SAF-RC-233
100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil In-Process
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 3/18/13
INITIAL/DATE

COMMENTS:

SDG K4061 SAF-RC-233

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 600-376

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

12 March 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 #	1302005
SDG #	K4061
SAF #	RC-233
Date Received	01/31/13
# Samples	2
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	X
Herbicides	
Metals	X
TCLP 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 46 pages.

CHAIN OF CUSTODY

Lionville Laboratory Use Only
1302005 VA
~~1301075~~ 2-1-13

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 WC HANFORD SAF# RC-233
Est. Final Proj. Sampling Date
Project#
Project Contact/Phone#
Lionville Laboratory Project Manager O. Johnson
QC SW Del SAL TAT 15 Days

Date Rec'd 1-31-13 Date Due 2-15-13

		A	B	C
Refrigerator #		2	2	2
#/Type Container	Liquid			
	Solid	1AG	1P ~~1AG~~	1AG
Volume	Liquid			
	Solid	125	125	125
Preservatives		–	–	–
ANALYSES REQUESTED	ORGANIC: VOA			
	BNA			
	Pest/PCB			
	Herb			
		PAHs		
	INORG: Metal Hg		METALS	TCLP METALS
	CN			TCLP Hg
Lionville Laboratory Use Only		8310	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

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	8310	METALS	TCLP METALS
01	J1RD77			SOIL	1-28-13	1240	X	X	X
02	J1RD78			SOIL	1-28-13	1255	X	X	X

Special Instructions:

METALS = HSL + B, Mo, Si (NOTL)

Special Instructions:

2-1-13 1. TCLP metals are leach and hold
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
FedEx	[signature]	1-31-13	1020

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-233-008	Page 1 of 1

Collector ~~Brackett, RA~~ DUNNUM, A	Company Contact: Joan Kessner	Telephone No.: 509-375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100-IU-2 & 100-IU-6 Remaining Waste Sites - Soil In-Proce	Sampling Location: 600-376		SAF No.: RC-233
Ice Chest No.: WCH-12-020	Field Logbook No.: EL-1666	COA: 0603762600	Method of Shipment: fed EX
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A-120 730		Bill of Lading/Air Bill No.: See OSAC

POSSIBLE SAMPLE HAZARDS/REMARKS

May contain hazardous substances at levels that present risk to humans and/or the environment

Special Handling and/or Storage

Maintain preservation as indicated in header

Preservation	Cool 4C	None	Cool 4C								
Type of Container	G/P	aG	aG								
No. of Container(s)	1	1	1								
Volume	125mL	125mL	125mL								
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	PAHs - 8310								

Sample No.	Matrix *	Sample Date	Sample Time										
J1RD77	SOIL	1/28/13	1240	X	X	X							
J1RD78	SOIL	1/28/13	1255	X	X	X							

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Aaron Dunnum	1-28-13 1315	Received By/Stored In: HUDSON Bitudson	1/28/13 1315
Relinquished By/Removed From: HUDSON Bitudson	1/28/13 1500	Received By/Stored In: Cindy Bingham	1-28-13 1500
Relinquished By/Removed From: Cindy WCH	1-29-13 0905	Received By/Stored In: fed EX	
Relinquished By/Removed From: fed Ex	1-31-13 1020	Received By/Stored In: VICTOR HERNANDEZ	1-31-13 1020
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

** Please leach and hold TCLP until directed to run analysis by Joan Kessner

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, 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}

REVIEWED BY AJ DATE 1-29-13

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

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

WCH-EE-011

000000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAP/SOW/Release #: RC-233

Date: 1-31-13

LvL Batch #: 1301075

Sample Custodian: [illegible]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier Fed Ex		Airbill # 7946 2606 7249
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°	°C	Cooler # WCH-12-020
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, 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 _____

PAHs

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

WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/17/2013 08:00

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD77	1302005-01	Soil	01/28/2013 12:40	01/31/2013 10:20
J1RD78	1302005-02	Soil	01/28/2013 12:55	01/31/2013 10:20

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
Phone (610) 280-3000
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Case Narrative

Client: WC-HANFORD RC-233 K4061
LVL #: 1302005

W.O. #: 60049-001-001-0001-00
Date Received: 01-31-2013

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

Two (2) soil samples were collected on 01-28-2013.

The samples and associated QC samples were extracted 02-11-2013 and analyzed 02-14,15-2013 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C and the analysis procedure was based on SW846 Method 8310. Sample J1RD77 and associated QC had an elevated final volume of 20mLs and sample J1RD78 had an elevated final volume of 40 mLs due to sample matrix. Reporting limits have been adjusted for the necessary dilutions.

Lionville Laboratory (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. LvL certifies that all test results meet the requirements of NELAC with any exception noted in the following statements:

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

2. All required holding times for extraction and analysis have been met.

3. One (1) of six (6) surrogate recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 13GC027) has been enclosed

4. The method blank was below the reporting limits for all target compounds.

5. All blank spike recoveries were within QC acceptance criteria.

6. Six (6) of thirty-two (32) matrix spike recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 13GC027) has been enclosed.

7. Sample J1RD77 and associated QC required a 10-fold instrument dilution and sample J1RD78 required a 100-fold instrument dilution due to high concentration of non-target analytes and sample matrix. Reporting limits have been adjusted to reflect the necessary dilutions.

8. The initial calibrations associated with this data set were within acceptance criteria.

9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria. Per SW846 Method 8000B, the attached table lists compounds where the % difference or drift was greater than 15% and the mean across all compounds was used for evaluation of the continuing calibration. Results associated with these compounds are considered to have greater uncertainty.

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 pages.

10. The sample was reported on a dry weight basis.

11. 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
LvL Laboratory Manager

3/12/13
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 13GC027

Initiator: Catherine Carey
Date: 02/17/13
Client: WC Hanford

Batch: 1302005
Samples: 02, MS3, MSD3
Method: SW846/MCAWW/CLP/

Parameter: PAH
Matrix: SOIL
Prep Batch: L302092

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other _____

b. General Discrepancy

__ Missing Sample/Extract* __ Container Broken* __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample* __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. Problem (Include all relevant specific results; attach data if necessary)

surrogate recovery out in sample #02

several spike recoveries outside QC limits in MS3, MSD3

2. Known or Probable Causes(s) Dilutions and intergerence from non target compounds

3. Discussion and Proposed Action Other Description:

__ Re-log
__ Entire Batch
__ Following Samples: _____
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to _____
__ Place On/Take Off Hold (circle)

Narrate ID.

4. Project Manager Instructions...signature/date: 2/20/13

__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
✓ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: 3/12/13 Other Explanation:

__ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA for diposition.

Route
__ Lab Manager: Daniels
__ Project Mgr (circle): Johnson / Stone
__ Sample Prep (circle): Ford
__ Log-in: King

Route
__ Metals: Welsh / _____
__ Inorganic: Perrone / _____
__ GC/LC: Carey / _____
__ MS VOA: Rubino / _____
__ MS BNA: Carden / _____
__ Other: _____

QA-139-A-0208

8310 PAH

Analytes with %Difference or %Drift >15%, Where Mean is Used for Continuing Calibration

Analyte	02.14.13 10:39:49 am CCV1	02.14.13 3:07:39 pm CCV2	2-14-13 7:17:30 pm CCV3	2-14-13 9:29:19 pm CCV4	CCV5	CCV6	CCV7	CCV8
Triphenylene (surrogate)								
Naphthalene								
Acenaphthylene								
Acenaphthene								
Fluorene								
Phenanthrene								
Anthracene								
Fluoranthene								
Indeno[1,2,3-cd]pyrene								
Pyrene								
Benz[a]anthracene								
Chrysene								
Benzo[b]fluoranthene								
Benzo[k]fluoranthene								
Benzo[a]pyrene	-17.5		-31.5	-31.9				
Dibenz[a,h]anthracene								
Benzo[g,h,i]perylene								
Mean %D or %Drift	1.2/2.3	2.7/0.2	0.2/-3.2	5.0/-3.3				

Sample results reported from affected CCV:

CCV1: L302092-BIK1, BS1, 1301065-01, 1301066-01, L301202-MS3, MS4, MSD3, MSD4

CCV2: 1302005-01

CCV3: 1302005-02

CCV4:

CCV5:

CCV6:

CCV7:

CCV8:

GLOSSARY OF DATA

DATA QUALIFIERS

U	=	Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
J	=	Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
B	=	This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
E	=	Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
I	=	Interference.
.I	=	Indicates an interference on one analytical column only. Result is reported from remaining analytical column.
P	=	This flag is used for a dual column analysis (i.e. pesticides/PCB/herbicides) when there is greater than 40% difference for detected concentrations between the two GC columns; the lower of the two values is reported on Form 1 and flagged with a "P".
D	=	This flag identifies all compounds identified in an analysis at a secondary dilution factor.
C	=	This flag applies to a compound that has been confirmed by GC/MS.

ABBREVIATIONS

BS	=	Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
BSD	=	Indicates blank spike duplicate.
MS	=	Indicates matrix spike.
MSD	=	Indicates matrix spike duplicate.
DL	=	Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
NA	=	Not Applicable.
DF	=	Dilution Factor.
NR	=	Not Required.
NS	=	Not Spiked.
SP	=	Indicates Spiked Compound.
NPM	=	No pattern match for multi-component target analytes.

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

WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/17/2013 08:00

J1RD77
1302005-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Acenaphthylene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Acenaphthene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Fluorene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Phenanthrene	**262**	D	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Anthracene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Fluoranthene	**38.9**	J, D	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Indeno[1,2,3-cd]pyrene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Pyrene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Benz[a]anthracene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Chrysene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Benzo[b] fluoranthene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Benzo[k] fluoranthene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Benzo[a] pyrene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Dibenz[a,h]anthracene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Benzo[g,h,i] perylene	149	U	149	ug/kg dry	10	L302092	02/11/2013	02/14/2013	8310
Surrogate: Triphenylene	*89 %*		*68-129*			*L302092*	*02/11/2013*	*02/14/2013*	*8310*

264 Welsh Pool Road
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Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4061 Project Manager: Joan Kessner	**Reported:** 02/17/2013 08:00

J1RD78

1302005-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Acenaphthylene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Acenaphthene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Fluorene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Phenanthrene	**4360**	D	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Anthracene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Fluoranthene	**1090**	J, D	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Indeno[1,2,3-cd]pyrene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Pyrene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benz[a]anthracene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Chrysene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[b] fluoranthene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[k] fluoranthene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[a] pyrene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Dibenz[a,h]anthracene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[g,h,i] perylene	2840	U	2840	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Surrogate: Triphenylene	*430 % **		*68-129*			*L302092*	*02/11/2013*	*02/14/2013*	*8310*

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Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/17/2013 08:00

Polynuclear Aromatic Compounds by SW846 8310 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302092 - SW 3540C										
Blank (L302092-BLK1)				Prepared: 02/11/2013 Analyzed: 02/14/2013						
Naphthalene	3.33	U	3.33	ug/kg wet						
Acenaphthylene	3.33	U	3.33	ug/kg wet						
Acenaphthene	3.33	U	3.33	ug/kg wet						
Fluorene	3.33	U	3.33	ug/kg wet						
Phenanthrene	3.33	U	3.33	ug/kg wet						
Anthracene	3.33	U	3.33	ug/kg wet						
Fluoranthene	3.33	U	3.33	ug/kg wet						
Indeno[1,2,3-cd]pyrene	3.33	U	3.33	ug/kg wet						
Pyrene	3.33	U	3.33	ug/kg wet						
Benz[a]anthracene	3.33	U	3.33	ug/kg wet						
Chrysene	3.33	U	3.33	ug/kg wet						
Benzo[b] fluoranthene	3.33	U	3.33	ug/kg wet						
Benzo[k] fluoranthene	3.33	U	3.33	ug/kg wet						
Benzo[a] pyrene	3.33	U	3.33	ug/kg wet						
Dibenz[a,h]anthracene	3.33	U	3.33	ug/kg wet						
Benzo[g,h,i] perylene	3.33	U	3.33	ug/kg wet						
Surrogate: Triphenylene	*143*			*ug/kg wet*	*166.67*		*86*	*68-129*		
LCS (L302092-BS1)				Prepared: 02/11/2013 Analyzed: 02/14/2013						
Naphthalene	186		3.33	ug/kg wet	166.67		111	0-127		
Acenaphthylene	143		3.33	ug/kg wet	166.67		86	50-140		
Acenaphthene	145		3.33	ug/kg wet	166.67		87	17-139		
Fluorene	138		3.33	ug/kg wet	166.67		83	28-145		
Phenanthrene	140		3.33	ug/kg wet	166.67		84	30-152		
Anthracene	133		3.33	ug/kg wet	166.67		80	19-171		
Fluoranthene	144		3.33	ug/kg wet	166.67		86	34-159		
Indeno[1,2,3-cd]pyrene	145		3.33	ug/kg wet	166.67		87	31-156		
Pyrene	149		3.33	ug/kg wet	166.67		89	33-152		
Benz[a]anthracene	145		3.33	ug/kg wet	166.67		87	32-157		
Chrysene	146		3.33	ug/kg wet	166.67		88	31-159		
Benzo[b] fluoranthene	148		3.33	ug/kg wet	166.67		89	33-164		
Benzo[k] fluoranthene	148		3.33	ug/kg wet	166.67		89	28-161		
Benzo[a] pyrene	122		3.33	ug/kg wet	166.67		73	29-149		
Dibenz[a,h]anthracene	150		3.33	ug/kg wet	166.67		90	27-153		
Benzo[g,h,i] perylene	154		3.33	ug/kg wet	166.67		92	32-157		
Surrogate: Triphenylene	*147*			*ug/kg wet*	*166.67*		*88*	*68-129*		

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/17/2013 08:00

Polynuclear Aromatic Compounds by SW846 8310 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302092 - SW 3540C										
Matrix Spike (L302092-MS3)		**Source: 1302005-01**		Prepared: 02/11/2013 Analyzed: 02/15/2013						
Naphthalene	498	D	149	ug/kg dry	186.74	149 U	267*	0-127		
Acenaphthylene	4850	D	149	ug/kg dry	186.74	149 U	2600*	50-140		
Acenaphthene	159	D	149	ug/kg dry	186.74	149 U	85	17-139		
Fluorene	167	D	149	ug/kg dry	186.74	149 U	90	28-145		
Phenanthrene	255	D	149	ug/kg dry	186.74	262	-4*	30-152		
Anthracene	41.8	J, D	149	ug/kg dry	186.74	149 U	22	19-171		
Fluoranthene	183	D	149	ug/kg dry	186.74	38.9	77	34-159		
Indeno[1,2,3-cd]pyrene	176	D	149	ug/kg dry	186.74	149 U	94	31-156		
Pyrene	178	D	149	ug/kg dry	186.74	149 U	95	33-152		
Benz[a]anthracene	179	D	149	ug/kg dry	186.74	149 U	96	32-157		
Chrysene	144	J, D	149	ug/kg dry	186.74	149 U	77	31-159		
Benzo[b] fluoranthene	193	D	149	ug/kg dry	186.74	149 U	103	33-164		
Benzo[k] fluoranthene	166	D	149	ug/kg dry	186.74	149 U	89	28-161		
Benzo[a] pyrene	165	D	149	ug/kg dry	186.74	149 U	88	29-149		
Dibenz[a,h]anthracene	157	D	149	ug/kg dry	186.74	149 U	84	27-153		
Benzo[g,h,i] perylene	103	J, D	149	ug/kg dry	186.74	149 U	55	32-157		
Surrogate: Triphenylene	*218*			*ug/kg dry*	*186.74*		*117*	*68-129*		
Matrix Spike Dup (L302092-MSD3)		**Source: 1302005-01**		Prepared: 02/11/2013 Analyzed: 02/15/2013						
Naphthalene	542	D	150	ug/kg dry	187.37	149 U	289*	0-127	8	40
Acenaphthylene	5880	D	150	ug/kg dry	187.37	149 U	3140*	50-140	19	40
Acenaphthene	173	D	150	ug/kg dry	187.37	149 U	92	17-139	8	40
Fluorene	150	D	150	ug/kg dry	187.37	149 U	80	28-145	11	40
Phenanthrene	238	D	150	ug/kg dry	187.37	262	-13*	30-152	-111	40
Anthracene	40.5	J, D	150	ug/kg dry	187.37	149 U	22	19-171	4	40
Fluoranthene	193	D	150	ug/kg dry	187.37	38.9	82	34-159	7	40
Indeno[1,2,3-cd]pyrene	172	D	150	ug/kg dry	187.37	149 U	92	31-156	3	40
Pyrene	193	D	150	ug/kg dry	187.37	149 U	103	33-152	8	40
Benz[a]anthracene	216	D	150	ug/kg dry	187.37	149 U	115	32-157	18	40
Chrysene	184	D	150	ug/kg dry	187.37	149 U	98	31-159	24	40
Benzo[b] fluoranthene	160	D	150	ug/kg dry	187.37	149 U	86	33-164	19	40
Benzo[k] fluoranthene	186	D	150	ug/kg dry	187.37	149 U	100	28-161	11	40
Benzo[a] pyrene	173	D	150	ug/kg dry	187.37	149 U	92	29-149	4	40
Dibenz[a,h]anthracene	181	D	150	ug/kg dry	187.37	149 U	96	27-153	13	40
Benzo[g,h,i] perylene	210	D	150	ug/kg dry	187.37	149 U	112	32-157	68*	40
Surrogate: Triphenylene	*215*			*ug/kg dry*	*187.37*		*115*	*68-129*		

PREPARATION BENCH SHEET

L302092

Lionville Laboratory

Printed: 2/14/2013 10:15:04AM

000000017

Matrix: Solid **Prepared using: HPLC - SW 3540C** **Surrogate used: 1200612**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1302003-01	8310 PAH	02/11/2013 13:31	30.81	40				50	WC-Hanford, Inc.	
1302004-01	8310 PAH	02/11/2013 13:31	30.51	20				50	WC-Hanford, Inc.	
1302005-01	8310 PAH	02/11/2013 13:31	30.15	20				50	WC-Hanford, Inc.	
1302005-02	8310 PAH	02/11/2013 13:31	30.4	40				50	WC-Hanford, Inc.	
1302014-01	8310 PAH	02/11/2013 13:31	30.58	40				50	WC-Hanford, Inc.	
L302092-BLK1	QC	02/11/2013 13:31	30	5				50		
L302092-BS1	QC	02/11/2013 13:31	30	5	1300078		50	50		
L302092-MS1	QC	02/11/2013 13:31	30.13	40	1300078	1302003-01	50	50		
L302092-MS2	QC	02/11/2013 13:31	30.04	20	1300078	1302004-01	50	50		
L302092-MS3	QC	02/11/2013 13:31	30.17	20	1300078	1302005-01	50	50		
L302092-MS4	QC	02/11/2013 13:31	30.35	40	1300078	1302014-01	50	50		
L302092-MSD1	QC	02/11/2013 13:31	30.54	40	1300078	1302003-01	50	50		
L302092-MSD2	QC	02/11/2013 13:31	30.62	20	1300078	1302004-01	50	50		
L302092-MSD3	QC	02/11/2013 13:31	30.07	20	1300078	1302005-01	50	50		
L302092-MSD4	QC	02/11/2013 13:31	30.15	40	1300078	1302014-01	50	50		

2/14/13 1015 — Extracts Relinquished By — Date

SY Lock 02.14.13 10:15 — Extracts Received By — Date

METALS

264 Welsh Pool Road
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/20/2013 07:59

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD77	1302005-01	Soil	01/28/2013 12:40	01/31/2013 10:20
J1RD78	1302005-02	Soil	01/28/2013 12:55	01/31/2013 10:20

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Case Narrative

Client: WC-HANFORD RC-233
LVL#: 1302005
SDG/SAF#: K4061/RC-233

W.O.#: 60049-001-001-0001-00
Date Received: 01-31-13

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 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 with 3-fold dilutions 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 LvLI's sample acceptance policy.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits.

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.

7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation (3-10X the LOD 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.

10. The matrix spike (MS) recovery for 6 analytes was 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,

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 pages

Antimony, Calcium, 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.

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 hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory

3/12/13
Date

m1302005hg%rgc.doc

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Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4061 Project Manager: Joan Kessner	**Reported:** 02/20/2013 07:59

Notes and Definitions

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

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4061 Project Manager: Joan Kessner	**Reported:** 02/20/2013 07:59

J1RD77
1302005-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**9180**		16.3	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Antimony	1.95	U	1.95	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Arsenic	**3.86**		3.25	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Barium	**88.8**		1.63	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Beryllium	**0.333**	B	0.650	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Boron	**3.25**	B	6.50	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Cadmium	0.650	U	0.650	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Calcium	**3560**		325	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Chromium	**13.6**		0.650	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Cobalt	**4.41**	B	6.50	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Copper	**13.9**		3.25	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Iron	**22500**		65.0	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Lead	**7.11**		1.63	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Magnesium	**2880**		244	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Manganese	**178**		16.3	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Molybdenum	6.50	U	6.50	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Nickel	**8.21**	B	13.0	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Potassium	**2600**		1300	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Selenium	0.975	U	0.975	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Silicon	**240**		6.50	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Silver	0.650	U	0.650	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Sodium	**345**		163	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Vanadium	**51.6**		8.13	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Zinc	**37.3**		32.5	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Mercury	0.0317	U	0.0317	mg/kg dry	1	L302090	02/12/2013	02/13/2013	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4061 Project Manager: Joan Kessner	**Reported:** 02/20/2013 07:59

J1RD78

1302005-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**8900**		12.7	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Antimony	1.52	U	1.52	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Arsenic	**18.4**		2.53	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Barium	**75.0**		1.27	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Beryllium	**0.292**	B	0.507	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Boron	**1.43**	B	5.07	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Cadmium	**0.136**	B	0.507	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Calcium	**3520**		253	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Chromium	**12.9**		0.507	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Cobalt	**5.71**		5.07	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Copper	**15.9**		2.53	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Iron	**20400**		50.7	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Lead	**248**		1.27	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Magnesium	**3830**		190	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Manganese	**247**		12.7	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Molybdenum	5.07	U	5.07	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Nickel	**9.16**	B	10.1	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Potassium	**1700**		1010	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Selenium	0.760	U	0.760	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Silicon	**240**		5.07	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Silver	0.507	U	0.507	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Sodium	**215**		127	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Vanadium	**52.2**		6.33	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Zinc	**69.7**		25.3	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Mercury	**0.0609**		0.0256	mg/kg dry	1	L302090	02/12/2013	02/13/2013	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4061 Project Manager: Joan Kessner	**Reported:** 02/20/2013 07:59

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 L302089 - SW 3050B										
Blank (L302089-BLK1)				Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	4.55	U	4.55	mg/kg wet						
Antimony	0.545	U	0.545	mg/kg wet						
Arsenic	0.909	U	0.909	mg/kg wet						
Barium	0.455	U	0.455	mg/kg wet						
Beryllium	0.182	U	0.182	mg/kg wet						
Boron	1.82	U	1.82	mg/kg wet						
Cadmium	0.182	U	0.182	mg/kg wet						
Calcium	6.60	B	90.9	mg/kg wet						
Chromium	0.182	U	0.182	mg/kg wet						
Cobalt	1.82	U	1.82	mg/kg wet						
Copper	0.909	U	0.909	mg/kg wet						
Iron	18.2	U	18.2	mg/kg wet						
Lead	0.455	U	0.455	mg/kg wet						
Magnesium	1.65	B	68.2	mg/kg wet						
Manganese	0.187	B	4.55	mg/kg wet						
Molybdenum	1.82	U	1.82	mg/kg wet						
Nickel	3.64	U	3.64	mg/kg wet						
Potassium	364	U	364	mg/kg wet						
Selenium	0.273	U	0.273	mg/kg wet						
Silicon	1.82	U	1.82	mg/kg wet						
Silver	0.182	U	0.182	mg/kg wet						
Sodium	45.5	U	45.5	mg/kg wet						
Vanadium	2.27	U	2.27	mg/kg wet						
Zinc	9.09	U	9.09	mg/kg wet						
Duplicate (L302089-DUP5)		**Source: 1302005-01**		Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	8870		16.3	mg/kg dry		9180			3.46	20
Antimony	1.95	U	1.95	mg/kg dry		1.95 U				20
Arsenic	3.92		3.25	mg/kg dry		3.86			1.59	20
Barium	95.5		1.63	mg/kg dry		88.8			7.30	20
Beryllium	0.317	B	0.650	mg/kg dry		0.333			5.15	20
Boron	3.79	B	6.50	mg/kg dry		3.25			15.5	20
Cadmium	0.650	U	0.650	mg/kg dry		0.650 U				20
Calcium	3630		325	mg/kg dry		3560			1.90	20
Chromium	13.1		0.650	mg/kg dry		13.6			3.48	20
Cobalt	4.35	B	6.50	mg/kg dry		4.41			1.41	20
Copper	15.6		3.25	mg/kg dry		13.9			11.5	20

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/20/2013 07:59

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 L302089 - SW 3050B										
Duplicate (L302089-DUP5)		**Source: 1302005-01**		Prepared: 02/11/2013 Analyzed: 02/13/2013						
Iron	23200		65.0	mg/kg dry		22500			3.44	20
Lead	7.75		1.63	mg/kg dry		7.11			8.62	20
Magnesium	2680		244	mg/kg dry		2880			7.06	20
Manganese	182		16.3	mg/kg dry		178			1.84	20
Molybdenum	6.50	U	6.50	mg/kg dry		6.50 U				20
Nickel	7.25	B	13.0	mg/kg dry		8.21			12.4	20
Potassium	2610		1300	mg/kg dry		2600			0.336	20
Selenium	0.975	U	0.975	mg/kg dry		0.975 U				20
Silicon	387		6.50	mg/kg dry		240			47.2*	20
Silver	0.650	U	0.650	mg/kg dry		0.650 U				20
Sodium	385		163	mg/kg dry		345			10.9	20
Vanadium	50.0		8.13	mg/kg dry		51.6			3.13	20
Zinc	36.2		32.5	mg/kg dry		37.3			3.00	20
Matrix Spike (L302089-MS5)		**Source: 1302005-01**		Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	10800		15.7	mg/kg dry	208.67	9180	761*	75-125		
Antimony	18.3		1.88	mg/kg dry	52.167	1.95 U	35.0*	75-125		
Arsenic	195		3.13	mg/kg dry	208.67	3.86	91.7	75-125		
Barium	299		1.57	mg/kg dry	208.67	88.8	101	75-125		
Beryllium	5.22		0.626	mg/kg dry	5.2167	0.333	93.7	75-125		
Boron	95.7		6.26	mg/kg dry	104.33	3.25	88.7	75-125		
Cadmium	4.69		0.626	mg/kg dry	5.2167	0.650 U	89.8	75-125		
Calcium	7060		313	mg/kg dry	2608.4	3560	134*	75-125		
Chromium	33.7		0.626	mg/kg dry	20.867	13.6	96.2	75-125		
Cobalt	52.6		6.26	mg/kg dry	52.167	4.41	92.3	75-125		
Copper	39.1		3.13	mg/kg dry	26.084	13.9	96.8	75-125		
Iron	23400		62.6	mg/kg dry	104.33	22500	880*	75-125		
Lead	56.1		1.57	mg/kg dry	52.167	7.11	93.8	75-125		
Magnesium	5430		235	mg/kg dry	2608.4	2880	97.8	75-125		
Manganese	245		15.7	mg/kg dry	52.167	178	128*	75-125		
Molybdenum	94.4		6.26	mg/kg dry	104.33	6.50 U	90.5	75-125		
Nickel	56.2		12.5	mg/kg dry	52.167	8.21	92.0	75-125		
Potassium	5190		1250	mg/kg dry	2608.4	2600	99.0	75-125		
Selenium	192		0.939	mg/kg dry	208.67	0.975 U	92.1	75-125		
Silicon	458		6.26	mg/kg dry	104.33	240	209*	75-125		
Silver	4.80		0.626	mg/kg dry	5.2167	0.650 U	91.9	75-125		
Sodium	2990		157	mg/kg dry	2608.4	345	101	75-125		

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Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4061 Project Manager: Joan Kessner	**Reported:** 02/20/2013 07:59

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 L302089 - SW 3050B									
Matrix Spike (L302089-MS5)		**Source: 1302005-01**	Prepared: 02/11/2013 Analyzed: 02/13/2013						
Vanadium	102	7.83	mg/kg dry	52.167	51.6	95.9	75-125		
Zinc	87.0	31.3	mg/kg dry	52.167	37.3	95.2	75-125		
Post Spike (L302089-PS5)		**Source: 1302005-01**	Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	148000		ug/L	66000	84700	96.5	75-125		
Antimony	319		ug/L	300.00	-1.49	107	75-125		
Calcium	92100		ug/L	62400	32900	95.0	75-125		
Iron	321000		ug/L	126000	207000	90.3	75-125		
Manganese	4480		ug/L	3000.0	1650	94.5	75-125		
Silicon	9340		ug/L	6300.0	2210	113	75-125		
Reference (L302089-SRM1)			Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	10300	14.7	mg/kg wet	6670.0		154	0-200.89		
Antimony	43.1	1.76	mg/kg wet	53.000		81.4	0-235.8		
Arsenic	115	2.94	mg/kg wet	114.00		101	82.8-117.54		
Barium	318	1.47	mg/kg wet	307.00		104	79.8-120.2		
Beryllium	107	0.588	mg/kg wet	108.00		99.1	82.8-117.6		
Boron	78.3	5.88	mg/kg wet	85.100		92.0	67.5-132.8		
Cadmium	224	0.588	mg/kg wet	225.00		99.7	83.6-116.4		
Calcium	3380	294	mg/kg wet	3360.0		100	83.3-116.9		
Chromium	84.0	0.588	mg/kg wet	77.200		109	73.3-126.4		
Cobalt	165	5.88	mg/kg wet	166.00		99.1	80.7-118.7		
Copper	263	2.94	mg/kg wet	271.00		97.1	80.8-119.2		
Iron	8580	58.8	mg/kg wet	8420.0		102	78.6-121.1		
Lead	195	1.47	mg/kg wet	190.00		103	81.6-118.4		
Magnesium	8400	221	mg/kg wet	8570.0		98.1	83.2-116.7		
Manganese	1010	14.7	mg/kg wet	965.00		104	69.3-130.5		
Molybdenum	237	5.88	mg/kg wet	235.00		101	76.2-123.8		
Nickel	226	11.8	mg/kg wet	221.00		102	79.6-120.8		
Potassium	14700	1180	mg/kg wet	14400		102	81.9-118.1		
Selenium	188	0.882	mg/kg wet	187.00		100	75.9-124.6		
Silicon	339	5.88	mg/kg wet	807.00		42.0	0-219.3		
Silver	84.2	0.588	mg/kg wet	83.500		101	82.7-117.1		
Sodium	9440	147	mg/kg wet	9730.0		97.0	82.5-117.2		
Vanadium	110	7.35	mg/kg wet	98.700		112	75.9-123.6		
Zinc	199	29.4	mg/kg wet	199.00		100	78.4-121.6		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4061 Project Manager: Joan Kessner	**Reported:** 02/20/2013 07:59

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 L302090 - SW 7471A Prep										
Blank (L302090-BLK1)				Prepared: 02/12/2013 Analyzed: 02/13/2013						
Mercury	0.0273	U	0.0273	mg/kg wet						
Duplicate (L302090-DUP5)		**Source: 1302005-01**		Prepared: 02/12/2013 Analyzed: 02/13/2013						
Mercury	0.0307	U	0.0307	mg/kg dry		0.0317 U				20
Matrix Spike (L302090-MS5)		**Source: 1302005-01**		Prepared: 02/12/2013 Analyzed: 02/13/2013						
Mercury	0.196		0.0298	mg/kg dry	0.16571	0.0317 U	118	75-125		20
Reference (L302090-SRM1)				Prepared: 02/12/2013 Analyzed: 02/13/2013						
Mercury	1.37		0.0281	mg/kg wet	1.2900		106	62.6-138		

Lionville Laboratory Logbook #: 1194

SAMPLE DIGESTION RECORD

Digestion Batch #: L302089
Date/Time Initiated: 2/11/13 1735
Date/Time Completed: 2/12/13 1300
Analyst: AMJ
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
1301049-01		0.61	50		TO	fine	light brown mud	H_2O, roots	BAM
L302089-DUP1		0.69	50			↓	↓ ↓	↓ ↓	↓
MS1	0.5*	0.63	50			↓	↓ ↓	↓ ↓	↓
1301060-01		0.56	50			not fine	black, tan flecks granular	roots	
L302089-DUP2		0.55	50			↓	↓ ↓	↓	
MS2	0.5*	0.57	50			↓	↓ ↓	↓	
1301060-02		0.54	50			not fine	dark brown, tan sandy	roots	
03		0.53	50			not fine	dark brown, tan sandy	roots	
04		0.60	50			coarse	ottawa sand	N/A	
1302003-01		0.53	50			fine	brown soil	roots	
L302089-DUP3		0.54	50			↓	↓ ↓	↓	
MS3	0.5	0.53	50			↓	↓ ↓	↓	
1302004-01		0.53	50			fine	brown soil	roots, vegetation	
L302089-DUP4		0.53	50			↓	↓ ↓	↓	↓
MS4	0.5	0.59	50			↓	↓ ↓	↓	↓
1302005-01		0.52	50			coarse	brown soil	roots	
L302089-DUP5		0.52	50			↓	↓ ↓	↓	
MS5	0.5	0.54	50			↓	↓ ↓	↓	
1302005-02		0.64	50			fine	brown soil	roots	
L302089-BLK		0.55	50		↓	coarse	boiling chips		
SPM1	(A)	0.51	50			fine	pink sandy		

AMJ 2/11/13

Spiking IDs / Expiration Date:
MS#: 1300144

LCS#: 1201014 (A)

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:
Rev 2/19/13

Rev 2/19/13 RE

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

*also 0.25 ml 1201380 (U-)
0.25 ml 1201382 (Z-)

Page #:

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 2/11/13 – 2/12/13
Start Time/Temp: 1825/95°
End Time/Temp: 1900/97°

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

Logbook # 1198
Prep Batch: L302090
Worksheet: HG021301
SOP No. ME-HgCVAA
BLOCK 1 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH <2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
Blank				10ml	50	
0.2 µg/l		0.100		10ml	50	
1.0 µg/l		0.500		10ml	50	
2.0 µg/l		1.000		10ml	50	
5.0 µg/l		2.500		10ml	50	
10.0 µg/l		5.000		10ml	50	
ICV		0.125	2.5	10ml	50	
CCV		0.250	5.0	10ml	50	
ICB/CCB				10ml	50	
L302090-BLK1				0.33	50	
SRM1				0.32	50	
1301049-01				0.33	50	RATIO
L302090-DUP1				0.39	50	
MS1		0.500	1.0	0.38	50	
1301060-01				0.35	50	
L302090-DUP2				0.33	50	
MS2		0.500	1.0	0.36	50	
1301060-02				0.33	50	
03				0.38	50	
04				0.33	50	Ottawa sand
1302003-01				0.31	50	
L302090-DUP3				0.37	50	
MS3		0.500	1.0	0.32	50	
1302004-07				0.37	50	
L302090-DUP4				0.39	50	
MS4		0.500	1.0	0.38	50	
1302005-01				0.32	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	2/12/13 1310
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: [illegible] 2/13

se book # 1198 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

Page #:

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Lionville Laboratory

MERCURY PREPARATION

Logbook # 1198

Analyst: [illegible]
Date 2/11/13 - 2/12/13
Start Time/Temp: See pg 040
End Time/Temp: See pg 040

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

Prep Batch: L302090
Worksheet: HG021301
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.
1302090-DUP5				0.33	50	
MS5		0.500	1.0	0.34	50	
1302005-02				0.38	50	

AW 2/11/13

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

Reviewed By/Date: [illegible] 2/12/13

se book # 1198 for std traceability information

Soil LCS True Value = See pg 040 mg/Kg
Standard # ____

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

ME-HgCVAA-Prep0910

Page #:

TCLP METALS

264 Welsh Pool Road
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/28/2013 12:33

Analytical Report for TCLP Metals by SW846 1311 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD77	1302005-01	Soil	01/28/2013 12:40	01/31/2013 10:20
J1RD78	1302005-02	Soil	01/28/2013 12:55	01/31/2013 10:20

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Case Narrative

Client: WC-HANFORD RC-233
LVL#: 1302005
SDG/SAF#: K4061/RC-233

W.O.#: 60049-001-001-0001-00
Date Received: 01-31-13

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 analyses of 2 TCLP leachate samples.

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

   The TCLP leachate samples were analyzed and reported with a 5-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 (less than the LOQ).

7. All 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 were greater than 20X MB value}.

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

9. All laboratory control samples (LCS) were within the 80-120% control limits.

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 pages.

10. The TCLP leachate 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.

11. The TCLP extract from sample J1RD77 was selected for the matrix spike (MS) for this analytical batch.

12. The matrix spike for Barium was below 50% recovery (12.5%%). The recovery in the TCLP Leachate was below 80-120% of the action level so standard addition was not required per Federal Register, Vol.57, No.227, Nov. 24, 1992, page 55117.

    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.

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

3/12/13
Date

jjw/m02-003tc2013

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/28/2013 12:33

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-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/28/2013 12:33

J1RD77
1302005-01 (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	L302146	02/26/2013	02/27/2013	6010
Barium	**0.0181**		0.00500	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Cadmium	0.0150	U	0.0150	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Chromium	**0.00520**	B	0.0250	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Lead	0.0500	U	0.0500	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Selenium	0.100	U	0.100	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Silver	0.0300	U	0.0300	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Mercury	0.000200	U	0.000200	mg/L	1	L302147	02/26/2013	02/27/2013	7470

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/28/2013 12:33

J1RD78

1302005-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
TCLP Metals by SW846 1311 6000/7000 series									
Arsenic	**0.0576**	B	0.0750	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Barium	**0.133**		0.00500	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Cadmium	0.0150	U	0.0150	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Chromium	0.0250	U	0.0250	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Lead	**0.0618**		0.0500	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Selenium	0.100	U	0.100	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Silver	0.0300	U	0.0300	mg/L	5	L302146	02/26/2013	02/27/2013	6010
Mercury	0.000200	U	0.000200	mg/L	1	L302147	02/26/2013	02/27/2013	7470

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/28/2013 12:33

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 L302146 - SW 3010A										
Blank (L302146-BLK1)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
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 (L302146-BLK2)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
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 (L302146-BS1)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Arsenic	9.81		0.0150	mg/L	10.000		98.1	80-120		
Barium	4.83		0.00100	mg/L	5.0000		96.6	80-120		
Cadmium	0.229		0.00300	mg/L	0.25000		91.6	80-120		
Chromium	0.506		0.00500	mg/L	0.50000		101	80-120		
Lead	2.42		0.0100	mg/L	2.5000		96.8	80-120		
Selenium	9.47		0.0200	mg/L	10.000		94.7	80-120		
Silver	0.498		0.00600	mg/L	0.50000		99.5	80-120		
Duplicate (L302146-DUP4)		**Source: 1302005-01**		Prepared: 02/26/2013 Analyzed: 02/27/2013						
Arsenic	0.0750	U	0.0750	mg/L		0.0750 U				20
Barium	0.0167		0.00500	mg/L		0.0181			8.09	20
Cadmium	0.0150	U	0.0150	mg/L		0.0150 U				20
Chromium	0.0250	U	0.0250	mg/L		0.00520				20
Lead	0.0500	U	0.0500	mg/L		0.0500 U				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

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4061	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/28/2013 12:33

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 L302146 - SW 3010A										
Matrix Spike (L302146-MS4)		**Source: 1302005-01**		Prepared: 02/26/2013 Analyzed: 02/27/2013						
Arsenic	5.09		0.0750	mg/L	5.0000	0.0750 U	102	50-1000		
Barium	12.5		0.00500	mg/L	100.00	0.0181	12.5*	50-1000		
Cadmium	0.986		0.0150	mg/L	1.0000	0.0150 U	98.6	50-1000		
Chromium	5.14		0.0250	mg/L	5.0000	0.00520	103	50-1000		
Lead	3.99		0.0500	mg/L	5.0000	0.0500 U	79.8	50-1000		
Selenium	0.972		0.100	mg/L	1.0000	0.100 U	97.2	50-1000		
Silver	5.02		0.0300	mg/L	5.0000	0.0300 U	100	50-1000		
Batch L302147 - SW 7470A Prep										
Blank (L302147-BLK1)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L						
Blank (L302147-BLK2)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L						
Blank (L302147-BLK3)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L						
LCS (L302147-BS1)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.00527		0.000200	mg/L	0.0050000		105	80-120		
Duplicate (L302147-DUP7)		**Source: 1302005-01**		Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L		0.000200 U				20
Matrix Spike (L302147-MS7)		**Source: 1302005-01**		Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.173		0.0100	mg/L	0.20000	0.000200 U	86.5	50-1000		

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

Start Date: 2-5-13 Start Time: ~~8~~ 13:12 Analyst: RH SOP: SPI-1311.1	End Date: 2-6-13 End Time: 7:00 Analyst: RH Method: 1311	Tumbler Speed: 31 RPM Leachate Batch #: L302031 Leachate Page: 1 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria: 23°C ± 2°**

LvL #: 1302003-01 Client ID#: JIRD44 pH After 5 Min: 5.84 pH After Acid/Heat: 2.05 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.94	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1302004-01 Client ID#: JIRD74 pH After 5 Min: 5.57 pH After Acid/Heat: 2.35 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.95	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL # 1302005-01 Client ID#: JIRD77 pH After 5 Min: 4.52 pH After Acid/Heat: N/A Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.90	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1302005-02 Client ID#: JIRD78 pH After 5 Min: 6.35 pH After Acid/Heat: 2.15 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.92	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____

Standard	ID	Prep Date	Expir Date	pH Acceptance Criteria
Fluid #1	1300077	1/28/13	7/28/13	4.93 ± 0.05
Fluid # 2	—		—	2.88 ± 0.05

SPI-1311.1-A-0310

Reviewed By/Date RW 2/6/13

Page #

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

Start Date: 2-5-13 Start Time: 13:12 Analyst: RH SOP: SPI-1311.1	End Date: 2-6-13 End Time: 7:00 Analyst: RH Method: 1311.1	Tumbler Speed: 31 RPM Leachate Batch #: L302031 Leachate Page: 2 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria: 23°C ± 2°**

LvL #: 1302013-01 Client ID#: JIRD82 pH After 5 Min: 6.02 pH After Acid/Heat: 2.35 Extraction Fluid/pH: #1 4.92 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 #: 1302013-02 Client ID#: JIRD83 pH After 5 Min: 5.81 pH After Acid/Heat: 2.41 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.89	Initial Filtration Data and Comments: Solids: ____% / NA Initial Filtrate Added:
LvL # 1302013-03 Client ID#: JIRD84 pH After 5 Min: 4.31 pH After Acid/Heat: N/A Extraction Fluid/pH: #1 4.92 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 #: 1302013-04 Client ID#: JIRD85 pH After 5 Min: 5.45 pH After Acid/Heat: 2.35 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.93	Initial Filtration Data and Comments: Solids: ____% / NA Initial Filtrate Added:

Standard	ID	Prep Date	Expir Date	pH Acceptance Criteria
Fluid #1	1300077	1/28/13	7/28/13	4.93 ± 0.05
Fluid # 2				2.88 ± 0.05

SPI-1311.1-A-0310 Reviewed By/Date [illegible] 2/6/13 Page #

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

Start Date: 2-5-13 Start Time: 13:12 Analyst: RH SOP: SPI-1311.1	End Date: 2-6-13 End Time: 7:00 Analyst: RH Method: 1311.1	Tumbler Speed: 31 RPM Leachate Batch #: L302031 Leachate Page: 3 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria: 23°C ± 2°**

LvL #: 1302014-01 Client ID#: JIRD81 pH After 5 Min: 5.93 pH After Acid/Heat: 2.26 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 gm Extract Fluid Vol.(mL): 500 pH After Extraction: 6.15	Initial Filtration Data and Comments: Solids: ____% / NA Initial Filtrate Added:
LvL #: L302031 Client ID#: N/A 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: Blank
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: 2-6-13
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: RH Solids: ____% / NA Initial Filtrate Added:

Standard	ID	Prep Date	Expir Date	pH Acceptance Criteria
Fluid #1	1300077	1/28/13	7/28/13	4.93 ± 0.05
Fluid # 2				2.88 ± 0.05

SPI-1311.1-A-0310 Reviewed By/Date 2/7/13 Page #

Lionville Laboratory

Logbook #: 1194

SAMPLE DIGESTION RECORD

Digestion Batch #: L302146
Date/Time Initiated: 2/26/13 1150
Date/Time Completed: 2/27/13 1145
Analyst: MW
Matrix (circle): Soil Water Other TCLP
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 #:
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
1301060-01		50	50	<	TC		clear, colorless		
02		50	50	<			clear, colorless		
03		50	50	<			clear, colorless		
L302146-DUP1		50	50	<					
MS1	0.5	50	50						
1302003-01		50	50	<			clear, light yellow		
L302146-DUP2		50	50	<					
MS2	0.5	50	50						
1302004-01		50	50	<			clear, yellow		
L302146-DUP3		50	50	<					
MS3	0.5	50	50						
1302005-01		50	50	<			clear, barely yellow		
L302146-DUP4		50	50	<					
MS4	0.5	50	50						
1302005-02		50	50	<			clear, barely yellow		
1302013-01		50	50	<			clear, yellow		
L302146-DUP5		50	50	<					
MS5	0.5	50	50						
1302013-02		50	50	<			clear, yellow		
03		50	50	<			clear, colorless		
04		50	50	<			clear, barely yellow		
1302014-01		50	50	<			clear, barely yellow		
L302146-DUP6		50	50	<					
MS6	0.5	50	50						
BLK1		50	50				clear, colorless		
BS1	0.5	50	50						
BLK2 (A)		50	50	<					

Spiking IDs / Expiration Date:
MS#: 1201195
1250388
LCS#: 1201583

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:
RMP, 02/28/13

J.E. MW 2/26/13
(A) ~~L17~~ L302051-BLK1

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

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Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 2/26/13
Start Time/Temp: 1730/95°
End Time/Temp: 1940/97°

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

Logbook # 1198
Prep Batch: L302147
Worksheet: HG022701
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				35	35	
0.2 µg/L		0.070		35	35	
1.0 µg/L		0.350		35	35	
2.0 µg/L		0.700		35	35	
5.0 µg/L		1.750		35	35	
10.0 µg/L		3.500		35	35	
ICV		0.0875	2.5	35	35	
CCV		0.175	5.0	35	35	
ICB/CCB				35	35	
L302147-BLK1				35	35	
BS1		0.175	5.0	35	35	
BLK2	<			35	35	
BLK3	<			35	35	
1301060-01	<			35	35	
02	<			35	35	
03	<			35	35	
L302147-DUP1	<			35	35	
MS1		0.700	200 *	35	35	
1301062-01	<			35	35	
L302147-DUP2	<			35	35	
MS2		0.700	200 *	35	35	
1301065-01	<			35	35	
L302147-DUP3	<			35	35	
MS3		0.700	200 *	35	35	
1301066-01	<			35	35	
L302147-DUP4	<			35	35	
MS4		0.700	200 *	35	35	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	2/26/13 1125
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: [illegible] 02/28/13

se book # 1198 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

* used 1201234 (10 µg/ml)

ME-HgCVAA-Prep0910

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Lionville Laboratory

MERCURY PREPARATION

Logbook # 1198

Analyst: [illegible]
Date 2/26/13
Start Time/Temp: see pg 051
End Time/Temp: see pg 051

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

Prep Batch: L302147
Worksheet: HG022701
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.
1302003-01				35	35	
L302147-DUP5				35	35	
MS5		0.700	200*	35	35	
1302004-01				35	35	cancelled
L302147-DUP6				35	35	
MS6		0.700	200*	35	35	
1302005-01				35	35	
L302147-DUP7				35	35	
MS7		0.700	200*	35	35	
1302005-02				35	35	
1302013-01				35	35	
L302147-DUP8				35	35	
MS8		0.700	200*	35	35	
1302-013-02				35	35	
03				35	35	
04				35	35	
1302014-01				35	35	cancelled
L302147-DUP9				35	35	
MS9		0.700	200*	35	35	

MW 2/26/13

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

Reviewed By/Date: BMP, 02/28/13

see book # 1198 for std traceability information

Soil LCS True Value = see pg 051 mg/Kg
Standard #

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

* see pg 051A

ME-HgCVAA-Prep0910

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