SAF-RC-225
100K Remaining Waste Sites – Soil In-Process
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 11/27/12
INITIAL/DATE

COMMENTS:

SDG KP0147 SAF-RC-225

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 100-K-91

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

25 November 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 #	1211026
SDG #	KP0147
SAF #	RC-225
Date Received	11/08/12
# Samples	2
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 18 pages.

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1211026

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

KP0147

Lionville Laboratory
A Division of Eberline Analytical Corporation

Client: WC Hanford OAF# RC-225

Est. Final Proj. Sampling Date:

Project#:

Project Contact/Phone#:

Lionville Laboratory Project Manager: O-Johnson

QC: SW Del: STL TAT: 7 Days

Date Rec'd: 11-8-12 Date Due: 11-15-12

Refrigerator #: A

#/Type Container: Liquid 2; Solid 1AG

Volume: Liquid; Solid 125

Preservatives:

ANALYSES REQUESTED → ORGANIC: VOA, BNA, Pest/PCB, Herb; INORG: Metal, HG, CN

Lionville Laboratory Use Only

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	Metals
01	J1R5C9			Soil	11-6-12	1380	X
02	1 558			Soil	11-6-12	1346	X

Special Instructions:

METAL=HSL+B, Mo, Si (NO Tl)

Special Instructions:

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

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	11/8/12	0950

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-225-074	Page 1 of 1
Collector: ~~Brackett, R~~ DUNNUM, A BH 11/6/12	Company Contact: Joan Kessner Telephone No.: (509) 375-4688	Project Coordinator: KESSNER, JH	Price Code: 8B Data Turnaround: 7 Days
Project Designation: 100K Remaining Waste Sites - Soil In-Process	Sampling Location: 100-K ~~93~~ 91 BH 11/6/12	SAF No.: RC-225	
Ice Chest No.: WCH-12-020 ~~WCH-12-11-7~~ AJ 11-7-12	Field Logbook No.: EL-1666 COA: 010K912600 ~~011KX1Y000~~ 11-7-12 CMB	Method of Shipment: FedEx	
Shipped To: AJ 11-7-12 ~~EBERLINE SERVICES~~ LIONVILLE	Offsite Property No.: A120~~615~~641 AJ 11-7-12	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C										
Type of Container	G/P										
No. of Container(s)	1										
Volume	125mL										
SAMPLE ANALYSIS	See item (1) in Special Instructions.										

Sample No.	Matrix *	Sample Date	Sample Time										
J1R5C9	SOIL	11-6-12	13:30	X									
J1R558	SOIL	11-6-12	13:45	X									

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Aaron Dunnum	11-6-12 13:50	BHUDSON Bhudson	11/6/12 1350
BHUDSON Bhudson	11/6/12 1435	Linda Bingham	106044 11-6-12 1435
Linda Bingham	106044 11-7-12 0820	Fed Ex	
Fed Ex	11-8-12 0950	VICTOR HERNANDEZ	11-8-12 0950

SPECIAL INSTRUCTIONS

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

REVIEWED BY AJ
DATE 11-7-12

KP0147

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: WC Hanford
Project/SAF/SOW/Release #: RC-225

Date: 11/8/12

LvL Batch #: 1211026

Sample Custodian: Victor Hernandez

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier Fed Ex		Airbill # 7940 2699 0495
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 # WCH-11-020
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-0412.doc

METALS

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

WC-Hanford, Inc.	Project: RC-225	
2620 Fermi Avenue	Project Number: KP0147	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	11/19/2012 07:46

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5C9	1211026-01	Soil	11/06/2012 13:30	11/08/2012 09:50
J1R558	1211026-02	Soil	11/06/2012 13:45	11/08/2012 09:50

LIONVILLE LABORATORY
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Case Narrative

Client: WC-HANFORD RC-225
LVL#: 1211026
SDG/SAF#: KP0147/RC-225

W.O.#: 60049-001-001-0001-00
Date Received: 11-08-12

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 2 soil samples.

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

   The samples were analyzed and reported with 3-fold dilutions for ICP metals due to sample matrix.

   Sample J1R5C9 was analyzed and reported with a 20-fold dilution for Mercury due to high concentration of Mercury in the sample. Sample J1R558 was analyzed and reported with a 50-fold dilution for Mercury due to high concentration of Mercury in the sample.

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) with the exception of CCV4 for Silicon (115.3%). All samples reported from file ICP111212B were surrounded by in control QC.

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, samples were greater than 20X MB value}.

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 6 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 serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration levels for the following analytes: Aluminum, Iron, Antimony, Zinc, Mercury, and Silicon.

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1R5C9	Mercury	1.0	117.8

12. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limit critieria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL. The sample results for Cadmium 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

11/20/12
Date

alm/11-026ccvhg%

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WC-Hanford, Inc.	Project: RC-225	
2620 Fermi Avenue	Project Number: KP0147	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	11/19/2012 07:46

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-225	
2620 Fermi Avenue	Project Number: KP0147	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	11/19/2012 07:46

J1R5C9
1211026-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**9820**		14.4	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Antimony	1.73	U	1.73	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Arsenic	**2.96**		2.89	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Barium	**77.3**		1.44	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Beryllium	**0.354**	B	0.577	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Boron	**2.63**	B	5.77	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Cadmium	**0.196**	B	0.577	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Calcium	**4170**		289	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Chromium	**11.9**		0.577	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Cobalt	**7.00**		5.77	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Copper	**15.3**		2.89	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Iron	**21400**		57.7	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Lead	**7.63**		1.44	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Magnesium	**3820**		217	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Manganese	**341**		14.4	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Molybdenum	5.77	U	5.77	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Nickel	**10.1**	B	11.5	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Potassium	**4750**		1150	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Selenium	0.866	U	0.866	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Silicon	**505**		5.77	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Silver	0.577	U	0.577	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Sodium	**271**		144	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Vanadium	**52.5**		7.22	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Zinc	**1010**		28.9	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Mercury	**13.5**		0.577	mg/kg dry	20	L211072	11/09/2012	11/09/2012	7471A

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WC-Hanford, Inc.	Project: RC-225	
2620 Fermi Avenue	Project Number: KP0147	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	11/19/2012 07:46

J1R558
1211026-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**11100**		13.7	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Antimony	1.64	U	1.64	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Arsenic	**2.46**	B	2.74	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Barium	**87.5**		1.37	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Beryllium	**0.382**	B	0.548	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Boron	**2.89**	B	5.48	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Cadmium	**0.214**	B	0.548	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Calcium	**4420**		274	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Chromium	**11.4**		0.548	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Cobalt	**6.10**		5.48	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Copper	**18.0**		2.74	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Iron	**22400**		54.8	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Lead	**12.1**		1.37	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Magnesium	**4080**		205	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Manganese	**383**		13.7	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Molybdenum	5.48	U	5.48	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Nickel	**9.83**	B	11.0	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Potassium	**6040**		1100	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Selenium	0.822	U	0.822	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Silicon	**320**		5.48	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Silver	0.548	U	0.548	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Sodium	**317**		137	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Vanadium	**46.9**		6.85	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Zinc	**2590**		27.4	mg/kg dry	3	L211069	11/08/2012	11/12/2012	6010B
Mercury	**43.5**		1.32	mg/kg dry	50	L211072	11/09/2012	11/09/2012	7471A

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WC-Hanford, Inc.	Project: RC-225	
2620 Fermi Avenue	Project Number: KP0147	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	11/19/2012 07:46

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 L211069 - SW 3050B										
Blank (L211069-BLK1)				Prepared: 11/08/2012 Analyzed: 11/12/2012						
Aluminum	4.72	U	4.72	mg/kg wet						
Antimony	0.566	U	0.566	mg/kg wet						
Arsenic	0.943	U	0.943	mg/kg wet						
Barium	0.472	U	0.472	mg/kg wet						
Beryllium	0.189	U	0.189	mg/kg wet						
Boron	1.89	U	1.89	mg/kg wet						
Cadmium	0.189	U	0.189	mg/kg wet						
Calcium	6.20	B	94.3	mg/kg wet						
Chromium	0.189	U	0.189	mg/kg wet						
Cobalt	1.89	U	1.89	mg/kg wet						
Copper	0.943	U	0.943	mg/kg wet						
Iron	18.9	U	18.9	mg/kg wet						
Lead	0.472	U	0.472	mg/kg wet						
Magnesium	1.21	B	70.8	mg/kg wet						
Manganese	4.72	U	4.72	mg/kg wet						
Molybdenum	1.89	U	1.89	mg/kg wet						
Nickel	3.77	U	3.77	mg/kg wet						
Potassium	377	U	377	mg/kg wet						
Selenium	0.283	U	0.283	mg/kg wet						
Silicon	1.89	U	1.89	mg/kg wet						
Silver	0.189	U	0.189	mg/kg wet						
Sodium	47.2	U	47.2	mg/kg wet						
Vanadium	2.36	U	2.36	mg/kg wet						
Zinc	9.43	U	9.43	mg/kg wet						
Duplicate (L211069-DUP1)		**Source: 1211026-01**		Prepared: 11/08/2012 Analyzed: 11/12/2012						
Aluminum	9920		15.6	mg/kg dry		9820			1	20
Antimony	1.87	U	1.87	mg/kg dry		1.73 U				20
Arsenic	2.74	B	3.11	mg/kg dry		2.96			8	20
Barium	81.1		1.56	mg/kg dry		77.3			5	20
Beryllium	0.353	B	0.623	mg/kg dry		0.354			0.4	20
Boron	2.58	B	6.23	mg/kg dry		2.63			2	20
Cadmium	0.243	B	0.623	mg/kg dry		0.196			21*	20
Calcium	4380		311	mg/kg dry		4170			5	20
Chromium	11.8		0.623	mg/kg dry		11.9			0.8	20
Cobalt	7.82		6.23	mg/kg dry		7.00			11	20
Copper	15.6		3.11	mg/kg dry		15.3			2	20

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WC-Hanford, Inc.	Project: RC-225	
2620 Fermi Avenue	Project Number: KP0147	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	11/19/2012 07:46

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 L211069 - SW 3050B										
Duplicate (L211069-DUP1)		**Source: 1211026-01**		Prepared: 11/08/2012 Analyzed: 11/12/2012						
Iron	23400		62.3	mg/kg dry		21400			9	20
Lead	7.94		1.56	mg/kg dry		7.63			4	20
Magnesium	4060		233	mg/kg dry		3820			6	20
Manganese	380		15.6	mg/kg dry		341			11	20
Molybdenum	6.23	U	6.23	mg/kg dry		5.77 U				20
Nickel	10.3	B	12.5	mg/kg dry		10.1			2	20
Potassium	5080		1250	mg/kg dry		4750			7	20
Selenium	0.934	U	0.934	mg/kg dry		0.866 U				20
Silicon	484		6.23	mg/kg dry		505			4	20
Silver	0.623	U	0.623	mg/kg dry		0.577 U				20
Sodium	276		156	mg/kg dry		271			2	20
Vanadium	56.2		7.78	mg/kg dry		52.5			7	20
Zinc	1030		31.1	mg/kg dry		1010			1	20
Matrix Spike (L211069-MS1)		**Source: 1211026-01**		Prepared: 11/08/2012 Analyzed: 11/12/2012						
Aluminum	12000		14.7	mg/kg dry	196.01	9820	1090*	75-125		
Antimony	13.2		1.76	mg/kg dry	49.003	1.73 U	27*	75-125		
Arsenic	176		2.94	mg/kg dry	196.01	2.96	89	75-125		
Barium	265		1.47	mg/kg dry	196.01	77.3	96	75-125		
Beryllium	4.82		0.588	mg/kg dry	4.9003	0.354	91	75-125		
Boron	88.0		5.88	mg/kg dry	98.005	2.63	87	75-125		
Cadmium	4.76		0.588	mg/kg dry	4.9003	0.196	93	75-125		
Calcium	6840		294	mg/kg dry	2450.1	4170	109	75-125		
Chromium	30.6		0.588	mg/kg dry	19.601	11.9	95	75-125		
Cobalt	49.8		5.88	mg/kg dry	49.003	7.00	87	75-125		
Copper	36.9		2.94	mg/kg dry	24.501	15.3	88	75-125		
Iron	21000		58.8	mg/kg dry	98.005	21400	-436*	75-125		
Lead	50.8		1.47	mg/kg dry	49.003	7.63	88	75-125		
Magnesium	6210		221	mg/kg dry	2450.1	3820	98	75-125		
Manganese	386		14.7	mg/kg dry	49.003	341	91	75-125		
Molybdenum	84.9		5.88	mg/kg dry	98.005	5.77 U	87	75-125		
Nickel	53.7		11.8	mg/kg dry	49.003	10.1	89	75-125		
Potassium	7370		1180	mg/kg dry	2450.1	4750	107	75-125		
Selenium	172		0.882	mg/kg dry	196.01	0.866 U	88	75-125		
Silicon	507		5.88	mg/kg dry	98.005	505	2*	75-125		
Silver	4.39		0.588	mg/kg dry	4.9003	0.577 U	90	75-125		
Sodium	2670		147	mg/kg dry	2450.1	271	98	75-125		

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

WC-Hanford, Inc.	Project: RC-225	
2620 Fermi Avenue	Project Number: KP0147	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/19/2012 07:46

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 L211069 - SW 3050B									
Matrix Spike (L211069-MS1)		**Source: 1211026-01**	Prepared: 11/08/2012 Analyzed: 11/12/2012						
Vanadium	94.4	7.35	mg/kg dry	49.003	52.5	86	75-125		
Zinc	1200	29.4	mg/kg dry	49.003	1010	379*	75-125		
Post Spike (L211069-PS1)		**Source: 1211026-01**	Prepared: 11/08/2012 Analyzed: 11/12/2012						
Aluminum	162000		ug/L	66000	102000	92	75-125		
Antimony	298		ug/L	300.00	3.28	98	75-125		
Iron	329000		ug/L	126000	222000	85	75-125		
Silicon	11600		ug/L	6300.0	5250	101	75-125		
Zinc	10800		ug/L	300.00	10500	84	75-125		
Reference (L211069-SRM1)			Prepared: 11/08/2012 Analyzed: 11/12/2012						
Aluminum	10700	13.2	mg/kg wet	6670.0		160	0-200.89		
Antimony	34.6	1.58	mg/kg wet	53.000		65	0-235.8		
Arsenic	110	2.63	mg/kg wet	114.00		97	82.8-117.54		
Barium	288	1.32	mg/kg wet	307.00		94	79.8-120.2		
Beryllium	101	0.526	mg/kg wet	108.00		94	82.8-117.6		
Boron	75.4	5.26	mg/kg wet	85.100		89	67.5-132.8		
Cadmium	215	0.526	mg/kg wet	225.00		95	83.6-116.4		
Calcium	3150	263	mg/kg wet	3360.0		94	83.3-116.9		
Chromium	77.8	0.526	mg/kg wet	77.200		101	73.3-126.4		
Cobalt	154	5.26	mg/kg wet	166.00		93	80.7-118.7		
Copper	252	2.63	mg/kg wet	271.00		93	80.8-119.2		
Iron	8180	52.6	mg/kg wet	8420.0		97	78.6-121.1		
Lead	177	1.32	mg/kg wet	190.00		93	81.6-118.4		
Magnesium	7920	197	mg/kg wet	8570.0		92	83.2-116.7		
Manganese	953	13.2	mg/kg wet	965.00		99	69.3-130.5		
Molybdenum	220	5.26	mg/kg wet	235.00		94	76.2-123.8		
Nickel	209	10.5	mg/kg wet	221.00		95	79.6-120.8		
Potassium	13700	1050	mg/kg wet	14400		95	81.9-118.1		
Selenium	180	0.789	mg/kg wet	187.00		96	75.9-124.6		
Silicon	191	5.26	mg/kg wet	807.00		24	0-219.3		
Silver	80.4	0.526	mg/kg wet	83.500		96	82.7-117.1		
Sodium	8730	132	mg/kg wet	9730.0		90	82.5-117.2		
Vanadium	101	6.58	mg/kg wet	98.700		103	75.9-123.6		
Zinc	189	26.3	mg/kg wet	199.00		95	78.4-121.6		

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Richland WA, 99354	Project Manager: Joan Kessner	11/19/2012 07:46

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 L211072 - SW 7471A Prep										
Blank (L211072-BLK1)				Prepared & Analyzed: 11/09/2012						
Mercury	0.0237	U	0.0237	mg/kg wet						
Duplicate (L211072-DUP1)		**Source: 1211026-01**		Prepared & Analyzed: 11/09/2012						
Mercury	11.9		0.560	mg/kg dry		13.5			13.2	20
Matrix Spike (L211072-MS1)		**Source: 1211026-01**		Prepared & Analyzed: 11/09/2012						
Mercury	12.6		0.515	mg/kg dry	0.14303	13.5	-663*	75-125		20
Reference (L211072-SRM1)				Prepared & Analyzed: 11/09/2012						
Mercury	1.28		0.0243	mg/kg wet	1.2900		99.0	62.6-138		

Lionville Laboratory

Logbook #: 1154

SAMPLE DIGESTION RECORD

Digestion Batch #: L211069
Date/Time Initiated: 11/8/12 1640
Date/Time Completed: 11/9/12 1400
Analyst: [illegible]
Matrix (circle): Soil Water Other
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.

Digested / Undigested (circle one)
Balance #: B14
Balance Cal Verification: Y NA
Temp: 94°
BLOCK 1 2 (circle one)
3

NOTE: All temperatures are recorded as corrected temperatures

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/ TC	Texture	Color / Appearance	Artifact	Turb
1211026-01		0.55	50		TOT	fine	Brown soil		
L211069-DUP1		0.51	50			fine	Brown Soil		
MS1	0.5	0.54	50			fine	Brown Soil		
02		0.58	50			fine	Brown Soil		
1211027-01		0.58	50			fine	Brown Soil		
L211069-DUP2		0.55	50			fine	Brown Soil		
MS2	0.5	0.53	50			fine	Brown Soil		
BLK		0.53	50			COARSE	Boiling Chips		
SRM	*	0.57	50			fine	Pink Loamy		

SER 11/9/12

Spiking IDs / Expiration Date:
MS# : 1201377
LCS# 1201014

Reagent IDs:
HNO_3 0000003390
HCl L13029
H_2O_2 L11A03
1:1 HNO_3 637-066-02
1:1 HCl

File ID#:

Data Review By/Date:
[illegible] 11/14/12

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Signed\SPI\Metals Digestion log.doc

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Lionville Laboratory

MERCURY PREPARATION

Logbook # 1153

Analyst: TRB
Date 11/9/12
Start Time/Temp: 1230 / 93°
End Time/Temp: 1305 / 96°

Instrument ID: H63.1
Balance # B14 /NA
Pipette Calibration (Daily) Y ✓

Prep Batch: L211072
Worksheet: HG110901
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				10 mL	50	
0.2 µg/L		0.100		10 mL	50	
1.0		0.500		10 mL	50	
2.0		1.000		10 mL	50	
5.0		2.500		10 mL	50	
10.0		5.000		10 mL	50	
ICV		0.125	2.5	10 mL	50	
CCV		0.25	5.0	10 mL	50	
ICB/CCB				10 mL	50	
L211072-BLK				0.38	50	
SRM		*	*	0.37	50	
12110026-01				0.33	50	
L211072-Dup1				0.34	50	
MS1		0.5	1.0	0.37	50	
02				0.36	50	
1211027-01				0.34	50	
L211072-Dup2				0.33	50	
MS2		0.5	1.0	0.31	50	

TRB 11/9/12

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	
ICV/CCV/LCS	IV 1200532	

Reviewed By/Date: RC 11/19/12

se book # 1153 for std traceability information

Soil LCS True Value = 1.29 mg/Kg
Standard # 1201014 *

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

ME-HgCVAA-Prep0910

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