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 K4055 SAF-RC-233

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 600-370

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 #	1301062
SDG #	K4055
SAF #	RC-233
Date Received	01/25/13
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	X
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 55 pages.

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

CHAIN OF CUSTODY

* REVISION *

Lionville Laboratory Use Only: 1301062

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: Arlette Johnson
QC: SW Del: Std TAT: 15
Date Rec'd: 1-25-13 Date Due: 2-9-13

		A		B	C							
Refrigerator #		2		2	2							
#/Type Container	Liquid											
	Solid	1qt		1pt	1qt							
Volume	Liquid											
	Solid	125		125	120							
Preservatives		—		—	—							
ANALYSES REQUESTED	ORGANIC: VOA	ORGANIC: BNA	ORGANIC: Pest/PCB	ORGANIC: Herb	PAHs 8310			INORG: (F) Metal + HS	INORG: CN	INORG: (P) TCLP Metals + HS		
Lionville Laboratory Use Only *					8310	DRO/MO		METALS		TCLP Metals	HS	

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

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected															
01	J1RD37	✓	✓	S	1-23-13	0830					X	X		X		X	X				

Special Instructions:
METALS = HSL + B, Mo, Si (NO TL)

Special Instructions: *
1. Please Leave + Hold TCLP until directed to run by Joan Kessner.
2.
3. 1/27/13 DRO/MO added per client
4.
5.
6.

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

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-233-004	Page 1 of 1
Collector BH 1/23/13 ~~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: 600-370	SAF No.: RC-233	
Ice Chest No.: WCH-12-023	Field Logbook No.: EL-1666; COA: 0603702600	Method of Shipment: Fed Ex	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A120717	Bill of Lading/Air Bill No.: See OSPC	

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								
J1RD37	SOIL	1/23/13	0830	*	*	*					
~~J1RD38~~	SOIL										
J1RD39	SOIL										
J1RD40	SOIL										
J1RD41	SOIL										

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From		1-23-13 0835		0835
Relinquished By/Removed From	BHudson	1/23/13 1135	A. Freier	1-23-13 1135
Relinquished By/Removed From	A. Freier	1-23-13 1145	Received By/Stored In: Fed Ex	
Relinquished By/Removed From	Fed Ex	1-25-13 0945		1-25-13 0945
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}

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

REVIEWED BY CMB DATE 1-23-13

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

WCH-EE-011

00000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

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

Date: 1-25-13

LvL Batch #: 1301062

Sample Custodian: [illegible]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7945 8387 7896
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** 3.3	**°C**	Cooler # WCH -12-027
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☑ Yes	☐ No	
Short holds taken to wet lab?	☐ Yes	☐ No	☑ N/A
13. VOA, TOC, TOX, RSK-175, Sulfides, Non-Halogenated VOAs (Alcohol/Glycol) free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☑ Yes	☐ No	☐ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted_____ Date _____

SR-002-A-0113

DRO/MO

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: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/03/2013 09:28

Analytical Report for Extractable Petroleum Hydrocarbons by SW846 8015

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD37	1301062-01	Soil	01/23/2013 08:30	01/25/2013 09:45

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

Case Narrative

Client: WC-HANFORD RC-233 K4055
LVL #: 1301062

W.O. #: 60049-001-001-0001-00
Date Received: 01-25-2013

DIESEL RANGE ORGANICS

One (1) soil sample was collected on 01-23-2013.

The sample and associated QC samples were extracted 01-28-2013 and analyzed 01-30,31-2013 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 8015B for Diesel Range Organics. The sample and associated QC samples had an elevated final volume of 4 mLs due to sample matrix. Reporting limits have been adjusted to reflect 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 a sample that met LvL's sample acceptance policy.

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

3. All surrogate recoveries were within QC acceptance criteria.

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

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

6. Two (2) of two (2) matrix spike recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 13GC014) has been enclosed.

7. The sample and associated QC samples required 2-fold instrument dilutions due to high concentration of target analytes and sample matrix. Reporting limits have been adjusted to reflect the necessary dilutions.

8. All 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.

10. The samples were reported on a dry weight basis.

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.

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 hardcopy data package has been authorized by the laboratory manager or a designee as verified by the following signature.

Iain Daniels
LvL Laboratory Manager

5/13/12
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 13GC014

Initiator: Catherine Carey
Date: 02/03/13
Client: WC Hanford

Batch: 1301062
Samples: M63, MSD3
Method: SW846/MCAWW/CLP/

Parameter: DRO
Matrix: SOIL
Prep Batch: L301199

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)

spike recoveries are high

2. Known or Probable Causes(s)

high concentration of target compound in sample

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
SB.

4. Project Manager Instructions...signature/date: 2/10/13

__ 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: 2/12/13 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

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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4055 Project Manager: Joan Kessner	**Reported:** 02/03/2013 09:28

J1RD37
1301062-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Extractable Petroleum Hydrocarbons by SW846 8015									
Diesel Range Organics	27400	U	27400	ug/kg dry	2	L301199	01/28/2013	01/31/2013	8015M
Motor Oil	**581000**		82100	ug/kg dry	2	L301199	01/28/2013	01/31/2013	8015M
Surrogate: p-Terphenyl	*93 %*		*39-129*			*L301199*	*01/28/2013*	*01/31/2013*	*8015M*

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: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/03/2013 09:28

Extractable Petroleum Hydrocarbons by SW846 8015 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L301199 - SW 3540C										
Blank (L301199-BLK1)				Prepared: 01/28/2013 Analyzed: 01/30/2013						
Diesel Range Organics	3330	U	3330	ug/kg wet						
Motor Oil	10000	U	10000	ug/kg wet						
Surrogate: p-Terphenyl	*5460*			*ug/kg wet*	*6666.7*		*82*	*39-129*		
LCS (L301199-BS1)				Prepared: 01/28/2013 Analyzed: 01/30/2013						
Diesel Range Organics	56200		3330	ug/kg wet	66667		84	42-133		
Surrogate: p-Terphenyl	*6380*			*ug/kg wet*	*6666.7*		*96*	*39-129*		
Matrix Spike (L301199-MS3)		**Source: 1301062-01**		Prepared: 01/28/2013 Analyzed: 01/31/2013						
Diesel Range Organics	471000		27700	ug/kg dry	69177	27400 U	681*	42-133		
Surrogate: p-Terphenyl	*6910*			*ug/kg dry*	*6917.7*		*100*	*39-129*		
Matrix Spike Dup (L301199-MSD3)		**Source: 1301062-01**		Prepared: 01/28/2013 Analyzed: 01/31/2013						
Diesel Range Organics	276000		27700	ug/kg dry	69291	27400 U	398*	42-133	52*	40
Surrogate: p-Terphenyl	*6990*			*ug/kg dry*	*6929.1*		*101*	*39-129*		

PREPARATION BENCH SHEET

L301199

Lionville Laboratory

Printed: 1/29/2013 2:44:46PM

00000014

Matrix: Solid **Prepared using: GC - SW 3540C** **Surrogate used: 1300029**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301058-01	8015M DRO	01/28/2013 13:59	30.91	1				1000	WC-Hanford, Inc.	
1301058-02	8015M DRO	01/28/2013 13:59	30.02	1				1000	WC-Hanford, Inc.	
1301060-01	8015M DRO	01/28/2013 13:59	30.41	1				1000	WC-Hanford, Inc.	
1301060-02	8015M DRO	01/28/2013 13:59	30.95	1				1000	WC-Hanford, Inc.	
1301060-03	8015M DRO	01/28/2013 13:59	30.01	1				1000	WC-Hanford, Inc.	
1301062-01	8015M DRO	01/28/2013 13:59	30.6	4				1000	WC-Hanford, Inc.	
1301067-01	8015M DRO	01/28/2013 13:59	30.51	4				1000	WC-Hanford, Inc.	
1301067-03	8015M DRO	01/28/2013 13:59	30.05	4				1000	WC-Hanford, Inc.	
L301199-BLK1	QC	01/28/2013 13:59	30	1				1000		
L301199-BS1	QC	01/28/2013 13:59	30	1	1201538		1000	1000		
L301199-MS1	QC	01/28/2013 13:59	30.6	1	1201538	1301058-01	1000	1000		
L301199-MS2	QC	01/28/2013 13:59	30.05	1	1201538	1301060-01	1000	1000		
L301199-MS3	QC	01/28/2013 13:59	30.28	4	1201538	1301062-01	1000	1000		
L301199-MS4	QC	01/28/2013 13:59	30.27	4	1201538	1301067-03	1000	1000		
L301199-MSD1	QC	01/28/2013 13:59	30.79	1	1201538	1301058-01	1000	1000		
L301199-MSD2	QC	01/28/2013 13:59	30.96	1	1201538	1301060-01	1000	1000		
L301199-MSD3	QC	01/28/2013 13:59	30.23	4	1201538	1301062-01	1000	1000		
L301199-MSD4	QC	01/28/2013 13:59	30.36	4	1201538	1301067-03	1000	1000		

1/29/13 1444
Extracts Relinquished By Date

UC 1-29-13
Extracts Received By 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: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 22:29

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD37	1301062-01	Soil	01/23/2013 08:30	01/25/2013 09:45

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

Case Narrative

Client: WC-HANFORD RC-233 K4055
LVL #: 1301062

W.O. #: 60049-001-001-0001-00
Date Received: 01-25-2013

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

One (1) soil sample was collected on 01-23-2013.

The sample and associated QC samples were extracted 01-29-2013 and analyzed 02-08,09-2013 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.

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 a sample that met LvL's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. All surrogate recoveries were within QC acceptance criteria.
4. The method blank was below the reporting limits for all target compounds.
5. All blank spike recoveries were within QC acceptance criteria.
6. All matrix spike recoveries were within QC acceptance criteria.
7. The sample and associated QC required an instrument dilution of 20-fold due to sample matrix. Reporting limits have been adjusted to reflect these 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.
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

r:\group\data\2013\pah 8310\wc hanford\1301062rgc.doc
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.

8310 PAH

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

Analyte	CCV1 02/09/13 10:53 AM	CCV2 02/09/13 4:03:02 PM	CCV3	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		-51.4						
Dibenz[a,h]anthracene								
Benzo[g,h,i]perylene								
Mean %D or %Drift	2.6/2.7	-0.5/-7.2						

Sample results reported from affected CCV:

CCV1: _____

CCV2: _____

CCV3: _____

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: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 22:29

J1RD37
1301062-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Acenaphthylene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Acenaphthene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Fluorene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Phenanthrene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Anthracene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Fluoranthene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Indeno[1,2,3-cd]pyrene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Pyrene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Benz[a]anthracene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Chrysene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Benzo[b] fluoranthene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Benzo[k] fluoranthene	**18.0**	J, D	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Benzo[a] pyrene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Dibenz[a,h]anthracene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Benzo[g,h,i] perylene	68.3	U	68.3	ug/kg dry	20	L301202	01/29/2013	02/09/2013	8310
Surrogate: Triphenylene	*105 %*		*68-129*			*L301202*	*01/29/2013*	*02/09/2013*	*8310*

264 Welsh Pool Road
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Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 22:29

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 L301202 - SW 3540C										
Blank (L301202-BLK1)				Prepared: 01/29/2013 Analyzed: 02/08/2013						
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	*155*			*ug/kg wet*	*166.67*		*93*	*68-129*		
LCS (L301202-BS1)				Prepared: 01/29/2013 Analyzed: 02/08/2013						
Naphthalene	205		3.33	ug/kg wet	166.67		123	0-127		
Acenaphthylene	159		3.33	ug/kg wet	166.67		95	50-140		
Acenaphthene	162		3.33	ug/kg wet	166.67		97	17-139		
Fluorene	159		3.33	ug/kg wet	166.67		96	28-145		
Phenanthrene	161		3.33	ug/kg wet	166.67		97	30-152		
Anthracene	155		3.33	ug/kg wet	166.67		93	19-171		
Fluoranthene	163		3.33	ug/kg wet	166.67		98	34-159		
Indeno[1,2,3-cd]pyrene	163		3.33	ug/kg wet	166.67		98	31-156		
Pyrene	166		3.33	ug/kg wet	166.67		100	33-152		
Benz[a]anthracene	167		3.33	ug/kg wet	166.67		100	32-157		
Chrysene	160		3.33	ug/kg wet	166.67		96	31-159		
Benzo[b] fluoranthene	169		3.33	ug/kg wet	166.67		101	33-164		
Benzo[k] fluoranthene	167		3.33	ug/kg wet	166.67		100	28-161		
Benzo[a] pyrene	173		3.33	ug/kg wet	166.67		104	29-149		
Dibenz[a,h]anthracene	168		3.33	ug/kg wet	166.67		101	27-153		
Benzo[g,h,i] perylene	173		3.33	ug/kg wet	166.67		104	32-157		
Surrogate: Triphenylene	*163*			*ug/kg wet*	*166.67*		*98*	*68-129*		

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4055	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 22:29

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 L301202 - SW 3540C										
Matrix Spike (L301202-MS2)		**Source: 1301062-01**		Prepared: 01/29/2013 Analyzed: 02/09/2013						
Naphthalene	162	D	69.3	ug/kg dry	173.51	68.3 U	93	0-127		
Acenaphthylene	138	D	69.3	ug/kg dry	173.51	68.3 U	80	50-140		
Acenaphthene	140	D	69.3	ug/kg dry	173.51	68.3 U	81	17-139		
Fluorene	125	D	69.3	ug/kg dry	173.51	68.3 U	72	28-145		
Phenanthrene	124	D	69.3	ug/kg dry	173.51	68.3 U	72	30-152		
Anthracene	67.7	J, D	69.3	ug/kg dry	173.51	68.3 U	39	19-171		
Fluoranthene	116	D	69.3	ug/kg dry	173.51	68.3 U	67	34-159		
Indeno[1,2,3-cd]pyrene	180	D	69.3	ug/kg dry	173.51	68.3 U	104	31-156		
Pyrene	141	D	69.3	ug/kg dry	173.51	68.3 U	81	33-152		
Benz[a]anthracene	140	D	69.3	ug/kg dry	173.51	68.3 U	81	32-157		
Chrysene	115	D	69.3	ug/kg dry	173.51	68.3 U	66	31-159		
Benzo[b] fluoranthene	113	D	69.3	ug/kg dry	173.51	68.3 U	65	33-164		
Benzo[k] fluoranthene	89.8	D	69.3	ug/kg dry	173.51	18.0	41	28-161		
Benzo[a] pyrene	102	D	69.3	ug/kg dry	173.51	68.3 U	59	29-149		
Dibenz[a,h]anthracene	107	D	69.3	ug/kg dry	173.51	68.3 U	61	27-153		
Benzo[g,h,i] perylene	157	D	69.3	ug/kg dry	173.51	68.3 U	90	32-157		
Surrogate: Triphenylene	*175*			*ug/kg dry*	*173.51*		*101*	*68-129*		
Matrix Spike Dup (L301202-MSD2)		**Source: 1301062-01**		Prepared: 01/29/2013 Analyzed: 02/09/2013						
Naphthalene	165	D	68.7	ug/kg dry	171.81	68.3 U	96	0-127	3	40
Acenaphthylene	126	D	68.7	ug/kg dry	171.81	68.3 U	74	50-140	8	40
Acenaphthene	149	D	68.7	ug/kg dry	171.81	68.3 U	87	17-139	8	40
Fluorene	138	D	68.7	ug/kg dry	171.81	68.3 U	80	28-145	10	40
Phenanthrene	142	D	68.7	ug/kg dry	171.81	68.3 U	82	30-152	14	40
Anthracene	83.4	D	68.7	ug/kg dry	171.81	68.3 U	49	19-171	22	40
Fluoranthene	138	D	68.7	ug/kg dry	171.81	68.3 U	81	34-159	18	40
Indeno[1,2,3-cd]pyrene	217	D	68.7	ug/kg dry	171.81	68.3 U	126	31-156	20	40
Pyrene	148	D	68.7	ug/kg dry	171.81	68.3 U	86	33-152	6	40
Benz[a]anthracene	142	D	68.7	ug/kg dry	171.81	68.3 U	82	32-157	2	40
Chrysene	119	D	68.7	ug/kg dry	171.81	68.3 U	69	31-159	5	40
Benzo[b] fluoranthene	192	D	68.7	ug/kg dry	171.81	68.3 U	112	33-164	53*	40
Benzo[k] fluoranthene	174	D	68.7	ug/kg dry	171.81	18.0	91	28-161	75*	40
Benzo[a] pyrene	124	D	68.7	ug/kg dry	171.81	68.3 U	72	29-149	20	40
Dibenz[a,h]anthracene	110	D	68.7	ug/kg dry	171.81	68.3 U	64	27-153	4	40
Benzo[g,h,i] perylene	227	D	68.7	ug/kg dry	171.81	68.3 U	132	32-157	38	40
Surrogate: Triphenylene	*184*			*ug/kg dry*	*171.81*		*107*	*68-129*		

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

Printed: 2/12/2013 9:56:00PM

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
1301060-01	8310 PAH	01/29/2013 13:26	31.71	5				50	WC-Hanford, Inc.	
1301060-02	8310 PAH	01/29/2013 13:26	30.12	5				50	WC-Hanford, Inc.	
1301060-03	8310 PAH	01/29/2013 13:26	30.68	5				50	WC-Hanford, Inc.	
1301062-01	8310 PAH	01/29/2013 13:26	30.64	5				50	WC-Hanford, Inc.	
1301065-01	8310 PAH	01/29/2013 13:26	30.1	25				50	WC-Hanford, Inc.	
1301066-01	8310 PAH	01/29/2013 13:26	30.52	25				50	WC-Hanford, Inc.	
1301067-01	8310 PAH	01/29/2013 13:26	30.12	40				50	WC-Hanford, Inc.	
1301067-02	8310 PAH	01/29/2013 13:26	30.87	40				50	WC-Hanford, Inc.	
1301067-03	8310 PAH	01/29/2013 13:26	30.13	40				50	WC-Hanford, Inc.	
L301202-BLK1	QC	01/29/2013 13:26	30	5				50		
L301202-BS1	QC	01/29/2013 13:26	30	5	1300078		50	50		
L301202-MS1	QC	01/29/2013 13:26	30.69	5	1300078	1301060-01	50	50		
L301202-MS2	QC	01/29/2013 13:26	30.18	5	1300078	1301062-01	50	50		
L301202-MS3	QC	01/29/2013 13:26	30.25	25	1300078	1301065-01	50	50		
L301202-MS4	QC	01/29/2013 13:26	30.2	25	1300078	1301066-01	50	50		
L301202-MS5	QC	01/29/2013 13:26	30.11	40	1300078	1301067-02	50	50		
L301202-MSD1	QC	01/29/2013 13:26	30.27	5	1300078	1301060-01	50	50		
L301202-MSD2	QC	01/29/2013 13:26	30.48	5	1300078	1301062-01	50	50		
L301202-MSD3	QC	01/29/2013 13:26	30.25	25	1300078	1301065-01	50	50		
L301202-MSD4	QC	01/29/2013 13:26	30.29	25	1300078	1301066-01	50	50		

Revision CAC 2/12/13

Extracts Relinquished By Date Extracts Received By Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

Printed: 2/12/2013 9:56:00PM

00000024

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
L301202-MSD5	QC	01/29/2013 13:26	30.19	40	1300078	1301067-02	50	50		

Revision CAC 2/12/13

Extracts Relinquished By Date

Extracts Received By Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

Printed: 2/11/2013 3:12:37PM

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
1301060-01	8310 PAH	01/29/2013 13:26	31.71	5				50	WC-Hanford, Inc.	
1301060-02	8310 PAH	01/29/2013 13:26	30.12	5				50	WC-Hanford, Inc.	
1301060-03	8310 PAH	01/29/2013 13:26	30.68	5				50	WC-Hanford, Inc.	
1301062-01	8310 PAH	01/29/2013 13:26	30.64	5				50	WC-Hanford, Inc.	
1301065-01	8310 PAH	01/29/2013 13:26	30.1	25				50	WC-Hanford, Inc.	
1301066-01	8310 PAH	01/29/2013 13:26	30.52	25				50	WC-Hanford, Inc.	
1301067-01	8310 PAH	01/29/2013 13:26	30.12	40				50	WC-Hanford, Inc.	
1301067-02	8310 PAH	01/29/2013 13:26	30.87	40				50	WC-Hanford, Inc.	
1301067-03	8310 PAH	01/29/2013 13:26	30.13	40				50	WC-Hanford, Inc.	
L301202-BLK1	QC	01/29/2013 13:26	30	5				50		
L301202-BS1	QC	01/29/2013 13:26	30	5	1300078		50	50		
L301202-MS1	QC	01/29/2013 13:26	30.69	5	1300078	1301060-01	50	50		
L301202-MS2	QC	01/29/2013 13:26	30.18	5	1300078	1301062-01	50	50		
L301202-MS3	QC	01/29/2013 13:26	30.25	25	1300078	1301065-01	50	50		
L301202-MS4	QC	01/29/2013 13:26	30.2	25	1300078	1301067-01	50	50		
L301202-MS5	QC	01/29/2013 13:26	30.11	40	1300078	1301067-02	50	50		
L301202-MSD1	QC	01/29/2013 13:26	30.27	5	1300078	1301060-01	50	50		
L301202-MSD2	QC	01/29/2013 13:26	30.48	5	1300078	1301062-01	50	50		
L301202-MSD3	QC	01/29/2013 13:26	30.25	25	1300078	1301065-01	50	50		
L301202-MSD4	QC	01/29/2013 13:26	30.29	25	1300078	1301067-01	50	50		

Revision — Extracts Relinquished By — Date

CK 2-1-13 — Extracts Received By — Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

Printed: 2/11/2013 3:12:37PM

00000026

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
L301202-MSD5	QC	01/29/2013 13:26	30.19	40	1300078	1301067-02	50	50		

Revision

Extracts Relinquished By Date

LC 2-11-13

Extracts Received By Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

Printed: 1/31/2013 2:52;27PM

000000027

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301060-01	8310 PAH	01/29/2013 13:26	31.71	5				50	WC-Hanford, Inc.	
1301060-02	8310 PAH	01/29/2013 13:26	30.12	5				50	WC-Hanford, Inc.	
1301060-03	8310 PAH	01/29/2013 13:26	30.68	5				50	WC-Hanford, Inc.	
1301062-01	8310 PAH	01/29/2013 13:26	30.64	5				50	WC-Hanford, Inc.	
1301065-01	8310 PAH	01/29/2013 13:26	30.1	5				50	WC-Hanford, Inc.	
1301066-01	8310 PAH	01/29/2013 13:26	30.52	5				50	WC-Hanford, Inc.	
1301067-01	8310 PAH	01/29/2013 13:26	30.12	5				50	WC-Hanford, Inc.	
1301067-02	8310 PAH	01/29/2013 13:26	30.87	5				50	WC-Hanford, Inc.	
1301067-03	8310 PAH	01/29/2013 13:26	30.13	5				50	WC-Hanford, Inc.	
L301202-BLK1	QC	01/29/2013 13:26	30	5				50		
L301202-BS1	QC	01/29/2013 13:26	30	5	1300078		50	50		
L301202-MS1	QC	01/29/2013 13:26	30.69	5	1300078	1301060-01	50	50		
L301202-MS2	QC	01/29/2013 13:26	30.18	5	1300078	1301062-01	50	50		
L301202-MS3	QC	01/29/2013 13:26	30.25	5	1300078	1301065-01	50	50		
L301202-MS4	QC	01/29/2013 13:26	30.2	5	1300078	1301067-01	50	50		
L301202-MS5	QC	01/29/2013 13:26	30.11	5	1300078	1301067-02	50	50		
L301202-MSD1	QC	01/29/2013 13:26	30.27	5	1300078	1301060-01	50	50		
L301202-MSD2	QC	01/29/2013 13:26	30.48	5	1300078	1301062-01	50	50		
L301202-MSD3	QC	01/29/2013 13:26	30.25	5	1300078	1301065-01	50	50		
L301202-MSD4	QC	01/29/2013 13:26	30.29	5	1300078	1301067-01	50	50		

1/31/13 1455 — Extracts Relinquished By — Date

LC 2/1/13 — Extracts Received By — Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

Printed: 1/31/2013 2:52:27PM

00000028

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L301202-MSD5	QC	01/29/2013 13:26	30.19	5	1300078	1301067-02	50	50		

Extracts Relinquished By 1/31/13 1455 Date

Extracts Received By UC 2-1-13 Date

METALS

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: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 12:10

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD37	1301062-01	Soil	01/23/2013 08:30	01/25/2013 09:45

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

Case Narrative

Client: WC-HANFORD RC-233
LVL#: 1301062
SDG/SAF#: K4055/RC-233

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

METALS

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

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

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

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

   The sample was analyzed and reported with 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 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, samples were greater than 20X MB value}.

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

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

10. The matrix spike (MS) recoveries for 8 analytes were outside the 75-125% 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.

11. For analytes where the MS is out of control, a post-digestion MS (PDS) is performed. A PDS was prepared at meaningful concentration levels for the following analytes: Aluminum, Antimony, Barium, Calcium, Iron, and Silicon. The PDS values for Copper and Zinc were too low compared to indigenous concentrations.

12. The duplicate analyses for 3 analytes were outside 20% Relative Percent Difference (RPD) control limit criteria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL. The sample result for Selenium was less than ten times the MDL.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

3/12/13
Date

m1301062hg%rgc.doc

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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-233 Project Number: K4055 Project Manager: Joan Kessner	**Reported:** 02/12/2013 12:10

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

264 Welsh Pool Road
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 12:10

J1RD37
1301062-01 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**7440**		14.0	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Antimony	1.68	U	1.68	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Arsenic	**2.65**	B	2.81	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Barium	**701**		1.40	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Beryllium	**0.267**	B	0.561	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Boron	**2.03**	B	5.61	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Cadmium	**1.46**		0.561	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Calcium	**10000**		281	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Chromium	**10.2**		0.561	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Cobalt	**7.22**		5.61	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Copper	**3700**		2.81	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Iron	**24700**		56.1	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Lead	**624**		1.40	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Magnesium	**4530**		210	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Manganese	**361**		14.0	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Molybdenum	5.61	U	5.61	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Nickel	**12.8**		11.2	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Potassium	**1310**		1120	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Selenium	**2.25**		0.842	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Silicon	**269**		5.61	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Silver	0.561	U	0.561	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Sodium	**370**		140	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Vanadium	**77.9**		7.01	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Zinc	**4440**		28.1	mg/kg dry	3	L302012	02/04/2013	02/06/2013	6010B
Mercury	0.0255	U	0.0255	mg/kg dry	1	L302014	02/04/2013	02/05/2013	7471A

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2620 Fermi Avenue	Project Number: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 12:10

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 L302012 - SW 3050B										
Blank (L302012-BLK1)				Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	4.81	U	4.81	mg/kg wet						
Antimony	0.577	U	0.577	mg/kg wet						
Arsenic	0.962	U	0.962	mg/kg wet						
Barium	0.481	U	0.481	mg/kg wet						
Beryllium	0.192	U	0.192	mg/kg wet						
Boron	1.92	U	1.92	mg/kg wet						
Cadmium	0.192	U	0.192	mg/kg wet						
Calcium	8.94	B	96.2	mg/kg wet						
Chromium	0.192	U	0.192	mg/kg wet						
Cobalt	1.92	U	1.92	mg/kg wet						
Copper	0.962	U	0.962	mg/kg wet						
Iron	19.2	U	19.2	mg/kg wet						
Lead	0.481	U	0.481	mg/kg wet						
Magnesium	3.72	B	72.1	mg/kg wet						
Manganese	4.81	U	4.81	mg/kg wet						
Molybdenum	1.92	U	1.92	mg/kg wet						
Nickel	3.85	U	3.85	mg/kg wet						
Potassium	385	U	385	mg/kg wet						
Selenium	0.288	U	0.288	mg/kg wet						
Silicon	1.99		1.92	mg/kg wet						
Silver	0.192	U	0.192	mg/kg wet						
Sodium	9.73	B	48.1	mg/kg wet						
Vanadium	2.40	U	2.40	mg/kg wet						
Zinc	9.62	U	9.62	mg/kg wet						
Duplicate (L302012-DUP1)			**Source: 1301062-01**	Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	7430		14.8	mg/kg dry		7440			0.0769	20
Antimony	1.78	U	1.78	mg/kg dry		1.68 U				20
Arsenic	3.06		2.96	mg/kg dry		2.65			14.5	20
Barium	976		1.48	mg/kg dry		701			32.7*	20
Beryllium	0.272	B	0.593	mg/kg dry		0.267			1.94	20
Boron	2.12	B	5.93	mg/kg dry		2.03			4.43	20
Cadmium	1.37		0.593	mg/kg dry		1.46			6.32	20
Calcium	10600		296	mg/kg dry		10000			5.73	20
Chromium	10.4		0.593	mg/kg dry		10.2			1.58	20
Cobalt	7.49		5.93	mg/kg dry		7.22			3.66	20
Copper	7940		2.96	mg/kg dry		3700			72.7*	20

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4055 Project Manager: Joan Kessner	**Reported:** 02/12/2013 12:10

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 L302012 - SW 3050B										
Duplicate (L302012-DUP1)		**Source: 1301062-01**		Prepared: 02/04/2013 Analyzed: 02/06/2013						
Iron	24700		59.3	mg/kg dry		24700			0.197	20
Lead	786		1.48	mg/kg dry		624			23.0*	20
Magnesium	4690		222	mg/kg dry		4530			3.44	20
Manganese	375		14.8	mg/kg dry		361			3.94	20
Molybdenum	5.93	U	5.93	mg/kg dry		5.61 U				20
Nickel	12.8		11.9	mg/kg dry		12.8			0.283	20
Potassium	1240		1190	mg/kg dry		1310			4.90	20
Selenium	1.42		0.889	mg/kg dry		2.25			45.6*	20
Silicon	282		5.93	mg/kg dry		269			4.81	20
Silver	0.593	U	0.593	mg/kg dry		0.561 U				20
Sodium	359		148	mg/kg dry		370			3.11	20
Vanadium	75.7		7.41	mg/kg dry		77.9			2.86	20
Zinc	4040		29.6	mg/kg dry		4440			9.31	20
Matrix Spike (L302012-MS1)		**Source: 1301062-01**		Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	8500		13.5	mg/kg dry	180.57	7440	585*	75-125		
Antimony	15.3		1.63	mg/kg dry	45.144	1.68 U	33.9*	75-125		
Arsenic	157		2.71	mg/kg dry	180.57	2.65	85.7	75-125		
Barium	1030		1.35	mg/kg dry	180.57	701	180*	75-125		
Beryllium	4.21		0.542	mg/kg dry	4.5144	0.267	87.3	75-125		
Boron	77.8		5.42	mg/kg dry	90.287	2.03	83.9	75-125		
Cadmium	5.58		0.542	mg/kg dry	4.5144	1.46	91.2	75-125		
Calcium	14100		271	mg/kg dry	2257.2	10000	180*	75-125		
Chromium	25.8		0.542	mg/kg dry	18.057	10.2	86.5	75-125		
Cobalt	46.2		5.42	mg/kg dry	45.144	7.22	86.4	75-125		
Copper	4660		2.71	mg/kg dry	22.572	3700	4260*	75-125		
Iron	25600		54.2	mg/kg dry	90.287	24700	996*	75-125		
Lead	667		1.35	mg/kg dry	45.144	624	94.5	75-125		
Magnesium	6840		203	mg/kg dry	2257.2	4530	102	75-125		
Manganese	407		13.5	mg/kg dry	45.144	361	103	75-125		
Molybdenum	76.9		5.42	mg/kg dry	90.287	5.61 U	85.2	75-125		
Nickel	52.8		10.8	mg/kg dry	45.144	12.8	88.5	75-125		
Potassium	3180		1080	mg/kg dry	2257.2	1310	82.9	75-125		
Selenium	153		0.813	mg/kg dry	180.57	2.25	83.7	75-125		
Silicon	249		5.42	mg/kg dry	90.287	269	-21.5*	75-125		
Silver	3.50		0.542	mg/kg dry	4.5144	0.561 U	77.5	75-125		
Sodium	2530		135	mg/kg dry	2257.2	370	95.6	75-125		

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4055	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 12:10

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 L302012 - SW 3050B									
Matrix Spike (L302012-MS1)		**Source: 1301062-01**	Prepared: 02/04/2013 Analyzed: 02/06/2013						
Vanadium	120	6.77	mg/kg dry	45.144	77.9	92.3	75-125		
Zinc	4590	27.1	mg/kg dry	45.144	4440	345*	75-125		
Post Spike (L302012-PS1)		**Source: 1301062-01**	Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	136000		ug/L	66000	79600	85.7	75-125		
Antimony	302		ug/L	300.00	5.25	99.0	75-125		
Barium	7770		ug/L	300.00	7500	89.0	75-125		
Calcium	158000		ug/L	62400	107000	82.5	75-125		
Iron	368000		ug/L	126000	265000	81.9	75-125		
Silicon	9150		ug/L	6300.0	2870	99.7	75-125		
Reference (L302012-SRM1)			Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	10800	14.2	mg/kg wet	6670.0		162	0-200.89		
Antimony	45.9	1.70	mg/kg wet	53.000		86.7	0-235.8		
Arsenic	115	2.83	mg/kg wet	114.00		101	82.8-117.54		
Barium	290	1.42	mg/kg wet	307.00		94.6	79.8-120.2		
Beryllium	108	0.566	mg/kg wet	108.00		100	82.8-117.6		
Boron	80.2	5.66	mg/kg wet	85.100		94.3	67.5-132.8		
Cadmium	230	0.566	mg/kg wet	225.00		102	83.6-116.4		
Calcium	3310	283	mg/kg wet	3360.0		98.4	83.3-116.9		
Chromium	81.5	0.566	mg/kg wet	77.200		106	73.3-126.4		
Cobalt	166	5.66	mg/kg wet	166.00		99.9	80.7-118.7		
Copper	276	2.83	mg/kg wet	271.00		102	80.8-119.2		
Iron	8570	56.6	mg/kg wet	8420.0		102	78.6-121.1		
Lead	181	1.42	mg/kg wet	190.00		95.0	81.6-118.4		
Magnesium	7490	212	mg/kg wet	8570.0		87.4	83.2-116.7		
Manganese	968	14.2	mg/kg wet	965.00		100	69.3-130.5		
Molybdenum	235	5.66	mg/kg wet	235.00		100	76.2-123.8		
Nickel	222	11.3	mg/kg wet	221.00		100	79.6-120.8		
Potassium	13900	1130	mg/kg wet	14400		96.9	81.9-118.1		
Selenium	190	0.849	mg/kg wet	187.00		101	75.9-124.6		
Silicon	501	5.66	mg/kg wet	807.00		62.1	0-219.3		
Silver	84.5	0.566	mg/kg wet	83.500		101	82.7-117.1		
Sodium	9610	142	mg/kg wet	9730.0		98.8	82.5-117.2		
Vanadium	106	7.08	mg/kg wet	98.700		107	75.9-123.6		
Zinc	198	28.3	mg/kg wet	199.00		99.6	78.4-121.6		

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2620 Fermi Avenue	Project Number: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 12:10

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 L302014 - SW 7471A Prep										
Blank (L302014-BLK1)				Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	0.0290	U	0.0290	mg/kg wet						
Duplicate (L302014-DUP1)		**Source: 1301062-01**		Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	0.0242	U	0.0242	mg/kg dry		0.0255 U				20
Matrix Spike (L302014-MS1)		**Source: 1301062-01**		Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	0.183		0.0269	mg/kg dry	0.14962	0.0255 U	122	75-125		20
Reference (L302014-SRM1)				Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	1.29		0.0290	mg/kg wet	1.2900		99.8	62.6-138		

Lionville Laboratory **Logbook #:** 1184

SAMPLE DIGESTION RECORD

Digestion Batch #: L302012
Date/Time Initiated: 2/4/13 1825
Date/Time Completed: 2/5/13 1900
Analyst: MW
Matrix (circle): Soil Water Other
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.
NOTE: All temperatures are recorded as corrected temperatures

Digested / Undigested (circle one)
Balance #: B14
Balance Cal Verification: ✓ 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
1301062-01		0.56	50		TO	fine	dark brown soil	rocks	
L302012-DUP1		0.53	50			↓	↓	↓	
MS1	0.5	0.58	50			↓	↓	↓	
1302063-01		0.54	50			fine	light brown, dirty	vegetation,	moss, rocks
L302012-DUP2		0.55	50			↓	↓	↓	↓
MS2	0.5	0.54	50			↓	↓	↓	↓
1302064-01		0.57	50			fine	light brown dirty	moss, chalk/gypsum (?)	
L302012-DUP3		0.53	50			↓	↓	↓	↓
MS3	0.5	0.58	50			↓	↓	↓	↓
1302065-01		0.58	50			not fine	brown soil	green flakes (?)	
L302012-DUP4		0.56	50			↓	↓	↓	
MS4	0.5	0.58	50			↓	↓	↓	
1302066-01		0.57	50			not fine	brown, soil	green chunks/flakes, rocks	
L302012-DUP5		0.57	50			↓	↓	↓	↓
MS5	0.5	0.60	50			↓	↓	↓	↓
1302067-01		0.59	50			fine	nearly black soil	vegetation	
L302012-DUP6		0.56	50			↓	↓	↓	
MS6	0.5	0.59	50			↓	↓	↓	
1302067-02		0.54	50			fine	brown soil	rocks	
03		0.62	50			fine	brown soil	vegetation	
L302012-BLK4		0.52	50			coarse	boiling chips		
SRM1	(✓)	0.53	50			fine	pink, gravelly		

MW 2/4/13

Spiking IDs / Expiration Date:
MS#: 1300144
LCS#: 1201014 (✓)

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

File ID#:

Data Review By/Date:
Rev 2/8/13

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Signed\SPI\Metals Digestion log.doc

Page #:

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 2/4/13
Start Time/Temp: 2110/94°
End Time/Temp: 2145/95°

Instrument ID: HG31
Balance # B14 /NA
Pipette Calibration (Daily) (Y) ____

Logbook # 1198
Prep Batch: L302014
Worksheet: HG020501
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	
0.2ug/l		0.100		10ml	50	
1.0ug/l		0.500		10ml	50	
2.0ug/l		1.000		10ml	50	
5.0ug/l		2.500		10ml	50	
10.0ug/l		5.000		10ml	50	
ICV		0.125	2.5	10ml	50	
CCV		0.250	5.0	10ml	50	
ICB/CCB				10ml	50	
L302014-BLK1				0.31	50	
w.e. 2/4/13 SRM1		(*)	(*)	0.31	50	
1302062-01			w.e. 2/4/13	~~0.34~~ 0.37	50	
L302014-DUP1				~~0.38~~ 0.39	50	
w.e. 2/4/13 MS1		0.500	1.0	0.35	50	
1302063-01				0.32	50	
L302014-DUP2				0.36	50	
w.e. 2/4/13 MS2		0.500	1.0	0.33	50	
1302064-01				0.32	50	
L302014-DUP3				0.37	50	
w.e. 2/4/13 MS3		0.500	1.0	0.34	50	
1302065-01				0.37	50	
L302014-DUP4				0.34	50	
w.e. 2/4/13 MS4		0.500	1.0	0.38	50	
1302066-01				0.33	50	
L302014-DUP5				0.35	50	
w.e. 2/4/13 MS5		0.500	1.0	0.35	50	
1302067-01				0.32	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RT 1201235	2/4/13 1915
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: RMP. 02/07/13

Soil LCS True Value = 1129 mg/Kg
Standard # 1201014

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

ME-HgCVAA-Prep0910

Page #:

000000934
000000040

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 2/4/13
Start Time/Temp: See page
End Time/Temp: See page

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

Logbook # 1198
Prep Batch: L302014
Worksheet: HG020501
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.
L302014-DUP6				0.53	50	
MS6		0.500	1.0	0.38	50	
1308067-02				0.39	50	
w.k. PW 2/4/13 03				0.36	50	

PW 2/4/13

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

See page 034

Reviewed By/Date: PMP, 02/07/13

Soil LCS True Value = See page 034 mg/Kg
Standard # ____

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

ME-HgCVAA-Prep0910

Page #:

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TCLP METALS

264 Welsh Pool Road
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/27/2013 14:06

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

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD37	1301062-01	Soil	01/23/2013 08:30	01/25/2013 09:45

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Case Narrative

Client: WC-HANFORD RC-233
LVL#: 1301062
SDG/SAF#: K4055/RC-233

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

METALS

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

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

1. This narrative covers the analysis of 1 TCLP leachate sample.

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

   The TCLP leachate sample was 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 J1RD37 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.

12. 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.

13. 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.

14. 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

6/12/13
Date

jjw/m01-062tc2013

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-233 Project Number: K4055 Project Manager: Joan Kessner	**Reported:** 02/27/2013 14:06

Notes and Definitions

U	Analyte included in the analysis, but not detected
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: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/27/2013 14:06

J1RD37
1301062-01 (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	L302145	02/21/2013	02/22/2013	6010
Barium	**2.37**		0.00500	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Cadmium	**0.0311**		0.0150	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Chromium	0.0250	U	0.0250	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Lead	**6.14**		0.0500	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Selenium	0.100	U	0.100	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Silver	0.0300	U	0.0300	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Mercury	0.000200	U	0.000200	mg/L	1	L302147	02/26/2013	02/27/2013	7470

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4055 Project Manager: Joan Kessner	**Reported:** 02/27/2013 14:06

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 L302145 - SW 3010A										
Blank (L302145-BLK1)				Prepared: 02/21/2013 Analyzed: 02/22/2013						
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 (L302145-BLK2)				Prepared: 02/21/2013 Analyzed: 02/22/2013						
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 (L302145-BS1)				Prepared: 02/21/2013 Analyzed: 02/22/2013						
Arsenic	10.0		0.0150	mg/L	10.000		100	80-120		
Barium	5.13		0.00100	mg/L	5.0000		103	80-120		
Cadmium	0.257		0.00300	mg/L	0.25000		103	80-120		
Chromium	0.506		0.00500	mg/L	0.50000		101	80-120		
Lead	2.46		0.0100	mg/L	2.5000		98.2	80-120		
Selenium	9.68		0.0200	mg/L	10.000		96.8	80-120		
Silver	0.504		0.00600	mg/L	0.50000		101	80-120		
Duplicate (L302145-DUP1)		**Source: 1301062-01**		Prepared: 02/21/2013 Analyzed: 02/22/2013						
Arsenic	0.0750	U	0.0750	mg/L		0.0750 U				20
Barium	2.36		0.00500	mg/L		2.37			0.508	20
Cadmium	0.0311		0.0150	mg/L		0.0311			0.00	20
Chromium	0.0250	U	0.0250	mg/L		0.0250 U				20
Lead	6.20		0.0500	mg/L		6.14			0.891	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: K4055	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/27/2013 14:06

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 L302145 - SW 3010A										
Matrix Spike (L302145-MS1)		**Source: 1301062-01**		Prepared: 02/21/2013 Analyzed: 02/22/2013						
Arsenic	5.14		0.0750	mg/L	5.0000	0.0750 U	103	50-1000		
Barium	97.3		0.00500	mg/L	100.00	2.37	94.9	50-1000		
Cadmium	1.04		0.0150	mg/L	1.0000	0.0311	101	50-1000		
Chromium	5.02		0.0250	mg/L	5.0000	0.0250 U	100	50-1000		
Lead	11.2		0.0500	mg/L	5.0000	6.14	100	50-1000		
Selenium	1.00		0.100	mg/L	1.0000	0.100 U	100	50-1000		
Silver	5.12		0.0300	mg/L	5.0000	0.0300 U	102	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-DUP2)		**Source: 1301062-01**		Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L		0.000200 U				20
Matrix Spike (L302147-MS2)		**Source: 1301062-01**		Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.196		0.0100	mg/L	0.20000	0.000200 U	98.0	50-1000		

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

Start Date: 1/30/13 Start Time: 12:03 Analyst: RH SOP: SPI-1311.1	End Date: 1/31/13 End Time: 6:00 Analyst: RH Method: 1311.1	Tumbler Speed: 31 RPM Leachate Batch #: L301209 Leachate Page: 1 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria:** **23°C ± 2°**

LvL #: 1301060-01 Client ID#: J1R9W0 pH After 5 Min: 6.19 pH After Acid/Heat: 1.96 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.97	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1301060-02 Client ID#: J1R9W1 pH After 5 Min: 7.38 pH After Acid/Heat: 1.92 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.00	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL # 1301060-03 Client ID#: J1R9W2 pH After 5 Min: 7.63 pH After Acid/Heat: 1.91 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.98	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1301062-01 Client ID#: J1RD37 pH After 5 Min: 7.45 pH After Acid/Heat: 1.93 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.34	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 RH 2/1/13 Page #

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

Start Date: 1/30/13 Start Time: 12:08 Analyst: RH SOP: SPI-1311.1	End Date: 1/31/13 End Time: 6:00 Analyst: RH Method: 1311.1	Tumbler Speed: 31 RPM Leachate Batch #: L301209 Leachate Page: 2 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria: 23°C ± 2°**

LvL #: 1301063-01 Client ID#: JIRD42 pH After 5 Min: 7.22 pH After Acid/Heat: 1.98 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 6.78	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1301064-01 Client ID#: JIRD43 pH After 5 Min: 7.21 pH After Acid/Heat: 2.19 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 6.13	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL # 1301065-01 (RH 5) Client ID#: JIRD29 pH After 5 Min: 7.56 pH After Acid/Heat: 1.82 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.27	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1301066-01 Client ID#: JIRD31 pH After 5 Min: 7.23 pH After Acid/Heat: 1.91 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.26	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 RG 2/1/13

Page #

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

Start Date: 1/30/13 Start Time: 12:08 Analyst: RH SOP: SPI-1311.1	End Date: 1/31/13 End Time: 6:00 Analyst: RH Method: 1311.1	Tumbler Speed: 31 RPM Leachate Batch #: L301209 Leachate Page: 3 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria:** **23°C ± 2°**

LvL #: 1301067-01 Client ID#: JIRD32 pH After 5 Min: 6.52 pH After Acid/Heat: 1.96 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: _____
LvL #: 1301067-02 Client ID#: JIRD33 pH After 5 Min: 6.56 pH After Acid/Heat: 2.03 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 #: 1301067-03 Client ID#: JIRD34 pH After 5 Min: 6.36 pH After Acid/Heat: 2.04 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 #: L301209 Client ID#: pH After 5 Min: N/A pH After Acid/Heat: Extraction Fluid/pH: Sample Wt.(g): N/A Extract Fluid Vol.(mL): pH After Extraction:	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: Blank

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 2/1/13 Page #

Lionville Laboratory

Logbook #: 1194

SAMPLE DIGESTION RECORD

Digestion Batch #: L302145
Date/Time Initiated: 2/21/13 1330
Date/Time Completed: 2/22/13 1310
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
1301062-01		50	50	<	TC		clear, nearly colorless		
L302145-DUP1		50	50	<					
MS1	0.5	50	50						
1301065-01		50	50	<			clear, nearly colorless		
L302145-DUP2		50	50	<					
MS2	0.5	50	50						
1301066-01		50	50	<			clear, nearly colorless		
L302145-DUP3		50	50	<					
MS3	0.5	50	50						
BL4		50	50				clear, colorless		
BS1	0.5	50	50						
BL42		50	50	<					

MW 2/21/13

Spiking IDs / Expiration Date:
MS# : 1201195
1200388
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:
PMP, 02/28/13

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

Page #:

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: HG-022701
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	cancelled
MS6		0.700	200*	35	35	cancelled
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	cancelled
MS9		0.700	200*	35	35	cancelled

MW 2/26/13

Standard:	ID	Prep Date/Time
ICAL/MS	see page 051	
ICV/CCV/LCS		

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

see book # 1198 for std traceability information

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

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

* see page 051A

ME-HgCVAA-Prep0910

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