SAF-RC-030
Remaining Sites Confirmation Sampling - Other
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 8/21/12
INITIAL/DATE

COMMENTS:

SDG K3965 SAF-RC-030

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Waste Site: 100-D-98:2 TP3

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
Phone (610) 280-3000
Fax (610) 280-3041

20 August 2012

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, WA 99354

Subject: Analytical Data Package

Dear Ms. Kessner:

Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	1208011
SDG #	K3965
SAF #	RC-030
Date Received	08/03/12
# Samples	1
Matrix	SOLID
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	
Herbicides	
Metals	X
Inorganics	X

The electronic data deliverable (EDD) has been emailed. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory
A Division of Eberline Analytical Corporation

Orlette S. Johnson
Project Manager

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 24 pages.

R:\GROUP\PM\ORLETTE\Hanford\Data\B_ltrs.DOC

CHAIN OF CUSTODY

Lionville Laboratory Use Only
1208 011

Custody Transfer Record/Lab Work Request

Page _____ of _____

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Lionville Laboratory
A Division of Eberline Analytical Corporation

Client WC Hanford SAF# RC-030
Est. Final Proj. Sampling Date
Project#
Project Contact/Phone#
Lionville Laboratory Project Manager O. Johnson
QC SW Del Std TAT 15Day

Date Rec'd 8.3.12 Date Due 8.18.12

Refrigerator #															A							
#/Type Container	Liquid														1							
	Solid														1AG							
Volume	Liquid																					
	Solid														250							
Preservatives																						
ANALYSES REQUESTED →		ORGANIC							INORG													
		VOA	BNA	Pest/PCB	Herb				ICP Metal Hg	CN	IC ANIONS											
		Lionville Laboratory Use Only																				
									Met/Hg		Anions/ Alk Hg pH											

MATRIX CODES:
W Water
WW Waste Water
GW Groundwater
WST Waste
WI Wipe
SO Solid
S Soil
SL Sludge
SE Sediment
PC Paint Chips
O Oil
NAL Non-Aqueous Liquid
L Leachate
A Air
T Tissue
F Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	Met/Hg	Anions/ Alk Hg pH
01	J1PX33-A	✓	✓	SO	8/1/12	1250	X	X

Special Instructions:
(10) Met = HSL + B, Mo, Si (no TL)

Special Instructions:
8/3/12 1. NO → N3 N2 Per Client 05 8/3/12
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
[signature]	[signature]	8/3/12	1000

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-030-210	Page 1 of 1

Collector: Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Project Designation: Remaining Sites Confirmation Sampling - Other	Sampling Location: 100-D-98:2 TP3		SAF No.: RC-030
Ice Chest No.: RCC-08-027	Field Logbook No.: EL-1662-01	COA: C10D98A000	Method of Shipment: Fed Ex
Shipped To: On 8/1/12 ~~TestAmerica Incorporated, Richland~~ Lionville	Offsite Property No.: A110479		Bill of Lading/Air Bill No.: SEE OSPL

Price Code: 9C

Data Turnaround: 15 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples may contain hazardous chemicals at levels that pose a risk to human health and/or the environment. Please handle accordingly.

Special Handling and/or Storage

4 degree C

Preservation	Cool 4C	Cool 4C	None
Type of Container	G/P	G/P	G/P
No. of Container(s)	1	1	8/1/12 X 0
Volume	60mL	~~60mL~~ 8/1/12 250mL	~~60mL~~ 8/1/12 250mL
SAMPLE ANALYSIS	Chromium Hex - 7196 8/1/12	See item (1) in Special Instructions.	pH - 9045

Sample No.	Matrix *	Sample Date	Sample Time			
J1PX33 - A	OTHER	8/1/12	1250		X	X

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	8/1/12 1320	DWOOLERY	8-1-12 1320
DWOOLERY	8-1-12 1410	DWSHEA DWShea	8/1/12 1410
DWShea DWSHEA	8/1/12 1414	A. Freier A. Freier 1060#1	8-1-12 1414
A. Freier A. Freier WCH	8-2-12 1060#1 0940	Fed Ex	
Fed Ex	8-3-12 1000	Victor HERNANDEZ V Hernandez	8-3-12 1000

SPECIAL INSTRUCTIONS

Please call Joan Kessner for additionall instructions, if necessary.

(1) IC Anions - 9056 Modified {Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen inNitrite, Phosphorous in phosphate, Sulfate}; NO2/NO3 - 353.1

Please include ICP Metals and Mercury in the analysis list.

AF 8-2-12

REVIEWED BY JEB DATE 8-2-12

Matrix *: S=Soil, SE=Sediment, SO=Solid, SI=Sludge, W = Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

WCH-EE-011

00000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAF/SOW/Release #: RC-030

Date: 8/3/12

LvL Batch #: 1208 011

Sample Custodian: [illegible]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7938 6063 2602
2. Custody Seals on coolers or shipping containers intact, signed & dated?	☑ Yes	☐ No	☐ No Seals
3. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	*Comments:*
4. All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible?	☑ Yes	☐ No	
5. Samples received cooled or ambient?	Temp 2-3°	°C	Cooler # RC-08-027
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☑ Yes	☐ No	
Short holds taken to wet lab?	☐ Yes	☐ No	☑ N/A
13. VOA, TOC, TOX free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☑ Yes	☐ No	☐ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted _____ Date _____

SR-002-B.doc

METALS

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc.	Project: RC-030	
2620 Fermi Avenue	Project Number: K3965	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	08/17/2012 12:14

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PX33-A	1208011-01	Other Solid	08/01/2012 12:50	08/03/2012 10:00

LIONVILLE LABORATORY
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Case Narrative

Client: WC-HANFORD RC-030
LVL#: 1208011
SDG/SAF#: K3965/RC-030

W.O.#: 60049-001-001-0001-00
Date Received: 08-03-11

METALS

The following is a summary of the QC results accompanying the sample results. Lionville Laboratory (LvL) certifies that all test results meet the requirements of NELAC except as noted below.

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

1. This narrative covers the analyses of 1 solid sample.

2. The sample was prepared and analyzed in accordance with methods listed on the data report forms. The sample was reported on a wet weight, 'as received' basis.

3. All analyses were performed within the required holding times.

4. Please refer to the Sample Receipt Check List for any sample discrepancies in LvL's sample acceptance policy.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the LOQ).

7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation, or samples were greater than 20X MB value}.

8. All ICP Interference Check Standards were within control limits.

9. All Standard Reference Material (SRM) analytes were within the Prediction Interval control limits supplied by the manufacturer.

10. The matrix spike (MS) recoveries for 13 analytes were outside the 75-125% control limits.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the

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following analytes:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1PX33-A	Aluminum	22,000	73.8
	Antimony	100	89.0
	Beryllium	100	88.0
	Boron	100	86.0
	Chromium	100	83.3
	Cobalt	100	83.6
	Iron	22,000	14.5
	Lead	100	80.9
	Molybdenum	100	86.4
	Nickel	100	82.1
	Selenium	100	91.3
	Silver	100	83.6
	Vanadium	1,000	72.7

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limit criteria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL. The samples result for Molybdenum was less than ten times the MDL.

13. For the purposes of this report, the data have been reported to the Limit of Detection (LOD). Values between the LOD and the Limit of Quantitation (LOQ) are acquired in a region of less-certain quantification.

14. LvL is NELAP accredited by the State of Pennsylvania. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

15. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory

8/20/12
Date

jjw/08-011hgno%

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WC-Hanford, Inc.	Project: RC-030	
2620 Fermi Avenue	Project Number: K3965	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	08/17/2012 12:14

Notes and Definitions

U	Analyte included in the analysis, but not detected
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
B	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag)
*	Value outside QC acceptance criteria
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
wet	Sample results reported on a wet weight basis
RPD	Relative Percent Difference

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-030 Project Number: K3965 Project Manager: Joan Kessner	**Reported:** 08/17/2012 12:14

J1PX33-A
1208011-01 (Other Solid)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**5080**		4.55	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Antimony	0.545	U	0.545	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Arsenic	**1.70**		0.909	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Barium	**51.6**		0.455	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Beryllium	**0.199**		0.182	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Boron	**0.978**	B	1.82	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Cadmium	**0.0715**	B	0.182	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Calcium	**6400**		90.9	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Chromium	**7.03**		0.182	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Cobalt	**5.84**		1.82	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Copper	**11.2**		0.909	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Iron	**20600**		18.2	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Lead	**2.65**		0.455	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Magnesium	**3700**		68.2	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Manganese	**256**		4.55	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Molybdenum	**0.381**	B	1.82	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Nickel	**7.73**		3.64	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Potassium	**793**		364	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Selenium	0.273	U	0.273	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Silicon	**250**		1.82	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Silver	0.182	U	0.182	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Sodium	**341**		45.5	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Vanadium	**61.3**		2.27	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Zinc	**39.1**		9.09	mg/kg	1	L208077	08/12/2012	08/13/2012	6010B
Mercury	0.0250	U	0.0250	mg/kg	1	L208035	08/06/2012	08/07/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-030 Project Number: K3965 Project Manager: Joan Kessner	**Reported:** 08/17/2012 12:14

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L208035 - SW 7471A Prep										
Blank (L208035-BLK1)				Prepared: 08/06/2012 Analyzed: 08/07/2012						
Mercury	0.0290	U	0.0290	mg/kg						
Duplicate (L208035-DUP2)		**Source: 1208011-01**		Prepared: 08/06/2012 Analyzed: 08/07/2012						
Mercury	0.0237	U	0.0237	mg/kg		0.0250 U				20
Matrix Spike (L208035-MS2)		**Source: 1208011-01**		Prepared: 08/06/2012 Analyzed: 08/08/2012						
Mercury	0.154		0.0250	mg/kg	0.13889	0.0250 U	111	75-125		
Reference (L208035-SRM1)				Prepared: 08/06/2012 Analyzed: 08/07/2012						
Mercury	1.20		0.0281	mg/kg	1.2900		93.1	62.6-138		
Batch L208077 - SW 3050B										
Blank (L208077-BLK1)				Prepared: 08/12/2012 Analyzed: 08/13/2012						
Aluminum	4.63	U	4.63	mg/kg						
Antimony	0.556	U	0.556	mg/kg						
Arsenic	0.926	U	0.926	mg/kg						
Barium	0.463	U	0.463	mg/kg						
Beryllium	0.185	U	0.185	mg/kg						
Boron	1.85	U	1.85	mg/kg						
Cadmium	0.185	U	0.185	mg/kg						
Calcium	92.6	U	92.6	mg/kg						
Chromium	0.185	U	0.185	mg/kg						
Cobalt	1.85	U	1.85	mg/kg						
Copper	0.926	U	0.926	mg/kg						
Iron	18.5	U	18.5	mg/kg						
Lead	0.463	U	0.463	mg/kg						
Magnesium	69.4	U	69.4	mg/kg						
Manganese	4.63	U	4.63	mg/kg						
Molybdenum	1.85	U	1.85	mg/kg						
Nickel	3.70	U	3.70	mg/kg						
Potassium	370	U	370	mg/kg						
Selenium	0.278	U	0.278	mg/kg						
Silicon	1.85	U	1.85	mg/kg						
Silver	0.185	U	0.185	mg/kg						
Sodium	46.3	U	46.3	mg/kg						
Vanadium	2.31	U	2.31	mg/kg						
Zinc	9.26	U	9.26	mg/kg						

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WC-Hanford, Inc.	Project: RC-030	
2620 Fermi Avenue	Project Number: K3965	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	08/17/2012 12:14

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L208077 - SW 3050B										
Duplicate (L208077-DUP2)		**Source: 1208011-01**		Prepared: 08/12/2012 Analyzed: 08/13/2012						
Aluminum	4430		4.17	mg/kg		5080			13.7	20
Antimony	0.500	U	0.500	mg/kg		0.545 U				20
Arsenic	1.54		0.833	mg/kg		1.70			10.4	20
Barium	53.7		0.417	mg/kg		51.6			3.87	20
Beryllium	0.189		0.167	mg/kg		0.199			5.33	20
Boron	0.906	B	1.67	mg/kg		0.978			7.68	20
Cadmium	0.0669	B	0.167	mg/kg		0.0715			6.75	20
Calcium	5240		83.3	mg/kg		6400			19.9	20
Chromium	5.84		0.167	mg/kg		7.03			18.5	20
Cobalt	6.01		1.67	mg/kg		5.84			2.92	20
Copper	11.2		0.833	mg/kg		11.2			0.283	20
Iron	18700		16.7	mg/kg		20600			10.0	20
Lead	2.54		0.417	mg/kg		2.65			4.20	20
Magnesium	3920		62.5	mg/kg		3700			5.72	20
Manganese	243		4.17	mg/kg		256			5.11	20
Molybdenum	0.274	B	1.67	mg/kg		0.381			32.5*	20
Nickel	10.7		3.33	mg/kg		7.73			32.5*	20
Potassium	670		333	mg/kg		793			16.8	20
Selenium	0.250	U	0.250	mg/kg		0.273 U				20
Silicon	222		1.67	mg/kg		250			11.9	20
Silver	0.167	U	0.167	mg/kg		0.182 U				20
Sodium	279		41.7	mg/kg		341			20.1*	20
Vanadium	53.8		2.08	mg/kg		61.3			13.0	20
Zinc	36.5		8.33	mg/kg		39.1			6.86	20
Matrix Spike (L208077-MS2)		**Source: 1208011-01**		Prepared: 08/12/2012 Analyzed: 08/13/2012						
Aluminum	6070		4.72	mg/kg	188.68	5080	526*	75-125		
Antimony	15.0		0.566	mg/kg	47.170	0.545 U	31.9*	75-125		
Arsenic	144		0.943	mg/kg	188.68	1.70	75.4	75-125		
Barium	206		0.472	mg/kg	188.68	51.6	81.6	75-125		
Beryllium	3.72		0.189	mg/kg	4.7170	0.199	74.5*	75-125		
Boron	65.2		1.89	mg/kg	94.340	0.978	68.1*	75-125		
Cadmium	4.15		0.189	mg/kg	4.7170	0.0715	86.4	75-125		
Calcium	8440		94.3	mg/kg	2358.5	6400	86.2	75-125		
Chromium	20.1		0.189	mg/kg	18.868	7.03	69.3*	75-125		
Cobalt	40.0		1.89	mg/kg	47.170	5.84	72.4*	75-125		
Copper	30.4		0.943	mg/kg	23.585	11.2	81.5	75-125		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-030 Project Number: K3965 Project Manager: Joan Kessner	**Reported:** 08/17/2012 12:14

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L208077 - SW 3050B									
Matrix Spike (L208077-MS2)		**Source: 1208011-01**		Prepared: 08/12/2012 Analyzed: 08/13/2012					
Iron	21700	18.9	mg/kg	94.340	20600	1130*	75-125		
Lead	34.9	0.472	mg/kg	47.170	2.65	68.4*	75-125		
Magnesium	5530	70.8	mg/kg	2358.5	3700	77.6	75-125		
Manganese	306	4.72	mg/kg	47.170	256	106	75-125		
Molybdenum	69.5	1.89	mg/kg	94.340	0.381	73.3*	75-125		
Nickel	41.1	3.77	mg/kg	47.170	7.73	70.7*	75-125		
Potassium	2610	377	mg/kg	2358.5	793	77.1	75-125		
Selenium	137	0.283	mg/kg	188.68	0.273 U	72.4*	75-125		
Silicon	335	1.89	mg/kg	94.340	250	90.3	75-125		
Silver	3.52	0.189	mg/kg	4.7170	0.182 U	74.6*	75-125		
Sodium	2310	47.2	mg/kg	2358.5	341	83.6	75-125		
Vanadium	95.7	2.36	mg/kg	47.170	61.3	72.9*	75-125		
Zinc	75.8	9.43	mg/kg	47.170	39.1	77.7	75-125		
Reference (L208077-SRM1)				Prepared: 08/12/2012 Analyzed: 08/13/2012					
Aluminum	10700	14.7	mg/kg	6670.0		160	0-200.89		
Antimony	37.6	1.76	mg/kg	53.000		70.9	0-235.8		
Arsenic	111	2.94	mg/kg	114.00		97.8	82.8-117.54		
Barium	294	1.47	mg/kg	307.00		95.9	79.8-120.2		
Beryllium	100	0.588	mg/kg	108.00		92.9	82.8-117.6		
Boron	77.5	5.88	mg/kg	85.100		91.1	67.5-132.8		
Cadmium	215	0.588	mg/kg	225.00		95.7	83.6-116.4		
Calcium	3100	294	mg/kg	3360.0		92.2	83.3-116.9		
Chromium	79.1	0.588	mg/kg	77.200		102	73.3-126.4		
Cobalt	157	5.88	mg/kg	166.00		94.5	80.7-118.7		
Copper	258	2.94	mg/kg	271.00		95.4	80.8-119.2		
Iron	8090	58.8	mg/kg	8420.0		96.1	78.6-121.1		
Lead	184	1.47	mg/kg	190.00		96.6	81.6-118.4		
Magnesium	7880	221	mg/kg	8570.0		91.9	83.2-116.7		
Manganese	729	14.7	mg/kg	965.00		75.6	69.3-130.5		
Molybdenum	228	5.88	mg/kg	235.00		97.0	76.2-123.8		
Nickel	215	11.8	mg/kg	221.00		97.2	79.6-120.8		
Potassium	13700	1180	mg/kg	14400		95.3	81.9-118.1		
Selenium	184	0.882	mg/kg	187.00		98.2	75.9-124.6		
Silicon	332	5.88	mg/kg	807.00		41.1	0-219.3		
Silver	78.9	0.588	mg/kg	83.500		94.4	82.7-117.1		
Sodium	8890	147	mg/kg	9730.0		91.4	82.5-117.2		

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WC-Hanford, Inc.	Project: RC-030	
2620 Fermi Avenue	Project Number: K3965	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	08/17/2012 12:14

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L208077 - SW 3050B									
Reference (L208077-SRM1)			Prepared: 08/12/2012 Analyzed: 08/13/2012						
Vanadium	97.9	7.35	mg/kg	98.700		99.2	75.9-123.6		
Zinc	190	29.4	mg/kg	199.00		95.5	78.4-121.6		

Lionville Laboratory

Logbook #: 1128

SAMPLE DIGESTION RECORD

Digestion Batch #: L208077
Date/Time Initiated: 8/10/12 (weighed) 8/12/12 1330
Date/Time Completed: 8/12/12 2035
Analyst: GA
Matrix (circle): Soil Water Other
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.
NOTE: All temperatures are recorded as corrected temperatures

Digested / Undigested (circle one)
Balance #: B14
Balance Cal Verification: Y ~~NA~~ TEMP 8/10/12
Temp: 96°
BLOCK 1 2 (circle one)

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/TC	Texture	Color / Appearance	Artifact	Turb
1208010-01		0.52	50		TO	OILY	orange oil	NA	NA
01R		0.50	50			OILY	orange oil		
01S	0.5	0.52	50			OILY	orange oil		
1208011-01		0.55	50			fine	Brown Sandy		
01R		0.60	50			fine	Brown Sandy		
01S	0.5	0.53	50			fine	Brown Sandy		
1208012-01		0.51	50			fine	DARK Sandy		
01R		0.51	50			fine	~~Brown~~ DARK Sandy TEMP 8/10/12		
01S	0.5	0.52	50			fine	DARK Sandy		
02		0.57	50			fine	DARK Sandy		
03		0.53	50			fine	DARK Sandy		
04		0.52	50			fine	DARK Sandy		
05		0.58	50			fine	Brown Sandy		
1208077-BLK		0.54	50			COARSE	Boiling chips		
1208077-SRM	✱	0.51	50			fine	Pink LOAMY		

GA 8/12/12

Spiking IDs / Expiration Date:
MS#: 1200457
LCS#: 1101357 ✱

Reagent IDs:
HNO_3 L08023
HCl L01031
H_2O_2 K09A03
1:1 HNO_3 637-066-02
1:1 HCl

File ID#:

Data Review By/Date:
RLC 8/14/12

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Signed\SPI\Metals Digestion log.doc

Page #:

Lionville Laboratory

MERCURY PREPARATION

Logbook # 1143

Analyst: ZB
Date 8/6/12
Start Time/Temp: 1505 / 94°
End Time/Temp: 1535 / 95°

Instrument ID: HG3.1
Balance # B29 /NA
Pipette Calibration (Daily) Y ✓

Prep Batch: L208035
Worksheet: HG080701
SOP No. ME-HgCVAA
BLOCK 1 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH < 2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
Blank				10mL	50	
0.2 µg/L		0.100		10mL	50	
1.0		0.500		10mL	50	
2.0		1.000		10mL	50	
5.0		2.500		10mL	50	
10.0		5.000		10mL	50	
ICV		0.125	2.5	10mL	50	
CCV		0.250	5.0	10mL	50	
ICB/CCB				10mL	50	
L208035-BLK1				0.31	50	
SRM1		*	*	0.32	50	
1208001-01				0.37	50	
01R				0.36	50	
01S		0.500	1.0	0.36	50	
02				0.36	50	
03				0.36	50	
1208011-01				0.36	50	
01R				0.38	50	
01S		0.500	1.0	0.36	50	
1208012-01				0.37	50	
01R				0.34	50	
01S		0.500	1.0	0.33	50	
02				0.34	50	
03				0.31	50	
04				0.31	50	
05				0.38	50	
		ZEB 8/6/12				

Standard:	ID	Prep Date/Time
ICAL/MS	A1 1200588	8/6/12 1130
ICV/CCV/LCS	IV 1200532	NA

Reviewed By/Date: CLM 8/8/12

se book # 9368 for std traceability information

Soil LCS True Value = 1.29 mg/Kg
Standard # 1101357

Water Matrix Spiking Solution Concentration = 0.1 µg/ml
Water LCS Spiking Concentration: 1.0 µg/ml

ME-HgCVAA-Prep0910

Page #:

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WET CHEMISTRY

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-030 Project Number: K3965 Project Manager: Joan Kessner	**Reported:** 08/20/2012 17:31

Analytical Report for Wet Chemistry

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PX33-A	1208011-01	Other Solid	08/01/2012 12:50	08/03/2012 10:00

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Case Narrative

Client: WC-HANFORD RC-030 K3965
LVL#: 1208011 **Date Received:** 08-03-12

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 solid sample.

2. The sample was prepared and analyzed in accordance with the methods indicated on the data summary report. Results for soil or solid pH are measured in water at 25°C unless otherwise specified.

   Lionville Lab (LvL) is NELAP accredited by the State of Pennsylvania. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvL certifies that all test results meet the requirements of NELAC with any exception noted in the following statements.

3. Sample holding times as required by the method and/or contract were met with the exceptions of Nitrate, Nitrite and Orthophosphate.

4. The results presented in this report are derived from samples that met LvL's sample acceptance policy.

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits and method criteria.

7. The matrix spike recoveries were within the 75-125% control limits with the exception of Sulfate at 57.6% that may be attributed to sample inhomogeneity.

8. The replicate analysie were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for solid samples are reported on an "as-received" weight basis.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory

8/20/12
Date

njp\i08-011

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.

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WC-Hanford, Inc.	Project: RC-030	
2620 Fermi Avenue	Project Number: K3965	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	08/20/2012 17:31

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Results reported from a dilution; related reporting limits are elevated due to the presence of an interference or a high target value.
B	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
*	Value outside QC acceptance criteria
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
Dry	Sample results reported on a dry weight basis
Wet	Sample results reported on a wet weight basis
RPD	Relative Percent Difference
LOD	Limit of Detection (LOD): the minimum estimated concentration of a target analyte that can be detected reliably. Concentrations at the LOD or between the LOD and LOQ are flagged estimated with either a 'J' qualifier or client-specific qualifier.
LOQ	Limit of Quantitation (LOQ): the minimum concentration of a target analyte that can be quantified reliably

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-030 Project Number: K3965 Project Manager: Joan Kessner	**Reported:** 08/20/2012 17:31

Wet Chemistry
Lionville Laboratory

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1PX33-A (1208011-01) Other Solid									
Bromide	1.0 U	1.0	4.9	mg/kg	1	L208144	08/16/2012	08/16/2012	EPA 300.0 (1993)
Chloride	**1.0** B	1.0	4.9	mg/kg	1	L208144	08/16/2012	08/16/2012	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	4.9	mg/kg	1	L208144	08/16/2012	08/16/2012	EPA 300.0 (1993)
Nitrate	**8.7**	1.0	4.9	mg/kg	1	L208144	08/16/2012	08/16/2012	EPA 300.0 (1993)
Nitrite	1.0 U	1.0	4.9	mg/kg	1	L208144	08/16/2012	08/16/2012	EPA 300.0 (1993)
Orthophosphate	2.0 U	2.0	9.9	mg/kg	1	L208144	08/16/2012	08/16/2012	EPA 300.0 (1993)
Sulfate	**213** D	5.0	25.0	mg/kg	5	L208152	08/16/2012	08/17/2012	EPA 300.0 (1993)
pH	**8.71**	0.10	0.10	pH Units	1	L208085	08/13/2012	08/13/2012	SW846 9045D

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-030 Project Number: K3965 Project Manager: Joan Kessner	**Reported:** 08/20/2012 17:31

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L208085 - Default Prep GenChem										
Duplicate (L208085-DUP3)	**Source: 1208011-01**			Prepared & Analyzed: 08/13/2012						
pH	8.75	0.10	0.10	pH Units		8.71			0.458	20
Reference (L208085-SRM1)				Prepared & Analyzed: 08/13/2012						
pH	4.05	0.10	0.10	pH Units	4.0000		101	99-101		
Batch L208144 - Default Prep GenChem										
Blank (L208144-BLK1)				Prepared & Analyzed: 08/16/2012						
Fluoride	1.0 U	1.0	5.0	mg/kg						
Chloride	1.0 U	1.0	5.0	mg/kg						
Bromide	1.0 U	1.0	5.0	mg/kg						
Orthophosphate	2.0 U	2.0	10.0	mg/kg						
Nitrate	1.0 U	1.0	5.0	mg/kg						
Nitrite	1.0 U	1.0	5.0	mg/kg						
LCS (L208144-BS1)				Prepared & Analyzed: 08/16/2012						
Fluoride	49.6	1.0	5.0	mg/kg	50.000		99.2	80-120		
Chloride	47.1	1.0	5.0	mg/kg	50.000		94.2	80-120		
Bromide	48.1	1.0	5.0	mg/kg	50.000		96.2	80-120		
Orthophosphate	46.9	2.0	10.0	mg/kg	50.000		93.8	80-120		
Nitrate	47.9	1.0	5.0	mg/kg	50.000		95.8	80-120		
Nitrite	48.2	1.0	5.0	mg/kg	50.000		96.4	80-120		
Duplicate (L208144-DUP3)	**Source: 1208011-01**			Prepared & Analyzed: 08/16/2012						
Fluoride	0.9 U	0.9	4.7	mg/kg		1.0 U				20
Chloride	1.0 B	0.9	4.7	mg/kg		1.0 J				20
Bromide	0.9 U	0.9	4.7	mg/kg		1.0 U				20
Orthophosphate	1.9 U	1.9	9.4	mg/kg		2.0 U				20
Nitrate	8.8	0.9	4.7	mg/kg		8.7			1.21	20
Nitrite	0.9 U	0.9	4.7	mg/kg		1.0 U				20

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Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L208144 - Default Prep GenChem										
Matrix Spike (L208144-MS3)	**Source: 1208011-01**			Prepared & Analyzed: 08/16/2012						
Fluoride	48.8	1.0	4.9	mg/kg	49.100	1.0 U	99.4	75-125		
Chloride	47.3	1.0	4.9	mg/kg	49.100	1.0 J	96.4	75-125		
Bromide	47.4	1.0	4.9	mg/kg	49.100	1.0 U	96.6	75-125		
Orthophosphate	47.3	2.0	9.8	mg/kg	49.100	2.0 U	96.4	75-125		
Nitrate	58.4	1.0	4.9	mg/kg	49.100	8.7	101	75-125		
Nitrite	47.8	1.0	4.9	mg/kg	49.100	1.0 U	97.4	75-125		
Batch L208152 - Default Prep GenChem										
Blank (L208152-BLK1)				Prepared: 08/16/2012 Analyzed: 08/17/2012						
Sulfate	1.0 U	1.0	5.0	mg/kg						
LCS (L208152-BS1)				Prepared: 08/16/2012 Analyzed: 08/17/2012						
Sulfate	48.4	1.0	5.0	mg/kg	50.000		96.8	80-120		
Duplicate (L208152-DUP1)	**Source: 1208011-01**			Prepared: 08/16/2012 Analyzed: 08/17/2012						
Sulfate	202 D	4.7	23.4	mg/kg		213			5.72	20
Matrix Spike (L208152-MS1)	**Source: 1208011-01**			Prepared: 08/16/2012 Analyzed: 08/17/2012						
Sulfate	496 D	9.8	49.1	mg/kg	491.00	213	57.6*	75-125		