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 3/13/13
INITIAL/DATE

COMMENTS:

SDG K4051 SAF-RC-233

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 600-369

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

11 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 #	1301067
SDG #	K4051
SAF #	RC-233
Date Received	01/25/13
# Samples	2
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	X
PAHs	X
Herbicides	
Metals	X
Inorganics	

The electronic data deliverable (EDD) has been emailed. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory
A Division of Eberline Analytical Corporation

Orlette S. Johnson
Project Manager

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 45 pages.

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1301067

* REVISION * Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Lionville Laboratory
A Division of Eberline Analytical Corporation

Client W.C. Hanford SAF# RC-233

Est. Final Proj. Sampling Date

Project#

Project Contact/Phone#

Lionville Laboratory Project Manager Arletta Johnson

QC SW Del 8th TAT 15 days

Date Rec'd 1-25-13 Date Due 2-9-13

		A	B	C	D
Refrigerator #		2	2	2	2
#/Type Container	Liquid				
	Solid	1qgl	1qgl	1pl	1qgl
Volume	Liquid				
	Solid	125	125	125	125
Preservatives		1	1	1	1

ANALYSES REQUESTED →

MATRIX CODES	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	ORGANIC: VOA	BNA	Pest/PCB	Herb	PAHs 8310	TPH-D	INORG: Metal + Hg	CN	TCLP Metals + Hg	Lionville Laboratory Use Only
												8310	DRO/MO	METALS		TCLP METALS	↓
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	01	JIRD32			S	1-22-13	0920					X	X		X		X	X
	02	JIRD33			↓	↓	1320					X			X		X	X
	03	JIRD34			↓	↓	1330					X	X		X		X	X

Special Instructions:

METALS = HSL + B, Mo, Si (No Tl)

Special Instructions:

1. Please Leach + Hold TCLP until directed otherwise by Joan Kessler
2.
3. 1/27/13 DRO/MO added to -01 per client OJ
4.
5.
6.

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

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

0000000003

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-233-003	Page 1 of 1
Collector Brackett, RA	Company Contact Joan Kessner	Telephone No. 509-375-4688	Project Coordinator KESSNER, JH	Price Code 8C
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites - Soil In-Proce	Sampling Location 600-369		SAF No. RC-233	Data Turnaround 15 Days
Ice Chest No. WCH-11-011	Field Logbook No. EL-1666	COA 0603692600	Method of Shipment Fed Ex	
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A 120716		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	Cool 4C							
Type of Container	G/P	aG	aG	aG							
No. of Container(s)	1	1	1	1							
Volume	125mL	125mL	125mL	125mL							
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	PAHs - 8310	WTPH-D							

Sample No.	Matrix *	Sample Date	Sample Time									
J1RD32	SOIL	1-22-13	0920	*	*	*	1-22-13 MD					
J1RD33	SOIL	1-22-13	1320	x	x	x						
J1RD34	SOIL	1-22-13	1330	x	x	x	x					
~~J1RD35~~	SOIL											
~~J1RD36~~ BH 1/22/13	SOIL											

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Rob Brackett	1-22-13 1345	BHudson	1/22/13 1345
BHudson	1/22/13 1425	[illegible]	1-22-13 1425
[illegible]	1-23-13 0915	Fed Ex	
Fed Ex	1-25-13 0945	[illegible]	1-25-13 0945

Sign/Print Names

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 1-23-13

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

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

WCH-EE-011

0000000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford **Date:** 1-25-13

Project/SAF/SOW/Release #: RC-233

LvL Batch #: 1301067 **Sample Custodian:** [signature]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7945 8178 8957
2. Custody Seals on coolers or shipping containers intact, signed & dated?	☑ Yes	☐ No	☐ No Seals
3. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	*Comments:*
4. All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible?	☑ Yes	☐ No	
5. Samples received cooled or ambient?	Temp 2.0	°C	Cooler # WCH-11-011
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☑ Yes	☐ No	
Short holds taken to wet lab?	☐ Yes	☐ No	☑ N/A
13. VOA, TOC, TOX, RSK-175, Sulfides, Non-Halogenated VOAs (Alcohol/Glycol) free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☐ Yes	☐ No	☑ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted _____ Date _____

DRO/MO

Lionville Laboratory, PADEP Lab ID# 15-00009
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: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/04/2013 20:13

Analytical Report for Extractable Petroleum Hydrocarbons by SW846 8015

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD32	1301067-01	Soil	01/22/2013 09:20	01/25/2013 09:45
J1RD34	1301067-03	Soil	01/22/2013 13:30	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 K4051
LVL #: 1301067

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

DIESEL RANGE ORGANICS

Two (2) soil samples were collected on 01-22-2013.

The samples and associated QC samples were extracted 01-28-2013 and analyzed 01-30,31, 02-03-2013 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 samples 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 samples 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. Sample J1RD32 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

3/11/13
Date

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.

Lionville Laboratory, PADEP Lab ID# 15-00009
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: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/04/2013 20:13

Extractable Petroleum Hydrocarbons by SW846 8015
Lionville Laboratory

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
J1RD32 (1301067-01) Soil								
Surrogate: p-Terphenyl	*92 %*	*39-129*			*L301199*	*01/28/2013 13:59*	*02/03/2013 16:48*	*8015M*
Diesel Range Organics	553000	30600	ug/kg dry	2	L301199	01/28/2013 13:59	02/03/2013 16:48	8015M
Motor Oil	1010000	91900	ug/kg dry	2	L301199	01/28/2013 13:59	02/03/2013 16:48	8015M
J1RD34 (1301067-03) Soil								
Surrogate: p-Terphenyl	*93 %*	*39-129*			*L301199*	*01/28/2013 13:59*	*01/31/2013 07:34*	*8015M*
Diesel Range Organics	50900	13900	ug/kg dry	1	L301199	01/28/2013 13:59	01/31/2013 07:34	8015M
Motor Oil	213000	41700	ug/kg dry	1	L301199	01/28/2013 13:59	01/31/2013 07:34	8015M

Lionville Laboratory, PADEP Lab ID# 15-00009
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: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/04/2013 20:13

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 13:59 Analyzed: 01/30/2013 17:00						
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 13:59 Analyzed: 01/30/2013 17:58						
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-MS4)	**Source: 1301067-03**		Prepared: 01/28/2013 13:59 Analyzed: 01/31/2013 08:32						
Diesel Range Organics	115000	13800	ug/kg dry	68917	50900	93	42-133		
Surrogate: p-Terphenyl	*7030*		*ug/kg dry*	*6891.7*		*102*	*39-129*		
Matrix Spike Dup (L301199-MSD4)	**Source: 1301067-03**		Prepared: 01/28/2013 13:59 Analyzed: 01/31/2013 09:30						
Diesel Range Organics	113000	13700	ug/kg dry	68712	50900	91	42-133	3	40
Surrogate: p-Terphenyl	*6960*		*ug/kg dry*	*6871.2*		*101*	*39-129*		

PREPARATION BENCH SHEET

L301199

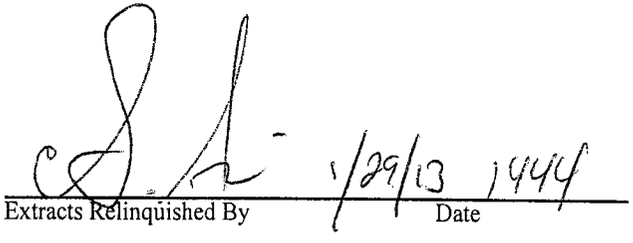
Lionville Laboratory

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

00000013

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

CC 1-29-13

Extracts Received By Date

PAHs

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: K4051 Project Manager: Joan Kessner	**Reported:** 02/14/2013 13:36

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD32	1301067-01	Soil	01/22/2013 09:20	01/25/2013 09:45
J1RD33	1301067-02	Soil	01/22/2013 13:20	01/25/2013 09:45
J1RD34	1301067-03	Soil	01/22/2013 13:30	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 K4051
LVL #: 1301067

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

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

Three (3) soil samples were collected on 01-22-2013.

The samples and associated QC samples were extracted 01-29-2013 and analyzed 02-08,12-2013 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. The samples and associated QC had an elevated final volume of 40 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 samples that met LvL's sample acceptance policy.

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

3. Two (2) of seven (7) surrogate recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 13GC021) 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. Nine (9) of thirty-two (32) matrix spike recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 13GC021) has been enclosed.

7. The samples and associated QC required a 10-fold instrument dilution due to high concentrations of non-target analytes. 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 samples were 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

5/11/13
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 1360021

Initiator: CatherineCarey
Date: 02/13/13
Client: WC Hanford

Batch: 1301067
Samples: MS5 MSD5
Method: SW846/MCAWW/CLP/

Parameter: PAH
Matrix: SOIL
Prep Batch: L301202

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)

multiple spike recoveries outside QC limits

surrogate recovery is high in MS5 & sample 02.

2. Known or Probable Causes(s)

Interference from non target analytes as well as high dilutions (some MS compounds diluted below LOD.

3. Discussion and Proposed Action

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

Other Description:

These samples were very nasty requiring additional dilution both in extraction and HPLC lab. Narrate JD

4. Project Manager Instructions...signature/date: 2/14/13

✓ 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: 3/11/13

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

LIONVILLE LABORATORY INC.

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.

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 13:36

J1RD32

1301067-01 (Soil)

Lionville Laboratory

Polynuclear Aromatic Compounds by SW846 8310

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Naphthalene	**2020**	D	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Acenaphthylene	**280**	J, D	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Acenaphthene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Fluorene	**636**	D	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Phenanthrene	**426**	D	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Anthracene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Fluoranthene	**1940**	D	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Indeno[1,2,3-cd]pyrene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Pyrene	**235**	J, D	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benz[a]anthracene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Chrysene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[b] fluoranthene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[k] fluoranthene	**79.3**	J, D	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[a] pyrene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Dibenz[a,h]anthracene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[g,h,i] perylene	310	U	310	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Surrogate: Triphenylene	*73 %*		*68-129*			*L301202*	*01/29/2013*	*02/12/2013*	*8310*

LVL
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 13:36

J1RD33

1301067-02 (Soil)

Lionville Laboratory

Polynuclear Aromatic Compounds by SW846 8310

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Naphthalene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Acenaphthylene	**244**	J, D	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Acenaphthene	**127**	J, D	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Fluorene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Phenanthrene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Anthracene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Fluoranthene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Indeno[1,2,3-cd]pyrene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Pyrene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benz[a]anthracene	**70.2**	J, D	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Chrysene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[b] fluoranthene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[k] fluoranthene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[a] pyrene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Dibenz[a,h]anthracene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[g,h,i] perylene	267	U	267	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Surrogate: Triphenylene	*148 % **		*68-129*			*L301202*	*01/29/2013*	*02/12/2013*	*8310*

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 13:36

J1RD34

1301067-03 (Soil)

Lionville Laboratory

Polynuclear Aromatic Compounds by SW846 8310

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Naphthalene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Acenaphthylene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Acenaphthene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Fluorene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Phenanthrene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Anthracene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Fluoranthene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Indeno[1,2,3-cd]pyrene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Pyrene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benz[a]anthracene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Chrysene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[b] fluoranthene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[k] fluoranthene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[a] pyrene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Dibenz[a,h]anthracene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Benzo[g,h,i] perylene	277	U	277	ug/kg dry	10	L301202	01/29/2013	02/12/2013	8310
Surrogate: Triphenylene	*102 %*		*68-129*			*L301202*	*01/29/2013*	*02/12/2013*	*8310*

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 13:36

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: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 13:36

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-MS5)		**Source: 1301067-02**		Prepared: 01/29/2013 Analyzed: 02/12/2013						
Naphthalene	170	J, D	274	ug/kg dry	171.24	267 U	100	0-127		
Acenaphthylene	271	J, D	274	ug/kg dry	171.24	244	16*	50-140		
Acenaphthene	452	D	274	ug/kg dry	171.24	127	190*	17-139		
Fluorene	194	J, D	274	ug/kg dry	171.24	267 U	113	28-145		
Phenanthrene	114	J, D	274	ug/kg dry	171.24	267 U	66	30-152		
Anthracene	274	U	274	ug/kg dry	171.24	267 U	*	19-171		
Fluoranthene	148	J, D	274	ug/kg dry	171.24	267 U	86	34-159		
Indeno[1,2,3-cd]pyrene	274	U	274	ug/kg dry	171.24	267 U	*	31-156		
Pyrene	105	J, D	274	ug/kg dry	171.24	267 U	61	33-152		
Benz[a]anthracene	236	J, D	274	ug/kg dry	171.24	70.2	97	32-157		
Chrysene	125	J, D	274	ug/kg dry	171.24	267 U	73	31-159		
Benzo[b] fluoranthene	109	J, D	274	ug/kg dry	171.24	267 U	63	33-164		
Benzo[k] fluoranthene	274	U	274	ug/kg dry	171.24	267 U	*	28-161		
Benzo[a] pyrene	79.9	J, D	274	ug/kg dry	171.24	267 U	47	29-149		
Dibenz[a,h]anthracene	74.0	J, D	274	ug/kg dry	171.24	267 U	43	27-153		
Benzo[g,h,i] perylene	274	U	274	ug/kg dry	171.24	267 U	*	32-157		
Surrogate: Triphenylene	*229*			*ug/kg dry*	*171.24*		*133**	*68-129*		
Matrix Spike Dup (L301202-MSD5)		**Source: 1301067-02**		Prepared: 01/29/2013 Analyzed: 02/12/2013						
Naphthalene	147	J, D	273	ug/kg dry	170.79	267 U	86	0-127	15	40
Acenaphthylene	446	D	273	ug/kg dry	170.79	244	118	50-140	153*	40
Acenaphthene	323	D	273	ug/kg dry	170.79	127	115	17-139	49*	40
Fluorene	156	J, D	273	ug/kg dry	170.79	267 U	91	28-145	21	40
Phenanthrene	147	J, D	273	ug/kg dry	170.79	267 U	86	30-152	26	40
Anthracene	273	U	273	ug/kg dry	170.79	267 U	*	19-171		40
Fluoranthene	109	J, D	273	ug/kg dry	170.79	267 U	64	34-159	30	40
Indeno[1,2,3-cd]pyrene	273	U	273	ug/kg dry	170.79	267 U	*	31-156		40
Pyrene	95.1	J, D	273	ug/kg dry	170.79	267 U	56	33-152	10	40
Benz[a]anthracene	268	J, D	273	ug/kg dry	170.79	70.2	116	32-157	18	40
Chrysene	129	J, D	273	ug/kg dry	170.79	267 U	75	31-159	3	40
Benzo[b] fluoranthene	97.3	J, D	273	ug/kg dry	170.79	267 U	57	33-164	11	40
Benzo[k] fluoranthene	89.9	J, D	273	ug/kg dry	170.79	267 U	53	28-161		40
Benzo[a] pyrene	82.5	J, D	273	ug/kg dry	170.79	267 U	48	29-149	4	40
Dibenz[a,h]anthracene	99.5	J, D	273	ug/kg dry	170.79	267 U	58	27-153	30	40
Benzo[g,h,i] perylene	273	U	273	ug/kg dry	170.79	267 U	*	32-157		40
Surrogate: Triphenylene	*206*			*ug/kg dry*	*170.79*		*120*	*68-129*		

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

00000025

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 CAE 2/12/13

Extracts Relinquished By Date

Extracts Received By Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

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 CBC 2/12/13

Extracts Relinquished By Date

Extracts Received By Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

0000000027

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

00000028

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

00000000029

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

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 2-1-13 Date

METALS

LIONVILLE LABORATORY
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD32	1301067-01	Soil	01/22/2013 09:20	01/25/2013 09:45
J1RD33	1301067-02	Soil	01/22/2013 13:20	01/25/2013 09:45
J1RD34	1301067-03	Soil	01/22/2013 13:30	01/25/2013 09:45

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Case Narrative

Client: WC-HANFORD RC-233
LVL#: 1301067
SDG/SAF#: K4051/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 3 soil samples.

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

   The samples were analyzed and reported with 3-fold dilutions for ICP metals due to sample matrix with the exception of J1RD32 and its associated QC samples which were reported with a 12-fold dilution for ICP metals.

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.

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 matrix spike (MS) recoveries for 5 analytes were outside the 75-125% control limits.

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1RD32	Aluminum	144,000	102.5
	Iron	264,000	95.3
	Manganese	12,000	96.1
	Antimony	100	110.7
	Silicon	100	100.9

Due to insufficient sample volume for sample J1RD32, the PDS was performed using sample L302012-DUP6 (J1RD32-DUP).

12. The duplicate analyses for 1 analyte was 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 Mercury was less than 10 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

3/11/13
Date

m1301067hg%rgc.doc

LIONVILLE LABORATORY
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

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: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

J1RD32

1301067-01 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**4880**		59.4	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Antimony	7.13	U	7.13	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Arsenic	11.9	U	11.9	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Barium	**239**		5.94	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Beryllium	2.38	U	2.38	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Boron	**11.9**	B	23.8	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Cadmium	2.38	U	2.38	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Calcium	**7500**		1190	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Chromium	**6.39**		2.38	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Cobalt	23.8	U	23.8	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Copper	**11.8**	B	11.9	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Iron	**16100**		238	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Lead	**8.07**		5.94	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Magnesium	**2950**		891	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Manganese	**249**		59.4	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Molybdenum	23.8	U	23.8	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Nickel	**7.46**	B	47.5	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Potassium	**1290**	B	4750	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Selenium	3.56	U	3.56	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Silicon	**1160**		23.8	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Silver	2.38	U	2.38	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Sodium	**142**	B	594	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Vanadium	**46.4**		29.7	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Zinc	**40.8**	B	119	mg/kg dry	12	L302012	02/04/2013	02/08/2013	6010B
Mercury	**0.0575**		0.0329	mg/kg dry	1	L302014	02/04/2013	02/05/2013	7471A

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

J1RD33
1301067-02 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**7210**		14.3	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Antimony	1.72	U	1.72	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Arsenic	**2.29**	B	2.86	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Barium	**68.8**		1.43	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Beryllium	**0.266**	B	0.573	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Boron	5.73	U	5.73	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Cadmium	0.573	U	0.573	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Calcium	**3790**		286	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Chromium	**7.73**		0.573	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Cobalt	**7.40**		5.73	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Copper	**10.6**		2.86	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Iron	**24600**		57.3	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Lead	**6.40**		1.43	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Magnesium	**4210**		215	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Manganese	**327**		14.3	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Molybdenum	5.73	U	5.73	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Nickel	**7.43**	B	11.5	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Potassium	**1570**		1150	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Selenium	0.859	U	0.859	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Silicon	**533**		5.73	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Silver	0.573	U	0.573	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Sodium	**217**		143	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Vanadium	**68.1**		7.16	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Zinc	**52.2**		28.6	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Mercury	0.0238	U	0.0238	mg/kg dry	1	L302014	02/04/2013	02/05/2013	7471A

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

J1RD34

1301067-03 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**6790**		12.6	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Antimony	1.51	U	1.51	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Arsenic	**2.29**	B	2.52	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Barium	**71.4**		1.26	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Beryllium	**0.248**	B	0.505	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Boron	5.05	U	5.05	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Cadmium	**0.150**	B	0.505	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Calcium	**3810**		252	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Chromium	**7.68**		0.505	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Cobalt	**7.33**		5.05	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Copper	**11.2**		2.52	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Iron	**23700**		50.5	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Lead	**7.47**		1.26	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Magnesium	**4070**		189	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Manganese	**339**		12.6	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Molybdenum	5.05	U	5.05	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Nickel	**7.23**	B	10.1	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Potassium	**1300**		1010	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Selenium	0.757	U	0.757	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Silicon	**538**		5.05	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Silver	0.505	U	0.505	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Sodium	**209**		126	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Vanadium	**69.3**		6.31	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Zinc	**52.7**		25.2	mg/kg dry	3	L302012	02/04/2013	02/08/2013	6010B
Mercury	0.0261	U	0.0261	mg/kg dry	1	L302014	02/04/2013	02/05/2013	7471A

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

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-DUP6)		**Source: 1301067-01**		Prepared: 02/04/2013 Analyzed: 02/08/2013						
Aluminum	5020		62.6	mg/kg dry		4880			2.93	20
Antimony	7.51	U	7.51	mg/kg dry		7.13 U				20
Arsenic	12.5	U	12.5	mg/kg dry		11.9 U				20
Barium	222		6.26	mg/kg dry		239			7.59	20
Beryllium	2.50	U	2.50	mg/kg dry		2.38 U				20
Boron	10.5	B	25.0	mg/kg dry		11.9			11.9	20
Cadmium	2.50	U	2.50	mg/kg dry		2.38 U				20
Calcium	7460		1250	mg/kg dry		7500			0.567	20
Chromium	6.50		2.50	mg/kg dry		6.39			1.76	20
Cobalt	25.0	U	25.0	mg/kg dry		23.8 U				20
Copper	10.6	B	12.5	mg/kg dry		11.8			10.7	20

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

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-DUP6)		**Source: 1301067-01**		Prepared: 02/04/2013 Analyzed: 02/08/2013						
Iron	17300		250	mg/kg dry		16100			7.63	20
Lead	7.21		6.26	mg/kg dry		8.07			11.3	20
Magnesium	3270		939	mg/kg dry		2950			10.4	20
Manganese	258		62.6	mg/kg dry		249			3.68	20
Molybdenum	25.0	U	25.0	mg/kg dry		23.8 U				20
Nickel	7.23	B	50.1	mg/kg dry		7.46			3.13	20
Potassium	1280	B	5010	mg/kg dry		1290			0.867	20
Selenium	3.75	U	3.75	mg/kg dry		3.56 U				20
Silicon	460		25.0	mg/kg dry		1160			86.7*	20
Silver	2.50	U	2.50	mg/kg dry		2.38 U				20
Sodium	626	U	626	mg/kg dry		142				20
Vanadium	49.3		31.3	mg/kg dry		46.4			6.03	20
Zinc	42.3	B	125	mg/kg dry		40.8			3.55	20
Matrix Spike (L302012-MS6)		**Source: 1301067-01**		Prepared: 02/04/2013 Analyzed: 02/08/2013						
Aluminum	6770		59.4	mg/kg dry	197.99	4880	953*	75-125		
Antimony	33.4		7.13	mg/kg dry	49.497	7.13 U	67.5*	75-125		
Arsenic	191		11.9	mg/kg dry	197.99	11.9 U	96.5	75-125		
Barium	436		5.94	mg/kg dry	197.99	239	99.7	75-125		
Beryllium	5.07		2.38	mg/kg dry	4.9497	2.38 U	102	75-125		
Boron	109		23.8	mg/kg dry	98.994	11.9	98.3	75-125		
Cadmium	5.01		2.38	mg/kg dry	4.9497	2.38 U	101	75-125		
Calcium	10500		1190	mg/kg dry	2474.8	7500	121	75-125		
Chromium	24.7		2.38	mg/kg dry	19.799	6.39	92.7	75-125		
Cobalt	56.0		23.8	mg/kg dry	49.497	23.8 U	113	75-125		
Copper	35.8		11.9	mg/kg dry	24.748	11.8	97.1	75-125		
Iron	18100		238	mg/kg dry	98.994	16100	2050*	75-125		
Lead	56.1		5.94	mg/kg dry	49.497	8.07	97.1	75-125		
Magnesium	5790		891	mg/kg dry	2474.8	2950	115	75-125		
Manganese	317		59.4	mg/kg dry	49.497	249	138*	75-125		
Molybdenum	93.8		23.8	mg/kg dry	98.994	23.8 U	94.8	75-125		
Nickel	56.5		47.5	mg/kg dry	49.497	7.46	99.1	75-125		
Potassium	3690	B	4750	mg/kg dry	2474.8	1290	97.1	75-125		
Selenium	195		3.56	mg/kg dry	197.99	3.56 U	98.5	75-125		
Silicon	563		23.8	mg/kg dry	98.994	1160	-607*	75-125		
Silver	4.97		2.38	mg/kg dry	4.9497	2.38 U	100	75-125		
Sodium	2800		594	mg/kg dry	2474.8	142	108	75-125		

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

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-MS6)	**Source: 1301067-01**			Prepared: 02/04/2013 Analyzed: 02/08/2013						
Vanadium	97.4		29.7	mg/kg dry	49.497	46.4	103	75-125		
Zinc	92.4	B	119	mg/kg dry	49.497	40.8	104	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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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4051	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 15:37

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-DUP6)		**Source: 1301067-01**		Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	0.112		0.0319	mg/kg dry		0.0575			64.1*	20
Matrix Spike (L302014-MS6)		**Source: 1301067-01**		Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	0.240		0.0277	mg/kg dry	0.15370	0.0575	119	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 #: 1194

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
1302062-01		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, dusty	vegetation, moss, rocks	
L302012-DUP2		0.55	50			↓	↓ ↓	↓	↓ ↓
MS2	0.5	0.54	50			↓	↓ ↓	↓	↓ ↓
1302064-01		0.57	50			fine	light brown dusty	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, powdy		
		MW 2/4/13							

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

Reagent IDs:
HNO_3 000000339O
HCl 000018301
H_2O_2 L11A03
1:1 HNO_3 637-076-07
1:1 HCl

File ID#:

Data Review By/Date:
Rev 2/6/13

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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: 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.
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. MW 2/4/13 SPIKE 1 1302062-01		(1)	(1)	0.31	50	
L302014-DUP1			w.e. MW 2/4/13	0.34 0.37	50	
				0.38 0.34	50	
w.e. MW 2/4/13 MS1 1307063-01		0.500	1.0	0.35	50	
				0.32	50	
L302014-DUP2				0.36	50	
w.e. MW 2/4/13 MS2 1307064-01		0.500	1.0	0.33	50	
				0.32	50	
L302014-DUP3				0.37	50	
w.e. MW 2/4/13 MS3 1307065-01		0.500	1.0	0.34	50	
				0.37	50	
L302014-DUP4				0.34	50	
w.e. MW 2/4/13 MS4 1307066-01		0.500	1.0	0.38	50	
				0.33	50	
L302014-DUP5				0.35	50	
w.e. MW 2/4/13 MS5 1307067-01		0.500	1.0	0.35	50	
				0.32	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 120/235	2/4/13 1915
ICV/CCV/LCS	(I.V. 120/411)	N/A

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

Soil LCS True Value = 1.29 mg/Kg
Standard # 120/014

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

Lionville Laboratory

MERCURY PREPARATION

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

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	
MSG		0.500	1.0	0.38	50	
1302067-02				0.39	50	
w.s. MW 2/4/13 03				0.36	50	

MW 2/4/13

Standard:	ID	Prep Date/Time
ICAL/MS		
ICV/CCV/LCS	[illegible] 034	

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

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

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