SAF-RC-148
300 Area D4 Waste Sites – Soil Full Protocol
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 1/31/13
INITIAL/DATE

COMMENTS:

SDG KP0182 SAF-RC-148

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location/Waste Site: 300-46 WSite – Verification Phase 2 – UIC 300-131

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

31 January 2013

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 #	1301068
SDG #	KP0182
SAF #	RC-148
Date Received	01/25/13
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	
Herbicides	
Metals	X
Inorganics	

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 21 pages.

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1301068

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Lionville Laboratory
A Division of Eberline Analytical Corporation

Client W.C. Hanford SAF# RC-148 KP0182

Est. Final Proj. Sampling Date

Project#

Project Contact/Phone#

Lionville Laboratory Project Manager Arlette Johnson

QC SW Del Std TAT 3 days

Date Rec'd 1-25-13 Date Due 1-30-13

Refrigerator #		A													
#/Type Container	Liquid							2							
	Solid							1							
Volume	Liquid														
	Solid							60							
Preservatives								—							
ANALYSES REQUESTED →		ORGANIC						INORG							
		VOA	BNA	Pest/PCB	Herb			Metal + Hg	CN						
		Lionville Laboratory Use Only													
								METALS							

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															
01	J1RD50	✓	✓	S	1-23-13	0814								X							

Special Instructions:

METALS = HSL + B, Li, Mo, Si, U, Zr (NO TL)

Special Instructions:

1.
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	1-25-13	0945

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-148-124	Page 1 of 1

Collector Oswald, M.G.	**Company Contact** Joan Kessner **Telephone No.** 509-375-4688	**Project Coordinator** KESSNER, JH	**Price Code** 8L **Data Turnaround** 3 ~~21~~ Days 1/23/13
Project Designation 300 Area D4 Waste Sites - Soil Full Protocol	**Sampling Location** 300-46 WSite - Verification Phase 2 - UIC 300-131	**SAF No.** RC-148	
Ice Chest No. WCH-11-011	**Field Logbook No.** EL-1663-05 **COA** R300462000	**Method of Shipment** Hand Deliver/Government Vehicle/FedEx	
Shipped To ~~EBERLINE SERVICES~~ LIONVILLE	**Offsite Property No.** A120716	**Bill of Lading/Air Bill No.** See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS 1/23/13

Potential Radioactive < Dot limits 1-23-13 CMB

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C										
Type of Container	G/P										
No. of Container(s)	1										
Volume	60mL										
SAMPLE ANALYSIS	See item (1) in Special Instructions.		RCF 34764								

Sample No.	Matrix *	Sample Date	Sample Time										
J1RD50	SOIL	1/23/13	0814	X									

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From TPMC Michael Oswald	Date/Time 0823 1-23-13	Received By/Stored In WCH DAVID BECKER	Date/Time 0823 1/23/13
Relinquished By/Removed From DAVID BECKER	Date/Time 0825 1/23/13	Received By/Stored In SM Sexton	Date/Time 0825 1/23/13
Relinquished By/Removed From SM Sexton	Date/Time 0835 1/23/13	Received By/Stored In Fed Ex	Date/Time
Relinquished By/Removed From Fed Ex	Date/Time 1-25-13 0945	Received By/Stored In DSmith	Date/Time 1-25-13 0945
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Uranium, Vanadium, Zinc, Zirconium}; Mercury - 7471 - (CV)

REVIEWED BY CMB DATE 1-23-13

KP0182

Matrix *
S=Soil
SE=Sediment
SO=Solid
Sl=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: W.C. Hanford
Project/SAF/SOW/Release #: RC-148

Date: 1-25-13

LvL Batch #: 1301068

Sample Custodian: [illegible]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier Fed Ex		Airbill # 7945 8178 8957
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** 2.0	**°C**	Cooler # WCH-11-011
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, RSK-175, Sulfides, Non-Halogenated VOAs (Alcohol/Glycol) 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-1112.doc

METALS

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

WC-Hanford, Inc.	Project: RC-148	
2620 Fermi Avenue	Project Number: KP0182	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/29/2013 20:03

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD50	1301068-01	Soil	01/23/2013 08:14	01/25/2013 09:45

LIONVILLE LABORATORY
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Case Narrative

Client: WC-HANFORD RC-148
LVL#: 1301068
SDG/SAF#: KP0182/RC-148

W.O.#: 60049-001-001-0001-00
Date Received: 01-25-13

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 analysis of 1 soil sample.

2. The sample was prepared and analyzed in accordance with methods listed on the data report forms.

   The sample was analyzed and reported with a 3-fold dilution for ICP metals due to sample matrix.

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.

7. The preparation/method blank L301186-BLK1 for 1 analyte was outside method criteria. {less than the Limit of Quantitation, samples greater than 20X MB value}.

   a). The MB result for Sodium was greater than the Limit of Quantitation (LOQ) {3-10x the (LOD) Limit of Detection} and the sample read less than 20 times the MB concentration. However, no corrective action criteria for MBs are provided in SW846 method 6010B. The sample result was reported herein "uncorrected" for the levels found in the MB.

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

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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 5 analytes were outside the 75-125% control limits.

11. For analytes where the MS is out of control, a post-digestion MS (PDS) is performed. A PDS was prepared at meaningful concentration levels for the following analytes: Aluminum, Antimony, Iron, Manganese, and Silicon.

12. The duplicate analyses for 1 analyte was 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. Results for Lead were 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

1/31/13
Date

jjw/01-068

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WC-Hanford, Inc.	Project: RC-148	
2620 Fermi Avenue	Project Number: KP0182	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/29/2013 20:03

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.	Project: RC-148	
2620 Fermi Avenue	Project Number: KP0182	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/29/2013 20:03

J1RD50
1301068-01 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**8040**		14.4	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Antimony	1.73	U	1.73	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Arsenic	**2.41**	B	2.88	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Barium	**89.3**		1.44	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Beryllium	**0.365**	B	0.576	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Boron	5.76	U	5.76	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Cadmium	0.576	U	0.576	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Calcium	**5500**		288	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Chromium	**9.33**		0.576	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Cobalt	**7.91**		5.76	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Copper	**13.3**		2.88	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Iron	**23500**		57.6	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Lead	**6.08**		1.44	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Lithium	**8.83**		7.20	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Magnesium	**4470**		216	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Manganese	**360**		14.4	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Molybdenum	5.76	U	5.76	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Nickel	**10.0**	B	11.5	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Potassium	**1480**		1150	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Selenium	0.864	U	0.864	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Silicon	**587**		5.76	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Silver	0.576	U	0.576	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Sodium	**247**		144	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Uranium	57.6	U	57.6	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Vanadium	**59.9**		7.20	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Zinc	**94.6**		28.8	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Zirconium	**22.9**		7.20	mg/kg dry	3	L301186	01/28/2013	01/29/2013	6010B
Mercury	**0.00986**	B	0.0269	mg/kg dry	1	L301193	01/28/2013	01/29/2013	7471A

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WC-Hanford, Inc.	Project: RC-148	
2620 Fermi Avenue	Project Number: KP0182	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/29/2013 20:03

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 L301186 - SW 3050B										
Blank (L301186-BLK1)				Prepared: 01/28/2013 Analyzed: 01/29/2013						
Aluminum	4.90	U	4.90	mg/kg wet						
Antimony	0.588	U	0.588	mg/kg wet						
Arsenic	0.980	U	0.980	mg/kg wet						
Barium	0.490	U	0.490	mg/kg wet						
Beryllium	0.196	U	0.196	mg/kg wet						
Boron	1.96	U	1.96	mg/kg wet						
Cadmium	0.196	U	0.196	mg/kg wet						
Calcium	98.0	U	98.0	mg/kg wet						
Chromium	0.196	U	0.196	mg/kg wet						
Cobalt	1.96	U	1.96	mg/kg wet						
Copper	0.980	U	0.980	mg/kg wet						
Iron	19.6	U	19.6	mg/kg wet						
Lead	0.490	U	0.490	mg/kg wet						
Lithium	2.45	U	2.45	mg/kg wet						
Magnesium	73.5	U	73.5	mg/kg wet						
Manganese	4.90	U	4.90	mg/kg wet						
Molybdenum	1.96	U	1.96	mg/kg wet						
Nickel	3.92	U	3.92	mg/kg wet						
Potassium	392	U	392	mg/kg wet						
Selenium	0.294	U	0.294	mg/kg wet						
Silicon	1.96	U	1.96	mg/kg wet						
Silver	0.196	U	0.196	mg/kg wet						
Sodium	52.2		49.0	mg/kg wet						
Uranium	19.6	U	19.6	mg/kg wet						
Vanadium	2.45	U	2.45	mg/kg wet						
Zinc	9.80	U	9.80	mg/kg wet						
Zirconium	2.45	U	2.45	mg/kg wet						

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WC-Hanford, Inc.	Project: RC-148	
2620 Fermi Avenue	Project Number: KP0182	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/29/2013 20:03

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 L301186 - SW 3050B										
Duplicate (L301186-DUP4)		**Source: 1301068-01**		Prepared: 01/28/2013 Analyzed: 01/29/2013						
Aluminum	7860		13.4	mg/kg dry		8040			2.24	20
Antimony	1.61	U	1.61	mg/kg dry		1.73 U				20
Arsenic	2.28	B	2.69	mg/kg dry		2.41			5.70	20
Barium	85.8		1.34	mg/kg dry		89.3			4.01	20
Beryllium	0.333	B	0.538	mg/kg dry		0.365			9.13	20
Boron	1.43	B	5.38	mg/kg dry		5.76 U				20
Cadmium	0.538	U	0.538	mg/kg dry		0.576 U				20
Calcium	5330		269	mg/kg dry		5500			3.14	20
Chromium	9.42		0.538	mg/kg dry		9.33			0.877	20
Cobalt	6.72		5.38	mg/kg dry		7.91			16.3	20
Copper	13.6		2.69	mg/kg dry		13.3			2.30	20
Iron	22600		53.8	mg/kg dry		23500			4.01	20
Lead	663		1.34	mg/kg dry		6.08			196*	20
Lithium	8.73		6.72	mg/kg dry		8.83			1.10	20
Magnesium	4220		202	mg/kg dry		4470			5.74	20
Manganese	345		13.4	mg/kg dry		360			4.13	20
Molybdenum	5.38	U	5.38	mg/kg dry		5.76 U				20
Nickel	9.94	B	10.8	mg/kg dry		10.0			0.820	20
Potassium	1400		1080	mg/kg dry		1480			5.39	20
Selenium	0.807	U	0.807	mg/kg dry		0.864 U				20
Silicon	590		5.38	mg/kg dry		587			0.620	20
Silver	0.538	U	0.538	mg/kg dry		0.576 U				20
Sodium	248		134	mg/kg dry		247			0.182	20
Uranium	53.8	U	53.8	mg/kg dry		57.6 U				20
Vanadium	59.1		6.72	mg/kg dry		59.9			1.38	20
Zinc	75.3		26.9	mg/kg dry		94.6			22.6*	20
Zirconium	22.9		6.72	mg/kg dry		22.9			0.0126	20

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WC-Hanford, Inc.	Project: RC-148	
2620 Fermi Avenue	Project Number: KP0182	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/29/2013 20:03

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 L301186 - SW 3050B									
Matrix Spike (L301186-MS4)		**Source: 1301068-01**	Prepared: 01/28/2013 Analyzed: 01/29/2013						
Aluminum	9490	14.4	mg/kg dry	192.07	8040	759*	75-125		
Antimony	20.3	1.73	mg/kg dry	48.016	1.73 U	42.2*	75-125		
Arsenic	168	2.88	mg/kg dry	192.07	2.41	86.5	75-125		
Barium	266	1.44	mg/kg dry	192.07	89.3	91.9	75-125		
Beryllium	4.68	0.576	mg/kg dry	4.8016	0.365	90.0	75-125		
Boron	85.1	5.76	mg/kg dry	96.033	5.76 U	88.6	75-125		
Cadmium	4.09	0.576	mg/kg dry	4.8016	0.576 U	85.1	75-125		
Calcium	8030	288	mg/kg dry	2400.8	5500	106	75-125		
Chromium	26.3	0.576	mg/kg dry	19.207	9.33	88.6	75-125		
Cobalt	49.5	5.76	mg/kg dry	48.016	7.91	86.5	75-125		
Copper	35.3	2.88	mg/kg dry	24.008	13.3	91.3	75-125		
Iron	23000	57.6	mg/kg dry	96.033	23500	-477*	75-125		
Lead	47.7	1.44	mg/kg dry	48.016	6.08	86.6	75-125		
Lithium	101	7.20	mg/kg dry	96.033	8.83	96.3	75-125		
Magnesium	6490	216	mg/kg dry	2400.8	4470	84.4	75-125		
Manganese	385	14.4	mg/kg dry	48.016	360	52.2*	75-125		
Molybdenum	84.7	5.76	mg/kg dry	96.033	5.76 U	88.2	75-125		
Nickel	52.6	11.5	mg/kg dry	48.016	10.0	88.6	75-125		
Potassium	3750	1150	mg/kg dry	2400.8	1480	94.5	75-125		
Selenium	166	0.864	mg/kg dry	192.07	0.864 U	86.2	75-125		
Silicon	839	5.76	mg/kg dry	96.033	587	263*	75-125		
Silver	3.70	0.576	mg/kg dry	4.8016	0.576 U	77.2	75-125		
Sodium	2650	144	mg/kg dry	2400.8	247	100	75-125		
Uranium	407	57.6	mg/kg dry	480.16	57.6 U	84.8	75-125		
Vanadium	104	7.20	mg/kg dry	48.016	59.9	91.0	75-125		
Zinc	143	28.8	mg/kg dry	48.016	94.6	102	75-125		
Zirconium	441	7.20	mg/kg dry	480.16	22.9	87.1	75-125		

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Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc.	Project: RC-148	
2620 Fermi Avenue	Project Number: KP0182	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/29/2013 20:03

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 L301186 - SW 3050B									
Post Spike (L301186-PS4)		**Source: 1301068-01**	Prepared: 01/28/2013 Analyzed: 01/29/2013						
Aluminum	142000		ug/L	66000	83700	89.1	75-125		
Antimony	289		ug/L	300.00	3.15	95.4	75-125		
Iron	348000		ug/L	126000	245000	81.8	75-125		
Manganese	6310		ug/L	3000.0	3740	85.5	75-125		
Silicon	12300		ug/L	6300.0	6110	98.5	75-125		
Reference (L301186-SRM1)			Prepared: 01/28/2013 Analyzed: 01/29/2013						
Aluminum	9820	14.2	mg/kg wet	6670.0		147	0-200.89		
Antimony	48.3	1.70	mg/kg wet	53.000		91.2	0-235.8		
Arsenic	112	2.83	mg/kg wet	114.00		98.5	82.8-117.54		
Barium	307	1.42	mg/kg wet	307.00		100	79.8-120.2		
Beryllium	107	0.566	mg/kg wet	108.00		99.4	82.8-117.6		
Boron	81.6	5.66	mg/kg wet	85.100		95.9	67.5-132.8		
Cadmium	226	0.566	mg/kg wet	225.00		100	83.6-116.4		
Calcium	3310	283	mg/kg wet	3360.0		98.6	83.3-116.9		
Chromium	79.8	0.566	mg/kg wet	77.200		103	73.3-126.4		
Cobalt	162	5.66	mg/kg wet	166.00		97.9	80.7-118.7		
Copper	269	2.83	mg/kg wet	271.00		99.3	80.8-119.2		
Iron	8550	56.6	mg/kg wet	8420.0		102	78.6-121.1		
Lead	181	1.42	mg/kg wet	190.00		95.1	81.6-118.4		
Lithium	126	7.08	mg/kg wet	114.00		111	50.9-148.2		
Magnesium	8560	212	mg/kg wet	8570.0		99.9	83.2-116.7		
Manganese	902	14.2	mg/kg wet	965.00		93.4	69.3-130.5		
Molybdenum	236	5.66	mg/kg wet	235.00		100	76.2-123.8		
Nickel	220	11.3	mg/kg wet	221.00		99.7	79.6-120.8		
Potassium	14800	1130	mg/kg wet	14400		103	81.9-118.1		
Selenium	183	0.849	mg/kg wet	187.00		97.6	75.9-124.6		
Silicon	771	5.66	mg/kg wet	807.00		95.5	0-219.3		
Silver	81.5	0.566	mg/kg wet	83.500		97.6	82.7-117.1		
Sodium	10000	142	mg/kg wet	9730.0		103	82.5-117.2		
Vanadium	106	7.08	mg/kg wet	98.700		107	75.9-123.6		
Zinc	198	28.3	mg/kg wet	199.00		99.7	78.4-121.6		

264 Welsh Pool Road
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Richland WA, 99354	Project Manager: Joan Kessner	01/29/2013 20:03

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 L301193 - SW 7471A Prep										
Blank (L301193-BLK1)				Prepared: 01/28/2013 Analyzed: 01/29/2013						
Mercury	0.0290	U	0.0290	mg/kg wet						
Duplicate (L301193-DUP5)		**Source: 1301068-01**		Prepared: 01/28/2013 Analyzed: 01/29/2013						
Mercury	0.0269	U	0.0269	mg/kg dry		0.00986				20
Matrix Spike (L301193-MS5)		**Source: 1301068-01**		Prepared: 01/28/2013 Analyzed: 01/29/2013						
Mercury	0.166		0.0262	mg/kg dry	0.14535	0.00986	107	75-125		20
Reference (L301193-SRM1)				Prepared: 01/28/2013 Analyzed: 01/29/2013						
Mercury	1.25		0.0273	mg/kg wet	1.2900		96.8	62.6-138		

Lionville Laboratory Logbook #: 1194

SAMPLE DIGESTION RECORD

Digestion Batch #: L301186
Date/Time Initiated: 1/28/13 1030
Date/Time Completed: 1/28/13 2130
Analyst: MW
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: 95
BLOCK 1 2 (circle one)
3

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/ TC	Texture	Color / Appearance	Artifact	Turb
1301050-01		0.59	50		TO	coarse	light brown soil	rocks	
L301186-DUP1		0.60	50						
MS1	0.5	0.56	50						
1301050-02		0.53	50			coarse	brown soil	rocks	
03		0.55	50			coarse	dark brown soil	rocks	
04		0.59	50			coarse	dark brown soil	rocks	
05		0.56	50			coarse	brown soil	rocks	
1301059-01		0.58	50			fine	dusty brown, soil-like	vegetation	RAD
L301186-DUP2		0.61	50						
MS2	0.5	0.55	50						
1301061-01		0.62	50			coarse	light brown, muddy	rocks, H_2O	
L301186-DUP3		0.61	50						
MS3	0.5	0.60	50						
1301061-02		0.58	50			coarse	brown, muddy	rocks	
03		0.63	50			not fine	brown, muddy	rocks	
1301068-01		0.56	50			fine	brown, sandy	rocks	
L301186-DUP4		0.60	50						
MS4	0.5*	0.56	50						
BLK1		0.51	50			coarse	boiling chips	N/A	
SRM1	*	0.53	50			fine	pink, sandy		

MW 1/28/13

Spiking IDs / Expiration Date:
MS#: 1201581

LCS#: 1201014 *

Reagent IDs:
HNO_3 0000003390
HCl 0000018301
H_2O_2 L11A03
1:1 HNO_3 637-076-07
1:1 HCl

File ID#:

Data Review By/Date:
PMP, 01/30/13

R:\group\QA\SOP\
Signed\SPI\Metals Digestion log.doc

* also 0.25ml 1201380 (U-)
1201386 (Zr)

W.E. MW 1/28/13

Page #:

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PREPARATION BENCH SHEET

L301186

Lionville Laboratory

Printed: 1/28/2013 10:03:04PM

00000018

Matrix: Solid **Prepared using: METALS - SW 3050B** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301050-01	6010B HSL Metals	01/28/2013 10:30	0.59	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1301050-02	6010B HSL Metals	01/28/2013 10:30	0.53	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1301050-03	6010B HSL Metals	01/28/2013 10:30	0.55	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1301050-04	6010B HSL Metals	01/28/2013 10:30	0.59	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1301050-05	6010B HSL Metals	01/28/2013 10:30	0.56	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1301059-01	6010B HSL Metals	01/28/2013 10:30	0.58	50					Navarro Research & Engineering, Inc.	
1301061-01	6010B HSL Metals	01/28/2013 10:30	0.62	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1301061-02	6010B HSL Metals	01/28/2013 10:30	0.58	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1301061-03	6010B HSL Metals	01/28/2013 10:30	0.63	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1301068-01	6010B HSL Metals	01/28/2013 10:30	0.56	50					WC-Hanford, Inc.	HSL + B, Li, Mo, Si, U, Zr (No TL)
L301186-BLK1	QC	01/28/2013 10:30	0.51	50						
L301186-DUP1	QC	01/28/2013 10:30	0.6	50		1301050-01				
L301186-DUP2	QC	01/28/2013 10:30	0.61	50		1301059-01				
L301186-DUP3	QC	01/28/2013 10:30	0.61	50		1301061-01				
L301186-DUP4	QC	01/28/2013 10:30	0.6	50		1301068-01				
L301186-MS1	QC	01/28/2013 10:30	0.56	50	1201581	1301050-01	500			
L301186-MS2	QC	01/28/2013 10:30	0.55	50	1201581	1301059-01	500			
L301186-MS3	QC	01/28/2013 10:30	0.6	50	1201581	1301061-01	500			
L301186-MS4	QC	01/28/2013 10:30	0.56	50	1201581	1301068-01	500			
L301186-PS1	QC	01/28/2013 10:30	0.59	50	1201582	1301050-01	100			

Extracts Relinquished By — Date: 1/28/13

Extracts Received By — Date: 01/29/13

PREPARATION BENCH SHEET

L301186

Lionville Laboratory

Printed: 1/28/2013 10:03:04PM

Matrix: Solid **Prepared using: METALS - SW 3050B** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L301186-PS2	QC	01/28/2013 10:30	0.58	50	1201582	1301059-01	100			
L301186-PS3	QC	01/28/2013 10:30	0.62	50	1201582	1301061-01	100			
L301186-PS4	QC	01/28/2013 10:30	0.56	50	1201582	1301068-01	100			
L301186-SRM1	QC	01/28/2013 10:30	0.53	50	1201014		530			

Extracts Relinquished By — Date: 1/28/13

Extracts Received By — Date: 01/29/13

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 1/28/13
Start Time/Temp: 2010/94°
End Time/Temp: 2040/96°

Instrument ID: HG3.1
Balance # B14 /NA
Pipette Calibration (Daily) (Y)

Logbook # 1198
Prep Batch: L301193
Worksheet: HG012961
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 ug/l		0.100		10ml	50	
1.0 ug/l		0.500		10ml	50	
2.0 ug/l		1.000		10ml	50	
5.0 ug/l		2.500		10ml	50	
10.0 ug/l		5.000		10ml	50	
ICV		0.125	2.5	10ml	50	
CCV		0.250	5.0	10ml	50	
ICB/CCB				10ml	50	
L301193-BLK1				0.31	50	
SRM1		(A)	(A)	0.33	50	
1301037-01				0.35	50	
L301193-DUP1				0.33	50	
MS1		0.500	1.0	0.37	50	
1301037-02				0.35	50	
03				0.35	50	
04				0.37	50	
1301050-01				0.35	50	
L301193-DUP2				0.37	50	
MS2		0.500	1.0	0.36	50	
1301050-02				0.35	50	
03				0.33	50	
04				0.35	50	
05				0.38	50	
1301059-01				0.31	50	RAD
L301193-DUP3				0.31	50	↓
MS3		0.500	1.0	0.34	50	↓

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	1/28/13 1330
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: PMP, 01/30/13

se book # 1198 for std traceability information

Soil LCS True Value = 1.29 mg/Kg
Standard # 1201041 (A)

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

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 1/28/13
Start Time/Temp: See pg 027
End Time/Temp: See pg 027

Instrument ID: HG3.1
Balance # B14 /NA
Pipette Calibration (Daily) (Y) ____

Logbook # 1198
Prep Batch: L301193
Worksheet: HG017901
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.
1301061-01				0.39	50	
L301193-DUP4				0.37	50	
MS4		0.500	1.0	0.37	50	
1301061-02				0.37	50	
03				0.33	50	
1301068-01				0.36	50	
L301193-DUP5				0.36	50	
MS5		0.500	1.0	0.37	50	

PMP 1/28/13

Standard:	ID	Prep Date/Time
ICAL/MS	See page 027	
ICV/CCV/LCS		

Reviewed By/Date: PMP, 01/30/13

Soil LCS True Value = See page 027 mg/Kg
Standard # ____

see book # 1198 for std traceability information
Water Matrix Spiking Solution Concentration = 0.1 µg/ml
after LCS Spiking Concentration: 1.0 µg/ml

ME-HgCVAA-Prep0910

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