 39843. The data was evaluated based on the following parameters.

- * Data Completeness
- Holding Times
- * GC/MS Tuning
- * Calibrations
- * Internal Standard Performance
- Blanks
- Surrogate Recoveries
- * Laboratory Control Samples
- * Matrix Spike / Matrix Spike Duplicate
- * Field Duplicates
- Compound Identification / Quantitation

* - All criteria were met for this parameter

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ANALYSIS

PAGE - 2

Holding Times

Sample 008GSP1701RE exceeded the seven day extraction holding time by 20 days. Qualify all positive results as estimated (J) and non detects as rejected (UR).

Blank

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.

Method Blank

<u>Associated blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
SBLK2	bis(2-ethylhexyl)phthalate	1J ug/L	10 ug/L

<u>Samples</u>	<u>Compound</u>	<u>Qualification</u>
008GSP1701RE	bis(2-ethylhexyl)phthalate	CRQL

Surrogates

Sample 008GSP1001 exhibited low surrogate recoveries for 2-fluorophenol (20%) and 2-chlorophenol-d4 (28%). Qualify all acid fraction compound results as estimated (J/UJ).

Compound Identification / Quantitation

Do not use sample 008GSP1701, in favor of the re-extraction, due all surrogate recoveries below 5% recovery.

System Performance and Overall Assessment

The data as presented requires qualifications.

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 10X 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 10X 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 10X 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>
008GSP1701RE	all compounds	+/-	J/UR
008GSP1701RE	bis(2-ethylhexyl)phthalate	+	CRQL
008GSP1001	all acid fraction compounds	+/-	J/UJ
008GSP1701	all 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 HYDRAZINE

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 # 39843

A validation was performed on the hydrazine Data from SDG 39843. The data was evaluated based on the following parameters.

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

* - All criteria were met for this parameter.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
Data stands as reported without qualification.			

~~ANNOTATED FORM IS~~

CA
16-12-99

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39843

HYDRAZINE	SAMPLE ID ----->	008-G-SP10-01	008-G-SP11-01	008-G-SP12-01	008-G-SP13-01	008-G-SP14-01	008-G-SP15-01
	ORIGINAL ID ----->	008GSP1001	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
	LAB SAMPLE ID ---->	39843.01	39843.02	39843.03	39843.04	39843.05	39843.06
	ID FROM REPORT -->	008GSP1001	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
	SAMPLE DATE ----->	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
	DATE ANALYZED ---->	08/26/99	08/26/99	08/26/99	08/26/99	08/26/99	08/26/99
	MATRIX ----->	Water	Water	Water	Water	Water	Water
UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	

CAS #	Parameter	39843	39843	39843	39843	39843	39843
-------	-----------	-------	-------	-------	-------	-------	-------

302-01-2	Hydrazine	5. U	5.	10.1	6.7	5.6	7.12
----------	-----------	------	----	------	-----	-----	------

PBV
9/30/99

Ch
10-12-99

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39843

SV846-SVOA		SAMPLE ID ----->	008-G-SP10-01	008-G-SP11-01	008-G-SP12-01	008-G-SP13-01	008-G-SP14-01	008-G-SP15-01
		ORIGINAL ID ----->	008GSP1001	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
		LAB SAMPLE ID ---->	39843.01	39843.02	39843.03	39843.04	39843.05	39843.06
		ID FROM REPORT -->	008GSP1001	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
		SAMPLE DATE ----->	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
		DATE EXTRACTED -->	08/07/99	08/07/99	08/07/99	08/07/99	08/07/99	08/07/99
		DATE ANALYZED --->	08/26/99	08/31/99	08/31/99	08/31/99	08/26/99	08/26/99
		MATRIX ----->	Water	Water	Water	Water	Water	Water
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter	39843	39843	39843	39843	39843	39843	39843
108-95-2	Phenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
111-44-4	bis(2-Chloroethyl)ether	10. U	10. U	10. U	10. U	10. U	10. U	10. U
95-57-8	2-Chlorophenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
541-73-1	1,3-Dichlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
106-46-7	1,4-Dichlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
100-51-6	Benzyl alcohol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
95-50-1	1,2-Dichlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
95-48-7	2-Methylphenol (o-Cresol)	10. U	10. U	10. U	10. U	10. U	10. U	10. U
108-60-1	2,2'-oxybis(1-Chloropropane)	10. U	10. U	10. U	10. U	10. U	10. U	10. U
106-44-5	4-Methylphenol (p-Cresol)	10. U	10. U	10. U	10. U	10. U	10. U	10. U
621-64-7	N-Nitroso-di-n-propylamine	10. U	10. U	10. U	10. U	10. U	10. U	10. U
67-72-1	Hexachloroethane	10. U	10. U	10. U	10. U	10. U	10. U	10. U
98-95-3	Nitrobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
78-59-1	Isophorone	10. U	10. U	10. U	10. U	10. U	10. U	10. U
88-75-5	2-Nitrophenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
105-67-9	2,4-Dimethylphenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
65-85-0	Benzoic acid	10. U	10. U	10. U	10. U	10. U	10. U	10. U
111-91-1	bis(2-Chloroethoxy)methane	10. U	10. U	10. U	10. U	10. U	10. U	10. U
120-83-2	2,4-Dichlorophenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
120-82-1	1,2,4-Trichlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
91-20-3	Naphthalene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
106-47-8	4-Chloroaniline	10. U	10. U	10. U	10. U	3. J	10. U	28. U
87-68-3	Hexachlorobutadiene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
59-50-7	4-Chloro-3-methylphenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
91-57-6	2-Methylnaphthalene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
77-47-4	Hexachlorocyclopentadiene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
88-06-2	2,4,6-Trichlorophenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
95-95-4	2,4,5-Trichlorophenol	25. U	25. U	25. U	25. U	25. U	25. U	25. U
91-58-7	2-Chloronaphthalene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
88-74-4	2-Nitroaniline	25. U	25. U	25. U	25. U	25. U	25. U	25. U
131-11-3	Dimethyl phthalate	10. U	10. U	10. U	10. U	10. U	10. U	10. U
208-96-8	Acenaphthylene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
606-20-2	2,6-Dinitrotoluene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
99-09-2	3-Nitroaniline	25. U	25. U	25. U	25. U	25. U	25. U	25. U
83-32-9	Acenaphthene	10. U	10. U	10. U	10. U	2. J	10. U	2. J
31-28-5	2,4-Dinitrophenol	25. U	25. U	25. U	25. U	25. U	25. U	25. U

510

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39843

SW846-SVDA		SAMPLE ID ----->	008-G-SP10-01	008-G-SP11-01	008-G-SP12-01	008-G-SP13-01	008-G-SP14-01	008-G-SP15-01
		ORIGINAL ID ----->	008GSP1001	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
		LAB SAMPLE ID ---->	39843.01	39843.02	39843.03	39843.04	39843.05	39843.06
		ID FROM REPORT -->	008GSP1001	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
		SAMPLE DATE ----->	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
		DATE EXTRACTED -->	08/07/99	08/07/99	08/07/99	08/07/99	08/07/99	08/07/99
		DATE ANALYZED ---->	08/26/99	08/31/99	08/31/99	08/31/99	08/26/99	08/26/99
		MATRIX ----->	Water	Water	Water	Water	Water	Water
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter	39843	39843	39843	39843	39843	39843	39843
100-02-7	4-Nitrophenol	25. <i>US</i>	25. U					
132-64-9	Dibenzofuran	10. U	10. U	10. U	10. U	1. J	10. U	2. J
121-14-2	2,4-Dinitrotoluene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
84-66-2	Diethylphthalate	10. U	10. U	10. U	10. U	10. U	10. U	10. U
7005-72-3	4-Chlorophenylphenylether	10. U	10. U	10. U	10. U	10. U	10. U	10. U
86-73-7	Fluorene	10. U	1. J	1. J	1. J	2. J	10. U	3. <i>US</i> J
100-01-6	4-Nitroaniline	25. U	25. U	25. U	25. U	25. U	25. U	25. U
534-52-1	2-Methyl-4,6-Dinitrophenol	25. <i>US</i>	25. U					
86-30-6	N-Nitrosodiphenylamine	10. U	10. U	10. U	10. U	10. U	10. U	10. U
101-55-3	4-Bromophenyl-phenylether	10. U	10. U	10. U	10. U	10. U	10. U	10. U
118-74-1	Hexachlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
87-86-5	Pentachlorophenol	25. <i>US</i>	25. U					
85-01-8	Phenanthrene	1. J	2. J	1. J	1. J	2. J	10. U	3. J
120-12-7	Anthracene	10. U	1. J	1. J	1. J	1. J	10. U	1. J
84-74-2	Di-n-butylphthalate	1. J	1. J	10. U	1. J	1. J	10. U	1. J
206-44-0	Fluoranthene	10. U	2. J	1. J	1. J	1. J	10. U	10. U
129-00-0	Pyrene	1. J	7. J	2. J	1. J	1. J	1. J	1. J
85-68-7	Butylbenzylphthalate	10. U	10. U	10. U	3. J	10. U	10. U	10. U
91-94-1	3,3'-Dichlorobenzidine	10. U	10. U	10. U	10. U	10. U	10. U	10. U
56-55-3	Benzo(a)anthracene	10. U	2. J	1. J	10. U	10. U	10. U	10. U
218-01-9	Chrysene	1. J	3. J	1. J	10. U	10. U	10. U	10. U
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	7. J	4. J	1. J	5. J	4. J	8. J	8. J
117-84-0	Di-n-octyl phthalate	10. U	10. U	10. U	10. U	10. U	10. U	10. U
205-99-2	Benzo(b)fluoranthene	10. U	1. J	10. U				
207-08-9	Benzo(k)fluoranthene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
50-32-8	Benzo(a)pyrene	10. U	1. J	10. U				
193-39-5	Indeno(1,2,3-cd)pyrene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
53-70-3	Dibenz(a,h)anthracene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
191-24-2	Benzo(g,h,i)perylene	10. U	1. J	10. U				

016

1/10/99

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39843

SUB#46-SVDA		SAMPLE ID ----->	008-G-SP16-01	008-G-SP17-01	008-G-SP17-01 RE	008-G-SP18-01	SBL-0-9843-02	SBL-0-9843-03
		ORIGINAL ID ----->	008GSP1601	008GSP1701	008GSP1701	008GSP1801	SBLK1	SBLK2
		LAB SAMPLE ID ---->	39843.07	39843.08	39843.08	39843.09	SBLK1	SBLK2
		ID FROM REPORT -->	008GSP1601	008GSP1701	008GSP1701	008GSP1801	SBLK1	SBLK2
		SAMPLE DATE ----->	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
		DATE EXTRACTED -->	08/07/99	08/07/99	09/01/99	08/07/99	08/07/99	09/01/99
		DATE ANALYZED ---->	08/26/99	08/26/99	09/02/99	08/26/99	08/26/99	09/03/99
		MATRIX ----->	Water	Water	Water	Water	Water	Water
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
			A	CA	A	A	D	D
CAS #	Parameter	39843	39843	39843	39843	39843	39843	39843
108-95-2	Phenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
111-44-4	bis(2-Chloroethyl)ether	10. U	10. U	10. U	10. U	10. U	10. U	10. U
95-57-8	2-Chlorophenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
541-73-1	1,3-Dichlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
106-46-7	1,4-Dichlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
100-51-6	Benzyl alcohol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
95-50-1	1,2-Dichlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
95-48-7	2-Methylphenol (o-Cresol)	10. U	10. U	10. U	10. U	10. U	10. U	10. U
108-60-1	2,2'-oxybis(1-Chloropropane)	10. U	10. U	10. U	10. U	10. U	10. U	10. U
106-44-5	4-Methylphenol (p-Cresol)	10. U	10. U	10. U	10. U	10. U	10. U	10. U
621-64-7	N-Nitroso-di-n-propylamine	10. U	10. U	10. U	10. U	10. U	10. U	10. U
67-72-1	Hexachloroethane	10. U	10. U	10. U	10. U	10. U	10. U	10. U
98-95-3	Nitrobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
78-59-1	Isophorone	10. U	10. U	10. U	10. U	10. U	10. U	10. U
88-75-5	2-Nitrophenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
105-67-9	2,4-Dimethylphenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
65-85-0	Benzoic acid	10. U	10. U	10. U	10. U	10. U	10. U	10. U
111-91-1	bis(2-Chloroethoxy)methane	10. U	10. U	10. U	10. U	10. U	10. U	10. U
120-83-2	2,4-Dichlorophenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
120-82-1	1,2,4-Trichlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
91-20-3	Naphthalene	5. J	10. U	10. U	10. U	10. U	10. U	10. U
106-47-8	4-Chloroaniline	10. U	10. U	10. U	10. U	10. U	10. U	10. U
87-68-3	Hexachlorobutadiene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
59-50-7	4-Chloro-3-methylphenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
91-57-6	2-Methylnaphthalene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
77-47-4	Hexachlorocyclopentadiene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
88-06-2	2,4,6-Trichlorophenol	10. U	10. U	10. U	10. U	10. U	10. U	10. U
95-95-4	2,4,5-Trichlorophenol	25. U	25. U	25. U	25. U	25. U	25. U	25. U
91-58-7	2-Chloronaphthalene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
88-74-4	2-Nitroaniline	25. U	25. U	25. U	25. U	25. U	25. U	25. U
131-11-3	Dimethyl phthalate	10. U	10. U	10. U	10. U	10. U	10. U	10. U
208-96-8	Acenaphthylene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
606-20-2	2,6-Dinitrotoluene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
99-09-2	3-Nitroaniline	25. U	25. U	25. U	25. U	25. U	25. U	25. U
83-32-9	Acenaphthene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
11-28-5	2,4-Dinitrophenol	25. U	25. U	25. U	25. U	25. U	25. U	25. U

210

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39843

SW846-SVDA		SAMPLE ID ----->	008-G-SP16-01	008-G-SP17-01	008-G-SP17-01 RE	008-G-SP18-01	SBL-0-9843-02	SBL-0-9843-03
		ORIGINAL ID ----->	008GSP1601	008GSP1701	008GSP1701	008GSP1801	SBLK1	SBLK2
		LAB SAMPLE ID ---->	39843.07	39843.08	39843.08	39843.09	SBLK1	SBLK2
		ID FROM REPORT -->	008GSP1601	008GSP1701	008GSP1701	008GSP1801	SBLK1	SBLK2
		SAMPLE DATE ----->	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
		DATE EXTRACTED -->	08/07/99	08/07/99	09/01/99	08/07/99	08/07/99	09/01/99
		DATE ANALYZED ---->	08/26/99	08/26/99	09/02/99	08/26/99	08/26/99	09/03/99
		MATRIX ----->	Water	Water	Water	Water	Water	Water
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter	39843	39843	39843	39843	39843	39843	39843
100-02-7	4-Nitrophenol	25. U	25. U	25. U	25. U	25. U	25. U	25. U
132-64-9	Dibenzofuran	10. U	10. U	10. U	10. U	10. U	10. U	10. U
121-14-2	2,4-Dinitrotoluene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
84-66-2	Diethylphthalate	10. U	10. U	10. U	10. U	10. U	10. U	10. U
7005-72-3	4-Chlorophenylphenylether	10. U	10. U	10. U	10. U	10. U	10. U	10. U
86-73-7	Fluorene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
100-01-6	4-Nitroaniline	25. U	25. U	25. U	25. U	25. U	25. U	25. U
534-52-1	2-Methyl-4,6-Dinitrophenol	25. U	25. U	25. U	25. U	25. U	25. U	25. U
86-30-6	N-Nitrosodiphenylamine	10. U	10. U	10. U	10. U	10. U	10. U	10. U
101-55-3	4-Bromophenyl-phenylether	10. U	10. U	10. U	10. U	10. U	10. U	10. U
118-74-1	Hexachlorobenzene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
87-86-5	Pentachlorophenol	25. U	25. U	25. U	25. U	25. U	25. U	25. U
85-01-8	Phenanthrene	1. J	10. U	10. U	10. U	10. U	10. U	10. U
120-12-7	Anthracene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
84-74-2	Di-n-butylphthalate	1. J	10. U	10. U	10. U	1. J	10. U	10. U
206-44-0	Fluoranthene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
129-00-0	Pyrene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
85-68-7	Butylbenzylphthalate	10. U	10. U	10. U	10. U	10. U	10. U	10. U
91-94-1	3,3'-Dichlorobenzidine	10. U	10. U	10. U	10. U	10. U	10. U	10. U
56-55-3	Benzo(a)anthracene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
218-01-9	Chrysene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	5. J	10. U	10. U	10. U	5. J	10. U	1. J
117-84-0	Di-n-octyl phthalate	10. U	10. U	10. U	10. U	10. U	10. U	10. U
205-99-2	Benzo(b)fluoranthene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
207-08-9	Benzo(k)fluoranthene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
50-32-8	Benzo(a)pyrene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
193-39-5	Indeno(1,2,3-cd)pyrene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
53-70-3	Dibenz(a,h)anthracene	10. U	10. U	10. U	10. U	10. U	10. U	10. U
191-24-2	Benzo(g,h,i)perylene	10. U	10. U	10. U	10. U	10. U	10. U	10. U

018

1M092999

CA
10-12-99

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39843

SW846-VOA		SAMPLE ID ----->	008-G-SP10-01	008-G-SP11-01	008-G-SP12-01	008-G-SP13-01	008-G-SP14-01	008-G-SP15-01
		ORIGINAL ID ----->	008GSP1001	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
		LAS SAMPLE ID ---->	39843.01	39843.02	39843.03	39843.04	39843.05	39843.06
		ID FROM REPORT ---->	008GSP1001	008GSP1101	008GSP1201	008GSP1301	008GSP1401	008GSP1501
		SAMPLE DATE ----->	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
		DATE ANALYZED ---->	08/09/99	08/09/99	08/09/99	08/09/99	08/09/99	08/09/99
		MATRIX ----->	Water	Water	Water	Water	Water	Water
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter	39843	39843	39843	39843	39843	39843	39843
74-87-3	Chloromethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
74-83-9	Bromomethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
75-01-4	Vinyl chloride	5. U	5. U	5. U	5. U	5. U	5. U	5. U
75-00-3	Chloroethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
75-09-2	Methylene chloride	5. U	5. U	5. U	5. U	5. U	5. U	5. U
67-64-1	Acetone	5. SUR	5. SUR	5. SUR	5. SUR	5. SUR	5. SUR	5. SUR
75-15-0	Carbon disulfide	5. U	5. U	5. U	5. U	5. U	5. U	5. U
75-35-4	1,1-Dichloroethene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
75-34-3	1,1-Dichloroethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
540-59-0	1,2-Dichloroethene (total)	5. U	5. U	5. U	5. U	5. U	5. U	5. U
67-66-3	Chloroform	5. U	5. U	5. U	5. U	5. U	5. U	5. U
107-06-2	1,2-Dichloroethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
78-93-3	2-Butanone (MEK)	5. U	5. U	5. U	5. U	5. U	5. U	5. U
71-55-6	1,1,1-Trichloroethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
56-23-5	Carbon tetrachloride	5. U	5. U	5. U	5. U	5. U	5. U	5. U
75-27-4	Bromodichloromethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
78-87-5	1,2-Dichloropropane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
10061-01-5	cis-1,3-Dichloropropene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
79-01-6	Trichloroethene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
124-48-1	Dibromochloromethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
79-00-5	1,1,2-Trichloroethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
71-43-2	Benzene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
10061-02-6	trans-1,3-Dichloropropene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
75-25-2	Bromoform	5. U	5. U	5. U	5. U	5. U	5. U	5. U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5. U	5. U	5. U	5. U	5. U	5. U	5. U
591-78-6	2-Hexanone	5. U	5. U	5. U	5. U	5. U	5. U	5. U
127-18-4	Tetrachloroethene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
79-34-5	1,1,1,2,2-Tetrachloroethane	5. U	5. U	5. U	5. U	5. U	5. U	5. U
108-88-3	Toluene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
108-90-7	Chlorobenzene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
100-41-4	Ethylbenzene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
100-42-5	Styrene	5. U	5. U	5. U	5. U	5. U	5. U	5. U
1330-20-7	Xylene (Total)	5. U	5. U	5. U	5. U	5. U	5. U	5. U
108-05-4	Vinyl acetate	5. U	5. U	5. U	5. U	5. U	5. U	5. U
110-75-8	2-Chloroethyl vinyl ether	5. U	5. U	5. U	5. U	5. U	5. U	5. U

13

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39843

SW846-VOA		SAMPLE ID ----->	008-G-SP16-01	008-G-SP17-01	008-G-SP18-01	008-T-SP18-01	BLK-0-9843-04	
		ORIGINAL ID ----->	008GSP1601	008GSP1701	008GSP1801	008TSP1801	U990809A	
		LAB SAMPLE ID ----->	39843.07	39843.08	39843.09	39843.10	U990809A	
		ID FROM REPORT ----->	008GSP1601	008GSP1701	008GSP1801	008TSP1801	U990809A	
		SAMPLE DATE ----->	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	
		DATE ANALYZED ----->	08/09/99	08/09/99	08/09/99	08/09/99	08/09/99	
		MATRIX ----->	Water	Water	Water	Water	Water	
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	
CAS #	Parameter	39843	39843	39843	39843	39843	39843	
74-87-3	Chloromethane	5. U	5. U	5. U	5. U	5. U	5. U	
74-83-9	Bromomethane	5. U	5. U	5. U	5. U	5. U	5. U	
75-01-4	Vinyl chloride	5. U	5. U	5. U	5. U	5. U	5. U	
75-00-3	Chloroethane	5. U	5. U	5. U	5. U	5. U	5. U	
75-09-2	Methylene chloride	5. U	5. U	5. U	5. U	5. U	5. U	
67-64-1	Acetone	5. <i>NR</i>	5. <i>NR</i>	5. <i>NR</i>	18. <i>NR</i>	5. U	5. U	
75-15-0	Carbon disulfide	5. U	5. U	5. U	5. U	5. U	5. U	
75-35-4	1,1-Dichloroethene	5. U	5. U	5. U	5. U	5. U	5. U	
75-34-3	1,1-Dichloroethane	5. U	5. U	5. U	5. U	5. U	5. U	
540-59-0	1,2-Dichloroethene (total)	5. U	5. U	5. U	5. U	5. U	5. U	
67-66-3	Chloroform	5. U	5. U	3. J	5. U	5. U	5. U	
107-06-2	1,2-Dichloroethane	5. U	5. U	5. U	5. U	5. U	5. U	
78-93-3	2-Butanone (MEK)	5. U	5. U	5. U	5. U	5. U	5. U	
71-55-6	1,1,1-Trichloroethane	5. U	5. U	5. U	5. U	5. U	5. U	
56-23-5	Carbon tetrachloride	5. U	5. U	5. U	5. U	5. U	5. U	
75-27-4	Bromodichloromethane	5. U	5. U	5. U	5. U	5. U	5. U	
78-87-5	1,2-Dichloropropane	5. U	5. U	5. U	5. U	5. U	5. U	
10061-01-5	cis-1,3-Dichloropropene	5. U	5. U	5. U	5. U	5. U	5. U	
79-01-6	Trichloroethene	5. U	5. U	5. U	5. U	5. U	5. U	
124-48-1	Dibromochloromethane	5. U	5. U	5. U	5. U	5. U	5. U	
79-00-5	1,1,2-Trichloroethane	5. U	5. U	5. U	5. U	5. U	5. U	
71-43-2	Benzene	5. U	5. U	5. U	5. U	5. U	5. U	
10061-02-6	trans-1,3-Dichloropropene	5. U	5. U	5. U	5. U	5. U	5. U	
75-25-2	Bromoform	5. U	5. U	5. U	5. U	5. U	5. U	
108-10-1	4-Methyl-2-Pentanone (MIBK)	5. U	5. U	5. U	5. U	5. U	5. U	
591-78-6	2-Hexanone	5. U	5. U	5. U	5. U	5. U	5. U	
127-18-4	Tetrachloroethene	5. U	5. U	5. U	5. U	5. U	5. U	
79-34-5	1,1,1,2,2-Tetrachloroethane	5. U	5. U	5. U	5. U	5. U	5. U	
108-88-3	Toluene	5. U	5. U	5. U	5. U	5. U	5. U	
108-90-7	Chlorobenzene	5. U	5. U	5. U	5. U	5. U	5. U	
100-41-4	Ethylbenzene	5. U	5. U	5. U	5. U	5. U	5. U	
100-42-5	Styrene	5. U	5. U	5. U	5. U	5. U	5. U	
1330-20-7	Xylene (Total)	5. U	5. U	5. U	5. U	5. U	5. U	
108-05-4	Vinyl acetate	5. U	5. U	5. U	5. U	5. U	5. U	
110-75-8	2-Chloroethyl vinyl ether	5. U	5. U	5. U	5. U	5. U	5. U	

014

11M092999

DATA VALIDATION WORKSHEETS

MULTI-MEDIA VOLATILE ORGANIC FRACTION

CASE NUMBER: _____ SDG NUMBER: 39843

LABORATORY: SWOK

CLIENT: EnSafe PROJECT: Charleston Zone 6

REVIEWER: UM DATE: 9-29-99 Rel 99-7

QA/QC LEVEL

- NEESA C
- NEESA D
- DQO LEVEL III
- DQO LEVEL IV
- _____

Statement Of Work (SOW)

- CLP 3/90
- CLP 2/88
- SW846 8240
- SW846 8240 Appendix IX
- 8260B

ANALYSIS MODIFICATIONS: _____

port Date : 28-Jul-1999 18:13

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 28-JUL-1999 00:53
 End Cal Date : 28-JUL-1999 10:27
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/i.i/i990727b.b/5ml82602.m
 Cal Date : 28-Jul-1999 14:39 doug

Calibration File Names:
 Level 1: /chem/i.i/i990727b.b/i52365.d
 Level 2: /chem/i.i/i990727b.b/i52355.d
 Level 3: /chem/i.i/i990727b.b/i52358.d
 Level 4: /chem/i.i/i990727b.b/i52356.d
 Level 5: /chem/i.i/i990727b.b/i52357.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
1 DICHLORODIFLUOROMETHANE	0.14128	0.12461	0.13889	0.13178	0.10688	0.12869	10.742
2 CHLOROMETHANE	0.29528	0.36488	0.38552	0.38963	0.35379	0.35782	10.602
3 VINYL CHLORIDE	0.35048	0.39197	0.40302	0.38206	0.37178	0.37986	5.292
4 BROMOMETHANE	0.39100	0.36396	0.41118	0.37866	0.37523	0.38401	4.685
5 CHLOROETHANE	0.21195	0.23032	0.22038	0.20960	0.19417	0.21328	6.295
6 TRICHLOROFUOROMETHANE	0.70605	0.71618	0.80490	0.73094	0.58964	0.71354	10.983
7 ETHYL ETHER	-----	-----	-----	-----	-----	0.00000	-----
8 ACROLEIN	0.01566	0.02168	0.02030	0.01923	0.01701	0.01878	12.990
9 1,1-DICHLOROETHENE	0.43751	0.37000	0.37123	0.35548	0.36409	0.37966	8.674
10 1,1,2-TRICHLOROTRIFLUOROETHAN	0.36199	0.60922	0.61429	0.57819	0.61122	0.55498	0.999 L
11 ACETONE	0.12342	0.07938	0.05943	0.04319	0.03836	0.06880	0.990 L
12 METHYL IODIDE	0.59540	0.96785	0.99903	0.93895	0.93322	0.88689	0.999 L
13 CARBON DISULFIDE	0.99015	0.96539	1.07794	0.92376	1.09492	1.01043	7.281
14 ACETONITRILE	0.04561	0.05560	0.06205	0.05498	0.05241	0.05413	10.969
15 ALLYL CHLORIDE	0.22684	0.25179	0.15154	0.24197	0.35702	0.24583	0.964 L
16 METHYLENE CHLORIDE	1.25047	0.51989	0.46489	0.38825	0.37547	0.59979	0.999 L
17 ACRYLONITRILE	0.03670	0.04806	0.05248	0.04910	0.04753	0.04657	12.292
18 1,2-Dichloroethene (total)	0.45033	0.40932	0.41484	0.39798	0.40092	0.41468	5.069
19 trans-1,2-DICHLOROETHENE	0.47389	0.37826	0.42523	0.39382	0.40499	0.41524	8.907
20 Methyl-tert-Butyl Ether	0.47466	0.57328	0.59621	0.58035	0.54390	0.55368	8.582
21 Hexane	0.28252	0.37059	0.41612	0.40624	0.42897	0.38089	0.999 L
22 1,1-DICHLOROETHANE	0.62635	0.66133	0.69429	0.67085	0.64299	0.66716	3.894
23 VINYL ACETATE	0.42577	0.42497	0.39505	0.40984	0.40578	0.41228	3.181
24 CHLOROPRENE	0.38591	0.49188	0.55350	0.49571	0.52366	0.49053	13.011
25 2,2-DICHLOROPROPANE	0.55198	0.58302	0.53341	0.54167	0.55916	0.55385	3.436
26 cis-1,2-DICHLOROETHENE	0.42676	0.44038	0.40444	0.40214	0.39686	0.41412	4.493
27 2-BUTANONE	0.09026	0.08022	0.08087	0.07002	0.06106	0.07649	0.991 L
28 PROPIONITRILE	0.01223	0.01855	0.01830	0.01826	0.01720	0.01691	0.999 L
29 ETHYL ACETATE	-----	-----	-----	-----	-----	0.00000	-----

Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCG Failure L = Linear Q = Quadratic

Report Date : 28-Jul-1999 18:13

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 28-JUL-1999 00:53
 End Cal Date : 28-JUL-1999 10:27
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/i.i/i990727b.b/5ml82602.m
 Cal Date : 28-Jul-1999 14:39 doug

Calibration File Names:

Level 1: /chem/i.i/i990727b.b/i52365.d
 Level 2: /chem/i.i/i990727b.b/i52355.d
 Level 3: /chem/i.i/i990727b.b/i52358.d
 Level 4: /chem/i.i/i990727b.b/i52356.d
 Level 5: /chem/i.i/i990727b.b/i52357.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	100 Level 5	RRF	% RSD/R ²
30 METHACRYLONITRILE	0.04381	0.06191	0.06293	0.06313	0.05929	0.05821	14.078
31 BROMOCHLOROMETHANE	0.20935	0.22531	0.25445	0.24148	0.23819	0.23376	7.331
32 CHLOROFORM	0.70638	0.76660	0.78760	0.75489	0.79004	0.76110	4.457
34 1 1 1-TRICHLOROETHANE	0.68104	0.65571	0.67960	0.65599	0.68416	0.67130	2.115
36 1 1-DICHLOROPROPENE	0.58111	0.60389	0.54650	0.53133	0.53598	0.55976	5.616
37 CARBON TETRACHLORIDE	0.62250	0.63594	0.61373	0.62528	0.63719	0.62693	1.561
39 BENZENE	0.97137	0.98460	0.96520	0.95190	0.99654	0.97394	1.772
40 ISOBUTYL ALCOHOL	0.00329	0.00661	0.00591	0.00556	0.00475	0.00522	0.990 L
41 1 2-DICHLOROETHANE	0.38062	0.38760	0.38025	0.39455	0.38608	0.38582	1.520
42 1,4-DIOXANE	0.00325	0.00456	0.00347	0.00352	0.00324	0.00361	0.997 L
44 TRICHLOROETHENE	0.39860	0.45315	0.41715	0.41953	0.43683	0.42505	4.880
45 1 2-DICHLOROPROPANE	0.38938	0.37325	0.34656	0.35479	0.36640	0.36608	4.536
46 DIBROMOMETHANE	0.29318	0.34062	0.31713	0.32952	0.32696	0.32148	5.566
47 METHYL METHACRYLATE	0.12770	0.18035	0.26223	0.15822	0.14761	0.15522	12.496
48 BROMODICHLOROMETHANE	0.58870	0.66568	0.64881	0.64733	0.66261	0.64263	4.859
49 2-NITROPROPANE	-----	-----	-----	-----	-----	0.00000	-----
50 2-CHLOROETHYL VINYL ETHER	0.32145	0.50109	0.45778	0.47438	0.45173	0.44129	0.999 L
51 cis-1,3-Dichloropropene	0.50807	0.54710	0.50941	0.53635	0.54735	0.52966	3.702
52 4-METHYL-2-PENTANONE	0.31592	0.21904	0.27623	0.17785	0.16445	0.21070	0.999 L
54 TOLUENE	0.60210	0.64857	0.64927	0.63808	0.65633	0.63887	3.375
55 trans-1,3-Dichloropropene	0.41364	0.47029	0.42366	0.43865	0.43106	0.43546	4.949
56 ETHYL METHACRYLATE	0.24384	0.33057	0.32252	0.31063	0.29749	0.30101	11.401
57 1 1 2-TRICHLOROETHANE	0.23777	0.29095	0.25119	0.27646	0.27594	0.26846	7.697
58 TETRACHLOROETHENE	0.64297	0.65058	0.78613	0.71653	0.83625	0.72649	11.607
59 1 3-DICHLOROPROPANE	0.41601	0.46408	0.53622	0.52026	0.57405	0.50212	12.408
60 2-HEXANONE	0.23010	0.13109	0.13807	0.12987	0.12763	0.15135	1.000 L
61 DIBROMOCHLOROMETHANE	0.51675	0.54438	0.62879	0.63677	0.72664	0.61067	13.621
62 1 2-DIBROMOETHANE	0.37288	0.42238	0.40165	0.40921	0.39855	0.40093	4.533
63 D-LIMONENE	-----	-----	-----	-----	-----	0.00000	-----

- Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

Report Date : 28-Jul-1999 18:13

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 28-JUL-1999 00:53
 End Cal Date : 28-JUL-1999 10:27
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/i.i/i990727b.b/5ml82602.m
 Cal Date : 28-Jul-1999 14:39 doug

Calibration File Names:
 Level 1: /chem/i.i/i990727b.b/i52365.d
 Level 2: /chem/i.i/i990727b.b/i52355.d
 Level 3: /chem/i.i/i990727b.b/i52358.d
 Level 4: /chem/i.i/i990727b.b/i52356.d
 Level 5: /chem/i.i/i990727b.b/i52357.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
65 CHLOROBENZENE	0.89076	0.84892	0.98690	0.96408	1.10409	0.95895	10.248
66 CYCLOHEXANONE	-----	-----	-----	-----	-----	0.00000	-----
67 1-CHLOROHEXANE	0.41632	0.38939	0.41371	0.37636	0.43435	0.40603	5.576
68 1 1 1 2-TETRACHLOROETHANE	0.41581	0.42179	0.47780	0.47461	0.54862	0.46773	11.462
69 ETHYL BENZENE	1.59071	1.64498	2.03292	1.88925	2.40634	1.91284	17.221
70 m,p-XYLENES	0.63825	0.73022	0.97082	0.81852	0.91708	0.79498	14.060
71 o-XYLENE	0.52294	0.55249	0.61891	0.60441	0.69477	0.59870	11.062
M 72 Xylene (Total)	0.52294	0.55249	0.61891	0.60441	0.69477	0.59870	11.062
73 STYRENE	0.80261	0.81897	0.93296	0.92148	1.04460	0.90412	10.840
74 BROMOFORM	0.30927	0.34502	0.40138	0.39695	0.44499	0.37952	13.938
75 ISOPROPYLBENZENE	2.74213	2.80384	2.65458	2.69101	2.82110	2.74253	2.599
77 BROMOBENZENE	0.87908	0.95801	0.89454	0.92686	0.93204	0.91811	3.419
78 1 1 2 2-TETRACHLOROETHANE	0.80643	0.88014	0.80098	0.82253	0.79915	0.82185	4.120
79 1 2 3-TRICHLOROPROPANE	0.74683	0.86209	0.79696	0.80604	0.77472	0.79733	5.369
80 trans-1,4-DICHLORO-2-BUTEN	0.07639	0.10404	0.10345	0.10320	0.11527	0.10047	14.321
81 n-PROPYLBENZENE	0.64992	0.71753	0.69351	0.68197	0.71568	0.69172	4.025
82 2-CHLOROTOLUENE	0.61547	0.67640	0.72444	0.65507	0.72281	0.67884	6.850
83 4-CHLOROTOLUENE	2.74183	2.59862	2.59252	2.58477	2.78561	2.66067	3.588
84 1 3 5-TRIMETHYLBENZENE	2.09902	2.29765	2.17104	2.16649	2.33096	2.21303	4.404
85 PENTACHLOROETHANE	0.17940	0.24613	0.27295	0.29514	0.33316	0.26536	0.997 L
86 tert-BUTYLBENZENE	2.48497	2.69497	2.54758	2.61228	2.79464	2.62689	4.640
87 1 2 4-TRIMETHYLBENZENE	2.04477	2.24524	2.16998	2.20923	2.29854	2.19355	4.363
88 sec-BUTYLBENZENE	2.82833	3.38322	3.25003	3.13662	3.55769	3.23118	8.494
89 1 3-DICHLOROBENZENE	1.34456	1.51052	1.47296	1.40834	1.52612	1.45250	5.298
90 p-ISOPROPYLTOLUENE	2.38836	2.50226	2.35918	2.47364	2.62756	2.47020	4.295
92 1 4-DICHLOROBENZENE	1.88372	1.90889	1.78329	1.83538	1.84500	1.85126	2.603
93 1 2-DICHLOROBENZENE	1.31011	1.51030	1.38932	1.42614	1.51252	1.42968	5.986
94 n-BUTYLBENZENE	2.42354	2.63160	2.49783	2.44522	2.76883	2.55340	5.681
95 1 2-DIBROMO-3-CHLOROPROPANE	0.20328	0.16094	0.13630	0.15371	0.13231	0.15731	0.993 L

no (+)

<- Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

Report Date : 28-Jul-1999 18:13

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 28-JUL-1999 00:53
End Cal Date : 28-JUL-1999 10:27
Quant Method : ISTD
Cal Curve Type : Averaged
Target Version : Target 3.00
Integrator : HP RTE
Method file : /chem/i.i/i990727b.b/5ml82602.m
Cal Date : 28-Jul-1999 14:39 doug

Calibration File Names:

Level 1: /chem/i.i/i990727b.b/i52365.d
Level 2: /chem/i.i/i990727b.b/i52355.d
Level 3: /chem/i.i/i990727b.b/i52358.d
Level 4: /chem/i.i/i990727b.b/i52356.d
Level 5: /chem/i.i/i990727b.b/i52357.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
96 1 2 4-TRICHLOROBENZENE	1.10698	1.20786	1.13322	1.12861	1.20757	1.15685	4.104
97 HEXACHLOROBUTADIENE	0.94270	0.98909	0.97122	0.90058	1.02371	0.96546	4.834
98 NAPHTHALENE	1.41640	1.50832	1.42212	1.44236	1.40975	1.43979	2.792
99 1 2 3-TRICHLOROBENZENE	0.94578	1.00962	0.97769	0.96284	0.96172	0.97153	2.481
\$ 33 DIBROMOFLUOROMETHANE	0.46636	0.49389	0.57546	0.55461	0.53196	0.52446	8.461
\$ 38 1,2-DICHLOROETHANE-d4	0.26164	0.29162	0.32830	0.35487	0.35801	0.32089	13.225
\$ 53 TOLUENE-d8	0.80161	0.84380	0.98478	0.92203	0.88039	0.88652	7.974
\$ 76 4-BROMOFLUOROBENZENE	0.47644	0.48688	0.57316	0.53515	0.51228	0.51678	7.530

<- Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39843

Lab File ID: I52554.D

BFB Injection Date: 08/09/99

Instrument ID: I

BFB Injection Time: 1015

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	20.5
75	30.0 - 60.0% of mass 95	50.8
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.0
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	85.0
175	5.0 - 9.0% of mass 174	6.1 (7.1)1
176	Greater than 95.0%, but less than 101.0% of mass 174	84.1 (99.0)1
177	5.0 - 9.0% of mass 176	6.1 (7.3)2

1-Value is % mass 174

2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050	VSTD050	I52555.D	08/09/99	1141
02	VBLK1	U990809A	I52557.D	08/09/99	1301
03	LCS1	LCS1	I52558.D	08/09/99	1333
04	LCSD1	LCSD1	I52559.D	08/09/99	1356
05	008GSP1001	39843.01	I52567.D	08/09/99	1740
06	008GSP1101	39843.02	I52568.D	08/09/99	1803
07	008GSP1201	39843.03	I52569.D	08/09/99	1826
08	008GSP1301	39843.04	I52570.D	08/09/99	1849
09	008GSP1401	39843.05	I52571.D	08/09/99	1913
10	008GSP1501	39843.06	I52572.D	08/09/99	1936
11	008GSP1601	39843.07	I52573.D	08/09/99	1959
12	008GSP1701	39843.08	I52574.D	08/09/99	2022
13	008GSP1801	39843.09	I52575.D	08/09/99	2045
14	008TSP1801	39843.10	I52576.D	08/09/99	2108
15					
16					
17					
18					
19					
20					
21					
22					

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: i.i Injection Date: 09-AUG-1999 11:41
 Lab File ID: i52555.d Init. Calibration Date(s): 07/28/99 07/28/99
 Analysis Type: WATER Init. Calibration Times: 00:53 10:27
 Lab Sample ID: VSTD050 Method File: /chem/i.i/i990809a.b/5ml82602.m
 Quant Type: ISTD

COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
1 DICHLORODIFLUOROMETHANE	0.129	0.152	0.000	17.9	100.0
2 CHLOROMETHANE	0.358	0.335	0.100	6.5	100.0
3 VINYL CHLORIDE	0.380	0.324	0.010	14.7	20.0
4 BROMOMETHANE	0.384	0.294	0.010	23.5	100.0
5 CHLOROETHANE	0.213	0.174	0.010	18.2	100.0
6 TRICHLOROFLUOROMETHANE	0.714	0.569	0.010	20.3	100.0
7 ETHYL ETHER	++++	++++	0.010	++++	100.0
8 ACROLEIN	0.019	0.017	0.001	10.7	100.0
9 1,1-DICHLOROETHENE	0.380	0.329	0.010	13.3	20.0
10 1,1,2-TRICHLOROTRIFLUOROETHA	0.612	0.544	0.010	N/A	100.0
11 ACETONE	0.035	0.048	0.010	N/A	100.0
12 METHYL IODIDE	0.934	0.819	0.010	N/A	100.0
13 CARBON DISULFIDE	1.010	0.917	0.010	9.2	100.0
14 ACETONITRILE	0.054	0.044	0.000	23.9	100.0
15 ALLYL CHLORIDE	0.376	0.117	0.010	N/A	100.0
16 METHYLENE CHLORIDE	0.354	0.355	0.010	N/A	100.0
17 ACRYLONITRILE	0.047	0.040	0.010	13.6	100.0
18 1,2-Dichloroethene (total)	0.415	0.360	0.010	13.1	100.0
19 trans-1,2-DICHLOROETHENE	0.415	0.371	0.010	10.6	100.0
20 Methyl-tert-Butyl Ether	0.554	0.487	0.010	12.1	100.0
21 Hexane	0.432	0.387	0.010	N/A	100.0
22 1,1-DICHLOROETHANE	0.667	0.621	0.100	6.9	100.0
23 VINYL ACETATE	0.412	0.387	0.010	6.2	100.0
24 CHLOROPRENE	0.491	0.365	0.010	25.5	100.0
25 2,2-DICHLOROPROPANE	0.554	0.498	0.010	10.1	100.0
26 cis-1,2-DICHLOROETHENE	0.414	0.349	0.010	15.7	100.0
27 2-BUTANONE	0.060	0.062	0.010	N/A	100.0
28 PROPIONITRILE	0.017	0.016	0.001	N/A	100.0
29 ETHYL ACETATE	++++	++++	0.010	++++	100.0
30 METHACRYLONITRILE	0.058	0.051	0.010	13.1	100.0
31 BROMOCHLOROMETHANE	0.234	0.208	0.010	11.2	100.0
32 CHLOROFORM	0.761	0.688	0.010	9.6	20.0
33 DIBROMOFLUOROMETHANE	0.524	0.478	0.010	8.8	100.0
34 1,1,1-TRICHLOROETHANE	0.671	0.578	0.010	13.9	100.0
36 1,1-DICHLOROPROPENE	0.560	0.493	0.010	11.9	100.0
37 CARBON TETRACHLORIDE	0.627	0.569	0.010	9.2	100.0
38 1,2-DICHLOROETHANE-d4	0.321	0.259	0.010	19.3	100.0
39 BENZENE	0.974	0.876	0.010	10.0	100.0
40 ISOBUTYL ALCOHOL	0.005	0.005	0.000	N/A	100.0
41 1,2-DICHLOROETHANE	0.386	0.353	0.010	8.6	100.0
42 1,4-DIOXANE	0.003	0.003	0.000	N/A	100.0
44 TRICHLOROETHENE	0.425	0.383	0.010	9.8	100.0
45 1,2-DICHLOROPROPANE	0.366	0.335	0.010	8.4	20.0
46 DIBROMOMETHANE	0.321	0.286	0.010	11.0	100.0

no ⊕

JTR

ta File: /chem/i.i/i990809a.b/i52555.d
 Sport Date: 09-Aug-1999 12:10

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: i.i Injection Date: 09-AUG-1999 11:41
 Lab File ID: i52555.d Init. Calibration Date(s): 07/28/99 07/28/99
 Analysis Type: WATER Init. Calibration Times: 00:53 10:27
 Lab Sample ID: VSTD050 Method File: /chem/i.i/i990809a.b/5ml82602.m
 Quant Type: ISTD

COMPOUND	RRF	RF50	MIN RRF	SD	MAX SD
47 METHYL METHACRYLATE	0.155	0.133	0.010	14.1	100.0
48 BROMODICHLOROMETHANE	0.643	0.564	0.010	12.2	100.0
49 2-NITROPROPANE	++++	++++	0.010	++++	100.0 <-
50 2-CHLOROETHYL VINYL ETHER	0.454	0.374	0.010	N/A	100.0
51 cis-1,3-Dichloropropene	0.530	0.496	0.010	6.4	100.0
52 4-METHYL-2-PENTANONE	0.161	0.152	0.010	N/A	100.0
S 53 TOLUENE-d8	0.887	0.780	0.010	12.1	100.0
54 TOLUENE	0.639	0.581	0.010	9.1	20.0
55 trans-1,3-Dichloropropene	0.435	0.377	0.010	13.5	100.0
56 ETHYL METHACRYLATE	0.301	0.266	0.010	11.6	100.0
57 1 1 2-TRICHLOROETHANE	0.268	0.247	0.010	8.1	100.0
58 TETRACHLOROETHENE	0.726	0.685	0.010	5.7	100.0
59 1 3-DICHLOROPROPANE	0.502	0.453	0.010	9.8	100.0
60 2-HEXANONE	0.126	0.112	0.010	N/A	100.0
61 DIBROMOCHLOROMETHANE	0.611	0.536	0.010	12.2	100.0
62 1 2-DIBROMOETHANE	0.401	0.351	0.010	12.6	100.0
63 D-LIMONENE	++++	++++	0.010	++++	100.0 <-
65 CHLOROBENZENE	0.959	0.870	0.300	9.3	100.0
66 CYCLOHEXANONE	++++	++++	0.010	++++	100.0 <-
67 1-CHLOROHEXANE	0.406	0.362	0.010	10.9	100.0
68 1 1 2-TETRACHLOROETHANE	0.468	0.410	0.010	12.3	100.0
69 ETHYL BENZENE	1.913	1.757	0.010	8.2	20.0
70 m,p-XYLENES	0.795	0.735	0.010	7.6	100.0
71 o-XYLENE	0.599	0.529	0.010	11.6	100.0
M 72 Xylene (Total)	0.599	0.529	0.010	11.6	100.0
73 STYRENE	0.904	0.809	0.010	10.5	100.0
74 BROMOFORM	0.380	0.334	0.100	12.1	100.0
75 ISOPROPYLBENZENE	2.743	2.364	0.010	13.8	100.0
S 76 4-BROMOFLUOROBENZENE	0.517	0.433	0.010	16.2	100.0
77 BROMOBENZENE	0.918	0.794	0.010	13.6	100.0
78 1 1 2 2-TETRACHLOROETHANE	0.822	0.744	0.300	9.5	100.0
79 1 2 3-TRICHLOROPROPANE	0.797	0.706	0.010	11.5	100.0
80 trans-1,4-DICHLORO-2-BUTEN	0.100	0.083	0.010	17.7	100.0
81 n-PROPYLBENZENE	0.692	0.629	0.010	9.0	100.0
82 2-CHLOROTOLUENE	0.679	0.591	0.010	13.0	100.0
83 4-CHLOROTOLUENE	2.661	2.335	0.010	12.2	100.0
84 1 3 5-TRIMETHYLBENZENE	2.213	1.933	0.010	12.6	100.0
85 PENTACHLOROETHANE	0.339	0.222	0.010	N/A	100.0
86 tert-BUTYLBENZENE	2.627	2.346	0.010	10.7	100.0
87 1 2 4-TRIMETHYLBENZENE	2.194	1.911	0.010	12.9	100.0
88 sec-BUTYLBENZENE	3.231	2.839	0.010	12.1	100.0
89 1 3-DICHLOROBENZENE	1.453	1.153	0.010	20.6	100.0
90 p-ISOPROPYLTOLUENE	2.470	2.142	0.010	13.3	100.0
92 1 4-DICHLOROBENZENE	1.851	1.811	0.010	2.2	100.0

Data File: /chem/i.i/i990809a.b/i52555.d
Report Date: 09-Aug-1999 12:10

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: i.i Injection Date: 09-AUG-1999 11:41
Lab File ID: i52555.d Init. Calibration Date(s): 07/28/99 07/28/99
Analysis Type: WATER Init. Calibration Times: 00:53 10:27
Lab Sample ID: VSTD050 Method File: /chem/i.i/i990809a.b/5ml82602.m
Quant Type: ISTD

COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
93 1 2-DICHLOROBENZENE	1.430	1.251	0.010	12.5	100.0
94 n-BUTYLBENZENE	2.553	2.213	0.010	13.3	100.0
95 1 2-DIBROMO-3-CHLOROPROPANE	0.133	0.115	0.010	N/A	100.0
96 1 2 4-TRICHLOROBENZENE	1.157	0.966	0.010	16.5	100.0
97 HEXACHLOROBUTADIENE	0.965	0.802	0.010	17.0	100.0
98 NAPHTHALENE	1.440	1.158	0.010	19.6	100.0
99 1 2 3-TRICHLOROBENZENE	0.972	0.836	0.010	14.0	100.0

% DRIFT REPORT

Data File : is2555.d
 Lab ID : VSTD050
 Samp Info : VSTD050 (2-094-6)
 Method : /chem/i.i/i990809a.b/5ml82602.m
 Operator : DOUG
 Analyzed : 09-AUG-99 11:41
 Sublist : all
 Instrument : i
 ICAL Analyzed : 28-JUL-99 00:53 to 28-JUL-99 10:27

Compound	Amount	Nominal	% Drift	Flag	RRF
DICHLORODIFLUOROMETHANE	58.94	50.00	17.9		0.152
CHLOROMETHANE	46.74	50.00	-6.5		0.335
VINYL CHLORIDE	42.65	50.00	-14.7	✓	0.324
BROMOMETHANE	38.27	50.00	-23.5		0.294
CHLOROETHANE	40.89	50.00	-18.2		0.174
TRICHLOROFLUOROMETHANE	39.85	50.00	-20.3		0.569
ETHYL ETHER	0.00	50.00	-100.0	*	0.000
ACROLEIN	446.42	500.00	-10.7		0.017
1 1-DICHLOROETHENE	43.34	50.00	-13.3	✓	0.329
1,1,2-TRICHLOROTRIFLUOROETHAN	45.99	50.00	-8.0		0.544
ACETONE	45.61	50.00	-8.8		0.048
METHYL IODIDE	43.32	50.00	-13.4		0.819
CARBON DISULFIDE	45.37	50.00	-9.3	✓	0.917
ACETONITRILE	380.38	500.00	-23.9		0.041
ALLYL CHLORIDE	32.33	50.00	-35.3		0.117
METHYLENE CHLORIDE	38.25	50.00	-23.5	Mo(t)	0.355
ACRYLONITRILE	431.77	500.00	-13.6		0.040
1,2-Dichloroethene (total)	86.88	100.00	-13.1		0.360
trans-1 2-DICHLOROETHENE	44.71	50.00	-10.6		0.371
Methyl-tert-Butyl Ether	43.96	50.00	-12.1		0.487
Hexane	47.58	50.00	-4.8		0.387
1 1-DICHLOROETHANE	46.56	50.00	-6.9		0.621
VINYL ACETATE	46.91	50.00	-6.2		0.387
CHLOROPRENE	37.22	50.00	-25.6		0.365
2 2-DICHLOROPROPANE	44.95	50.00	-10.1		0.498
cis-1 2-DICHLOROETHENE	42.16	50.00	-15.7		0.349
2-BUTANONE	42.41	50.00	-15.2		0.062
PROPIONITRILE	442.49	500.00	-11.5		0.016
ETHYL ACETATE	0.00	50.00	-100.0	*	0.000
METHACRYLONITRILE	434.66	500.00	-13.1		0.051
BROMOCHLOROMETHANE	44.39	50.00	-11.2		0.208
CHLOROFORM	45.19	50.00	-9.6	✓	0.688
DIBROMOFLUOROMETHANE	45.61	50.00	-8.8		0.478
1 1 1-TRICHLOROETHANE	43.07	50.00	-13.9		0.578
1 1-DICHLOROPROPENE	44.03	50.00	-11.9		0.493
CARBON TETRACHLORIDE	45.40	50.00	-9.2		0.569
1,2-DICHLOROETHANE-d4	40.36	50.00	-19.3		0.259
BENZENE	44.97	50.00	-10.1		0.876
ISOBUTYL ALCOHOL	935.33	1000.00	-6.5		0.005
1 2-DICHLOROETHANE	45.70	50.00	-8.6		0.353
1,4-DIOXANE	826.45	1000.00	-17.4		0.003
TRICHLOROETHENE	45.10	50.00	-9.8		0.383
1 2-DICHLOROPROPANE	45.80	50.00	-8.4		0.335
DIBROMOMETHANE	44.51	50.00	-11.0		0.286
METHYL METHACRYLATE	42.95	50.00	-14.1		0.133
BROMODICHLOROMETHANE	43.90	50.00	-12.2		0.504

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

% DRIFT REPORT

Data File : i52555.d
 Lab ID : VSTD050
 Samp Info : VSTD050 (2-094-6)
 Method : /chem/i.i/i990809a.b/5ml82602.m
 Operator : DOUG
 Analyzed : 09-AUG-99 11:41
 Sublist : all
 Instrument : i
 ICAL Analyzed : 28-JUL-99 00:53 to 28-JUL-99 10:27

Compound	Amount	Nominal	% Drift	Flag	RRF
2-NITROPROPANE	0.00	50.00	-100.0	*	0.000
2-CHLOROETHYL VINYL ETHER	40.26	50.00	-19.5		0.374
cis-1,3-Dichloropropene	46.79	50.00	-6.4		0.496
4-METHYL-2-PENTANONE	40.97	50.00	-18.1		0.152
TOLUENE-d8	43.96	50.00	-12.1		0.780
TOLUENE	45.46	50.00	-9.1	v	0.581
trans-1,3-Dichloropropene	43.26	50.00	-13.5		0.377
ETHYL METHACRYLATE	44.21	50.00	-11.6		0.266
1 1 2-TRICHLOROETHANE	45.95	50.00	-8.1		0.247
TETRACHLOROETHENE	47.16	50.00	-5.7		0.685
1 3-DICHLOROPROPANE	45.09	50.00	-9.8		0.453
2-HEXANONE	41.39	50.00	-17.2		0.112
DIBROMOCHLOROMETHANE	43.90	50.00	-12.2		0.536
1 2-DIBROMOETHANE	43.71	50.00	-12.6		0.351
D-LIMONENE	0.00	50.00	-100.0	*	0.000
CHLOROBENZENE	45.36	50.00	-9.3		0.870
CYCLOHEXANONE	0.00	100.00	-100.0	*	0.000
1-CHLOROHEXANE	44.52	50.00	-11.0		0.362
1 1 1 2-TETRACHLOROETHANE	43.85	50.00	-12.3		0.410
ETHYL BENZENE	45.91	50.00	-8.2	v	1.757
m,p-XYLENES	92.39	100.00	-7.6		0.735
o-XYLENE	44.17	50.00	-11.7		0.529
Xylene (Total)	166.86	150.00	233.7	11.5	1.998
STYRENE	44.73	50.00	-10.5		0.809
BROMOFORM	43.95	50.00	-12.1		0.334
ISOPROPYLBENZENE	43.09	50.00	-13.8		2.364
4-BROMOFLUOROBENZENE	41.89	50.00	-16.2		0.433
BROMOBENZENE	43.22	50.00	-13.6		0.794
1 1 2 2-TETRACHLOROETHANE	45.24	50.00	-9.5		0.744
1 2 3-TRICHLOROPROPANE	44.25	50.00	-11.5		0.706
trans-1,4-DICHLORO-2-BUTEN	41.15	50.00	-17.7		0.083
n-PROPYLBENZENE	45.49	50.00	-9.0		0.629
2-CHLOROTOLUENE	43.50	50.00	-13.0		0.591
4-CHLOROTOLUENE	43.88	50.00	-12.2		2.335
1 3 5-TRIMETHYLBENZENE	43.68	50.00	-12.6		1.933
PENTACHLOROETHANE	39.57	50.00	-20.9		0.222
tert-BUTYLBENZENE	44.64	50.00	-10.7		2.346
1 2 4-TRIMETHYLBENZENE	43.56	50.00	-12.9		1.911
sec-BUTYLBENZENE	43.93	50.00	-12.1		2.839
1 3-DICHLOROBENZENE	39.69	50.00	-20.6		1.153
p-ISOPROPYLTOLUENE	43.35	50.00	-13.3		2.142
1 4-DICHLOROBENZENE	48.90	50.00	-2.2		1.811
1 2-DICHLOROBENZENE	43.74	50.00	-12.5		1.251
n-BUTYLBENZENE	43.32	50.00	-13.4		2.213
1 2-DIBROMO-3-CHLOROPROPANE	38.64	50.00	-22.7		0.115
1 2 4-TRICHLOROBENZENE	41.76	50.00	-16.5		0.866

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

% DRIFT REPORT

Data File : i52555.d
Lab ID : VSTD050
Samp Info : VSTD050 (2-094-6)
Method : /chem/i.i/i990809a.b/5ml82602.m
Operator : DOUG
Analyzed : 09-AUG-99 11:41
Sublist : all
Instrument : i
ICAL Analyzed : 28-JUL-99 00:53 to 28-JUL-99 10:27

Compound	Amount	Nominal	% Drift	Flag	RRF
HEXACHLOROBUTADIENE	41.51	50.00	-17.0		0.802
NAPHTHALENE	40.21	50.00	-19.6		1.158
1 2 3-TRICHLOROBENZENE	43.00	50.00	-14.0		0.836

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Lab File ID (Standard): I52555.D

Date Analyzed: 08/09/99

Instrument ID: I

Time Analyzed: 1141

	IS1 (PFB) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	310180	3.72	325252	4.37	275414	7.59
=====	=====	=====	=====	=====	=====	=====
UPPER LIMIT	620360	4.22	650504	4.87	550828	8.09
=====	=====	=====	=====	=====	=====	=====
LOWER LIMIT	155090	3.22	162626	3.87	137707	7.09
=====	=====	=====	=====	=====	=====	=====
EPA SAMPLE No.	-					
=====	=====	=====	=====	=====	=====	=====
01 VBLK1	246267	3.73	267374	4.36	228780	7.56
02 LCS1	250475	3.72	265070	4.34	231446	7.57
03 LCSD1	253316	3.73	272264	4.37	223157	7.57
04 008GSP1001	226649	3.70	239964	4.35	209856	7.55
05 008GSP1101	227063	3.72	240386	4.34	213395	7.55
06 008GSP1201	230792	3.70	248819	4.34	213594	7.55
07 008GSP1301	215707	3.70	227673	4.34	201464	7.55
08 008GSP1401	229032	3.72	246744	4.35	211056	7.55
09 008GSP1501	229235	3.70	244873	4.34	213829	7.55
10 008GSP1601	220852	3.69	244177	4.34	208835	7.55
11 008GSP1701	221256	3.70	241175	4.34	207508	7.55
12 008GSP1801	224488	3.72	238427	4.35	206985	7.55
13 008TSP1801	222483	3.72	246098	4.35	211891	7.55
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (PFB) = PENTAFLUOROBENZENE
IS2 (DFB) = 1,4-DIFLUOROBENZENE
IS3 (CBZ) = CHLOROBENZENE-d5

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag values outside QC limits with an asterisk.

**BLANK SUMMARY
VOLATILE ORGANIC FRACTION**

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 (other than the three (3) listed below) 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. For the following four (4) compounds, the results are qualified by elevating the limit of detection or adjusting the limit of detection to the sample result, when the sample concentration is less than ten (10) times the blank concentration.

Common laboratory contaminants: methylene chloride
 acetone
 2-butanone

- 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 ten times (10X) 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 ten times (10X) the blank value. Reject the sample result, cross out the "B" flag, and report the CRQL.

greater No Action - The sample result is greater than the CRQL and than ten times (10X) the blank value.

2A
WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCA) #	SMC4 (DBF) #	TOT OUT
01	VBLK1	98	94	89	96	0
02	LCS1	109	101	100	104	0
03	LCSD1	108	100	104	105	0
04	008GSP1001	97	94	92	98	0
05	008GSP1101	107	101	104	104	0
06	008GSP1201	106	102	99	104	0
07	008GSP1301	110	108	109	110	0
08	008GSP1401	104	104	100	107	0
09	008GSP1501	102	99	98	102	0
10	008GSP1601	104	100	99	104	0
11	008GSP1701	101	94	95	98	0
12	008GSP1801	102	97	99	100	0
13	008TSP1801	96	99	94	99	0
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

QC LIMITS

SMC1 (TOL) = TOLUENE-d8 (88-110)
 SMC2 (BFB) = 4-BROMOFLUOROBENZENE (86-115)
 SMC3 (DCA) = 1,2-DICHLOROETHANE-d4 (80-120)
 SMC4 (DBF) = DIBROMOFLUOROMETHANE (86-118)

Column to be used to flag recovery values
 * Values outside of contract required QC limits
 D Surrogates diluted out

LCS\LCSD RECOVERY REPORT

Lab Name: SWOK\AATS

Matrix: WATER

Instrument: i

Analyst: DOUG

LCS Analysis Date: 09-AUG-99 13:33

LCS File id: i52558.d

LCSD Analysis Date: 09-AUG-99 13:56

LCSD File id: i52559.d

Units:--Water ug/L Soil ug/Kg Air ppbv

COMPOUND	SPIKE ADDED	LCS CONCENTRATION	LCS % REC #	QC LIMITS REC
CHLOROMETHANE	50.00	58.40	117	47-150
VINYL CHLORIDE	50.00	55.62	111	53-138
BROMOMETHANE	50.00	45.64	91	46-143
CHLOROETHANE	50.00	47.47	95	59-142
1 1-DICHLOROETHENE	50.00	47.42	95	58-135
ACETONE	50.00	31.31	63	36-154
CARBON DISULFIDE	50.00	56.56	113	49-133
METHYLENE CHLORIDE	50.00	39.56	79	59-134
trans-1 2-DICHLOROETHENE	50.00	48.97	98	59-134
1 1-DICHLOROETHANE	50.00	52.52	105	60-133
VINYL ACETATE	50.00	46.32	93	56-135
cis-1 2-DICHLOROETHENE	50.00	47.65	95	61-134
2-BUTANONE	50.00	50.11	100	44-152
CHLOROFORM	50.00	49.36	99	61-133
1 1 1-TRICHLOROETHANE	50.00	48.55	97	59-130
CARBON TETRACHLORIDE	50.00	48.51	97	61-129
BENZENE	50.00	48.90	98	64-128
1 2-DICHLOROETHANE	50.00	50.52	101	61-136
TRICHLOROETHENE	50.00	48.43	97	64-128
1 2-DICHLOROPROPANE	50.00	49.19	98	66-135
BROMODICHLOROMETHANE	50.00	46.98	94	63-134
2-CHLOROETHYL VINYL ETHER	50.00	40.61	81	40-149
cis-1,3-Dichloropropene	50.00	49.08	98	65-129
4-METHYL-2-PENTANONE	50.00	45.94	92	56-146
TOLUENE	50.00	49.56	99	59-134
trans-1,3-Dichloropropene	50.00	47.03	94	64-130
1 1 2-TRICHLOROETHANE	50.00	48.67	97	68-131
TETRACHLOROETHENE	50.00	48.56	97	62-133
2-HEXANONE	50.00	43.54	87	55-142
DIBROMOCHLOROMETHANE	50.00	46.60	93	41-145
CHLOROBENZENE	50.00	50.47	101	62-132
ETHYL BENZENE	50.00	35.11	70	60-131
m,p-XYLENES	100.00	94.94	95	72-126
o-XYLENE	50.00	46.96	94	62-132
STYRENE	50.00	46.78	94	61-136
BROMOFORM	50.00	45.77	92	61-135
1 1 2 2-TETRACHLOROETHANE	50.00	45.26	90	59-139

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

LCS Recovery: 0 out of 37 outside limits

LCS\LCS D RECOVERY REPORT

Lab Name: SWOK\AATS

Matrix: WATER

Instrument: i

Analyst: DOUG

LCS Analysis Date: 09-AUG-99 13:33

LCS File id: i52558.d

LCS D Analysis Date: 09-AUG-99 13:56

LCS D File id: i52559.d

Units: Water ug/L Soil ug/Kg Air ppbv

COMPOUND	SPIKE ADDED	LCS D CONC.	LCS D % REC #	% RPD	QC LIMITS REC
CHLOROMETHANE	50.00	57.37	115	2	47-150
VINYL CHLORIDE	50.00	53.67	107	4	53-138
BROMOMETHANE	50.00	45.82	92	1	46-143
CHLOROETHANE	50.00	51.19	102	7	59-142
1 1-DICHLOROETHENE	50.00	51.24	102	7	58-135
ACETONE	50.00	46.96	94	39	36-154
CARBON DISULFIDE	50.00	58.14	116	3	49-133
METHYLENE CHLORIDE	50.00	40.29	80	1	59-134
trans-1 2-DICHLOROETHENE	50.00	49.71	99	1	59-134
1 1-DICHLOROETHANE	50.00	53.46	107	2	60-133
VINYL ACETATE	50.00	51.34	103	10	56-135
cis-1 2-DICHLOROETHENE	50.00	47.39	95	0	61-134
2-BUTANONE	50.00	57.34	115	14	44-152
CHLOROFORM	50.00	50.40	101	2	61-133
1 1 1-TRICHLOROETHANE	50.00	50.11	100	3	59-130
CARBON TETRACHLORIDE	50.00	50.47	101	4	61-129
BENZENE	50.00	48.91	98	0	64-128
1 2-DICHLOROETHANE	50.00	52.94	106	5	61-136
TRICHLOROETHENE	50.00	49.24	98	1	64-128
1 2-DICHLOROPROPANE	50.00	52.09	104	6	66-135
BROMODICHLOROMETHANE	50.00	49.97	100	6	63-134
2-CHLOROETHYL VINYL ETHER	50.00	43.60	87	7	40-149
cis-1,3-Dichloropropene	50.00	50.52	101	3	65-129
4-METHYL-2-PENTANONE	50.00	44.67	89	3	56-146
TOLUENE	50.00	50.88	102	3	59-134
trans-1,3-Dichloropropene	50.00	48.20	96	2	64-130
1 1 2-TRICHLOROETHANE	50.00	52.20	104	7	68-131
TETRACHLOROETHENE	50.00	50.82	102	5	62-133
2-HEXANONE	50.00	53.55	107	21	55-142
DIBROMOCHLOROMETHANE	50.00	51.54	103	10	41-145
CHLOROBENZENE	50.00	52.93	106	5	62-132
ETHYL BENZENE	50.00	36.51	73	4	60-131
m,p-XYLENES	100.00	103.60	104	9	72-126
o-XYLENE	50.00	50.01	100	6	62-132
STYRENE	50.00	50.48	101	7	61-136
BROMOFORM	50.00	51.93	104	12	61-135
1 1 2 2-TETRACHLOROETHANE	50.00	48.20	96	6	59-139

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

LCS D Recovery: 0 out of 37 outside limits

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Volatiles
 Test Code MS326
 Method SW846 5030A/8260B
 Matrix Water-Soil
 Sample Volume 5 mL - 5 g
 Initial Calibration(5ml/5g) 50-50-100-200 ppb ±RSD<30% for VOC compounds SPCC RRF>0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCC RRF > 0.100 for Chloromethane 1,1-Dichloroethane and Bromoform
 Continuing Calibration(5ml/5g) 50 ppb ±RSD < 20% for VOC compounds SPCC RRF > 0.100 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCC RRF > 0.100 for Chloromethane 1,1-Dichloroethane and Bromoform
 Internal Standards Chlorobenzene-D5 1,4-Dichlorobenzene-D4 1,4-Difluorobenzene, Perfluorobenzene
 Surrogates Toluene-D8 4-Bromofluorobenzene Dibromofluoromethane
 Page 1 of 2

COMPOUND	CAS NUMBER	PQL	PQL	MDL	MDL
		WATER, 5ml ug/L	SOIL ug/Kg	WATER, 5ml ug/L	SOIL ug/Kg
DICHLORODIFLUOROMETHANE	75-71-8	5	5	4	3.2
CHLOROMETHANE	74-87-3	5	5	0.6	0.6
VINYL CHLORIDE	75-01-4	5	5	1.0	0.8
BROMOMETHANE	74-83-9	5	5	0.5	1.0
CHLOROETHANE	75-00-3	5	5	0.6	0.9
TRICHLOROFLUOROMETHANE	75-69-4	5	5	1.4	0.8
1,1-DICHLOROETHENE	75-35-4	5	5	1.6	1.0
CARBON DISULFIDE	75-15-0	5	5	1.8	1.0
METHYLENE CHLORIDE	75-09-2	5	5	1.1	1.2
trans-1,2-DICHLOROETHENE	156-60-5	5	5	1.3	1.0
1,1-DICHLOROETHANE	75-34-3	5	5	1.0	0.9
cis-1,2-DICHLOROETHENE	156-59-2	5	5	1.4	1.2
1,2-Dichloroethene (total)	540-59-0	5	5	2.5	2.1
2,2-DICHLOROPROPANE	594-20-7	5	5	0.9	0.7
BROMOCHLOROMETHANE	74-97-5	5	5	0.6	1.3
CHLOROFORM	67-66-3	5	5	0.8	0.7
1,1,1-TRICHLOROETHANE	71-55-6	5	5	0.8	0.7
1,1-DICHLOROPROPENE	563-58-6	5	5	0.6	0.8
CARBON TETRACHLORIDE	56-23-5	5	5	0.8	0.5
BENZENE	71-43-2	5	5	0.6	0.8
1,2-DICHLOROETHANE	107-06-2	5	5	1.0	1.2
TRICHLOROETHENE	79-01-6	5	5	1.6	0.7
1,2-DICHLOROPROPANE	78-87-5	5	5	0.6	1.0
DIBROMOMETHANE	74-95-3	5	5	0.8	0.9
BRO-DICHLOROMETHANE	75-27-4	5	5	0.7	0.6
TOLUENE	108-88-3	5	5	1.1	1.1
1,1,2-TRICHLOROETHANE	79-00-5	5	5	0.8	0.8
TETRACHLOROETHENE	127-18-4	5	5	0.9	0.7
1,3-DICHLOROPROPANE	142-28-9	5	5	0.8	0.9
DIBROMOCHLOROMETHANE	124-48-1	5	5	1.0	0.5
1,2-DIBROMOETHANE	106-93-4	5	5	1.1	1.1
CHLOROBENZENE	108-90-7	5	5	0.7	0.7
1,1,1,2-TETRACHLOROETHANE	630-20-6	5	5	0.6	0.8
ETHYL BENZENE	100-41-4	5	5	0.8	1.1
m,p-XYLENES	13-302-07	5	5	1.6	1.2
o-XYLENE	95-47-6	5	5	0.9	0.8
Xylene (total)	1330-20-7	5	5	2.4	1.8
STYRENE	100-42-5	5	5	0.8	1.2
BROMOFORM	75-25-2	5	5	0.7	0.9
ISOPROPYLBENZENE	98-82-8	5	5	0.9	0.9
1,2,3-TRICHLOROPROPANE	96-18-4	5	5	0.8	1.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Volatiles
 Test Code MS326
 Method SW846 8030A / 8230B
 Matrix Water-Soil
 Sample volume 5 mL - 5 g
 Initial Calibration(5ml/5g) 10-50-100-200 ppb %RSD < 20% for VOC compounds SPCO RRF > 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCO RRF > 0.100 for Bromomethane, 1,1-Dichloroethane and Bromoform
 Continuing Calibration(5ml/5g) 10 ppb %RSD < 20% for VOC compounds SPCO RRF > 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCO RRF > 0.100 for Bromomethane, 1,1-Dichloroethane and Bromoform
 Internal Standards Chlorobenzene-D5, 1,4-Dichlorobenzene-D4, 1,4-Difluorobenzene, Perfluorobenzene
 Surrogates Toluene-D8, 4-Bromofluorobenzene, Dibromofluoromethane
 Page 2 of 2

COMPOUND	CAS NUMBER	PQL	PQL	MDL	MDL
		WATER, 5ml ug/L	SOIL ug/Kg	WATER, 5ml ug/L	SOIL ug/Kg
BROMOBENZENE	108-86-1	5	5	1.1	1.0
1,1,2,2-TETRACHLOROETHANE	79-34-5	5	5	0.8	0.8
n-PROPYLBENZENE	103-65-1	5	5	1.2	1.1
2-CHLOROTOLUENE	95-49-8	5	5	0.7	1.2
4-CHLOROTOLUENE	106-43-4	5	5	0.8	1.3
1,3,5-TRIMETHYLBENZENE	108-67-8	5	5	0.9	0.9
tert-BUTYLBENZENE	98-06-6	5	5	1.0	0.9
1,2,4-TRIMETHYLBENZENE	35-63-6	5	5	0.8	0.7
sec-BUTYLBENZENE	135-98-8	5	5	0.8	0.7
1,3-DICHLOROBENZENE	541-73-1	5	5	0.8	0.9
p-ISOPROPYLTOLUENE	99-87-6	5	5	0.9	0.9
1,4-DICHLOROBENZENE	106-46-7	5	5	0.7	0.8
1,2-DICHLOROBENZENE	95-50-1	5	5	0.6	0.7
n-BUTYLBENZENE	104-51-8	5	5	1.0	1.0
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	5	5	1.6	4.0
1,2,4-TRICHLOROBENZENE	120-82-1	5	5	1.0	1.0
HEXACHLOROBUTADIENE	87-68-3	5	5	1.0	1.0
NAPHTHALENE	91-20-3	5	5	0.9	1.0
1,2,3-TRICHLOROBENZENE	87-61-6	5	5	1.0	0.9

WATER MDL ANALYZED ON INSTR. K - 1/19/98
 SOIL MDL ANALYZED ON INSTR. K - 1/23/98



CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
 PROJECT/JOB NO: 2907 " 89-014/00
 COC NO: _____
 PO NO: 4
 REL NO: 119
 LAB NAME: SWL

800-588-7882
 MEMPHIS, TENNESSEE
 CHARLESTON, SC; CINCINNATI, OH; JALLAS, TX; JACKSON, TN; KNOXVILLE, TN;
 LANCASTER, PA; NASHVILLE, TN; RICHMOND, VA; RYDOLK, VA; PADU, VA; KY; PENSACOLA, FL;
 RALEIGH, NC; COLOGNE, GERMANY

CLIENT: Naval Base Charleston PROJECT MANAGER: Charlie Vernoy
 LOCATION: Eche G, SWA, 18 TELE/FAX NO. (843) 884-0029 / 856-0107
 SAMPLERS: (SIGNATURE) Andrew Wertz

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS			REMARKS	
					TEMP.	CHEMICAL	VOAs	SVOAs	Hydrazine		
NBC 51008GSP1001	8/5/99	0945	W	2-40mL vial, 2-1/2 amber; 1-500mL amber	4°C	see remarks	5	X	X	X	40mL vial - HCl 1/2 amber - None 500mL amber - HCl
NBC 51008GSP1101		1015					5	X	X	X	
NBC 51008GSP1201		1100					5	X	X	X	
NBC 51008GSP1301		1130					5	X	X	X	
NBC 51008GSP1401		1335					5	X	X	X	
NBC 51008GSP1501		1400					5	X	X	X	
NBC 51008GSP1601		1420					5	X	X	X	
NBC 51008GSP1701		1445					5	X	X	X	
NBC 51008GSP1801		1535					5	X	X	X	
NBC 51008TSP1801				2-40mL vial		HCl	2	X			

Andrew Wertz
 8/5/99

RELINQUISHER: <u>Andrew Wertz</u>	DATE: <u>8/5/99</u>	RECEIVER: <u>Jason Spriggs</u>	DATE: <u>8/6/99</u>	RELINQUISHER:	DATE:	RECEIVER:	DATE:
PRINTED: <u>ANDREW WERTZ</u>	TIME: <u>1730</u>	PRINTED: <u>JASON SPRIGGS</u>	TIME: <u>11:00</u>	PRINTED:	TIME:	PRINTED:	TIME:
COMPANY:		COMPANY: <u>SWLO</u>		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FEDEX
 SHIPMENT NO. 4849148754
 SEND RESULTS TO: Charlie Vernoy

COMMENTS: DQO III STANDARD FAT

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

SDG NARRATIVE

August 18, 1999

CLIENT: ENSAFE

SDG No.: 39843

VOLATILE FRACTION

Ten water samples were submitted for Volatile Organic Analysis. The samples were analyzed by GC/MS following Method SW846-8260B and a specified compound list.

No major problems occurred during the analyses of these samples.

Blanks: No problems.

Surrogates: No problems.

Laboratory Control Spikes: No problems.

Internal Standards: No problems.

Matrix Spikes. There were no matrix spikes submitted with this SDG. Analytical batch I990809A contained an MS/MSD from SWLO episode 39825.

Harry M. Borg
Harry M. Borg
Organic Program Manager

August 18, 1999

MULTI-MEDIA SEMIVOLATILE ORGANIC FRACTION

CASE NUMBER: _____ SDG NUMBER: 39843

LABORATORY: SWOK

CLIENT: EnSafe PROJECT: Charleston Zone G

REVIEWER: MM DATE: 9-29-99 Rel 99-78

QA/QC LEVEL

- NEESA C
- NEESA D
- DQO LEVEL III
- DQO LEVEL IV
- _____

Statement Of Work (SOW)

- CLP 3/90
- CLP 2/88
- SW846 8270 C
- SW846 8270 Appendix IX
- _____

ANALYSIS MODIFICATIONS: _____

SEMIVOLATILE HOLDING TIMES

	<u>Water</u>	<u>soil</u>	<u>Analysis</u>
CLP:	7 days from sampling	14 days from sampling	40 days from VTSR
SW846:	7 days from sampling	14 days from sampling	40 days from VTSR
Region I:	5 days from VTSR	7 days from VTSR	40 days from VTSR
Region III:	7 days from sampling	7 days from sampling	40 days from VTSR
NYSDEC:	5 days form VTSR	5 days from VTSR	40 days From VTSR

1. Were the holding times met for the all semivolatle samples? YES NO

If yes, complete the following form for all samples that exceeded holding times.

EPA SAMPLE NO.	MATRIX	VTSR OR DATE SAMPLED	DATE OF EXTRACTION ANALYSIS	DA	Action
008-G-SP17-01RE	W	8-5-99	9-1-99	20	JTR

Action: DA - The number of days that the holding time was exceeded.

DA ≤ 5: Qualify all positive results as estimated (J).

DA > 5 ≤ 15: Qualify all positive results as estimated (J) and all non detects estimated (UJ).

DA > 15: Qualify all positive results estimated (J) and reject all non detects.

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Lab File ID: A9082601.D

DFTPP Injection Date: 08/26/99

Instrument ID: HP70A

DFTPP Injection Time: 1100

m/e	ION ABUNCANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	53.0
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	53.0
70	Less than 2.0% of mass 69	0.0 (0.0)1
127	40.0 - 60.0% of mass 198	44.1
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 - 9.0% of mass 198	7.0
275	10.0 - 30.0% of mass 198	24.5
365	Greater than 1.00% of mass 198	1.2
441	Present, but less than mass 443	13.7
442	Greater than 40.0% of mass 198	73.5
443	17.0 - 23.0% of mass 442	15.4 (20.9)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARD

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD160	SSTD160	A9082603.D	08/26/99	1157
02	SSTD050	SSTD050	A9082604.D	08/26/99	1234
03	SSTD120	SSTD120	A9082605.D	08/26/99	1311
04	SSTD020	SSTD020	A9082606.D	08/26/99	1349
05	SSTD080	SSTD080	A9082607.D	08/26/99	1427
06	SBLK1	BL0807WA	A9082609.D	08/26/99	1543
07	LCS1	LD0807WA	A9082611.D	08/26/99	1701
08	008GSP1601	39843.07	A9082617.D	08/26/99	1954
09	008GSP1701	39843.08	A9082618.D	08/26/99	2031
10	008GSP1801	39843.09	A9082619.D	08/26/99	2108
11	008GSP1401	39843.05	A9082620.D	08/26/99	2144
12	008GSP1501	39843.06	A9082621.D	08/26/99	2221
13	008GSP1001	39843.01	A9082622.D	08/26/99	2257
14					
15					
16					
17					
18					
19					
20					
21					
22					

6B
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Instrument ID: HP70A

Calibration Date(s): 08/26/99

Calibration Times:

1157

1427

LAB FILE ID: RRF20 = A9082606.D RRF50 = A9082604.D
RRF80 = A9082607.D RRF120 = A9082605.D RRF160 = A9082603.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Phenol	1.380	1.226	1.372	1.314	1.251	1.309	5.3*
bis(2-Chloroethyl) ether	1.070	0.978	1.018	0.995	0.974	1.007	3.9
2-Chlorophenol	1.054	0.971	1.014	0.986	0.948	0.995	4.1
1,3-Dichlorobenzene	1.207	1.130	1.116	1.104	1.059	1.123	4.8
1,4-Dichlorobenzene	1.272	1.156	1.153	1.130	1.091	1.160	5.8*
Benzyl Alcohol	0.772	0.703	0.757	0.792	0.689	0.743	6.0
1,2-Dichlorobenzene	1.193	1.090	1.093	1.080	1.032	1.098	5.3
2-Methylphenol	0.832	0.814	0.848	0.838	0.812	0.829	1.9
bis(2-Chloroisopropyl) ether	1.674	1.517	1.566	1.512	1.404	1.535	6.4
4-Methylphenol	0.891	0.869	0.897	0.887	0.857	0.880	1.9
N-Nitroso-di-n-propylamine	0.670	0.584	0.741	0.717	0.617	0.666	9.9#
Hexachloroethane	0.511	0.449	0.456	0.464	0.459	0.468	5.3
Nitrobenzene	0.294	0.298	0.302	0.309	0.306	0.302	2.0
Isophorone	0.571	0.510	0.551	0.550	0.523	0.541	4.5
2-Nitrophenol	0.130	0.139	0.139	0.145	0.142	0.139	4.0*
2,4-Dimethylphenol	0.250	0.246	0.252	0.265	0.249	0.252	17.4
Benzoic Acid	0.148	0.170	0.211	0.230	0.211	0.194	2.6
bis(2-Chloroethoxy)methane	0.382	0.364	0.363	0.367	0.356	0.366	0.9*
2,4-Dichlorophenol	0.267	0.265	0.268	0.271	0.266	0.267	5.2
1,2,4-Trichlorobenzene	0.350	0.330	0.308	0.314	0.316	0.324	5.4
Naphthalene	0.919	0.861	0.840	0.820	0.801	0.848	1.9
4-Chloroaniline	0.355	0.348	0.353	0.355	0.339	0.350	7.4*
Hexachlorobutadiene	0.217	0.200	0.194	0.185	0.180	0.195	1.3*
4-Chloro-3-methylphenol	0.270	0.266	0.274	0.269	0.265	0.269	2.6
2-Methylnaphthalene	0.593	0.595	0.567	0.571	0.563	0.578	5.2*
Hexachlorocyclopentadiene	0.273	0.260	0.265	0.278	0.297	0.275	2.2*
2,4,6-Trichlorophenol	0.322	0.314	0.334	0.324	0.327	0.324	3.6
2,4,5-Trichlorophenol	0.324	0.341	0.355	0.352	0.341	0.343	2.3
2-Chloronaphthalene	0.868	0.839	0.837	0.847	0.815	0.841	14.5
2-Nitroaniline	0.154	0.167	0.207	0.214	0.209	0.190	3.2
Dimethylphthalate	0.895	0.896	0.951	0.958	0.935	0.927	16.7
Acenaphthylene	1.405	1.344	1.412	1.370	1.353	1.377	14.7
2,6-Dinitrotoluene	0.143	0.179	0.203	0.218	0.219	0.192	14.2
3-Nitroaniline	0.158	0.186	0.218	0.228	0.223	0.203	27.8
Acenaphthene	0.961	0.910	0.934	0.904	0.886	0.919	9.9#
2,4-Dinitrophenol	0.076	0.112	0.129	0.152	0.166	0.127	
4-Nitrophenol	0.101	0.114	0.124	0.129	0.128	0.119	

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 11 non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA Contract: ZONE G, REL
 Lab Code: SWOK Case No.: ENSAFE SAS No.: SDG No.: 39843
 Instrument ID: HP70A Calibration Date(s): 08/26/99
 Calibration Times: 1157 1427

LAB FILE ID: RRF20 = A9082606.D RRF50 = A9082604.D
 RRF80 = A9082607.D RRF120 = A9082605.D RRF160 = A9082603.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	RSD
Dibenzofuran	1.376	1.314	1.293	1.266	1.224	1.295	4.4
2,4-Dinitrotoluene	0.235	0.287	0.318	0.330	0.334	0.301	13.7
Diethylphthalate	0.771	0.720	0.839	0.832	0.760	0.784	6.4
4-Chlorophenyl-phenylether	0.661	0.623	0.649	0.619	0.596	0.630	4.1
Fluorene	1.123	1.066	1.090	1.070	1.042	1.078	8
4-Nitroaniline	0.161	0.178	0.221	0.234	0.227	0.204	16.0
4,6-Dinitro-2-methylphenol	0.077	0.095	0.106	0.115	0.119	0.102	16.6
N-Nitrosodiphenylamine (1)	0.337	0.308	0.352	0.336	0.315	0.330	16.4*
4-Bromophenyl-phenylether	0.219	0.207	0.215	0.215	0.208	0.213	2.4
Hexachlorobenzene	0.304	0.279	0.285	0.285	0.267	0.284	4.7
Pentachlorophenol	0.128	0.129	0.140	0.132	0.141	0.134	4.6*
Phenanthrene	0.900	0.824	0.836	0.842	0.808	0.842	4.1
Anthracene	0.805	0.758	0.784	0.791	0.764	0.780	2.5
Carbazole	0.712	0.677	0.728	0.718	0.685	0.704	
Di-n-butylphthalate	0.506	0.468	0.576	0.569	0.501	0.524	6.9
Fluoranthene	1.016	0.953	0.998	1.005	0.963	0.987	2.8
Pyrene	0.986	0.962	1.033	1.004	1.086	1.014	4.7
Butylbenzylphthalate	0.123	0.117	0.164	0.143	0.131	0.136	13.7
3,3'-Dichlorobenzidine	0.171	0.152	0.215	0.199	0.181	0.184	13.3
Benzo(a)anthracene	0.835	0.804	0.933	0.897	0.957	0.885	7.3
Chrysene	0.933	0.919	0.971	0.870	0.946	0.928	4.0
bis(2-Ethylhexyl)phthalate	0.198	0.183	0.258	0.241	0.200	0.216	14.7
Di-n-octylphthalate	0.377	0.374	0.470	0.464	0.442	0.425	11.0*
Benzo(b)fluoranthene	1.138	1.087	1.007	1.143	1.190	1.113	6.2
Benzo(k)fluoranthene	0.987	1.040	1.080	1.046	1.222	1.075	8.2
Benzo(a)pyrene	0.856	0.907	0.910	1.004	1.087	0.953	9.7*
Indeno(1,2,3-cd)pyrene	1.127	1.304	1.146	1.234	1.396	1.241	9.0
Dibenz(a,h)anthracene	1.042	1.064	1.000	1.054	1.171	1.066	6.0
Benzo(g,h,i)perylene	1.000	1.075	1.044	1.083	1.233	1.087	8.1
Pyridine	0.888	0.810	0.813	0.793	0.724	0.806	7.2
Nitrobenzene-d5	0.275	0.288	0.295	0.303	0.307	0.294	4.3
2-Fluorobiphenyl	1.034	0.961	0.987	0.950	0.949	0.976	3.7
Terphenyl-d14	0.830	0.815	0.883	0.863	0.895	0.857	4.0
Phenol-d5	1.173	1.107	1.148	1.134	1.089	1.130	2.9
2-Fluorophenol	0.865	0.815	0.837	0.811	0.794	0.824	3.3
2,4,6-Tribromophenol	0.129	0.107	0.130	0.135	0.121	0.124	8.8

(1) Cannot be separated from Diphenylamine
 = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 All non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Instrument ID: HP70A

Calibration Date(s): 08/26/99

Calibration Times: 1157

1427

LAB FILE ID:		RRF20 = A9082606.D	RRF50 = A9082604.D				
RRF80 = A9082607.D		RRF120 = A9082605.D	RRF160 = A9082603.D				
COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	\bar{RRF}	% RSD
2-Chlorophenol-d4	0.948	0.899	0.922	0.926	0.886	0.916	2.6
1,2-Dichlorobenzene-d4	0.827	0.770	0.753	0.729	0.714	0.759	5.8

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 All non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

SEMIVOLATILE INITIAL CALIBRATION : LINEAR REGRESSION SUMMARY

Lab Name: SWL-TULSA Contract: ZONE G, REL
 Lab Code: SWOK Case No.: ENSAFE SAS No.: SDG No.: 39843
 Instrument ID: HP70A Calibration Date(s): 08/26/99
 Calibration Times: 1157 1427

COMPOUND	SLOPE	INTERCEPT	R2	#
Benzoic Acid	0.230520	-0.046889	0.990	
2,6-Dinitrotoluene	0.233424	-0.055237	0.999	
2,4-Dinitrophenol	0.180781	-0.077092	0.993	
4-Nitroaniline	0.244035	-0.053133	0.996	
4,6-Dinitro-2-methylphenol	0.126035	-0.033294	0.999	

= Column used to flag R2 values that fail. * = R2 value < 0.99

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39843

Lab File ID: A9083101.D

DFTPP Injection Date: 08/31/99

Instrument ID: HP70A

DFTPP Injection Time: 1042

m/e	ION ABUNCANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	42.5
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	53.6
70	Less than 2.0% of mass 69	0.0 (0.0)1
127	40.0 - 60.0% of mass 198	44.8
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 - 9.0% of mass 198	6.6
275	10.0 - 30.0% of mass 198	19.7
365	Greater than 1.00% of mass 198	1.9
441	Present, but less than mass 443	8.9
442	Greater than 40.0% of mass 198	58.7
443	17.0 - 23.0% of mass 442	10.6 (18.1)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD080	SSTD080	A9083102.D	08/31/99	1113
02	SSTD160	SSTD160	A9083103.D	08/31/99	1150
03	SSTD020	SSTD020	A9083104.D	08/31/99	1226
04	SSTD120	SSTD120	A9083105.D	08/31/99	1304
05	SSTD050	SSTD050	A9083106.D	08/31/99	1342
06	008GSP1301	39843.04	A9083108.D	08/31/99	1529
07	008GSP1201	39843.03	A9083109.D	08/31/99	1607
08	008GSP1101	39843.02	A9083110.D	08/31/99	1644
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA Contract: ZONE G, REL
 Lab Code: SWOK Case No.: ENSAFE SAS No.: SDG No.: 39843
 Instrument ID: HP70A Calibration Date(s): 08/31/99
 Calibration Times: 1113 1342

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Dibenzofuran	1.384	1.285	1.242	1.260	1.237	1.282	4.
2,4-Dinitrotoluene	0.251	0.295	0.326	0.341	0.356	0.314	13.
Diethylphthalate	1.095	1.069	1.020	1.028	1.066	1.056	2.1
4-Chlorophenyl-phenylether	0.602	0.584	0.544	0.568	0.556	0.571	4.0
Fluorene	1.114	1.088	1.016	1.038	1.032	1.058	3.5
4-Nitroaniline	0.205	0.245	0.244	0.275	0.281	0.250	12.1
4,6-Dinitro-2-methylphenol	0.068	0.098	0.113	0.118	0.126	0.105	12.8
N-Nitrosodiphenylamine (1)	0.379	0.388	0.379	0.373	0.376	0.379	1.5
4-Bromophenyl-phenylether	0.182	0.190	0.175	0.189	0.183	0.184	3.3
Hexachlorobenzene	0.238	0.228	0.222	0.222	0.221	0.226	3.2
Pentachlorophenol	0.103	0.111	0.116	0.116	0.122	0.114	6.2
Phenanthrene	0.869	0.855	0.864	0.834	0.834	0.851	1.9
Anthracene	0.792	0.785	0.794	0.790	0.784	0.789	0.6
Carbazole	0.721	0.765	0.744	0.758	0.754	0.748	2.3
Di-n-butylphthalate	0.871	0.926	0.976	0.985	0.974	0.946	5.1
Fluoranthene	0.938	0.941	0.955	0.954	0.926	0.943	1.3
Pyrene	1.152	1.084	1.140	1.015	1.074	1.093	5.0
Butylbenzylphthalate	0.399	0.414	0.439	0.444	0.477	0.435	6.9
3,3'-Dichlorobenzidine	0.275	0.286	0.291	0.287	0.344	0.297	9.1
Benzo(a)anthracene	0.976	0.956	0.957	0.875	0.900	0.933	4.6
Chrysene	0.988	0.952	0.935	0.877	0.914	0.933	4.4
bis(2-Ethylhexyl)phthalate	0.601	0.621	0.663	0.652	0.704	0.648	6.1
Di-n-octylphthalate	0.796	0.986	0.972	1.116	1.190	1.012	14.9*
Benzo(b)fluoranthene	1.048	0.996	1.019	1.029	1.137	1.046	5.2
Benzo(k)fluoranthene	0.928	1.057	1.018	0.956	0.896	0.971	6.8
Benzo(a)pyrene	0.910	0.909	0.905	0.909	0.905	0.908	0.3*
Indeno(1,2,3-cd)pyrene	1.124	1.177	1.192	1.098	1.078	1.134	4.4
Dibenz(a,h)anthracene	1.036	0.971	0.936	0.951	0.994	0.978	4.0
Benzo(g,h,i)perylene	0.991	0.993	1.002	0.985	0.947	0.984	2.2
Pyridine	0.694	0.836	0.836	0.755	0.835	0.791	8.2
Nitrobenzene-d5	0.274	0.274	0.294	0.292	0.296	0.286	3.9
2-Fluorobiphenyl	1.027	0.982	0.954	0.957	0.935	0.971	3.6
Terphenyl-d14	0.872	0.837	0.879	0.788	0.827	0.841	4.4
Phenol-d5	1.118	1.109	1.107	1.116	1.090	1.108	1.0
2-Fluorophenol	0.856	0.835	0.828	0.824	0.810	0.831	2.0
2,4,6-Tribromophenol	0.085	0.086	0.087	0.093	0.101	0.090	7.4

(1) Cannot be separated from Diphenylamine
 * = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 All non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

6B
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Instrument ID: HP70A

Calibration Date(s): 09/02/99

Calibration Times:

1257

1528

LAB FILE ID: RRF20 = A9090204.D RRF50 = A9090206.D
RRF80 = A9090202.D RRF120 = A9090205.D RRF160 = A9090203.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Phenol	1.410	1.332	1.327	1.306	1.334	1.342	3.0*
bis(2-Chloroethyl) ether	1.074	1.014	0.992	0.973	1.004	1.011	3.8
2-Chlorophenol	1.115	1.020	1.010	0.991	1.013	1.030	4.7
1,3-Dichlorobenzene	1.227	1.123	1.107	1.071	1.080	1.122	5.6
1,4-Dichlorobenzene	1.306	1.135	1.126	1.085	1.086	1.148	8.0*
Benzyl Alcohol	0.841	0.851	0.859	0.871	0.871	0.859	1.5
1,2-Dichlorobenzene	1.200	1.077	1.074	1.045	1.027	1.085	6.2
2-Methylphenol	0.867	0.846	0.853	0.849	0.844	0.852	1.1
bis(2-Chloroisopropyl) ether	1.687	1.638	1.574	1.545	1.570	1.603	3.6
4-Methylphenol	0.977	0.922	0.923	0.928	0.933	0.937	2.4
N-Nitroso-di-n-propylamine	0.779	0.801	0.810	0.809	0.802	0.800	1.6#
Hexachloroethane	0.471	0.460	0.453	0.436	0.441	0.452	3.1
Nitrobenzene	0.276	0.284	0.289	0.290	0.292	0.286	2.2
Isophorone	0.537	0.563	0.564	0.556	0.561	0.556	2.0
2-Nitrophenol	0.131	0.142	0.157	0.154	0.161	0.149	8.3*
2,4-Dimethylphenol	0.227	0.244	0.258	0.258	0.262	0.250	5.8
Benzoic Acid	0.283	0.340	0.390	0.392	0.414	0.364	14.5
bis(2-Chloroethoxy)methane	0.380	0.371	0.376	0.363	0.361	0.370	2.2
2,4-Dichlorophenol	0.254	0.258	0.257	0.254	0.260	0.257	1.0*
1,2,4-Trichlorobenzene	0.312	0.292	0.299	0.286	0.292	0.296	3.4
Naphthalene	0.904	0.833	0.846	0.819	0.815	0.843	4.3
4-Chloroaniline	0.358	0.356	0.368	0.359	0.356	0.359	1.4
Hexachlorobutadiene	0.178	0.146	0.170	0.149	0.160	0.161	8.4*
4-Chloro-3-methylphenol	0.253	0.287	0.279	0.280	0.287	0.277	5.1*
2-Methylnaphthalene	0.598	0.570	0.586	0.566	0.559	0.576	2.8
Hexachlorocyclopentadiene	0.218	0.209	0.242	0.250	0.247	0.233	7.9#
2,4,6-Trichlorophenol	0.285	0.286	0.306	0.299	0.304	0.296	3.4*
2,4,5-Trichlorophenol	0.316	0.311	0.330	0.308	0.332	0.319	3.4
2-Chloronaphthalene	0.875	0.825	0.855	0.813	0.825	0.839	3.0
2-Nitroaniline	0.205	0.231	0.273	0.276	0.295	0.256	14.4
Dimethylphthalate	1.035	0.993	1.057	0.994	1.007	1.017	2.8
Acenaphthylene	1.380	1.350	1.421	1.368	1.356	1.375	2.0
2,6-Dinitrotoluene	0.146	0.185	0.216	0.220	0.229	0.199	17.1
3-Nitroaniline	0.196	0.232	0.266	0.262	0.274	0.246	13.1
Acenaphthene	0.972	0.914	0.948	0.893	0.899	0.925	3.6*
2,4-Dinitrophenol	0.071	0.106	0.141	0.149	0.166	0.127	13.9#
4-Nitrophenol	0.089	0.120	0.137	0.137	0.136	0.124	16.7#

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound

All non-SPCC compounds must meet a minimum RRF of 0.01.

Compounds with % RSD values > 15.0 must be analyzed by linear regression

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Instrument ID: HP70A

Calibration Date(s): 09/02/99

Calibration Times:

1257

1528

LAB FILE ID: RRF20 = A9090204.D RRF50 = A9090206.D
RRF80 = A9090202.D RRF120 = A9090205.D RRF160 = A9090203.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Dibenzofuran	1.367	1.280	1.302	1.252	1.277	1.296	3.4
2,4-Dinitrotoluene	0.232	0.290	0.340	0.339	0.350	0.310	16.0
Diethylphthalate	1.067	1.070	1.076	1.047	1.046	1.061	1.3
4-Chlorophenyl-phenylether	0.610	0.564	0.586	0.553	0.556	0.574	4.2
Fluorene	1.109	1.063	1.097	1.038	1.036	1.069	3.1
4-Nitroaniline	0.203	0.248	0.286	0.283	0.295	0.263	14.4
4,6-Dinitro-2-methylphenol	0.069	0.094	0.115	0.120	0.127	0.105	22.5
N-Nitrosodiphenylamine (1)	0.380	0.384	0.372	0.384	0.382	0.380	1.3*
4-Bromophenyl-phenylether	0.180	0.178	0.176	0.176	0.179	0.178	1.0
Hexachlorobenzene	0.227	0.215	0.217	0.220	0.218	0.219	2.1
Pentachlorophenol	0.097	0.105	0.118	0.120	0.118	0.112	9.0*
Phenanthrene	0.909	0.831	0.835	0.851	0.839	0.853	3.8
Anthracene	0.799	0.781	0.783	0.799	0.790	0.790	1.1
Carbazole	0.742	0.752	0.769	0.783	0.760	0.761	2.1
Di-n-butylphthalate	0.878	0.934	0.973	0.986	0.983	0.951	1.1
Fluoranthene	0.956	0.939	0.950	0.968	0.947	0.952	1.1
Pyrene	1.075	1.058	1.103	1.098	1.081	1.083	1.7
Butylbenzylphthalate	0.397	0.440	0.485	0.494	0.496	0.462	9.3
3,3'-Dichlorobenzidine	0.270	0.312	0.360	0.332	0.344	0.324	10.7
Benzo(a)anthracene	0.932	0.946	0.925	0.910	0.897	0.922	2.1
Chrysene	0.966	0.946	0.931	0.948	0.911	0.940	2.2
bis(2-Ethylhexyl)phthalate	0.546	0.646	0.703	0.719	0.725	0.668	11.2
Di-n-octylphthalate	0.804	0.982	1.097	1.151	1.182	1.043	14.8*
Benzo(b)fluoranthene	1.253	1.122	0.991	1.062	1.058	1.097	9.0
Benzo(k)fluoranthene	0.756	0.854	1.038	0.958	0.896	0.900	11.8
Benzo(a)pyrene	0.874	0.843	0.895	0.892	0.911	0.883	2.9*
Indeno(1,2,3-cd)pyrene	1.167	1.131	1.121	1.140	1.154	1.143	1.6
Dibenz(a,h)anthracene	1.033	0.976	0.989	0.984	0.951	0.987	3.0
Benzo(g,h,i)perylene	0.972	0.943	0.987	1.016	0.968	0.977	2.7
Pyridine	0.799	0.823	0.748	0.891	0.795	0.811	6.4
Nitrobenzene-d5	0.272	0.278	0.283	0.292	0.295	0.284	3.4
2-Fluorobiphenyl	1.005	0.934	0.965	0.902	0.925	0.946	4.2
Terphenyl-d14	0.823	0.797	0.841	0.852	0.822	0.827	2.5
Phenol-d5	1.224	1.174	1.164	1.157	1.171	1.178	2.2
2-Fluorophenol	0.862	0.817	0.838	0.824	0.816	0.831	2.3
2,4,6-Tribromophenol	0.085	0.079	0.092	0.094	0.090	0.088	6.9

(1) Cannot be separated from Diphenylamine

= CCC Compound, must have % RSD < 30.0 # = SPCC Compound

All non-SPCC compounds must meet a minimum RRF of 0.01.

Compounds with % RSD values > 15.0 must be analyzed by linear regression

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Instrument ID: HP70A

Calibration Date(s): 09/02/99

Calibration Times: 1257

1528

LAB FILE ID:	RRF20 = A9090204.D	RRF50 = A9090206.D
RRF80 = A9090202.D	RRF120 = A9090205.D	RRF160 = A9090203.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
2-Chlorophenol-d4	0.993	0.948	0.940	0.934	0.958	0.955	2.4
1,2-Dichlorobenzene-d4	0.808	0.751	0.720	0.697	0.710	0.737	6.0

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 All non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

SEMIVOLATILE INITIAL CALIBRATION : LINEAR REGRESSION SUMMARY

Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Instrument ID: HP70A

Calibration Date(s): 09/02/99

Calibration Times: 1257

1528

SSTD020 = A9090204.D SSTD050 = A9090206.D SSTD080 = A9090202.D
 SSTD120 = A9090205.D SSTD160 = A9090203.D

COMPOUND	SLOPE	INTERCEPT	R2 #
2,6-Dinitrotoluene	0.242062	-0.057904	0.999
2,4-Dinitrophenol	0.180063	-0.074937	0.994
4-Nitrophenol	0.144216	-0.024716	0.999
2,4-Dinitrotoluene	0.368008	-0.075878	0.999
4,6-Dinitro-2-methylphenol	0.135906	-0.042568	0.998

= Column used to flag R2 values that fail. * = R2 value < 0.99

7B
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract: ZONE G, REL
 Lab Code: SWOK Case No.: ENSAFE SAS No.: SDG No.: 38843
 Instrument ID: HP70A Calibration Date: 09/03/99 Time: 0900
 Lab File ID: A9090302.D Init. Calib. Date(s): 09/02/99 09/02/99
 Init. Calib. Times: 1257 1528

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
Phenol	1.342	1.380		2.8	20.0
bis(2-Chloroethyl) ether	1.011	1.052		4.0	
2-Chlorophenol	1.030	1.034		0.4	
1,3-Dichlorobenzene	1.122	1.119		-0.1	
1,4-Dichlorobenzene	1.148	1.142		-0.5	20.0
Benzyl Alcohol	0.859	0.856		-0.3	
1,2-Dichlorobenzene	1.085	1.047		-3.5	
2-Methylphenol	0.852	0.852		0.0	
bis(2-Chloroisopropyl) ether	1.603	1.602		0.1	
4-Methylphenol	0.937	0.954		1.8	
N-Nitroso-di-n-propylamine	0.800	0.826	0.050	3.2	
Hexachloroethane	0.452	0.454		0.4	
Nitrobenzene	0.286	0.303		5.9	
Isophorone	0.556	0.571		2.7	
2-Nitrophenol	0.149	0.157		5.4	20.0
2,4-Dimethylphenol	0.250	0.253		1.2	
Benzoic Acid	0.364	0.399		9.6	
bis(2-Chloroethoxy) methane	0.370	0.376		1.6	
2,4-Dichlorophenol	0.257	0.255		-0.6	20.0
1,2,4-Trichlorobenzene	0.296	0.286		-3.2	
Naphthalene	0.843	0.847		0.5	
4-Chloroaniline	0.359	0.363		1.1	
Hexachlorobutadiene	0.161	0.160		-0.6	20.0
4-Chloro-3-methylphenol	0.277	0.282		1.8	20.0
2-Methylnaphthalene	0.576	0.576		0.0	
Hexachlorocyclopentadiene	0.233	0.213	0.050	-8.4	
2,4,6-Trichlorophenol	0.296	0.298		0.7	20.0
2,4,5-Trichlorophenol	0.319	0.332		4.1	
2-Chloronaphthalene	0.839	0.846		0.8	
2-Nitroaniline	0.256	0.275		7.4	
Dimethylphthalate	1.017	1.026		0.9	
Acenaphthylene	1.375	1.359		-1.0	
2,6-Dinitrotoluene	0.199	0.215		8.0	
3-Nitroaniline	0.246	0.257		4.5	
Acenaphthene	0.925	0.914		-1.0	20.0
2,4-Dinitrophenol	0.127	0.140	0.050	10.2	
4-Nitrophenol	0.124	0.138	0.050	11.3	
Dibenzofuran	1.296	1.320		1.8	
2,4-Dinitrotoluene	0.310	0.340		9.7	
Diethylphthalate	1.061	1.070		0.8	

no qual
068

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Lab File ID (Standard): A9082607

Date Analyzed: 08/26/99

Instrument ID: HP70A

Time Analyzed: 1427

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	88027	5.62	320202	7.93	230517	11.32
UPPER LIMIT	176054	6.12	640404	8.43	461034	11.82
LOWER LIMIT	44014	5.12	160101	7.43	115259	10.82
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 SBLK1	76798	5.62	270803	7.94	192059	11.32
02 LCS1	100191	5.62	365551	7.93	258666	11.32
03 008GSP1601	100547	5.62	354588	7.92	263275	11.32
04 008GSP1701	103518	5.62	372181	7.92	260904	11.32
05 008GSP1801	98985	5.62	354602	7.93	263470	11.32
06 008GSP1401	108585	5.62	386224	7.92	277070	11.31
07 008GSP1501	109449	5.61	396402	7.92	301432	11.31
08 008GSP1001	114088	5.62	403346	7.92	289878	11.31
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits.

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

o Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Lab File ID (Standard): A9082607

Date Analyzed: 08/26/99

Instrument ID: HP70A

Time Analyzed: 1427

	IS4 (PHN)	RT #	IS5 (CRY)	RT #	IS6 (PRY)	RT #
	AREA #		AREA #		AREA #	
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	468427	14.07	484673	18.97	465809	21.42
UPPER LIMIT	936854	14.57	969346	19.47	931618	21.92
LOWER LIMIT	234214	13.57	242337	18.47	232905	20.92
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 SBLK1	389358	14.06	383158	18.97	372122	21.43
02 LCS1	537458	14.07	484794	18.97	529867	21.42
03 008GSP1601	522533	14.06	483580	18.98	533402	21.42
04 008GSP1701	513220	14.06	505990	18.97	512936	21.42
05 008GSP1801	494723	14.06	475687	18.96	483947	21.41
06 008GSP1401	543507	14.05	472446	18.96	534544	21.41
07 008GSP1501	574049	14.06	531540	18.97	567409	21.41
08 008GSP1001	550721	14.06	491925	18.96	530070	21.42
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits.

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39843

Lab File ID (Standard): A9083102

Date Analyzed: 08/31/99

Instrument ID: HP70A

Time Analyzed: 1113

	IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	437295	14.02	385036	18.91	380269	21.36
UPPER LIMIT	874590	14.52	770072	19.41	760538	21.86
LOWER LIMIT	218648	13.52	192518	18.41	190135	20.86
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 008GSP1301	561864	14.01	544877	18.92	521993	21.36
02 008GSP1201	592325	14.01	548343	18.92	550748	21.36
03 008GSP1101	720496	14.01	677353	18.92	721972	21.37
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits.

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Lab File ID (Standard): A9090202

Date Analyzed: 09/02/99

Instrument ID: HP70A

Time Analyzed: 1257

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	90746	5.45	334591	7.76	238314	11.14
UPPER LIMIT	181492	5.95	669182	8.26	476628	11.64
LOWER LIMIT	45373	4.95	167296	7.26	119157	10.64
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 LCSD2	108630	5.45	378306	7.76	269192	11.14
02 008GSP1701RE	112698	5.45	403314	7.75	290919	11.14
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits.

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Lab File ID (Standard): A9090302

Date Analyzed: 09/03/99

Instrument ID: HP70A

Time Analyzed: 0900

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	86510	5.42	317020	7.72	229587	11.10
UPPER LIMIT	173020	5.92	634040	8.22	459174	11.60
LOWER LIMIT	43255	4.92	158510	7.22	114794	10.60
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 SBLK2	83681	5.42	288877	7.72	204598	11.10
02 LCS2	97882	5.42	349863	7.72	246177	11.10
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits.

**BLANK SUMMARY
SEMIVOLATILE ORGANIC FRACTION**

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 (other than listed below) 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. For the following four (4) compounds, the results are qualified by elevating the limit of detection or adjusting the limit of detection to the sample result, when the sample concentration is less than ten (10) times the blank concentration.

Common laboratory contaminants: phthalates

- 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 ten times (10X) 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 ten times (10X) 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 ten times (10X) the blank value.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK SAMPLE NO.

SBLK1

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39843

Lab File ID: A9082609

Lab Sample ID: BL0807WA

Instrument ID: HP70A

Date Extracted: 08/07/99

Matrix: (soil/water) WATER

Date Analyzed: 08/26/99

Level: (low/med) LOW

Time Analyzed: 1543

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1	LD0807WA	A9082611	08/26/99
02	008GSP1601	39843.07	A9082617	08/26/99
03	008GSP1701	39843.08	A9082618	08/26/99
04	008GSP1801	39843.09	A9082619	08/26/99
05	008GSP1401	39843.05	A9082620	08/26/99
06	008GSP1501	39843.06	A9082621	08/26/99
07	008GSP1001	39843.01	A9082622	08/26/99
08	008GSP1301	39843.04	A9083108	08/31/99
09	008GSP1201	39843.03	A9083109	08/31/99
10	008GSP1101	39843.02	A9083110	08/31/99
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Comments:

no contamination

4B
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK SAMPLE NO

SBLK2

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

Lab File ID: A9090304

Lab Sample ID: BL0901WA

Instrument ID: HP70A

Date Extracted: 09/01/99

Matrix: (soil/water) WATER

Date Analyzed: 09/03/99

Level: (low/med) LOW

Time Analyzed: 1013

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
	=====	=====	=====	=====
01	LCSD2	LD0901WA	A9090211	09/02/99
<i>CRAL</i> -02	008GSP1701RE	39843.08RE	A9090213	09/02/99
03	LCS2	LC0901WA	A9090308	09/03/99
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Comments:

bis(2 ethyl hexyl) phth. 15 ug/l

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

b Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39843

	CLIENT SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01	SBLK1	62	69	106	65	55	56	60	52	0
02	SBLK2	103	114	135	32	51	94	82	97	0
03	LCS1	78	82	112	75	68	74	72	65	0
04	008GSP1601	90	89	72	79	72	87	79	77	0
05	008GSP1701 *	3 *	3 *	3 *	3 *	3 *	2 *	3 *	3 *	8
06	008GSP1801	83	82	69	78	70	70	77	73	0
07	008GSP1401	65	66	55	58	54	54	59	55	0
08	008GSP1501	84	82	70	77	70	69	76	74	0
09	008GSP1001	70	75	96	28	20 *	20	28 *	57	2
10	008GSP1301	85	90	68	79	72	92	76	76	0
11	008GSP1201	62	66	50	57	53	75	56	53	0
12	008GSP1101	82	83	78	73	57	77	69	68	0
13	LCSD2	90	102	137	34	48	96	76	83	0
14	008GSP1701RE	101	112	133	31	46	118	85	96	0
15	LCS2	111	116	143 *	31	50	109	87	96	1
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Handwritten notes:
Diluted
add
Diluted

- QC LIMITS
- S1 (NBZ) = Nitrobenzene-d5 (35-114)
 - S2 (FBP) = 2-Fluorobiphenyl (43-116)
 - S3 (TPH) = Terphenyl-d14 (33-141)
 - S4 (PHL) = Phenol-d5 (10-110)
 - S5 (2FP) = 2-Fluorophenol (21-110)
 - S6 (TBP) = 2,4,6-Tribromophenol (10-123)
 - S7 (2CP) = 2-Chlorophenol-d4 (33-110)
 - S8 (DCB) = 1,2-Dichlorobenzene-d4 (16-110)

Handwritten note: * use RE

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

WATER SEMIVOLATILE SEMIVOLATILE LABORATORY CONTROL SPIKE RECOVERY

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

LCS Sample NO.: LCS1

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Phenol	75	52	69	10-102
2-Chlorophenol	75	56	75	27- 94
1,4-Dichlorobenzene	50	33	66	30- 81
N-Nitroso-di-n-prop.(1)	50	43	86	28- 95
1,2,4-Trichlorobenzene	50	33	66	32- 86
4-Chloro-3-methylphenol	75	61	81	32- 92
Acenaphthene	50	40	80	41- 93
4-Nitrophenol	75	55	73	10-135
2,4-Dinitrotoluene	50	39	78	39- 94
Pentachlorophenol	75	51	68	10-118
Pyrene	50	52	104	40-112

Column to be used to flag recovery values

* Values outside of QC limits

Spike Recovery: 0 out of 11 outside limits

Comments: _____

WATER SEMIVOLATILE SEMIVOLATILE LABORATORY CONTROL SPIKE/DUPLICATE RECOVERY

Lab Name: SWL-TULSA

Contract: ZONE G, REL

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39843

LCS Sample NO.: LCS2

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Phenol	75	23	31	10-102
2-Chlorophenol	75	68	91	27- 94
1,4-Dichlorobenzene	50	49	98 *	30- 81
N-Nitroso-di-n-prop. (1)	50	54	108 *	28- 95
1,2,4-Trichlorobenzene	50	50	100 *	32- 86
4-Chloro-3-methylphenol	75	79	105 *	32- 92
Acenaphthene	50	55	110 *	41- 93
4-Nitrophenol	75	23	31	10-135
2,4-Dinitrotoluene	50	52	104 *	39- 94
Pentachlorophenol	75	86	115	10-118
Pyrene	50	66	132 *	40-112

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
Phenol	75	26	35	12	24	10-102
2-Chlorophenol	75	59	79	14	23	27- 94
1,4-Dichlorobenzene	50	42	84 *	15	37	30- 81
N-Nitroso-di-n-prop. (1)	50	45	90	18	35	28- 95
1,2,4-Trichlorobenzene	50	45	90 *	10	31	32- 86
4-Chloro-3-methylphenol	75	69	92	14	22	32- 92
Acenaphthene	50	50	100 *	10	20	41- 93
4-Nitrophenol	75	25	33	8	30	10-135
2,4-Dinitrotoluene	50	46	92	12	32	39- 94
Pentachlorophenol	75	76	101	12	65	10-118
Pyrene	50	65	130 *	2	23	40-112

Column to be used to flag recovery values

* Values outside of QC limits

RPD: 0 out of 11 outside limits
 Spike Recovery: 11 out of 22 outside limits

Comments: _____

no qual

ref col
12-Mar-88
MLM
ver
5.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Semivolatile
Test Code 115500
Method 846 80000
Matrix water-soil
Extract Volume 100 ml
Initial Calibration 10 20 50 80 100 ng µPSD for VOC Compounds = 30% SPCC=RF x 0.05
Continuing Calibration 10 ng µD = 20% for VOC Compounds SPCC = RF x 0.05
PAGE 1 OF 2

COMPOUND	CAS NUMBE	PQL's		MDL's	
		WATER	SOIL	WATER	SOIL
		ug/L	ug/Kg	ug/L	ug/Kg
1,2,4-Trichlorobenzene	120-82-1	10	330	3.7	65
1,2-Dichlorobenzene	95-50-1	10	330	3.7	74
1,3-Dichlorobenzene	541-73-1	10	330	4.1	31
1,4-Dichlorobenzene	106-46-7	10	330	4.2	58
2,3,4,6-Tetrachlorophenol	58-90-2	10	330	8.2	71
2,4,5-Trichlorophenol	95-95-4	50	1600	6.1	120
2,4,6-Trichlorophenol	88-06-2	10	330	4.6	85
2,4-Dichlorophenol	120-83-2	10	330	4.7	70
2,4-Dimethylphenol	105-67-9	10	330	4.0	210
2,4-Dinitrophenol	51-28-5	50	1600	7.1	54
2,4-Dinitrotoluene	121-14-2	10	330	2.9	74
2,6-Dinitrotoluene	506-20-2	10	330	3.1	85
2-Chloronaphthalene	81-58-7	10	330	3.3	63
2-Chlorophenol	95-57-8	10	330	5.0	92
2-Methylnaphthalene	91-57-6	10	330	3.2	43
2-Methylphenol	95-48-7	10	330	5.1	170
2-Nitroaniline	88-74-4	10	1600	3.4	57
2-Nitrophenol	88-75-5	10	330	3.7	93
3,3'-Dichlorobenzidine	91-94-1	20	660	3.3	6.4
3-Nitroaniline	99-09-2	50	1600	3.7	3.6
4,6-Dinitro-2-methylphenol	534-52-1	50	1600	3.3	93
4-Bromophenyl-phenyl ether	101-55-3	10	330	3.1	72
4-Chloro-3-methylphenol	59-50-7	10	330	4.1	75
4-Chloroaniline	106-47-8	10	330	4.6	87
4-Chlorophenyl-phenyl ether	7005-72-3	10	330	4.1	49
4-Methylphenol	106-44-5	10	330	5.0	220
4-Nitroaniline	100-01-6	50	1600	2.5	62
4-Nitrophenol	100-02-7	50	1600	7.1	93
Acenaphthene	83-32-9	10	330	3.4	65
Acenaphthylene	208-96-8	10	330	3.5	69
Anthracene	120-12-7	10	330	2.7	47
Benzo(a)anthracene	56-55-3	10	330	2	56
Benzo(a)pyrene	50-32-8	10	330	2.6	38
Benzo(b)fluoranthene	205-99-2	10	330	2.8	160
Benzo(g,h,i)perylene	191-24-2	10	330	2.8	81
Benzo(k)fluoranthene	207-08-9	10	330	4.2	96
Benzoic acid	65-85-0	50	1600	3.9	440
Benzyl alcohol	100-51-6	10	330	5.2	98
Butylbenzothalate	95-68-7	10	330	0.3	87

WATER MDLS PERFORMED ON INST V <01/09/98>
SOIL MDL'S PERFORMED ON INST P <01/08/98>
NR = NonRoutine Compounds. Analyzed only upon request

ref coi
12-Mar-98
MLM
ver
5.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Test Code Semivolatile
Method 82500
Matrix water-soil
Extract Volume 100 mL
Initial Calibration 100 ug/L 20% RSD for CCC compounds SPC = RF > 0.05
Continuing Calibration 10 ug/L 20% RSD for CCC compounds SPC = RF > 0.05
PAGE 2 OF 2

COMPOUND	CAS NUMBER	POL's		MDL's	
		WATER ug/L	SOIL ug/Kg	WATER ug/L	SOIL ug/Kg
Carbazole	96-74-6	10	330	2.3	89
Chrysene	218-1-9	10	330	2.5	51
Di-n-octylphthalate	117-84-0	10	330	.8	46
Dibenz(a,h)anthracene	53-70-3	10	330	3.0	150
Dibenzofuran	132-64-9	10	330	3.3	50
Diethylthiathalate	84-66-2	10	330	0.4	64
Fluoranthene	206-44-0	10	330	2.2	71
Fluorene	86-73-7	10	330	3.2	40
Hexachlorobenzene	118-74-1	10	330	2.8	59
Hexachlorobutadiene	87-68-3	10	330	3.3	56
Hexachlorocyclopentadiene	77-47-4	10	330	0.6	73
Hexachloroethane	67-72-1	10	330	3.6	120
Indeno(1,2,3-cd)pyrene	93-39-5	10	330	3.3	280
Isoporphone	78-59-1	10	330	4.1	69
N-Nitroso-di-n-propylamine	521-64-7	10	330	4.1	110
N-Nitrosodiphenylamine	86-30-6	10	330	2.0	56
Naphthalene	91-20-3	10	330	3.7	30
Nitrobenzene	98-95-3	10	330	3.8	74
Pentachlorobenzene	87-86-5	50	600	3.4	130
Phenanthrene	85-01-8	10	330	2.9	42
Phenol	108-95-2	10	330	4.2	66
Pyrene	129-00-2	10	330	2.4	47
bis(2-Chloroethoxy)methane	111-91-1	10	330	4.0	69
bis(2-Chloroethyl)ether	111-44-4	10	330	3.5	61
bis(2-Chloroisopropyl)ether	108-60-1	10	330	4.5	73
bis(2-Ethylhexyl)phthalate	117-81-7	10	330	1.9	80

* CCC compounds **SPCC compounds
WATER MDLS PERFORMED ON INST. H <01/09/98>
SOIL MDLS PERFORMED ON INST. H <01/08/98>

800-547-7982
 MEMPHIS, TENNESSEE
 CHARLESTON, S.C.; CINCINNATI, OH.; DALLAS, TX.; JACKSON, TN.; KNOXVILLE, TN.;
 LANCASTER, PA.; NASHVILLE, TN.; NORFOLK, VA.; PADUCAH, KY.; PENSACOLA, FL.;
 RALEIGH, NC.; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
 PROJECT/JOB NO: 29 - 01' 19-014/1
 COC NO: _____
 PO NO: 4
 REL NO: 119
 LAB NAME: SWL

CLIENT: Naval Base Charleston PROJECT MANAGER: Charlie Vernoy
 LOCATION: Zone G, SWA, 18 TELE/FAX NO.: (843) 884-0229/856-0107
 SAMPLERS: (SIGNATURE) A. Wertz

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS			REMARKS	
					TEMP.	CHEMICAL	VOAs	SVOAs	Hydrazine		
NBC 5 008GSP100	8/5/99	0945	W	2-40mL vial, 2-1L amber 1-500mL amber	4°C	see remarks	5	X	X	X	40mL vial - HCl 1L amber - None 500mL amber - t
NBC 1 008GSP110		1015					5	X	X	X	
NBC 2 008GSP120		1100					5	X	X	X	
NBC 3 008GSP130		1130					5	X	X	X	
NBC 4 008GSP140		1335					5	X	X	X	
NBC 5 008GSP150		1400					5	X	X	X	
NBC 6 008GSP160		1420					5	X	X	X	
NBC 7 008GSP170		1445					5	X	X	X	
NBC 8 008GSP180		1535					5	X	X	X	
NBC 9 008TSP180	∇	-	∇	2-40mL vial	∇	HCl	2	X			

Andrew Wertz
 8/5/99

RELINQUISHER: <u>Andrew Wertz</u>	DATE: <u>8/5/99</u>	RECEIVER: <u>[Signature]</u>	DATE: <u>8/6/99</u>	RELINQUISHER: _____	DATE: _____	RECEIVER: _____
PRINTED: <u>ANDREW WERTZ</u>	TIME: <u>1730</u>	PRINTED: <u>TABON SPR. 685</u>	TIME: <u>11:00</u>	PRINTED: _____	TIME: _____	PRINTED: _____
COMPANY: _____	COMPANY: <u>SWLO</u>	COMPANY: _____	COMPANY: _____	COMPANY: _____	COMPANY: _____	COMPANY: _____

METHOD OF SHIPMENT: FEDE
 SHIPMENT NO.: 4849148 254
 SEND RESULTS TO: Charlie Vernoy

COMMENTS: DQO III STANDARD FAT

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

SDG NARRATIVE

September 8, 1999

CONTRACT: ENSAFE
PROJECT: ZONE G, RELEASE 119
SDG NO: 39843

SEMIVOLATILE FRACTION

Nine water samples were submitted for Semivolatile Organic analyses. The samples were analyzed by GC/MS following SW846-8270C.

SWLO uses a 2uL injection for method SW846-8270C as allowed by the method and has added two extra "advisory surrogates (one acid and one base/neutral)" to the surrogate spiking mix. These surrogates are 1,2-dichlorobenzene-d4 and 2-chlorophenol-d4 and have advisory control limits. The surrogates, laboratory control spikes and matrix spikes are spiked at 75 ug/L (waters) and 2500ug/Kg (soils) for the acid surrogates and 50 ug/L (waters) and 1700 (actual 1667) ug/Kg (soils) for base/neutral surrogates. The instrument calibration range is from 10 ug/L to 80 ug/L for waters and 330 ug/Kg to 2700 ug/Kg for soils, which relates to 20 ng on column (low cal. std.) up to 160 ng on column (high cal. std.).

No major problems occurred during the analyses of these samples.

Blanks: SBLK2 had low level phthalate contamination below reporting limit.

Surrogates: Sample 008GSP1701 had all surrogates recovered below 10%. This sample was re-extracted outside of holding time and re-analyzed. The re-extract had all surrogates within QC limits. Both sets of data have been submitted. Sample 008GSP1001 had low recovery for 2-fluorophenol at 20% and 2-chlorophenol-d4 at 28%. LCS2 had high recovery for terphenyl-d14 at 143%.

Matrix Spikes: There was insufficient sample sent to analyze a matrix spike or matrix spike duplicate with this sample set.

Laboratory Control Spikes: LCS1 had all spike recoveries within QC limits. LCS2/LCSD2 had 11 out of 22 spike recoveries outside of QC limits slightly high ranging from 84% to 130%, recovery.

Internal Standards: All internal standards were within QC limits.


Harry M. Borg
Organic Program Manager

September 8, 1999

57-088

**SAMPLE RESULT VERIFICATION
SEMIVOLATILE ORGANIC FRACTION**

- 1. Were the sample results reported within the calibration range? Yes No
- 2. Were the percent moistures reported? Yes No NR
- 3. Were the data reported on a dry weight basis? Yes No NR
- 4. Did the GC/MS RIC and TIC exhibit interferences, off scale peaks or elevated baseline? Yes No
- 5. Did the data contain elevated detection limits that could not be accounted for? Yes No
- 6. Were any computational or transcription errors found? Yes No

Specific Comments: _____

Do not use 008GSP1701, in favor of RE,
all surr below 5% Recovery

Reviewer: *L Maschhoff*

Date: 9.29.99

IN122/07-11-97

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

GENERAL CHEMISTRY
INORGANICS QUALITY CONTROL DATA SHEET
LCS/LCSD

MATRIX **WATER**

EPISODE 39843
CLIENT ENSAFE

PARAMETER	TEST CODE	UNITS	METHOD BLANK		LCS					LCS DUPLICATE			RPD			BATCHID	DATE ANALYZED	ANALYST INI.	
			AMT. FOUND	DET. LIMIT	KNOWN CONC.	AMT. FOUND	% REC	%REC LIMITS	FLAG	AMT. FOUND	%REC.	FLAG	RPD	LIMIT	FLAG				
Hydrazine	IN699	ug/l	<5.0	5.0	50.0	51.8	104	80	120		51.5	103		0.6	20		9908266993	26-Aug-99	KAL

NARRATIVE:
* = OUTSIDE QC LIMITS

39843
/GLCSW
15-Sep-99
SST
REV 4.2

142090

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

Hydrazine in Water

Bench Logs and Raw Data

143

091

ABSORPTANCE/DIRECT READING LOGBOOK

DEPARTMENT _____

TEST CODE IN-099

DATE OF ANALYSIS 7-26-99

TIME 11:00

SAMPLE ID 99099-14

DIGESTION BATCH ID. Hydromax

ANALYST'S INITIALS KAC

PAGE 3 OF 3 D-099-14

Sample I.D.	Matrix	Wt %	Wt/Vol Initial	Wt/Vol Final	Dilution	Spike/Comments	Absorbance	Conc	Results	Units	% Error
9919999-6	W			50-10		Low conc. 1.5 mg/L 5.2 mg/L	0.000	0.000	0.000	mg/L	
LOW 991999-6		50.0	10.0			5.2 - 10.0	0.140	51.82	51.8		100
3454-01							0.000	0.000	0.000		
01 (circled)							0.004	15.0	15.0		100
01 (circled)		50.0	10.0			5.2 - 11 - 3	0.121	43.21	43.2		86
01 (circled)		50.0	10.0			5.2 - 11 - 3	0.120	43.40	43.4		85
02							0.010	4.957	5.0		
03							0.005	10.13	10.1		
04							0.015	6.621	6.7		
05							0.010	5.677	5.0		
06							0.010	6.5	7.0		
07							0.013	5.921	6.0		
08							0.010	5.0	5.0		
09							0.017	7.370	7.7		
39852-01							0.004	2.500	25.0		
02							0.001	4.613	25.0		
03							0.000	0	25.0		
04	W			50-10			0.040	15.30	15.3	mg/L	

092

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

SDG NARRATIVE

**CLIENT: ENSAFE
PROJECT: ZONE G, RELEASE**

**DATE: 9/15/99
EPISODE NO.: 39843**

INORGANIC FRACTION:

Ten water samples were submitted for Hydrazine analysis. The sample analysis was completed according to the following:

<u>SWL SOP #</u>	<u>Method SOP is based</u>	<u>Parameter</u>
N/A	ASTMD 1385-88	Hydrazine in Water

Refer to Sample Receipt Notification for details of sample conditions at receipt. An explanation of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.

Form 3 (Blanks) - This information is included on the QC spreadsheet.

Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

Initial and Continuing Calibration Check: No problems.

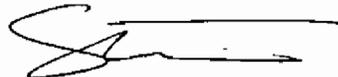
Initial and Continuing Calibration Blanks: All blanks were below the reporting limit.

CRI (Low Standard): No problems.

Preparation Blanks: All blanks were below the reporting limit.

Lab Control Spikes: No problems.

Sincerely,



Susan S. Turner for...
Deborah J. Inman
Inorganic Program Manager

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
 PROJECT/JOB NO: 2907-01 19-014/00
 COC NO: _____
 PO NO: 4
 REL NO: 119
 LAB NAME: SWL

CLIENT: Naval Base Charleston PROJECT MANAGER: Charlie Vernoy
 LOCATION: Zone G, SWA, 18 TELE/FAX NO. (843) 884-0029 / 856-0107
 SAMPLERS: (SIGNATURE) A. Wertz

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		ANALYSIS REQUIRED				REMARKS
					TEMP.	CHEMICAL	NO. OF CONTAINERS	VOAs	SVOAs	Hydrazine	
NBC 5 008GSP1001	8/5/99	0945	W	2-40mL vial, 2-1L amber; 1-500mL amber	4°C	See remarks	5	X	X	X	40mL vial - HCl 1L amber - None 500mL amber - HCl
NBC 6 008GSP1101		1015					5	X	X	X	
NBC 7 008GSP1201		1100					5	X	X	X	
NBC 8 008GSP1301		1130					5	X	X	X	
NBC 9 008GSP1401		1335					5	X	X	X	
NBC 10 008GSP1501		1400					5	X	X	X	
NBC 11 008GSP1601		1420					5	X	X	X	
NBC 12 008GSP1701		1445					5	X	X	X	
NBC 13 008GSP1801		1535					5	X	X	X	
NBC 14 008TSP1801	↓	-	↓	2-40mL vial	↓	HCl	2	X			

Andrew Wertz
 8/5/99

RELINQUISHER: <u>Andrew Wertz</u>	DATE: <u>8/5/99</u>	RECEIVER: <u>[Signature]</u>	DATE: <u>8/6/99</u>	RELINQUISHER: _____	DATE: _____	RECEIVER: _____	DATE: _____
PRINTED: <u>ANDREW WERTZ</u>	TIME: <u>1730</u>	PRINTED: <u>JASON SPRUELL</u>	TIME: <u>11:00</u>	PRINTED: _____	TIME: _____	PRINTED: _____	TIME: _____
COMPANY: _____		COMPANY: <u>SWL</u>		COMPANY: _____		COMPANY: _____	

METHOD OF SHIPMENT: FEDEX
 SHIPMENT NO. 4849148754
 SEND RESULTS TO: Charlie Vernoy

COMMENTS: 100 III STANDARD FAT



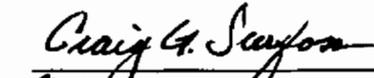
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: EN036
Date: January 28, 2000
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: December 17, 1999
Number of Samples: 20 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 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 E. Humburg, President

2-3-00.

Date

SDG# EN036

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	SVOA		MET		TOC	
628SB00601	SOIL		X		X		X
628SB00602	SOIL		X		X		X
628SB00701	SOIL		X		X		X
628SB00801	SOIL				X		X
628SB00802	SOIL				X		X
628SB00901	SOIL				X		X
628SB00902	SOIL				X		X
628SB01001	SOIL				X		X
628CB01001	SOIL				X		X
628SB01002	SOIL				X		X
628CB01002	SOIL				X		X
628SB01101	SOIL				X		X
628SB01102	SOIL				X		X
628SB01201	SOIL				X		X
628SB01202	SOIL				X		X
636SB01501	SOIL		X		X		X
636SB01502	SOIL		X		X		X
636SB01601	SOIL		X		X		X
636SB01602	SOIL		X		X		X
636SB01701	SOIL		X		X		X
Total Billable Samples (Water/Soil)		0	8	0	20	0	20

SVOA= Semivolatiles
 MET= Metals
 TOC= Total Organic Carbon

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT AND 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 SW846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # EN036

A validation was performed on the Semivolatile Data from SDG EN036. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- Calibrations
- Internal Standard Performance
- * Blanks
- * Surrogate Recoveries
- * Laboratory Control Samples
- * Matrix Spike/Matrix Spike duplicate
- * Field Duplicates
- Compound Identification/Quantitation

* - All criteria were met for this parameter

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ANALYSIS

PAGE - 2

Initial Calibration

The initial calibration, analyzed on 11-08-99, contained compounds with %Ds greater than 15% and less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

628SB00701	benzo(b)fluoranthene (20.0%)
628SB00602	benzo(k)fluoranthene (16.3%)
628SB00601	benzo(b)fluoranthene (20.0%)
628SB01502	benzo(k)fluoranthene (16.3%)

Continuing Calibration

The continuing calibration, Z1229006.D, contained compounds with %Ds greater than 50% and less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as estimated (UJ).

636SB01601	2,2-oxybis(1-chloropropane) (61.9%)
636SB01602	
636SB01502	
636SB01701	
628SB00701	

Internal Standards

Samples 636SB01502 and 636SB01701 exhibited low internal standard area recoveries for perylene-d12. Qualify all associated compounds as estimated (J/UJ).

Compound Identification/Quantitation

Do not use sample 636SB01502DL due to unnecessary analysis.

System Performance and Overall Assessment

The data as presented requires qualifications.

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 10X 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 10X 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 10X 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>
628SB00701	benzo(b)fluoranthene	+	J
628SB00602	benzo(k)fluoranthene	+	J
628SB00601	benzo(b)fluoranthene	+	J
628SB01502	benzo(k)fluoranthene		
636SB01601	2,2-oxybis(1-chloropropane)	+/-	J/UJ
636SB01602			
636SB01502			
636SB01701			
628SB00701			
636SB01502	<i>All Associated Compounds</i> perylene-d12	+/-	J/UJ
636SB01701			
636SB01502DL	all 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 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 # EN036

A validation was performed on the Metals for soils and TOC Data from SDG EN036. 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	0.25 mg/kg	all soil samples below 1.25 mg/kg
Barium	0.13 mg/kg	no impact
Cadmium	0.41 mg/kg	all soil samples below 2.0 mg/kg
Calcium	17.8 mg/kg	no impact
Chromium	0.08 mg/kg	no impact
Copper	0.08 mg/kg	no impact
Iron	5.44 mg/kg	no impact

Lead	0.38 mg/kg	no impact
Manganese	0.08 mg/kg	no impact
Selenium	0.18 mg/kg	all soil samples below 0.9 mg/kg
Zinc	0.58 mg/kg	no impact
Tin	3.18 mg/kg	all soil samples below 16.0 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>
Aluminum	-6.3 mg/kg	no impact
Cobalt	-0.06 mg/kg	all soil samples below 0.6 mg/kg
Thallium	-0.79 mg/kg	all soil samples below 7.9 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 (66%) 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 results for soils for Antimony (45%), Beryllium (48%), Calcium (167%), Copper (63%), Mercury (43%), Iron (36%), Magnesium (85%), Nickel (50%), Selenium (132%), Zinc (55%) and Tin (61%) were greater than 35%. All positive results are qualified as estimated, "J". The difference for soils for TOC (23%), Barium (31%), Chromium (26%), Cobalt (31%), Lead (27%) and Manganese (30%) were not greater than 35% and will not be qualified for soils.

Serial Dilution recovery results

The serial dilution result for soils for Potassium 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 1.25 mg/kg	Sb.	+	U
all soil samples below 2.0 mg/kg	Cd.		
all soil samples below 16.0 mg/kg	Sn.		
all soil samples below 0.6 mg/kg	Co.	+/U	J/UJ
all soil samples below 7.9 mg/kg	Tl.		
all soil samples	Sb.	+/U	J/UJ
all soil samples	Sb, Be, Ca, Cu, Fe, Mg, Ni, Se, Hg, Zn and Sn.	+	J
all soil samples	K.	+	J
all "B" results	all analytes	B	J

ANNOTATED FORM 1s



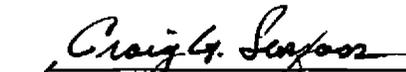
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

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

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 # 41874

A validation was performed on the Metals Data from SDG 41874. 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.

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 samples	all analytes	B	J

ATALCP2
2/14/00

CAV
2-26-00

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

je: 1
Time: 10:41

41874 HEXACHROME	SAMPLE ID -----> ORIGINAL ID -----> LAB SAMPLE ID ----> SAMPLE DATE -----> DATE ANALYZED ----> MATRIX -----> UNITS ----->	706-S-8018-01 706SB01801 41874.10 01/26/00 02/02/00 Soil MG/KG A	706-S-8018-02 706SB01802 41874.11 01/26/00 02/02/00 Soil MG/KG A	BLK-0-1874-02 PBS1 PBS1 01/26/00 02/02/00 Soil MG/KG D		
CAS #	Parameter					
18540-29-9	Chromium (Hexavalent)	0.3	0.7	0.25 U	<i>VB#</i> <i>2/15/00</i>	

006

(C4)
Z-26-00

CHARLESTON - ZONE G
CHARLESTON ZONE G SOIL (ONLY)

SDG# 41874

CAS #	Parameter	636-S-B018-01 636S801801 41874.02 01/26/00 01/31/00 01/31/00 Soil MG/KG	636-S-B018-02 636S801802 41874.03 01/26/00 01/31/00 01/31/00 Soil MG/KG	636-S-B019-01 636S801901 41874.04 01/26/00 01/31/00 01/31/00 Soil MG/KG	636-S-B019-02 636S801902 41874.05 01/26/00 01/31/00 01/31/00 Soil MG/KG	636-S-B020-01 636S802001 41874.01 01/26/00 01/31/00 01/31/00 Soil MG/KG	706-S-B021-01 706S802101 41874.06 01/26/00 01/31/00 01/31/00 Soil MG/KG
7429-90-5	Aluminum (Al)	3920.	5050.	3730.	9850.	2940.	4180.
7440-38-0	Antimony (Sb)	0.5	0.32	0.32	47.5	0.31	0.54
7440-38-2	Arsenic (As)	2.3	2.1	0.63	25.	1.6	2.2
7440-39-3	Barium (Ba)	18.6	7.	5.9	437.	3.4	12.2
7440-41-7	Beryllium (Be)	0.22	0.26	0.11	0.63	0.22	0.22
7440-43-9	Cadmium (Cd)	0.37	0.18	0.15	9.2	0.45	0.36
7440-70-2	Calcium (Ca)	53300.	2450.	1260.	10400.	132000.	57400.
7440-47-3	Chromium (Cr)	7.8	5.8	5.7	91.8	5.3	14.9
7440-48-4	Cobalt (Co)	1.3	1.5	0.8	9.1	2.5	1.5
7440-50-8	Copper (Cu)	38.8	1.4	7.3	1940.	1.3	24.
7439-89-6	Iron (Fe)	4110.	3080.	2000.	53500.	2360.	3870.
7439-92-1	Lead (Pb)	38.1	2.8	4.9	1250.	2.7	29.
7439-95-4	Magnesium (Mg)	689.	262.	241.	3330.	1390.	1530.
7439-96-5	Manganese (Mn)	41.2	20.	19.9	478.	55.3	82.6
7439-97-6	Mercury (Hg)	0.02	0.02	0.02	0.38	0.02	0.05
7440-02-0	Nickel (Ni)	4.	2.2	2.	76.7	3.6	5.3
7440-09-7	Potassium (K)	136.	113.	93.	963.	233.	254.
7782-49-2	Selenium (Se)	0.39	0.39	0.39	0.9	0.38	0.4
7440-22-4	Silver (Ag)	0.33	0.17	0.22	1.9	0.2	0.23
7440-23-5	Sodium (Na)	893.	474.	306.	2110.	467.	411.
7440-28-0	Thallium (Tl)	0.4	0.4	0.41	3.8	0.4	0.42
7440-31-5	Tin (Sn)	5.8	4.2	4.6	99.5	3.8	5.3
7440-62-2	Vanadium (V)	7.8	4.9	4.3	74.5	3.7	8.3
7440-66-6	Zinc (Zn)	88.4	5.9	9.6	2210.	9.7	45.7

BBZ
2/15/00

004

ATALCP2
2/14/00

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

ge: 3
Time: 10:41

CAS #	Parameter	706-S-8021-02 706S802102 41874.08 01/26/00 01/31/00 01/31/00 Soil MG/KG	706-S-8022-01 706S802201 41874.07 01/26/00 01/31/00 01/31/00 Soil MG/KG	706-S-8022-02 706S802202 41874.09 01/26/00 01/31/00 01/31/00 Soil MG/KG	BLK-0-1874-01 PBS PBS 01/26/00 01/31/00 01/31/00 Soil MG/KG	BLK-0-1874-03 PBSH PBSH 01/26/00 01/31/00 01/31/00 Soil MG/KG
41874	SUR46-META					
7429-90-5	Aluminum (Al)	4250.	4290.	7100.	2.8 U	?????????
7440-36-0	Antimony (Sb)	0.32 U	0.64	1.7	0.52 B	?????????
7440-38-2	Arsenic (As)	1.7	2.7	6.9	-0.22 B	?????????
7440-39-3	Barium (Ba)	15.6	28.6	43.7	0.18 B	?????????
7440-41-7	Beryllium (Be)	0.18	0.28	0.31	0.08 U	?????????
7440-43-9	Cadmium (Cd)	0.33	0.6	0.92	0.2 B	?????????
7440-70-2	Calcium (Ca)	25600.	31000.	17800.	25.8 U	?????????
7440-47-3	Chromium (Cr)	13.3	23.	19.1	0.38 B	?????????
7440-48-4	Cobalt (Co)	1.1	1.6	2.	0.08 U	?????????
7440-50-8	Copper (Cu)	10.5	52.6	132.	0.25 U	?????????
7439-89-6	Iron (Fe)	3200.	4840.	7680.	6.8 B	?????????
7439-92-1	Lead (Pb)	18.	84.	82.	0.22 B	?????????
7439-95-4	Magnesium (Mg)	741.	1010.	1340.	9.2 U	?????????
7439-96-5	Manganese (Mn)	35.7	89.8	87.3	0.089 B	?????????
7439-97-6	Mercury (Hg)	0.02	0.11	1.2	?????????	-0.03 B
7440-02-0	Nickel (Ni)	3.6	6.2	10.	0.36 U	?????????
7440-09-7	Potassium (K)	229.	210.	449.	15.2 U	?????????
7782-49-2	Selenium (Se)	0.39	0.43	0.44	0.33 U	?????????
7440-22-4	Silver (Ag)	0.29	0.45	0.52	0.55 B	?????????
7440-23-5	Sodium (Na)	884.	436.	953.	50.2 U	?????????
7440-28-0	Thallium (Tl)	0.4	0.44	0.59	0.34 U	?????????
7440-31-5	Tin (Sn)	5.	8.4	11.4	3.5 B	?????????
7440-62-2	Vanadium (V)	7.2	12.8	19.4	0.07 U	?????????
7440-66-6	Zinc (Zn)	36.8	99.5	243.	0.99 B	?????????

Handwritten: JB 2/15/00

005

DATA DELIVERABLES(DQG III or C)
INORGANICS

Site Name: Charleston

Client: Encote

Location: 41874
Analytical Fraction: Metals

Lab: SWOK

Reviewer: P. Humby

Date(s): 2/15/00

- A. Control Chart - results of the method blank : Yes No NR
spikes run with each batch of samples :
processed :
- B. CLP Form 1s with associated sample results : No NR
and CLP flagging system. All percent :
moistures for soils and discussion of :
sample type :
- C. CLP Form 2s with Initial and continuing : No NR
calibration standards (part 1 only) :
- D. CLP Form 3s with prep and method blanks : No NR
- E. CLP Form 4s with Interference check : No NR
sample data :
- F. CLP Form 5s with Matrix spike recovery and : No NR
the postdigestion spike recovery for :
ICP Metals. Only done if predigest :
spike recovery exceeds limits :
- G. CLP Form 6s with Duplicate data results : No NR
- H. CLP Form 8s with GFAA standard addition : Yes No NR
data
- I. CLP Form 13s with holding time data : No NR

HEARTLAND ESI Form A

DATA DELIVERABLE REQUIREMENTS

A.	Permanently Bound	Yes	<input checked="" type="radio"/> No	NR
B.	Paginated	<input checked="" type="radio"/> Yes	No	NR
C.	Table of Contents	<input checked="" type="radio"/> Yes	No	NR
D.	Digestion Records(internal C-O-C)	<input checked="" type="radio"/> Yes	No	NR
E.	Chain-Of-Custody (external)	<input checked="" type="radio"/> Yes	No	NR
F.	Case Narrative			
	1. Sample list with Client and Lab IDs cross-referenced (copy attached)	<input checked="" type="radio"/> Yes	No	NR
	2. All Protocol deviations and QC problems noted	<input checked="" type="radio"/> Yes	No	NR
	3. Comments: _____			

G.	Uninitialed Strikeovers	Yes	<input checked="" type="radio"/> No	NR
H.	Legible Photocopies	<input checked="" type="radio"/> Yes	No	NR
I.	Consistent Dates	<input checked="" type="radio"/> Yes	No	NR
J.	Preparation Logs	<input checked="" type="radio"/> Yes	No	NR
K.	Instrument Run Logs	<input checked="" type="radio"/> Yes	No	NR
L.	Other Deviations or Comments: _____			

HEARTLAND ESI Form 8

HOLDING TIMES FOR METALS

1. Was the holding time exceeded on any of the Metal Fractions

ICP/GFAA/FAA - Holding time of 6 months VTSR

Mercury - Holding time of 28 days VTSR

Cyanide - Holding time of 14 days VTSR

Yes

No

2. - If yes, complete the following form for all samples that exceeding holding times.

Fraction: _____
Sample ID : Matrix : VTSR : Date of Analysis : DA : QC
Decision

:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:

PB# 2/15/00

Note: DA = The number of days holding time to analysis is exceeded.

- S = Non-aqueous
- A = Aqueous
- X = Air

QA Decision: : Results > IDL - J - estimated
 : Results < IDL - R - rejected

HEARTLAND ESI Form C-1

INSTRUMENT CALIBRATION AND INITIAL CALIBRATION
VERIFICATION (ICV)

Associated Samples All soil sample

1. a. Was the ICP instrument properly standardized? Yes No
If no, explain and list action. _____
- b. Was the furnace instrument properly standardized? If no, were the required standards analyzed immediately after the instrument calibration and results within 95-105% recovery? Yes No
Yes No NR
If no, explain and list action. _____
- c. Were the instruments for the analyses of Cyanide and Mercury properly standardized? Yes No
If no, explain and list action. _____
2. Was the ICV analyzed immediately after the system(s) were calibrated? Yes No
If no, explain and list action. _____
3. Was the ICV analyzed for every analyte? Yes No
If no, explain and list action. _____
4. Do all ICV analytes meet the QC requirements for % recovery? Yes No
If no, list affected analytes, their % recovery, and action for which:
- a. % recovery is between 75-88% (CN), 70-84% or HG, 65-78%

HEARTLAND ESI Form C-2

b. % recovery is between 111-125% (CN, 116-130% or HG, 121-135%) _____

c. % recovery is less than 75% or greater than 125% (CN, <70 or >130%, Hg <65 or >135) _____

5. a. Show calculation for the % recovery of one ICV analyte by ICP. Lab value 101.99

$$\text{Acting} \cdot \frac{510}{500} \times 100 = 102\%$$

b. Show calculation for the % recovery of one ICV analyte by furnace AA. Lab value NK

c. Show calculation for the ICV % recovery of Mercury. Lab Value 96.69

$$\frac{3.96}{4.10} \times 100 = 96.69$$

d. Show calculation for the ICV % recovery of Cyanide. Lab value NK

6. Specific comments: _____

CONTINUING CALIBRATION VERIFICATION (CCV)

Associated Samples All good sample

1. a. Was the CCV performed every two hours or at the 10% frequency? Yes No
If no, list action. _____

b. Was the CCV performed at the beginning and end of the sample analysis? Yes No
If no, list action. _____

2. Were the CCV standards analyzed for all analytes? Yes No
If no, list affected analytes, their associated samples and action. _____

3. Was the same concentration used for CCV throughout the analyses? Yes No
If no, list affected analytes, their associated samples and action. _____

4. Do all CCV analytes meet the QC requirements for % recovery? Yes No
If no, list affected analytes, their associated samples and action for which:

a. % recovery is between 75-89% (CN, 70-84% or Hg, 65-79%) _____

b. % recovery is between 111-125% (CN, 116-130% or Hg, 121-135%) _____

HEARTLAND ESI Form D-2

5. a. Show calculation for the % recovery of one CCV analyte analyzed by IC? Lab value 98.1%

$$\text{Tin} \quad \frac{490}{500} \times 100 = 98.0\%$$

- b. Show calculation for the % recovery of one CCV analyte analyzed by furnace AA. Lab value NK

- c. Show calculation for the % recovery of one CCV analyte analyzed for Mercury. Lab value 107.6%

$$\frac{5.48}{5.00} \times 100 = 109.6\%$$

- d. Show calculation for the % recovery of one CCV analyte for Cyanide. Lab value NK

6. Specific comments: _____

HEARTLAND ESI Form F

INITIAL & CONTINUING CALIBRATION BLANK

Associated Samples All cool sample

1. Were the initial calibration blanks analyzed for all analytes and run after the initial calibration verification? Yes No
If no, list affected analytes, and action. _____

2. Was the absolute value for all analytes in the initial calibration blank below the CRDL? Yes No
If no, list affected analytes and reject them. _____

3. Were the continuing calibration blanks analyzed for all analytes and run after the continuing calibration verification? Yes No
If no, list affected analytes, associated samples and action. _____

4. Was the frequency for the continuing calibration blanks correct? Yes No
If no, list affected analytes, associated samples and action. _____

5. Was the absolute value of all analytes for the continuing calibration blank below the CRDL? Yes No
If no, list affected analytes, associated samples and reject them. _____

HEARTLAND ESI Form G

PREPARATION BLANK SUMMARY

Sample Matrix: Soil Water Air Preparation Blank ID PBS
 Units: mg/kg ug/l ug/m3

1. Did the frequency of the preparation blank analysis meet method requirements? Yes No
 If no, explain and note action: _____

Analyte : Conc : <CRDL : Comments/Action

Antimony	0.52	Yes	qualify all dirty
Barium	0.18		as necessary
Calcium	0.20		
Chromium	0.38		
Iron	6.85		
Lead	0.22		
Manganese	0.09		
Silver	0.55		
Zinc	0.97		
Tin	3.49		
Arsenic	-0.22		

Associated Samples All soil sample

N123/07-11-97

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

GENERAL CHEMISTRY INORGANICS QUALITY CONTROL DATA SHEET LCS/LCSD

MATRIX **SOIL**

PIISODE 41874
CLIENT ENSAFE

PARAMETER	TEST CODE	UNITS	METHOD BLANK		LCS					LCS DUPLICATE			RPD			BATCHID	DATE ANALYZED	ANALYST INL	
			AMT. FOUND	DET. LIMIT	KNOWN CONC.	AMT. FOUND	% REC	%REC LIMITS	FLAG	AMT. FOUND	%REC.	FLAG	RPD	LIMIT	FLAG				
Hex. Chromium	MT189	mg/kg	<0.25	0.25	0.20	0.20	100	80	120		0.20	100		0.0	20		0002011691	02-Feb-2000	TGG

NARRATIVE:

* = OUTSIDE QC LIMITS

41874
/GLCSS REV 4.2
08-Feb-2000 SST

0220

)

()

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

SDG NARRATIVE

CLIENT: ENSAFE
PROJECT: ZONE G, RELEASE 139

DATE: February 8, 2000
EPISODE NO.: 41874

INORGANIC FRACTION:

Two soil samples were submitted for the following classical inorganic analysis: Chromium, Hexavalent. The sample's analyses were completed according to the following:

<u>SWL SOP #</u>	<u>Method SOP is based</u>	<u>Parameter</u>
SWL-IN-406	SW846 / 7196A	Chromium, Hexavalent

Refer to Sample Receipt Notification for details of sample conditions at receipt. Explanations of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.

Form 3 (Blanks) - This information is included on the QC spreadsheet.

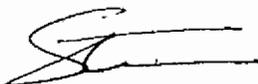
Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

Initial and Continuing Calibration Check: No problems.

Blanks: All blanks were below the reporting limit.

Lab Control Spikes: No problems.

Sincerely,



Susan S. Turner for ...
Deborah J. Innman
Inorganic Program Manager

020A
06

Sample Results

ENSAFE INC.
5724 SUMMER TREES DRIVE
MEMPHIS, TN 38134

REPORT : 41874.10

REPORTED : 02/08/00

PROJECT : ZONE G, RELEASE 139

SAMPLED : 01/26/00

LAB# : 41874.10

SUBMITTED: 01/27/00

SAMPLE #: 706SB01801

LOCATION: ZONE G

MATRIX : Soil

%MOISTURE: 23.4

METALS

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE/TIME ANALYZED	METHOD ANALYST REFERENCE
HEX. CHROMIUM	0.25	mg/kg	0.30	02/02/00 15:40	TGG SW 7196A

∅ = NOT DETECTED ABOVE QUANTITATION LIMIT
= SURROGATE RECOVERY OUTSIDE OF QC LIMITS

N/A = NOT APPLICABLE

METHODOLOGY: SM = STANDARD METHODS, 19TH EDITION, 1995

EPA = #EPA600/4-79-020, MARCH 1985

58
022

ENSAFE INC.
5724 SUMMER TREES DRIVE
MEMPHIS, TN 38134

REPORT : 41874.11

REPORTED : 02/08/00

PROJECT : ZONE G, RELEASE 139
LAB# : 41874.11
SAMPLE #: 706SB01802
LOCATION: ZONE G
MATRIX : Soil

SAMPLED : 01/26/00

SUBMITTED: 01/27/00

%MOISTURE: 55.3

METALS

PARAMETER	REPORTING LIMIT	UNITS	RESULTS	DATE/TIME ANALYZED	METHOD ANALYST REFERENCE
HEX. CHROMIUM	0.25	mg/kg	0.70	02/02/00 15:40	TGG SW 7196A

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
N/A = NOT APPLICABLE
METHODOLOGY: SM = STANDARD METHODS, 19TH EDITION, 1995

QC Results

LCS/LCSD Quality Control Data Sheets

IN123/07-11-97

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

GENERAL CHEMISTRY INORGANICS QUALITY CONTROL DATA SHEET LCS/LCSD

MATRIX **SOIL**

EPISODE 41874
CLIENT ENSAFE

PARAMETER	TEST CODE	UNITS	METHOD BLANK		KNOWN CONC.	LCS				LCS DUPLICATE			RPD			BATCHID	DATE ANALYZED	ANALYST INI.	
			AMT. FOUND	DET. LIMIT		AMT. FOUND	% REC	% REC LIMITS	FLAG	AMT. FOUND	% REC.	FLAG	RPD	LIMIT	FLAG				
Hex. Chromium	MT189	mg/kg	<0.25	0.25	0.20	0.20	100	80	120		0.20	100		0.0	20		0002011691	02-Feb-2000	TGG

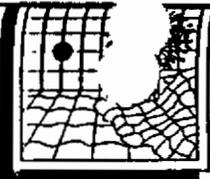
NARRATIVE:
* = OUTSIDE QC LIMITS

41874
/GLCSS REV 4.2
08-Feb-2000 SST

025
21

SWL-IN-406 / Chromium, Hexavalent

Bench Logs and Raw Data



ABSORBANCE/DIRECT READING LOGBOOK

TEST CODE MT169 DATE OF ANALYSIS 2-2-00 TIME 15:40 BATCH # 10201/59
 SWL-1A-406 Rev 21
 DIGESTION BATCH I.D. _____ ANALYST'S INITIALS TD PAGE 71 OF BOOK 0169-4

Sample I.D.	Matrix	TV mg/l	Wt/Vol Initial	Wt/Vol Final	Dilution	Spike/Comments	Absorbance @ 540 nm	Curve value	Results	Units	% Rec
PBS000201A	W			50ml		Curve #6 0169-4 2-22-99 SK	0.000	0	0.25	mg/kg	
ICV		0.2	10ml			TR5-18-18	0.170	0.217	0.2		100%
LCF000201A		0.2	2ml			SP9-29-2 SP9-26-4 2/2/00	0.164	0.209	0.2		100%
41874.10	S		10.00g		2X 5X		0.126 0.061	0.161	0.3		
.11			10.01g		10X		0.057	0.073	0.7		
.11 Dup			10.00g		10X		0.064	0.082	0.8		
.11 SD		0.2	2ml		10X	SP9-29-2 SP9-26-4	0.181	0.231	2.3		81%
.11 ASD		0.2	2ml		10X	SP9-29-2 SP9-26-4 2/2/00	0.186	0.238	2.4		84%
LDSC000201A	W	0.2	2ml			SP9-29-2 SP9-26-4	0.165	0.811	0.2		100%

TD
2/2/00

SOUTHWEST LABORATORY OF OKLAHOMA, INC./AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.

1700 W. ALBANY • BROKEN ARROW, OKLAHOMA

2 • OFFICE (918) 251-2858 • FAX (918) 251-2599

IN064-196-01

027



CHAIN OF JUSTODY RECORD

800-588-7962
 MEMPHIS, TENNESSEE
 CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN;
 LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL;
 RALEIGH, NC; COLOGNE, GERMANY

PAGE _____ OF _____
 PROJECT/JOB NO: 2 7-001-0842
 COC NO: _____
 PO NO: 4
 REL NO: 139
 LAB NAME: SWL

CLIENT Naval Base Charleston PROJECT MANAGER Charlie Vernoy
 LOCATION Zone G TELE/FAX NO. 843-884-0029 / 856-0107
 SAMPLERS: (SIGNATURE) Rachel M. White

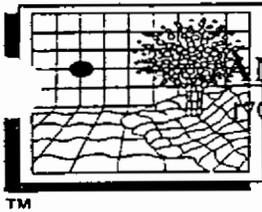
FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	ANALYSIS REQUIRED			REMARKS
					TEMP.	CHEMICAL		Metals	Hexavalent Chromium		
NBCG\636SB02001	1-26-00	1456	S	4oz. Jars	4°C	None	2	X			
NBCG\636SB01801		1521					2	X			
NBCG\636SB01802		1526					2	X			
NBCG\636SB01901		1537					2	X			
NBCG\636SB01902		1542					2	X			
NBCG\706SB02101		1600					2	X			
NBCG\706SB02201		1628					2	X			
NBCG\706SB02102		1616					2	X			
NBCG\706SB02202		1635					2	X			
NBCG\706SB01801		1657					2	X			
NBCG\706SB01802	↓	1702	↓	↓	↓	↓	2	X			

Rachel M. White
 1-26-00

RELINQUISHER: <u>Rachel M. White</u>	DATE: <u>1-26-00</u>	RECEIVER: <u>[Signature]</u>	DATE: <u>1-27-00</u>	RELINQUISHER: _____	DATE: _____	RECEIVER: _____	DATE: _____
PRINTED: <u>Rachel M. White</u>	TIME: <u>1735</u>	PRINTED: <u>[Signature]</u>	TIME: <u>10:30</u>	PRINTED: _____	TIME: _____	PRINTED: _____	TIME: _____
COMPANY: <u>EnSafe</u>		COMPANY: <u>SWL</u>		COMPANY: _____		COMPANY: _____	

METHOD OF SHIPMENT: FedEx
 SHIPMENT NO. 4849147866
 SEND RESULTS TO: Charlie Vernoy

COMMENTS: _____



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: 41874
SDG: 41874

DATE: February 4, 2000
SOW NO.: SW846
EPISODE NO.: 41874

INORGANIC METAL FRACTION:

Nine 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, & Ca. 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, Hg, Ag, Zn, & Sn. No action required.

Lab Control Spikes: No problems.

Duplicate (LCSD): No problems.

SW846 MDLs: The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL 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



HEARTLAND

ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 39785
Date: September 14, 1999
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: August 3, 1999
Number of Samples: 6 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: Volatiles and Semivolatiles

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# 39785

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA		SVOA	
008GSP0101	WATER	X		X	
008GSP0201	WATER	X		X	
008GSP0301	WATER	X		X	
008GSP0401	WATER	X		X	
008GSP0501	WATER	X		X	
008TSP0501	WATER	X			
Total Billable Samples (Water/Soil)		6	0	5	0

VOA= Volatiles
SVOA= Semivolatiles

DATA ASSESSMENT AND NARRATIVE

VOLATILE 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 SW846 Method 8260B; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 39785

A validation was performed on the Volatile Data from SDG 39785. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- Calibrations
- * Internal Standard Performance
- * Blanks
- * Surrogate Recoveries
- * Laboratory Control Samples
- * Field Duplicates
- * Compound Identification /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 10X 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 10X 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 10X 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>
All Samples	2-chloroethyl vinyl ether	+/-	J/UJ
All Samples	acetone 2-butanone	+/-	J/UR

- * 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 AND 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 SW846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 39785

A validation was performed on the Semivolatile Data from SDG 39785. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- * Calibrations
- * Internal Standard Performance
- * Blanks
- * Surrogate Recoveries
- * Laboratory Control Samples
- * Matrix Spike / Matrix Spike Duplicate
- * Field Duplicates
- * Compound Identification / Quantitation

* - All criteria were met for this parameter

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ANALYSIS

PAGE - 2

Blank

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.

Method Blank

<u>Associated blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
SBLK1	bis(2-ethylhexyl)phthalate	11 ug/L	10 ug/L

<u>Samples</u>	<u>Compound</u>	<u>Qualification</u>
008GSP0101	bis(2-ethylhexyl)phthalate	CRQL
008GSP0201		
008GSP0301		
008GSP0401		
008GSP0501		

System Performance and Overall Assessment

The data as presented requires qualifications.

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 10X 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 10X 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 10X 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>
008GSP0101	bis(2-ethylhexyl)phthalate	+	CRQL
008GSP0201			
008GSP0301			
008GSP0401			
008GSP0501			

- * 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

ANNOTATED FORM Is

DATA VALIDATION WORKSHEETS

MULTI-MEDIA VOLATILE ORGANIC FRACTION

CASE NUMBER: _____ SDG NUMBER: 39785

LABORATORY: SWL-Tulsa

CLIENT: EnSafe PROJECT: Charleston Rel 99-75

REVIEWER: MM DATE: 9-9-99

QA/QC LEVEL

- NEESA C
- NEESA D
- DQO LEVEL III
- DQO LEVEL IV
- _____

Statement Of Work (SOW)

- CLP 3/90
- CLP 2/88
- SW846 8240
- SW846 8240 Appendix IX
- 8260B

ANALYSIS MODIFICATIONS: _____

VOLATILE HOLDING TIMES

- CLP/SW846 : 14 days from date of sampling (If properly preserved)
- Region I : 10 days from VTSR
- Region III : 14 days from date of sampling (If properly preserved)
- NYSDEC : 10 days from date VTSR (If properly preserved)

1. Were the holding times met for the all volatile analysis? **YES** NO

If yes, complete the following form for all samples that exceeded holding times.

EPA SAMPLE NO.	MATRIX	VTSR OR DATE SAMPLED	DATE OF ANALYSIS	DA	Action

WAA 02/19/99

- Action:** DA - The number of days that the holding time was exceeded.
- DA ≤ 5: Qualify all positive results as estimated (J).
- DA > 5 ≤ 15: Qualify all positive results as estimated (J) and all non detects estimated (UJ).
- DA > 15: Qualify all positive results estimated (J) and reject all non detects.

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: SWL-TULSA

Contract: ZONEG R119

Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39785

Lab File ID: UL9861.D

BFB Injection Date: 07/09/99

Instrument ID: U

BFB Injection Time: 0953

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	16.9
75	30.0 - 60.0% of mass 95	40.4
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.5
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	75.3
175	5.0 - 9.0% of mass 174	6.0 (8.0)1
176	Greater than 95.0%, but less than 101.0% of mass 174	72.6 (96.5)1
177	5.0 - 9.0% of mass 176	4.8 (6.6)2

1-Value is % mass 174

2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050	VSTD050	UL9862.D	07/09/99	1155
02	VSTD020	VSTD020	UL9863.D	07/09/99	1224
03	VSTD005	VSTD005	UL9864.D	07/09/99	1252
04	VSTD100	VSTD100	UL9865.D	07/09/99	1321
05	VSTD200	VSTD200	UL9866.D	07/09/99	1350
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 09-JUL-1999 11:55
 End Cal Date : 09-JUL-1999 11:55
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/u.i/u990709a.b/5ml82602.m
 Cal Date : 09-Jul-1999 13:56 doug

Calibration File Names:

Level 1: /chem/u.i/u990709a.b/ul9864.d
 Level 2: /chem/u.i/u990709a.b/ul9863.d
 Level 3: /chem/u.i/u990709a.b/ul9862.d
 Level 4: /chem/u.i/u990709a.b/ul9865.d
 Level 5: /chem/u.i/u990709a.b/ul9866.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R^2
1 DICHLORODIFLUOROMETHANE	0.43577	0.44660	0.42722	0.42344	0.40043	0.42669	4.024
2 CHLOROMETHANE	0.26155	0.25739	0.25098	0.24118	0.23925	0.25007	3.909
3 VINYL CHLORIDE	0.23603	0.24906	0.23547	0.24329	0.23501	0.23977	2.586
4 BROMOMETHANE	0.34382	0.25037	0.19078	0.21487	0.20042	0.24005	0.998
5 CHLOROETHANE	0.15835	0.16242	0.14959	0.15156	0.11826	0.14804	11.771
6 TRICHLOROFLUOROMETHANE	0.43785	0.45014	0.43243	0.42876	0.41329	0.43249	3.108
7 ETHYL ETHER	++++	++++	++++	++++	++++	0.00000	++++
8 ACROLEIN	0.01430	0.00762	0.01103	0.00722	0.00838	0.00971	0.982
9 1 1-DICHLOROETHENE	0.23177	0.25636	0.26643	0.23184	0.23299	0.24388	6.719
10 1,1,2-TRICHLOROTRIFLUOROETHAN	0.42763	0.39640	0.39028	0.36378	0.35549	0.38672	7.407
11 ACETONE	0.12864	0.06183	0.04782	0.03391	0.03330	0.06110	0.994
12 METHYL IODIDE	0.51805	0.43647	0.29817	0.40404	0.39047	0.40944	0.994
13 CARBON DISULFIDE	0.56603	0.72080	0.72159	0.64479	0.62958	0.65656	10.051
14 ACETONITRILE	0.05060	0.04975	0.04177	0.04525	0.04720	0.04691	7.608
15 ALLYL CHLORIDE	0.15331	0.13946	0.11001	0.13365	0.14581	0.13645	12.085
16 METHYLENE CHLORIDE	0.24573	0.24369	0.24269	0.21628	0.21859	0.23340	6.270
17 ACRYLONITRILE	0.03558	0.03100	0.03064	0.02761	0.02891	0.03075	9.835
M 18 1,2-Dichloroethene (total)	0.27537	0.30588	0.31346	0.27755	0.27843	0.29014	6.226
19 trans-1 2-DICHLOROETHENE	0.26321	0.29142	0.30164	0.26916	0.26780	0.27865	6.053
20 Methyl-tert-Butyl Ether	0.43990	0.37980	0.37351	0.34585	0.34334	0.37648	10.354
21 Hexane	++++	++++	++++	++++	++++	0.00000	++++
22 1 1-DICHLOROETHANE	0.44342	0.49683	0.51693	0.45011	0.46225	0.47391	6.679
23 VINYL ACETATE	0.20794	0.25325	0.24605	0.22647	0.22545	0.23183	7.780
24 CHLOROPRENE	0.35773	0.35951	0.32677	0.32947	0.33913	0.34252	4.499
25 2 2-DICHLOROPROPANE	0.32674	0.37140	0.36272	0.33015	0.33142	0.34449	6.068
26 cis-1 2-DICHLOROETHENE	0.28753	0.32033	0.32528	0.28593	0.28907	0.30163	6.447
27 2-BUTANONE	0.07411	0.07499	0.07188	0.05834	0.05989	0.06784	11.888
28 PROPIONITRILE	0.01404	0.01434	0.01281	0.01112	0.01256	0.01297	9.957
29 ETHYL ACETATE	++++	++++	++++	++++	++++	0.00000	++++

<- Indicates Error R = % RSD or R^2 Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

Report Date : 09-Jul-1999 13:57

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 09-JUL-1999 11:55
 End Cal Date : 09-JUL-1999 11:55
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/u.i/u990709a.b/5ml82602.m
 Cal Date : 09-Jul-1999 13:56 doug

Calibration File Names:

Level 1: /chem/u.i/u990709a.b/ul9864.d
 Level 2: /chem/u.i/u990709a.b/ul9863.d
 Level 3: /chem/u.i/u990709a.b/ul9862.d
 Level 4: /chem/u.i/u990709a.b/ul9865.d
 Level 5: /chem/u.i/u990709a.b/ul9866.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R^2
30 METHACRYLONITRILE	0.04685	0.04479	0.04480	0.03963	0.04225	0.04366	6.373
31 BROMOCHLOROMETHANE	0.14507	0.16311	0.16665	0.15176	0.14920	0.15516	5.977
32 CHLOROFORM	0.46401	0.50796	0.53209	0.46029	0.46679	0.48623	6.601
34 1 1-TRICHLOROETHANE	0.39453	0.44391	0.45922	0.40379	0.40936	0.42216	6.606
36 1 1-DICHLOROPROPENE	0.34290	0.40023	0.42217	0.35774	0.36307	0.37722	8.699
37 CARBON TETRACHLORIDE	0.36932	0.41282	0.43280	0.38055	0.37813	0.39472	6.820
39 BENZENE	0.74163	0.85489	0.89717	0.79400	0.80357	0.81825	7.293
40 ISOBUTYL ALCOHOL	0.01076	0.00845	0.00599	0.00497	0.00512	0.00706	0.996 L
41 1 2-DICHLOROETHANE	0.18868	0.22598	0.24577	0.20900	0.21624	0.21713	9.700
42 1,4-DIOXANE	0.00254	0.00273	0.00249	0.00153	0.00199	0.00226	0.971 L ma
44 TRICHLOROETHENE	0.30348	0.34018	0.36068	0.31272	0.31707	0.32683	7.116
45 1 2-DICHLOROPROPANE	0.27409	0.32074	0.33597	0.29313	0.29910	0.30461	7.936
46 DIBROMOMETHANE	0.15053	0.18455	0.18904	0.16518	0.16805	0.17147	9.079
47 METHYL METHACRYLATE	0.15282	0.12877	0.12777	0.11877	0.12238	0.13010	10.269
48 BROMODICHLOROMETHANE	0.40055	0.45296	0.48168	0.41535	0.43200	0.43651	7.310
49 2-NITROPROPANE	++++	++++	++++	++++	++++	0.00000	++++
50 2-CHLOROETHYL VINYL ETHER	0.39783	0.39157	0.23858	0.37733	0.39278	0.35962	0.989 L J-mat
51 cis-1,3-Dichloropropene	0.34220	0.41016	0.43101	0.37311	0.38223	0.38774	8.834
52 4-METHYL-2-PENTANONE	0.13535	0.16883	0.18821	0.15613	0.16538	0.16278	11.844
54 TOLUENE	0.53382	0.62050	0.64588	0.57205	0.58719	0.59189	7.326
55 trans-1,3-Dichloropropene	0.24074	0.30175	0.31799	0.27513	0.28208	0.28354	10.318
56 ETHYL METHACRYLATE	0.32214	0.29096	0.27630	0.25995	0.27411	0.28469	8.305
57 1 1 2-TRICHLOROETHANE	0.16493	0.18469	0.19845	0.16518	0.16944	0.17654	8.310
58 TETRACHLOROETHENE	0.49746	0.59406	0.60934	0.55700	0.57891	0.56735	7.684
59 1 3-DICHLOROPROPANE	0.34852	0.43627	0.46616	0.39528	0.40848	0.41094	10.772
60 2-HEXANONE	0.09222	0.12380	0.15824	0.13096	0.13825	0.12869	0.997 L
61 DIBROMOCHLOROMETHANE	0.40652	0.50877	0.55179	0.45853	0.47892	0.48091	11.313
62 1 2-DIBROMOETHANE	0.24244	0.28742	0.32063	0.26734	0.27675	0.27892	10.269
63 D-LIMONENE	++++	++++	++++	++++	++++	0.00000	++++

<- Indicates Error R = % RSD or R^2 Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

Report Date : 09-Jul-1999 13:57

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 09-JUL-1999 11:55
 End Cal Date : 09-JUL-1999 11:55
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/u.i/u990709a.b/5ml82602.m
 Cal Date : 09-Jul-1999 13:56 doug

Calibration File Names:

Level 1: /chem/u.i/u990709a.b/ul9864.d
 Level 2: /chem/u.i/u990709a.b/ul9863.d
 Level 3: /chem/u.i/u990709a.b/ul9862.d
 Level 4: /chem/u.i/u990709a.b/ul9865.d
 Level 5: /chem/u.i/u990709a.b/ul9866.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
65 CHLOROBENZENE	0.88257	1.05774	1.10383	0.98300	1.00843	1.00711	8.309
66 CYCLOHEXANONE	+++++	+++++	+++++	+++++	+++++	0.00000	+++++
67 1-CHLOROHXANE	0.42291	0.34202	0.32181	0.30451	0.30597	0.33944	14.452
68 1 1 2-TETRACHLOROETHANE	0.37433	0.46566	0.48063	0.42247	0.43955	0.43653	9.493
69 ETHYL BENZENE	1.63559	1.82188	1.83491	1.69682	1.74207	1.74625	4.816
70 m,p-XYLENES	0.79917	0.91414	0.92680	0.85435	0.87869	0.87463	5.831
71 o-XYLENE	0.59105	0.72577	0.73957	0.67080	0.68306	0.68205	8.558
M 72 Xylene (Total)	0.59105	0.72577	0.73957	0.67080	0.68306	0.68205	8.558
73 STYRENE	0.84933	1.06688	1.11306	0.99854	1.03799	1.01316	9.936
74 BROMOFORM	0.23328	0.29547	0.32917	0.27929	0.28966	0.28537	12.126
75 ISOPROPYLBENZENE	2.93913	3.20728	3.17210	2.95781	2.97912	3.05109	4.193
77 BROMOBENZENE	0.78259	0.90942	0.90713	0.82396	0.84788	0.85420	6.394
78 1 1 2-TETRACHLOROETHANE	0.67996	0.71981	0.73755	0.64032	0.65213	0.68595	6.129
79 1 2 3-TRICHLOROPROPANE	0.71018	0.69460	0.69051	0.61656	0.63560	0.66949	6.103
80 trans-1,4-DICHLORO-2-BUTEN	0.05306	0.07039	0.07287	0.05479	0.06927	0.06408	14.636
81 n-PROPYLBENZENE	0.75534	0.86578	0.85827	0.79706	0.81521	0.81833	5.559
82 2-CHLOROTOLUENE	0.73255	0.79760	0.79593	0.73214	0.74270	0.76018	4.429
83 4-CHLOROTOLUENE	2.36848	2.57868	2.52280	2.34268	2.35523	2.43357	4.485
84 1 3 5-TRIMETHYLBENZENE	2.28067	2.55432	2.48714	2.28821	2.35290	2.39265	5.123
85 PENTACHLOROETHANE	0.32642	0.36389	0.33838	0.32206	0.33556	0.33726	4.832
86 tert-BUTYLBENZENE	3.25778	3.44438	3.39652	3.14159	3.24198	3.29645	3.726
87 1 2 4-TRIMETHYLBENZENE	2.32451	2.59724	2.56374	2.32125	2.40601	2.44255	5.361
88 sec-BUTYLBENZENE	3.34391	3.62209	3.60332	3.31072	3.41867	3.45974	4.196
89 1 3-DICHLOROBENZENE	1.38045	1.57411	1.59552	1.44256	1.47534	1.49360	6.045
90 p-ISOPROPYLTOLUENE	2.80282	3.09641	3.06094	2.79307	2.91822	2.93429	4.814
92 1 4-DICHLOROBENZENE	1.47684	1.69325	1.68042	1.48089	1.55670	1.57762	6.640
93 1 2-DICHLOROBENZENE	1.21066	1.38728	1.41999	1.23806	1.26797	1.30479	7.143
94 n-BUTYLBENZENE	2.06843	2.38617	2.34038	2.14294	2.28671	2.24493	5.991
95 1 2-DIBROMO-3-CHLOROPROPANE	0.15771	0.17747	0.15571	0.15071	0.15134	0.15859	6.909

Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

Report Date : 09-Jul-1999 13:57

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 09-JUL-1999 11:55
End Cal Date : 09-JUL-1999 11:55
Quant Method : ISTD
Cal Curve Type : Averaged
Target Version : Target 3.00
Integrator : HP RTE
Method file : /chem/u.i/u990709a.b/5ml82602.m
Cal Date : 09-Jul-1999 13:56 doug

Calibration File Names:

Level 1: /chem/u.i/u990709a.b/ul9864.d
Level 2: /chem/u.i/u990709a.b/ul9863.d
Level 3: /chem/u.i/u990709a.b/ul9862.d
Level 4: /chem/u.i/u990709a.b/ul9865.d
Level 5: /chem/u.i/u990709a.b/ul9866.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
96 1 2 4-TRICHLOROBENZENE	0.56421	0.72463	0.73728	0.64700	0.73503	0.68163	11.072
97 HEXACHLOROBUTADIENE	0.44315	0.52027	0.55722	0.43807	0.48562	0.48887	10.400
98 NAPHTHALENE	1.22851	1.32482	1.01992	0.94279	1.05098	1.11340	14.179
99 1 2 3-TRICHLOROBENZENE	0.46720	0.56664	0.53682	0.48270	0.54847	0.52037	8.292
\$ 33 DIBROMOFLUOROMETHANE	0.37440	0.37687	0.37303	0.37339	0.37563	0.37466	0.425
\$ 38 1,2-DICHLOROETHANE-d4	0.14914	0.15134	0.16192	0.16676	0.18899	0.16363	9.743
\$ 53 TOLUENE-d8	0.79498	0.80119	0.79976	0.80128	0.80900	0.80124	0.629
\$ 76 4-BROMOFLUOROBENZENE	0.46355	0.47238	0.48948	0.48059	0.48921	0.47904	2.332

<- Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39785

Lab File ID: UL10135.D

BFB Injection Date: 08/05/99

Instrument ID: U

BFB Injection Time: 0912

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	17.8
75	30.0 - 60.0% of mass 95	41.5
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	5.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	64.6
175	5.0 - 9.0% of mass 174	5.2 (8.1)1
176	Greater than 95.0%, but less than 101.0% of mass 174	63.5 (98.4)1
177	5.0 - 9.0% of mass 176	4.3 (6.8)2

1-Value is % mass 174

2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050	VSTD050	UL10136.D	08/05/99	0943
02	VBLK1	U990805A	UL10137.D	08/05/99	1042
03	LCS1	LCS1	UL10145.D	08/05/99	1420
04	LCSD1	LCSD1	UL10146.D	08/05/99	1448
05	008GSP0101	39785.01	UL10152.D	08/05/99	1743
06	008GSP0201	39785.02	UL10153.D	08/05/99	1811
07	008GSP0301	39785.03	UL10154.D	08/05/99	1839
08	008GSP0401	39785.04	UL10155.D	08/05/99	1907
09	008GSP0501	39785.05	UL10156.D	08/05/99	1934
10	008TSP0501	39785.06	UL10157.D	08/05/99	2002
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: u.i
 Lab File ID: ul10136.d
 Analysis Type: WATER
 Lab Sample ID: VSTD050
 Quant Type: ISTD

Injection Date: 05-AUG-1999 09:43
 Init. Calibration Date(s): 07/09/99 07/09/99
 Init. Calibration Times: 11:55 11:55
 Method File: /chem/u.i/u990805a.b/5m182602.m

COMPOUND	RRF	RF50	MIN RRF	ZD	MAX ZD
1 DICHLOROFLUOROMETHANE	0.427	0.407	0.000	4.7	100.0
2 CHLOROMETHANE	0.250	0.300	0.100	20.0	100.0
3 VINYL CHLORIDE	0.240	0.268	0.010	11.6	20.0
4 BROMOMETHANE	0.199	0.165	0.010	N/A	100.0
5 CHLOROETHANE	0.148	0.174	0.010	17.5	100.0
6 TRICHLOROFLUOROMETHANE	0.432	0.491	0.010	13.5	100.0
7 ETHYL ETHER	++++	++++	0.010	++++	100.0 <-
8 ACROLEIN	0.008	0.011	0.001	N/A	100.0
9 1 1-DICHLOROETHENE	0.244	0.273	0.010	12.1	20.0
10 1,1,2-TRICHLOROTRIFLUOROETHA	0.387	0.479	0.010	23.8	100.0
11 ACETONE	0.030	0.044	0.010	N/A	100.0 JTR
12 METHYL IODIDE	0.395	0.245	0.010	N/A	100.0
13 CARBON DISULFIDE	0.657	0.682	0.010	3.9	100.0
14 ACETONITRILE	0.047	0.046	0.000	1.6	100.0
15 ALLYL CHLORIDE	0.136	0.124	0.010	9.3	100.0
16 METHYLENE CHLORIDE	0.233	0.203	0.010	13.0	100.0
17 ACRYLONITRILE	0.031	0.024	0.010	22.7	100.0
M 18 1,2-Dichloroethene (total)	0.290	0.298	0.010	2.5	100.0
19 trans-1 2-DICHLOROETHENE	0.279	0.309	0.010	10.8	100.0
20 Methyl-tert-Butyl Ether	0.376	0.302	0.010	19.8	100.0
21 Hexane	++++	++++	0.010	++++	100.0 <-
22 1 1-DICHLOROETHANE	0.474	0.535	0.100	13.0	100.0
23 VINYL ACETATE	0.232	0.244	0.010	5.3	100.0
24 CHLOROPRENE	0.343	0.437	0.010	27.7	100.0
25 2 2-DICHLOROPROPANE	0.344	0.416	0.010	20.8	100.0
26 cis-1 2-DICHLOROETHENE	0.302	0.286	0.010	5.1	100.0
27 2-BUTANONE	0.068	0.048	0.010	29.3	100.0 JTR
28 PROPIONITRILE	0.013	0.009	0.001	26.8	100.0
29 ETHYL ACETATE	++++	++++	0.010	++++	100.0 <-
30 METHACRYLONITRILE	0.044	0.033	0.010	24.5	100.0
31 BROMOCHLOROMETHANE	0.155	0.109	0.010	29.8	100.0
32 CHLOROFORM	0.486	0.489	0.010	0.5	20.0
S 33 DIBROMOFLUOROMETHANE	0.375	0.312	0.010	16.8	100.0
34 1 1 1-TRICHLOROETHANE	0.422	0.498	0.010	18.0	100.0
36 1 1-DICHLOROPROPENE	0.377	0.398	0.010	5.5	100.0
37 CARBON TETRACHLORIDE	0.395	0.408	0.010	3.5	100.0
S 38 1,2-DICHLOROETHANE-d4	0.164	0.130	0.010	20.4	100.0
39 BENZENE	0.818	0.792	0.010	3.3	100.0
40 ISOBUTYL ALCOHOL	0.005	0.004	0.000	N/A	100.0
41 1 2-DICHLOROETHANE	0.217	0.173	0.010	20.1	100.0
42 1,4-DIOXANE	0.002	0.001	0.000	N/A	100.0
44 TRICHLOROETHENE	0.327	0.319	0.010	2.4	100.0
45 1 2-DICHLOROPROPANE	0.305	0.267	0.010	12.4	20.0
46 DIBROMOMETHANE	0.171	0.111	0.010	35.4	100.0

Data File: /chem/u.i/u990805a.b/ul10136.d
 Port Date: 05-Aug-1999 10:43

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: u.i
 Lab File ID: ul10136.d
 Analysis Type: WATER
 Lab Sample ID: VSTD050
 Quant Type: ISTD

Injection Date: 05-AUG-1999 09:43
 Init. Calibration Date(s): 07/09/99 07/09/99
 Init. Calibration Times: 11:55 11:55
 Method File: /chem/u.i/u990805a.b/5ml82602.m

COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
47 METHYL METHACRYLATE	0.130	0.093	0.010	28.9	100.0
48 BROMODICHLOROMETHANE	0.437	0.346	0.010	20.6	100.0
49 2-NITROPROPANE	++++	++++	0.010	++++	100.0 <-
50 2-CHLOROETHYL VINYL ETHER	0.403	0.110	0.010	N/A	100.0
51 cis-1,3-Dichloropropene	0.388	0.308	0.010	20.5	100.0
52 4-METHYL-2-PENTANONE	0.163	0.105	0.010	35.2	100.0
S 53 TOLUENE-d8	0.801	0.841	0.010	5.0	100.0
54 TOLUENE	0.592	0.566	0.010	4.3	20.0
55 trans-1,3-Dichloropropene	0.284	0.206	0.010	27.4	100.0
56 ETHYL METHACRYLATE	0.285	0.177	0.010	37.7	100.0
57 1 1 2-TRICHLOROETHANE	0.177	0.118	0.010	33.4	100.0
58 TETRACHLOROETHENE	0.567	0.614	0.010	8.3	100.0
59 1 3-DICHLOROPROPANE	0.411	0.328	0.010	20.1	100.0
60 2-HEXANONE	0.138	0.095	0.010	N/A	100.0
61 DIBROMOCHLOROMETHANE	0.481	0.362	0.010	24.7	100.0
62 1 2-DIBROMOETHANE	0.279	0.158	0.010	43.3	100.0
63 D-LIMONENE	++++	++++	0.010	++++	100.0 <-
65 CHLOROBENZENE	1.007	0.948	0.300	5.9	100.0
66 CYCLOHEXANONE	++++	++++	0.010	++++	100.0 <-
67 1-CHLOROHXANE	0.339	0.465	0.010	36.9	100.0
68 1 1 1 2-TETRACHLOROETHANE	0.437	0.374	0.010	14.3	100.0
69 ETHYL BENZENE	1.746	1.971	0.010	12.9	20.0
70 m,p-XYLENES	0.875	0.991	0.010	13.3	100.0
71 o-XYLENE	0.682	0.713	0.010	4.6	100.0
M 72 Xylene (Total)	0.682	0.713	0.010	4.6	100.0
73 STYRENE	1.013	0.950	0.010	6.2	100.0
74 BROMOFORM	0.285	0.176	0.100	38.2	100.0
75 ISOPROPYLBENZENE	3.051	4.327	0.010	41.8	100.0
S 76 4-BROMOFLUOROBENZENE	0.479	0.394	0.010	17.8	100.0
77 BROMOBENZENE	0.854	0.779	0.010	8.8	100.0
78 1 1 2 2-TETRACHLOROETHANE	0.686	0.601	0.300	12.3	100.0
79 1 2 3-TRICHLOROPROPANE	0.669	0.601	0.010	10.2	100.0
80 trans-1,4-DICHLORO-2-BUTEN	0.064	0.038	0.010	40.9	100.0
81 n-PROPYLBENZENE	0.818	1.095	0.010	33.8	100.0
82 2-CHLOROTOLUENE	0.760	0.893	0.010	17.5	100.0
83 4-CHLOROTOLUENE	2.434	3.005	0.010	23.5	100.0
84 1 3 5-TRIMETHYLBENZENE	2.393	3.173	0.010	32.6	100.0
85 PENTACHLOROETHANE	0.337	0.177	0.010	47.6	100.0
86 tert-BUTYLBENZENE	3.296	3.903	0.010	18.4	100.0
87 1 2 4-TRIMETHYLBENZENE	2.443	2.934	0.010	20.1	100.0
88 sec-BUTYLBENZENE	3.460	4.465	0.010	29.1	100.0
89 1 3-DICHLOROBENZENE	1.494	1.478	0.010	1.0	100.0
90 p-ISOPROPYLTOLUENE	2.934	3.515	0.010	19.8	100.0
92 1 4-DICHLOROBENZENE	1.578	1.513	0.010	4.1	100.0

J-no ⊕

Data File: /chem/u.i/u990805a.b/ul10136.d
port Date: 05-Aug-1999 10:43

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: u.i Injection Date: 05-AUG-1999 09:43
Lab File ID: ul10136.d Init. Calibration Date(s): 07/09/99 07/09/99
Analysis Type: WATER Init. Calibration Times: 11:55 11:55
Lab Sample ID: VSTD050 Method File: /chem/u.i/u990805a.b/5ml82602.m
Quant Type: ISTD

COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
93 1 2-DICHLOROBENZENE	1.305	1.198	0.010	8.2	100.0
94 n-BUTYLBENZENE	2.245	2.362	0.010	5.2	100.0
95 1 2-DIBROMO-3-CHLOROPROPANE	0.159	0.075	0.010	52.6	100.0
96 1 2 4-TRICHLOROBENZENE	0.682	0.453	0.010	33.6	100.0
97 HEXACHLOROBUTADIENE	0.489	0.426	0.010	12.9	100.0
98 NAPHTHALENE	1.113	0.551	0.010	50.5	100.0
99 1 2 3-TRICHLOROBENZENE	0.520	0.295	0.010	43.2	100.0

% DRIFT REPORT

Data File : ul10136.d
 Lab ID : VSTD050
 Samp Info : VSTD050 (2-094-6)
 Method : /chem/u.i/u990805a.b/5ml82602.m
 Operator : DOUG
 Analyzed : 05-AUG-99 09:43
 Sublist : all
 Instrument : u
 ICAL Analyzed : 09-JUL-99 11:55 to 09-JUL-99 11:55

Compound	Amount	Nominal	% Drift	Flag	RRF
DICHLORODIFLUOROMETHANE	47.64	50.00	-4.7		0.407
CHLOROMETHANE	59.97	50.00	19.9		0.300
VINYL CHLORIDE	55.80	50.00	11.6		0.268
BROMOMETHANE	38.16	50.00	23.7	met	0.165
CHLOROETHANE	58.74	50.00	17.5		0.174
TRICHLOROFLUOROMETHANE	56.73	50.00	13.5		0.491
ETHYL ETHER	0.00	50.00	-100.0	*	0.000
ACROLEIN	648.33	500.00	29.7		0.011
1 1-DICHLOROETHENE	56.06	50.00	12.1	✓	0.273
1,1,2-TRICHLOROTRIFLUOROETHAN	61.88	50.00	23.8		0.479
ACETONE	52.27	50.00	4.5		0.044
METHYL IODIDE	32.73	50.00	-34.5		0.245
CARBON DISULFIDE	51.96	50.00	3.9		0.682
ACETONITRILE	492.23	500.00	-1.6		0.046
ALLYL CHLORIDE	45.34	50.00	-9.3		0.124
METHYLENE CHLORIDE	43.49	50.00	-13.0		0.203
ACRYLONITRILE	386.71	500.00	-22.7		0.024
1,2-Dichloroethene (total)	102.54	100.00	2.5		0.298
trans-1 2-DICHLOROETHENE	55.42	50.00	10.8		0.309
Methyl-tert-Butyl Ether	40.11	50.00	-19.8		0.302
Hexane	0.00	50.00	-100.0	*	0.000
1 1-DICHLOROETHANE	56.47	50.00	12.9		0.535
VINYL ACETATE	52.64	50.00	5.3		0.244
CHLOROPRENE	63.84	50.00	27.7		0.437
2 2-DICHLOROPROPANE	60.41	50.00	20.8		0.416
cis-1 2-DICHLOROETHENE	47.43	50.00	-5.1		0.286
2-BUTANONE	35.36	50.00	-29.3		0.048
PROPIONITRILE	365.80	500.00	-26.8		0.009
ETHYL ACETATE	0.00	50.00	-100.0	*	0.000
METHACRYLONITRILE	377.25	500.00	-24.6		0.033
BROMOCHLOROMETHANE	35.11	50.00	-29.8		0.109
CHLOROFORM	50.25	50.00	0.5	✓	0.489
DIBROMOFLUOROMETHANE	41.59	50.00	-16.8		0.312
1 1 1-TRICHLOROETHANE	58.99	50.00	18.0		0.498
1 1-DICHLOROPROPENE	52.77	50.00	5.5		0.398
CARBON TETRACHLORIDE	51.73	50.00	3.5		0.408
1,2-DICHLOROETHANE-d4	39.77	50.00	-20.5		0.130
BENZENE	48.36	50.00	-3.3		0.792
ISOBUTYL ALCOHOL	549.49	1000.00	-45.1		0.004
1 2-DICHLOROETHANE	39.93	50.00	-20.1		0.173
1,4-DIOXANE	634.25	1000.00	-36.6		0.001
TRICHLOROETHENE	48.81	50.00	-2.4		0.319
1 2-DICHLOROPROPANE	43.81	50.00	-12.4	✓	0.267
DIBROMOMETHANE	32.30	50.00	-35.4		0.111
METHYL METHACRYLATE	35.57	50.00	-28.9		0.093
BROMODICHLOROMETHANE	39.68	50.00	-20.6		0.346

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

% DRIFT REPORT

Data File : ul10136.d
 Lab ID : VSTD050
 Samp Info : VSTD050 (2-094-6)
 Method : /chem/u.i/u990805a.b/5ml82602.m
 Operator : DOUG
 Analyzed : 05-AUG-99 09:43
 Sublist : all
 Instrument : u
 ICAL Analyzed : 09-JUL-99 11:55 to 09-JUL-99 11:55

Compound	Amount	Nominal	% Drift	Flag	RRF
2-NITROPROPANE	0.00	50.00	-100.0	*	0.000
2-CHLOROETHYL VINYL ETHER	20.18	50.00	-59.6	JWS	0.110
cis-1,3-Dichloropropene	39.73	50.00	-20.5		0.308
4-METHYL-2-PENTANONE	32.38	50.00	-35.2		0.105
TOLUENE-d8	52.51	50.00	5.0		0.841
TOLUENE	47.83	50.00	-4.3	✓	0.566
trans-1,3-Dichloropropene	36.28	50.00	-27.4		0.206
ETHYL METHACRYLATE	31.14	50.00	-37.7		0.177
1 1 2-TRICHLOROETHANE	33.28	50.00	-33.4		0.118
TETRACHLOROETHENE	54.14	50.00	8.3		0.614
1 3-DICHLOROPROPANE	39.94	50.00	-20.1		0.328
2-HEXANONE	34.70	50.00	-30.6	ME	0.095
DIBROMOCHLOROMETHANE	37.62	50.00	-24.8		0.362
1 2-DIBROMOETHANE	28.36	50.00	-43.3		0.158
D-LIMONENE	0.00	50.00	-100.0	*	0.000
CHLOROBENZENE	47.07	50.00	-5.9		0.948
CYCLOHEXANONE	0.00	100.00	100.0	*	0.000
1-CHLOROHEXANE	68.42	50.00	36.8		0.465
1 1 1 2-TETRACHLOROETHANE	42.85	50.00	-14.3		0.374
ETHYL BENZENE	56.42	50.00	12.8	✓	1.971
m,p-XYLENES	113.29	100.00	13.3		0.991
o-XYLENE	52.27	50.00	4.5		0.713
Xylene (Total)	197.56	150.00	-295.2	21.7	2.695
STYRENE	46.89	50.00	-6.2		0.950
BROMOFORM	30.90	50.00	-38.2		0.176
ISOPROPYLBENZENE	70.90	50.00	41.8		4.327
4-BROMOFLUOROBENZENE	41.10	50.00	-17.8		0.394
BROMOBENZENE	45.62	50.00	-8.8		0.779
1 1 2 2-TETRACHLOROETHANE	43.83	50.00	-12.3		0.601
1 2 3-TRICHLOROPROPANE	44.91	50.00	-10.2		0.601
trans-1,4-DICHLORO-2-BUTEN	29.56	50.00	-40.9		0.038
n-PROPYLBENZENE	66.87	50.00	33.7		1.095
2-CHLOROTOLUENE	58.76	50.00	17.5		0.893
4-CHLOROTOLUENE	61.73	50.00	23.5		3.005
1 3 5-TRIMETHYLBENZENE	66.31	50.00	32.6		3.173
PENTACHLOROETHANE	26.20	50.00	-47.6		0.177
tert-BUTYLBENZENE	59.19	50.00	18.4		3.903
1 2 4-TRIMETHYLBENZENE	60.06	50.00	20.1		2.934
sec-BUTYLBENZENE	64.53	50.00	29.1		4.465
1 3-DICHLOROBENZENE	49.48	50.00	-1.0		1.478
p-ISOPROPYLTOLUENE	59.90	50.00	19.8		3.515
1 4-DICHLOROBENZENE	47.94	50.00	-4.1		1.513
1 2-DICHLOROBENZENE	45.88	50.00	-8.2		1.198
n-BUTYLBENZENE	52.61	50.00	5.2		2.362
1 2-DIBROMO-3-CHLOROPROPANE	23.69	50.00	-52.6		0.075
1 2 4-TRICHLOROBENZENE	33.20	50.00	-33.6		0.453

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

% DRIFT REPORT

Data File : ul10136.d
Lab ID : VSTD050
Samp Info : VSTD050 (2-094-6)
Method : /chem/u.i/u990805a.b/5ml82602.m
Operator : DOUG
Analyzed : 05-AUG-99 09:43
Sublist : all
Instrument : u
ICAL Analyzed : 09-JUL-99 11:55 to 09-JUL-99 11:55

Compound	Amount	Nominal	% Drift	Flag	RRF
HEXACHLOROBUTADIENE	43.56	50.00	-12.9		0.426
NAPHTHALENE	24.76	50.00	-50.5		0.551
1 2 3-TRICHLOROBENZENE	28.38	50.00	-43.2		0.295

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONEG R119

Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39785

Lab File ID (Standard): UL10136.D

Date Analyzed: 08/05/99

Instrument ID: U

Time Analyzed: 0943

	IS1 (PFB) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	751700	4.95	849385	5.72	567817	9.63
=====	=====	=====	=====	=====	=====	=====
UPPER LIMIT	1503400	5.45	1698770	6.22	1135634	10.13
=====	=====	=====	=====	=====	=====	=====
LOWER LIMIT	375850	4.45	424692	5.22	283908	9.13
=====	=====	=====	=====	=====	=====	=====
EPA SAMPLE No.						
=====	=====	=====	=====	=====	=====	=====
01 VBLK1	783924	4.94	954061	5.70	718927	9.62
02 LCS1	758582	4.94	954272	5.70	727733	9.59
03 LCSD1	785855	4.94	965955	5.70	736110	9.59
04 008GSP0101	760337	4.94	915995	5.69	697962	9.58
05 008GSP0201	756229	4.94	893007	5.70	691448	9.58
06 008GSP0301	750588	4.94	900178	5.70	687383	9.58
07 008GSP0401	751703	4.94	901019	5.70	679499	9.58
08 008GSP0501	750179	4.94	901174	5.70	683419	9.58
9 008TSP0501	757976	4.95	915911	5.71	696623	9.58
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (PFB) = PENTAFLUOROBENZENE
 IS2 (DFB) = 1,4-DIFLUOROBENZENE
 IS3 (CBZ) = CHLOROBENZENE-d5

UPPER LIMIT = + 100%
 of internal standard area.
 LOWER LIMIT = - 50%
 of internal standard area.

Column used to flag values outside QC limits with an asterisk.

8B
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39785

Lab File ID (Standard): UL10136.D

Date Analyzed: 08/05/99

Instrument ID: U

Time Analyzed: 0943

	IS4 (DCB) AREA #	RT
=====	=====	=====
12 HOUR STD	253188	14.01
=====	=====	=====
UPPER LIMIT	506376	14.51
=====	=====	=====
LOWER LIMIT	126594	13.51
=====	=====	=====
EPA SAMPLE No.		
=====	=====	=====
01 VBLK1	295321	14.01
02 LCS1	356305	13.98
03 LCSD1	351156	13.98
04 008GSP0101	293396	13.96
05 008GSP0201	286879	13.95
06 008GSP0301	276697	13.96
07 008GSP0401	284773	13.96
08 008GSP0501	277186	13.98
09 008TSP0501	274334	13.98
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

IS4 (DCB) = 1,4-DICHLOROBENZENE d4

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag values outside QC limits with an asterisk.

**BLANK SUMMARY
VOLATILE ORGANIC FRACTION**

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 (other than the three (3) listed below) 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. For the following four (4) compounds, the results are qualified by elevating the limit of detection or adjusting the limit of detection to the sample result, when the sample concentration is less than ten (10) times the blank concentration.

Common laboratory contaminants: methylene chloride
 acetone
 2-butanone

- 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 ten times (10X) 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 ten times (10X) the blank value. Reject the sample result, cross out the "B" flag, and report the CRQL.

greater
No Action - The sample result is greater than the CRQL and than ten times (10X) the blank value.

4A
VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK1

Lab Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39785

Lab File ID: UL10137.D

Lab Sample ID: U990805A

Date Analyzed: 08/05/99

Time Analyzed: 1042

Matrix: (soil/water) WATER

Level: (low/med) LOW

Instrument ID: U

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1	LCS1	UL10145.D	1420
02	LCSD1	LCSD1	UL10146.D	1448
03	008GSP0101	39785.01	UL10152.D	1743
04	008GSP0201	39785.02	UL10153.D	1811
05	008GSP0301	39785.03	UL10154.D	1839
06	008GSP0401	39785.04	UL10155.D	1907
07	008GSP0501	39785.05	UL10156.D	1934
08	008TSP0501	39785.06	UL10157.D	2002
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

No Contamination

2A
WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: SWL-TULSA

Contract: ZONEG R119

Law Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39785

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCA) #	SMC4 (DBF) #	TOT OUT
01	VBLK1	106	94	95	96	0
02	LCS1	108	99	107	98	0
03	LCSD1	108	99	107	98	0
04	008GSP0101	107	98	97	99	0
05	008GSP0201	108	99	96	98	0
06	008GSP0301	106	97	96	98	0
07	008GSP0401	106	97	95	98	0
08	008GSP0501	108	96	94	99	0
09	008TSP0501	105	97	96	99	0
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

QC LIMITS

SMC1 (TOL) = TOLUENE-d8 (88-110)
 SMC2 (BFB) = 4-BROMOFLUOROBENZENE (86-115)
 SMC3 (DCA) = 1,2-DICHLOROETHANE-d4 (80-120)
 SMC4 (DBF) = DIBROMOFLUOROMETHANE (86-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

LCS\LCSD RECOVERY REPORT

(1)

Lab Name: SWOK\AATS

Matrix: WATER

Instrument: u

Analyst: DOUG

Analysis Date: 05-AUG-99 14:20

LCS File id: ul10145.d

LCSD Analysis Date: 05-AUG-99 14:48

LCSD File id: ul10146.d

Units: Water ug/L Soil ug/Kg Air ppbv

COMPOUND	SPIKE ADDED	LCS CONCENTRATION	LCS % REC #	QC LIMITS REC
CHLOROMETHANE	50.00	60.63	121	47-150
VINYL CHLORIDE	50.00	58.92	118	53-138
BROMOMETHANE	50.00	52.86	106	46-143
CHLOROETHANE	50.00	66.11	132	59-142
1 1-DICHLOROETHENE	50.00	60.96	122	58-135
ACETONE	50.00	58.14	116	36-154
CARBON DISULFIDE	50.00	63.27	126	49-133
METHYLENE CHLORIDE	50.00	58.38	117	59-134
trans-1 2-DICHLOROETHENE	50.00	63.24	126	59-134
1 1-DICHLOROETHANE	50.00	68.39	137*	60-133
VINYL ACETATE	50.00	79.94	160*	56-135
cis-1 2-DICHLOROETHENE	50.00	60.66	121	61-134
2-BUTANONE	50.00	61.24	122	44-152
CHLOROFORM	50.00	64.45	129	61-133
1 1 1-TRICHLOROETHANE	50.00	63.96	128	59-130
CARBON TETRACHLORIDE	50.00	51.05	102	61-129
BENZENE	50.00	53.60	107	64-128
1 2-DICHLOROETHANE	50.00	53.43	107	61-136
TRICHLOROETHENE	50.00	51.13	102	64-128
1 2-DICHLOROPROPANE	50.00	54.55	109	66-135
BROMODICHLOROMETHANE	50.00	49.48	99	63-134
2-CHLOROETHYL VINYL ETHER	50.00	44.16	88	40-149
cis-1,3-Dichloropropene	50.00	50.92	102	65-129
4-METHYL-2-PENTANONE	50.00	48.11	96	56-146
TOLUENE	50.00	52.72	105	59-134
trans-1,3-Dichloropropene	50.00	50.24	100	64-130
1 1 2-TRICHLOROETHANE	50.00	46.76	94	68-131
TETRACHLOROETHENE	50.00	53.09	106	62-133
2-HEXANONE	50.00	45.60	91	55-142
DIBROMOCHLOROMETHANE	50.00	43.89	88	41-145
CHLOROBENZENE	50.00	49.68	99	62-132
ETHYL BENZENE	50.00	53.36	107	60-131
m,p-XYLENES	100.00	105.43	105	72-126
o-XYLENE	50.00	52.39	105	62-132
STYRENE	50.00	49.22	98	61-136
BROMOFORM	50.00	38.06	76	61-135
1 1 2 2-TETRACHLOROETHANE	50.00	49.72	99	59-139

na
na

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

LCS Recovery: 2 out of 37 outside limits

LCS\LCS D RECOVERY REPORT

(1)

Lab Name: SWOK\AATS

Matrix: WATER

Instrument: u

Analyst: DOUG

Analysis Date: 05-AUG-99 14:20

LCS File id: ul10145.d

LCS D Analysis Date: 05-AUG-99 14:48

LCS D File id: ul10146.d

Units: Water ug/L Soil ug/Kg Air ppbv

COMPOUND	SPIKE ADDED	LCS D CONC.	LCS D % REC #	% RPD	QC LIMITS REC
CHLOROMETHANE	50.00	54.41	109	10	47-150
VINYL CHLORIDE	50.00	53.43	107	10	53-138
BROMOMETHANE	50.00	47.03	94	12	46-143
CHLOROETHANE	50.00	59.41	119	10	59-142
1 1-DICHLOROETHENE	50.00	54.26	108	12	58-135
ACETONE	50.00	53.90	108	7	36-154
CARBON DISULFIDE	50.00	52.67	105	18	49-133
METHYLENE CHLORIDE	50.00	53.57	107	9	59-134
trans-1 2-DICHLOROETHENE	50.00	57.48	115	9	59-134
1 1-DICHLOROETHANE	50.00	62.72	125	9	60-133
VINYL ACETATE	50.00	77.79	156*	3	56-135
cis-1 2-DICHLOROETHENE	50.00	55.87	112	8	61-134
2-BUTANONE	50.00	50.57	101	19	44-152
CHLOROFORM	50.00	59.93	120	7	61-133
1 1 1-TRICHLOROETHANE	50.00	58.80	118	8	59-130
CARBON TETRACHLORIDE	50.00	46.96	94	8	61-129
BENZENE	50.00	50.23	100	7	64-128
1 2-DICHLOROETHANE	50.00	51.05	102	5	61-136
TRICHLOROETHENE	50.00	48.61	97	5	64-128
1 2-DICHLOROPROPANE	50.00	52.03	104	5	66-135
BROMODICHLOROMETHANE	50.00	46.90	94	5	63-134
2-CHLOROETHYL VINYL ETHER	50.00	42.92	86	2	40-149
cis-1,3-Dichloropropene	50.00	48.52	97	5	65-129
4-METHYL-2-PENTANONE	50.00	46.83	94	2	56-146
TOLUENE	50.00	49.88	100	5	59-134
trans-1,3-Dichloropropene	50.00	47.98	96	4	64-130
1 1 2-TRICHLOROETHANE	50.00	45.68	91	3	68-131
TETRACHLOROETHENE	50.00	48.53	97	9	62-133
2-HEXANONE	50.00	43.72	87	4	55-142
DIBROMOCHLOROMETHANE	50.00	41.18	82	7	41-145
CHLOROBENZENE	50.00	46.74	93	6	62-132
ETHYL BENZENE	50.00	50.12	100	7	60-131
m,p-XYLENES	100.00	100.61	101	4	72-126
o-XYLENE	50.00	49.17	98	7	62-132
STYRENE	50.00	47.25	94	4	61-136
BROMOFORM	50.00	35.56	71	7	61-135
1 1 2 2-TETRACHLOROETHANE	50.00	50.82	102	3	59-139

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

LCS D Recovery: 1 out of 37 outside limits

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

SDG NARRATIVE

August 17, 1999

CLIENT: ENSAFE

SDG No.: 39785

VOLATILE FRACTION

Six water samples were submitted for Volatile Organic Analysis. The samples were analyzed by GC/MS following Method SW846-8260B and a specified compound list.

No major problems occurred during the analyses of these samples.

Blanks: No problems.

Surrogates: No problems.

Laboratory Control Spikes: LCS1 contained two compounds outside QC recovery limits (high). LCSD1 contained one compound outside QC recovery limits (high).

Internal Standards: No problems.

Matrix Spikes. There were no matrix spikes submitted with this SDG. Analytical batch U990805A contained an MS/MSD from SWLO episode 39752.

Harry M. Borg
Harry M. Borg
Organic Program Manager

August 17, 1999

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Volatiles
 Test Code MS326
 Method SW846 8030A,826CB
 Matrix Water-Soil
 Sample Volume 5 mL - 5 g
 Initial Calibration(5ml/5g) 5-20-50-100-200 ppb %RSD<30% for VOC compounds SPCC RRF>0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCC RRF > 0.100 for Chloromethane, 1,1-Dichloroethane and Bromoform
 Continuing Calibration(5ml/5g) 50 ppb %RSD < 20% for VOC compounds SPCC RRF > 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCC RRF > 0.100 for Chloromethane, 1,1-Dichloroethane, and Bromoform
 Internal Standards Chlorobenzene-D5, 1,4-Dichlorobenzene-D4, 1,4-Difluorobenzene, Perfluorobenzene
 Surrogates Toluene-D8, 4-Bromofluorobenzene, Dibromofluoromethane
 Page 1 of 2

COMPOUND	CAS NUMBER	PQL	PQL	MDL	MDL
		WATER, 5ml ug/L	SOIL ug/Kg	WATER, 5ml ug/L	SOIL ug/Kg
DICHLORODIFLUOROMETHANE	75-71-8	5	5	4	3.2
CHLOROMETHANE	74-87-3	5	5	0.6	0.6
VINYL CHLORIDE	75-01-4	5	5	1.0	0.8
BROMOMETHANE	74-83-9	5	5	0.5	1.0
CHLOROETHANE	75-00-3	5	5	0.6	0.9
TRICHLOROFLUOROMETHANE	75-69-4	5	5	1.4	0.8
1,1-DICHLOROETHENE	75-35-4	5	5	1.5	1.0
CARBON DISULFIDE	75-15-0	5	5	1.3	1.0
METHYLENE CHLORIDE	75-09-2	5	5	1.1	1.2
trans-1,2-DICHLOROETHENE	156-60-5	5	5	1.3	1.0
1,1-DICHLOROETHANE	75-34-3	5	5	1.0	0.9
cis-1,2-DICHLOROETHENE	156-59-2	5	5	1.4	1.2
1,2-Dichloroethene (total)	540-59-0	5	5	2.5	2.1
2,2-DICHLOROPROPANE	594-20-7	5	5	0.9	0.7
BROMOCHLOROMETHANE	74-97-5	5	5	0.6	1.3
CHLOROFORM	67-66-3	5	5	0.8	0.7
1,1,1-TRICHLOROETHANE	71-55-6	5	5	0.8	0.7
1,1-DICHLOROPROPENE	563-58-6	5	5	0.6	0.8
CARBON TETRACHLORIDE	56-23-5	5	5	0.8	0.5
BENZENE	71-43-2	5	5	0.6	0.8
1,2-DICHLOROETHANE	107-06-2	5	5	1.0	1.2
TRICHLOROETHENE	79-01-6	5	5	1.6	0.7
1,2-DICHLOROPROPANE	78-87-5	5	5	0.6	1.0
DIBROMOMETHANE	74-95-3	5	5	0.8	0.9
BROMODICHLOROMETHANE	75-27-4	5	5	0.7	0.6
TOLUENE	108-88-3	5	5	1.1	1.1
1,1,2-TRICHLOROETHANE	79-00-5	5	5	0.8	0.8
TETRACHLOROETHENE	127-18-4	5	5	0.9	0.7
1,3-DICHLOROPROPANE	142-28-9	5	5	0.8	0.9
DIBROMOCHLOROMETHANE	124-48-1	5	5	1.0	0.5
1,2-DIBROMOETHANE	106-93-4	5	5	1.1	1.1
CHLOROBENZENE	108-90-7	5	5	0.7	0.7
1,1,1,2-TETRACHLOROETHANE	630-20-6	5	5	0.6	0.8
ETHYL BENZENE	100-41-4	5	5	0.8	1.1
m,p-XYLENES	13-302-07	5	5	1.6	1.2
o-XYLENE	95-47-6	5	5	0.9	0.8
Xylene (total)	1330-20-7	5	5	2.4	1.8
STYRENE	100-42-5	5	5	0.8	1.2
BROMOFORM	75-25-2	5	5	0.7	0.8
ISOPROPYLBENZENE	98-82-8	5	5	0.9	0.9
1,2,3-TRICHLOROPROPANE	96-18-4	5	5	0.8	1.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Volatiles
 Test Code MS326
 Method SW846 8030A / 8160B
 Matrix Water-Soil
 Sample Volume 5 mL - 5 g
 Initial Calibration (5ml/5g) 50-50-100-200 see HRSD < 20% for VOC compounds SPOC RRF > 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPOC RRF > 0.100 for Chloroethane, 1,1-Dichloroethane and Bromoform
 Continuing Calibration (5ml/5g) 50-50-100-200 see HRSD < 20% for VOC compounds SPOC RRF > 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPOC RRF > 0.100 for Chloroethane, 1,1-Dichloroethane and Bromoform
 Internal Standards Chlorobenzene-05 1,4-Dichlorobenzene-04 1,4-Difluorobenzene Pentafluorobenzene Toluene-08 4-Bromofluorobenzene Dibromofluoromethane
 Surrogates
 Page 2 of 2

COMPOUND	CAS NUMBER	PQL	PQL	MDL	MDL
		WATER, 5ml ug/L	SOIL ug/Kg	WATER, 5ml ug/L	SOIL ug/Kg
BROMOBENZENE	108-86-1	5	5	1.1	1.0
1,1,2,2-TETRACHLOROETHANE	79-34-5	5	5	0.8	0.8
n-PROPYLBENZENE	103-65-1	5	5	1.2	1.1
2-CHLOROTOLUENE	95-49-8	5	5	0.7	1.2
4-CHLOROTOLUENE	106-43-4	5	5	0.8	1.3
1,3,5-TRIMETHYLBENZENE	108-67-3	5	5	0.9	0.9
tert-BUTYLBENZENE	98-06-6	5	5	1.0	0.9
1,2,4-TRIMETHYLBENZENE	95-63-6	5	5	0.8	0.7
sec-BUTYLBENZENE	135-98-8	5	5	0.8	0.7
1,3-DICHLOROBENZENE	541-73-1	5	5	0.8	0.9
o-ISOPROPYLTOLUENE	99-87-6	5	5	0.9	0.9
1,4-DICHLOROBENZENE	106-46-7	5	5	0.7	0.8
1,2-DICHLOROBENZENE	95-50-1	5	5	0.6	0.7
n-BUTYLBENZENE	104-51-8	5	5	1.0	1.0
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	5	5	1.6	4.0
1,2,4-TRICHLOROBENZENE	120-82-1	5	5	1.0	1.1
HEXACHLOROBUTADIENE	87-68-3	5	5	1.0	
NAPHTHALENE	91-20-3	5	5	0.9	
1,2,3-TRICHLOROBENZENE	87-61-6	5	5	1.0	0.9

WATER MDL ANALYZED ON INSTR. K - 1/19/98
 SOIL MDL ANALYZED ON INSTR. K - 1/23/98



CHAIN OF CUSTODY RECORD

20-508-7962
PHS, TENNESSEE

CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN;
LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL;
RALEIGH, NC; COLOGNE, GERMANY

PROJECT/JOB NO: _____
COC NO: _____
PO NO: 4
REL NO: 119
LAB NAME: _____

CLIENT Naval Base Charleston PROJECT MANAGER Charlie Verney
LOCATION Zone C, SWMU 8 TELE/FAX NO. (843) 884-0029 / 856-0107
SAMPLERS: (SIGNATURE) Andrew Wert

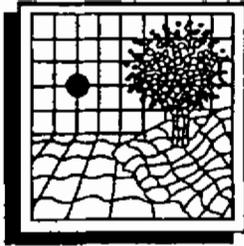
FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	ANALYSIS REQUIRED		REMARKS
					TEMP.	CHEMICAL		VOA	SVOA	
VBCG 008GSP0101	8/3/99	1120	W	2-40 mL vial 2-1 L amber	4°C	40 mL-HCl 1L-none	4	X	X	3°C
VBCG 008GSP0201		1355					4	X	X	
VBCG 008GSP0301		1425					4	X	X	
VBCG 008GSP0401		1445					4	X	X	
VBCG 008GSP0501		1505					4	X	X	
VBCG 008GSP0501		-		2-40 mL vial		HCl	2	X		

Andrew Wert
8/3/99

RELINQUISHER: <u>Andrew Wert</u>	DATE: <u>8/3/99</u>	RECEIVER: <u>[Signature]</u>	DATE: _____	RELINQUISHER: _____	DATE: _____	RECEIVER: _____	DATE: _____
PRINTED: <u>ANDREW WERTZ</u>	TIME: <u>1630</u>	PRINTED: <u>Andrew Wert</u>	TIME: _____	PRINTED: _____	TIME: _____	PRINTED: _____	TIME: _____
COMPANY: <u>EnSafe</u>		COMPANY: <u>SWLD</u>		COMPANY: _____		COMPANY: _____	

METHOD OF SHIPMENT: FEDEX
SHIPMENT NO. 4949148802
SEND RESULTS TO: Charlie Verney

COMMENTS: DQO III Standard TAT



SOUTHWEST LABORATORY OF OKLAHOMA, INC.

August 30, 1999

Charlie Vernoy
ENSAFE ENVIRONMENTAL & SAFETY DESIGNS, INC.
935 Houston Northcutt Blvd.
Suite 113
Mount Pleasant, SC 29464

Project: ZONE G, RELEASE 119
SDG: 39785
SWLO #: 39785.01-39785.06

Dear Mr. Vernoy:

Please find enclosed the Level III and the Diskette deliverables for your samples received in our laboratory on August 04, 1999, for the above captioned project.

If, in your review, you should have any questions or require additional information, do not hesitate to call.

Sincerely,

A handwritten signature in cursive script that reads "Sandy Grovenstein".

Sandy Grovenstein
Project Officer

SG/jt
Enclosures

**SAMPLE RESULT VERIFICATION
VOLATILE ORGANIC FRACTION**

- 1. Were the sample results reported within the calibration range? Yes No Yes
- 2. Were the percent moistures reported? Yes No NR
- 3. Were the data reported on a dry weight basis? Yes No NR
- 4. Did the GC/MS RIC and TIC exhibit interferences, off scale peaks or elevated baseline? Yes No
- 5. Did the data contain elevated detection limits that could not be accounted for? Yes No
- 6. Were any computational or transcription errors found? Yes No

Specific Comments: _____

Reviewer: L Maschnoff

Date: 9, 9, 99

MULTI-MEDIA SEMIVOLATILE ORGANIC FRACTION

CASE NUMBER: _____ SDG NUMBER: 39785

LABORATORY: SWL-Tulsa

CLIENT: EnSafe PROJECT: Charleston Rel 99-75

REVIEWER: MM DATE: 9-9-99

QA/QC LEVEL

- NEESA C
- NEESA D
- DQO LEVEL III
- DQO LEVEL IV
- _____

Statement Of Work (SOW)

- CLP 3/90
- CLP 2/88
- SW846 8270C
- SW846 8270 Appendix IX
- _____

ANALYSIS MODIFICATIONS: _____

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Name: SWL-TULSA

Contract: ZONE G

ab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

Lab File ID: V9081702.D

DFTPP Injection Date: 08/17/99

Instrument ID: HP72V

DFTPP Injection Time: 1134

m/e	ION ABUNCANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	32.9
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	48.4
70	Less than 2.0% of mass 69	0.4 (0.8)1
127	40.0 - 60.0% of mass 198	42.3
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 - 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	18.9
365	Greater than 1.00% of mass 198	2.0
441	Present, but less than mass 443	10.0
442	Greater than 40.0% of mass 198	66.1
443	17.0 - 23.0% of mass 442	12.2 (18.5)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD080	SSTD080	V9081703.D	08/17/99	1152
02	SSTD160	SSTD160	V9081704.D	08/17/99	1219
03	SSTD020	SSTD020	V9081705.D	08/17/99	1245
04	SSTD120	SSTD120	V9081706.D	08/17/99	1312
05	SSTD050	SSTD050	V9081707.D	08/17/99	1339
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6B
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Name: SWL-TULSA Contract: ZONE G
 Lab Code: SWOK Case No.: ENSAF SAS No.: SDG No.: 39785
 Instrument ID: HP72V Calibration Date(s): 08/17/99
 Calibration Times: 1152 1339

LAB FILE ID:	RRF20 = V9081705.D	RRF50 = V9081707.D	RRF80 = V9081703.D	RRF120 = V9081706.D	RRF160 = V9081704.D	RRF	% RSD
Phenol	1.524	1.448	1.396	1.213	0.847	1.286	21.0*
bis(2-Chloroethyl) ether	0.915	0.858	0.940	1.089	0.926	0.946	9.1
2-Chlorophenol	0.998	1.026	1.079	1.213	0.944	1.052	9.7
1,3-Dichlorobenzene	1.106	1.074	1.199	1.259	0.948	1.117	10.7
1,4-Dichlorobenzene	1.466	1.340	1.351	1.281	1.211	1.330	7.1*
Benzyl Alcohol	0.712	0.756	0.768	0.718	0.606	0.712	9.0
1,2-Dichlorobenzene	1.194	1.054	1.046	1.299	1.020	1.123	10.6
2-Methylphenol	1.068	0.929	0.975	0.949	0.888	0.962	7.0
bis(2-Chloroisopropyl) ether	1.305	1.235	1.296	1.254	1.089	1.236	7.0
4-Methylphenol	1.168	1.046	0.955	1.044	0.792	1.001	13.9
N-Nitroso-di-n-propylamine	0.651	0.590	0.699	0.728	0.662	0.666	7.8#
Hexachloroethane	0.474	0.444	0.464	0.546	0.402	0.466	11.3
Nitrobenzene	0.274	0.231	0.242	0.330	0.323	0.280	16.2
Isophorone	0.619	0.548	0.574	0.584	0.559	0.577	4.7
2-Nitrophenol	0.243	0.224	0.236	0.185	0.184	0.214	1.0*
2,4-Dimethylphenol	0.251	0.260	0.277	0.245	0.236	0.254	6.2
Benzoic Acid	0.501	0.469	0.524	0.494	0.529	0.503	4.8
bis(2-Chloroethoxy) methane	0.418	0.372	0.384	0.346	0.347	0.373	8.0
2,4-Dichlorophenol	0.297	0.273	0.274	0.290	0.279	0.283	3.7*
1,2,4-Trichlorobenzene	0.369	0.313	0.309	0.278	0.268	0.307	12.9
Naphthalene	1.087	0.923	0.912	0.916	0.837	0.935	9.8
4-Chloroaniline	0.508	0.429	0.430	0.381	0.364	0.422	13.3
Hexachlorobutadiene	0.180	0.161	0.166	0.152	0.143	0.160	8.8*
4-Chloro-3-methylphenol	0.269	0.247	0.267	0.269	0.251	0.261	4.1*
2-Methylnaphthalene	0.694	0.600	0.590	0.580	0.534	0.600	9.8
Hexachlorocyclopentadiene	0.269	0.294	0.327	0.306	0.315	0.302	7.3#
2,4,6-Trichlorophenol	0.375	0.352	0.354	0.352	0.333	0.353	4.2*
2,4,5-Trichlorophenol	0.367	0.359	0.355	0.353	0.359	0.359	1.5
2-Chloronaphthalene	1.108	1.007	1.006	0.976	0.934	1.006	6.4
2-Nitroaniline	0.316	0.282	0.282	0.286	0.284	0.290	5.0
Dimethylphthalate	1.335	1.212	1.194	1.193	1.167	1.220	5.4
Acenaphthylene	1.856	1.699	1.644	1.593	1.558	1.670	7.0
2,6-Dinitrotoluene	0.326	0.319	0.308	0.316	0.311	0.316	2.2
3-Nitroaniline	0.404	0.386	0.360	0.358	0.340	0.370	6.8
Acenaphthene	1.076	0.995	0.956	0.942	0.929	0.980	6.0
2,4-Dinitrophenol	0.138	0.190	0.210	0.221	0.228	0.197	18.4
4-Nitrophenol	0.140	0.144	0.142	0.144	0.152	0.144	3.0

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 All non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

Instrument ID: HP72V

Calibration Date(s): 08/17/99

Calibration Times: 1152

1339

LAB FILE ID: RRF20 = V9081705.D RRF50 = V9081707.D
RRF80 = V9081703.D RRF120 = V9081706.D RRF160 = V9081704.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Dibenzofuran	1.645	1.481	1.452	1.464	1.420	1.492	5.9
2,4-Dinitrotoluene	0.442	0.421	0.419	0.426	0.422	0.426	2.2
Diethylphthalate	1.398	1.280	1.222	1.227	1.202	1.266	6.3
4-Chlorophenyl-phenylether	0.635	0.571	0.548	0.536	0.520	0.562	8.0
Fluorene	1.250	1.162	1.105	1.103	1.106	1.145	5.6
4-Nitroaniline	0.414	0.391	0.387	0.392	0.410	0.399	3.1
4,6-Dinitro-2-methylphenol	0.138	0.154	0.168	0.172	0.174	0.161	9.4
N-Nitrosodiphenylamine (1)	0.530	0.457	0.475	0.468	0.453	0.477	6.5*
4-Bromophenyl-phenylether	0.231	0.202	0.202	0.202	0.196	0.207	6.7
Hexachlorobenzene	0.279	0.246	0.247	0.238	0.237	0.249	6.9
Pentachlorophenol	0.139	0.151	0.165	0.166	0.169	0.158	8.0*
Phenanthrene	1.100	0.973	0.992	0.970	0.954	0.998	5.9
Anthracene	1.045	0.930	0.938	0.919	0.900	0.946	6.0
Carbazole	1.063	0.947	0.960	0.962	0.943	0.975	5.1
Di-n-butylphthalate	1.508	1.361	1.387	1.348	1.335	1.388	5.0
Fluoranthene	1.180	1.060	1.052	1.030	1.013	1.067	6.2
Pyrene	1.281	1.163	1.161	1.120	1.101	1.165	6.0
Butylbenzylphthalate	0.700	0.651	0.662	0.646	0.666	0.665	3.2
3,3'-Dichlorobenzidine	0.499	0.465	0.465	0.456	0.458	0.469	3.7
Benzo(a)anthracene	1.168	1.084	1.101	1.069	1.058	1.096	4.0
Chrysene	1.163	1.022	1.009	1.022	0.992	1.042	6.6
bis(2-Ethylhexyl)phthalate	0.972	0.896	0.925	0.896	0.917	0.921	3.4
Di-n-octylphthalate	1.654	1.581	1.578	1.633	1.605	1.610	2.0*
Benzo(b)fluoranthene	1.236	1.219	1.118	1.188	1.134	1.179	4.4
Benzo(k)fluoranthene	1.193	1.026	1.118	1.057	1.022	1.083	6.7
Benzo(a)pyrene	1.108	0.998	0.996	1.030	0.975	1.021	5.1*
Indeno(1,2,3-cd)pyrene	1.030	0.993	1.026	1.040	1.002	1.018	1.9
Dibenz(a,h)anthracene	1.000	0.939	0.949	0.965	0.977	0.966	2.5
Benzo(g,h,i)perylene	1.169	1.072	1.082	1.110	1.058	1.098	4.0
Pyridine	1.104	0.990	0.879	1.110	0.684	0.953	18.7
Nitrobenzene-d5	0.285	0.250	0.262	0.316	0.288	0.280	9.1
2-Fluorobiphenyl	1.176	1.074	1.049	1.005	0.978	1.056	7.2
Terphenyl-d14	0.909	0.828	0.825	0.801	0.811	0.835	5.1
Phenol-d5	1.161	1.122	1.123	1.392	1.161	1.192	9.5
2-Fluorophenol	1.155	0.969	1.041	1.003	0.936	1.021	8.3
2,4,6-Tribromophenol	0.142	0.127	0.136	0.130	0.130	0.133	4.5

(1) Cannot be separated from Diphenylamine

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound

† 1 non-SPCC compounds must meet a minimum RRF of 0.01.

Compounds with % RSD values > 15.0 must be analyzed by linear regression

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

Instrument ID: HP72V

Calibration Date(s): 08/17/99

Calibration Times: 1152

1339

LAB FILE ID:	RRF20 = V9081705.D	RRF50 = V9081707.D
RRF80 = V9081703.D	RRF120 = V9081706.D	RRF160 = V9081704.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
=====	=====	=====	=====	=====	=====	=====	=====
2-Chlorophenol-d4	0.964	0.974	1.072	1.177	0.969	1.031	9.0
1,2-Dichlorobenzene-d4	0.874	0.788	0.748	0.714	0.632	0.751	11.9

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 All non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

Lab File ID: V9082003.D

DFTPP Injection Date: 08/20/99

Instrument ID: HP72V

DFTPP Injection Time: 1422

m/e	ION ABUNCANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	30.8
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	47.8
70	Less than 2.0% of mass 69	0.0 (0.0)1
127	40.0 - 60.0% of mass 198	42.6
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 - 9.0% of mass 198	6.9
275	10.0 - 30.0% of mass 198	19.8
365	Greater than 1.00% of mass 198	2.2
441	Present, but less than mass 443	10.8
442	Greater than 40.0% of mass 198	69.1
443	17.0 - 23.0% of mass 442	13.8 (19.9)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD080	SSTD080	V9082004.D	08/20/99	1435
02	SBLK1	BL0805WC	V9082014.D	08/20/99	1902
03	LCS1	LC0805WC	V9082015.D	08/20/99	1929
04	LCSD1	LD0805WC	V9082016.D	08/20/99	1955
05	008GSP0101	39785.01	V9082020.D	08/20/99	2141
06	008GSP0201	39785.02	V9082021.D	08/20/99	2208
07	008GSP0301	39785.03	V9082022.D	08/20/99	2234
08	008GSP0401	39785.04	V9082023.D	08/20/99	2300
09	008GSP0501	39785.05	V9082024.D	08/20/99	2326
10	008GSP0501MS	39785.05MS	V9082025.D	08/20/99	2352
11	008GSP0501MSD	39785.05MSD	V9082026.D	08/21/99	0019
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

ge 1 of 1

7B
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

Instrument ID: HP72V

Calibration Date: 08/20/99

Time: 1435

Lab File ID: V9082004.D

Init. Calib. Date(s): 08/17/99

08/17/99

Init. Calib. Times:

1152

1339

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
Phenol	1.286	1.212		-5.6	20.0
bis(2-Chloroethyl) ether	0.946	1.047		10.7	
2-Chlorophenol	1.052	1.072		1.9	
1,3-Dichlorobenzene	1.117	1.411		26.3	
1,4-Dichlorobenzene	1.330	1.271		-4.4	20.0
Benzyl Alcohol	0.712	0.748		5.0	
1,2-Dichlorobenzene	1.123	1.281		14.1	
2-Methylphenol	0.962	0.979		1.8	
bis(2-Chloroisopropyl) ether	1.236	1.420		14.9	
4-Methylphenol	1.001	0.978		-2.1	
N-Nitroso-di-n-propylamine	0.666	0.957	0.050	43.7	
Hexachloroethane	0.466	0.568		21.9	
Nitrobenzene	0.280	0.260		-7.1	
Isophorone	0.577	0.597		3.5	
2-Nitrophenol	0.214	0.202		-5.6	20.0
2,4-Dimethylphenol	0.254	0.269		5.9	
Benzoic Acid	0.503	0.599		19.1	
bis(2-Chloroethoxy)methane	0.373	0.358		-4.0	
2,4-Dichlorophenol	0.283	0.294		3.9	20.0
1,2,4-Trichlorobenzene	0.307	0.301		-1.8	
Naphthalene	0.935	0.930		-0.5	
4-Chloroaniline	0.422	0.396		-6.0	
Hexachlorobutadiene	0.160	0.171		6.9	20.0
4-Chloro-3-methylphenol	0.261	0.279		6.9	20.0
2-Methylnaphthalene	0.600	0.612		2.0	
Hexachlorocyclopentadiene	0.302	0.326	0.050	7.9	
2,4,6-Trichlorophenol	0.353	0.372		5.4	20.0
2,4,5-Trichlorophenol	0.359	0.378		5.3	
2-Chloronaphthalene	1.006	1.018		1.2	
2-Nitroaniline	0.290	0.323		11.4	
Dimethylphthalate	1.220	1.228		0.6	
Acenaphthylene	1.670	1.625		-2.5	
2,6-Dinitrotoluene	0.316	0.331		4.7	
3-Nitroaniline	0.370	0.346		-6.3	
Acenaphthene	0.980	0.962		-1.8	20.0
2,4-Dinitrophenol	0.197	0.219	0.050	11.2	
4-Nitrophenol	0.144	0.170	0.050	18.0	
Dibenzofuran	1.492	1.481		-0.7	
2,4-Dinitrotoluene	0.426	0.440		3.3	
Diethylphthalate	1.266	1.293		2.1	

not
not

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Name: SWL-TULSA Contract: ZONE G
 Lab Code: SWOK Case No.: ENSAF SAS No.: SDG No.: 39785
 Lab File ID (Standard): V9082004 Date Analyzed: 08/20/99
 Instrument ID: HP72V Time Analyzed: 1435

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	139457	2.87	532529	3.80	332741	5.76
UPPER LIMIT	278914	3.37	1065058	4.30	665482	6.26
LOWER LIMIT	69729	2.37	266265	3.30	166371	5.26
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 SBLK1	80411	2.87	330218	3.80	222205	5.76
02 LCS1	83771	2.87	320121	3.79	220895	5.76
03 LCSD1	88263	2.87	349553	3.80	236713	5.76
04 O08GSP0101	81766	2.87	366923	3.80	247426	5.77
05 O08GSP0201	106521	2.87	383552	3.79	254477	5.76
06 O08GSP0301	110178	2.88	384457	3.79	244997	5.76
07 O08GSP0401	125266	2.87	451977	3.79	307236	5.76
08 O08GSP0501	120884	2.87	500287	3.80	319815	5.76
09 O08GSP0501MS	116524	2.87	475977	3.79	317144	5.76
10 O08GSP0501MSD	150927	2.88	564917	3.79	342265	5.76
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits.

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Name: SWL-TULSA

Contract: ZONE G

Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

Lab File ID (Standard): V9082004

Date Analyzed: 08/20/99

Instrument ID: HP72V

Time Analyzed: 1435

	IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	589677	8.16	545813	13.25	502346	15.85
UPPER LIMIT	1179354	8.66	1091626	13.75	1004692	16.35
LOWER LIMIT	294839	7.66	272907	12.75	251173	15.35
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 SBLK1	391557	8.14	367836	13.24	351317	15.84
02 LCS1	377550	8.15	359229	13.23	359207	15.84
03 LCSD1	404451	8.14	379732	13.22	368608	15.84
04 OO8GSP0101	388542	8.17	347983	13.26	343020	15.87
05 OO8GSP0201	405364	8.16	352807	13.25	343368	15.86
06 OO8GSP0301	422792	8.16	371402	13.24	357644	15.85
07 OO8GSP0401	531619	8.16	475311	13.24	460806	15.85
08 OO8GSP0501	553880	8.16	482407	13.25	461472	15.86
09 OO8GSP0501MS	543157	8.16	480364	13.24	460743	15.85
10 OO8GSP0501MSD	578590	8.16	499331	13.24	486610	15.85
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits.

**BLANK SUMMARY
SEMIVOLATILE ORGANIC FRACTION**

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 (other than listed below) 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. For the following four (4) compounds, the results are qualified by elevating the limit of detection or adjusting the limit of detection to the sample result, when the sample concentration is less than ten (10) times the blank concentration.

Common laboratory contaminants: phthalates

- 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 ten times (10X) 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 ten times (10X) 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 ten times (10X) the blank value.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK SAMPLE NO.

SBLK1

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

Lab File ID: V9082014

Lab Sample ID: BL0805WC

Instrument ID: HP72V

Date Extracted: 08/05/99

Matrix: (soil/water) WATER

Date Analyzed: 08/20/99

Level: (low/med) LOW

Time Analyzed: 1902

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

bis
CRQL
↓

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1	LC0805WC	V9082015	08/20/99
02	LCSD1	LD0805WC	V9082016	08/20/99
03	008GSP0101	39785.01	V9082020	08/20/99
04	008GSP0201	39785.02	V9082021	08/20/99
05	008GSP0301	39785.03	V9082022	08/20/99
06	008GSP0401	39785.04	V9082023	08/20/99
07	008GSP0501	39785.05	V9082024	08/20/99
08	008GSP0501MS	39785.05MS	V9082025	08/20/99
09	008GSP0501MSD	39785.05MSD	V9082026	08/21/99
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Comments: *bis(2-ethylhexyl) phthalate* 15 ug/l

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

	CLIENT SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01	SBLK1	78	53	92	66	53	54	62	43	0
02	LCS1	94	62	94	64	66	62	67	53	0
03	LCSD1	97	68	96	72	71	70	75	60	0
04	OO8GSP0101	86	66	52	91	74	78	101	62	0
05	OO8GSP0201	88	60	52	55	52	69	64	54	0
06	OO8GSP0301	78	61	58	49	45	62	49	50	0
07	OO8GSP0401	95	65	64	54	51	59	65	56	0
08	OO8GSP0501	83	68	64	75	61	69	83	58	0
09	OO8GSP0501MS	86	68	57	60	61	64	74	61	0
10	OO8GSP0501MSD	82	67	78	64	45	70	56	61	0
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 (35-114)
 S2 (FBP) = 2-Fluorobiphenyl (43-116)
 S3 (TPH) = Terphenyl-d14 (33-141)
 S4 (PHL) = Phenol-d5 (10-110)
 S5 (2FP) = 2-Fluorophenol (21-110)
 S6 (TBP) = 2,4,6-Tribromophenol (10-123)
 S7 (2CP) = 2-Chlorophenol-d4 (33-110)
 S8 (DCB) = 1,2-Dichlorobenzene-d4 (16-110)

Column to be used to flag recovery values
 * Values outside of contract required QC limits
 D Surrogate diluted out

WATER SEMIVOLATILE SEMIVOLATILE LABORATORY CONTROL SPIKE/DUPLICATE RECOVERY

Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

LCS Sample NO.: LCS1

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC LIMITS REC.
Phenol	75	59	79	12-110
2-Chlorophenol	75	54	72	27-123
1,4-Dichlorobenzene	50	22	44	36- 97
N-Nitroso-di-n-prop. (1)	50	42	84	41-116
1,2,4-Trichlorobenzene	50	24	48	39- 98
4-Chloro-3-methylphenol	75	54	72	23- 97
Acenaphthene	50	30	60	46-118
4-Nitrophenol	75	56	75	10- 80
2,4-Dinitrotoluene	50	33	66	24- 96
Pentachlorophenol	75	42	56	9-103
Pyrene	50	39	78	26-127

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
Phenol	75	62	83	5	42	12-110
2-Chlorophenol	75	58	77	7	40	27-123
1,4-Dichlorobenzene	50	24	48	9	28	36- 97
N-Nitroso-di-n-prop. (1)	50	44	88	5	38	41-116
1,2,4-Trichlorobenzene	50	29	58	19	28	39- 98
4-Chloro-3-methylphenol	75	60	80	10	42	23- 97
Acenaphthene	50	33	66	10	31	46-118
4-Nitrophenol	75	58	77	4	50	10- 80
2,4-Dinitrotoluene	50	34	68	3	38	24- 96
Pentachlorophenol	75	50	67	17	50	9-103
Pyrene	50	40	80	2	31	26-127

Column to be used to flag recovery values

* Values outside of QC limits

RPD: 0 out of 11 outside limits
Spike Recovery: 0 out of 22 outside limits

Comments:

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39785

Matrix Spike - Client Sample NO.: 008GSP0501

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Phenol	150	0	84	56	12-110
2-Chlorophenol	150	0	110	73	27-123
1,4-Dichlorobenzene	100	0	46	46	36- 97
N-Nitroso-di-n-prop. (1)	100	0	84	84	41-115
1,2,4-Trichlorobenzene	100	0	52	52	39- 98
4-Chloro-3-methylphenol	150	0	110	73	23- 97
Acenaphthene	100	1	65	64	46-118
4-Nitrophenol	150	0	110	73	10- 80
2,4-Dinitrotoluene	100	0	74	74	24- 96
Pentachlorophenol	150	0	110	73	9-103
Pyrene	100	0	85	85	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	REC
Phenol	150	100	67	17	42	12-110
2-Chlorophenol	150	89	59	21	40	27-123
1,4-Dichlorobenzene	100	55	55	18	28	36- 97
N-Nitroso-di-n-prop. (1)	100	82	82	2	38	41-116
1,2,4-Trichlorobenzene	100	50	50	4	28	39- 98
4-Chloro-3-methylphenol	150	110	73	0	42	23- 97
Acenaphthene	100	65	64	0	31	46-118
4-Nitrophenol	150	130	87 *	0	50	10- 80
2,4-Dinitrotoluene	100	72	72	3	38	24- 96
Pentachlorophenol	150	120	80	9	50	9-103
Pyrene	100	84	84	1	31	26-127

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 11 outside limits

Spike Recovery: 1 out of 22 outside limits

Comments: _____

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

SDG NARRATIVE

August 27, 1999

CONTRACT: ENSAFE
PROJECT: ZONE G, RELEASE 119
SDG NO: 39785

SEMIVOLATILE FRACTION

Five water samples were submitted for Semivolatile Organic analyses. The samples were analyzed by GC/MS following SW846-8270C.

SWLO uses a 2uL injection for method SW846-8270C as allowed by the method and has added two extra "advisory surrogates (one acid and one base/neutral)" to the surrogate spiking mix. These surrogates are 1,2-dichlorobenzene-d4 and 2-chlorophenol-d4 and have advisory control limits. The surrogates, laboratory control spikes and matrix spikes are spiked at 75 ug/L (waters) and 2500ug/Kg (soils) for the acid surrogates and 50 ug/L (waters) and 1700 (actual 1667) ug/Kg (soils) for base/neutral surrogates. The instrument calibration range is from 10 ug/L to 80 ug/L for waters and 330 ug/Kg to 2700 ug/Kg for soils, which relates to 20 ng on column (low cal. std.) up to 160 ng on column (high cal. std.).

No major problems occurred during the analyses of these samples.

Blanks: SBLK1 had low level phthalate contamination below reporting limit.

Surrogates: All surrogates were within QC limits.

Matrix Spikes: 008GSP0501MSD had slightly high spike recovery for 4-nitrophenol at 87%.

Laboratory Control Spikes: All laboratory control spikes were within QC limits.

Internal Standards: All internal standards were within QC limits.

Harry M. Borg
Harry M. Borg
Organic Program Manager

August 27, 1999

ref col
12-Mar-98
MLM
ver
5.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Test Code: Semivolatile
 Method: MS500
 Matrix: Water-soil
 Extract Volume: 100 mL
 Initial Calibration: 10 20 50 80 100 ug RSD for OGC Compounds = 30% SPCC = RF > 0.05
 Continuing Calibration: 10 ug RSD for OGC Compounds = 30% SPCC = RF > 0.05
 PAGE 1 OF 2

COMPOUND	CAS NUMBE	PQL's		MDL's	
		WATER	SOIL	WATER	SOIL
		ug/L	ug/Kg	ug/L	ug/Kg
1,2,4-Trichlorobenzene	120-82-1	10	330	3.7	65
1,2-Dichlorobenzene	95-50-1	10	330	3.7	74
1,3-Dichlorobenzene	541-73-1	10	330	4.1	31
1,4-Dichlorobenzene	106-46-7	10	330	4.2	58
2,3,4,6-Tetrachlorobenol	58-90-2	10	330	8.2	71
2,4,5-Trichlorobenol	95-95-4	50	1600	6.1	120
2,4,6-Trichlorobenol	88-06-2	10	330	4.6	85
2,4-Dichlorobenol	120-83-2	10	330	4.7	70
2,4-Dimethylenol	105-67-9	10	330	4.0	210
2,4-Dinitrobenol	51-28-5	50	600	7.1	64
2,4-Dinitrotoluene	121-14-2	10	330	2.9	74
2,6-Dinitrotoluene	606-20-2	10	330	3.1	85
2-Chloronaphthalene	91-58-7	10	330	3.3	63
2-Chlorobenol	95-57-8	10	330	5.0	32
2-Methylnaphthalene	91-57-6	10	330	3.2	43
2-Methylenol	95-48-7	10	330	5.1	170
2-Nitroaniline	58-74-4	10	600	3.4	57
2-Nitrobenol	88-75-5	10	330	7.7	93
3,3'-Dichlorobenzidine	91-94-1	20	660	3.3	6.4
3-Nitroaniline	99-09-2	50	1600	5.7	3.6
4,6-Dinitro-2-methylenol	534-52-1	50	600	7.3	93
4-Bromobenzyloxyphenylether	101-55-3	10	330	3.1	72
4-Chloro-3-methyphenol	59-50-7	10	330	4.1	75
4-Chloroaniline	106-47-8	10	330	4.6	87
4-Chlorobenzyloxyphenylether	7005-72-3	10	330	4.1	49
4-Methylenol	106-44-5	10	330	6.0	220
4-Nitroaniline	100-01-6	50	1600	2.5	62
4-Nitrobenol	100-02-7	50	1600	7.1	93
Acenaphthene	83-32-9	10	330	3.4	65
Acenaphthylene	108-96-8	10	330	3.5	69
Anthracene	120-12-7	10	330	2.7	47
Benzofluranthracene	56-55-3	10	330	2	56
Benzofluorene	50-32-8	10	330	2.6	38
Benzofluoranthene	205-99-2	10	330	2.8	160
Benzofluoranthene	191-24-2	10	330	2.8	81
Benzofluoranthene	207-08-9	10	330	4.2	96
Benzic acid	65-85-0	50	1600	7.9	440
Benzyl alcohol	100-51-6	10	330	5.2	98
Butylbenzylthiolate	85-88-7	10	330	0.3	87

WATER MDLS PERFORMED ON INST V <01/09/98>

SOIL MDL'S PERFORMED ON INST P <01/08/98>

NR = NonRoutine Compounds. Analyzed only upon request.

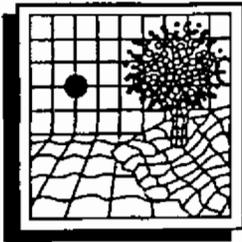
ref col
12-Mar-98
MLM
ver
5.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Test Code: Semivolatile
Method: 8210C
Matrix: Air-Soil
Extract Volume: 10 mL
Initial Calibration: 100, 50, 80, 100 ng, 1% RSD for CCC compounds = 90% SPOC-RF > 0.05
Continuing Calibration: 10 ng, 1% RSD = 100% for CCC Compounds SPOC-RF > 0.05
PAGE 2 OF 2

COMPOUND	CAS NUMBE	PQL's		MDL's	
		WATER	SOIL	WATER	SOIL
		ug/L	ug/Kg	ug/L	ug/Kg
Carbazole	86-74-8	10	330	2.3	89
Chrysene	218-1-9	10	330	2.5	51
Di-n-octylphthalate	117-84-0	10	330	1.8	46
Dibenz(a,h)anthracene	53-70-3	10	330	3.0	150
Dibenzofuran	132-64-9	10	330	3.3	50
Diethylthiophthalate	84-66-2	10	330	0.4	64
Fluoranthene	206-44-0	10	330	2.2	71
Fluorene	86-73-7	10	330	3.2	40
Hexachlorobenzene	118-74-1	10	330	2.8	59
Hexachlorobutadiene	37-68-3	10	333	3.3	56
Hexachlorocyclopentadiene	77-47-4	10	330	0.6	73
Hexachloroethane	57-72-1	10	330	3.6	120
Indenol 1,2,3-cisloprene	93-39-5	10	330	3.3	280
Isophorone	78-59-1	10	330	4.1	59
N-Nitroso-di-n-propylamine	521-64-7	10	330	4.1	110
N-Nitrosoammoniumamine	86-30-6	10	330	2.0	56
Naphthalene	31-20-3	10	330	3.7	30
Nitrobenzene	98-95-3	10	330	3.8	74
Pentachlorophenol	87-86-5	50	1600	3.4	130
Phenanthrene	85-01-8	10	330	2.9	42
Phenol	108-95-2	10	330	4.2	66
Pyrene	129-00-2	10	330	2.4	47
bis(2-Chloroethoxy)methane	111-91-1	10	330	4.0	69
bis(2-Chloroethyl)ether	111-44-4	10	330	3.5	61
bis(2-Chloroisopropyl)ether	108-60-1	10	330	4.5	73
bis(2-Ethylhexyl)phthalate	117-81-7	10	330	1.9	80

* CCC compounds **SPCC compounds
WATER MDLS PERFORMED ON INST. H <01/09/98>
SOIL MDLS PERFORMED ON INST. H <01/08/98>



SOUTHWEST LABORATORY OF OKLAHOMA, INC.

August 30, 1999

Charlie Vernoy
ENSAFE ENVIRONMENTAL & SAFETY DESIGNS, INC.
935 Houston Northcutt Blvd.
Suite 113
Mount Pleasant, SC 29464

Project: ZONE G, RELEASE 119
SDG: 39785
SWLO #: 39785.01-39785.06

Dear Mr. Vernoy:

Please find enclosed the Level III and the Diskette deliverables for your samples received in our laboratory on August 04, 1999, for the above captioned project.

If, in your review, you should have any questions or require additional information, do not hesitate to call.

Sincerely,

Sandy Grovenstein
Project Officer

SG/jt
Enclosures

CHAIN OF CUSTODY RECORD

1-7967
 TENNESSEE
 CHARLESTON, SC; CINCINNATI, OH; JALAS, TX; JACKSON, TN; KNOXVILLE, TN;
 WILKESVILLE, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL;
 RALEIGH, NC; COLOGNE, GERMANY

PROJECT/JOB NO: _____
 COC NO: _____
 PO NO: 4
 REL NO: 119
 LAB NAME: _____

CLIENT: Naval Base Charleston PROJECT MANAGER: Charlie Verney
 LOCATION: Zone G, SIMMU 8 TELE/FAX NO.: (843) 884-0029 / 856-0107
 SAMPLERS: (SIGNATURE) Andrew Wert

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	ANALYSIS REQUIRED		REMARKS
					TEMP.	CHEMICAL		VOA	SVOA	
BCG 008GSP0101	8/3/99	1120	W	2-40mL vial 2-1L amber	4°C	40mL-HCl 1L-none	4	X	X	3°C
BCG 008GSP0201		1355					4	X	X	
BCG 008GSP0301		1425					4	X	X	
BCG 008GSP0401		1445					4	X	X	
BCG 008GSP0501		1505					4	X	X	
BCG 008GSP0501				2-40 mL vial		HCl	2	X		

Andrew Wert
8/3/99

RELINQUISHER: <u>Andrew Wert</u>	DATE: <u>8/3/99</u>	RECEIVER: <u>[Signature]</u>	DATE: _____	RELINQUISHER: _____	DATE: _____	RECEIVER: _____	DATE: _____
PRINTED: <u>ANDREW WERT</u>	TIME: <u>1630</u>	PRINTED: <u>[Signature]</u>	TIME: _____	PRINTED: _____	TIME: _____	PRINTED: _____	TIME: _____
COMPANY: <u>EnSafe</u>		COMPANY: <u>SWLO</u>		COMPANY: _____		COMPANY: _____	

METHOD OF SHIPMENT: FEDEX
 SHIPMENT NO.: 4749148802
 SEND RESULTS TO: Charlie Verney

COMMENTS: DQO III Standard TAT



CHAIN OF CUSTODY RECORD

PROJECT/JOB NO: _____
 COC NO: _____
 PO NO: 4
 REL NO: 119
 LAB NAME: _____

20-500-7962
 PMS, TENNESSEE
 CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN;
 ANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL;
 RALEIGH, NC; COLOGNE, GERMANY

CLIENT Naval Base Charleston PROJECT MANAGER Charlie Verney
 LOCATION Zone G, SWMU 9 TELE/FAX NO. (843) 884-0029 / 856-0107
 SAMPLERS: (SIGNATURE) Andrew Wertz

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	VQA	SVQA	REMARKS
					TEMP.	CHEMICAL				
NBCG 008GSP0101	8/3/99	1120	W	2-40 mL vial 2-1 L amber	4°C	40 mL - HCl 1L - none	4	X	X	3°C
NBCG 009GSP0201		1355					4	X	X	
NBCG 008GSP0301		1425					4	X	X	
NBCG 008GSP0401		1445					4	X	X	
NBCG 008GSP0501		1505					4	X	X	
NBCG 008GSP0501 (A.W.)		-		2-40 mL vial		HCl	2	X		

Andrew Wertz
 8/3/99

RELINQUISHER: <u>Andrew Wertz</u>	DATE: <u>8/3/99</u>	RECEIVER: <u>[Signature]</u>	DATE: _____
PRINTED: <u>ANDREW WERTZ</u>	TIME: <u>1630</u>	PRINTED: <u>[Signature]</u>	TIME: _____
COMPANY: <u>EnSafe</u>		COMPANY: <u>SWCO</u>	

METHOD OF SHIPMENT: FEDEX
 SHIPMENT NO. 4349148802
 SEND RESULTS TO: Charlie Verney
 COMMENTS: DQO III Standard TAT

**SAMPLE RESULT VERIFICATION
SEMIVOLATILE ORGANIC FRACTION**

- 1. Were the sample results reported within the calibration range? Yes No
- 2. Were the percent moistures reported? Yes No NR
- 3. Were the data reported on a dry weight basis? Yes No NR
- 4. Did the GC/MS RIC and TIC exhibit interferences, off scale peaks or elevated baseline? Yes No
- 5. Did the data contain elevated detection limits that could not be accounted for? Yes No
- 6. Were any computational or transcription errors found? Yes No

Specific Comments: _____

Reviewer: *L. Maschhoff*

Date: 9, 9, 99



HEARTLAND

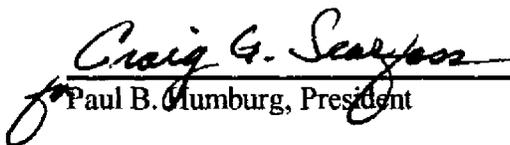
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 39825
Date: September 20, 1999
Client Name: Ensafe
Project/Site Name: Charleston - Zone G
Date Sampled: August 4, 1999
Number of Samples: 10 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: DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, Semivolatiles and Hydrazine

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. Numburg, President

9-21-99

Date

SDG# 39825

Samples and Fractions Reviewed

Sample Identifications

Analytical Fraction

ENSAFE ID	MATRIX	VOA		SVOA		HYD	
008GSP0101	WATER					X	
008GSP0201	WATER					X	
008GSP0301	WATER					X	
008GSP0401	WATER					X	
008GSP0501	WATER					X	
008GSP0601	WATER	X		X		X	
008GSP0701	WATER	X		X		X	
008GSP0801	WATER	X		X		X	
008GSP0901	WATER	X		X		X	
008TSP0901	WATER	X					
Total Billable Samples (Water/Soil)		5	0	4	0	9	0

VOA= Volatiles
SVOA= Semivolatiles
HYD= Hydrazine

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT AND NARRATIVE

VOLATILE 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 SW846 Method 8260B; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 39825

A validation was performed on the Volatile Data from SDG 39825. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- Calibrations
- * Internal Standard Performance
- * Blanks
- * Surrogate Recoveries
- * Laboratory Control Samples
- Matrix Spike / Matrix Spike Duplicate
- * Field Duplicates
- * Compound Identification /Quantitation

* - All criteria were met for this parameter

DATA ASSESSMENT AND NARRATIVE

VOLATILE ANALYSIS

PAGE - 2

Continuing Calibration

The continuing calibrations, I52555, contained compounds with RRFs less than 0.050. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (UR).

All Samples acetone (0.048)

Matrix Spike / Matrix Spike Duplicate

The matrix spike for sample 008GSP0601 exhibited low recovery for compound 2-chloroethyl vinyl ether (12%) and the matrix spike duplicate exhibited no recovery for 2-chloroethyl vinyl ether. Qualify the sample non detect result as rejected (UR).

System Performance and Overall Assessment

The data as presented requires qualifications.

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 10X 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 10X 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 10X 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>
All Samples	acetone	+/-	J/UR
008GSP0601	2-chloroethyl vinyl ether	-	UR

- * 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 AND 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 SW846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 39825

A validation was performed on the Semivolatile Data from SDG 39825. The data was evaluated based on the following parameters.

- * Data Completeness
Holding Times
- * GC/MS Tuning
Calibrations
- * Internal Standard Performance
Blanks
- * Surrogate Recoveries
- * Laboratory Control Samples
- * Matrix Spike / Matrix Spike Duplicate
- * Field Duplicates
Compound Identification / Quantitation

* - All criteria were met for this parameter

Holding Times

Sample 008GSP0601RE exceeded the seven day extraction holding time by 12 days. Qualify all positive results as estimated (J) and non detects as estimated (UJ).

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ANALYSIS

PAGE - 2

Continuing Calibration

The continuing calibration, A9082503, contained compounds with %Ds greater than 50% and less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as estimated (UJ).

008GSP0601RE bis(2-ethylhexyl)phthalate (57.9%)

Blank

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.

Method Blank

<u>Associated blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
SBLK1	bis(2-ethylhexyl)phthalate	5J ug/L	50 ug/L
SBLK2	bis(2-ethylhexyl)phthalate	1J ug/L	10 ug/L

<u>Samples</u>	<u>Compound</u>	<u>Qualification</u>
008GSP0701	bis(2-ethylhexyl)phthalate	CRQL
008GSP0801		
008GSP0901		
008GSP0601RE		

Compound Identification / Quantitation

Do not use sample 008GSP0601, in favor of the re-extraction, due to non compliant surrogates below 10% recovery.

System Performance and Overall Assessment

The data as presented requires qualifications.

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 10X 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 10X 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 10X 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>
008GSP0601RE	all compounds	+/-	J/UJ
008GSP0601RE	bis(2-ethylhexyl)phthalate	+/-	J/UJ
008GSP0701 008GSP0801 008GSP0901 008GSP0601RE	bis(2-ethylhexyl)phthalate	+	CRQL
008GSP0601	all 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 HYDRAZINE

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 # 39825

A validation was performed on the hydrazine Data from SDG 39825. The data was evaluated based on the following parameters.

- * ● Data Completeness
- * ● Holding Times
- * ● Calibrations
- * ● Blanks
- * ● Field Duplicates
- * ● Laboratory Control Samples

* - All criteria were met for this parameter.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
data stands as reported without qualification.			

ANNOTATED FORM Is

AW
9/22/99

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39825

HYDRAZINE		SAMPLE ID ----->	008-G-SP01-01	008-G-SP02-01	008-G-SP03-01	008-G-SP04-01	008-G-SP05-01	008-G-SP06-01
		ORIGINAL ID ----->	008GSP0101	008GSP0201	008GSP0301	008GSP0401	008GSP0501	008GSP0601
		LAB SAMPLE ID ---->	39825.02	39825.03	39825.04	39825.05	39825.06	39825.01
		ID FROM REPORT -->	008GSP0101	008GSP0201	008GSP0301	008GSP0401	008GSP0501	008GSP0601
		SAMPLE DATE ----->	08/04/99	08/04/99	08/04/99	08/04/99	08/04/99	08/04/99
		DATE ANALYZED ---->	08/26/99	08/26/99	08/26/99	08/26/99	08/26/99	08/26/99
		MATRIX ----->	Water	Water	Water	Water	Water	Water
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter		39825	39825	39825	39825	39825	39825
			NV	NV	NV	NV	NV	NV
302-01-2 <small>4-41</small>	Hydrazine		76.6	5. U	14.6	5. U	5.6	5. U
					<i>VB</i>	<i>9/20/99</i>		

018

CPW
9/22/99

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39825

366-SVOA		SAMPLE ID ----->	008-G-SP06-01	008-G-SP06-01 RE	008-G-SP07-01	008-G-SP08-01	008-G-SP09-01	SBL-D-9825-02
		ORIGINAL ID ----->	008GSP0601	008GSP0601	008GSP0701	008GSP0801	008GSP0901	SBLK1
		LAB SAMPLE ID ---->	39825.01	39825.01	39825.07	39825.08	39825.09	SBLK1
		ID FROM REPORT -->	008GSP0601	008GSP0601	008GSP0701	008GSP0801	008GSP0901	SBLK1
		SAMPLE DATE ----->	08/04/99	08/04/99	08/04/99	08/04/99	08/04/99	08/04/99
		DATE EXTRACTED -->	08/06/99	08/23/99	08/06/99	08/06/99	08/06/99	08/06/99
		DATE ANALYZED ---->	08/24/99	08/25/99	08/24/99	08/24/99	08/24/99	08/19/99
		MATRIX ----->	Water	Water	Water	Water	Water	Water
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L

CAS #	Parameter	39825	NV								
108-95-2	Phenol	10.	UR	12.	U	10.	U	10.	U	10.	U
111-44-4	bis(2-Chloroethyl)ether	10.	U	12.	U	10.	U	10.	U	10.	U
95-57-8	2-Chlorophenol	10.	U	12.	U	10.	U	10.	U	10.	U
541-73-1	1,3-Dichlorobenzene	10.	U	12.	U	10.	U	10.	U	10.	U
106-46-7	1,4-Dichlorobenzene	10.	U	12.	U	10.	U	1.	J	10.	U
100-51-6	Benzyl alcohol	10.	U	12.	U	10.	U	10.	U	10.	U
95-50-1	1,2-Dichlorobenzene	10.	U	12.	U	10.	U	10.	U	10.	U
95-48-7	2-Methylphenol (o-Cresol)	10.	U	12.	U	10.	U	10.	U	10.	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10.	U	12.	U	10.	U	10.	U	10.	U
106-44-5	4-Methylphenol (p-Cresol)	10.	U	12.	U	10.	U	10.	U	10.	U
621-64-7	N-Nitroso-di-n-propylamine	10.	U	12.	U	10.	U	10.	U	10.	U
67-72-1	Hexachloroethane	10.	U	12.	U	10.	U	10.	U	10.	U
98-95-3	Nitrobenzene	10.	U	12.	U	10.	U	10.	U	10.	U
78-59-1	Isophorone	10.	U	12.	U	10.	U	10.	U	10.	U
88-75-5	2-Nitrophenol	10.	U	12.	U	10.	U	10.	U	10.	U
105-67-9	2,4-Dimethylphenol	10.	U	12.	U	10.	U	10.	U	10.	U
65-85-0	Benzoic acid	10.	U	12.	U	10.	U	10.	U	10.	U
111-91-1	bis(2-Chloroethoxy)methane	10.	U	12.	U	10.	U	10.	U	10.	U
120-83-2	2,4-Dichlorophenol	10.	U	12.	U	10.	U	10.	U	10.	U
120-82-1	1,2,4-Trichlorobenzene	10.	U	12.	U	10.	U	10.	U	10.	U
91-20-3	Naphthalene	10.	U	12.	U	10.	U	1.	J	10.	U
106-47-8	4-Chloroaniline	10.	U	12.	U	10.	U	10.	U	10.	U
87-68-3	Hexachlorobutadiene	10.	U	12.	U	10.	U	10.	U	10.	U
59-50-7	4-Chloro-3-methylphenol	10.	U	12.	U	10.	U	10.	U	10.	U
91-57-6	2-Methylnaphthalene	10.	U	12.	U	10.	U	10.	U	10.	U
77-47-4	Hexachlorocyclopentadiene	10.	U	12.	U	10.	U	10.	U	10.	U
88-06-2	2,4,6-Trichlorophenol	10.	U	12.	U	10.	U	10.	U	10.	U
95-95-4	2,4,5-Trichlorophenol	25.	U	29.	U	25.	U	25.	U	25.	U
91-58-7	2-Chloronaphthalene	10.	U	12.	U	10.	U	10.	U	10.	U
88-74-4	2-Nitroaniline	25.	U	29.	U	25.	U	25.	U	25.	U
131-11-3	Dimethyl phthalate	10.	U	12.	U	10.	U	10.	U	10.	U
208-96-8	Acenaphthylene	10.	U	12.	U	10.	U	10.	U	10.	U
606-20-2	2,6-Dinitrotoluene	10.	U	12.	U	10.	U	10.	U	10.	U
99-09-2	3-Nitroaniline	25.	U	29.	U	25.	U	25.	U	25.	U
83-32-9	Acenaphthene	1.	J	1.	J	1.	J	1.	J	10.	U
51-28-5	2,4-Dini henol	25.	U	29.	U	25.	U	25.	U	25.	U

10/29/99

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39825

846-SVOA		SAMPLE ID ----->	008-G-SP06-01	008-G-SP06-01 RE	008-G-SP07-01	008-G-SP08-01	008-G-SP09-01	SBL-0-9825-02			
		ORIGINAL ID ----->	008GSP0601	008GSP0601	008GSP0701	008GSP0801	008GSP0901	SBLK1			
		LAB SAMPLE ID ---->	39825.01	39825.01	39825.07	39825.08	39825.09	SBLK1			
		ID FROM REPORT -->	008GSP0601	008GSP0601	008GSP0701	008GSP0801	008GSP0901	SBLK1			
		SAMPLE DATE ----->	08/04/99	08/04/99	08/04/99	08/04/99	08/04/99	08/04/99			
		DATE EXTRACTED -->	08/06/99	08/23/99	08/06/99	08/06/99	08/06/99	08/06/99			
		DATE ANALYZED --->	08/24/99	08/25/99	08/24/99	08/24/99	08/24/99	08/19/99			
		MATRIX ----->	Water	Water	Water	Water	Water	Water			
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L			
CAS #	Parameter	39825	NV	39825	NV	39825	NV	39825	NV	39825	NV
100-02-7	4-Nitrophenol	25.	UR	29.	US	25.	U	25.	U	25.	U
132-64-9	Dibenzofuran	10.	U	12.	U	10.	U	1.	J	10.	U
121-14-2	2,4-Dinitrotoluene	10.	U	12.	U	10.	U	10.	U	10.	U
84-66-2	Diethylphthalate	10.	U	12.	U	10.	U	10.	U	10.	U
7005-72-3	4-Chlorophenylphenylether	10.	U	12.	U	10.	U	10.	U	10.	U
86-73-7	Fluorene	1.	R	1.	J	1.	J	2.	J	10.	U
100-01-6	4-Nitroaniline	25.	U	29.	US	25.	U	25.	U	25.	U
534-52-1	2-Methyl-4,6-Dinitrophenol	25.	U	29.	U	25.	U	25.	U	25.	U
86-30-6	N-Nitrosodiphenylamine	10.	U	12.	U	10.	U	10.	U	10.	U
101-55-3	4-Bromophenyl-phenylether	10.	U	12.	U	10.	U	10.	U	10.	U
118-74-1	Hexachlorobenzene	10.	U	12.	U	10.	U	10.	U	10.	U
87-86-5	Pentachlorophenol	10.	U	29.	U	25.	U	25.	U	25.	U
85-01-8	Phenanthrene	1.	R	1.	J	1.	J	2.	J	10.	U
120-12-7	Anthracene	10.	U	12.	U	1.	J	10.	U	10.	U
84-74-2	Di-n-butylphthalate	10.	U	12.	U	1.	J	1.	J	10.	U
206-44-0	Fluoranthene	10.	U	12.	U	10.	U	10.	U	10.	U
129-00-0	Pyrene	1.	U	1.	J	1.	J	1.	J	10.	U
85-68-7	Butylbenzylphthalate	10.	U	12.	U	10.	U	10.	U	10.	U
91-94-1	3,3'-Dichlorobenzidine	10.	U	12.	U	10.	U	10.	U	10.	U
56-55-3	Benzo(a)anthracene	10.	U	12.	U	10.	U	10.	U	10.	U
218-01-9	Chrysene	10.	U	12.	U	10.	U	10.	U	10.	U
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	2.	BR	12.2	U	10.5	U	10.2	U	10.1	U
117-84-0	Di-n-octyl phthalate	10.	U	12.	U	10.	U	10.	U	10.	U
205-99-2	Benzo(b)fluoranthene	10.	U	12.	U	10.	U	10.	U	10.	U
207-08-9	Benzo(k)fluoranthene	10.	U	12.	U	10.	U	10.	U	10.	U
50-32-8	Benzo(a)pyrene	10.	U	12.	U	10.	U	10.	U	10.	U
193-39-5	Indeno(1,2,3-cd)pyrene	10.	U	12.	U	10.	U	10.	U	10.	U
53-70-3	Dibenz(a,h)anthracene	10.	U	12.	U	10.	U	10.	U	10.	U
191-24-2	Benzo(g,h,i)perylene	10.	U	12.	U	10.	U	10.	U	10.	U

015

UM091699

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39825

W846-SVOA		SAMPLE ID ----->	SBL-0-9825-03				
		ORIGINAL ID ----->	SBLK2				
		LAB SAMPLE ID ---->	SBLK2				
		ID FROM REPORT -->	SBLK2				
		SAMPLE DATE ----->	08/04/99				
		DATE EXTRACTED -->	08/23/99				
		DATE ANALYZED ---->	08/25/99				
		MATRIX ----->	Water				
		UNITS ----->	UG/L	D			
CAS #	Parameter	39825	NV				
108-95-2	Phenol	10.	U				
111-44-4	bis(2-Chloroethyl)ether	10.	U				
95-57-8	2-Chlorophenol	10.	U				
541-73-1	1,3-Dichlorobenzene	10.	U				
106-46-7	1,4-Dichlorobenzene	10.	U				
100-51-6	Benzyl alcohol	10.	U				
95-50-1	1,2-Dichlorobenzene	10.	U				
95-48-7	2-Methylphenol (o-Cresol)	10.	U				
108-60-1	2,2'-oxybis(1-Chloropropane)	10.	U				
106-44-5	4-Methylphenol (p-Cresol)	10.	U				
621-64-7	N-Nitroso-di-n-propylamine	10.	U				
67-72-1	Hexachloroethane	10.	U				
98-95-3	Nitrobenzene	10.	U				
78-59-1	Isophorone	10.	U				
88-75-5	2-Nitrophenol	10.	U				
105-67-9	2,4-Dimethylphenol	10.	U				
65-85-0	Benzoic acid	10.	U				
111-91-1	bis(2-Chloroethoxy)methane	10.	U				
120-83-2	2,4-Dichlorophenol	10.	U				
120-82-1	1,2,4-Trichlorobenzene	10.	U				
91-20-3	Naphthalene	10.	U				
106-47-8	4-Chloroaniline	10.	U				
87-68-3	Hexachlorobutadiene	10.	U				
59-50-7	4-Chloro-3-methylphenol	10.	U				
91-57-6	2-Methylnaphthalene	10.	U				
77-47-4	Hexachlorocyclopentadiene	10.	U				
88-06-2	2,4,6-Trichlorophenol	10.	U				
95-95-4	2,4,5-Trichlorophenol	25.	U				
91-58-7	2-Chloronaphthalene	10.	U				
88-74-4	2-Nitroaniline	25.	U				
131-11-3	Dimethyl phthalate	10.	U				
208-96-8	Acenaphthylene	10.	U				
606-20-2	2,6-Dinitrotoluene	10.	U				
99-09-2	3-Nitroaniline	25.	U				
83-32-9	Acenaphthene	10.	U				
51-28-5	2,4-Dinitrophenol	25.	U				

UM091699

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39825

W846-SVDA		SAMPLE ID -----> SBL-0-9825-03					
		ORIGINAL ID -----> SBLK2					
		LAB SAMPLE ID ----> SBLK2					
		ID FROM REPORT --> SBLK2					
		SAMPLE DATE -----> 08/04/99					
		DATE EXTRACTED --> 08/23/99					
		DATE ANALYZED ----> 08/25/99					
		MATRIX -----> Water					
		UNITS -----> UG/L					
CAS #	Parameter	39825	NV				
100-02-7	4-Nitrophenol	25.	U				
132-64-9	Dibenzofuran	10.	U				
121-14-2	2,4-Dinitrotoluene	10.	U				
84-66-2	Diethylphthalate	10.	U				
7005-72-3	4-Chlorophenylphenylether	10.	U				
86-73-7	Fluorene	10.	U				
100-01-6	4-Nitroaniline	25.	U				
534-52-1	2-Methyl-4,6-Dinitrophenol	25.	U				
86-30-6	N-Nitrosodiphenylamine	10.	U				
101-55-3	4-Bromophenyl-phenylether	10.	U				
118-74-1	Hexachlorobenzene	10.	U				
87-86-5	Pentachlorophenol	25.	U				
85-01-8	Phenanthrene	10.	U				
120-12-7	Anthracene	10.	U				
84-74-2	Di-n-butylphthalate	10.	U				
206-44-0	Fluoranthene	10.	U				
129-00-0	Pyrene	10.	U				
85-68-7	Butylbenzylphthalate	10.	U				
91-94-1	3,3'-Dichlorobenzidine	10.	U				
56-55-3	Benzo(a)anthracene	10.	U				
218-01-9	Chrysene	10.	U				
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	1.	J				
117-84-0	Di-n-octyl phthalate	10.	U				
205-99-2	Benzo(b)fluoranthene	10.	U				
207-08-9	Benzo(k)fluoranthene	10.	U				
50-32-8	Benzo(a)pyrene	10.	U				
193-39-5	Indeno(1,2,3-cd)pyrene	10.	U				
53-70-3	Dibenz(a,h)anthracene	10.	U				
191-24-2	Benzo(g,h,i)perylene	10.	U				

017

UM091699

CAW
9/22/99

CHARLESTON - ZONE G
CHARLESTON ZONE G QUARTERLY GW
SDG# 39825

#846-VQA		SAMPLE ID ----->	008-G-SP06-01	008-G-SP07-01	008-G-SP08-01	008-G-SP09-01	008-T-SP09-01	BLK-0-9825-01	
		ORIGINAL ID ----->	008GSP0601	008GSP0701	008GSP0801	008GSP0901	008TSP0901	U990809A	
		LAB SAMPLE ID ---->	39825.01	39825.07	39825.08	39825.09	39825.10	U990809A	
		ID FROM REPORT -->	008GSP0601	008GSP0701	008GSP0801	008GSP0901	008TSP0901	U990809A	
		SAMPLE DATE ----->	08/04/99	08/04/99	08/04/99	08/04/99	08/04/99	08/04/99	
		DATE ANALYZED ---->	08/09/99	08/09/99	08/09/99	08/09/99	08/09/99	08/09/99	
		MATRIX ----->	Water	Water	Water	Water	Water	Water	
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	
CAS #	Parameter	39825	NV	39825	NV	39825	NV	39825	NV
74-87-3	Chloromethane	5.	U	5.	U	5.	U	5.	U
74-83-9	Bromomethane	5.	U	5.	U	5.	U	5.	U
75-01-4	Vinyl chloride	5.	U	5.	U	5.	U	5.	U
75-00-3	Chloroethane	5.	U	5.	U	5.	U	5.	U
75-09-2	Methylene chloride	5.	U	5.	U	5.	U	5.	U
67-64-1	Acetone	5.	<i>UUR</i>	5.	<i>UUR</i>	5.	<i>UUR</i>	5.	<i>UUR</i>
75-15-0	Carbon disulfide	5.	U	5.	U	5.	U	5.	U
75-35-4	1,1-Dichloroethene	5.	U	5.	U	5.	U	5.	U
75-34-3	1,1-Dichloroethane	5.	U	5.	U	5.	U	5.	U
540-59-0	1,2-Dichloroethene (total)	5.	U	5.	U	5.	U	5.	U
67-66-3	Chloroform	5.	U	5.	U	5.	U	5.	U
107-06-2	1,2-Dichloroethane	5.	U	5.	U	5.	U	5.	U
78-93-3	2-Butanone (MEK)	5.	U	5.	U	5.	U	5.	U
71-55-6	1,1,1-Trichloroethane	5.	U	5.	U	5.	U	5.	U
56-23-5	Carbon tetrachloride	5.	U	5.	U	5.	U	5.	U
75-27-4	Bromodichloromethane	5.	U	5.	U	5.	U	5.	U
78-87-5	1,2-Dichloropropane	5.	U	5.	U	5.	U	5.	U
10061-01-5	cis-1,3-Dichloropropene	5.	U	5.	U	5.	U	5.	U
79-01-6	Trichloroethene	5.	U	5.	U	5.	U	5.	U
124-48-1	Dibromochloromethane	5.	U	5.	U	5.	U	5.	U
79-00-5	1,1,2-Trichloroethane	5.	U	5.	U	5.	U	5.	U
71-43-2	Benzene	5.	U	5.	U	5.	U	5.	U
10061-02-6	trans-1,3-Dichloropropene	5.	U	5.	U	5.	U	5.	U
75-25-2	Bromoform	5.	U	5.	U	5.	U	5.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.	U	5.	U	5.	U	5.	U
591-78-6	2-Hexanone	5.	U	5.	U	5.	U	5.	U
127-18-4	Tetrachloroethene	5.	U	5.	U	5.	U	5.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U	5.	U	5.	U	5.	U
108-88-3	Toluene	5.	U	5.	U	5.	U	5.	U
108-90-7	Chlorobenzene	5.	U	5.	U	5.	U	5.	U
100-41-4	Ethylbenzene	5.	U	5.	U	5.	U	5.	U
100-42-5	Styrene	5.	U	5.	U	5.	U	5.	U
1330-20-7	Xylene (Total)	2.	J	5.	U	5.	U	5.	U
108-05-4	Vinyl acetate	5.	U	5.	U	5.	U	5.	U
110-75-8	2-Chloroethyl vinyl ether	5.	<i>UUR</i>	5.	U	5.	U	5.	U

013

10/21/99

DATA VALIDATION WORKSHEETS

MULTI-MEDIA VOLATILE ORGANIC FRACTION

CASE NUMBER: _____ SDG NUMBER: 39825

LABORATORY: SWL - Tulsa

CLIENT: EnSafe PROJECT: Charleston Zone G

REVIEWER: LM DATE: 9-16-99 Rel 99-7

QA/QC LEVEL

- NEESA C
- NEESA D
- DQO LEVEL III
- DQO LEVEL IV
- _____

Statement Of Work (SOW)

- CLP 3/90
- CLP 2/88
- SW846 8240
- SW846 8240 Appendix IX
- 8260B

ANALYSIS MODIFICATIONS: _____

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39825

Lab File ID: I52352.D

BFB Injection Date: 07/27/99

Instrument ID: I

BFB Injection Time: 2310

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	21.4
75	30.0 - 60.0% of mass 95	48.4
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.4
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	82.4
175	5.0 - 9.0% of mass 174	6.7 (8.2)1
176	Greater than 95.0%, but less than 101.0% of mass 174	79.5 (96.5)1
177	5.0 - 9.0% of mass 176	6.7 (8.5)2

1-Value is % mass 174

2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD020	VSTD020	I52355.D	07/28/99	0053
02	VSTD100	VSTD100	I52356.D	07/28/99	0115
03	VSTD200	VSTD200	I52357.D	07/28/99	0137
04	VSTD050	VSTD050	I52358.D	07/28/99	0216
05	VSTD005	VSTD005	I52365.D	07/28/99	1027
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

Report Date : 28-Jul-1999 18:13

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 28-JUL-1999 00:53
 End Cal Date : 28-JUL-1999 10:27
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/i.i/i990727b.b/5ml82602.m
 Cal Date : 28-Jul-1999 14:39 doug

Calibration File Names:

Level 1: /chem/i.i/i990727b.b/i52365.d
 Level 2: /chem/i.i/i990727b.b/i52355.d
 Level 3: /chem/i.i/i990727b.b/i52358.d
 Level 4: /chem/i.i/i990727b.b/i52356.d
 Level 5: /chem/i.i/i990727b.b/i52357.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
1 DICHLORODIFLUOROMETHANE	0.14128	0.12461	0.13889	0.13178	0.10688	0.12869	10.742
2 CHLOROMETHANE	0.29528	0.36488	0.38552	0.38963	0.35379	0.35782	10.602
3 VINYL CHLORIDE	0.35048	0.39197	0.40302	0.38206	0.37178	0.37986	5.292
4 BROMOMETHANE	0.39100	0.36396	0.41118	0.37866	0.37523	0.38401	4.685
5 CHLOROETHANE	0.21195	0.23032	0.22038	0.20960	0.19417	0.21328	6.295
6 TRICHLOROFLUOROMETHANE	0.70605	0.73618	0.80490	0.73094	0.58964	0.71354	10.983
7 ETHYL ETHER	++++	++++	++++	++++	++++	0.00000	++++
8 ACROLEIN	0.01566	0.02168	0.02030	0.01923	0.01701	0.01878	12.990
9 1,1-DICHLOROETHENE	0.43751	0.37000	0.37123	0.35548	0.36409	0.37966	8.674
10 1,1,2-TRICHLOROTRIFLUOROETHAN	0.36199	0.60922	0.61429	0.57819	0.61122	0.55498	0.999 L
11 ACETONE	0.12342	0.07938	0.05943	0.04339	0.03836	0.06880	0.990 L
12 METHYL IODIDE	0.59540	0.96785	0.99903	0.93895	0.93322	0.88689	0.999 L
13 CARBON DISULFIDE	0.99015	0.96539	1.07794	0.92376	1.09492	1.01043	7.281
14 ACETONITRILE	0.04561	0.05560	0.06205	0.05498	0.05241	0.05413	10.959
15 ALLYL CHLORIDE	0.22684	0.25179	0.15154	0.24197	0.35702	0.24583	0.964 L
16 METHYLENE CHLORIDE	1.25047	0.51989	0.46489	0.38825	0.37547	0.59979	0.999 L
17 ACRYLONITRILE	0.03670	0.04806	0.05148	0.04910	0.04753	0.04657	12.292
M 18 1,2-Dichloroethene (total)	0.45033	0.40932	0.41484	0.39798	0.40092	0.41468	5.063
19 trans-1,2-DICHLOROETHENE	0.47389	0.37826	0.42523	0.39382	0.40499	0.41524	8.907
20 Methyl-tert-Butyl Ether	0.47466	0.57328	0.59621	0.58035	0.54390	0.55368	8.682
21 Hexane	0.28252	0.37059	0.41612	0.40624	0.42897	0.38089	0.999 L
22 1,1-DICHLOROETHANE	0.62635	0.66133	0.69429	0.67085	0.68299	0.66716	3.894
23 VINYL ACETATE	0.42577	0.42497	0.39505	0.40984	0.40578	0.41228	3.181
24 CHLOROPRENE	0.38591	0.49188	0.55550	0.49571	0.52366	0.49053	13.011
25 2,2-DICHLOROPROPANE	0.55198	0.58302	0.53341	0.54167	0.55916	0.55385	3.436
26 cis-1,2-DICHLOROETHENE	0.42676	0.44038	0.40444	0.40214	0.39686	0.41412	4.493
27 2-BUTANONE	0.09026	0.08022	0.08087	0.07002	0.06106	0.07649	0.991 L
28 PROPIONITRILE	0.01223	0.01855	0.01830	0.01826	0.01720	0.01691	0.999 L
29 ETHYL ACETATE	++++	++++	++++	++++	++++	0.00000	++++

<- Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

Report Date : 28-Jul-1999 18:13

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 28-JUL-1999 00:53
 End Cal Date : 28-JUL-1999 10:27
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/i.i/i990727b.b/5ml82602.m
 Cal Date : 28-Jul-1999 14:39 doug

Calibration File Names:

Level 1: /chem/i.i/i990727b.b/i52365.d
 Level 2: /chem/i.i/i990727b.b/i52355.d
 Level 3: /chem/i.i/i990727b.b/i52358.d
 Level 4: /chem/i.i/i990727b.b/i52356.d
 Level 5: /chem/i.i/i990727b.b/i52357.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
30 METHACRYLONITRILE	0.04381	0.06191	0.06255	0.06313	0.05929	0.05821	14.078
31 BROMOCHLOROMETHANE	0.20935	0.22531	0.25445	0.24148	0.23819	0.23376	7.331
32 CHLOROFORM	0.70638	0.76660	0.78760	0.75489	0.79004	0.76110	4.457
34 1 1 1-TRICHLOROETHANE	0.68104	0.65571	0.67960	0.65599	0.68416	0.67130	2.115
36 1 1-DICHLOROPROPENE	0.58111	0.60389	0.54650	0.53133	0.53598	0.55976	5.516
37 CARBON TETRACHLORIDE	0.62250	0.63594	0.61373	0.62528	0.63719	0.62593	1.561
39 BENZENE	0.97137	0.98460	0.96528	0.95190	0.99654	0.97354	1.772
40 ISOBUTYL ALCOHOL	0.00329	0.00661	0.00591	0.00556	0.00475	0.00522	0.990 L
41 1 2-DICHLOROETHANE	0.38062	0.38760	0.38025	0.39455	0.38608	0.38582	1.520
42 1,4-DIOXANE	0.00325	0.00456	0.00347	0.00352	0.00324	0.00364	0.997 L
44 TRICHLOROETHENE	0.39860	0.45315	0.41715	0.41953	0.43683	0.42505	4.980
45 1 2-DICHLOROPROPANE	0.38938	0.37325	0.34656	0.35479	0.36640	0.36608	4.536
46 DIBROMOMETHANE	0.29318	0.34062	0.31713	0.32952	0.32696	0.32148	5.566
47 METHYL METHACRYLATE	0.12770	0.18035	0.16223	0.15822	0.14761	0.15522	12.496
48 BROMODICHLOROMETHANE	0.58870	0.66568	0.64881	0.64733	0.66261	0.64263	4.859
49 2-NITROPROPANE	+++++	+++++	+++++	+++++	+++++	0.00000	+++++
50 2-CHLOROETHYL VINYL ETHER	0.32145	0.50109	0.45778	0.47438	0.45173	0.44129	0.999 L
51 cis-1,3-Dichloropropene	0.50807	0.54710	0.50941	0.53635	0.54735	0.52966	3.702
52 4-METHYL-2-PENTANONE	0.31592	0.21904	0.17623	0.17785	0.16445	0.21070	0.999 L
54 TOLUENE	0.60210	0.64857	0.64927	0.63808	0.65633	0.63887	3.375
55 trans-1,3-Dichloropropene	0.41164	0.47029	0.42366	0.43865	0.43106	0.43546	4.949
56 ETHYL METHACRYLATE	0.24384	0.33057	0.32252	0.31063	0.29749	0.30101	11.401
57 1 1 2-TRICHLOROETHANE	0.23777	0.29095	0.26119	0.27646	0.27594	0.26846	7.497
58 TETRACHLOROETHENE	0.64297	0.65058	0.78613	0.71653	0.83625	0.72649	11.607
59 1 3-DICHLOROPROPANE	0.41601	0.46408	0.53622	0.52026	0.57405	0.50212	12.408
60 2-HEXANONE	0.23010	0.13109	0.13807	0.12987	0.12763	0.15135	1.000 L
61 DIBROMOCHLOROMETHANE	0.51675	0.54438	0.62879	0.63677	0.72664	0.61067	13.521
62 1 2-DIBROMOETHANE	0.37288	0.42238	0.40165	0.40921	0.39855	0.40093	4.533
63 D-LIMONENE	+++++	+++++	+++++	+++++	+++++	0.00000	+++++

-- Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

Report Date : 28-Jul-1999 18:13

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 28-JUL-1999 00:53
 End Cal Date : 28-JUL-1999 10:27
 Quant Method : ISTD
 Cal Curve Type : Averaged
 Target Version : Target 3.00
 Integrator : HP RTE
 Method file : /chem/i.i/i990727b.b/5ml82602.m
 Cal Date : 28-Jul-1999 14:39 doug

Calibration File Names:

Level 1: /chem/i.i/i990727b.b/i52365.d
 Level 2: /chem/i.i/i990727b.b/i52355.d
 Level 3: /chem/i.i/i990727b.b/i52358.d
 Level 4: /chem/i.i/i990727b.b/i52356.d
 Level 5: /chem/i.i/i990727b.b/i52357.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
65 CHLOROBENZENE	0.89076	0.84892	0.98690	0.96408	1.10409	0.95895	10.248
66 CYCLOHEXANONE	-----	-----	-----	-----	-----	0.00000	-----
67 1-CHLOROHXANE	0.41632	0.38939	0.41371	0.37636	0.43435	0.40603	5.676
68 1 1 1 2-TETRACHLOROETHANE	0.41581	0.42179	0.47780	0.47461	0.54862	0.46773	11.462
69 ETHYL BENZENE	1.59071	1.64498	2.03292	1.88925	2.40634	1.91284	17.221
70 m,p-XYLENES	0.63825	0.73022	0.87082	0.81852	0.91708	0.79498	14.060
71 o-XYLENE	0.52294	0.55249	0.61891	0.60441	0.69477	0.59870	11.062
M 72 Xylene (Total)	0.52294	0.55249	0.61891	0.60441	0.69477	0.59870	11.062
73 STYRENE	0.80261	0.81897	0.93296	0.92148	1.04460	0.90412	10.840
74 BROMOFORM	0.30927	0.34502	0.40138	0.39695	0.44499	0.37952	13.938
75 ISOPROPYL BENZENE	2.74213	2.80384	2.65458	2.69101	2.82110	2.74253	2.599
77 BROMOBENZENE	0.87908	0.95801	0.89454	0.92686	0.93204	0.91811	3.429
78 1 1 2 2-TETRACHLOROETHANE	0.80643	0.88014	0.80098	0.82253	0.79915	0.82185	4.120
79 1 2 3-TRICHLOROPANE	0.74683	0.86209	0.79696	0.80604	0.77472	0.79733	5.363
80 trans-1,4-DICHLORO-2-BUTEN	0.07639	0.10404	0.10345	0.10320	0.11527	0.10047	14.321
81 n-PROPYLBENZENE	0.64992	0.71753	0.69351	0.68197	0.71568	0.69172	4.015
82 2-CHLOROTOLUENE	0.61547	0.67640	0.72444	0.65507	0.72281	0.67884	6.830
83 4-CHLOROTOLUENE	2.74183	2.59862	2.59252	2.58477	2.78561	2.66067	3.538
84 1 3 5-TRIMETHYLBENZENE	2.09902	2.29765	2.17104	2.16649	2.33096	2.21303	4.404
85 PENTACHLOROETHANE	0.17940	0.24613	0.27295	0.29514	0.33316	0.26536	0.997
86 tert-BUTYLBENZENE	2.48497	2.69497	2.54758	2.61228	2.79464	2.62689	4.640
87 1 2 4-TRIMETHYLBENZENE	2.04477	2.24524	2.16998	2.20923	2.29854	2.19355	4.363
88 sec-BUTYLBENZENE	2.82833	3.38322	3.25003	3.13662	3.55769	3.23118	8.494
89 1 3-DICHLOROBENZENE	1.34456	1.51052	1.47296	1.40834	1.52612	1.45250	5.198
90 p-ISOPROPYLTOLUENE	2.38836	2.50226	2.35918	2.47364	2.62756	2.47020	4.285
92 1 4-DICHLOROBENZENE	1.88372	1.90889	1.78329	1.83538	1.84500	1.85126	2.603
93 1 2-DICHLOROBENZENE	1.31011	1.51030	1.38932	1.42614	1.51252	1.42968	5.986
94 n-BUTYLBENZENE	2.42354	2.63160	2.49783	2.44522	2.76883	2.55340	5.681
95 1 2-DIBROMO-3-CHLOROPROPANE	0.20328	0.16094	0.13630	0.15371	0.13231	0.15731	0.993

-- Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

Report Date : 28-Jul-1999 18:13

SWOK/AATS

INITIAL CALIBRATION DATA

Start Cal Date : 28-JUL-1999 00:53
End Cal Date : 28-JUL-1999 10:27
Quant Method : ISTD
Cal Curve Type : Averaged
Target Version : Target 3.00
Integrator : HP RTE
Method file : /chem/i.i/i990727b.b/5ml82602.m
Cal Date : 28-Jul-1999 14:39 doug

Calibration File Names:

Level 1: /chem/i.i/i990727b.b/i52365.d
Level 2: /chem/i.i/i990727b.b/i52355.d
Level 3: /chem/i.i/i990727b.b/i52358.d
Level 4: /chem/i.i/i990727b.b/i52356.d
Level 5: /chem/i.i/i990727b.b/i52357.d

Compound	5 Level 1	20 Level 2	50 Level 3	100 Level 4	200 Level 5	RRF	% RSD/R ²
96 1 2 4-TRICHLOROBENZENE	1.10698	1.20786	1.13322	1.12861	1.20757	1.15685	4.104
97 HEXACHLOROBUTADIENE	0.94270	0.98909	0.97122	0.90058	1.02371	0.96546	4.834
98 NAPHTHALENE	1.41640	1.50832	1.42212	1.44236	1.40975	1.43979	2.792
99 1 2 3-TRICHLOROBENZENE	0.94578	1.00962	0.97769	0.96284	0.96172	0.97153	2.481
\$ 33 DIBROMOFLUOROMETHANE	0.46636	0.49389	0.57546	0.55461	0.53196	0.52446	8.461
\$ 38 1,2-DICHLOROETHANE-d4	0.26164	0.29162	0.33830	0.35487	0.35801	0.32089	13.225
\$ 53 TOLUENE-d8	0.80151	0.84380	0.98478	0.92203	0.88039	0.88652	7.974
\$ 76 4-BROMOFLUOROBENZENE	0.47644	0.48688	0.57316	0.53515	0.51228	0.51678	7.530

<- Indicates Error R = % RSD or R² Failure C = CCC Failure S = SPCC Failure L = Linear Q = Quadratic

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: SWL-TULSA Contract: ZONEG R119
 Lab Code: SWOK Case No.: ENSAFE SAS No.: SDG No.: 39825
 Lab File ID: I52554.D BFB Injection Date: 08/09/99
 Instrument ID: I BFB Injection Time: 1015
 Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	20.5
75	30.0 - 60.0% of mass 95	50.8
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.0
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	85.0
175	5.0 - 9.0% of mass 174	6.1 (7.1)1
176	Greater than 95.0%, but less than 101.0% of mass 174	84.1 (99.0)1
177	5.0 - 9.0% of mass 176	6.1 (7.3)2

1-Value is % mass 174

2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050	VSTD050	I52555.D	08/09/99	1141
02	VBLK1	U990809A	I52557.D	08/09/99	1301
03	LCS1	LCS1	I52558.D	08/09/99	1333
04	LCSD1	LCSD1	I52559.D	08/09/99	1356
05	08GSP0601MS	39825.01MS	I52560.D	08/09/99	1442
06	08GSP0601MSD	39825.01MSD	I52561.D	08/09/99	1505
07	08GSP0601	39825.01	I52562.D	08/09/99	1545
08	08GSP0701	39825.07	I52563.D	08/09/99	1608
09	08GSP0801	39825.08	I52564.D	08/09/99	1631
10	08GSP0901	39825.09	I52565.D	08/09/99	1654
11	08TSP0901	39825.10	I52566.D	08/09/99	1717
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: i.i Injection Date: 09-AUG-1999 11:41
 Lab File ID: i52555.d Init. Calibration Date(s): 07/28/99 07/28/99
 Analysis Type: WATER Init. Calibration Times: 00:53 10:27
 Lab Sample ID: VSTD050 Method File: /chem/i.i/i990809a.b/5ml82602.m
 Quant Type: ISTD

COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
1 DICHLORODIFLUOROMETHANE	0.129	0.152	0.000	17.9	100.0
2 CHLOROMETHANE	0.358	0.335	0.100	6.5	100.0
3 VINYL CHLORIDE	0.380	0.324	0.010	14.7	20.0
4 BROMOMETHANE	0.384	0.294	0.010	23.5	100.0
5 CHLOROETHANE	0.213	0.174	0.010	18.2	100.0
6 TRICHLOROFLUOROMETHANE	0.714	0.569	0.010	20.3	100.0
7 ETHYL ETHER	++++	++++	0.010	++++	100.0
8 ACROLEIN	0.019	0.017	0.001	10.7	100.0
9 1 1-DICHLOROETHENE	0.380	0.329	0.010	13.3	20.0
10 1,1,2-TRICHLOROTRIFLUOROETHA	0.612	0.544	0.010	N/A	100.0
11 ACETONE	0.035	0.048	0.010	N/A	100.0
12 METHYL IODIDE	0.934	0.819	0.010	N/A	100.0
13 CARBON DISULFIDE	1.010	0.917	0.010	9.2	100.0
14 ACETONITRILE	0.054	0.061	0.000	23.9	100.0
15 ALLYL CHLORIDE	0.376	0.117	0.010	N/A	100.0
16 METHYLENE CHLORIDE	0.354	0.355	0.010	N/A	100.0
17 ACRYLONITRILE	0.047	0.060	0.010	13.6	100.0
M 18 1,2-Dichloroethene (total)	0.415	0.360	0.010	13.1	100.0
19 trans-1 2-DICHLOROETHENE	0.415	0.371	0.010	10.6	100.0
20 Methyl-tert-Butyl Ether	0.554	0.487	0.010	12.1	100.0
21 Hexane	0.432	0.387	0.010	N/A	100.0
22 1 1-DICHLOROETHANE	0.667	0.621	0.100	6.9	100.0
23 VINYL ACETATE	0.412	0.387	0.010	6.2	100.0
24 CHLOROPRENE	0.491	0.365	0.010	25.5	100.0
25 2 2-DICHLOROPROPANE	0.554	0.498	0.010	10.1	100.0
26 cis-1 2-DICHLOROETHENE	0.414	0.349	0.010	15.7	100.0
27 2-BUTANONE	0.060	0.062	0.010	N/A	100.0
28 PROPIONITRILE	0.017	0.016	0.001	N/A	100.0
29 ETHYL ACETATE	++++	++++	0.010	++++	100.0
30 METHACRYLONITRILE	0.058	0.051	0.010	13.1	100.0
31 BROMOCHLOROMETHANE	0.234	0.208	0.010	11.2	100.0
32 CHLOROFORM	0.761	0.688	0.010	9.6	20.0
S 33 DIBROMOFLUOROMETHANE	0.524	0.478	0.010	8.8	100.0
34 1 1 1-TRICHLOROETHANE	0.671	0.578	0.010	13.9	100.0
36 1 1-DICHLOROPROPENE	0.560	0.493	0.010	11.9	100.0
37 CARBON TETRACHLORIDE	0.627	0.569	0.010	9.2	100.0
S 38 1,2-DICHLOROETHANE-d4	0.321	0.259	0.010	19.3	100.0
39 BENZENE	0.974	0.876	0.010	10.0	100.0
40 ISOBUTYL ALCOHOL	0.005	0.005	0.000	N/A	100.0
41 1 2-DICHLOROETHANE	0.386	0.353	0.010	8.6	100.0
42 1,4-DIOXANE	0.003	0.003	0.000	N/A	100.0
44 TRICHLOROETHENE	0.425	0.383	0.010	9.8	100.0
45 1 2-DICHLOROPROPANE	0.366	0.335	0.010	8.4	20.0
46 DIBROMOMETHANE	0.321	0.286	0.010	11.0	100.0

MO ⊕
 JTR

Data File: /chem/i.i/i990809a.b/i52555.d
 Report Date: 09-Aug-1999 12:10

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: i.i Injection Date: 09-AUG-1999 11:41
 Lab File ID: i52555.d Init. Calibration Date(s): 07/28/99 07:28:00
 Analysis Type: WATER Init. Calibration Times: 00:53 10:27
 Lab Sample ID: VSTD050 Method File: /chem/i.i/i990809a.b/5ml82602.m
 Quant Type: ISTD

COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
47 METHYL METHACRYLATE	0.155	0.133	0.010	14.1	100.0
48 BROMODICHLOROMETHANE	0.643	0.564	0.010	12.2	100.0
49 2-NITROPROPANE	++++	++++	0.010	++++	100.0 <-
50 2-CHLOROETHYL VINYL ETHER	0.454	0.374	0.010	N/A	100.0
51 cis-1,3-Dichloropropene	0.530	0.496	0.010	6.4	100.0
52 4-METHYL-2-PENTANONE	0.161	0.152	0.010	N/A	100.0
S 53 TOLUENE-d8	0.887	0.780	0.010	12.1	100.0
54 TOLUENE	0.639	0.581	0.010	9.1	20.0
55 trans-1,3-Dichloropropene	0.435	0.377	0.010	13.5	100.0
56 ETHYL METHACRYLATE	0.301	0.266	0.010	11.6	100.0
57 1 1 2-TRICHLOROETHANE	0.268	0.247	0.010	8.1	100.0
58 TETRACHLOROETHENE	0.726	0.685	0.010	5.7	100.0
59 1 3-DICHLOROPROPANE	0.502	0.453	0.010	9.8	100.0
60 2-HEXANONE	0.126	0.112	0.010	N/A	100.0
61 DIBROMOCHLOROMETHANE	0.611	0.536	0.010	12.2	100.0
62 1 2-DIBROMOETHANE	0.401	0.351	0.010	12.6	100.0
63 D-LIMONENE	++++	++++	0.010	++++	100.0 <-
65 CHLOROBENZENE	0.959	0.870	0.300	9.3	100.0
66 CYCLOHEXANONE	++++	++++	0.010	++++	100.0 <-
67 1-CHLOROHEXANE	0.406	0.362	0.010	10.9	100.0
68 1 1 2-TETRACHLOROETHANE	0.468	0.410	0.010	12.3	100.0
69 ETHYL BENZENE	1.913	1.757	0.010	8.2	20.0
70 m,p-XYLENES	0.795	0.735	0.010	7.6	100.0
71 o-XYLENE	0.599	0.529	0.010	11.6	100.0
M 72 Xylene (Total)	0.599	0.529	0.010	11.6	100.0
73 STYRENE	0.904	0.809	0.010	10.5	100.0
74 BROMOFORM	0.380	0.334	0.100	12.1	100.0
75 ISOPROPYLBENZENE	2.743	2.364	0.010	13.8	100.0
S 76 4-BROMOFLUOROBENZENE	0.517	0.433	0.010	16.2	100.0
77 BROMOBENZENE	0.918	0.794	0.010	13.6	100.0
78 1 1 2-TETRACHLOROETHANE	0.822	0.744	0.300	9.5	100.0
79 1 2 3-TRICHLOROPROPANE	0.797	0.706	0.010	11.5	100.0
80 trans-1,4-DICHLORO-2-BUTEN	0.100	0.083	0.010	17.7	100.0
81 n-PROPYLBENZENE	0.692	0.629	0.010	9.0	100.0
82 2-CHLOROTOLUENE	0.679	0.591	0.010	13.0	100.0
83 4-CHLOROTOLUENE	2.661	2.335	0.010	12.2	100.0
84 1 3 5-TRIMETHYLBENZENE	2.213	1.933	0.010	12.6	100.0
85 PENTACHLOROETHANE	0.339	0.222	0.010	N/A	100.0
86 tert-BUTYLBENZENE	2.627	2.346	0.010	10.7	100.0
87 1 2 4-TRIMETHYLBENZENE	2.194	1.911	0.010	12.9	100.0
88 sec-BUTYLBENZENE	3.231	2.839	0.010	12.1	100.0
89 1 3-DICHLOROBENZENE	1.453	1.153	0.010	20.6	100.0
90 p-ISOPROPYLTOLUENE	2.470	2.142	0.010	13.3	100.0
92 1 4-DICHLOROBENZENE	1.851	1.811	0.010	2.2	100.0

Data File: /chem/i.i/i990809a.b/i52555.d
Report Date: 09-Aug-1999 12:10

SWOK/AATS

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: i.i Injection Date: 09-AUG-1999 11:41
Lab File ID: i52555.d Init. Calibration Date(s): 07/28/99 07/28/99
Analysis Type: WATER Init. Calibration Times: 00:53 10:27
Lab Sample ID: VSTD050 Method File: /chem/i.i/i990809a.b/5ml82602.m
Quant Type: ISTD

COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
93 1 2-DICHLOROBENZENE	1.430	1.251	0.010	12.5	100.0
94 n-BUTYLBENZENE	2.553	2.213	0.010	13.3	100.0
95 1 2-DIBROMO-3-CHLOROPROPANE	0.133	0.115	0.010	N/A	100.0
96 1 2 4-TRICHLOROBENZENE	1.157	0.966	0.010	16.5	100.0
97 HEXACHLOROBUTADIENE	0.965	0.802	0.010	17.0	100.0
98 NAPHTHALENE	1.440	1.158	0.010	19.6	100.0
99 1 2 3-TRICHLOROBENZENE	0.972	0.836	0.010	14.0	100.0

% DRIFT REPORT

Data File : i52555.d
 Lab ID : VSTD050
 Samp Info : VSTD050 (2-094-6)
 Method : /chem/i.i/i990809a.b/5ml82602.m
 Operator : DOUG
 Analyzed : 09-AUG-99 11:41
 Sublist : all
 Instrument : i
 ICAL Analyzed : 28-JUL-99 00:53 to 28-JUL-99 10:27

Compound	Amount	Nominal	% Drift	Flag	RRF
DICHLORODIFLUOROMETHANE	58.94	50.00	17.9		0.152
CHLOROMETHANE	46.74	50.00	-6.5		0.335
VINYL CHLORIDE	42.65	50.00	-14.7	✓	0.324
BROMOMETHANE	38.27	50.00	-23.5		0.294
CHLOROETHANE	40.89	50.00	-18.2		0.174
TRICHLOROFLUOROMETHANE	39.85	50.00	-20.3		0.569
ETHYL ETHER	0.00	50.00	-100.0	*	0.000
ACROLEIN	446.42	500.00	-10.7		0.017
1 1-DICHLOROETHENE	43.34	50.00	-13.3	✓	0.329
1,1,2-TRICHLOROTRIFLUOROETHAN	45.99	50.00	-8.0		0.544
ACETONE	45.61	50.00	-8.8		0.048
METHYL IODIDE	43.32	50.00	-13.4		0.819
CARBON DISULFIDE	45.37	50.00	-9.3		0.917
ACETONITRILE	380.38	500.00	-23.9		0.041
ALLYL CHLORIDE	32.33	50.00	-35.3		0.117
METHYLENE CHLORIDE	38.25	50.00	-23.5		0.355
ACRYLONITRILE	431.77	500.00	-13.6		0.040
1,2-Dichloroethene (total)	86.88	100.00	-13.1		0.360
trans-1 2-DICHLOROETHENE	44.71	50.00	-10.6		0.37
Methyl-tert-Butyl Ether	43.96	50.00	-12.1		0.487
Hexane	47.58	50.00	-4.8		0.387
1 1-DICHLOROETHANE	46.56	50.00	-6.9		0.621
VINYL ACETATE	46.91	50.00	-6.2		0.387
CHLOROPRENE	37.22	50.00	-25.6		0.365
2 2-DICHLOROPROPANE	44.95	50.00	-10.1		0.498
cis-1 2-DICHLOROETHENE	42.16	50.00	-15.7		0.349
2-BUTANONE	42.41	50.00	-15.2		0.062
PROPIONITRILE	442.49	500.00	-11.5		0.016
ETHYL ACETATE	0.00	50.00	-100.0	*	0.000
METHACRYLONITRILE	434.66	500.00	-13.1		0.051
BROMOCHLOROMETHANE	44.39	50.00	-11.2		0.208
CHLOROFORM	45.19	50.00	-9.6	✓	0.688
DIBROMOFLUOROMETHANE	45.61	50.00	-8.8		0.478
1 1 1-TRICHLOROETHANE	43.07	50.00	-13.9		0.578
1 1-DICHLOROPROPENE	44.03	50.00	-11.9		0.493
CARBON TETRACHLORIDE	45.40	50.00	-9.2		0.569
1,2-DICHLOROETHANE-d4	40.36	50.00	-19.3		0.259
BENZENE	44.97	50.00	-10.1		0.876
ISOBUTYL ALCOHOL	935.33	1000.00	-6.5		0.005
1 2-DICHLOROETHANE	45.70	50.00	-8.6		0.353
1,4-DIOXANE	826.45	1000.00	-17.4		0.003
TRICHLOROETHENE	45.10	50.00	-9.8		0.383
1 2-DICHLOROPROPANE	45.80	50.00	-8.4		0.335
DIBROMOMETHANE	44.51	50.00	-11.0		0.286
METHYL METHACRYLATE	42.95	50.00	-14.1		0.133
BROMODICHLOROMETHANE	43.90	50.00	-12.2		0.564

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

% DRIFT REPORT

Data File : i52555.d
 Lab ID : VSTD050
 Samp Info : VSTD050 (2-094-6)
 Method : /chem/i.i/i990809a.b/5ml82602.m
 Operator : DOUG
 Analyzed : 09-AUG-99 11:41
 Sublist : all
 Instrument : i
 ICAL Analyzed : 28-JUL-99 00:53 to 28-JUL-99 10:27

Compound	Amount	Nominal	% Drift	Flag	RRF
2-NITROPROPANE	0.00	50.00	-100.0	*	0.000
2-CHLOROETHYL VINYL ETHER	40.26	50.00	-19.5		0.374
cis-1,3-Dichloropropene	46.79	50.00	-6.4		0.496
4-METHYL-2-PENTANONE	40.97	50.00	-18.1		0.152
TOLUENE-d8	43.96	50.00	-12.1		0.780
TOLUENE	45.46	50.00	-9.1	v	0.581
trans-1,3-Dichloropropene	43.26	50.00	-13.5		0.377
ETHYL METHACRYLATE	44.21	50.00	-11.6		0.266
1 1 2-TRICHLOROETHANE	45.95	50.00	-8.1		0.247
TETRACHLOROETHENE	47.16	50.00	-5.7		0.685
1 3-DICHLOROPROPANE	45.09	50.00	-9.8		0.453
2-HEXANONE	41.39	50.00	-17.2		0.112
DIBROMOCHLOROMETHANE	43.90	50.00	-12.2		0.536
1 2-DIBROMOETHANE	43.71	50.00	-12.6		0.351
D-LIMONENE	0.00	50.00	-100.0	*	0.000
CHLOROBENZENE	45.36	50.00	-9.3		0.870
CYCLOHEXANONE	0.00	100.00	-100.0	*	0.000
1-CHLOROHEXANE	44.52	50.00	-11.0		0.362
1 1 1 2-TETRACHLOROETHANE	43.85	50.00	-12.3		0.410
ETHYL BENZENE	45.91	50.00	-8.2	v	1.757
m,p-XYLENES	92.39	100.00	-7.6		0.735
o-XYLENE	44.17	50.00	-11.7		0.529
Xylene (Total)	166.86	150.00	253.7	11.3	1.998
STYRENE	44.73	50.00	-10.5		0.809
BROMOFORM	43.95	50.00	-12.1		0.334
ISOPROPYLBENZENE	43.09	50.00	-13.8		2.364
4-BROMOFLUOROBENZENE	41.89	50.00	-16.2		0.433
BROMOBENZENE	43.22	50.00	-13.6		0.794
1 1 2 2-TETRACHLOROETHANE	45.24	50.00	-9.5		0.744
1 2 3-TRICHLOROPROPANE	44.25	50.00	-11.5		0.706
trans-1,4-DICHLORO-2-BUTEN	41.15	50.00	-17.7		0.083
n-PROPYLBENZENE	45.49	50.00	-9.0		0.629
2-CHLOROTOLUENE	43.50	50.00	-13.0		0.591
4-CHLOROTOLUENE	43.88	50.00	-12.2		2.335
1 3 5-TRIMETHYLBENZENE	43.68	50.00	-12.6		1.933
PENTACHLOROETHANE	39.57	50.00	-20.9		0.222
tert-BUTYLBENZENE	44.64	50.00	-10.7		2.346
1 2 4-TRIMETHYLBENZENE	43.56	50.00	-12.9		1.911
sec-BUTYLBENZENE	43.93	50.00	-12.1		2.839
1 3-DICHLOROENZENE	39.69	50.00	-20.6		1.153
p-ISOPROPYLTOLUENE	43.35	50.00	-13.3		2.142
1 4-DICHLOROENZENE	48.90	50.00	-2.2		1.811
1 2-DICHLOROENZENE	43.74	50.00	-12.5		1.251
n-BUTYLBENZENE	43.32	50.00	-13.4		2.213
1 2-DIBROMO-3-CHLOROPROPANE	38.64	50.00	-22.7		0.115
1 2 4-TRICHLOROENZENE	41.76	50.00	-16.5		0.966

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

% DRIFT REPORT

Data File : i52555.d
Lab ID : VSTD050
Samp Info : VSTD050 (2-094-6)
Method : /chem/i.i/i990809a.b/5ml82602.m
Operator : DOUG
Analyzed : 09-AUG-99 11:41
Sublist : all
Instrument : i
ICAL Analyzed : ~~28-JUL-99 00:53 to 28-JUL-99 10:27~~

Compound*	Amount	Nominal	% Drift	Flag	RRF
HEXACHLOROBUTADIENE	41.51	50.00	-17.0		0.802
NAPHTHALENE	40.21	50.00	-19.6		1.158
1 2 3-TRICHLOROBENZENE	43.00	50.00	-14.0		0.836

* = % Drift of CCC > 20 % or SPCC RRF < minimum RRF

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39825

Lab File ID (Standard): I52555.D

Date Analyzed: 08/09/01

Instrument ID: I

Time Analyzed: 1141

	IS1 (PFB) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	310180	3.72	325252	4.37	275414	7.59
=====	=====	=====	=====	=====	=====	=====
UPPER LIMIT	620360	4.22	650504	4.87	550828	8.09
=====	=====	=====	=====	=====	=====	=====
LOWER LIMIT	155090	3.22	162626	3.87	137707	7.09
=====	=====	=====	=====	=====	=====	=====
EPA SAMPLE No.						
=====	=====	=====	=====	=====	=====	=====
01 VBLK1	246267	3.73	267374	4.36	228780	7.56
02 LCS1	250475	3.72	265070	4.34	231446	7.57
03 LCSD1	253316	3.73	272264	4.37	223157	7.57
04 08GSP0601MS	257289	3.72	275084	4.36	224972	7.56
05 08GSP0601MSD	238889	3.73	259333	4.36	216264	7.57
06 08GSP0601	225428	3.70	242847	4.35	215877	7.56
07 08GSP0701	245170	3.72	263987	4.35	227190	7.55
08 08GSP0801	226060	3.72	243293	4.35	211193	7.55
09 08GSP0901	235737	3.72	252084	4.35	217564	7.55
10 08TSP0901	233038	3.72	261931	4.35	229183	7.55
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (PFB) = PENTAFLUOROENZENE
 IS2 (DFB) = 1,4-DIFLUOROENZENE
 IS3 (CBZ) = CHLOROENZENE-d5

UPPER LIMIT = + 100%
 of internal standard area.
 LOWER LIMIT = - 50%
 of internal standard area.

Column used to flag values outside QC limits with an asterisk.

8B
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39825

Lab File ID (Standard): I52555.D

Date Analyzed: 08/01

Instrument ID: I

Time Analyzed: 1141

	IS4 (DCB)	
	AREA #	RT
=====	=====	=====
12 HOUR STD	159787	10.88
=====	=====	=====
UPPER LIMIT	319574	11.38
=====	=====	=====
LOWER LIMIT	79894	10.38
=====	=====	=====
EPA SAMPLE No.		
=====	=====	=====
01 VBLK1	126277	10.87
02 LCS1	132943	10.87
03 LCSD1	135951	10.88
04 08GSP0601MS	132970	10.87
05 08GSP0601MSD	122968	10.86
06 08GSP0601	116813	10.87
07 08GSP0701	129676	10.86
08 08GSP0801	118262	10.86
09 08GSP0901	123994	10.85
10 08TSP0901	129818	10.86
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

IS4 (DCB) = 1,4-DICHLOROBENZENE d4

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag values outside QC limits with an asterisk.

**BLANK SUMMARY
VOLATILE ORGANIC FRACTION**

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 (other than the three (3) listed below) 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. For the following four (4) compounds, the results are qualified by elevating the limit of detection or adjusting the limit of detection to the sample result, when the sample concentration is less than ten (10) times the blank concentration.

Common laboratory contaminants: methylene chloride
 acetone
 2-butanone

- 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 ten times (10X) 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 ten times (10X) the blank value. Reject the sample result, cross out the "B" flag, and report the CRQL.

greater
No Action - The sample result is greater than the CRQL and than ten times (10X) the blank value.

4A
VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK1

Lab Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE

SAS No.:

SDG No.: 39825

Lab File ID: I52557.D

Lab Sample ID: U990809A

Date Analyzed: 08/09/99

Time Analyzed: 1301

Matrix: (soil/water) WATER

Level: (low/med) LOW

Instrument ID: I

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1	LCS1	I52558.D	1333
02	LCSD1	LCSD1	I52559.D	1356
03	08GSP0601MS	39825.01MS	I52560.D	1442
04	08GSP0601MSD	39825.01MSD	I52561.D	1505
05	08GSP0601	39825.01	I52562.D	1545
06	08GSP0701	39825.07	I52563.D	1608
07	08GSP0801	39825.08	I52564.D	1631
08	08GSP0901	39825.09	I52565.D	1654
09	08TSP0901	39825.10	I52566.D	1717
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

no contamination

BLANK SUMMARY - TCL SUMMARY
VOLATILE ORGANIC FRACTION

Method Blank Trip Blank Rinseate Blank Field Blank Other

Sample ID: 008TSP0901

File ID: _____

COMPOUND	CONCENTRATION	CRQL

EPA SAMPLE ID				
	<i>WAA 09/16/99</i>			

2A
WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: SWL-TULSA

Contract: ZONEG R119

Lab Code: SWOK

Case No.: ENSAFE SAS No.:

SDG No.: 39835

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCA) #	SMC4 (DBF) #	TOT OUT
01	VBLK1	98	94	89	96	0
02	LCS1	109	101	100	104	0
03	LCSD1	108	100	104	105	0
04	08GSP0601MS	100	94	97	98	0
05	08GSP0601MSD	110	106	105	110	0
06	08GSP0601	103	96	93	97	0
07	08GSP0701	98	93	93	95	0
08	08GSP0801	104	98	95	101	0
09	08GSP0901	108	103	104	107	0
10	08TSP0901	103	102	102	103	0
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

QC LIMITS

SMC1 (TOL) = TOLUENE-d8 (88-110)
 SMC2 (BFB) = 4-BROMOFLUOROBENZENE (86-115)
 SMC3 (DCA) = 1,2-DICHLOROETHANE-d4 (80-120)
 SMC4 (DBF) = DIBROMOFLUOROMETHANE (86-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

LCS\LCSD RECOVERY REPORT

Lab Name: SWOK\AATS

Matrix: WATER

Instrument: i

Analyst: DOUG

LCS Analysis Date: 09-AUG-99 13:33

LCS File id: i52558.d

LCSD Analysis Date: 09-AUG-99 13:56

LCSD File id: i52559.d

Units: Water ug/L Soil ug/Kg Air ppbv

COMPOUND	SPIKE ADDED	LCS CONCENTRATION	LCS % REC #	QC LIMITS REC
CHLOROMETHANE	50.00	58.40	117	47-150
VINYL CHLORIDE	50.00	55.62	111	53-138
BROMOMETHANE	50.00	45.64	91	46-143
CHLOROETHANE	50.00	47.47	95	59-142
1 1-DICHLOROETHENE	50.00	47.42	95	58-135
ACETONE	50.00	31.31	63	36-154
CARBON DISULFIDE	50.00	56.56	113	49-133
METHYLENE CHLORIDE	50.00	39.56	79	59-134
trans-1 2-DICHLOROETHENE	50.00	48.97	98	59-134
1 1-DICHLOROETHANE	50.00	52.52	105	60-133
VINYL ACETATE	50.00	46.32	93	56-135
cis-1 2-DICHLOROETHENE	50.00	47.65	95	61-134
2-BUTANONE	50.00	50.11	100	44-152
CHLOROFORM	50.00	49.36	99	61-133
1 1 1-TRICHLOROETHANE	50.00	48.55	97	59-130
CARBON TETRACHLORIDE	50.00	48.51	97	61-129
BENZENE	50.00	48.90	98	64-128
1 2-DICHLOROETHANE	50.00	50.52	101	61-136
TRICHLOROETHENE	50.00	48.43	97	64-128
1 2-DICHLOROPROPANE	50.00	49.19	98	66-135
BROMODICHLOROMETHANE	50.00	46.98	94	63-134
2-CHLOROETHYL VINYL ETHER	50.00	40.61	81	40-149
cis-1,3-Dichloropropene	50.00	49.08	98	65-129
4-METHYL-2-PENTANONE	50.00	45.94	92	56-146
TOLUENE	50.00	49.56	99	59-134
trans-1,3-Dichloropropene	50.00	47.03	94	64-130
1 1 2-TRICHLOROETHANE	50.00	48.67	97	68-131
TETRACHLOROETHENE	50.00	48.56	97	62-133
2-HEXANONE	50.00	43.54	87	55-142
DIBROMOCHLOROMETHANE	50.00	46.60	93	41-145
CHLOROBENZENE	50.00	50.47	101	62-132
ETHYL BENZENE	50.00	35.11	70	60-131
m,p-XYLENES	100.00	94.94	95	72-126
o-XYLENE	50.00	46.96	94	62-132
STYRENE	50.00	46.78	94	61-136
BROMOFORM	50.00	45.77	92	61-135
1 1 2 2-TETRACHLOROETHANE	50.00	45.26	90	59-139

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

LCS Recovery: 0 out of 37 outside limits

LCS\LCSD RECOVERY REPORT

Lab Name: SWOK\AATS

Matrix: WATER

Instrument: i

Analyst: DOUG

LCS Analysis Date: 09-AUG-99 13:33

LCS File id: i52558.d

LCSD Analysis Date: 09-AUG-99 13:56

LCSD File id: i52558.d

Units: Water ug/L Soil ug/Kg Air ppbv

COMPOUND	SPIKE ADDED	LCSD CONC.	LCSD % REC #	% RPD	QC LIMITS REC
CHLOROMETHANE	50.00	57.37	115	2	47-150
VINYL CHLORIDE	50.00	53.67	107	4	53-138
BROMOMETHANE	50.00	45.82	92	1	46-143
CHLOROETHANE	50.00	51.19	102	7	59-142
1 1-DICHLOROETHENE	50.00	51.24	102	7	58-135
ACETONE	50.00	46.96	94	39	36-154
CARBON DISULFIDE	50.00	58.14	116	3	49-133
METHYLENE CHLORIDE	50.00	40.29	80	1	59-134
trans-1 2-DICHLOROETHENE	50.00	49.71	99	1	59-134
1 1-DICHLOROETHANE	50.00	53.46	107	2	60-133
VINYL ACETATE	50.00	51.34	103	10	56-135
cis-1 2-DICHLOROETHENE	50.00	47.39	95	0	61-134
2-BUTANONE	50.00	57.34	115	14	44-152
CHLOROFORM	50.00	50.40	101	2	61-133
1 1 1-TRICHLOROETHANE	50.00	50.11	100	3	59-130
CARBON TETRACHLORIDE	50.00	50.47	101	4	61-129
BENZENE	50.00	48.91	98	0	64-128
1 2-DICHLOROETHANE	50.00	52.94	106	5	61-136
TRICHLOROETHENE	50.00	49.24	98	1	64-128
1 2-DICHLOROPROPANE	50.00	52.09	104	6	66-135
BROMODICHLOROMETHANE	50.00	49.97	100	6	63-134
2-CHLOROETHYL VINYL ETHER	50.00	43.60	87	7	40-149
cis-1,3-Dichloropropene	50.00	50.52	101	3	65-129
4-METHYL-2-PENTANONE	50.00	44.67	89	3	56-146
TOLUENE	50.00	50.88	102	3	59-134
trans-1,3-Dichloropropene	50.00	48.20	96	2	64-130
1 1 2-TRICHLOROETHANE	50.00	52.20	104	7	68-131
TETRACHLOROETHENE	50.00	50.82	102	5	62-133
2-HEXANONE	50.00	53.55	107	21	55-142
DIBROMOCHLOROMETHANE	50.00	51.54	103	10	41-145
CHLOROBENZENE	50.00	52.93	106	5	62-132
ETHYL BENZENE	50.00	36.51	73	4	60-131
m,p-XYLENES	100.00	103.60	104	9	72-126
o-XYLENE	50.00	50.01	100	6	62-132
STYRENE	50.00	50.48	101	7	61-136
BROMOFORM	50.00	51.93	104	12	61-135
1 1 2 2-TETRACHLOROETHANE	50.00	48.20	96	6	59-139

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

LCSD Recovery: 0 out of 37 outside limits

MS\MSD RECOVERY REPORT

Lab Name: SWOK\AATS

Matrix: WATER

Instrument: i

Analyst: DOUG

Sample Analysis Date: 09-AUG-99 15:45

Sample File id: i52562.d

Sample Lab ID: 39825.01

Sample Client id: 08GSP0601

MS Analysis Date: 09-AUG-99 14:42

MS File id: i52560.d

MS Lab ID: 39825.01MS

MS Client id: 08GSP0601MS

MSD Analysis Date: 09-AUG-99 15:05

MSD File id: i52561.d

MSD Lab ID: 39825.01MSD

MSD Client id: 08GSP0601MSD

Units: Water ug/L Soil ug/Kg

COMPOUND	SPIKE ADDED	SAMPLE CONC.	MS CONC.	MS % REC #	QC LIMITS REC
CHLOROMETHANE	50.0	0.0	57.5	115	47-150
VINYL CHLORIDE	50.0	0.0	56.4	113	53-138
BROMOMETHANE	50.0	0.0	46.1	92	46-143
CHLOROETHANE	50.0	0.0	50.4	101	59-142
1 1-DICHLOROETHENE	50.0	0.0	49.1	98	58-135
ACETONE	50.0	0.0	37.5	75	36-154
CARBON DISULFIDE	50.0	0.0	56.9	114	49-133
METHYLENE CHLORIDE	50.0	0.0	37.1	74	59-134
trans-1 2-DICHLOROETHENE	50.0	0.0	47.7	95	59-134
1 1-DICHLOROETHANE	50.0	0.0	49.9	100	60-133
VINYL ACETATE	50.0	0.0	45.7	91	56-135
cis-1 2-DICHLOROETHENE	50.0	0.0	46.5	93	61-134
2-BUTANONE	50.0	0.0	55.8	112	44-152
CHLOROFORM	50.0	0.0	48.4	97	61-133
1 1 1-TRICHLOROETHANE	50.0	0.0	48.2	96	59-130
CARBON TETRACHLORIDE	50.0	0.0	47.5	95	61-129
BENZENE	50.0	0.0	46.7	93	64-128
1 2-DICHLOROETHANE	50.0	0.0	47.7	95	61-136
TRICHLOROETHENE	50.0	0.0	45.8	92	64-128
1 2-DICHLOROPROPANE	50.0	0.0	46.9	94	66-135
BROMODICHLOROMETHANE	50.0	0.0	45.5	91	63-134
2-CHLOROETHYL VINYL ETHER	50.0	0.0	5.8	12*	40-149
cis-1,3-Dichloropropene	50.0	0.0	47.7	95	65-129
4-METHYL-2-PENTANONE	50.0	0.0	47.2	94	56-146
TOLUENE	50.0	0.0	47.8	96	59-134
trans-1,3-Dichloropropene	50.0	0.0	44.6	89	64-130
1 1 2-TRICHLOROETHANE	50.0	0.0	46.3	93	68-131
TETRACHLOROETHENE	50.0	0.0	51.8	104	62-133
2-HEXANONE	50.0	0.0	49.8	100	55-142
DIBROMOCHLOROMETHANE	50.0	0.0	48.4	97	41-145
CHLOROBENZENE	50.0	0.0	50.0	100	62-132
ETHYL BENZENE	50.0	0.0	34.1	68	60-131
m,p-XYLENES	100.0	1.2	97.6	96	72-126
o-XYLENE	50.0	0.0	49.2	98	62-132

Column to be used to flag recovery with an asterisk

Value outside of QC limits

JWJ
5-043

COMPOUND	SPIKE ADDED	SAMPLE CONC.	MS CONC.	MS % REC #	QC LIMITS REC
STYRENE	50.0	0.0	47.6	95	11-136
BROMOFORM	50.0	0.0	46.7	93	11-135
1 1 2 2-TETRACHLOROETHANE	50.0	0.0	46.9	94	59-139

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

MS Recovery: 1 out of 37 outside limits

MS\MSD RECOVERY REPORT

Lab Name: SWOK\AATS

Matrix: WATER

Instrument: i

Analyst: DOUG

Sample Analysis Date: 09-AUG-99 15:45

Sample File id: i52560.d

Sample Lab ID: 39825.01

Sample Client id: 08GSP0601

MS Analysis Date: 09-AUG-99 14:42

MS File id: i52560.d

MS Lab ID: 39825.01MS

MS Client id: 08GSP0601MS

MSD Analysis Date: 09-AUG-99 15:05

MSD File id: i52561.d

MSD Lab ID: 39825.01MSD

MSD Client id: 08GSP0601MSD

Units: Water ug/L Soil ug/Kg

COMPOUND	SPIKE ADDED	MSD CONC.	MSD % REC #	% RPD	QC LIMITS	
					RPD#	REC
CHLOROMETHANE	50.0	54.1	108	6	22	47-150
VINYL CHLORIDE	50.0	59.3	118	4	24	53-138
BROMOMETHANE	50.0	51.4	103	11	24	46-143
CHLOROETHANE	50.0	51.7	103	2	20	59-142
1 1-DICHLOROETHENE	50.0	48.4	97	1	20	58-135
ACETONE	50.0	46.9	94	22	27	36-154
CARBON DISULFIDE	50.0	61.4	123	8	21	49-133
METHYLENE CHLORIDE	50.0	44.3	88	17	20	59-134
trans-1 2-DICHLOROETHENE	50.0	50.7	101	6	20	59-134
1 1-DICHLOROETHANE	50.0	55.7	111	10	20	60-133
VINYL ACETATE	50.0	55.0	110	19	20	56-135
cis-1 2-DICHLOROETHENE	50.0	50.9	102	9	20	61-134
2-BUTANONE	50.0	57.2	114	2	24	44-152
CHLOROFORM	50.0	52.8	106	9	20	61-133
1 1 1-TRICHLOROETHANE	50.0	51.7	103	7	20	59-130
CARBON TETRACHLORIDE	50.0	48.3	97	2	20	61-129
BENZENE	50.0	50.1	100	7	20	64-128
1 2-DICHLOROETHANE	50.0	53.3	107	12	20	61-136
TRICHLOROETHENE	50.0	49.7	99	7	20	64-128
1 2-DICHLOROPROPANE	50.0	48.4	97	3	20	66-135
BROMODICHLOROMETHANE	50.0	50.9	102	11	20	63-134
2-CHLOROETHYL VINYL ETHER	50.0	0.0	0*	200	54*	40-149
cis-1,3-Dichloropropene	50.0	51.6	103	8	20	65-129
4-METHYL-2-PENTANONE	50.0	54.1	108	14	20	56-146
TOLUENE	50.0	50.3	100	4	20	59-134
trans-1,3-Dichloropropene	50.0	50.0	100	12	20	64-130
1 1 2-TRICHLOROETHANE	50.0	51.8	104	11	20	68-131
TETRACHLOROETHENE	50.0	52.7	105	1	20	62-133
2-HEXANONE	50.0	56.3	113	12	20	55-142
DIBROMOCHLOROMETHANE	50.0	51.7	103	6	20	41-145
CHLOROBENZENE	50.0	52.3	104	4	20	62-132
ETHYL BENZENE	50.0	37.8	76	11	20	60-131
m,p-XYLENES	100.0	102.3	101	5	20	72-126
o-XYLENE	50.0	49.6	99	1	20	62-132

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

JLR

045

COMPOUND	SPIKE ADDED	MSD CONC.	MSD % REC #	% RPD	QC LIMITS	
					RPD#	REC
STYRENE	50.0	50.5	101	6	20	61-136
BROMOFORM	50.0	51.5	103	10	20	61-135
1 1 2 2-TETRACHLOROETHANE	50.0	54.3	108	14	20	59-139

Column to be used to flag recovery with an asterisk

* Value outside of QC limits

MSD Recovery: 1 out of 37 outside limits

RPD: 1 out of 37 outside limits

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

SDG NARRATIVE

August 18, 1999

CLIENT: ENSAFE

SDG No.: 39825

VOLATILE FRACTION

Five water samples were submitted for Volatile Organic Analysis. The samples were analyzed by GC/MS following Method SW846-8260B and a specified compound list.

No major problems occurred during the analyses of these samples. It should be noted that the laboratory does not control off of the compound 2-chloroethyl vinyl ether (2CEVE). The recoveries are frequently very low and the compound is often not detected in highly acidified spike samples.

Blanks: No problems.

Surrogates: No problems.

Laboratory Control Spikes: No problems.

Internal Standards: No problems.

Matrix Spikes. There were no matrix spikes submitted with this SDG. The MS/MSD on sample 08GSP0601 was run as part of our laboratory QC (analytical batch 1990809A). Sample 08GSP0601MS and 08GSP0601MSD each contained one target compound outside QC recovery limits (2CEVE see above). One compound (2CEVE) exceeded its RPD limit.


Harry M. Borg
Organic Program Manager

August 18, 1999

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Test Code: Volatiles MS326
 Method: SW846 5030A/8260B
 Matrix: Water-Soil
 Sample Volume: 5 mL - 5 g
 Initial Calibration(5ml/5g): 5-20-50-100-200 ccc (NRSD < 30% for VOC compounds SPCC RRF > 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCC RRF > 1.000 for Chloromethane, 1,1-Dichloroethane and Bromoform
 Continuing Calibration(5ml/5g): 50 ccc, %D < 20% for VOC compounds SPCC RRF > 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCC RRF > 1.000 for Chloromethane, 1,1-Dichloroethane, and Bromoform
 Internal Standards: Chlorobenzene-D5, 1,4-Dichlorobenzene-D4, 1,4-Difluorobenzene, Perfluorobenzene
 Surrogates: Toluene-D8, 4-Bromofluorobenzene, Dibromofluoromethane
 Page 1 of 2

COMPOUND	CAS NUMBER	PQL	PQL	MDL	MDL
		WATER, 5ml ug/L	SOIL ug/Kg	WATER, 5ml ug/L	SOIL ug/Kg
DICHLORODIFLUOROMETHANE	75-71-8	5	5	4	3.2
CHLOROMETHANE	74-87-3	5	5	0.6	0.6
VINYL CHLORIDE	75-01-4	5	5	1.0	0.8
BROMOMETHANE	74-83-9	5	5	0.5	1.0
CHLOROETHANE	75-00-3	5	5	0.6	0.9
TRICHLOROFLUOROMETHANE	75-69-4	5	5	1.4	0.8
1,1-DICHLOROETHENE	75-35-4	5	5	1.6	1.0
CARBON DISULFIDE	75-15-0	5	5	1.3	1.0
METHYLENE CHLORIDE	75-09-2	5	5	1.1	1.2
trans-1,2-DICHLOROETHENE	156-60-5	5	5	1.3	1.0
1,1-DICHLOROETHANE	75-34-3	5	5	1.0	0.9
cis-1,2-DICHLOROETHENE	156-59-2	5	5	1.4	1.2
1,2-Dichloroethene (total)	540-59-0	5	5	2.5	2.1
2,2-DICHLOROPROPANE	594-20-7	5	5	0.9	0.7
BROMOCHLOROMETHANE	74-97-5	5	5	0.6	0.3
CHLOROFORM	67-66-3	5	5	0.8	0.7
1,1,1-TRICHLOROETHANE	71-55-6	5	5	0.8	0.7
1,1-DICHLOROPROPENE	563-58-6	5	5	0.6	0.8
CARBON TETRACHLORIDE	56-23-5	5	5	0.8	0.5
BENZENE	71-43-2	5	5	0.6	0.8
1,2-DICHLOROETHANE	107-06-2	5	5	1.0	1.2
TRICHLOROETHENE	79-01-6	5	5	1.6	0.7
1,2-DICHLOROPROPANE	78-87-5	5	5	0.6	1.0
DIBROMOMETHANE	74-95-3	5	5	0.8	0.9
BROMODICHLOROMETHANE	75-27-4	5	5	0.7	0.6
1,1,1-TRICHLOROETHANE	108-88-3	5	5	1.1	1.1
1,1,2-TRICHLOROETHANE	79-00-5	5	5	0.8	0.8
TETRACHLOROETHENE	127-18-4	5	5	0.9	0.7
1,3-DICHLOROPROPANE	142-28-9	5	5	0.8	0.9
DIBROMOCHLOROMETHANE	124-48-1	5	5	1.0	0.5
1,2-DIBROMOETHANE	106-93-4	5	5	1.1	1.1
CHLOROBENZENE	108-90-7	5	5	0.7	0.7
1,1,1,2-TETRACHLOROETHANE	630-20-6	5	5	0.6	0.8
ETHYL BENZENE	100-41-4	5	5	0.8	1.1
m,p-XYLENES	13-302-07	5	5	1.6	1.2
o-XYLENE	95-47-6	5	5	0.9	0.8
Xylene (Total)	1330-20-7	5	5	2.4	1.8
STYRENE	100-42-5	5	5	0.8	1.2
BROMOFORM	75-25-2	5	5	0.7	0.9
ISOPROPYLBENZENE	98-82-8	5	5	0.9	0.9
1,2,3-TRICHLOROPROPANE	96-18-4	5	5	0.8	1.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Volatiles
 Test Code MS326
 Method SW846 5030A / 8050B
 Matrix Water-Soil
 Sample Volume 5 mL - 5 g
 Initial Calibration(5ml/5g) 50-50-100-200 ppm \pm RSO \times 20% for VOC compounds SPCG RRF \times 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCG RRF \times 1.100 for Chloroethane 1,1-Dichloroethane and Bromoform
 Continuing Calibration(5ml/5g) 50 ppm \pm RD \times 20% for VOC compounds SPCG RRF \times 0.300 for Chlorobenzene and 1,1,2,2-Tetrachloroethane SPCG RRF \times 1.100 for Chloroethane 1,1-Dichloroethane and Bromoform
 Internal Standards Chlorobenzene-D5 1,4-Dichlorobenzene-D4 1,4-Difluorobenzene, Pentafluorobenzene
 Surrogates Toluene-D8 4-Bromofluorobenzene Dibromofluorobenzene
 Page 2 of 2

COMPOUND	CAS NUMBER	PQL	PQL	MDL	MDL
		WATER, 5ml ug/L	SOIL ug/Kg	WATER, 5ml ug/L	SOIL ug/Kg
BROMOBENZENE	108-86-1	5	5	1.1	1.0
1,1,2,2-TETRACHLOROETHANE	79-34-5	5	5	0.8	0.8
n-PROPYLBENZENE	103-65-1	5	5	1.2	1.1
2-CHLOROTOLUENE	95-49-8	5	5	0.7	1.2
4-CHLOROTOLUENE	106-43-4	5	5	0.8	1.3
1,3,5-TRIMETHYLBENZENE	108-67-8	5	5	0.9	0.9
tert-BUTYLBENZENE	98-06-6	5	5	1.0	0.9
1,2,4-TRIMETHYLBENZENE	95-63-6	5	5	0.8	0.7
sec-BUTYLBENZENE	135-98-8	5	5	0.8	0.7
1,3-DICHLOROBENZENE	541-73-1	5	5	0.8	0.9
p-ISOPROPYLTOLUENE	99-87-6	5	5	0.9	0.9
1,4-DICHLOROBENZENE	106-46-7	5	5	0.7	0.8
1,2-DICHLOROBENZENE	95-50-1	5	5	0.6	0.7
n-BUTYLBENZENE	104-51-8	5	5	1.0	1.0
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	5	5	1.6	4.0
1,2,4-TRICHLOROBENZENE	120-82-1	5	5	1.0	1.1
HEXACHLOROBUTADIENE	87-68-3	5	5	1.0	1.6
NAPHTHALENE	91-20-3	5	5	0.9	1.0
1,2,3-TRICHLOROBENZENE	87-61-6	5	5	1.0	0.9

WATER MDL ANALYZED ON INSTR. K - 1/19/98
 SOIL MDL ANALYZED ON INSTR. K - 1/23/98

MULTI-MEDIA SEMIVOLATILE ORGANIC FRACTION

CASE NUMBER: _____ SDG NUMBER: 39825

LABORATORY: SWL-Tulsa

CLIENT: EnSafe PROJECT: Charleston Zone G

REVIEWER: LM DATE: 9-16-99 Rel 99-74

QA/QC LEVEL

- NEESA C
- NEESA D
- DQO LEVEL III
- DQO LEVEL IV
- _____

Statement Of Work (SOW)

- CLP 3/90
- CLP 2/88
- SW846 8270C
- SW846 8270 Appendix IX
- _____

ANALYSIS MODIFICATIONS: _____

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39105

Lab File ID: S9081801.D

DFTPP Injection Date: 08/18/99

Instrument ID: HP70S

DFTPP Injection Time: 0720

m/e	ION ABUNCANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	46.2
68	Less than 2.0% of mass 69	0.7 (1.3)1
69	Mass 69 relative abundance	54.3
70	Less than 2.0% of mass 69	0.0 (0.0)1
127	40.0 - 60.0% of mass 198	46.0
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 - 9.0% of mass 198	6.3
275	10.0 - 30.0% of mass 198	25.0
365	Greater than 1.00% of mass 198	1.7
441	Present, but less than mass 443	8.0
442	Greater than 40.0% of mass 198	60.9
443	17.0 - 23.0% of mass 442	12.3 (20.2)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD160	SSTD160	S9081802.D	08/18/99	0758
02	SSTD020	SSTD020	S9081803.D	08/18/99	0833
03	SSTD120	SSTD120	S9081804.D	08/18/99	0908
04	SSTD080	SSTD080	S9081806.D	08/18/99	1021
05	SSTD050	SSTD050	S9081808.D	08/18/99	1135
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6B
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Instrument ID: HP70S

Calibration Date(s): 08/18/99

Calibration Times:

0758

1135

LAB FILE ID:	RRF20 = S9081803.D	RRF50 = S9081808.D	RRF80 = S9081806.D	RRF120 = S9081804.D	RRF160 = S9081802.D	RRF	% RSD
COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Phenol	1.722	1.703	1.603	1.441	1.452	1.584	8.4*
bis(2-Chloroethyl) ether	1.266	1.315	1.183	1.149	1.194	1.221	5.5
2-Chlorophenol	1.215	1.267	1.152	1.101	1.119	1.171	5.9
1,3-Dichlorobenzene	1.381	1.302	1.260	1.217	1.204	1.273	5.6
1,4-Dichlorobenzene	1.407	1.281	1.285	1.245	1.232	1.290	5.4*
Benzyl Alcohol	1.284	1.278	1.202	1.093	1.181	1.208	6.5
1,2-Dichlorobenzene	1.275	1.175	1.178	1.086	1.080	1.159	6.9
2-Methylphenol	1.043	1.052	1.030	0.930	0.934	0.998	6.1
bis(2-Chloroisopropyl) ether	1.721	1.965	1.845	1.666	1.582	1.756	8.6
4-Methylphenol	1.130	1.119	1.060	0.984	1.014	1.061	6.0
N-Nitroso-di-n-propylamine	0.978	1.087	1.037	0.936	0.953	0.998	6.3#
Hexachloroethane	0.606	0.583	0.588	0.572	0.567	0.583	2.6
Nitrobenzene	0.468	0.468	0.460	0.444	0.425	0.453	4.1
Isophorone	0.779	0.748	0.736	0.731	0.704	0.740	
2-Nitrophenol	0.198	0.199	0.199	0.198	0.201	0.199	0.6*
2,4-Dimethylphenol	0.301	0.336	0.336	0.341	0.333	0.329	4.9
Benzoic Acid	0.263	0.383	0.455	0.482	0.493	0.415	23.0
bis(2-Chloroethoxy)methane	0.464	0.448	0.442	0.423	0.420	0.439	4.2
2,4-Dichlorophenol	0.294	0.270	0.268	0.263	0.268	0.273	4.5*
1,2,4-Trichlorobenzene	0.328	0.304	0.302	0.301	0.297	0.306	4.0
Naphthalene	1.069	0.973	0.910	0.910	0.893	0.951	7.6
4-Chloroaniline	0.434	0.390	0.391	0.378	0.370	0.393	6.3
Hexachlorobutadiene	0.218	0.173	0.181	0.206	0.192	0.194	9.4*
4-Chloro-3-methylphenol	0.350	0.329	0.330	0.336	0.312	0.331	4.1*
2-Methylnaphthalene	0.618	0.580	0.583	0.579	0.558	0.584	3.7
Hexachlorocyclopentadiene	0.355	0.307	0.382	0.402	0.377	0.365	9.9#
2,4,6-Trichlorophenol	0.375	0.333	0.347	0.356	0.346	0.351	4.4*
2,4,5-Trichlorophenol	0.384	0.332	0.356	0.349	0.347	0.354	5.4
2-Chloronaphthalene	1.103	0.971	1.003	0.969	0.940	0.997	6.3
2-Nitroaniline	0.442	0.496	0.491	0.471	0.451	0.470	5.1
Dimethylphthalate	1.216	1.138	1.190	1.156	1.102	1.160	3.8
Acenaphthylene	1.710	1.632	1.630	1.552	1.472	1.599	5.6
2,6-Dinitrotoluene	0.260	0.257	0.283	0.268	0.276	0.269	4.0
3-Nitroaniline	0.304	0.295	0.326	0.314	0.300	0.308	4.0
Acenaphthene	1.063	0.976	1.020	1.013	0.931	1.001	5.0*
2,4-Dinitrophenol	0.051	0.068	0.096	0.104	0.109	0.086	29.1#
4-Nitrophenol	0.172	0.192	0.218	0.213	0.213	0.202	9.6#

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 All non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

Handwritten signature and number:
 ME 5056

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA Contract: ZONE G
 Lab Code: SWOK Case No.: ENSAF SAS No.: SDG No.: 39825
 Instrument ID: HP70S Calibration Date(s): 08/18/99
 Calibration Times: 0758 1135

LAB FILE ID:	RRF20 = S9081803.D	RRF50 = S9081808.D	RRF80 = S9081806.D	RRF120 = S9081804.D	RRF160 = S9081802.D		
COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Dibenzofuran	1.466	1.308	1.328	1.361	1.304	1.353	4.9
2,4-Dinitrotoluene	0.301	0.341	0.382	0.384	0.378	0.357	10.1
Diethylphthalate	1.250	1.212	1.203	1.172	1.110	1.189	4.4
4-Chlorophenyl-phenylether	0.576	0.532	0.563	0.554	0.549	0.555	2.9
Fluorene	1.150	1.076	1.133	1.013	0.975	1.069	7.0
4-Nitroaniline	0.293	0.296	0.334	0.320	0.316	0.312	5.5
4,6-Dinitro-2-methylphenol	0.065	0.092	0.106	0.114	0.108	0.097	20.2
N-Nitrosodiphenylamine (1)	0.500	0.489	0.471	0.452	0.440	0.470	5.3*
4-Bromophenyl-phenylether	0.245	0.219	0.206	0.220	0.213	0.221	6.7
Hexachlorobenzene	0.280	0.249	0.263	0.261	0.254	0.261	4.5
Pentachlorophenol	0.122	0.120	0.125	0.160	0.153	0.136	13.9*
Phenanthrene	1.016	1.028	0.922	0.919	0.911	0.959	6.0
Anthracene	1.023	0.973	0.901	0.868	0.870	0.927	7.4
Carbazole	0.928	0.934	0.875	0.872	0.850	0.892	4.2
Di-n-butylphthalate	1.383	1.364	1.295	1.223	1.216	1.296	6.0
Fluoranthene	1.087	1.005	1.009	1.007	0.981	1.018	4.0
Pyrene	1.369	1.325	1.392	1.212	1.186	1.297	7.2
Butylbenzylphthalate	0.818	0.803	0.864	0.734	0.710	0.786	8.0
3,3'-Dichlorobenzidine	0.488	0.423	0.474	0.423	0.454	0.452	6.5
Benzo(a)anthracene	1.144	1.042	1.108	1.083	1.063	1.088	3.6
Chrysene	1.190	1.014	1.154	0.998	0.951	1.061	9.8
bis(2-Ethylhexyl)phthalate	1.098	1.079	1.133	0.976	0.946	1.046	7.7
Di-n-octylphthalate	2.044	2.034	1.931	1.735	1.637	1.876	9.7*
Benzo(b)fluoranthene	1.428	1.520	1.176	1.184	1.280	1.318	11.5
Benzo(k)fluoranthene	1.193	0.969	1.140	1.106	0.838	1.049	13.7
Benzo(a)pyrene	1.215	1.094	0.998	1.064	1.034	1.081	7.7*
Indeno(1,2,3-cd)pyrene	1.626	1.359	1.456	1.378	1.414	1.447	7.4
Dibenz(a,h)anthracene	1.269	1.104	1.066	1.048	1.043	1.106	8.5
Benzo(g,h,i)perylene	1.339	1.129	1.167	1.124	1.164	1.185	7.5
Pyridine	1.342	1.217	1.001	1.278	1.415	1.251	12.6
Nitrobenzene-d5	0.444	0.463	0.454	0.442	0.434	0.447	2.5
2-Fluorobiphenyl	1.125	1.072	1.093	1.009	0.997	1.059	5.2
Terphenyl-d14	0.959	0.897	0.934	0.888	0.868	0.909	4.0
Phenol-d5	1.611	1.654	1.518	1.432	1.464	1.536	6.2
2-Fluorophenol	1.102	1.167	1.096	1.043	1.071	1.096	4.2
2,4,6-Tribromophenol	0.120	0.101	0.125	0.138	0.130	0.123	11.3

(1) Cannot be separated from Diphenylamine
 * = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
 All non-SPCC compounds must meet a minimum RRF of 0.01.
 Compounds with % RSD values > 15.0 must be analyzed by linear regression

SEMIVOLATILE INITIAL CALIBRATION : LINEAR REGRESSION SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39325

Instrument ID: HP70S

Calibration Date(s): 08/18/99

Calibration Times: 0758

1135

SSTD020 = S9081803.D SSTD050 = S9081808.D SSTD080 = S9081806.D
 SSTD120 = S9081804.D SSTD160 = S9081802.D

COMPOUND	SLOPE	INTERCEPT	R2 #
Benzoic Acid	0.531650	-0.155081	0.999
2,4-Dinitrophenol	0.120099	-0.047792	0.996
4,6-Dinitro-2-methylphenol	0.117264	-0.025173	0.996

= Column used to flag R2 values that fail. * = R2 value < 0.99

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Lab File ID: S9081901.D

DFTPP Injection Date: 08/19/99

Instrument ID: HP70S

DFTPP Injection Time: 0921

m/e	ION ABUNCANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	57.1
68	Less than 2.0% of mass 69	0.0 (0.0) 1
69	Mass 69 relative abundance	62.7
70	Less than 2.0% of mass 69	0.0 (0.0) 1
127	40.0 - 60.0% of mass 198	51.1
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 - 9.0% of mass 198	5.8
275	10.0 - 30.0% of mass 198	27.4
365	Greater than 1.00% of mass 198	1.4
441	Present, but less than mass 443	10.3
442	Greater than 40.0% of mass 198	60.3
443	17.0 - 23.0% of mass 442	12.7 (21.1) 2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDAR

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD080	SSTD080	S9081902.D	08/19/99	0936
02	SBLK1	BL0806WC	S9081913.D	08/19/99	1639
03	LCS1	LC0806WC	S9081918.D	08/19/99	1944
04	LCSD1	LD0806WC	S9081919.D	08/19/99	2021
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract: ZONE G
 Lab Code: SWOK Case No.: ENSAF SAS No.: SDG No.: 30 20
 Instrument ID: HP70S Calibration Date: 08/19/99 Time: 0936
 Lab File ID: S9081902.D Init. Calib. Date(s): 08/18/99 08/18/99
 Init. Calib. Times: 0758 1135

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
4-Chlorophenyl-phenylether	0.555	0.597		7.6	
Fluorene	1.069	1.131		5.8	
4-Nitroaniline	0.312	0.352		12.8	
4,6-Dinitro-2-methylphenol	0.097	0.120		23.7	
N-Nitrosodiphenylamine (1)	0.470	0.440		-6.2	20.0
4-Bromophenyl-phenylether	0.221	0.217		-1.8	
Hexachlorobenzene	0.261	0.266		1.9	
Pentachlorophenol	0.136	0.151		11.0	20.0
Phenanthrene	0.959	0.964		0.5	
Anthracene	0.927	0.923		-0.4	
Carbazole	0.892	0.896		0.4	
Di-n-butylphthalate	1.296	1.342		3.5	
Fluoranthene	1.018	1.041		2.2	
Pyrene	1.297	1.481		14.2	
Butylbenzylphthalate	0.786	0.809		2.9	
3,3'-Dichlorobenzidine	0.452	0.386		-14.6	
Benzo(a)anthracene	1.088	1.078		-0.9	
Chrysene	1.061	0.878		-17.2	
bis(2-Ethylhexyl)phthalate	1.046	1.121		7.2	
Di-n-octylphthalate	1.876	2.083		11.0	20.0
Benzo(b)fluoranthene	1.318	1.509		14.5	
Benzo(k)fluoranthene	1.049	1.074		2.4	
Benzo(a)pyrene	1.081	1.079		0.0	20.0
Indeno(1,2,3-cd)pyrene	1.447	1.207		-16.4	
Dibenz(a,h)anthracene	1.106	0.974		-11.9	
Benzo(g,h,i)perylene	1.185	1.018		-13.9	
Pyridine	1.251	1.190		-4.7	
Nitrobenzene-d5	0.447	0.442		-1.1	
2-Fluorobiphenyl	1.059	1.070		1.0	
Terphenyl-d14	0.909	1.009		11.0	
Phenol-d5	1.536	1.461		-4.7	
2-Fluorophenol	1.096	1.030		-6.0	
2,4,6-Tribromophenol	0.123	0.118		-3.9	
2-Chlorophenol-d4	1.130	1.133		0.3	
1,2-Dichlorobenzene-d4	0.757	0.797		5.3	

(1) Cannot be separated from Diphenylamine

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Lab File ID: S9082401.D

DFTPP Injection Date: 08/24/99

Instrument ID: HP70S

DFTPP Injection Time: 1055

m/e	ION ABUNANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	43.8
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	48.2
70	Less than 2.0% of mass 69	0.0 (0.0)1
127	40.0 - 60.0% of mass 198	43.4
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 - 9.0% of mass 198	6.4
275	10.0 - 30.0% of mass 198	29.3
365	Greater than 1.00% of mass 198	2.3
441	Present, but less than mass 443	10.6
442	Greater than 40.0% of mass 198	70.2
443	17.0 - 23.0% of mass 442	14.3 (20.4)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD160	SSTD160	S9082403.D	08/24/99	1155
02	SSTD120	SSTD120	S9082404.D	08/24/99	1232
03	SSTD050	SSTD050	S9082405.D	08/24/99	1308
04	SSTD020	SSTD020	S9082407.D	08/24/99	1444
05	SSTD080	SSTD080	S9082409.D	08/24/99	1559
06	008GSP0601	39825.01	S9082412.D	08/24/99	1816
07	008GSP0701	39825.07	S9082413.D	08/24/99	1854
08	008GSP0801	39825.08	S9082414.D	08/24/99	1931
09	008GSP0901	39825.09	S9082415.D	08/24/99	2008
10	008GSP0801MS	39825.08MS	S9082416.D	08/24/99	2044
11	008GSP0801MSD	39825.08MSD	S9082417.D	08/24/99	2120
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6B
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Instrument ID: HP70S

Calibration Date(s): 08/24/99

Calibration Times: 1155

1559

LAB FILE ID: RRF20 = S9082407.D RRF50 = S9082405.D
RRF80 = S9082409.D RRF120 = S9082404.D RRF160 = S9082403.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Phenol	1.554	1.390	1.506	1.330	1.264	1.409	8.6*
bis(2-Chloroethyl) ether	1.236	1.051	1.209	1.021	1.004	1.104	9.9
2-Chlorophenol	1.159	1.048	1.075	0.979	0.979	1.048	7.2
1,3-Dichlorobenzene	1.171	1.087	1.143	1.130	1.099	1.126	3.0
1,4-Dichlorobenzene	1.225	1.154	1.203	1.109	1.094	1.157	4.9*
Benzyl Alcohol	1.133	1.042	1.110	0.988	0.918	1.038	8.5
1,2-Dichlorobenzene	1.166	1.073	1.039	1.064	0.995	1.067	5.9
2-Methylphenol	0.935	0.864	0.893	0.822	0.823	0.867	5.6
bis(2-Chloroisopropyl) ether	2.188	1.890	2.161	1.780	1.600	1.924	13.1
4-Methylphenol	0.969	0.921	0.997	0.834	0.834	0.911	8.3
N-Nitroso-di-n-propylamine	1.040	0.943	1.038	0.848	0.823	0.938	10.9#
Hexachloroethane	0.510	0.500	0.585	0.510	0.474	0.516	8.0
Nitrobenzene	0.398	0.396	0.388	0.361	0.359	0.380	5.0
Isophorone	0.673	0.688	0.666	0.593	0.618	0.648	
2-Nitrophenol	0.107	0.143	0.131	0.139	0.144	0.133	11.5*
2,4-Dimethylphenol	0.313	0.326	0.323	0.293	0.296	0.310	4.9
Benzoic Acid	0.110	0.246	0.259	0.260	0.298	0.235	30.8
bis(2-Chloroethoxy)methane	0.449	0.398	0.407	0.384	0.368	0.401	7.6
2,4-Dichlorophenol	0.244	0.270	0.239	0.225	0.236	0.243	6.9*
1,2,4-Trichlorobenzene	0.307	0.309	0.266	0.284	0.284	0.290	6.2
Naphthalene	0.921	0.900	0.813	0.787	0.745	0.833	9.0
4-Chloroaniline	0.375	0.392	0.367	0.353	0.362	0.370	4.0
Hexachlorobutadiene	0.192	0.212	0.152	0.179	0.200	0.187	12.3*
4-Chloro-3-methylphenol	0.264	0.305	0.302	0.256	0.276	0.281	7.9*
2-Methylnaphthalene	0.556	0.567	0.523	0.491	0.487	0.525	7.0
Hexachlorocyclopentadiene	0.268	0.317	0.313	0.400	0.408	0.341	17.8#
2,4,6-Trichlorophenol	0.259	0.330	0.298	0.310	0.312	0.302	8.8*
2,4,5-Trichlorophenol	0.275	0.322	0.288	0.318	0.338	0.308	8.4
2-Chloronaphthalene	0.915	0.861	0.884	0.882	0.874	0.883	2.2
2-Nitroaniline	0.311	0.342	0.383	0.329	0.364	0.346	8.2
Dimethylphthalate	1.087	1.034	0.968	0.914	0.993	0.999	6.6
Acenaphthylene	1.439	1.514	1.321	1.378	1.336	1.398	5.7
2,6-Dinitrotoluene	0.152	0.180	0.193	0.194	0.214	0.187	12.2
3-Nitroaniline	0.225	0.240	0.231	0.220	0.248	0.233	4.8
Acenaphthene	0.952	0.969	0.850	0.880	0.887	0.908	5.6*
2,4-Dinitrophenol	0.031	0.061	0.060	0.061	0.087	0.060	33.0#
4-Nitrophenol	0.112	0.153	0.155	0.140	0.167	0.145	14.5#

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound
All non-SPCC compounds must meet a minimum RRF of 0.01.
Compounds with % RSD values > 15.0 must be analyzed by linear regression

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Instrument ID: HP70S

Calibration Date(s): 08/24/99

Calibration Times: 1155

1559

LAB FILE ID: RRF20 = S9082407.D RRF50 = S9082405.D
RRF80 = S9082409.D RRF120 = S9082404.D RRF160 = S9082403.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Dibenzofuran	1.389	1.270	1.168	1.094	1.134	1.211	9.8
2,4-Dinitrotoluene	0.219	0.261	0.269	0.256	0.299	0.261	11.0
Diethylphthalate	1.203	1.179	1.076	0.964	1.002	1.085	9.7
4-Chlorophenyl-phenylether	0.579	0.576	0.522	0.513	0.520	0.542	6.0
Fluorene	1.038	1.046	0.930	0.904	0.930	0.970	6.9
4-Nitroaniline	0.237	0.253	0.226	0.212	0.249	0.235	7.2
4,6-Dinitro-2-methylphenol	0.047	0.065	0.077	0.080	0.089	0.072	22.5
N-Nitrosodiphenylamine (1)	0.440	0.391	0.432	0.415	0.397	0.415	5.1*
4-Bromophenyl-phenylether	0.213	0.204	0.210	0.215	0.210	0.210	2.0
Hexachlorobenzene	0.275	0.281	0.289	0.283	0.265	0.279	3.3
Pentachlorophenol	0.059	0.104	0.098	0.119	0.131	0.102	26.8*
Phenanthrene	0.939	0.854	0.885	0.834	0.751	0.853	8.1
Anthracene	0.902	0.808	0.861	0.788	0.724	0.817	8.4
Carbazole	0.817	0.729	0.746	0.718	0.653	0.733	8.0
Di-n-butylphthalate	1.094	1.009	1.105	0.996	0.944	1.030	6.6
Fluoranthene	0.933	0.821	0.843	0.840	0.746	0.837	8.0
Pyrene	1.394	1.263	1.238	1.234	1.296	1.285	5.1
Butylbenzylphthalate	0.516	0.529	0.587	0.557	0.580	0.554	5.6
3,3'-Dichlorobenzidine	0.287	0.293	0.314	0.347	0.367	0.322	10.7
Benzo(a)anthracene	0.900	0.897	0.826	0.988	0.915	0.905	6.4
Chrysene	1.015	0.906	0.796	0.965	0.898	0.916	9.0
bis(2-Ethylhexyl)phthalate	0.653	0.715	0.768	0.762	0.779	0.735	7.1
Di-n-octylphthalate	0.960	1.155	1.304	1.168	1.278	1.173	11.6*
Benzo(b)fluoranthene	1.012	1.024	0.987	1.019	1.128	1.034	5.3
Benzo(k)fluoranthene	1.288	1.043	1.036	0.911	0.815	1.019	17.4
Benzo(a)pyrene	0.833	0.790	0.896	0.885	0.865	0.854	5.0*
Indeno(1,2,3-cd)pyrene	0.995	1.054	1.017	1.186	1.206	1.092	9.0
Dibenz(a,h)anthracene	0.730	0.745	0.763	0.871	0.896	0.801	9.6
Benzo(g,h,i)perylene	0.803	0.889	0.899	1.056	1.045	0.938	11.6
Pyridine	1.294	0.950	1.411	1.157	0.980	1.158	17.1
Nitrobenzene-d5	0.358	0.356	0.366	0.342	0.348	0.354	2.6
2-Fluorobiphenyl	1.021	0.998	0.946	0.982	0.928	0.975	3.9
Terphenyl-d14	1.011	0.974	0.974	0.936	0.989	0.977	2.8
Phenol-d5	1.311	1.291	1.341	1.208	1.183	1.267	5.4
2-Fluorophenol	0.920	0.878	0.933	0.864	0.871	0.893	3.5
2,4,6-Tribromophenol	0.098	0.124	0.129	0.134	0.124	0.122	11.4

(1) Cannot be separated from Diphenylamine

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound

All non-SPCC compounds must meet a minimum RRF of 0.01.

Compounds with % RSD values > 15.0 must be analyzed by linear regression

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39873

Instrument ID: HP70S

Calibration Date(s): 08/24/99

Calibration Times:

1155

1553

LAB FILE ID:	RRF20 = S9082407.D	RRF50 = S9082405.D
RRF80 = S9082409.D	RRF120 = S9082404.D	RRF160 = S9082403.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	RSD
=====	=====	=====	=====	=====	=====	=====	=====
2-Chlorophenol-d4	0.988	0.983	0.999	0.976	0.903	0.970	3.9
1,2-Dichlorobenzene-d4	0.812	0.718	0.732	0.676	0.658	0.719	8.3

* = CCC Compound, must have % RSD < 30.0

= SPCC Compound

All non-SPCC compounds must meet a minimum RRF of 0.01.

Compounds with % RSD values > 15.0 must be analyzed by linear regression

SEMIVOLATILE INITIAL CALIBRATION : LINEAR REGRESSION SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 30005

Instrument ID: HP70S

Calibration Date(s): 08/24/99

Calibration Times: 1155

1559

SSTD020 = S9082407.D SSTD050 = S9082405.D SSTD080 = S9082409.D
 SSTD120 = S9082404.D SSTD160 = S9082403.D

COMPOUND	SLOPE	INTERCEPT	R2	#
Benzoic Acid	0.314110	-0.105128	0.993	
Hexachlorocyclopentadiene	0.437170	-0.142173	0.989*	NO+
2,4-Dinitrophenol	0.088957	-0.042734	0.950*	NO+
4,6-Dinitro-2-methylphenol	0.094499	-0.032413	0.995	
Pentachlorophenol	0.139706	-0.053102	0.990	
Benzo(k)fluoranthene	0.754377	0.381257	0.983*	NO-PC
Pyridine	0.992018	0.276482	0.927*	NON-TOX

= Column used to flag R2 values that fail. * = R2 value < 0.99

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Lab File ID: A9082501.D

DFTPP Injection Date: 08/25/99

Instrument ID: HP70A

DFTPP Injection Time: 0909

m/e	ION ABUNCANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	49.6
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	49.0
70	Less than 2.0% of mass 69	0.4 (0.9)1
127	40.0 - 60.0% of mass 198	40.6
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 - 9.0% of mass 198	7.5
275	10.0 - 30.0% of mass 198	24.4
365	Greater than 1.00% of mass 198	2.0
441	Present, but less than mass 443	16.6
442	Greater than 40.0% of mass 198	106.6
443	17.0 - 23.0% of mass 442	22.6 (21.2)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD080	SSTD080	A9082503.D	08/25/99	1002
02	SSTD160	SSTD160	A9082504.D	08/25/99	1044
03	SSTD020	SSTD020	A9082505.D	08/25/99	1121
04	SSTD120	SSTD120	A9082506.D	08/25/99	1158
05	SSTD050	SSTD050	A9082508.D	08/25/99	1314
06	SBLK2	BL0823WA	A9082510.D	08/25/99	1513
07	LCS2	LC0823WA	A9082511.D	08/25/99	1551
08	LCSD2	LD0823WA	A9082512.D	08/25/99	1630
09	008GSP0601RE	39825.01RE	A9082515.D	08/25/99	1825
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.:

Instrument ID: HP70A

Calibration Date(s): 08/25/99

Calibration Times: 1002

1314

LAB FILE ID: RRF20 = A9082505.D RRF50 = A9082508.D
RRF80 = A9082503.D RRF120 = A9082506.D RRF160 = A9082504.D

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Dibenzofuran	1.372	1.306	1.256	1.220	1.198	1.270	5.5
2,4-Dinitrotoluene	0.224	0.272	0.296	0.331	0.320	0.289	14.8
Diethylphthalate	1.144	1.073	1.052	1.115	1.071	1.091	3.4
4-Chlorophenyl-phenylether	0.638	0.592	0.581	0.568	0.557	0.587	5.3
Fluorene	1.151	1.073	1.075	1.061	1.022	1.076	4.4
4-Nitroaniline	0.193	0.213	0.246	0.257	0.264	0.235	12.9
4,6-Dinitro-2-methylphenol	0.063	0.076	0.090	0.102	0.100	0.086	19.2
N-Nitrosodiphenylamine (1)	0.382	0.376	0.371	0.374	0.366	0.374	1.6
4-Bromophenyl-phenylether	0.206	0.208	0.201	0.198	0.190	0.201	3.6
Hexachlorobenzene	0.278	0.277	0.271	0.266	0.254	0.269	3.6
Pentachlorophenol	0.100	0.114	0.119	0.123	0.133	0.118	10.3
Phenanthrene	0.899	0.864	0.840	0.842	0.817	0.852	3.6
Anthracene	0.853	0.824	0.810	0.818	0.790	0.819	2.8
Carbazole	0.749	0.730	0.722	0.757	0.717	0.735	4.1
Di-n-butylphthalate	0.860	0.864	0.931	0.991	0.972	0.924	6.5
Fluoranthene	1.006	0.990	0.997	0.998	0.974	0.993	1.2
Pyrene	1.019	1.030	1.050	0.950	0.984	1.007	3.9
Butylbenzylphthalate	0.284	0.258	0.353	0.328	0.366	0.318	14.4
3,3'-Dichlorobenzidine	0.256	0.216	0.362	0.300	0.347	0.296	20.7
Benzo(a)anthracene	0.882	0.836	0.996	0.794	0.850	0.872	8.8
Chrysene	0.907	0.872	0.992	0.822	0.865	0.892	10.7
bis(2-Ethylhexyl)phthalate	0.000	0.386	0.519	0.496	0.534	0.387	57.9
Di-n-octylphthalate	0.610	0.571	0.734	0.799	0.812	0.705	15.6
Benzo(b)fluoranthene	1.131	1.017	0.984	1.267	1.022	1.084	10.7
Benzo(k)fluoranthene	0.813	1.044	1.016	0.836	0.898	0.921	11.3
Benzo(a)pyrene	0.847	0.860	0.887	0.976	0.861	0.886	5.9
Indeno(1,2,3-cd)pyrene	1.309	1.166	1.261	1.305	1.154	1.239	6.0
Dibenz(a,h)anthracene	0.979	0.973	1.010	1.102	0.878	0.988	8.1
Benzo(g,h,i)perylene	1.062	1.003	1.028	1.134	0.952	1.036	6.6
Pyridine	0.979	0.866	0.886	0.862	0.991	0.917	6.9
Nitrobenzene-d5	0.318	0.315	0.312	0.355	0.330	0.326	5.4
2-Fluorobiphenyl	1.030	0.958	0.951	0.967	0.901	0.961	4.8
Terphenyl-d14	0.806	0.844	0.903	0.794	0.820	0.833	5.2
Phenol-d5	1.369	1.218	1.318	1.277	1.322	1.301	4.4
2-Fluorophenol	0.936	0.853	0.899	0.870	0.892	0.890	3.5
2,4,6-Tribromophenol	0.112	0.120	0.134	0.134	0.124	0.125	7.6

(1) Cannot be separated from Diphenylamine.

* = CCC Compound, must have % RSD < 30.0 # = SPCC Compound

All non-SPCC compounds must meet a minimum RRF of 0.01.

Compounds with % RSD values > 15.0 must be analyzed by linear regression

* Lab didn't run linear regression
Quality based on % RSD
EC

SEMIVOLATILE INITIAL CALIBRATION : LINEAR REGRESSION SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39000

Instrument ID: HP70A

Calibration Date(s): 08/25/99

Calibration Times: 1002

1324

SSTD020 = A9082505.D SSTD050 = A9082508.D SSTD080 = A9082503.D
 SSTD120 = A9082506.D SSTD160 = A9082504.D

COMPOUND	SLOPE	INTERCEPT	R2	#
Benzoic Acid	0.394881	-0.168006	0.992	
Hexachlorocyclopentadiene	0.281542	-0.092940	0.984*	J+No
2-Nitroaniline	0.341020	-0.098926	0.991	
2,4-Dinitrophenol	0.131987	-0.051230	0.993	
4,6-Dinitro-2-methylphenol	0.108936	-0.031337	0.996	
3,3'-Dichlorobenzidine	0.360015	-0.092013	0.972*	J+No
Di-n-octylphthalate	0.867891	-0.239390	0.995	

= Column used to flag R2 values that fail. * = R2 value < 0.99

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Lab File ID (Standard): A9082503

Date Analyzed: 08/25/99

Instrument ID: HP70A

Time Analyzed: 1002

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	186828	5.67	730210	7.98	514007	11.37
UPPER LIMIT	373656	6.17	1460420	8.48	1028014	11.87
LOWER LIMIT	93414	5.17	365105	7.48	257004	10.87
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 SBLK2	205418	5.67	751037	7.98	524918	11.38
02 LCS2	224658	5.67	812018	7.99	555534	11.38
03 LCSD2	223247	5.67	793417	7.99	555442	11.38
04 008GSP0601RE	213460	5.67	773402	7.98	536296	11.37
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits.

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Lab File ID (Standard): A9082503

Date Analyzed: 08/25/99

Instrument ID: HP70A

Time Analyzed: 1002

	IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	1022826	14.12	1019879	19.03	1127765	21.47
UPPER LIMIT	2045652	14.62	2039758	19.53	2255530	21.97
LOWER LIMIT	511413	13.62	509940	18.53	563883	20.97
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 SBLK2	1012928	14.12	1093130	19.03	1058323	21.48
02 LCS2	1094565	14.12	1104692	19.03	1012745	21.47
03 LCSD2	1070849	14.12	998349	19.03	1046932	21.49
04 008GSP0601RE	1053755	14.12	1205041	19.03	1311532	21.48
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Lab File ID (Standard): S9081902

Date Analyzed: 08/19/99

Instrument ID: HP70S

Time Analyzed: 0936

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	238533	5.15	741267	7.46	456978	10.85
UPPER LIMIT	477066	5.65	1482534	7.96	913956	11.35
LOWER LIMIT	119267	4.65	370634	6.96	228489	10.35
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 SBLK1	234935	5.15	797502	7.46	423451	10.86
02 LCS1	258701	5.15	928127	7.47	509910	10.86
03 LCSD1	220383	5.15	758028	7.46	426116	10.86
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits.

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

Lab File ID (Standard): S9082409

Date Analyzed: 08/24/99

Instrument ID: HP70S

Time Analyzed: 1559

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	371449	5.07	1324131	7.38	822857	10.76
UPPER LIMIT	742898	5.57	2648262	7.88	1645714	11.26
LOWER LIMIT	185725	4.57	662066	6.88	411429	10.26
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 008GSP0601	334235	5.07	1050666	7.38	598238	10.76
02 008GSP0701	344705	5.06	1093155	7.38	540868	10.77
03 008GSP0801	349413	5.06	1248174	7.38	667362	10.77
04 008GSP0901	366187	5.06	1271912	7.38	703164	10.77
05 008GSP0801MS	378819	5.06	1145929	7.38	575853	10.76
06 008GSP0801MSD	391665	5.06	1250456	7.38	664009	10.77
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits.

**BLANK SUMMARY
SEMIVOLATILE ORGANIC FRACTION**

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 (other than listed below) 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. For the following four (4) compounds, the results are qualified by elevating the limit of detection or adjusting the limit of detection to the sample result, when the sample concentration is less than ten (10) times the blank concentration.

Common laboratory contaminants: phthalates

- 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 ten times (10X) 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 ten times (10X) the blank value. Reject the sample result, cross out the "B" flag, and report the CRQL.

greater
No Action - The sample result is greater than the CRQL and than ten times (10X) the blank value.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK SAMPLE NO.

SBLK1

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.:

Lab File ID: S9081913

Lab Sample ID: BL0806WC

Instrument ID: HP70S

Date Extracted: 03/05/99

Matrix: (soil/water) WATER

Date Analyzed: 08/19/99

Level: (low/med) LOW

Time Analyzed: 1639

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1	LC0806WC	S9081918	08/19/99
02	LCSD1	LD0806WC	S9081919	08/19/99
03	008GSP0601	39825.01	S9082412	08/24/99
04	008GSP0701	39825.07	S9082413	08/24/99
05	008GSP0801	39825.08	S9082414	08/24/99
06	008GSP0901	39825.09	S9082415	08/24/99
07	008GSP0801MS	39825.08MS	S9082416	08/24/99
08	008GSP0801MSD	39825.08MSD	S9082417	08/24/99
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Comments:

bis(2ethylhexyl) ph 5J ug/L

4B
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK SAMPLE NO

SBLK2

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 20005

Lab File ID: A9082510

Lab Sample ID: BL0823WA

Instrument ID: HP70A

Date Extracted: 08/23/99

Matrix: (soil/water) WATER

Date Analyzed: 08/25/99

Level: (low/med) LOW

Time Analyzed: 1513

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS2	LC0823WA	A9082511	08/25/99
02	LCSD2	LD0823WA	A9082512	08/25/99
<i>CPQL</i> 03	008GSP0601RE	39825.01RE	A9082515	08/25/99
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Comments: bis (2 ethyl hexyl) 15 ug/L

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

	CLIENT SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01	SBLK2	82	94	123	33	50	100	75	81	0
02	SBLK1	70	62	110	59	53	48	54	44	0
03	LCS2	93	108	132	36	54	108	80	85	0
04	LCSD2	90	108	145 *	41	59	110	79	86	1
05	008GSP0601RE	87	106	111	40	56	112	80	84	0
06	LCS1	89	84	142 *	82	81	64	76	66	1
07	LCSD1	77	77	94	70	66	66	64	60	0
08	008GSP0601	81	75	104	3 *	1 *	0 *	3 *	53	4
09	008GSP0701	71	80	77	57	31	67	52	52	0
10	008GSP0801	85	88	105	67	31	72	67	66	0
11	008GSP0901	95	93	124	65	27	67	69	67	0
12	008GSP0801MS	98	99	99	67	24	57	71	67	0
13	008GSP0801MSD	93	93	106	67	22	65	72	75	0
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

*not used
use RE*

QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 (35-114)
 S2 (FBP) = 2-Fluorobiphenyl (43-116)
 S3 (TPH) = Terphenyl-d14 (33-141)
 S4 (PHL) = Phenol-d5 (10-110)
 S5 (2FP) = 2-Fluorophenol (21-110)
 S6 (TBP) = 2,4,6-Tribromophenol (10-123)
 S7 (2CP) = 2-Chlorophenol-d4 (33-110)
 S8 (DCB) = 1,2-Dichlorobenzene-d4 (16-110)

Column to be used to flag recovery values
 * Values outside of contract required QC limits
 D Surrogate diluted out

WATER SEMIVOLATILE SEMIVOLATILE LABORATORY CONTROL SPIKE/DUPLICATE RECOVERY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 3982

LCS Sample NO.: LCS1

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC LIMITS REC.
Phenol	75	63	84	12-110
2-Chlorophenol	75	62	83	27-123
1,4-Dichlorobenzene	50	29	58	36- 97
N-Nitroso-di-n-prop. (1)	50	47	94	41-116
1,2,4-Trichlorobenzene	50	28	56	39- 98
4-Chloro-3-methylphenol	75	64	85	23- 97
Acenaphthene	50	40	80	46-118
4-Nitrophenol	75	79	105 *	10- 80
2,4-Dinitrotoluene	50	46	92	24- 96
Pentachlorophenol	75	48	64	9-103
Pyrene	50	64	128 *	26-127

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	75	54	72	15	42 12-11
2-Chlorophenol	75	52	69	18	40 27-12
1,4-Dichlorobenzene	50	24	48	19	28 36- 9
N-Nitroso-di-n-prop. (1)	50	42	84	11	38 41-11
1,2,4-Trichlorobenzene	50	25	50	11	28 39- 9
4-Chloro-3-methylphenol	75	65	87	2	42 23- 9
Acenaphthene	50	40	80	0	31 46-11
4-Nitrophenol	75	85	113 *	7	50 10- 8
2,4-Dinitrotoluene	50	44	88	4	38 24- 9
Pentachlorophenol	75	56	75	15	50 9-10
Pyrene	50	46	92	33 *	31 26-12

Column to be used to flag recovery values

* Values outside of QC limits

RPD: 1 out of 11 outside limits
 Spike Recovery: 3 out of 22 outside limits

no qual

Comments: _____

WATER SEMIVOLATILE SEMIVOLATILE LABORATORY CONTROL SPIKE/DUPLICATE RECOVERY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39825

LCS Sample NO.: LCS2

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC LIMITS REC.
Phenol	75	25	33	12-110
2-Chlorophenol	75	64	85	27-123
1,4-Dichlorobenzene	50	39	78	36- 97
N-Nitroso-di-n-prop. (1)	50	45	90	41-116
1,2,4-Trichlorobenzene	50	46	92	39- 98
4-Chloro-3-methylphenol	75	71	95	23- 97
Acenaphthene	50	52	104	46-118
4-Nitrophenol	75	24	32	10- 80
2,4-Dinitrotoluene	50	47	94	24- 96
Pentachlorophenol	75	73	97	9-103
Pyrene	50	60	120	26-127

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS RPD	R
Phenol	75	29	39	15	42	12-110
2-Chlorophenol	75	62	83	3	40	27-123
1,4-Dichlorobenzene	50	42	84	7	28	36- 97
N-Nitroso-di-n-prop. (1)	50	44	88	2	38	41-116
1,2,4-Trichlorobenzene	50	46	92	0	28	39- 98
4-Chloro-3-methylphenol	75	70	93	1	42	23- 97
Acenaphthene	50	51	102	2	31	46-118
4-Nitrophenol	75	28	37	15	50	10- 80
2,4-Dinitrotoluene	50	47	94	0	38	24- 96
Pentachlorophenol	75	83	111 *	13	50	9-103
Pyrene	50	67	134 *	11	31	26-127

Column to be used to flag recovery values

* Values outside of QC limits

RPD: 0 out of 11 outside limits

Spike Recovery: 2 out of 22 outside limits

no qual

Comments:

3C
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA

Contract: ZONE G

Lab Code: SWOK

Case No.: ENSAF

SAS No.:

SDG No.: 39925

Matrix Spike - Client Sample NO.: 008GSP0801

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
Phenol	150	0	93	62	12-110
2-Chlorophenol	150	0	110	73	27-123
1,4-Dichlorobenzene	100	0	65	65	36- 97
N-Nitroso-di-n-prop. (1)	100	0	62	62	41-116
1,2,4-Trichlorobenzene	100	0	73	73	39- 98
4-Chloro-3-methylphenol	150	0	98	65	23- 97
Acenaphthene	100	1	92	91	46-118
4-Nitrophenol	150	0	120	80	10- 80
2,4-Dinitrotoluene	100	0	95	95	24- 96
Pentachlorophenol	150	0	120	80	9-103
Pyrene	100	1	100	99	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Phenol	150	94	63	1	42	12-110
2-Chlorophenol	150	110	73	0	40	27-123
1,4-Dichlorobenzene	100	67	67	3	28	36- 97
N-Nitroso-di-n-prop. (1)	100	66	66	6	38	41-116
1,2,4-Trichlorobenzene	100	75	75	3	28	39- 98
4-Chloro-3-methylphenol	150	99	66	1	42	23- 97
Acenaphthene	100	91	90	1	31	46-118
4-Nitrophenol	150	130	87 *	8	50	10- 80
2,4-Dinitrotoluene	100	100	100 *	5	38	24- 96
Pentachlorophenol	150	130	87	8	50	9-103
Pyrene	100	110	109	10	31	26-127

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

no qual

RPD: 0 out of 11 outside limits
Spike Recovery: 2 out of 22 outside limits

Comments: _____

FIELD DUPLICATE SAMPLE SUMMARY
SEMIVOLATILE ORGANIC FRACTION

Sample ID: no dup Duplicate Sample ID: _____

Matrix: aqueous / non aqueous Units: ug/L ug/Kg

Compound Name	Sample Concentration	Duplicate Concentration	RPD	Action
WAA 09/16/99				

Water RPDs < 20% RPD

Soil RPDs < 35% RPD

Comments: _____

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

SDG NARRATIVE
September 2, 1999

CONTRACT: ENSAFE
PROJECT: ZONE G, RELEASE 119
SDG NO: 39825

SEMIVOLATILE FRACTION

Four water samples were submitted for Semivolatile Organic analyses. The samples were analyzed by GC/MS following SW846-8270C.

SWLO uses a 2uL injection for method SW846-8270C as allowed by the method and has added two extra "advisory surrogates (one acid and one base/neutral)" to the surrogate spiking mix. These surrogates are 1,2-dichlorobenzene-d4 and 2-chlorophenol-d4 and have advisory control limits. The surrogates, laboratory control spikes and matrix spikes are spiked at 75 ug/L (waters) and 2500ug/Kg (soils) for the acid surrogates and 50 ug/L (waters) and 1700 (actual 1667) ug/Kg (soils) for base/neutral surrogates. The instrument calibration range is from 10 ug/L to 80 ug/L for waters and 330 ug/Kg to 2700 ug/Kg for soils, which relates to 20 ng on column (low cal. std.) up to 160 ng on column (high cal. std.).

No major problems occurred during the analyses of these samples.

Blanks: SBLK1 and SBLK2 had low level phthalate contamination below reporting limit.

Surrogates: LCS1 and LCSD2 had high surrogate recovery for terphenyl-d14 at 142% and 145%, respectively. Sample 008GSP0601 had all acid surrogates recovered below 10%. This sample was re-extracted outside of holding time and re-analyzed. The re-extract had all surrogates within QC limits. Both sets of data have been submitted.

Matrix Spikes: 008GSP0801MSD had slightly high spike recovery for 4-nitrophenol at 87% and 2,4-dinitrotoluene at 100%.

Laboratory Control Spikes: LCS1 had high spike recovery for pyrene at 128%. LCS1/LCSD1 had high spike recovery for 4-nitrophenol at 105% and 113%, respectively and had a high RPD for pyrene at 33%. LCSD2 had high spike recovery for pentachlorophenol at 111% and pyrene at 134%.

Internal Standards: All internal standards were within QC limits.

Harry M. Borg
Harry M. Borg
Organic Program Manager

September 2, 1999

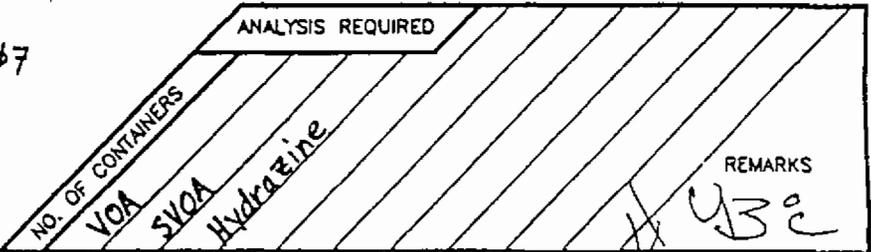
5087

CHAIN OF CUSTODY RECORD

COC NO: _____
 PO NO: 4
 REL NO: 119
 LAB NAME: SWL

800-588-7882
 MEMPHIS, TENNESSEE
 CHARLESTON, SC CINCINNATI, OH DALLAS, TX JACKSON, TN KNOXVILLE, TN
 LANCASTER, PA NASHVILLE, TN NORFOLK, VA PADUCAH, KY PENSACOLA, FL
 RALEIGH, NC COLOGNE, GERMANY

CLIENT Naval Base Charleston PROJECT MANAGER Charlie Vernoy
 LOCATION Zone G, SWMU 8 TELE/FAX NO. (843) 884-0029/956-0107
 SAMPLERS: (SIGNATURE) Andrew Wertz



FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	VOA	SVOA	Hydrazine	REMARKS
					TEMP.	CHEMICAL					
NBCG\008GSP0601	8/4/99	0950	W	2-40ml vial 2-1L amber	4°C	40ml-HCl 1L-None	4	X	X		
NBCG\008GSP0601		1020		1-500 ml amber		HCl	1		X		1ml HCl/100ml sample
NBCG\008GSP0101		1035					1		X		
NBCG\008GSP0201		1045					1		X		
NBCG\008GSP0301		1055					1		X		
NBCG\008GSP0401		1105					1		X		
NBCG\008GSP0501		1115					1		X		
NBCG\008GSP0701		1340		2-40ml vial, 2-1L amber, 1-500ml amber		SEE REMARKS	5	X	X	X	40ml vial-HCl 1L amber-None
NBCG\008GSP0801		1420					5	X	X	X	500ml amber- 1ml HCl/100ml sample
NBCG\008GSP0901		1510					5	X	X	X	
NBCG\008TSP0901		-	W	2-40ml vial		HCl	2	X			

Andrew Wertz
 8/4/99

RELINQUISHER: <u>Andrew Wertz</u>	DATE: <u>8/4/99</u>	RECEIVER: <u>[Signature]</u>	DATE: <u>8-5-99</u>	RELINQUISHER: _____	DATE: _____	RECEIVER: _____	DATE: _____
PRINTED: <u>ANDREW WERTZ</u>	TIME: <u>1700</u>	PRINTED: <u>JASON SERVICES</u>	TIME: <u>10:40</u>	PRINTED: _____	TIME: _____	PRINTED: _____	TIME: _____
COMPANY: <u>EnSafe</u>		COMPANY: <u>SACO</u>		COMPANY: _____		COMPANY: _____	

METHOD OF SHIPMENT: FEDEX
 SHIPMENT NO. 4849148776
 SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: _____

ANALYTICAL DATA RECEIVED BY (INITIALS/DA)

ref cot
12-Mar-98
MLM
ver
5.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Semivolatile
Test Code 155500
Method 8246 82700
Matrix water-soil
Extract Volume 1000 mL
Initial Calibration 0 20 50 20 100 ng/RSB for 600 compounds*30% SPCC=PF > 0.75
Continuing Calibration 50 ng = 0 = 20% for 600 Compounds SPCC = PF > 0.75
PAGE 1 OF 2

COMPOUND	CAS NUMBE	PQL's		MDL's	
		WATER	SOIL	WATER	SOIL
		ug/L	ug/Kg	ug/L	ug/Kg
1,2,4-Trichlorobenzene	120-82-1	10	330	3.7	65
1,2-Dichlorobenzene	95-50-1	10	330	3.7	74
1,3-Dichlorobenzene	641-73-1	10	330	4.1	31
1,4-Dichlorobenzene	106-46-7	10	330	4.2	58
2,3,4,6-Tetrachlorophenol	58-90-2	10	330	8.2	71
2,4,5-Trichlorophenol	95-95-4	50	1600	6.1	120
2,4,6-Trichlorophenol	88-06-2	10	330	4.6	85
2,4-Dichlorophenol	120-83-2	10	330	4.7	70
2,4-Dimethylphenol	105-67-9	10	330	4.0	210
2,4-Dinitrophenol	51-28-5	50	1600	7.1	64
2,4-Dinitrotoluene	121-14-2	10	330	2.9	74
2,6-Dinitrotoluene	506-20-2	10	330	3.1	85
2-Chloronaphthalene	91-58-7	10	330	3.3	63
2-Chlorophenol	95-57-8	10	330	5.0	92
2-Methylnaphthalene	91-57-6	10	330	3.2	43
2-Methylphenol	95-48-7	10	330	5.1	170
2-Nitroaniline	88-74-4	10	1600	3.4	57
2-Nitrophenol	88-75-5	10	330	7.7	93
3,3'-Dichlorobenzidine	91-94-1	20	660	3.3	6.4
3-Nitroaniline	99-09-2	50	1600	5.7	3.6
4,6-Dinitro-2-methylphenol	534-52-1	50	1600	7.3	93
4-Bromophenyl-phenylether	101-55-3	10	330	3.1	72
4-Chloro-3-methylphenol	59-50-7	10	330	4.1	75
4-Chloroaniline	106-47-8	10	330	4.6	87
4-Chlorophenyl-phenylether	7005-72-3	10	330	4.1	49
4-Methylphenol	106-44-5	10	330	6.0	220
4-Nitroaniline	100-01-6	50	1600	2.5	62
4-Nitrophenol	100-02-7	50	1600	7.1	93
Acenaphthene	83-32-9	10	330	3.4	65
Acenaphthylene	208-96-8	10	330	3.5	69
Anthracene	120-12-7	10	330	2.7	47
Benzofluoranthracene	56-55-3	10	330	2	56
Benzofluoranthene	50-32-8	10	330	2.6	38
Benzofluoranthene	205-99-2	10	330	2.8	160
Benzofluoranthene	191-24-2	10	330	2.8	81
Benzofluoranthene	207-08-9	10	330	4.2	96
Benzoic acid	65-85-0	50	1600	7.9	440
Benzyl alcohol	100-51-6	10	330	5.2	98
Butylbenzylphthalate	85-68-7	10	330	0.3	87

WATER MDLS PERFORMED ON INST V <01/09/98>

SOIL MDL'S PERFORMED ON INST P <01/08/98>

NR = NonRoutine Compounds Analyzed only upon request.

per col
12-Mar-98
MLM
ver
5.0

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Test Code: Semivolatile
Method: 8160
Matrix: Water/Soil
Extract Volume: 100 mL
Initial Calibration: 10 20 50 80 100 ng ± 10% RSD for VOC Compounds ± 30% SPCC = RF × 0.05
Continuing Calibration: 10 ng ± 10% for VOC Compounds SPCC = RF × 0.05
PAGE 2 OF 2

COMPOUND	CAS NUMBER	PQL's		MDL's	
		WATER	SOIL	WATER	SOIL
		ug/L	ug/Kg	ug/L	ug/Kg
Carbazole	36-74-8	10	330	2.3	89
Chrysene	218-1-9	10	330	2.5	51
Di-n-octylphthalate	117-84-0	10	330	1.8	46
Dibenz(a,h)anthracene	53-70-3	10	330	3.0	150
Dibenzofuran	132-64-9	10	330	3.3	50
Diethylphthalate	84-66-2	10	330	0.4	64
Fluoranthene	206-44-0	10	330	2.2	71
Fluorene	86-73-7	10	330	3.2	40
Hexachlorobenzene	118-74-1	10	330	2.8	59
Hexachlorobutadiene	87-68-3	10	333	3.3	56
Hexachlorocyclopentadiene	77-47-4	10	330	0.6	73
Hexachloroethane	67-72-1	10	330	3.6	120
Indeno(1,2,3-cd)pyrene	193-39-5	10	330	3.3	280
Isophorone	78-59-1	10	330	4.1	69
N-Nitroso-di-n-propylamine	621-64-7	10	330	4.1	110
N-Nitrosodiphenylamine	86-30-6	10	330	2.0	56
Naphthalene	91-20-3	10	330	3.7	30
Nitrobenzene	98-95-3	10	330	3.8	74
Pentachlorononol	87-86-5	50	1600	3.4	130
Phenanthrene	85-01-8	10	330	2.9	42
Phenol	108-95-2	10	330	4.2	66
Pyrene	129-00-2	10	330	2.4	47
bis(2-Chloroethoxy)methane	111-91-1	10	330	4.0	69
bis(2-Chloroethyl)ether	111-44-4	10	330	3.5	61
bis(2-Chloroisopropyl)ether	108-60-1	10	330	4.5	73
bis(2-Ethylhexyl)phthalate	117-81-7	10	330	1.9	80

* CCC compounds **SPCC compounds
WATER MDLS PERFORMED ON INST. H <01/09/98>
SOIL MDLS PERFORMED ON INST. H <01/08/98>

**SAMPLE RESULT VERIFICATION
SEMIVOLATILE ORGANIC FRACTION**

- 1. Were the sample results reported within the calibration range? Yes No
- 2. Were the percent moistures reported? Yes No NR
- 3. Were the data reported on a dry weight basis? Yes No NR
- 4. Did the GC/MS RIC and TIC exhibit interferences, off scale peaks or elevated baseline? Yes No
- 5. Did the data contain elevated detection limits that could not be accounted for? Yes No
- 6. Were any computational or transcription errors found? Yes No

Specific Comments: _____

Do not use sample 008GSP0601 in favor
of RE due to non compl. surr.

Reviewer: *S. Maschnoff*

Date: 9, 16, 99

122/07-11-97

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

GENERAL CHEMISTRY INORGANICS QUALITY CONTROL DATA SHEET LCS/LCSD

MATRIX WATER

ISODE 39825
JENT ENSAFE

PARAMETER	TEST CODE	UNITS	METHOD BLANK		LCS						LCS DUPLICATE			RPD			BATCHID	DATE ANALYZED	ANALYST INI.
			AMT. FOUND	DET. LIMIT	KNOWN CONC.	AMT. FOUND	% REC	% REC LIMITS	FLAG	AMT. FOUND	% REC.	FLAG	RPD	LIMIT	FLAG				
ndrazine	IN899	ug/l	<5.0	5.0	50.0	52.2	104	80	120		52.5	105		0.6	20		9908266992	26-Aug-99	KAL

ARRATIVE:
 : OUTSIDE QC LIMITS

39825
 /GLCSW REV 4.2
 31-Aug-99

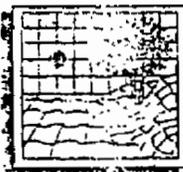
126
 092

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2509

ASTM 1385-88

Bench Logs and Raw Data



ABSORBANCE/DIRECT READING LOGBOOK

INORGANIC DEPARTMENT

TEST CODE IN 679

DATE OF ANALYSIS 8-26-99

TIME 1335

BATCH ID 2409266993

DIGESTION BATCH I.D. 4/20/99

ANALYST'S INITIALS KAL

PAGE 20 OF BOOK 0599-2

Sample I.D.	Matrix	Wt/Vol Initial	Wt/Vol Final	Dilution	Spikes/Comments	Absorbance 2455 nm	Calibration value	Results	Units	% Rec
P3W199326A	W		50 ml		SP1-11-3	0.005	2234	45.0		
LCW990326A		50.0	14.0 ml		SP1-11-3	0.147	32.17	52.2		104
39913.01						0.005	2234	45.0		
.01						0.004	2390	45.0		100
.01		50.0	13.2 ml		SP1-11-3	0.122	42.55	43.5		87
.01		50.0	13.2 ml		SP1-11-3	0.123	43.90	43.9		88
.02						0.008	2263	45.0		
.04						0.012	25.11	45.1		
.05						0.005	2234	45.0		
.06						0.003	2345	45.0		
.08						0.004	2390	45.0		
.09						0.097	31.49	31.5		
.10						0.002	2201	45.0		
+ .11						0.021	8.748	8.7		
39925.01						0.004	2390	45.0		
.02						0.213	76.64	76.6		
.03						0.009	4269	45.0		
+ .04	W		50 ml			0.033	14.61	14.6		

SOUTHWEST LABORATORY OF OKLAHOMA, INC. AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.

1700 W. ALBANY • BROKEN ARROW, OKLA

Office (918) 251-2858 • Fax (918) 251-2599

196-01

094



ABSORBANCE/DIRECT READING LOGBOOK

INORGANIC DEPARTMENT

1095

TEST CODE INORGANIC DATE OF ANALYSIS 8-20-90 TIME 12:15 BATCH ID 1900260942
 DIGESTION BATCH I.D. Hydroxide ANALYST'S INITIALS KAL PAGE 21 OF BOOK D150-2

Sample I.D.	Matrix	TV	WT/Vol Initial	WT/Vol Final	Dilution	Spike/Comments	Absorbance <small>(at 255 nm)</small>	Concn <small>(ppm)</small>	Results	Units	Rec
39505.05	N						0.255	500	25.0	ppm	
06							0.012	500	5.0		
07							0.012	500	5.0		
01							0.012	500	5.0		
08							0.007	3904	25.0		
410001202	N	500	10.0	5.0	2	517-11-3	0.141	50.51	52.5	ppm	105

SOUTHWEST LABORATORY OF OKLAHOMA, INC./AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.

1700 W. ALBANY • BROKEN ARROW, OKLAHOMA 74012 • O. (918) 251-2658 • FAX (918) 261-2554

INORG-195A

8-20-90

103

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2559

SDG NARRATIVE

**CLIENT: ENSAFE
PROJECT: ZONE G, RELEASE 119**

**DATE: 8/31/99
EPISODE NO.: 39825**

INORGANIC FRACTION:

Four water samples were submitted for Hydrazine analysis. The sample analysis was completed according to the following:

<u>SWL SOP #</u>	<u>Method SOP is based</u>	<u>Parameter</u>
N/A	ASTM 1385-88	Hydrazine

Refer to Sample Receipt Notification for details of sample conditions at receipt. An explanation of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.

Form 3 (Blanks) - This information is included on the QC spreadsheet.

Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

Initial and Continuing Calibration Check: No problems.

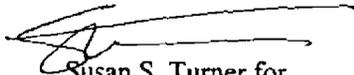
Initial and Continuing Calibration Blanks: All blanks were below the reporting limit.

CRI (Low Standard): No problems.

Preparation Blanks: All blanks were below the reporting limit.

Lab Control Spikes: No problems.

Sincerely,



Susan S. Turner for...
Deborah J. Inman
Inorganic Program Manager



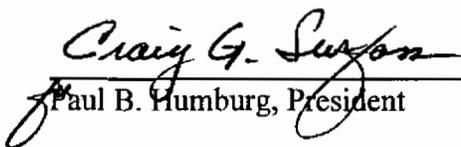
HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: EN035
Date: January 24, 2000
Client Name: Ensafe
Project/Site Name: Charleston Zone G
Date Sampled: December 17, 1999
Number of Samples: 19 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: SPLP 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

1-24-00.
Date

SDG# EN035

Samples and Fractions Reviewed

Sample Identifications Analytical Fraction

ENSAFE ID	MATRIX	SPLP-MET	
628SB00801	SOIL		X
628SB00802	SOIL		X
628SB00901	SOIL		X
628SB00902	SOIL		X
628SB01001	SOIL		X
628SB01002	SOIL		X
628SB01003	SOIL		X
628SB01004	SOIL		X
628SB01101	SOIL		X
628SB01102	SOIL		X
628SB01201	SOIL		X
628SB01202	SOIL		X
636SB01501	SOIL		X
636SB01502	SOIL		X
636SB01601	SOIL		X
636SB01602	SOIL		X
636SB01701	SOIL		X
643SB02401	SOIL		X
643SB02402	SOIL		X
Total Billable Samples (Water/Soil)		0	19

SPLP-MET= SPLP Metals

DATA ASSESSMENT NARRATIVE METALS (SPLP)

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 # EN035

A validation was performed on the Metals for SPLP Data from SDG EN035. 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>
Barium	0.80 ug/l	no impact
Cadmium	3.6 ug/l	all SPLP samples below 18.0 ug/l

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>
Aluminum	-192 ug/l	all SPLP samples below 1920 ug/l
Chromium	-0.7 ug/l	all SPLP samples below 7.0 ug/l
Cobalt	-1.4 ug/l	all SPLP samples below 14.0 ug/l
Copper	-1.0 ug/l	all SPLP samples below 10.0 ug/l
Magnesium	-15.7 ug/l	no impact
Potassium	-75.3 ug/l	all SPLP samples below 753 ug/l
Thallium	-7.1 ug/l	all SPLP samples below 71.0 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 recovery for SPLP samples for Selenium (72%) was below the lower control limits (>30% but <75%). All positive and non-detect results are qualified as estimated, "J" or "UJ".

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 18.0 ug/l	Cd.	+	U
all SPLP samples below 11920 ug/l	Al.	+/U	J/UJ
all SPLP samples below 7.0 ug/l	Cr.		
all SPLP samples below 14.0 ug/l	Co.		
all SPLP samples below 10.0 ug/l	Cu.		
all SPLP samples below 753 ug/l	K.		
all SPLP samples below 71.0 ug/l	Tl		
all SPLP samples	Se.	+/U	J/UJ
all "B" results	all analytes	B	J

CAW
1/25/00

CHARLESTON - ZONE G
CHARLESTON ZONE G SOIL (ONLY)

SDG# EN035

ER035 SPLP-META		SAMPLE ID ----->	628-S-B008-01	628-S-B008-02	628-S-B009-01	628-S-B009-02	628-S-B010-01	628-S-B010-02					
		ORIGINAL ID ----->	628S800801	628SB00802	628SB00901	628SB00902	628SB01001	628SB01002					
		LAB SAMPLE ID ----->	9912424-01	9912424-02	9912424-03	9912424-04	9912424-05	9912424-07					
		SAMPLE DATE ----->	12/17/99	12/17/99	12/17/99	12/17/99	12/17/99	12/17/99					
		DATE EXTRACTED -->	12/23/99	12/23/99	12/23/99	12/23/99	12/23/99	12/23/99					
		DATE ANALYZED -->	01/04/00	01/04/00	01/04/00	01/04/00	01/04/00	01/04/00					
		MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil					
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L					
CAS #	Parameter		A	A	A	A	A	A					
7429-90-5	Aluminum (Al)	58.7	<i>u</i>	382.	<i>u</i>	383.	<i>u</i>	1410.	<i>u</i>	321.	<i>u</i>	248.	<i>u</i>
7440-36-0	Antimony (Sb)	2.4	<i>u</i>	29.5	<i>u</i>	2.4	<i>u</i>	2.4	<i>u</i>	2.4	<i>u</i>	2.8	<i>u</i>
7440-38-2	Arsenic (As)	3.9	<i>u</i>	3.7	<i>u</i>	4.3	<i>u</i>	2.8	<i>u</i>	2.	<i>u</i>	2.	<i>u</i>
7440-39-3	Barium (Ba)	186.	<i>u</i>	420.	<i>u</i>	155.	<i>u</i>	477.	<i>u</i>	541.	<i>u</i>	388.	<i>u</i>
7440-41-7	Beryllium (Be)	0.9	<i>u</i>	0.9	<i>u</i>	0.9	<i>u</i>	0.9	<i>u</i>	0.9	<i>u</i>	0.9	<i>u</i>
7440-43-9	Cadmium (Cd)	3.1	<i>u</i>	3.2	<i>u</i>	3.5	<i>u</i>	3.4	<i>u</i>	4.	<i>u</i>	2.8	<i>u</i>
7440-70-2	Calcium (Ca)	122000.	<i>u</i>	11900.	<i>u</i>	12800.	<i>u</i>	19800.	<i>u</i>	19700.	<i>u</i>	23500.	<i>u</i>
7440-47-3	Chromium (Cr)	0.6	<i>u</i>	4.3	<i>u</i>	1.2	<i>u</i>	1.5	<i>u</i>	0.6	<i>u</i>	0.6	<i>u</i>
7440-48-4	Cobalt (Co)	0.5	<i>u</i>	0.5	<i>u</i>	0.5	<i>u</i>	0.5	<i>u</i>	0.5	<i>u</i>	0.5	<i>u</i>
7440-50-8	Copper (Cu)	10.5	<i>u</i>	1.9	<i>u</i>	3.3	<i>u</i>	2.8	<i>u</i>	2.1	<i>u</i>	1.5	<i>u</i>
7439-89-6	Iron (Fe)	49.	<i>u</i>	488.	<i>u</i>	309.	<i>u</i>	582.	<i>u</i>	579.	<i>u</i>	360.	<i>u</i>
7439-92-1	Lead (Pb)	2.1	<i>u</i>	7.	<i>u</i>	3.6	<i>u</i>	4.7	<i>u</i>	4.5	<i>u</i>	3.	<i>u</i>
7439-95-4	Magnesium (Mg)	19000.	<i>u</i>	2360.	<i>u</i>	189.	<i>u</i>	538.	<i>u</i>	857.	<i>u</i>	1780.	<i>u</i>
7439-96-5	Manganese (Mn)	67.1	<i>u</i>	4.2	<i>u</i>	1.8	<i>u</i>	2.3	<i>u</i>	4.7	<i>u</i>	2.5	<i>u</i>
7439-97-6	Mercury (Hg)	0.2	<i>u</i>	0.2	<i>u</i>	0.2	<i>u</i>	0.2	<i>u</i>	0.2	<i>u</i>	0.2	<i>u</i>
7440-02-0	Nickel (Ni)	1.1	<i>u</i>	5.9	<i>u</i>	1.1	<i>u</i>	2.3	<i>u</i>	1.1	<i>u</i>	1.1	<i>u</i>
7440-09-7	Potassium (K)	7660.	<i>u</i>	1330.	<i>u</i>	46.7	<i>u</i>	122.	<i>u</i>	134.	<i>u</i>	837.	<i>u</i>
7782-49-2	Selenium (Se)	1.7	<i>u</i>	1.7	<i>u</i>	1.7	<i>u</i>	1.7	<i>u</i>	1.7	<i>u</i>	1.7	<i>u</i>
7440-22-4	Silver (Ag)	0.5	<i>u</i>	0.5	<i>u</i>	0.5	<i>u</i>	0.5	<i>u</i>	0.5	<i>u</i>	0.5	<i>u</i>
7440-23-5	Sodium (Na)	35000.	<i>u</i>	8650.	<i>u</i>	3890.	<i>u</i>	4800.	<i>u</i>	5550.	<i>u</i>	6090.	<i>u</i>
7440-28-0	Thallium (Tl)	2.4	<i>u</i>	2.4	<i>u</i>	2.4	<i>u</i>	2.4	<i>u</i>	2.4	<i>u</i>	2.4	<i>u</i>
7440-62-2	Vanadium (V)	0.5	<i>u</i>	3.5	<i>u</i>	11.5	<i>u</i>	8.5	<i>u</i>	2.6	<i>u</i>	3.3	<i>u</i>
7440-66-6	Zinc (Zn)	41.9	<i>u</i>	23.3	<i>u</i>	21.7	<i>u</i>	60.9	<i>u</i>	17.	<i>u</i>	14.2	<i>u</i>
7440-31-5	Tin (Sn)	2.7	<i>u</i>	2.7	<i>u</i>	2.7	<i>u</i>	2.7	<i>u</i>	2.7	<i>u</i>	2.7	<i>u</i>

PB
1/20/00

CHARLESTON - ZONE G
CHARLESTON ZONE G SOIL (ONLY)
SDG# EN035

EN035 SPLP-META	SAMPLE ID ----->	628-S-8010-03	628-S-8010-04	628-S-8011-01	628-S-8011-02	628-S-8012-01	628-S-8012-02
	ORIGINAL ID ----->	628S801003	628S801004	628S801101	628S801102	628S801201	628S801202
	LAB SAMPLE ID ----->	9912424-06	9912424-12	9912424-08	9912424-09	9912424-10	9912424-11
	SAMPLE DATE ----->	12/17/99	12/17/99	12/17/99	12/17/99	12/17/99	12/17/99
	DATE EXTRACTED --->	12/23/99	12/23/99	12/23/99	12/23/99	12/23/99	12/23/99
	DATE ANALYZED ---->	01/04/00	01/04/00	01/04/00	01/04/00	01/04/00	01/04/00
	MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter	A	A	A	A	A	A
7429-90-5	Aluminum (Al)	1720.	888.	125.	618.	363.	9810.
7440-36-0	Antimony (Sb)	2.4	2.4	2.4	14.1	2.4	2.4
7440-38-2	Arsenic (As)	2.	2.2	2.	3.1	7.1	11.4
7440-39-3	Barium (Ba)	494.	438.	191.	489.	339.	1360.
7440-41-7	Beryllium (Be)	0.9	0.9	0.9	0.9	0.9	0.9
7440-43-9	Cadmium (Cd)	3.	3.2	3.	2.6	3.3	2.4
7440-70-2	Calcium (Ca)	18700.	21300.	24900.	21300.	10200.	2590.
7440-47-3	Chromium (Cr)	2.7	1.5	0.6	1.	4.7	14.7
7440-48-4	Cobalt (Co)	0.5	0.5	0.5	0.5	0.5	0.5
7440-50-8	Copper (Cu)	4.2	1.6	1.8	3.	1.2	15.5
7439-89-6	Iron (Fe)	1270.	803.	269.	514.	330.	8250.
7439-92-1	Lead (Pb)	6.3	4.1	2.2	6.9	6.1	9.9
7439-95-4	Magnesium (Mg)	891.	1480.	1330.	1730.	173.	1600.
7439-96-5	Manganese (Mn)	6.5	3.9	1.1	1.8	1.3	55.7
7439-97-6	Mercury (Hg)	0.2	0.2	0.2	0.2	0.2	0.2
7440-02-0	Nickel (Ni)	1.5	1.3	1.3	2.2	1.1	7.5
7440-09-7	Potassium (K)	175.	441.	166.	1680.	40.2	5760.
7782-49-2	Selenium (Se)	1.7	1.7	1.7	1.7	1.7	2.9
7440-22-4	Silver (Ag)	0.5	0.5	0.5	0.5	0.5	0.5
7440-23-5	Sodium (Na)	4530.	6010.	5060.	6730.	2220.	52600.
7440-28-0	Thallium (Tl)	2.4	2.4	2.4	2.4	2.4	2.4
7440-62-2	Vanadium (V)	5.2	4.6	1.6	2.9	2.6	30.3
7440-66-6	Zinc (Zn)	36.5	24.8	21.1	29.3	22.9	209.
7440-31-5	Tin (Sn)	2.7	2.7	2.7	2.7	2.7	2.7

Handwritten signature
1/20/00

CHARLESTON - ZONE G
CHARLESTON ZONE G SOIL (ONLY)
SDG# EN035

EN035 SPEL-META		SAMPLE ID -----> ORIGINAL ID -----> LAB SAMPLE ID ----> SAMPLE DATE -----> DATE EXTRACTED --> DATE ANALYZED ---> MATRIX -----> UNITS ----->	636-S-B015-01 636S801501 9912424-13 12/17/99 12/23/99 01/04/00 Soil UG/L	A	636-S-B015-02 636S801502 9912424-14 12/17/99 12/23/99 01/04/00 Soil UG/L	A	636-S-B016-01 636S801601 9912424-15 12/17/99 12/23/99 01/04/00 Soil UG/L	A	636-S-B016-02 636S801602 9912424-16 12/17/99 12/23/99 01/04/00 Soil UG/L	A	636-S-B017-01 636S801701 9912424-17 12/17/99 12/23/99 01/04/00 Soil UG/L	A	643-S-B024-01 643S802401 9912424-18 12/17/99 12/23/99 01/04/00 Soil UG/L	
CAS #	Parameter													
7429-90-5	Aluminum (Al)	1970.		3090.		1270.		3200.		3070.		2050.		
7440-36-0	Antimony (Sb)	2.4	U	36.7		2.4	U	2.4		6.8		2.4		
7440-38-2	Arsenic (As)	2.	U	4.3		2.	U	4.1		3.3		7.		
7440-39-3	Barium (Ba)	494.		767.		490.		770.		633.		519.		
7440-41-7	Beryllium (Be)	0.9	U	0.9		0.9	U	0.9		0.9		0.9		
7440-43-9	Cadmium (Cd)	3.8		2.8		2.3		2.6		3.8		3.1		
7440-70-2	Calcium (Ca)	13500.		10800.		1890.		12100.		16700.		12400.		
7440-47-3	Chromium (Cr)	1.4		5.5		0.6		4.		3.6		4.6		
7440-48-4	Cobalt (Co)	0.5		0.5		0.5		0.5		0.5		0.5		
7440-50-8	Copper (Cu)	0.6		103.		1.2		3.6		5.3		3.8		
7439-89-6	Iron (Fe)	932.		2900.		764.		2100.		1660.		1820.		
7439-92-1	Lead (Pb)	2.4		33.4		4.3		5.1		6.3		6.6		
7439-95-4	Magnesium (Mg)	528.		2300.		205.		2040.		866.		613.		
7439-96-5	Manganese (Mn)	1.5		12.1		1.6		11.		4.5		6.2		
7439-97-6	Mercury (Hg)	0.2		0.2		0.2		0.2		0.2		0.2		
7440-02-0	Nickel (Ni)	1.1		4.4		1.1		2.2		2.1		2.8		
7440-09-7	Potassium (K)	121.		3900.		79.3		3340.		440.		156.		
7782-49-2	Selenium (Se)	1.7		1.7		1.7		1.7		1.7		1.7		
7440-22-4	Silver (Ag)	0.5		0.5		0.5		0.5		0.5		0.5		
7440-23-5	Sodium (Na)	4320.		24400.		4950.		22200.		6150.		4460.		
7440-28-0	Thallium (Tl)	2.4		2.4		2.4		2.4		2.4		2.4		
7440-62-2	Vanadium (V)	2.9		13.7		2.6		9.9		7.		154.		
7440-66-6	Zinc (Zn)	23.2		100.		25.5		33.		33.9		33.1		
7440-31-5	Tin (Sn)	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U	

BB
1/20/00

DATA DELIVERABLES(DQO III or C)
INORGANICS

Site Name: Charleston

Client: Ensofe

Location: EN035

Lab: Lancet

Analytical Fraction: SPLP Metals

Reviewer: P. Humby

Date(s): 1/20/00

- A. Control Chart - results of the method blank : Yes No NR
spikes run with each batch of samples :
processed :
- B. CLP Form 1s with associated sample results : Yes No NR
and CLP flagging system. All percent :
moistures for soils and discussion of :
sample type :
- C. CLP Form 2s with initial and continuing : Yes No NR
calibration standards (part 1 only) :
- D. CLP Form 3s with prep and method blanks : Yes No NR
- E. CLP Form 4s with interference check : Yes No NR
sample data
- F. CLP Form 5s with Matrix spike recovery and : Yes No NR
the postdigestion spike recovery for :
ICP Metals. Only done if predigest :
spike recovery exceeds limits :
- G. CLP Form 6s with Duplicate data results : Yes No NR
- H. CLP Form 8s with GFAA standard addition : Yes No NR
data
- I. CLP Form 13s with holding time data : Yes No NR

HEARTLAND ESI Form A

DATA DELIVERABLE REQUIREMENTS

A.	Permanently Bound	Yes	<input checked="" type="radio"/> No	NR
B.	Paginated	<input checked="" type="radio"/> Yes	No	NR
C.	Table of Contents	<input checked="" type="radio"/> Yes	No	NR
D.	Digestion Records (internal C-O-C)	<input checked="" type="radio"/> Yes	No	NR
E.	Chain-Of-Custody (external)	<input checked="" type="radio"/> Yes	No	NR
F.	Case Narrative			
	1. Sample list with Client and Lab IDs cross-referenced (copy attached)	<input checked="" type="radio"/> Yes	No	NR
	2. All Protocol deviations and QC problems noted	<input checked="" type="radio"/> Yes	No	NR
	3. Comments: _____			
G.	Uninitialized Strikeovers	Yes	<input checked="" type="radio"/> No	NR
H.	Legible Photocopies	<input checked="" type="radio"/> Yes	No	NR
I.	Consistent Dates	<input checked="" type="radio"/> Yes	No	NR
J.	Preparation Logs	<input checked="" type="radio"/> Yes	No	NR
K.	Instrument Run Logs	<input checked="" type="radio"/> Yes	No	NR
L.	Other Deviations or Comments: _____			

HEARTLAND EST Form 8

HOLDING TIMES FOR METALS

1. Was the holding time exceeded on any of the Metal Fractions

ICP/GFAA/FAA - Holding time of 6 months VTSR
Mercury - Holding time of 28 days VTSR
Cyanide - Holding time of 14 days VTSR

Yes

No

2. - If yes, complete the following form for all samples that exceeding holding times.

Fraction: _____

Sample ID : Matrix : VTSR : Date of Analysis : DA : CC
Decision

:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:
:	:	:	:	:	:

MS 1/20/00

Note: DA = The number of days holding time to analysis is exceeded.

- S = Non-aqueous
- A = Aqueous
- X = Air

CA Decision: Results > IDL - J - estimated
 Results < IDL - R - rejected

INSTRUMENT CALIBRATION AND INITIAL CALIBRATION
VERIFICATION (ICV)

Associated Samples All samples

1. a. Was the ICV instrument properly standardized? Yes No
If no, explain and list action.

b. Was the furnace instrument properly standardized? If no, were the required standards analyzed immediately after the instrument calibration and results within 95-105% recovery? Yes No
Yes No NR
If no, explain and list action.

c. Were the instruments for the analyses of Cyanide and Mercury properly standardized? Yes No
If no, explain and list action.

2. Was the ICV analyzed immediately after the system(s) were calibrated? Yes No
If no, explain and list action.

3. Was the ICV analyzed for every analyte? Yes No
If no, explain and list action.

4. Do all ICV analytes meet the QC requirements for % recovery? Yes No
If no, list affected analytes, their % recovery, and action for which:

a. % recovery is between 75-89% (CN), 70-84% (or HG), 65-79%:

HEARTLAND EST Form C-2

b. % recovery is between 111-125% (CV. 116-130% or HG. 121-135%) _____

c. % recovery is less than 75% or greater than 125% (CV. <70 or >130%, Hg <65 or >135) _____

5. a. Show calculation for the % recovery of one ICV analyte by ICP. Lab value 92.1%

Beryllium $\frac{971}{1000} \times 100 = 97.1\%$

b. Show calculation for the % recovery of one ICV analyte by furnace AA. Lab value NR

c. Show calculation for the ICV % recovery of Mercury. Lab Value 99.5%
 $\frac{3.98}{4.00} \times 100 = 99.5\%$

d. Show calculation for the ICV % recovery of Cyanide. Lab value NR

6. Specific comments: _____

CONTINUING CALIBRATION VERIFICATION (CCV)

Associated Samples All Samples

1. a. Was the CCV performed every two hours or at the 10% frequency? Yes No
If no, list action. _____

b. Was the CCV performed at the beginning and end of the sample analysis? Yes No
If no, list action. _____

2. Were the CCV standards analyzed for all analytes? Yes No
If no, list affected analytes, their associated samples and action. _____

3. Was the same concentration used for CCV throughout the analyses? Yes No
If no, list affected analytes, their associated samples and action. _____

4. Do all CCV analytes meet the QC requirements for % recovery? Yes No
If no, list affected analytes, their associated samples and action for which:

a. % recovery is between 75-89% (CN, 70-84% or Hg, 65-79%) _____

b. % recovery is between 111-125% (CN, 115-130% or Hg, 121-135%) _____

HEARTLAND ESI Form D-2

5. a. Show calculation for the % recovery of one CCV analyte analyzed by ICP. Lab value 101.1%

$$\text{Ti} \quad \frac{1011}{1000} \times 100 = 101.1\%$$

- b. Show calculation for the % recovery of one CCV analyte analyzed by furnace AA. Lab value NR

- c. Show calculation for the % recovery of one CCV analyte analyzed for Mercury. Lab value 99.0%

$$\frac{4.95}{5.00} \times 100 = 99.0\%$$

- d. Show calculation for the % recovery of one CCV analyte for Cyanide. Lab value DK

6. Specific comments: _____

HEARTLAND ESI Form F

INITIAL & CONTINUING CALIBRATION BLANK

Associated Samples All sample

1. Were the initial calibration blanks analyzed for all analytes and run after the initial calibration verification? Yes No
If no, list affected analytes, and action. _____

2. Was the absolute value for all analytes in the initial calibration blank below the CRDL? Yes No
If no, list affected analytes and reject them. _____

3. Were the continuing calibration blanks analyzed for all analytes and run after the continuing calibration verification? Yes No
If no, list affected analytes, associated samples and action. _____

4. Was the frequency for the continuing calibration blanks correct? Yes No
If no, list affected analytes, associated samples and action. _____

5. Was the absolute value of all analytes for the continuing calibration blank below the CRDL? Yes No
If no, list affected analytes, associated samples and reject them. _____

ICP INTERFERENCE CHECK SAMPLE

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____Lab Code: LAUCKS Case No.: _____ SAS No.: _____ICP ID Number: TRACEICP ICS Source: SPEX

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol. A	Sol. AB	Sol. A	Sol. AB	%R	Sol. A	Sol. AB	%R
Aluminum	500000	500000	435206	433930.5	86.8	436472	437536.2	87.5
Antimony		600	8	661.0	110.2	5	647.6	107.9
Arsenic		100	-2	100.3	100.3	1	98.4	98.4
Barium		500	2	534.0	106.8	2	546.2	109.2
Beryllium		500	0	461.6	92.3	0	474.8	95.0
Cadmium		1000	-4	921.5	92.2	-2	896.1	89.6
Calcium	500000	500000	436821	432907.7	86.6	433756	436025.3	87.2
Chromium		500	1	480.7	96.1	1	478.6	95.7
Cobalt		500	1	484.1	96.8	0	477.3	95.5
Copper		500	2	587.7	117.5	2	580.2	116.0
Iron	200000	200000	188364	187895.5	93.9	188285	189646.1	94.8
Lead		50	5	53.3	106.6	1	50.3	100.6
Magnesium	500000	500000	457170	455189.3	91.0	452320	450083.6	90.0
Manganese		500	9	491.3	98.3	9	489.5	97.9
Mercury								
Nickel		1000	-1	947.2	94.7	0	924.6	92.5
Potassium			36	29.7		26	22.1	
Selenium		50	-1	52.1	104.2	2	49.8	99.6
Silver		200	-1	232.8	116.4	-1	234.5	117.2
Sodium			1537	1679.6		1513	1637.8	
Thallium		100	3	102.5	102.5	-1	94.5	94.5
Vanadium		500	3	491.3	98.3	3	490.5	98.1
Zinc		1000	2	942.4	94.2	2	942.4	94.2
Tin			5	4.3		6	4.9	

U.S. EPA - CLP
5A
SPIKE SAMPLE RECOVERY

EPA
JG 1201

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: _____ SAS No.: _____

Matrix: SPLP Level: LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum	75-125	1971.0000	362.6000	2000.00	80.4		P
Antimony	75-125	413.1000	2.4000	500.00	82.6		P
Arsenic	75-125	3209.4000	7.1000	4000.00	80.1		P
Barium	75-125	2143.7000	339.1000	2000.00	90.2		P
Beryllium	75-125	50.3000	0.9000	50.00	100.6		P
Cadmium	75-125	46.2000	3.3000	50.00	85.8		P
Calcium							NR
Chromium	75-125	196.4000	4.7000	200.00	95.8		P
Cobalt	75-125	442.8000	0.5000	500.00	88.6		P
Copper	75-125	228.2000	1.2000	250.00	90.8		P
Iron	75-125	1312.2000	330.5000	1000.00	98.2		P
Lead	75-125	417.1000	6.1000	500.00	82.2		P
Magnesium							NR
Manganese	75-125	479.9000	1.3000	500.00	95.7		P
Mercury	75-125	161.3050	0.2000	200.00	80.7		AV
Nickel	75-125	449.2000	1.1000	500.00	89.8		P
Potassium							NR
Selenium	75-125	2157.1000	1.7000	3000.00	71.9		P
Silver	75-125	917.7000	0.5000	1000.00	91.8		P
Sodium							NR
Thallium	75-125	1508.3000	2.4000	2000.00	75.4		P
Vanadium	75-125	477.0000	2.6000	500.00	94.9		P
Zinc	75-125	471.7000	22.9000	500.00	89.8		P
Tin	75-125	835.2000	2.7000	1000.00	83.5		P

Comments:

Lab Name: LAUCKS TESTING LABS, INC.

Contract: _____

Lab Code: LAUCKS

Case No.: _____

SAS No.: _____

306.16. INC 5P

Matrix: SPLPLevel: LOW% Solids for Sample: 0.0% Solids for Duplicate: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	RPD	Q	M
Aluminum	200.0	362.6000	370.8000	2.2		P
Antimony		2.4000U	2.4000U			P
Arsenic		7.1000B	6.3000B	11.9		P
Barium	200.0	339.1000	342.5000	1.0		P
Beryllium		0.9000U	0.9000U			P
Cadmium		3.3000B	6.4000B	63.9		P
Calcium	5000.0	10248.6000	10422.5000	1.7		P
Chromium		4.7000B	4.8000B	2.1		P
Cobalt		0.5000U	0.5000U			P
Copper		1.2000B	1.1000B	8.7		P
Iron	100.0	330.5000	337.6000	2.1		P
Lead		6.1000B	5.1000B	17.9		P
Magnesium		172.8000B	169.3000B	2.0		P
Manganese		1.3000B	1.4000B	7.4		P
Mercury		0.2000U	0.2000U			AV
Nickel		1.1000U	1.1000U			P
Potassium		40.2000U	40.2000U			P
Selenium		1.7000U	1.7000U			P
Silver		0.5000U	0.5000U			P
Sodium		2217.7000B	2280.0000B	2.8		P
Thallium		2.4000U	2.4000U			P
Vanadium		2.6000B	2.7000B	3.8		P
Zinc	20.0	22.9000	23.9000	4.3		P
Tin		2.7000U	2.7000U			P

LABORATORY CONTROL SAMPLE

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: _____ SAS No.: _____

SDG No.: _____

Solid LCS Source: IV

Aqueous LCS Source: IV

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum	2000.0	1910.50	95.5					
Antimony	500.0	504.40	100.9					
Arsenic	2000.0	1989.40	99.5					
Barium	2000.0	2027.20	101.4					
Beryllium	50.0	49.30	98.6					
Cadmium	50.0	48.60	97.2					
Calcium	50000.0	49160.10	98.3					
Chromium	200.0	203.20	101.6					
Cobalt	500.0	495.60	99.1					
Copper	250.0	255.60	102.2					
Iron	1000.0	1049.80	105.0					
Lead	500.0	498.50	99.7					
Magnesium	50000.0	48398.40	96.8					
Manganese	500.0	508.60	101.7					
Mercury	4.0	3.98	99.5					
Nickel	500.0	501.70	100.3					
Potassium	50000.0	50399.80	100.8					
Selenium	2000.0	1905.90	95.3					
Silver	50.0	51.30	102.6					
Sodium	50000.0	46206.80	92.4					
Thallium	2000.0	1933.90	96.7					
Vanadium	500.0	509.90	102.0					
Zinc	500.0	494.30	98.9					
Tin	1000.0	978.00	97.8					

U.S. EPA - CLP
9
ICP SERIAL DILUTIONS

EPA 821-R-01-010

b Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: _____ SAS No.: _____ 300 _____ 2

Matrix (soil/water): SPLP Level (low/med): LO

Concentration Units: ug/L

Analyte	Initial Sample Result (I) C	Serial Dilution Result (S) C	% Difference	Q	M
Aluminum	362.60	293.50U	100.0		P
Antimony	2.40U	12.00U			P
Arsenic	7.10B	10.00U	100.0		P
Barium	339.10	359.00B	5.9		P
Beryllium	0.90U	4.50U			P
Cadmium	3.30B	14.50B	339.4		P
Calcium	10248.60	10886.00B	6.2		P
Chromium	4.70B	3.00U	100.0		P
Cobalt	0.50U	2.50U			P
Copper	1.20B	3.00U	100.0		P
Iron	330.50	306.00B	7.4		P
Lead	6.10B	10.50U	100.0		P
Magnesium	172.80B	76.50B	55.7		P
Manganese	1.30B	1.50U	100.0		P
Mercury					
Nickel	1.10U	5.50U			P
Potassium	40.20U	201.00U			P
Selenium	1.70U	8.50U			P
Silver	0.50U	2.50U			P
Sodium	2217.70B	1935.00U	100.0		P
Thallium	2.40U	12.00U			P
Vanadium	2.60B	2.50U	100.0		P
Zinc	22.90	35.50B	55.0		P
Tin	2.70U	13.50U			P

CHAIN OF CUSTODY RECORD

800-448-7882
 MEMPHIS, TENNESSEE
 1701 DALLAS ST. JACKSON, TN 37504
 LANCASTER, PA. NASHVILLE, TN. HUNTSVILLE, ALA. MOBILE, ALA. PENSACOLA, FL.
 INDEPENDENCE, MO. OMAHA, NE. OROVILLE, GA. RICHMOND, VA.

9912424 EN035

CDC NO: _____
 PO NO: 1840
 REL NO: JP
 LAB NAME: Lanchem

CLIENT: Navy Clean CNC PROJECT MANAGER: T. Haverest
 LOCATION: Zone G / Aug 628 TELE/FAX NO.: (843) 884-0029
 SAMPLERS: (SIGNATURE) [Signature]

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		ANALYSIS REQUIRED												REMARKS							
					TEMP.	CHEMICAL	NO. OF CONTAINERS	SVOC'S	TOC	Metals	SPLP Metals															
NBCG/62FSB00601	11/11/99	1300	S	Glass 802	Ice	None	3	✓	✓	✓																
NBCG/62FSB00612	"	1310	S	"	"	"	3	✓	✓	✓																
NBCG/62FSB00701	"	1310	S	"	"	"	3	✓	✓	✓																Hit Conc Slt
NBCG/62FSB00501	"	1320	S	" 402	"	"	3		✓	✓	✓															Near 004
NBCG/62FSB00502	"	1330	S	" 402	"	"	3		✓	✓	✓															
NBCG/62FSB00901	"	1330	S	" 802	"	"	3		✓	✓	✓															Near 005
NBCG/62FSB00902	"	1340	S	" 402	"	"	3		✓	✓	✓															"
NBCG/62FSB01001	"	1400	S	" 402	"	"	3		✓	✓	✓															Near 001
NBCG/62FSB01003	"	1400	S	" 402	"	"	3		✓	✓	✓															Dup of 01001
NBCG/62FSB01002	"	1410	S	" 402	"	"	3		✓	✓	✓															Near 001
NBCG/62FSB01101	"	1400	S	" "	"	"	3		✓	✓	✓															Near 003
NBCG/62FSB01102	"	1410	S	" "	"	"	3		✓	✓	✓															"
NBCG/62FSB01201	"	1430	S	" "	"	"	3		✓	✓	✓															Near 002
NBCG/62FSB01202	"	1440	S	" "	"	"	3		✓	✓	✓															"
NBCG/62FSB01004	"	1410	S	" "	"	"	3		✓	✓	✓															Dup of 01002

RELINQUISHER: <u>[Signature]</u>	DATE: <u>11/12/99</u>	RECEIVER: <u>[Signature]</u>	DATE: <u>12/10/99</u>	RELINQUISHER: _____	DATE: _____	RECEIVER: _____	DATE: _____
PRINTED: <u>Fred Erdmann</u>	TIME: _____	PRINTED: <u>[Signature]</u>	TIME: <u>9:30</u>	PRINTED: _____	TIME: _____	PRINTED: _____	TIME: _____
COMPANY: <u>EnSafe</u>		COMPANY: <u>Lanchem</u>		COMPANY: _____		COMPANY: _____	

METHOD OF SHIPMENT: Fed Exp
 SHIPMENT NO.: 814 795 922 599
 SEND RESULTS TO: Charles V. Vehey

COMMENTS: _____



CHAIN OF CUSTODY RECORD

REGIONAL OFFICE
MEMPHIS, TENNESSEE
FEDERAL BUREAU OF INVESTIGATION
LABORATORY DIVISION
440 SOUTH MAIN STREET, SUITE 1000
MEMPHIS, TENNESSEE 38102

9912424 EN035

PROJECT/JOB NO: _____
DOC NO: _____
PO NO: 1840
REL NO: 3P
LAB NAME: LANEX

CLIENT: Navy Clean CNC PROJECT MANAGER: T. Havey
LOCATION: Zone G/AOC 643 TELE/FAX NO.: (843) 884-0029
SAMPLERS (SIGNATURE): [Signature]

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION		NO. OF CONTAINERS	ANALYSIS REQUIRED								REMARKS		
					TEMP.	CHEMICAL		PAH(SVOC)	Metals	TOC	PCB	Pesticides	SPM	Metals				
1BCG/643SB01501	11/10/99	0950	S	Glass 8oz	Ice	None	3	✓	✓	✓								
1BCG/643SB01502	"	1000	S	"	"	"	3	✓	✓	✓								
1BCG/643SB02301	"	1000	S	"	"	"	5	✓	✓	✓	✓	✓						None 013
1BCG/643SB02302	"	1010	S	"	"	"	5	✓	✓	✓	✓	✓						"
1BCG/643SB02401	"	1045	S	"	"	"	3		✓	✓		✓						None 004
1BCG/643SB02402	"	1055	S	"	"	"	3		✓	✓		✓						"

DATE: 11/17/99	RECOVER: <u>Mike Owen</u>	DATE: 12/12/99	RELINQUISHER: _____	DATE: _____	RECEIVER: _____
PRINTED: <u>Fred Erdmann</u>	PRINTED: <u>Mike Owen</u>	TIME: 9:36	PRINTED: _____	TIME: _____	PRINTED: _____
COMPANY: <u>En Safe</u>	COMPANY: <u>LANEX</u>		COMPANY: _____		COMPANY: _____

METHOD OF SHIPMENT: FIA Exp
SHIPMENT NO. 814795922349
SEND RESULTS TO: Charles Verney

COMMENTS: _____

LAUCKS TESTING LABORATORIES

940 S. Harney
Seattle, WA 98108

To: Ensafe
Laboratory No. : 9912424
SDG No. : EN035
Date of Report: January 13, 2000

SAMPLE RECEIPT, IDENTIFICATION, AND GENERAL COMMENTS:

Sample Receipt and Identification:

The samples submitted under the laboratory number(s) indicated above were identified and analyzed as tabulated below. The samples were collected and received on the dates noted on the enclosed chain-of-custody copies, Attachment A.

<u>Client Sample Identification</u>	<u>Laucks Sample Identification</u>	<u>Testing Analytical Request</u>
628SB00801	9912424-01	SPLP
628SB00802	9912424-02	SPLP
628SB00901	9912424-03	SPLP
628SB00902	9912424-04	SPLP
628SB01001	9912424-05	SPLP
628SB01003	9912424-06	SPLP
628SB01002	9912424-07	SPLP
628SB01101	9912424-08	SPLP
628SB01102	9912424-09	SPLP
628SB01201	9912424-10	SPLP
628SB01202	9912424-11	SPLP
628SB01004	9912424-12	SPLP
636SB01501	9912424-13	SPLP
636SB01502	9912424-14	SPLP
636SB01601	9912424-15	SPLP
636SB01602	9912424-16	SPLP
636SB01701	9912424-17	SPLP
643SB02401	9912424-18	SPLP
643SB02402	9912424-19	SPLP

Analytical Request Key:

SPLP = SPLP Metals (1312), TAL Metals + Tin (6010B/7470A)

Sample Receipt Comments:

There were no anomalies in the receipt of these samples.

LAUCKS TESTING LABORATORIES

940 S. Harney
Seattle, WA 98108

Sample Identification on Forms:

When completing forms created through the CLP software, every attempt is made to use both your sample IDs as well as the laboratory sample IDs. The forms have varied default sizes to their sample identification fields, and are not amenable to alteration or editing. When it is not possible to use your complete sample ID because of field length limitations, Laucks will usually do one of two things: 1) use as much of your ID as will fit, beginning from the RIGHT hand side of the sample ID number; or 2) select some sub-set of your sample identifier if it is clearly a discrete number. In addition, all forms will contain our sample IDs, which can be cross-referenced from the table above.

GENERAL REMARKS ON INORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON INORGANIC ANALYSES."

ICP Metals:

On the first timed and dated page of each ICP run, the data to be reported or rejected will be tabulated for that run.

Mercury:

Laucks purchases a 1000 mg/L Hg stock solution from Inorganic Ventures. The 1.0 mg/L working standard is made by diluting 100 μ L to 100 mL with 2% HNO₃. The calibration curve is made by placing 0, 20, 50, 100, 200, 500 and 1000 μ L of the working standard in BOD bottles and diluting up to 100 mL. The standard curve is equivalent to 0, 0.2, 0.5, 1.0, 2.0, 5.0 and 10.0 μ g/L.

SPECIFIC REMARKS ON INORGANIC ANALYSES:

Holding Time Compliance:

Laucks calculates holding time compliance for inorganic determinations using the date on which reportable data were acquired.

Metals:

The holding time for metals is six months from the date of collection, excepting mercury, which is 28 days. All analyses were performed within holding time.

LAUCKS TESTING LABORATORIES

940 S. Harney
Seattle, WA 98108

ICP Metals:

Zinc was present in the SPLP Extraction Fluid blank. However, zinc was not present in the preparation blank, therefore no further action was required.

The matrix spike sample percent recovery for selenium was outside of the established control limits of 75-125% for sample 628SB01201. No further corrective action was required. All relevant data have been flagged with an "N" on Forms I and V.

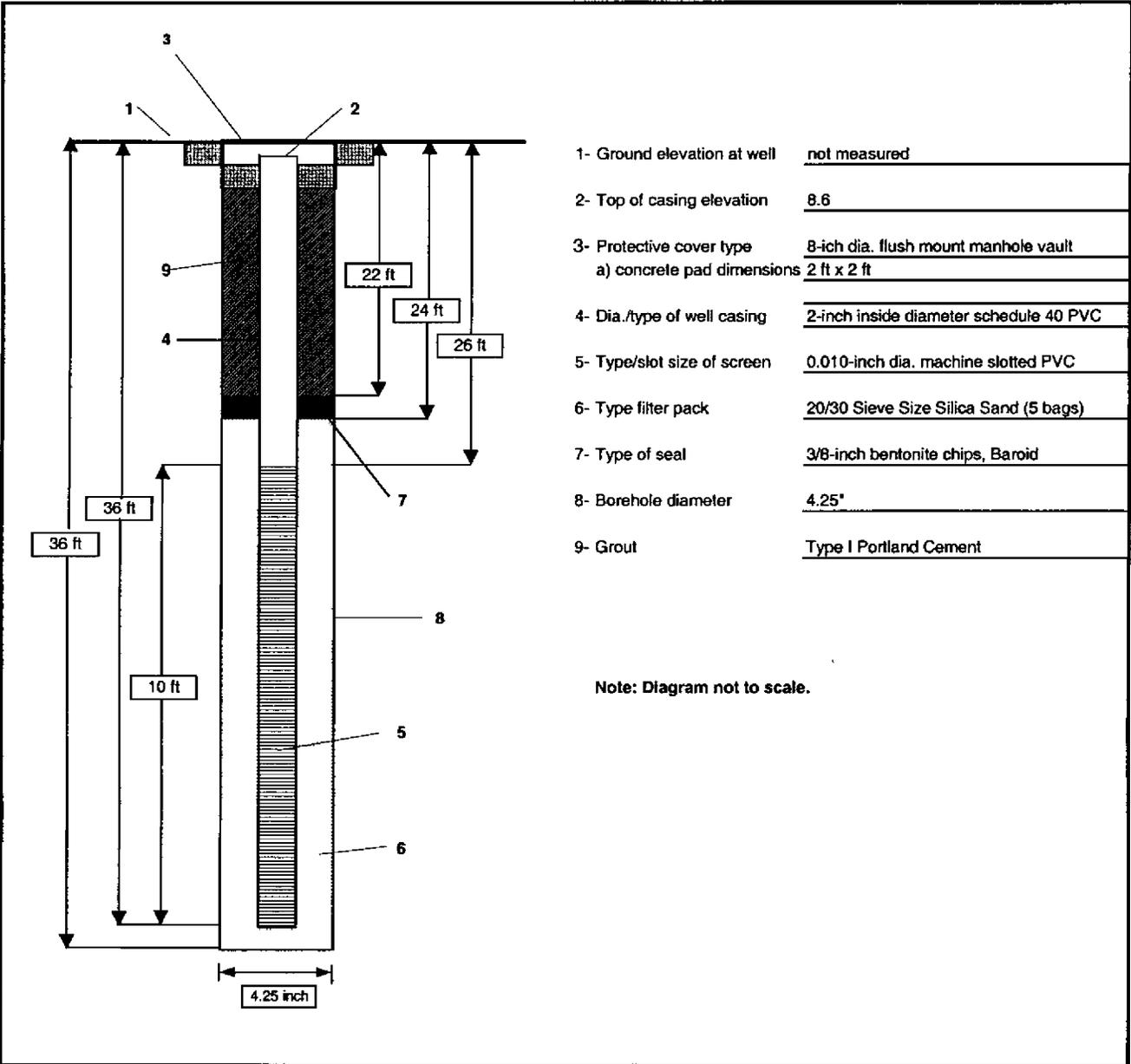
Mercury:

No comments.



PROJECT NUMBER 158814.ZG	WELL NUMBER G008GW04D	SHEET 1 OF 1
WELL COMPLETION DIAGRAM		

PROJECT : AOC 633, Zone E, Charleston Naval Complex	LOCATION : Charleston, South Carolina
DRILLING CONTRACTOR : Prosonic Corporation License # 1435	NORTHING 371964.1
DRILLING METHOD AND EQUIPMENT USED : Hollow Stem Augering (4.25-inch diameter)	EASTING: 2321499.1
WATER LEVELS : not measured	START : 7/23/2002 END: 09/23/2002 LOGGER : D. Gates/NVR





PROJECT NUMBER 158814.ZG	DPT NUMBER G008GW04D	page 1 of 1
DPT SOIL SAMPLE LOG		

PROJECT : Charleston Naval Complex (SWMU 8) LOCATION : Charleston, SC NORTHING: 371964.1
 ELEVATION : 8.6 DRILLING CONTRACTOR : Prosonic License # 1435 EASTING: 2321499.1
 DRILLING METHOD AND EQUIPMENT USED : Direct-Push Sampling
 START : 7/23/2002 END: 7/23/2002 LOGGER : D. Gates/NVR

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SOIL DESCRIPTION	COMMENTS
		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	TESTS, INSTRUMENTATION ABANDONMENT METHOD
	0-1'	surface Gray Sand with limerock gravel	
	1-1.6'	SAND, Brown, fine to medium grained, shell fragments, med dense, dry	
5	1.6-9.0'	CLAY Gray to black, stiff, 20% med gravel, dry	
10	9-14'	SAND Tan, fine to medium grain, med dense, saturated	
15	14-20'	CLAY Gray to black, stiff, organic fragments (wood 20%), moist	
20	20-24'	No Recovery	
25	24-28'	CLAY Olive green to gray, soft to med dense, plastic, moist to saturated	
30	28-32'	CLAY Olive green to gray, soft to med dense, plastic, moist to saturated.	
	32-35'	CLAY to Sandy Clay Olive green to gray, soft to med dense, moist to saturated	
35	35-36'	Sandy Clay Olive green to gray, soft to med dense, moist to saturated	End boring at 36 feet bbs

Hydrazine Analytical Methods and Results

TO: CNC BCT

FROM: Jim Edens/CH2M HILL
Casey Hudson/CH2M HILL

DATE: November 11, 2002

This memorandum presents the evaluation results of hydrazine analytical methods and historical reported hydrazine in groundwater. This evaluation was initiated because the reported detections of low levels of hydrazine across a large area of the Charleston Naval Complex (CNC) were inconsistent with hydrazines fate and transport properties. Hydrazine is a strong reducing agent and not expected to be persistent in the environment. However, historical data reported hydrazine present in groundwater at numerous locations across Zone H at the CNC. The findings of this evaluation are that the previously used analytical method (based on colorimetric assessment) was subject to false positives and an alternate more reliable analytical method did not detect hydrazine in split sample analysis.

Hydrazine Chemical Properties

Hydrazine is a nitrogen hydride compound and is a strong reducing agent with the molecular structure N_2H_4 . The molecule has four electrons available to donate in reduction-oxidation (RedOx) reactions. As a result, hydrazine reacts vigorously with strong oxidants, oxygen, and halogens. It is highly combustible in the presence of acids. It is a caustic, fuming, and hygroscopic colorless liquid at standard temperature and pressure with a pungent, ammoniacal odor. Hydrazine is highly soluble in water, but the mixture fumes in air. Hydrazine is highly toxic and a possible carcinogen.

Environmental releases of hydrazine are not expected to be persistent. Releases to soil would be expected to evaporate quickly. The portion that infiltrated would be adsorbed and decomposed on clay surfaces under aerobic conditions. It is possible that releases to soil could pose a leaching hazard.

Hydrazine released to groundwater systems would evaporate or undergo degradation. Degradation rate in water is dependant on pH, temperature, dissolved oxygen, hardness, and the presence of organic material. The degradation rate increases under aerobic conditions, increasing organic matter, alkaline conditions, and/or in hard water (metallic ions). The estimated half-life for hydrazine in water is 1 to 10 days.

Because hydrazine readily reacts with oxygen, atmospheric releases are also not expected to persist. Hydrazine is degradable with an estimated half-life of less than one day.

Hydrazine Uses

The main industrial use of hydrazine is in the manufacture of plastics, where it is used to produce porous plastics such as styrofoam packing material. Hydrazine added to the liquid plastic decomposes into nitrogen gas, which causes the plastic to foam and produces the porous texture. Production of agricultural pesticides is another major use of hydrazine. A variety of substituted hydrazines have been used as fungicides, herbicides, insecticides, and plant growth regulators (Zumdahl, 1993).

Hydrazine has some specialized uses, including rocket fuel and nuclear fuel processing. It is also used as a reducing agent for metals.

At the CNC hydrazine may have been used as a corrosion inhibitor in boiler feedwater. The presence of hydrazine in the feedwater reduces the oxidation potential of the feedwater and provided a source of electrons to reduce the valence state of the metal surfaces once oxidized.

Analytical Methods

There is no EPA approved analytical method for hydrazine. Two analytical methods are available to quantify the amount of hydrazine in groundwater and soil; a colorimetric method and the ion chromatographic (IC) method. These methods and their limitations are discussed below.

Colorimetric Method – ASTM

In the colorimetric method reagents (p-dimethylaminobenzaldehyde in methyl alcohol and hydrochloric acid) are added to the water that react with hydrazine and turns the solution yellow (p-dimethylaminobenzalazine). The intensity of the color is dependant on, and proportional to, the amount of reagent that has reacted with the hydrazine. An adsorption spectrometer (set at 458 nm) measures the intensity of the color to determine the concentration of hydrazine in the sample. This method is recommended for concentrations between 5 and 200 µg/L.

Results obtained from the colorimetric method are prone to false positives. The color comparison is sometimes done manually. This can lead to reading errors. Turbidity, other colors adsorbed at nearly the same wavelength, and dark colors can also influence an accurate reading. Use of a spectrophotometer controls the manual reading errors, but the other interferences discussed will continue to impact the results. Additionally the presence of aromatic amines will interfere with the results.

Ion Chromatographic Method

In the ion chromatographic method samples are filtered, acidified, and injected into a cation exchange column where the eluted chemicals are measured. Chemicals are identified based on retention time in the column compared to known standards. The amount of the chemical present is determined by analyzing a known amount of the chemical in a series of standards and determining a response factor. The magnitude of the elutant peak is compared to the calibration curve to calculate a concentration. This method can detect hydrazine concentrations between 10 and 100 µg/L.

False positives may also occur in the IC method. Hydroxylamine elutes approximately 15 seconds before hydrazine. Concentrations of hydroxylamine greater than about 30% of the hydrazine concentration could result in a decrease in accuracy of the hydrazine measurement. High concentrations of iron (Fe^{+2}), manganese (Mn^{+2}), and cobalt (Co^{+2}) can interfere with peak resolution. The presence of peroxides may also interfere with the accurate determination of hydrazine.

Groundwater Sampling Results at SWMU 8

During the RFI, more than 50 monitor wells were sampled and analyzed for hydrazine in the area of SWMUs 8 and 9, using the colorimetric method. Hydrazine was reported in the samples from many of these wells at concentrations from just above the detection limit (5 $\mu\text{g}/\text{L}$) to 20,800 $\mu\text{g}/\text{L}$. However neither a distribution pattern nor a likely source area was apparent.

In March 2002, approximately half of these wells were re-sampled and analyzed for hydrazine. The analytical results from these samples are presented in the attached table.

Reported concentrations of hydrazine in the March 2002 samples analyzed using the colorimetric method ranged from 6 to 61 $\mu\text{g}/\text{L}$ with 23 of the 27 samples having reported concentrations of hydrazine. Because hydrazine was not expected to persist in the environment, CH2M-Jones evaluated available analytical methods for hydrazine. All of the hydrazine results were determined using the colorimetric method and manual reading.

In an attempt to verify the previous data, CH2M-Jones collected and analyzed 34 additional samples using the same method in June 2002. However, the laboratory had updated its hydrazine method by ceasing its manually reading of the results in favor of an automated spectrophotometer. The spectrophotometer eliminated manual reading errors. Ten of the 34 samples were split samples, with one sample analyzed using the colorimetric method (with spectrophotometer readings) and one sample analyzed using the IC method.

For these samples, hHydrazine was reported only in a single colorimetric sample (008GW001M6, 110 $\mu\text{g}/\text{L}$). This sample was also analyzed using the IC method. Hydrazine was not detected in the IC method sample.

The June 2002 sampling effort included re-sampling monitoring wells H009GW004, H009GW013, and H009GW024. These three wells had previously reported concentrations of hydrazine of 13,900 $\mu\text{g}/\text{L}$, 14,000 $\mu\text{g}/\text{L}$, and 20,800 $\mu\text{g}/\text{L}$ respectively, based on the colorimetric method. The sample collected from H008GW013 was analyzed using both the colorimetric and IC methods. Hydrazine was not detected in any of the samples collected from these wells. The analytical data from the March and June 2002 sampling events are presented in Appendix D and the data validation summary is included in Attachment E of the RFI Report Addendum/CMS Work Plan.

Conclusions

Analytical results based on the colorimetric method appear to be false positives associated with the method used or interferences. Hydrazine was not detected in the most recent June 2002 samples collected at SWMUs 8 and 9 using the IC method. The sample results based on the colorimetric method using an automated spectrophotometer, rather than manual

readings, also resulted in almost complete contradiction of reported results from the March 2002 sampling event. These data demonstrate that the reported detections of hydrazine from the colorimetric/manual reading method are not reproducible using the IC or the colorimetric method/automated reading method.

Based on these data, hydrazine does not appear to be present in the groundwater as initially suggested by the samples collected and analyzed using the colorimetric method/manually reading method. Continued monitoring for hydrazine is not warranted.

References

Zumdahl, S. *Chemistry, Third Edition*, Heath and Company. 1993.

Summary of Resul. ydrazine in Groundwater
 Charleston Naval Complex
 Zones G and H

Sampling Event	November 15, 1996			April 30, 1997			May 20-23, 1997			September 13-16, 1997			December 8-11, 1997		
	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier
G008GW001							5.00	ug/L	U	16.70	ug/L	=	8.00	ug/L	=
G008GW002							7.30	ug/L	=	5.00	ug/L	U	5.10	ug/L	=
G008GW003							23.60	ug/L	=	5.00	ug/L	U	22.10	ug/L	=
G008GW004							5.00	ug/L	U	9.09	ug/L	=	7.60	ug/L	=
G008GW005							5.00	ug/L	U	10.20	ug/L	=	8.40	ug/L	=
G008GW006							5.00	ug/L	U	5.10	ug/L	=	5.00	ug/L	U
G636GW001	5.00	ug/L	U				5.00	ug/L	U	16.00	ug/L	=	5.80	ug/L	=
G637GW001							5.00	ug/L	U	5.00	ug/L	U	5.00	ug/L	U
G637GW002				5.80	ug/L	=				5.10	ug/L	=	5.00	ug/L	U
G637GW003				7.30	ug/L	=				5.00	ug/L	U	5.00	ug/L	U
G638GW001															
H653GW003															
GFDSGW01E															
GFDSGW02A															
GFDSGW02C															
GFDSGW02D															
GFDSGW03C															
GFDSGW05B															
G706GW001															
GU16GW005															
GCNC16-MW05															
GGDGGW001															
H009GW018															
G008GSP01															
G008GSP06															
G008GSP09															
G008GSP14															
G008GSP18															
H009GW002															
H009GW017															
G120GW003															
HFMWGW004															
GFDSGW07C															
IGD1GW018															
HU04G04W4															
HU06GW001															
H009GW011															
H009GW016															
H009GW003															
G006GW004															
G006GW007															

**Summary of Results - Hydrazine in Groundwater
Charleston Naval Complex
Zones G and H**

Sampling Event Station	November 15, 1996			April 30, 1997			May 20-23, 1997			September 13-16, 1997			December 8-11, 1997		
	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier
GU19GW002															
H009GW001															
H009GW004															
H009GW014															
H009GW021															
H009GW024															
H009GW005															
H009GW008															
H009GW01D															
H009GW05D															
H009GW08D															
H009GW02D															
H009GW07D															
H009GW013															

Summary of Results Hydrazine in Groundwater
 Charleston Naval Complex
 Zones G and H

Sampling Event Station	February 12, 1998			October 18-20, 1999			March 2002 Colorimetric Method			June 2002 Colorimetric Method			June 2002 IC Method		
	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier
G008GW001							23.00	ug/L	=	110	ug/L	=	10	ug/L	U
G008GW002							9.00	ug/L	=						
G008GW003							61.00	ug/L	=						
G008GW004							20.00	ug/L	=	5	ug/L	U	10	ug/L	U
G008GW005							6.00	ug/L	=	5	ug/L	U	10	ug/L	U
G008GW006							5.00	ug/L	U						
G636GW001							21.00	ug/L	=	5	ug/L	U	10	ug/L	U
G637GW001							9.00	ug/L	=						
G637GW002	5.00	ug/L	U				8.00	ug/L	=						
G637GW003	5.00	ug/L	U				5.00	ug/L	U						
G638GW001				5000.00	ug/L	U	12.00	ug/L	=						
H653GW003				5000.00	ug/L	U	5.00	ug/L	U						
GFDSGW01E				5000.00	ug/L	U	8.00	ug/L	=	5	ug/L	U			
GFDSGW02A							13.00	ug/L	=						
GFDSGW02C							11.00	ug/L	=						
GFDSGW02D							8.00	ug/L	=						
GFDSGW03C							12.00	ug/L	=						
GFDSGW05B							11.00	ug/L	=						
G706GW001							13.00	ug/L	=	5	ug/L	U	10	ug/L	U
GU16GW005															
GCNC16-MW05							25.00	ug/L	=	5	ug/L	U			
GGDGGW001							8.00	ug/L	=						
H009GW018							11.00	ug/L	=						
G008GSP01							31.00	ug/L	=						
G008GSP06							5.00	ug/L	U						
G008GSP09							8.00	ug/L	=						
G008GSP14							6.00	ug/L	=						
G008GSP18							8.00	ug/L	=						
H009GW002										5	ug/L	U	10	ug/L	U
H009GW017										5	ug/L	U	10	ug/L	U
G120GW003										5	ug/L	U	10	ug/L	U
HFMWGW004										5	ug/L	U			
GFDSGW07C										5	ug/L	U			
IGD1GW018										5	ug/L	U			
HU04G04W4										5	ug/L	U			
HU06GW001										5	ug/L	U			
H009GW011										5	ug/L	U			
H009GW016										5	ug/L	U			
H009GW003										5	ug/L	U			
G006GW004										5	ug/L	U			
G006GW007										5	ug/L	U			

**Summary of Results - Hydrazine in Groundwater
Charleston Naval Complex
Zones G and H**

Sampling Event	February 12, 1998			October 18-20, 1999			March 2002 Colorimetric Method			June 2002 Colorimetric Method			June 2002 IC Method		
	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier	Result	Unit	Qualifier
GU19GW002										5	ug/L	U			
H009GW001										5	ug/L	U			
H009GW004										5	ug/L	U			
H009GW014										5	ug/L	U			
H009GW021										5	ug/L	U			
H009GW024										5	ug/L	U			
H009GW005										5	ug/L	U			
H009GW008										5	ug/L	U			
H009GW01D										5	ug/L	U			
H009GW05D										5	ug/L	U			
H009GW08D										5	ug/L	U			
H009GW02D										5	ug/L	U			
H009GW07D										5	ug/L	U			
H009GW013										5	ug/L	U			

Statistical Summary

Site: SWMU 8/AOC 636
 Media: Surface soil
 Units: mg/Kg

Chemical	Notes	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	UCL95 nonparam	UCL95 bootstrap
Aroclor-1260	Exposure Box 1 (G636SB008)	9	5	4	56%	0.0085	0.92	0.21	0.13	0.02	0.0405	NONPARAMETRIC	1.86	0.32	4.16	0.66	0.0085	0.292
Aroclor-1260	Exposure Box 2 (GFDSSC012)	6	2	4	33%	0.32	0.84	0.58	0.22	0.0175	0.065	LOGNORMAL	2.015	0.49	6.15	19.99	0.0	0.429

Statistical Summary

Site: SWMU 8/AOC 636
 Media: Surface Soil
 Units: mg/Kg

Chemical	CASRN	Samples	Detects	NonDetects	FOD	Min Detect	Max Detect	Avg Detect	Mean	Min	Max	W-Test	t-Statistic	UCL95			UCL95 nonparm	UCL95 bootstrap
										nondetect	nondetect			norm	H-statistic	UCL96 log		
Aroclor-1260		40	8	32	20%	0.0085	0.92	0.287	0.081	0.0175	0.08	NONPARAMETRIC	1.70	0.13	2.25	0.08	0.019	0.13
Antimony		44	3	41	7%	1.5	7.6	5.167	1.794	0.155	3.45	NONPARAMETRIC	1.67	2.23	2.68	3.81	0.290	2.22
Arsenic		46	45	1	98%	0.63	150	9.670	9.471	0.55	0.55	LOGNORMAL	1.67	14.91	2.39	11.56	2.700	14.6
Chromium		46	45	1	98%	3.7	64.2	14.713	14.502	5	5	NONPARAMETRIC	1.67	17.85	2.08	18.07	5.900	17.8
Thallium		46	4	42	9%	0.42	0.92	0.723	0.844	0.105	3.15	NONPARAMETRIC	1.67	1.08	2.28	1.15	0.215	1.08

Site: SWMU 8/AOC 636
 Media: Surface Soil
 Units: mg/Kg
 Chemical: Aroclor-1260
 CASRN:

STATISTICS

N	40
Detects	8
FOD	20%
Mean of Detect	0.287
Min of Detect	0.0085
Max of Detect	0.92
Best Estimate of Mean (arithmetic)	0.081
Best Estimate of Mean (geometric)	0.035
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	0.13
<i>t</i> -statistic	1.70
UCL95 Lognormal	0.08
<i>H</i> -statistic	2.25
UCL95 Nonparametric	0.019
UCL95 Bootstrap	0.129

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	0.410790485
coverage	95%
UTL95 Lognormal	0.185550063
coverage	95%
UTL95 Nonparametric	0.92
coverage	98%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.357
W_{log}	0.744
$W_{\alpha = 0.05}$	0.940

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 to subjectively select a normal or lognormal distribution.
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.

Site	SWMU 8/AOC 636
Media	Surface Soil
Units	mg/Kg
Chemical	Antimony
CASRN	

STATISTICS

N	44
Detects	3
FOD	7%
Mean of Detect	5.167
Min of Detect	1.5000
Max of Detect	7.60
Best Estimate of Mean (arithmetic)	1.79
Best Estimate of Mean (geometric)	0.9
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	2.2
<i>t</i> -statistic	1.67
UCL95 Lognormal	3.8
<i>H</i> -statistic	2.68
UCL95 Nonparametric	0.29
UCL95 Bootstrap	2.22

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	4.749657057
coverage	95%
UTL95 Lognormal	8.652618668
coverage	95%
UTL95 Nonparametric	7.60
coverage	98%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.788
W_{log}	0.796
$W_{\alpha = 0.05}$	0.944

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 to subjectively select a normal or lognormal distribution.
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.

Site SWMU 8/AOC 636
 Media: Surface Soil
 Units: mg/Kg
 Chemical: Arsenic
 CASRN.

STATISTICS

N	46
Detects	45
FOD	98%
Mean of Detect	9.670
Min of Detect	0.6300
Max of Detect	150.00
Best Estimate of Mean (arithmetic)	9.47
Best Estimate of Mean (geometric)	4.6
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	14.9
<i>t</i> -statistic	1.67
UCL95 Lognormal	11.6
<i>H</i> -statistic	2.39
UCL95 Nonparametric	2.7
UCL95 Bootstrap	14.6

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	46.75690267
<i>coverage</i>	95%
UTL95 Lognormal	26.98863896
<i>coverage</i>	95%
UTL95 Nonparametric	150.00
<i>coverage</i>	98%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.345
W_{log}	0.971
$W_{\alpha = 0.05}$	0.945

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 to subjectively select a normal or lognormal distribution.
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.

Site: SWMU 8/AOC 636
 Media: Surface Soil
 Units: mg/Kg
 Chemical: Chromium
 CASRN:

STATISTICS

N	46
Detects	45
FOD	98%
Mean of Detect	14.713
Min of Detect	3.7000
Max of Detect	64.20
Best Estimate of Mean (arithmetic)	14.5
Best Estimate of Mean (geometric)	10.4
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	17.9
<i>f-statistic</i>	1.67
UCL95 Lognormal	18.1
<i>H-statistic</i>	2.08
UCL95 Nonparametric	5.9
UCL95 Bootstrap	17.8

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	37.47101365
<i>coverage</i>	95%
UTL95 Lognormal	39.31395972
<i>coverage</i>	95%
UTL95 Nonparametric	64.20
<i>coverage</i>	98%

DISTRIBUTION TESTING

Population is best described as:		NONPARAMETRIC
	W_{normal}	0.751
	W_{log}	0.889
	$W_{\alpha=0.05}$	0.945

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 to subjectively select a normal or lognormal distribution.
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.

Site: SWMU 8/AOC 636
 Media: Surface Soil
 Units: mg/Kg
 Chemical: Thallium
 CASRN:

STATISTICS

N	46
Detects	4
FOD	9%
Mean of Detect	0.723
Min of Detect	0.4200
Max of Detect	0.92
Best Estimate of Mean (arithmetic)	0.84
Best Estimate of Mean (geometric)	0.5
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	1.1	Exceeds Max Detect
t-statistic	1.67	
UCL95 Lognormal	1.1	Exceeds Max Detect
H-statistic	2.28	
UCL95 Nonparametric	0.215	
UCL95 Bootstrap	1.08	Exceeds Max Detect

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	2.48023996
coverage	95%
UTL95 Lognormal	2.682390661
coverage	95%
UTL95 Nonparametric	0.92
coverage	98%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W _{normal}	0.854
W _{log}	0.887
W _{ci = 0.05}	0.945

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 to subjectively select a normal or lognormal distribution.
- 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.

APPENDIX I**PAH Results in Surface Soil Used for BEQ Calculation***RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex*

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL^a	Mean Value^b
Benzo[a]Anthracene	G008SB01	3.8	U	09/24/1993	1.0	0.37
	G008SB02	0.4	U	09/25/1993		
	G008SB03	0.38	U	09/25/1993		
	G008SB04	0.39	U	09/27/1993		
	G008SB05	0.46	U	09/29/1993		
	G008SB06	0.36	U	09/30/1993		
	G008SB07	0.41	U	10/18/1993		
	G008SB08	0.43	U	10/18/1993		
	G008SB10	0.4	U	10/18/1993		
	G008SB13	0.44	U	10/19/1993		
	G008SB14	0.39	U	10/19/1993		
	G008SB15	0.2	J	10/19/1993		
	G008SB16	0.42	U	10/20/1993		
	G008SB17	1.1	=	10/20/1993		
	G008SB19	0.34	U	10/20/1993		
	G008SB20	0.35	U	10/27/1993		
	G008SB22	0.38	U	10/27/1993		
	G008SB23	0.38	U	10/26/1993		
	G008SB24	0.37	U	10/26/1993		
	G008SB26	0.42	U	10/27/1993		
	G008SB27	0.37	U	10/27/1993		
	G008SB29	0.37	U	10/27/1993		
	G008SB30	0.36	U	10/27/1993		
	G008SB001	0.4	U	09/12/1996		
	G008SB002	0.4	U	09/16/1996		
	G636SB001	0.13	J	09/11/1996		
	G636SB002	0.065	J	09/11/1996		
	G636SB003	0.27	J	09/11/1996		
	G636SB004	0.4	U	09/11/1996		
	G636SB005	0.039	J	09/11/1996		

APPENDIX I**PAH Results in Surface Soil Used for BEQ Calculation***RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex*

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Benzo[a]Anthracene	G636SB006	0.047	J	09/12/1996	1.0	0.37
	G636SB008	0.24	J	09/12/1996		
	G636SB009	0.37	U	09/12/1996		
	G636SB011	0.17	J	01/07/1997		
	G636SB012	0.38	U	01/07/1997		
	G636SB013	0.39	U	01/10/1997		
	G636SB014	0.39	U	01/10/1997		
	G636SB015	0.39	U	12/17/1999		
	G636SB016	0.39	U	12/17/1999		
	G636SB017	0.37	U	12/17/1999		
	GFDSSC012	10	U	12/04/1996		
	GFDSSC014	0.65	UJ	12/05/1996		
	GFDSSC016	0.78	UJ	12/04/1996		
Benzo[a]Pyrene	G008SB01	0.45	J	09/24/1993	4.0	0.31
	G008SB02	0.4	U	09/25/1993		
	G008SB03	0.38	U	09/25/1993		
	G008SB04	0.046	J	09/27/1993		
	G008SB05	0.036	J	09/29/1993		
	G008SB06	0.36	U	09/30/1993		
	G008SB07	0.41	U	10/18/1993		
	G008SB08	0.43	U	10/18/1993		
	G008SB10	0.4	U	10/18/1993		
	G008SB13	0.44	U	10/19/1993		
	G008SB14	0.11	J	10/19/1993		
	G008SB15	0.12	J	10/19/1993		
	G008SB16	0.065	J	10/20/1993		
	G008SB17	0.92	=	10/20/1993		
	G008SB19	0.059	J	10/20/1993		
G008SB20	0.35	U	10/27/1993			
G008SB22	0.38	U	10/27/1993			

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Benzo[a]Pyrene	G008SB23	0.38	U	10/26/1993	4.0	0.31
	G008SB24	0.37	U	10/26/1993		
	G008SB26	0.42	U	10/27/1993		
	G008SB27	0.37	U	10/27/1993		
	G008SB29	0.37	U	10/27/1993		
	G008SB30	0.36	U	10/27/1993		
	G008SB001	0.4	U	09/12/1996		
	G008SB002	0.4	U	09/16/1996		
	G636SB001	0.2	J	09/11/1996		
	G636SB002	0.064	J	09/11/1996		
	G636SB003	0.36	J	09/11/1996		
	G636SB004	0.4	U	09/11/1996		
	G636SB005	0.38	U	09/11/1996		
	G636SB006	0.056	J	09/12/1996		
	G636SB008	0.19	J	09/12/1996		
	G636SB009	0.038	J	09/12/1996		
	G636SB011	0.14	J	01/07/1997		
	G636SB012	0.38	U	01/07/1997		
	G636SB013	0.39	U	01/10/1997		
	G636SB014	0.39	U	01/10/1997		
	G636SB015	0.39	U	12/17/1999		
	G636SB016	0.39	U	12/17/1999		
	G636SB017	0.37	UJ	12/17/1999		
	GFDSSC012	10	U	12/04/1996		
	GFDSSC014	0.13	J	12/05/1996		
	GFDSSC016	0.78	UJ	12/04/1996		
Benzo[b]Fluoranthene	G008SB01	3.80	U	09/24/1993	2.5	0.35
	G008SB02	0.027	J	09/25/1993		
	G008SB03	0.052	J	09/25/1993		
	G008SB04	0.044	J	09/27/1993		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Benzo[b]Fluoranthene	G008SB05	0.086	J	09/29/1993	2.5	0.35
	G008SB06	0.36	U	09/30/1993		
	G008SB07	0.41	U	10/18/1993		
	G008SB08	0.43	U	10/18/1993		
	G008SB10	0.4	U	10/18/1993		
	G008SB13	0.44	U	10/19/1993		
	G008SB14	0.39	U	10/19/1993		
	G008SB15	0.4	J	10/19/1993		
	G008SB16	0.13	J	10/20/1993		
	G008SB17	1.2	=	10/20/1993		
	G008SB19	0.098	J	10/20/1993		
	G008SB20	0.35	U	10/27/1993		
	G008SB22	0.38	U	10/27/1993		
	G008SB23	0.38	U	10/26/1993		
	G008SB24	0.37	U	10/26/1993		
	G008SB26	0.42	U	10/27/1993		
	G008SB27	0.37	U	10/27/1993		
	G008SB29	0.37	U	10/27/1993		
	G008SB30	0.36	U	10/27/1993		
	G008SB001	0.4	U	09/12/1996		
	G008SB002	0.4	U	09/16/1996		
	G636SB001	0.27	J	09/11/1996		
	G636SB002	0.08	J	09/11/1996		
	G636SB003	0.49	=	09/11/1996		
	G636SB004	0.4	U	09/11/1996		
	G636SB005	0.042	J	09/11/1996		
	G636SB006	0.054	J	09/12/1996		
	G636SB008	0.42	J	09/12/1996		
	G636SB009	0.046	J	09/12/1996		
	G636SB011	0.14	J	01/07/1997		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Benzo[b]Fluoranthene	G636SB012	0.38	U	01/07/1997	2.5	0.35
	G636SB013	0.39	U	01/10/1997		
	G636SB014	0.39	U	01/10/1997		
	G636SB015	0.39	U	12/17/1999		
	G636SB016	0.39	U	12/17/1999		
	G636SB017	0.37	UJ	12/17/1999		
	GFDSSC012	10	U	12/04/1996		
	GFDSSC014	0.12	J	12/05/1996		
	GFDSSC016	0.084	J	12/04/1996		
Benzo[k]Fluoranthene	G008SB01	3.8	U	09/24/1993	24.5	0.33
	G008SB02	0.4	U	09/25/1993		
	G008SB03	0.38	U	09/25/1993		
	G008SB04	0.39	U	09/27/1993		
	G008SB05	0.46	U	09/29/1993		
	G008SB06	0.36	U	09/30/1993		
	G008SB07	0.41	U	10/18/1993		
	G008SB08	0.43	U	10/18/1993		
	G008SB10	0.4	U	10/18/1993		
	G008SB13	0.44	U	10/19/1993		
	G008SB14	0.07	J	10/19/1993		
	G008SB15	0.18	J	10/19/1993		
	G008SB16	0.42	U	10/20/1993		
	G008SB17	0.45	=	10/20/1993		
	G008SB19	0.34	U	10/20/1993		
	G008SB20	0.35	U	10/27/1993		
	G008SB22	0.38	U	10/27/1993		
	G008SB23	0.38	U	10/26/1993		
	G008SB24	0.37	U	10/26/1993		
	G008SB26	0.42	U	10/27/1993		
	G008SB27	0.12	J	10/27/1993		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Benzo[k]Fluoranthene	G008SB29	0.37	U	10/27/1993	24.5	0.33
	G008SB30	0.36	U	10/27/1993		
	G008SB001	0.4	U	09/12/1996		
	G008SB002	0.4	U	09/16/1996		
	G636SB001	0.16	J	09/11/1996		
	G636SB002	0.06	J	09/11/1996		
	G636SB003	0.27	J	09/11/1996		
	G636SB004	0.4	U	09/11/1996		
	G636SB005	0.38	U	09/11/1996		
	G636SB006	0.048	J	09/12/1996		
	G636SB008	0.3	J	09/12/1996		
	G636SB009	0.04	J	09/12/1996		
	G636SB011	0.1	J	01/07/1997		
	G636SB012	0.38	U	01/07/1997		
	G636SB013	0.39	U	01/10/1997		
	G636SB014	0.39	U	01/10/1997		
	G636SB015	0.39	U	12/17/1999		
	G636SB016	0.39	U	12/17/1999		
	G636SB017	0.37	UJ	12/17/1999		
	GFDSSC012	10	U	12/04/1996		
GFDSSC014	0.088	J	12/05/1996			
GFDSSC016	0.086	J	12/04/1996			
Chrysene	G008SB01	3.8	U	09/24/1993	80	0.30
	G008SB02	0.4	U	09/25/1993		
	G008SB03	0.057	J	09/25/1993		
	G008SB04	0.39	U	09/27/1993		
	G008SB05	0.1	J	09/29/1993		
	G008SB06	0.36	U	09/30/1993		
	G008SB07	0.41	U	10/18/1993		
	G008SB08	0.43	U	10/18/1993		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Chrysene	G008SB10	0.4	U	10/18/1993	80	0.30
	G008SB13	0.44	U	10/19/1993		
	G008SB14	0.26	J	10/19/1993		
	G008SB15	0.62	=	10/19/1993		
	G008SB16	0.38	J	10/20/1993		
	G008SB17	1.2	=	10/20/1993		
	G008SB19	0.064	J	10/20/1993		
	G008SB20	0.35	U	10/27/1993		
	G008SB22	0.38	U	10/27/1993		
	G008SB23	0.38	U	10/26/1993		
	G008SB24	0.37	U	10/26/1993		
	G008SB26	0.42	U	10/27/1993		
	G008SB27	0.13	J	10/27/1993		
	G008SB29	0.37	U	10/27/1993		
	G008SB30	0.36	U	10/27/1993		
	G008SB001	0.4	U	09/12/1996		
	G008SB002	0.4	U	09/16/1996		
	G636SB001	0.18	J	09/11/1996		
	G636SB002	0.08	J	09/11/1996		
	G636SB003	0.36	J	09/11/1996		
	G636SB004	0.4	U	09/11/1996		
	G636SB005	0.052	J	09/11/1996		
	G636SB006	0.062	J	09/12/1996		
	G636SB008	0.79	=	09/12/1996		
	G636SB009	0.038	J	09/12/1996		
	G636SB011	0.2	J	01/07/1997		
	G636SB012	0.38	U	01/07/1997		
	G636SB013	0.39	U	01/10/1997		
	G636SB014	0.39	U	01/10/1997		
	G636SB015	0.39	U	12/17/1999		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Chrysene	G636SB016	0.39	U	12/17/1999	80	0.30
	G636SB017	0.37	U	12/17/1999		
	GFDSSC012	1.2	J	12/04/1996		
	GFDSSC014	0.65	UJ	12/05/1996		
	GFDSSC016	0.78	UJ	12/04/1996		
Dibenz(a,h)anthracene	G008SB01	3.8	U	09/24/1993	1.0	0.35
	G008SB02	0.4	U	09/25/1993		
	G008SB03	0.38	U	09/25/1993		
	G008SB04	0.39	U	09/27/1993		
	G008SB05	0.46	U	09/29/1993		
	G008SB06	0.36	U	09/30/1993		
	G008SB07	0.41	U	10/18/1993		
	G008SB08	0.43	U	10/18/1993		
	G008SB10	0.4	U	10/18/1993		
	G008SB13	0.44	U	10/19/1993		
	G008SB14	0.39	U	10/19/1993		
	G008SB15	0.42	U	10/19/1993		
	G008SB16	0.42	U	10/20/1993		
	G008SB17	0.16	J	10/20/1993		
	G008SB19	0.34	U	10/20/1993		
	G008SB20	0.35	U	10/27/1993		
	G008SB22	0.38	U	10/27/1993		
	G008SB23	0.38	U	10/26/1993		
	G008SB24	0.37	U	10/26/1993		
	G008SB26	0.42	U	10/27/1993		
	G008SB27	0.37	U	10/27/1993		
	G008SB29	0.37	U	10/27/1993		
	G008SB30	0.36	U	10/27/1993		
G008SB001	0.4	U	09/12/1996			
G008SB002	0.4	U	09/16/1996			

APPENDIX I**PAH Results in Surface Soil Used for BEQ Calculation***RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex*

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL^a	Mean Value^b
Dibenz(a,h)anthracene	G636SB001	0.042	J	09/11/1996	1.0	0.35
	G636SB002	0.4	U	09/11/1996		
	G636SB003	0.053	J	09/11/1996		
	G636SB004	0.4	U	09/11/1996		
	G636SB005	0.38	U	09/11/1996		
	G636SB006	0.38	UJ	09/12/1996		
	G636SB008	0.38	UJ	09/12/1996		
	G636SB009	0.37	U	09/12/1996		
	G636SB011	0.4	U	01/07/1997		
	G636SB012	0.38	U	01/07/1997		
	G636SB013	0.39	U	01/10/1997		
	G636SB014	0.39	U	01/10/1997		
	G636SB015	0.39	U	12/17/1999		
	G636SB016	0.39	U	12/17/1999		
	G636SB017	0.37	UJ	12/17/1999		
	GFDSSC012	10	U	12/04/1996		
	GFDSSC014	0.65	UJ	12/05/1996		
GFDSSC016	0.78	UJ	12/04/1996			
Indeno(1,2,3-c,d)pyrene	G008SB01	3.8	U	09/24/1993	7.0	0.34
	G008SB02	0.4	U	09/25/1993		
	G008SB03	0.38	U	09/25/1993		
	G008SB04	0.39	U	09/27/1993		
	G008SB05	0.46	U	09/29/1993		
	G008SB06	0.36	U	09/30/1993		
	G008SB07	0.41	U	10/18/1993		
	G008SB08	0.43	U	10/18/1993		
	G008SB10	0.4	U	10/18/1993		
	G008SB13	0.44	U	10/19/1993		
	G008SB14	0.099	J	10/19/1993		
	G008SB15	0.42	U	10/19/1993		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Indeno(1,2,3-c,d)pyrene	G008SB16	0.42	U	10/20/1993	7.0	0.34
	G008SB17	0.5	=	10/20/1993		
	G008SB19	0.34	U	10/20/1993		
	G008SB20	0.35	U	10/27/1993		
	G008SB22	0.38	U	10/27/1993		
	G008SB23	0.38	U	10/26/1993		
	G008SB24	0.37	U	10/26/1993		
	G008SB26	0.42	U	10/27/1993		
	G008SB27	0.37	U	10/27/1993		
	G008SB29	0.37	U	10/27/1993		
	G008SB30	0.36	U	10/27/1993		
	G008SB001	0.4	U	09/12/1996		
	G008SB002	0.4	U	09/16/1996		
	G636SB001	0.13	J	09/11/1996		
	G636SB002	0.04	J	09/11/1996		
	G636SB003	0.17	J	09/11/1996		
	G636SB004	0.4	U	09/11/1996		
	G636SB005	0.38	U	09/11/1996		
	G636SB006	0.052	J	09/12/1996		
	G636SB008	0.14	J	09/12/1996		
	G636SB009	0.038	J	09/12/1996		
	G636SB011	0.085	J	01/07/1997		
	G636SB012	0.38	U	01/07/1997		
	G636SB013	0.39	U	01/10/1997		
	G636SB014	0.39	U	01/10/1997		
	G636SB015	0.39	U	12/17/1999		
	G636SB016	0.39	U	12/17/1999		
	G636SB017	0.37	UJ	12/17/1999		
	GFDSSC012	10	U	12/04/1996		
	GFDSSC014	0.13	J	12/05/1996		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Indeno(1,2,3-c,d)pyrene	GFDSSC016	0.78	UJ	12/04/1996	7.0	0.34
Historic Surface Soil Locations Not Representative of Site Conditions Based on IM Excavation Area						
Benzo[a]Anthracene	G008SB09	0.14	J	10/18/1993		
	G008SB11	853	=	10/19/1993		
	G008SB12	0.66	=	10/19/1993		
	G008SB18	7.7	=	10/20/1993		
	G008SB21	0.36	U	10/27/1993		
	G008SB25	0.37	U	10/27/1993		
	G008SB28	0.36	U	10/27/1993		
	G008SB31	18	=	10/27/1993		
	G008SB003	0.94	=	09/13/1996		
	G636SB007	0.083	J	09/12/1996		
	G636SB010	0.37	U	01/07/1997		
Benzo[a]Pyrene	G008SB09	0.1	J	10/18/1993		
	G008SB11	58	=	10/19/1993		
	G008SB12	0.48	=	10/19/1993		
	G008SB18	6.7	=	10/20/1993		
	G008SB21	0.36	U	10/27/1993		
	G008SB25	0.37	U	10/27/1993		
	G008SB28	0.36	U	10/27/1993		
	G008SB31	15	=	10/27/1993		
	G008SB003	0.73	=	09/13/1996		
	G636SB007	0.098	J	09/12/1996		
	G636SB010	0.37	U	01/07/1997		
Benzo[b]Fluoranthene	G008SB09	0.19	J	10/18/1993		
	G008SB11	76	=	10/19/1993		
	G008SB12	2.7	=	10/19/1993		
	G008SB18	9.2	=	10/20/1993		
	G008SB21	0.36	U	10/27/1993		
	G008SB25	0.37	U	10/27/1993		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Benzo[b]Fluoranthene	G008SB28	0.36	U	10/27/1993		
	G008SB31	20	=	10/27/1993		
	G008SB003	0.8	=	09/13/1996		
	G636SB007	0.12	J	09/12/1996		
	G636SB010	0.37	U	01/07/1997		
	G008SB09	0.42	U	10/18/1993		
	G008SB11	38	=	10/19/1993		
	G008SB12	0.76	=	10/19/1993		
	G008SB18	2.8	=	10/20/1993		
	G008SB21	0.36	U	10/27/1993		
	G008SB25	0.37	U	10/27/1993		
	G008SB28	0.36	U	10/27/1993		
	G008SB31	7.6	=	10/27/1993		
	G008SB003	0.83	=	09/13/1996		
	G636SB007	0.1	J	09/12/1996		
	G636SB010	0.37	U	01/07/1997		
	Chrysene	G008SB09	0.2	J	10/18/1993	
G008SB11		83	=	10/19/1993		
G008SB12		2.6	=	10/19/1993		
G008SB18		7.6	=	10/20/1993		
G008SB21		0.36	U	10/27/1993		
G008SB25		0.37	U	10/27/1993		
G008SB28		0.36	U	10/27/1993		
G008SB31		21	=	10/27/1993		
G008SB003		1.1	=	09/13/1996		
G636SB007		0.12	J	09/12/1996		
G636SB010	0.045	J	01/07/1997			
Dibenz(a,h)anthracene	G008SB09	0.42	U	10/18/1993		
	G008SB11	8.2	J	10/19/1993		
	G008SB12	0.4	U	10/19/1993		

APPENDIX I

PAH Results in Surface Soil Used for BEQ Calculation

RFI Report Addendum & CMS Work Plan, SWMU 8/AOC 636, Zone G, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Mean Value ^b
Dibenz(a,h)anthracene	G008SB18	0.83	J	10/20/1993		
	G008SB21	0.36	U	10/27/1993		
	G008SB25	0.37	U	10/27/1993		
	G008SB28	0.36	U	10/27/1993		
	G008SB31	2.9	J	10/27/1993		
	G008SB003	0.38	U	09/13/1996		
	G636SB007	0.41	UJ	09/12/1996		
	G636SB010	0.37	U	01/07/1997		
Indeno(1,2,3-c,d)pyrene	G008SB09	0.42	U	10/18/1993		
	G008SB11	34	=	10/19/1993		
	G008SB12	0.4	U	10/19/1993		
	G008SB18	2.6	=	10/20/1993		
	G008SB21	0.36	U	10/27/1993		
	G008SB25	0.37	U	10/27/1993		
	G008SB28	0.36	U	10/27/1993		
	G008SB31	7.8	=	10/27/1993		
	G008SB003	0.29	J	09/13/1996		
	G636SB007	0.082	J	09/12/1996		
	G636SB010	0.37	U	01/07/1997		

^a Generic soil to groundwater soil screening level (SSL) with a DAF=10 except for VOCs which were screened using SSL (DAF=1). SSLs were obtained from the *Soil Screening Guidance: Technical Background Document* (EPA, 1996).

^b Mean value is calculated when using non-detects at half the laboratory detection limit.

Concentrations in bold and outlined text exceed the appropriate screening criteria.

mg/kg milligrams per kilogram

NA Screening criteria not available for the referenced compound.

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

U Indicates the analyte was not detected above the laboratory detection limit.

J Indicates an estimated value. A "J" qualifier may signify that the concentration is below the PQL, or that the "J" has been applied as a result of the data validation.

Table J-1
Site-Specific Soil Screening Level (SSL) Calculations
SWMU 8 and AOC 636, Zone G
Charleston Naval Complex

				Parameter	Benzene
Chemical Specific Input Parameters					
Cw	=	Target groundwater concentration MCL (mg/L)			5.00E-03
H	=	Henry's Law Constant, dimensionless			2.28E-01
Kd	=	Soil-water sorption coefficient (cm ³ water / g soil = L/kg) = Koc x foc where koc = organic carbon-water sorption coefficient, (cm ³ (ml) water) / (g soluble organic carbon) foc = Fraction of organic content, dimensionless		0.013	8.02E-01 6.17E+01
Site Specific Input Parameters					
Sw	=	Width of Source Parallel to Groundwater Flow Direction (impacted soil zone)	304.8 m	1000 ft	
da	=	Aquifer Thickness	19.5 m	64 ft	
d	=	Groundwater Mixing Zone thickness (paved)	19.51 m	64.0 ft	
		(unpaved)	19.51 m	64.0 ft	
i	=	Groundwater Gradient		5.0E-03 (unitless)	
Ks	=	Saturated Hydraulic Conductivity	222.5 m/yr	730.0 ft/yr	
θw	=	Volumetric Water Content of Soil Pore Space	0.3 cm ³ _{vapor} /cm ³ _{soil}	0.3 in ³ _{vapor} /in ³ _{soil}	
θv	=	Volumetric Vapor Content of Soil Pore Space	0.15 cm ³ _{vapor} /cm ³ _{soil}	0.15 in ³ _{vapor} /in ³ _{soil}	
ρs	=	Soil Bulk Density	1.5 g/cm ³	93.64 lb _m /ft ³	
qi	=	Water Infiltration Rate (paved)	0.0086 m/yr	0.0283 ft/yr	
		(unpaved)	0.1372 m/yr	0.4500 ft/yr	
Partition Term, Cw/Csoil, (L/kg)					1.02E+00
Dilution Term, dimensionless (paved)					9.24E+00
(unpaved)					1.52E+00
Csoil/Cw = Partition term * Dilution term (mg/kg / mg/L) = L/kg (paved)					9.47E+00
(unpaved)					1.56E+00
Calculated Site Specific Target Level for Soil					
Csoil calculated source soil concentration (SSL, mg/kg) Cw*(partion term)*(dilution term) (paved)					0.047
(unpaved)					0.0078

Cw is the MCL from EPA National Drinking Water Standards (March 2001) or US EPA Region III RBCs (October, 2000).
 H is assumed to be zero as recommended in the Soil Screening Guidance; User's Guide (EPA, 1996).
 Kd = koc x foc for organics. Kd for inorganic compounds are from Table 43, Soil Screening Guidance, Technical Background Document (EPA, 1996).
 koc values are from Table 39, Soil Screening Guidance; Technical Background Document (EPA, 1996; not applicable to inorganoc compounds).
 foc was calculated as the mean foc from TOC measurements from Zone G.
 Sw Estimated as longest dimension of SWMU 8 (1000 ft).
 d is calculated as $M = (0.0112 L^2)^{0.5} + da(1 - e^{-(L/qi)g da})$ or da, whichever is less.
 da is based on water level elevation (4 ft msl, GIS) - the top of the Ashley formation (-60 ft msl, GIS).
 i is estimated from groundwater data in the GIS ((5-3)/400 ~ 0.005, CH2MHill, 2001)
 Ks Based on CH2MHill's hydraulic conductivity theme in the GIS (2 ft/d).
 θw is the default value presented in the Soil Screening Guidance; User's Guide (EPA, 1996)
 θv is calculated as total porosity (0.45, assumed) - θw (0.3) = 0.15.
 ρs is the default value presented in the Soil Screening Guidance; User's Guide (EPA, 1996)
 qi derived values (5.4 in/yr, unpaved and 0.34 in/ yr, paved) based on annual precipitation, evapo-transportation, and runoff coefficient values for the Charleston area.

Table J-2
Site-Specific Soil Screening Level (SSL) Calculations
 SWMU 8 and AOC 636, Zone G
 Charleston Naval Complex

		Parameter	1,1,2-TCA
Chemical Specific Input Parameters			
Cw	= Target groundwater concentration MCL (mg/L)		5.00E-03
H	= Henry's Law Constant, dimensionless		3.74E-02
Kd	= Soil-water sorption coefficient (cm ³ water / g soil = L/kg) = Koc x foc where koc = organic carbon-water sorption coefficient, (cm ³ (ml) water) / (g soluble organic carbon) foc = Fraction of organic content, dimensionless	0.013	9.75E-01 7.50E+01
Site Specific Input Parameters			
Sw	= Width of Source Parallel to Groundwater Flow Direction (impacted soil zone)	73.1 m	240 ft
da	= Aquifer Thickness	19.5 m	64 ft
d	= Groundwater Mixing Zone thickness (paved)	8.30 m	27.2 ft
	(unpaved)	14.96 m	49.1 ft
i	= Groundwater Gradient	5.0E-03	(unitless)
Ks	= Saturated Hydraulic Conductivity	222.5 m/yr	730.0 ft/yr
θw	= Volumetric Water Content of Soil Pore Space	0.3 cm ³ v _{apo} /cm ³ soil	0.3 in ³ v _{apo} /in ³ soil
θv	= Volumetric Vapor Content of Soil Pore Space	0.15 cm ³ v _{apo} /cm ³ soil	0.15 in ³ v _{apo} /in ³ soil
ρs	= Soil Bulk Density	1.5 g/cm ³	93.64 lb _m /ft ³
qi	= Water Infiltration Rate (paved)	0.0086 m/yr	0.0283 ft/yr
	(unpaved)	0.1372 m/yr	0.4500 ft/yr
Partition Term, Cw/Csoil, (L/kg)		$\frac{C_{soil}}{C_w} = \left(\frac{\theta_w + K_d \rho_s + H \theta_v}{\rho_s} \right) \left(\frac{K_s i d + q_i S_w}{q_i S_w} \right)$	1.18E+00
Dilution Term, dimensionless	(paved)		1.56E+01
	(unpaved)		2.66E+00
Csoil/Cw = Partition term * Dilution term (mg/kg / mg/L) = L/kg	(paved)		1.84E+01
	(unpaved)	3.13E+00	
Calculated Site Specific Target Level for Soil			
C _{soil}	= calculated source soil concentration (SSL, mg/kg) Cw*(partion term)*(dilution term)	(paved)	0.092
		(unpaved)	0.0157

Cw is the MCL from EPA National Drinking Water Standards (March 2001) or US EPA Region III RBCs (October, 2000).
 H is assumed to be zero as recommended in the Soil Screening Guidance; User's Guide (EPA, 1996).
 Kd = koc x foc for organics. Kd for inorganic compounds are from Table 43, Soil Screening Guidance; Technical Background Document (EPA, 1996).
 koc values are from Table 39, Soil Screening Guidance; Technical Background Document (EPA, 1996; not applicable to inorganic compounds).
 foc was calculated as the mean foc from TOC measurements from Zone G.
 Sw Estimated as longest dimension of SWMU 8 (1000 ft).
 d Is calculated as $M = (0.0112 L^2)^{0.5} + da[1 - e^{-L \cdot q_i / (K_d \cdot da)}]$ or da, whichever is less.
 da is based on water level elevation (4 ft msl, GIS) - the top of the Ashley formation (-60 ft msl, GIS).
 i is estimated from groundwater data in the GIS ([5-3]/400 ~ 0.005, CH2MHill, 2001)
 Ks Based on CH2MHill's hydraulic conductivity theme in the GIS (2 ft/d).
 θw is the default value presented in the Soil Screening Guidance; User's Guide (EPA, 1996)
 θv is calculated as total porosity (0.45, assumed) - θw (0.3) = 0.15.
 ρs is the default value presented in the Soil Screening Guidance; User's Guide (EPA, 1996)
 qi derived values (5.4 in/yr, unpaved and 0.34 in/yr, paved) based on annual precipitation, evapo-transportation, and runoff coefficient values for the Charleston area.