SAF-RC-190
100N Field Remediation – Soil In-Process
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 12/19/12
INITIAL/DATE

COMMENTS:

SDG KP0157 SAF-RC-190

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 100-N-91 In-Process

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

17 December 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 #	1211104
SDG #	KP0157
SAF #	RC-190
Date Received	11/27/12
# 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 35 pages.

CHAIN OF CUSTODY

Lionville Laboratory Use Only
1211104

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Lionville Laboratory
A Division of Eberline Analytical Corporation

KP0157

Client WC Hanford SAF# RC-190
Est. Final Proj. Sampling Date
Project#
Project Contact/Phone#
Lionville Laboratory Project Manager O. Johnson
QC SW Del 8Td TAT 7 Days

Date Rec'd 11-27-12 Date Due 12-4-12

		A	B
Refrigerator #		2	2
#/Type Container	Liquid		
	Solid	1	1
Volume	Liquid		
	Solid	60	120
Preservatives		–	

ANALYSES REQUESTED →

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	ORGANIC VOA	BNA	Pest/PCB	Herb	INORG Metal Hg	CN	TCLP Met	TCLP Hg
01	J1R5X3	✓	✓	Soil	11-20-12	0921					X		X	X

Lionville Laboratory Use Only

METALS | TCLP 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

Special Instructions:
METALS - HSL + B, Mo, Si (NOTL)

Special Instructions:
1.
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
[signature]	[signature]	11/27/12	1000

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-190-116	Page 1 of 1

Collector Q. Stowe	**Company Contact** Joan Kessner	**Telephone No.** 375-4688	**Project Coordinator** KESSNER, JH
Price Code ~~8L~~ 8J on 11/20/12	**Data Turnaround** ~~21~~ Days 7 on 11/20/12		
Project Designation 100N Field Remediation - Soil In-Process	**Sampling Location** 100-N-91 - In Process		**SAF No.** RC-190
Ice Chest No. RCC-08-022	**Field Logbook No.** EL-1652-07	**COA** 000N912000	**Method of Shipment** FedEx
Shipped To ~~EBERLINE SERVICES~~ LIONVILLE 11/20/12	**Offsite Property No.** A120646		**Bill of Lading/Air Bill No.** See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	None									
Type of Container	G/P	G/P									
No. of Container(s)	1	1									
Volume	60mL	120mL									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
J1R5X3	SOIL	11-20-12	0921	X	X								

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Quincy Stowe	0929 11/20/12	Received By/Stored In: Dennis Newman	0929 11/20/12
Relinquished By/Removed From: Dennis Newman	1400 11/20/12	Received By/Stored In: G. C. Bingham	1060#1 01-20-12 1400
Relinquished By/Removed From: G. C. Bingham	1060#1 11-26-12 0840	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: Fed Ex	11-27-12 1000	Received By/Stored In: Victor Hernandez	11-27-12 1000
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

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}

(2) Metals by ICP (TCLP) - 1311/6010 {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury (TCLP) - 1311/7470 {Mercury}

Matrix *

S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wl=Wipe
L=Liquid
V=Vegetation
X=Other

KP0157

REVIEWED BY AJ DATE 11-26-12

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

WCH-EE-011

0000000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAF/SOW/Release #: RC-190

Date: 11/27/12

LvL Batch #: 1211104

Sample Custodian: [signature]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier Fed Ex		Airbill #
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 2-5	°C	Cooler # RCC-08-022
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_____	

METALS

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

WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0157	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5X3	1211104-01	Soil	11/20/2012 09:21	11/27/2012 10:00

LIONVILLE LABORATORY
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Case Narrative

Client: WC-HANFORD RC-190
LVL#: 1211104
SDG/SAF#: KP0157/RC-190

W.O.#: 60049-001-001-0001-00
Date Received: 11-27-12

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 1 soil sample and 1 leachate sample.

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

   The soil samples J1R5X3, L21251-DUP4, and L211251-MS4 were analyzed and reported with 3-fold dilutions for ICP metals due to sample matrix. The soil samples J1R5X3, L21251-DUP4, and L211251-MS4 were reanalyzed and reported with a 100-fold dilution for Zinc due to high concentration of Zinc in the sample.

   The soil samples were analyzed and reported with 50-fold dilutions for Mercury due to high concentration of Mercury in the samples.

   The TCLP leachate samples were analyzed and reported with 5-fold dilutions for ICP metals due to sample matrix.

   The final low-level QC sample, in the ICP file for the reanalyses of Zinc at the 100-fold dilution, was not calculated or reported due to the Yttrium 224.3 line was not detected. The sample results for Zinc were above the concentration level of the CCVs, therefore there should be no bias to the sample results.

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).

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6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits. 2120019-CCB2 and 2120019-CCB4 results for Barium (TCLP) were above the MRL, however less than 5% of the RCRA limit.

7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation, samples greater than 20X MB value}. All TCLP preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation, MB value less than 5% of the RCRA limit, or samples 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. All laboratory control samples (LCS) were within the 80-120% control limits.

10. The matrix spike (MS) recoveries for 9 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, Antimony, Cadmium, Copper, Iron, Lead, Manganese, Mercury, and Zinc. The Lead post digestion spike recovery is outside the 75-125% control limit possibly due to matrix effect. The PDS concentration for Manganese was prepared at too low a level for a recovery.

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1R5X3	Mercury	1.0	108.9

12. The duplicate analyses for 5 analytes were outside the 20% Relative Percent Difference (RPD) control limits. The ± 20% RPD control limit applies to sample results greater than ten times the MDL.

13. The TCLP extract from sample J1R5X3 was selected for the matrix spike (MS) for this analytical batch. All MS recoveries were greater than 50% as per method criteria.

    The matrix spike (MS) concentration for Mercury was equivalent to the regulatory level (200 ppb) as per SW846 method 1311. The required spike concentration is above the linear range of the instrument, resulting in a 50-fold dilution. The MS recovery was greater than 50% as per method criteria.

14. 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.

15. 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.

16. 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

12/6/12
Date

alm/11-104TChg%

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-190 Project Number: KP0157 Project Manager: Joan Kessner	**Reported:** 12/05/2012 15:15

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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2620 Fermi Avenue	Project Number: KP0157	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

J1R5X3
1211104-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**7650**		14.8	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Antimony	**13.6**		1.77	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Arsenic	**17.8**		2.95	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Barium	**87.6**		1.48	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Beryllium	**0.304**	B	0.591	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Boron	**1.78**	B	5.91	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Cadmium	**21.6**		0.591	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Calcium	**2480**		295	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Chromium	**16.8**		0.591	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Cobalt	**8.16**		5.91	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Copper	**240**		2.95	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Iron	**16000**		59.1	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Lead	**1190**		1.48	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Magnesium	**3230**		222	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Manganese	**17600**		14.8	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Molybdenum	**6.47**		5.91	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Nickel	**22.9**		11.8	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Potassium	**1350**		1180	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Selenium	0.886	U	0.886	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Silicon	**890**		5.91	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Silver	0.591	U	0.591	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Sodium	**201**		148	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Vanadium	**43.4**		7.38	mg/kg dry	3	L211251	11/29/2012	12/04/2012	6010B
Zinc	**48000**		985	mg/kg dry	100	L211251	11/29/2012	12/04/2012	6010B
Mercury	**9.86**		1.30	mg/kg dry	50	L211252	11/29/2012	12/03/2012	7471A

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2620 Fermi Avenue	Project Number: KP0157	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

J1R5X3
1211104-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
TCLP Metals by SW846 1311 6000/7000 series									
Arsenic	0.0750	U	0.0750	mg/L	5	L211264	11/30/2012	12/04/2012	6010
Barium	**0.529**		0.00500	mg/L	5	L211264	11/30/2012	12/04/2012	6010
Cadmium	**0.525**		0.0150	mg/L	5	L211264	11/30/2012	12/04/2012	6010
Chromium	0.0250	U	0.0250	mg/L	5	L211264	11/30/2012	12/04/2012	6010
Lead	**11.3**		0.0500	mg/L	5	L211264	11/30/2012	12/04/2012	6010
Selenium	0.100	U	0.100	mg/L	5	L211264	11/30/2012	12/04/2012	6010
Silver	0.0300	U	0.0300	mg/L	5	L211264	11/30/2012	12/04/2012	6010
Mercury	**0.00355**		0.000200	mg/L	1	L211272	11/30/2012	12/03/2012	7470

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2620 Fermi Avenue	Project Number: KP0157	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

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 L211251 - SW 3050B										
Blank (L211251-BLK1)				Prepared: 11/29/2012 Analyzed: 12/03/2012						
Aluminum	4.63	U	4.63	mg/kg wet						
Antimony	0.556	U	0.556	mg/kg wet						
Arsenic	0.926	U	0.926	mg/kg wet						
Barium	0.463	U	0.463	mg/kg wet						
Beryllium	0.185	U	0.185	mg/kg wet						
Boron	1.85	U	1.85	mg/kg wet						
Cadmium	0.185	U	0.185	mg/kg wet						
Calcium	5.74	B	92.6	mg/kg wet						
Chromium	0.185	U	0.185	mg/kg wet						
Cobalt	1.85	U	1.85	mg/kg wet						
Copper	0.926	U	0.926	mg/kg wet						
Iron	18.5	U	18.5	mg/kg wet						
Lead	0.463	U	0.463	mg/kg wet						
Magnesium	69.4	U	69.4	mg/kg wet						
Manganese	4.63	U	4.63	mg/kg wet						
Molybdenum	1.85	U	1.85	mg/kg wet						
Nickel	3.70	U	3.70	mg/kg wet						
Potassium	370	U	370	mg/kg wet						
Selenium	0.278	U	0.278	mg/kg wet						
Silicon	1.85	U	1.85	mg/kg wet						
Silver	0.185	U	0.185	mg/kg wet						
Sodium	46.3	U	46.3	mg/kg wet						
Vanadium	2.31	U	2.31	mg/kg wet						
Zinc	9.26	U	9.26	mg/kg wet						
Duplicate (L211251-DUP4)			**Source: 1211104-01**	Prepared: 11/29/2012 Analyzed: 12/04/2012						
Aluminum	7680		15.3	mg/kg dry		7650			0.396	20
Antimony	9.21		1.84	mg/kg dry		13.6			38.4*	20
Arsenic	19.8		3.06	mg/kg dry		17.8			10.4	20
Barium	94.4		1.53	mg/kg dry		87.6			7.50	20
Beryllium	0.325	B	0.612	mg/kg dry		0.304			6.82	20
Boron	1.91	B	6.12	mg/kg dry		1.78			7.22	20
Cadmium	16.7		0.612	mg/kg dry		21.6			25.3*	20
Calcium	2500		306	mg/kg dry		2480			0.832	20
Chromium	17.0		0.612	mg/kg dry		16.8			1.24	20
Cobalt	8.08		6.12	mg/kg dry		8.16			0.946	20
Copper	288		3.06	mg/kg dry		240			18.4	20

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WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0157	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

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 L211251 - SW 3050B										
Duplicate (L211251-DUP4)		**Source: 1211104-01**		Prepared: 11/29/2012 Analyzed: 12/04/2012						
Iron	16100		61.2	mg/kg dry		16000			0.161	20
Lead	969		1.53	mg/kg dry		1190			20.6*	20
Magnesium	3170		230	mg/kg dry		3230			1.97	20
Manganese	17900		15.3	mg/kg dry		17600			1.30	20
Molybdenum	6.68		6.12	mg/kg dry		6.47			3.25	20
Nickel	23.2		12.2	mg/kg dry		22.9			1.25	20
Potassium	1340		1220	mg/kg dry		1350			0.482	20
Selenium	0.918	U	0.918	mg/kg dry		0.886 U				20
Silicon	812		6.12	mg/kg dry		890			9.11	20
Silver	0.612	U	0.612	mg/kg dry		0.591 U				20
Sodium	196		153	mg/kg dry		201			2.37	20
Vanadium	43.1		7.65	mg/kg dry		43.4			0.740	20
Zinc	31900		1020	mg/kg dry		48000			40.2*	20
Matrix Spike (L211251-MS4)		**Source: 1211104-01**		Prepared: 11/29/2012 Analyzed: 12/04/2012						
Aluminum	8430		15.6	mg/kg dry	207.85	7650	373*	75-125		
Antimony	24.6		1.87	mg/kg dry	51.962	13.6	21.2*	75-125		
Arsenic	211		3.12	mg/kg dry	207.85	17.8	93.1	75-125		
Barium	294		1.56	mg/kg dry	207.85	87.6	99.2	75-125		
Beryllium	5.30		0.624	mg/kg dry	5.1962	0.304	96.1	75-125		
Boron	95.3		6.24	mg/kg dry	103.92	1.78	90.0	75-125		
Cadmium	38.8		0.624	mg/kg dry	5.1962	21.6	331*	75-125		
Calcium	5070		312	mg/kg dry	2598.1	2480	99.7	75-125		
Chromium	34.1		0.624	mg/kg dry	20.785	16.8	83.3	75-125		
Cobalt	56.0		6.24	mg/kg dry	51.962	8.16	92.0	75-125		
Copper	525		3.12	mg/kg dry	25.981	240	1100*	75-125		
Iron	15300		62.4	mg/kg dry	103.92	16000	-733*	75-125		
Lead	849		1.56	mg/kg dry	51.962	1190	-659*	75-125		
Magnesium	5330		234	mg/kg dry	2598.1	3230	80.8	75-125		
Manganese	21500		15.6	mg/kg dry	51.962	17600	7370*	75-125		
Molybdenum	101		6.24	mg/kg dry	103.92	6.47	91.2	75-125		
Nickel	72.1		12.5	mg/kg dry	51.962	22.9	94.7	75-125		
Potassium	3740		1250	mg/kg dry	2598.1	1350	92.0	75-125		
Selenium	184		0.935	mg/kg dry	207.85	0.886 U	88.6	75-125		
Silicon	1000		6.24	mg/kg dry	103.92	890	106	75-125		
Silver	4.97		0.624	mg/kg dry	5.1962	0.591 U	95.6	75-125		
Sodium	2720		156	mg/kg dry	2598.1	201	96.8	75-125		

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WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0157	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

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 L211251 - SW 3050B									
Matrix Spike (L211251-MS4)		**Source: 1211104-01**	Prepared: 11/29/2012 Analyzed: 12/04/2012						
Vanadium	91.7	7.79	mg/kg dry	51.962	43.4	93.0	75-125		
Zinc	71100	1040	mg/kg dry	51.962	48000	44400*	75-125		
Post Spike (L211251-PS4)		**Source: 1211104-01**	Prepared: 11/29/2012 Analyzed: 12/04/2012						
Aluminum	138000		ug/L	66000	77700	92.0	75-125		
Antimony	430		ug/L	300.00	138	97.5	75-125		
Cadmium	524		ug/L	300.00	219	102	75-125		
Copper	5480		ug/L	3300.0	2440	92.2	75-125		
Iron	270000		ug/L	126000	163000	85.1	75-125		
Lead	14400		ug/L	3300.0	12100	70.7*	75-125		
Manganese	179000		ug/L	3000.0	179000	-6.00*	75-125		
Zinc	684000		ug/L	210000	487000	93.6	75-125		
Reference (L211251-SRM1)			Prepared: 11/29/2012 Analyzed: 12/03/2012						
Aluminum	9780	14.7	mg/kg wet	6670.0		147	0-200.89		
Antimony	46.6	1.76	mg/kg wet	53.000		87.9	0-235.8		
Arsenic	116	2.94	mg/kg wet	114.00		102	82.8-117.54		
Barium	309	1.47	mg/kg wet	307.00		101	79.8-120.2		
Beryllium	108	0.588	mg/kg wet	108.00		100	82.8-117.6		
Boron	81.4	5.88	mg/kg wet	85.100		95.6	67.5-132.8		
Cadmium	229	0.588	mg/kg wet	225.00		102	83.6-116.4		
Calcium	3330	294	mg/kg wet	3360.0		99.0	83.3-116.9		
Chromium	82.2	0.588	mg/kg wet	77.200		107	73.3-126.4		
Cobalt	166	5.88	mg/kg wet	166.00		100	80.7-118.7		
Copper	266	2.94	mg/kg wet	271.00		98.1	80.8-119.2		
Iron	8620	58.8	mg/kg wet	8420.0		102	78.6-121.1		
Lead	187	1.47	mg/kg wet	190.00		98.3	81.6-118.4		
Magnesium	8140	221	mg/kg wet	8570.0		95.0	83.2-116.7		
Manganese	1020	14.7	mg/kg wet	965.00		105	69.3-130.5		
Molybdenum	244	5.88	mg/kg wet	235.00		104	76.2-123.8		
Nickel	226	11.8	mg/kg wet	221.00		102	79.6-120.8		
Potassium	14900	1180	mg/kg wet	14400		103	81.9-118.1		
Selenium	193	0.882	mg/kg wet	187.00		103	75.9-124.6		
Silicon	803	5.88	mg/kg wet	807.00		99.5	0-219.3		
Silver	81.9	0.588	mg/kg wet	83.500		98.1	82.7-117.1		
Sodium	9560	147	mg/kg wet	9730.0		98.3	82.5-117.2		
Vanadium	110	7.35	mg/kg wet	98.700		111	75.9-123.6		
Zinc	220	29.4	mg/kg wet	199.00		110	78.4-121.6		

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WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0157	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

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 L211251 - SW 3050B										
Batch L211252 - SW 7471A Prep										
Blank (L211252-BLK1)				Prepared: 11/29/2012 Analyzed: 12/03/2012						
Mercury	0.0290	U	0.0290	mg/kg wet						
Duplicate (L211252-DUP4)		**Source: 1211104-01**		Prepared: 11/29/2012 Analyzed: 12/03/2012						
Mercury	15.2		1.44	mg/kg dry		9.86			42.9*	20
Matrix Spike (L211252-MS4)		**Source: 1211104-01**		Prepared: 11/29/2012 Analyzed: 12/03/2012						
Mercury	15.5		1.44	mg/kg dry	0.16034	9.86	3500*	75-125		20
Reference (L211252-SRM1)				Prepared: 11/29/2012 Analyzed: 12/03/2012						
Mercury	1.38		0.0290	mg/kg wet	1.2900		107	62.6-138		

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WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0157	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

TCLP Metals by SW846 1311 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 L211264 - SW 3010A										
Blank (L211264-BLK1)				Prepared: 11/30/2012 Analyzed: 12/03/2012						
Arsenic	0.0150	U	0.0150	mg/L						
Barium	0.00100	U	0.00100	mg/L						
Cadmium	0.00300	U	0.00300	mg/L						
Chromium	0.00500	U	0.00500	mg/L						
Lead	0.0100	U	0.0100	mg/L						
Selenium	0.0200	U	0.0200	mg/L						
Silver	0.00600	U	0.00600	mg/L						
Blank (L211264-BLK3)				Prepared: 11/30/2012 Analyzed: 12/03/2012						
Arsenic	0.0750	U	0.0750	mg/L						
Barium	0.00500	U	0.00500	mg/L						
Cadmium	0.0150	U	0.0150	mg/L						
Chromium	0.0250	U	0.0250	mg/L						
Lead	0.0500	U	0.0500	mg/L						
Selenium	0.100	U	0.100	mg/L						
Silver	0.0300	U	0.0300	mg/L						
LCS (L211264-BS1)				Prepared: 11/30/2012 Analyzed: 12/03/2012						
Arsenic	9.75		0.0150	mg/L	10.000		97.5	80-120		
Barium	4.99		0.00100	mg/L	5.0000		99.7	80-120		
Cadmium	0.228		0.00300	mg/L	0.25000		91.4	80-120		
Chromium	0.503		0.00500	mg/L	0.50000		101	80-120		
Lead	2.41		0.0100	mg/L	2.5000		96.6	80-120		
Selenium	9.44		0.0200	mg/L	10.000		94.4	80-120		
Silver	0.493		0.00600	mg/L	0.50000		98.6	80-120		
Duplicate (L211264-DUP5)		**Source: 1211104-01**		Prepared: 11/30/2012 Analyzed: 12/04/2012						
Arsenic	0.0750	U	0.0750	mg/L		0.0750 U				20
Barium	0.518		0.00500	mg/L		0.529			2.10	20
Cadmium	0.510		0.0150	mg/L		0.525			3.00	20
Chromium	0.0250	U	0.0250	mg/L		0.0250 U				20
Lead	10.9		0.0500	mg/L		11.3			3.10	20
Selenium	0.100	U	0.100	mg/L		0.100 U				20
Silver	0.0300	U	0.0300	mg/L		0.0300 U				20

LIONVILLE LABORATORY
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WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0157	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/05/2012 15:15

TCLP Metals by SW846 1311 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 L211264 - SW 3010A										
Matrix Spike (L211264-MS5)		**Source: 1211104-01**		Prepared: 11/30/2012 Analyzed: 12/04/2012						
Arsenic	5.12		0.0750	mg/L	5.0000	0.0750 U	102	50-1000		
Barium	96.3		0.00500	mg/L	100.00	0.529	95.8	50-1000		
Cadmium	1.53		0.0150	mg/L	1.0000	0.525	101	50-1000		
Chromium	5.06		0.0250	mg/L	5.0000	0.0250 U	101	50-1000		
Lead	16.2		0.0500	mg/L	5.0000	11.3	98.5	50-1000		
Selenium	0.974		0.100	mg/L	1.0000	0.100 U	97.4	50-1000		
Silver	2.79		0.0300	mg/L	5.0000	0.0300 U	55.8	50-1000		
Batch L211272 - SW 7470A Prep										
Blank (L211272-BLK1)				Prepared: 11/30/2012 Analyzed: 12/03/2012						
Mercury	0.000200	U	0.000200	mg/L						
Blank (L211272-BLK3)				Prepared: 11/30/2012 Analyzed: 12/03/2012						
Mercury	0.000200	U	0.000200	mg/L						
LCS (L211272-BS1)				Prepared: 11/30/2012 Analyzed: 12/03/2012						
Mercury	0.00523		0.000200	mg/L	0.0050000		105	80-120		
Duplicate (L211272-DUP5)		**Source: 1211104-01**		Prepared: 11/30/2012 Analyzed: 12/03/2012						
Mercury	0.00363		0.000200	mg/L		0.00355			2.23	20
Matrix Spike (L211272-MS5)		**Source: 1211104-01**		Prepared: 11/30/2012 Analyzed: 12/03/2012						
Mercury	0.213		0.0100	mg/L	0.20000	0.00355	105	50-1000		

Lionville Laboratory Logbook #: 1154

SAMPLE DIGESTION RECORD

Digestion Batch #: L211251
Date/Time Initiated: 11/29/12 1705
Date/Time Completed: 11/30/12 1400
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 #: 614
Balance Cal Verification: Y NA
Temp: 97
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
1211101-01		0.64	50		TO	fine	brown soil	rocks	
L211251-DUP1		0.57	50						
MS1	0.5	0.59	50						
1211102-01		0.53	50			coarse	dark brown compost	leaves/veg	
L211251-DUP2		0.55	50						
MS2	0.5	0.58	50						
1211102-02		0.64	50			coarse	dark gray soil, white	lumps rocks	
03		0.62	50			fine	dark brown soil	rocks, nail	
04		0.53	50			coarse	dark brown soil	rocks, veg.	
1211103-01		0.57	50			coarse	brown soil w/ white	rocks, nail, unknown	flat solid
L211251-DUP3		0.55	50						
MS3	0.5	0.65	50						
1211103-02		0.54	50			fine	brown soil	N/A	
1211104-01		0.57	50			fine	dark brown soil	unknown debris, veg.	
L211251-DUP4		0.55	50						
+1 MS4	0.5	0.54	50						
1211205-01		0.60	50			not fine	brown sandy	N/A	
L211251-DUP5		0.64	50						
MS5	0.5	0.70	50						
BLK1		0.54	50						
SRM1	⊛	0.51	50						

MW 11/30/12

Spiking IDs / Expiration Date:
MS#: 1201377

LCS#: 1201014 ⊛

Reagent IDs:
HNO_3 0000003190
HCl 413029
H_2O_2 41A03
1:1 HNO_3 637-076-07
1:1 HCl

File ID#:

Data Review By/Date: QLM 12/4/12

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Signed\SPI\Metals Digestion log.doc

+ IE QLM 12/4/12

Page #:

PREPARATION BENCH SHEET

L211251

Lionville Laboratory

Printed: 12/4/2012 11:57:48AM

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
1211101-01	6010B HSL Metals	11/29/2012 17:05	0.64	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211102-01	6010B HSL Metals	11/29/2012 17:05	0.53	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211102-02	6010B HSL Metals	11/29/2012 17:05	0.64	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211102-03	6010B HSL Metals	11/29/2012 17:05	0.62	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211102-04	6010B HSL Metals	11/29/2012 17:05	0.53	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211103-01	6010B HSL Metals	11/29/2012 17:05	0.57	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211103-02	6010B HSL Metals	11/29/2012 17:05	0.54	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211104-01	6010B HSL Metals	11/29/2012 17:05	0.57	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211105-01	6010B HSL Metals	11/29/2012 17:05	0.6	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
L211251-BLK1	QC	11/29/2012 17:05	0.54	50						
L211251-DUP1	QC	11/29/2012 17:05	0.57	50		1211101-01				
L211251-DUP2	QC	11/29/2012 17:05	0.55	50		1211102-01				
L211251-DUP3	QC	11/29/2012 17:05	0.55	50		1211103-01				
L211251-DUP4	QC	11/29/2012 17:05	0.55	50		1211104-01				
L211251-DUP5	QC	11/29/2012 17:05	0.64	50		1211105-01				
L211251-MS1	QC	11/29/2012 17:05	0.59	50	1201377	1211101-01	500			
L211251-MS2	QC	11/29/2012 17:05	0.58	50	1201377	1211102-01	500			
L211251-MS3	QC	11/29/2012 17:05	0.65	50	1201377	1211103-01	500			
L211251-MS4	QC	11/29/2012 17:05	0.54	50	1201377	1211104-01	500			
L211251-MS5	QC	11/29/2012 17:05	0.7	50	1201377	1211105-01	500			

Revision addition of Post spike AJM 12/4/12

Extracts Relinquished By Date Extracts Received By Date

PREPARATION BENCH SHEET

L211251

Lionville Laboratory

Printed: 12/4/2012 11:57:48 AM

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
L211251-PS1	QC	11/29/2012 17:05	0.64	50	1001493	1211101-01	100			
L211251-PS2	QC	11/29/2012 17:05	0.53	50	1001493	1211102-01	100			
L211251-PS3	QC	11/29/2012 17:05	0.57	50	1001493	1211103-01	100			
L211251-PS4	QC	11/29/2012 17:05	0.57	50	1001902	1211104-01	100			
L211251-PS5	QC	11/29/2012 17:05	0.6	50	1001902	1211105-01	100			
L211251-SRM1	QC	11/29/2012 17:05	0.51	50	1201014		510			

Revision addition of Post Spike AJM 12/4/12

Extracts Relinquished By Date Extracts Received By Date

PREPARATION BENCH SHEET

L211251

Lionville Laboratory

Printed: 12/3/2012 12:27:41PM

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
1211101-01	6010B HSL Metals	11/29/2012 17:05	0.64	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211102-01	6010B HSL Metals	11/29/2012 17:05	0.53	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211102-02	6010B HSL Metals	11/29/2012 17:05	0.64	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211102-03	6010B HSL Metals	11/29/2012 17:05	0.62	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211102-04	6010B HSL Metals	11/29/2012 17:05	0.53	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211103-01	6010B HSL Metals	11/29/2012 17:05	0.57	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211103-02	6010B HSL Metals	11/29/2012 17:05	0.54	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211104-01	6010B HSL Metals	11/29/2012 17:05	0.57	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211105-01	6010B HSL Metals	11/29/2012 17:05	0.6	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
L211251-BLK1	QC	11/29/2012 17:05	0.54	50						
L211251-DUP1	QC	11/29/2012 17:05	0.57	50		1211101-01				
L211251-DUP2	QC	11/29/2012 17:05	0.55	50		1211102-01				
L211251-DUP3	QC	11/29/2012 17:05	0.55	50		1211103-01				
L211251-DUP4	QC	11/29/2012 17:05	0.55	50		1211104-01				
L211251-DUP5	QC	11/29/2012 17:05	0.64	50		1211105-01				
L211251-MS1	QC	11/29/2012 17:05	0.59	50	1201377	1211101-01	500			
L211251-MS2	QC	11/29/2012 17:05	0.58	50	1201377	1211102-01	500			
L211251-MS3	QC	11/29/2012 17:05	0.65	50	1201377	1211103-01	500			
L211251-MS4	QC	11/29/2012 17:05	0.54	50	1201377	1211104-01	500			
L211251-MS5	QC	11/29/2012 17:05	0.7	50	1201377	1211105-01	500			

Extracts Relinquished By — Date: 12/3/12

Extracts Received By — Date: 12/03/12

PREPARATION BENCH SHEET

L211251

Lionville Laboratory

Printed: 12/3/2012 12:27:41PM

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
L211251-PS1	QC	11/29/2012 17:05	0.5	50						
L211251-SRM1	QC	11/29/2012 17:05	0.51	50	1201014		510			

Extracts Relinquished By 12/3/12 Date

Extracts Received By 12/03/12 Date

Lionville Laboratory

MERCURY PREPARATION

Logbook # 1153

Analyst: [illegible]
Date 11/29/12 - 11/30/12
Start Time/Temp: 1845/95
End Time/Temp: 1920/97

Instrument ID: HG3.3
Balance # B14 /NA
Pipette Calibration (Daily) (Y) ____

Prep Batch: L211252
Worksheet: HG120303
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 ug/l		0.100		10 ml	50	
1.0 ug/l		0.500		10 ml	50	
2.0 ug/l		1.000		10 ml	50	
5.0 ug/l		2.500		10 ml	50	
10.0 ug/l		5.000		10 ml	50	
ICV		0.125	2.5	10 ml	50	
CCV		0.250	5.0	10 ml	50	
ICB/CCB				10 ml	50	
L211252-BLK1				0.31	50	
SRM1		(*)	(*)	0.31	50	
1211101-01				0.34	50	
L211252-DUP1				0.36	50	
MS1		0.500	1.0	0.39	50	
1211102-01				0.34	50	
L211252-DUP2				0.34	50	
MS2		0.500	1.0	0.36	50	
1211102-02				0.36	50	
03				0.39	50	
04				0.37	50	
1211103-01				0.39	50	
L211252-DUP3				0.35	50	
MS3		0.500	1.0	0.35	50	
1211103-02				0.33	50	
1211104-01				0.39	50	
L211252-DUP4				0.35	50	
MS4		0.500	1.0	0.35	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	11/30/12 1145
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: CEM 12/4/12

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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Lionville Laboratory

MERCURY PREPARATION

Logbook # 1153

Analyst: [illegible]
Date 11/29/12 – 11/30/12
Start Time/Temp: [illegible] 082
End Time/Temp: [illegible]

Instrument ID: HG3.3
Balance # B14 ~~B24~~ w.e. /NA [illegible] 11/30/12
Pipette Calibration (Daily) (Y)

Prep Batch: L211252
Worksheet: HG120303
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.
1211105-01 w.e. 11/29/12				0.37	50	
L211252-DUP-1				0.37	50	
MS5		0.5500	1.0	0.39	50	

[illegible] 11/30/12

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

Soil LCS True Value = [illegible] mg/Kg
Standard # [illegible]

Reviewed By/Date: [illegible] 12/4/12

se book # 1153 for std traceability information

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

ME-HgCVAA-Prep0910

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Lionville Laboratory

Logbook #: 1154

SAMPLE DIGESTION RECORD

Digestion Batch #: L211264
Date/Time Initiated: 11/30/12 1030
Date/Time Completed: 11/30/12 1725
Analyst: MW
Matrix (circle): Soil Water Other TCLP
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.

Digested / Undigested (circle one)
Balance #:
Balance Cal Verification: Y NA
Temp: 96
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
1211037-01	1mL MS/MSD	50 ml	50	<	TC		colorless/clear	~~bottle/volume~~	
L211264-DUP1		50	50	<					
MS1	0.5	50	50						
1211037-02		50	50	<			colorless/clear		
03		50	50	<			colorless/clear		
1211101-01		50	50	<			colorless/clear		
L211264-DUP2		50	50	<					
MS2	0.5	50	50						
1211102-01		50	50	<			amber/clear		
02		50	50	<			colorless/clear		
L211264-DUP3		50	50	<					
MS3	0.5	50	50						
1211102-03		50	50	<			slightly yellow/clear		
04		50	50	<			colorless/clear		
1211103-01		50	50	<			slightly yellow/clear		
L211264-DUP4		50	50	<					
MS4	0.5	50	50						
1211103-02		50	50	<			slightly yellow/clear		
1211104-01		50	50	<			slightly yellow/clear		
L211264-DUP5		50	50	<					
MS5	0.5	50	50						
1211105-01		50	50	<			colorless/clear		
L211264-DUP6		50	50	<					
MS6	0.5	50	50						
BLK1		50	50				colorless/clear		
BS1	0.5	50	50						
BLK2		50	50	<					

Spiking IDs / Expiration Date:
MS#: 1201195
1203388

LCS#: 1201373

Reagent IDs:
HNO_3 0000003390
HCl
H_2O_2
1:1 HNO_3
1:1 HCl 637-069-01

File ID#:

Data Review By/Date: 12/4/12

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See next page

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Lionville Laboratory

Logbook #: 1154

SAMPLE DIGESTION RECORD

Digestion Batch #: L211264
Date/Time Initiated: 11/30/12 1030
Date/Time Completed:
Analyst: MW
Matrix (circle): Soil Water Other TCP
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.

Digested / Undigested (circle one)
Balance #:
Balance Cal Verification: Y NA
Temp:
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
L211264-BLK3		50	50	<	TC		clear/colorless		

MW 11/30/12

Spiking IDs / Expiration Date:
MS# : See page 004
LCS#: See page 004

Reagent IDs:
HNO_3
HCl
H_2O_2
1:1 HNO_3 See page 004
1:1 HCl

File ID#:

Data Review By/Date: CLM 12/4/12

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PREPARATION BENCH SHEET

L211264

Lionville Laboratory

Printed: 12/3/2012 12:33:04PM

Matrix: Solid **Prepared using: METALS - SW 3010A** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1211037-01	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					Alliance Environmental Systems	
1211037-02	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					Alliance Environmental Systems	
1211037-03	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					Alliance Environmental Systems	
1211101-01	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
1211102-01	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
1211102-02	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
1211102-03	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
1211102-04	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
1211103-01	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
1211103-02	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
1211104-01	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
1211105-01	1311/6010B TCLP RCRA ICP MET	11/30/2012 10:30	50	50					WC-Hanford, Inc.	
L211264-BLK1	QC	11/30/2012 10:30	50	50						
L211264-BLK2	QC	11/30/2012 10:30	50	50						1211037
L211264-BLK3	QC	11/30/2012 10:30	50	50						1211101-1211105
L211264-BS1	QC	11/30/2012 10:30	50	50	1201373		500			
L211264-DUP1	QC	11/30/2012 10:30	50	50		1211037-01				
L211264-DUP2	QC	11/30/2012 10:30	50	50		1211101-01				
L211264-DUP3	QC	11/30/2012 10:30	50	50		1211102-02				
L211264-DUP4	QC	11/30/2012 10:30	50	50		1211103-01				

Extracts Relinquished By — Date: 12/5/12

Extracts Received By — Date: 12/03/12

PREPARATION BENCH SHEET

L211264

Lionville Laboratory

Printed: 12/3/2012 12:33:04PM

Matrix: Solid **Prepared using: METALS - SW 3010A** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L211264-DUP5	QC	11/30/2012 10:30	50	50		1211104-01				
L211264-DUP6	QC	11/30/2012 10:30	50	50		1211105-01				
L211264-MS1	QC	11/30/2012 10:30	50	50	1201195	1211037-01	500			
L211264-MS2	QC	11/30/2012 10:30	50	50	1201195	1211101-01	500			
L211264-MS3	QC	11/30/2012 10:30	50	50	1201195	1211102-02	500			
L211264-MS4	QC	11/30/2012 10:30	50	50	1201195	1211103-01	500			
L211264-MS5	QC	11/30/2012 10:30	50	50	1201195	1211104-01	500			
L211264-MS6	QC	11/30/2012 10:30	50	50	1201195	1211105-01	500			

Extracts Relinquished By — Date: 12/3/12

Extracts Received By — Date: 12/03/12

Lionville Laboratory

MERCURY PREPARATION

Logbook # 1153

Analyst: [illegible]
Date 11/30/12
Start Time/Temp: 2000/94°
End Time/Temp: 2200/96°

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

Prep Batch: L211272
Worksheet: HG120301
SOP No. ME-HgCVAA
BLOCK 1 2 (circle one) (3)

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				35	35	
0.2 ug/l		0.070		35	35	
1.0 ug/l		0.350		35	35	
2.0 ug/l		0.700		35	35	
5.0 ug/l		1.750		35	35	
10.0 ug/l		3.500		35	35	
ICV		0.0875	2.5	35	35	
CCV		0.175	5.0	35	35	
ICB/CCB				35	35	
L211272-BLK1				35	35	
BS1		0.175	5.0	35	35	
BLK2	<			35	35	L211165
BLK3	<			35	35	L211223
1211037-01	<			35	35	
L211272-DUP1	<			35	35	
MS1		0.700	200 *	35	35	
1211037-02	<			35	35	
03	<			35	35	
1211101-01	<			7	35	limited volume
L211272-DUP2	<			7	35	limited volume
MS2		0.140	40(200)*	7	35	limited volume
1211102-01	<			35	35	
02	<			35	35	
L211272-DUP3	<			35	35	
MS3		0.700	200 *	35	35	
1211102-03	<			35	35	
04	<			35	35	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 120235	11/30/12 1145
ICV/CCV/LCS	C.I.V. 1201411	N/A

Reviewed By/Date: [illegible] 12/4/12

se book # 1153 for std traceability information

Soil LCS True Value = N/A mg/Kg
Standard #

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

* based 1201234 (10 ug/ml)

ME-HgCVAA-Prep0910

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Lionville Laboratory

MERCURY PREPARATION

Logbook # 1153

Analyst: [signature]
Date 11/30/12
Start Time/Temp: 1085
End Time/Temp: see pg

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

Prep Batch: L211272
Worksheet: HG120301
SOP No. ME-HgCVAA
BLOCK 1 2 (circle one) 3

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.
1211103-01	<			35	35	
L211272-DUP4	<			35	35	
MS4		0.700	200*	35	35	
1211103-02	<			35	35	
1211104-01	<			35	35	
L211272-DUP5	<			35	35	
MS5		0.700	200*	35	35	
1211105-01	<			35	35	
L211272-DUP6	<			35	35	
MS6		0.700	200*	35	35	

11/30/12 [initials]

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

Reviewed By/Date: [signature] 12/4/12

se book # 1153 for std traceability information

Soil LCS True Value = see page 085 mg/Kg
Standard #

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

* used 1201234 (1 Ung/ml)

ME-HgCVAA-Prep0910

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Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1168

Start Date: 11-28-12 Start Time: 12:51 Analyst: RH SOP: SPI-1311.1	End Date: 11-29-12 End Time: 7:00 Analyst: RH Method: B11.1	Tumbler Speed: 31 RPM Leachate Batch #: L211233 Leachate Page: 1 of 3 Room Temp. (°C): Start 22 /Finish 21 **Room Temp. Acceptance Criteria: 23°C ± 2°**

LvL #: 1211101-01 Client ID#: J1R5X8 pH After 5 Min: 9.15 pH After Acid/Heat: 2.05 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.91	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1211102-01 Client ID#: J1R5X4 pH After 5 Min: 7.05 pH After Acid/Heat: 1.92 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.93	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL # 1211102-02 Client ID#: J1R5X5 pH After 5 Min: 8.61 pH After Acid/Heat: 2.06 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 7.49	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1211102-03 Client ID#: J1R5X6 pH After 5 Min: 8.09 pH After Acid/Heat: 1.91 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.56	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____

Standard	ID	Prep Date	Expir Date	pH Acceptance Criteria
Fluid #1	1201456	11-14-12	5-14-13	4.93 ± 0.05
Fluid # 2	—		—	2.88 ± 0.05

SPI-1311.1-A-0310 Reviewed By/Date [signature] 12/4/12 Page #

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1168

Start Date: 11-28-12 Start Time: 12:51 Analyst: RH SOP: SPI-1311.1	End Date: 11-29-12 End Time: 7:00 Analyst: RH Method: B111	Tumbler Speed: 31 RPM Leachate Batch #: L211223 Leachate Page: 2 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria:** **23°C ± 2°**

LvL #: 1211102-04 Client ID#: J1R5X7 pH After 5 Min: 8.56 pH After Acid/Heat: 1.86 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.11	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1211103-01 Client ID#: J1R5X9 pH After 5 Min: 8.43 pH After Acid/Heat: 1.89 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.71	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL # 1211103-02 Client ID#: J1R600 pH After 5 Min: 8.64 pH After Acid/Heat: 2.15 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.83	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1211104-01 Client ID#: J1R5X3 pH After 5 Min: 8.12 pH After Acid/Heat: 2.91 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.76	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____

Standard	ID	Prep Date	Expir Date	pH Acceptance Criteria
Fluid #1	1201456	11-14-12	5-14-13	4.93 ± 0.05
Fluid # 2				2.88 ± 0.05

SPI-1311.1-A-0310 Reviewed By/Date RPM 12/4/12 Page #

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1168

Start Date: 11-28-12 Start Time: 12:51 Analyst: RH SOP: SPI-1311.1	End Date: 11-29-12 End Time: 7:00 Analyst: RH Method: 1311.1	Tumbler Speed: 31 RPM Leachate Batch #: L211223 Leachate Page: 3 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria:** **23°C ± 2°**

LvL #: 1211105-01 Client ID#: S1R5X2 pH After 5 Min: 7.63 pH After Acid/Heat: 2.31 Extraction Fluid/pH: #1 4.94 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.87	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: L211223 Client ID#: N/A pH After 5 Min: N/A pH After Acid/Heat: N/A Extraction Fluid/pH: N/A Sample Wt.(g): N/A Extract Fluid Vol.(mL): N/A pH After Extraction: N/A	Initial Filtration Data and Comments: Solids: _____% / NA BLANK Initial Filtrate Added: _____
LvL #: _____ Client ID#: _____ pH After 5 Min: _____ pH After Acid/Heat: _____ Extraction Fluid/pH: _____ Sample Wt.(g): _____ Extract Fluid Vol.(mL): _____ pH After Extraction: _____	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: _____ Client ID#: _____ pH After 5 Min: _____ pH After Acid/Heat: _____ Extraction Fluid/pH: _____ Sample Wt.(g): _____ Extract Fluid Vol.(mL): _____ pH After Extraction: _____	Initial Filtration Data and Comments: 11-29-12 RH Solids: _____% / NA Initial Filtrate Added: _____

Standard	ID	Prep Date	Expir Date	pH Acceptance Criteria
Fluid #1	1201456	11-14-12	5-14-13	4.93 ± 0.05
Fluid # 2	—			2.88 ± 0.05

SPI-1311.1-A-0310 Reviewed By/Date QPM 12/4/12 Page #