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 K4060 SAF-RC-233

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 600-374

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 #	1302004
SDG #	K4060
SAF #	RC-233
Date Received	01/31/13
# Samples	1
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 37 pages.

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

CHAIN OF CUSTODY

Lionville Laboratory Use Only
1302004
~~1301074~~ VH 2-1-13

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Lionville Laboratory
A Division of Eberline Analytical Corporation

Client: WC HANFORD SAF# RC-233
Est. Final Proj. Sampling Date:
Project#:
Project Contact/Phone#:
Lionville Laboratory Project Manager: O. Johnson
QC: SW Del: SFL TAT: 15 Days
Date Rec'd: 1-31-13 Date Due: 2-15-13

		A	B		C		D					
Refrigerator #		2	2		2		2					
#/Type Container	Liquid											
	Solid	1AG	1AG		1P		1AG					
Volume	Liquid											
	Solid	125	125		125		125					
Preservatives		—	—		—		—					
ANALYSES REQUESTED	ORGANIC: VOA											
	BNA											
	Pest/PCB											
	Herb											
		MTPH-D	PAHs		INORG: Metal Hg	CN	TCLP Metals	TCLP Hg				
Lionville Laboratory Use Only		DRO/MO	GRO		METALS		TCLP METALS					

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

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	DRO/MO	GRO	METALS	TCLP METALS	Hg
01	J1RD74	✓	✓	Soil	1-28-13	1310	X	X	X	X	X

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

Special Instructions:
2-1-13 1. TCLP metals are leach and holds
2.
3.
4.
5.
6.

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

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

000000003

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-233-007	Page 1 of 1
Collector 1/28/13 ~~Brackett, RA~~ SUNNUM, 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: 600-374	SAF No.: RC-233	
Ice Chest No.: WCH-12-020	Field Logbook No.: EL-1666 COA: 0603742600	Method of Shipment: Fed EX	
Shipped To: EBERLINE SERVICES, LIONVILLE	Offsite Property No.: A120730	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.	TPH-Diesel Range - WTPH-D +	PAHs - 8310					
Sample No.	Matrix *	Sample Date	Sample Time								
J1RD74	SOIL	1/28/13	1310	X	X	X	X				

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Aaron Sunnum	1-28-13 1315	Received By/Stored In: BHudson BHudson	1/28/13 1315
Relinquished By/Removed From: BHUDSON BHudson	1/28/13 1500	Received By/Stored In: Cindy Bingham	R-28-13 1500
Relinquished By/Received From: Cindy Bingham WCH	1-29-13 0905	Received By/Stored In: Fed EX	
Relinquished By/Removed From: FedEx	1-31-13 1020	Received By/Stored In: VICTOR HERNANDEZ	1-31-13 1020
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

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

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7471 - (CV) {Mercury}
(2) Metals by ICP (TCLP) - 1311/6010 {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury (TCLP) - 1311/7470 {Mercury}

REVIEWED BY AJ DATE 1-29-13

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

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

WCH-EE-011

000000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

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

Date: 1-31-13

LvL Batch #: 1301073

Sample Custodian:

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FED-EX		Airbill # 7946 2606 7249
2. Custody Seals on coolers or shipping containers intact, signed & dated?	☑ Yes	☐ No	☐ No Seals
3. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	*Comments:*
4. All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible?	☑ Yes	☐ No	
5. Samples received cooled or ambient?	**Temp** 2°	°C	Cooler # WCH-12-020
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☐ Yes	☐ No	
Short holds taken to wet lab?	☐ Yes	☐ No	☑ N/A
13. VOA, TOC, TOX, RSK-175, Sulfides, Non-Halogenated VOAs (Alcohol/Glycol) free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☑ Yes	☐ No	☐ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted_____ Date _____

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: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 22:02

Analytical Report for Extractable Petroleum Hydrocarbons by SW846 8015

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD74	1302004-01	Soil	01/28/2013 13:10	01/31/2013 10:20

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 K4060
LVL #: 1302004

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

DIESEL RANGE ORGANICS

One (1) soil sample was collected on 01-28-2013.

The sample and associated QC samples were extracted 02-11-2013 and analyzed 02-12,13-2013 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.

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.

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 (2) matrix spike recoveries were outside QC acceptance criteria. Matrix spike recoveries were unobtainable due to high concentration of target analytes and dilution required for analysis. A copy of the Sample Discrepancy Report (SDR# 13GC024) has been enclosed.

7. The sample and associated QC required a 2-fold instrument dilution due to high concentration of target analytes. 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

2/15/10
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 136C024

Initiator: Catherine Carey
Date: 02/14/13
Client: WC Hanford

Batch: 1302004
Samples: MS2 MSD2
Method: SW846/MCAWW/CLP/

Parameter: DRO
Matrix: SOIL
Prep Batch: 1302095

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 high

2. Known or Probable Causes(s)

high concentration of target analytes 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
IP

4. Project Manager Instructions...signature/date: 2/15/13

✓ 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: 2/15/13 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

000000010

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: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 22:02

J1RD74
1302004-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Extractable Petroleum Hydrocarbons by SW846 8015									
Diesel Range Organics	7430	U	7430	ug/kg dry	2	L302095	02/11/2013	02/13/2013	8015M
Motor Oil	**276000**		22300	ug/kg dry	2	L302095	02/11/2013	02/13/2013	8015M
Surrogate: p-Terphenyl	*120 %*		*39-129*			*L302095*	*02/11/2013*	*02/13/2013*	*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: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 22:02

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 L302095 - SW 3540C										
Blank (L302095-BLK1)				Prepared: 02/11/2013 Analyzed: 02/12/2013						
Diesel Range Organics	3330	U	3330	ug/kg wet						
Motor Oil	10000	U	10000	ug/kg wet						
Surrogate: p-Terphenyl	*5060*			*ug/kg wet*	*6666.7*		*76*	*39-129*		
LCS (L302095-BS1)				Prepared: 02/11/2013 Analyzed: 02/12/2013						
Diesel Range Organics	51100		3330	ug/kg wet	66667		77	42-133		
Surrogate: p-Terphenyl	*5580*			*ug/kg wet*	*6666.7*		*84*	*39-129*		
Matrix Spike (L302095-MS2)		**Source: 1302004-01**		Prepared: 02/11/2013 Analyzed: 02/13/2013						
Diesel Range Organics	147000		7410	ug/kg dry	74061	7430 U	199*	42-133		
Surrogate: p-Terphenyl	*6620*			*ug/kg dry*	*7406.1*		*89*	*39-129*		
Matrix Spike Dup (L302095-MSD2)		**Source: 1302004-01**		Prepared: 02/11/2013 Analyzed: 02/13/2013						
Diesel Range Organics	166000		7400	ug/kg dry	74036	7430 U	224*	42-133	12	40
Surrogate: p-Terphenyl	*7690*			*ug/kg dry*	*7403.6*		*104*	*39-129*		

PREPARATION BENCH SHEET

L302095

Lionville Laboratory

Printed: 2/12/2013 2:04:08PM

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
1302003-01	8015M DRO	02/11/2013 14:40	30.02	4				1000	WC-Hanford, Inc.	
1302004-01	8015M DRO	02/11/2013 14:40	30.03	1				1000	WC-Hanford, Inc.	
1302014-01	8015M DRO	02/11/2013 14:40	30.42	4				1000	WC-Hanford, Inc.	
1302015-01	8015M DRO	02/11/2013 14:40	30.63	1				1000	WC-Hanford, Inc.	
1302015-02	8015M DRO	02/11/2013 14:40	30	1				1000	WC-Hanford, Inc.	
L302095-BLK1	QC	02/11/2013 14:40	30	1				1000		
L302095-BS1	QC	02/11/2013 14:40	30	1	1201538		1000	1000		
L302095-MS1	QC	02/11/2013 14:40	30.01	4	1201538	1302003-01	1000	1000		
L302095-MS2	QC	02/11/2013 14:40	30.15	1	1201538	1302004-01	1000	1000		
L302095-MS3	QC	02/11/2013 14:40	30.2	4	1201538	1302014-01	1000	1000		
L302095-MS4	QC	02/11/2013 14:40	30	1	1201538	1302015-01	1000	1000		
L302095-MSD1	QC	02/11/2013 14:40	30.19	4	1201538	1302003-01	1000	1000		
L302095-MSD2	QC	02/11/2013 14:40	30.16	1	1201538	1302004-01	1000	1000		
L302095-MSD3	QC	02/11/2013 14:40	30.5	4	1201538	1302014-01	1000	1000		
L302095-MSD4	QC	02/11/2013 14:40	30	1	1201538	1302015-01	1000	1000		

2/12/13 1405

Extracts Relinquished By Date 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: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/15/2013 10:07

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD74	1302004-01	Soil	01/28/2013 13:10	01/31/2013 10:20

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 K4060
LVL #: 1302004

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

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

One (1) soil sample was collected on 01-28-2013.

The sample and associated QC samples were extracted 02-11-2013 and analyzed 02-14-2013 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 sample and associated QC had an elevated final volume of 20mLs due to sample matrix. Reporting limits have been adjusted for the necessary dilutions.

Lionville Laboratory (LvL) is NELAP accredited by the State of Pennsylvania. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvL certifies that all test results meet the requirements of NELAC with any exception noted in the following statements:

1. The results presented in this report are derived from 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 thirty-two (32) matrix spike recoveries were outside QC acceptance criteria. Spike recoveries for Naphthalene were biased high. The associated sample was non-detect for Naphthalene. Sample has been reported with minimal impact on the data.

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

8. 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.

9. The sample was 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.

10. 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

3/11/13
Date

8310 PAH

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

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

Sample results reported from affected CCV:

CCV1: L302092-BLK1, BS1, 1301065-01, 1301066-01, L301202-MS3, MS4, MSD3, MSD4

CCV2: 1302004-01, L302092-MS2, MSD2

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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4060 Project Manager: Joan Kessner	**Reported:** 02/15/2013 10:07

J1RD74
1302004-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Acenaphthylene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Acenaphthene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Fluorene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Phenanthrene	**14.6**		14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Anthracene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Fluoranthene	**29.3**		14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Indeno[1,2,3-cd]pyrene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Pyrene	**20.8**		14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Benz[a]anthracene	**21.1**		14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Chrysene	**5.56**	J	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Benzo[b] fluoranthene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Benzo[k] fluoranthene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Benzo[a] pyrene	**8.42**	J	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Dibenz[a,h]anthracene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Benzo[g,h,i] perylene	14.6	U	14.6	ug/kg dry	1	L302092	02/11/2013	02/14/2013	8310
Surrogate: Triphenylene	*97 %*		*68-129*			*L302092*	*02/11/2013*	*02/14/2013*	*8310*

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4060	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/15/2013 10:07

Polynuclear Aromatic Compounds by SW846 8310 - Quality Control

Lionville Laboratory

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

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/15/2013 10:07

Polynuclear Aromatic Compounds by SW846 8310 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302092 - SW 3540C									
Matrix Spike (L302092-MS2)		**Source: 1302004-01**	Prepared: 02/11/2013 Analyzed: 02/14/2013						
Naphthalene	275	14.9	ug/kg dry	185.83	14.6 U	148*	0-127		
Acenaphthylene	182	14.9	ug/kg dry	185.83	14.6 U	98	50-140		
Acenaphthene	46.8	14.9	ug/kg dry	185.83	14.6 U	25	17-139		
Fluorene	158	14.9	ug/kg dry	185.83	14.6 U	85	28-145		
Phenanthrene	161	14.9	ug/kg dry	185.83	14.6	79	30-152		
Anthracene	125	14.9	ug/kg dry	185.83	14.6 U	67	19-171		
Fluoranthene	163	14.9	ug/kg dry	185.83	29.3	72	34-159		
Indeno[1,2,3-cd]pyrene	159	14.9	ug/kg dry	185.83	14.6 U	86	31-156		
Pyrene	163	14.9	ug/kg dry	185.83	20.8	76	33-152		
Benz[a]anthracene	171	14.9	ug/kg dry	185.83	21.1	81	32-157		
Chrysene	161	14.9	ug/kg dry	185.83	5.56	83	31-159		
Benzo[b] fluoranthene	146	14.9	ug/kg dry	185.83	14.6 U	78	33-164		
Benzo[k] fluoranthene	152	14.9	ug/kg dry	185.83	14.6 U	82	28-161		
Benzo[a] pyrene	140	14.9	ug/kg dry	185.83	8.42	71	29-149		
Dibenz[a,h]anthracene	159	14.9	ug/kg dry	185.83	14.6 U	85	27-153		
Benzo[g,h,i] perylene	159	14.9	ug/kg dry	185.83	14.6 U	85	32-157		
Surrogate: Triphenylene	*192*		*ug/kg dry*	*185.83*		*103*	*68-129*		
Matrix Spike Dup (L302092-MSD2)		**Source: 1302004-01**	Prepared: 02/11/2013 Analyzed: 02/14/2013						
Naphthalene	326	14.6	ug/kg dry	182.31	14.6 U	179*	0-127	19	40
Acenaphthylene	174	14.6	ug/kg dry	182.31	14.6 U	95	50-140	3	40
Acenaphthene	113	14.6	ug/kg dry	182.31	14.6 U	62	17-139	85*	40
Fluorene	163	14.6	ug/kg dry	182.31	14.6 U	90	28-145	5	40
Phenanthrene	163	14.6	ug/kg dry	182.31	14.6	82	30-152	4	40
Anthracene	128	14.6	ug/kg dry	182.31	14.6 U	70	19-171	4	40
Fluoranthene	168	14.6	ug/kg dry	182.31	29.3	76	34-159	6	40
Indeno[1,2,3-cd]pyrene	176	14.6	ug/kg dry	182.31	14.6 U	96	31-156	12	40
Pyrene	168	14.6	ug/kg dry	182.31	20.8	81	33-152	5	40
Benz[a]anthracene	180	14.6	ug/kg dry	182.31	21.1	87	32-157	8	40
Chrysene	171	14.6	ug/kg dry	182.31	5.56	91	31-159	8	40
Benzo[b] fluoranthene	163	14.6	ug/kg dry	182.31	14.6 U	90	33-164	13	40
Benzo[k] fluoranthene	165	14.6	ug/kg dry	182.31	14.6 U	91	28-161	10	40
Benzo[a] pyrene	148	14.6	ug/kg dry	182.31	8.42	77	29-149	8	40
Dibenz[a,h]anthracene	167	14.6	ug/kg dry	182.31	14.6 U	92	27-153	7	40
Benzo[g,h,i] perylene	176	14.6	ug/kg dry	182.31	14.6 U	97	32-157	12	40
Surrogate: Triphenylene	*186*		*ug/kg dry*	*182.31*		*102*	*68-129*		

PREPARATION BENCH SHEET

L302092

Lionville Laboratory

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

000000024

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

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

2/14/13 1015
Extracts Relinquished By Date

SY Schoch 02.14.13 10:15
Extracts Received By 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: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/19/2013 14:56

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD74	1302004-01	Soil	01/28/2013 13:10	01/31/2013 10:20

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#: 1302004
SDG/SAF#: K4060/RC-233

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

METALS

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

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

1. This narrative covers the analysis 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 with a 3-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 LvLI's sample acceptance policy.

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

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

7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation (3-10X the LOD or samples greater than 20X MB value}.

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

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

10. The matrix spike (MS) recoveries for 6 analytes were outside the 75-125% control limits.

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

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

levels for the following analytes: Aluminum, Antimony, Iron, Manganese, Silicon, and Mercury.

Sample ID	PDS Element	PDS Concentration (ppb)	% Recovery
J1RD74	Mercury	5.0	116%

12. The duplicate analyses for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limit criteria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

3/11/13
Date

m1302004hg%rgc.doc

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/19/2013 14:56

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: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/19/2013 14:56

J1RD74
1302004-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**9570**		15.8	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Antimony	1.90	U	1.90	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Arsenic	**4.60**		3.16	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Barium	**85.6**		1.58	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Beryllium	**0.330**	B	0.632	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Boron	**2.85**	B	6.32	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Cadmium	0.632	U	0.632	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Calcium	**3970**		316	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Chromium	**12.0**		0.632	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Cobalt	**6.95**		6.32	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Copper	**13.9**		3.16	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Iron	**21700**		63.2	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Lead	**7.86**		1.58	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Magnesium	**4260**		237	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Manganese	**364**		15.8	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Molybdenum	6.32	U	6.32	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Nickel	**10.5**	B	12.6	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Potassium	**2850**		1260	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Selenium	0.948	U	0.948	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Silicon	**313**		6.32	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Silver	0.632	U	0.632	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Sodium	**242**		158	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Vanadium	**50.7**		7.90	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Zinc	**49.0**		31.6	mg/kg dry	3	L302089	02/11/2013	02/13/2013	6010B
Mercury	0.0272	U	0.0272	mg/kg dry	1	L302090	02/12/2013	02/13/2013	7471A

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/19/2013 14:56

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302089 - SW 3050B										
Blank (L302089-BLK1)				Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	4.55	U	4.55	mg/kg wet						
Antimony	0.545	U	0.545	mg/kg wet						
Arsenic	0.909	U	0.909	mg/kg wet						
Barium	0.455	U	0.455	mg/kg wet						
Beryllium	0.182	U	0.182	mg/kg wet						
Boron	1.82	U	1.82	mg/kg wet						
Cadmium	0.182	U	0.182	mg/kg wet						
Calcium	6.60	B	90.9	mg/kg wet						
Chromium	0.182	U	0.182	mg/kg wet						
Cobalt	1.82	U	1.82	mg/kg wet						
Copper	0.909	U	0.909	mg/kg wet						
Iron	18.2	U	18.2	mg/kg wet						
Lead	0.455	U	0.455	mg/kg wet						
Magnesium	1.65	B	68.2	mg/kg wet						
Manganese	0.187	B	4.55	mg/kg wet						
Molybdenum	1.82	U	1.82	mg/kg wet						
Nickel	3.64	U	3.64	mg/kg wet						
Potassium	364	U	364	mg/kg wet						
Selenium	0.273	U	0.273	mg/kg wet						
Silicon	1.82	U	1.82	mg/kg wet						
Silver	0.182	U	0.182	mg/kg wet						
Sodium	45.5	U	45.5	mg/kg wet						
Vanadium	2.27	U	2.27	mg/kg wet						
Zinc	9.09	U	9.09	mg/kg wet						
Duplicate (L302089-DUP4)		**Source: 1302004-01**		Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	9930		15.8	mg/kg dry		9570			3.63	20
Antimony	1.90	U	1.90	mg/kg dry		1.90 U				20
Arsenic	4.92		3.16	mg/kg dry		4.60			6.70	20
Barium	86.1		1.58	mg/kg dry		85.6			0.515	20
Beryllium	0.342	B	0.632	mg/kg dry		0.330			3.57	20
Boron	2.94	B	6.32	mg/kg dry		2.85			3.06	20
Cadmium	0.163	B	0.632	mg/kg dry		0.632 U				20
Calcium	3960		316	mg/kg dry		3970			0.319	20
Chromium	12.9		0.632	mg/kg dry		12.0			7.14	20
Cobalt	7.70		6.32	mg/kg dry		6.95			10.4	20
Copper	15.4		3.16	mg/kg dry		13.9			10.1	20

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WC-Hanford, Inc.	Project: RC-233	
2620 Fermi Avenue	Project Number: K4060	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/19/2013 14:56

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302089 - SW 3050B										
Duplicate (L302089-DUP4)			**Source: 1302004-01**	Prepared: 02/11/2013 Analyzed: 02/13/2013						
Iron	23600		63.2	mg/kg dry		21700			8.39	20
Lead	7.42		1.58	mg/kg dry		7.86			5.83	20
Magnesium	4490		237	mg/kg dry		4260			5.27	20
Manganese	368		15.8	mg/kg dry		364			1.12	20
Molybdenum	6.32	U	6.32	mg/kg dry		6.32 U				20
Nickel	11.7	B	12.6	mg/kg dry		10.5			11.0	20
Potassium	2970		1260	mg/kg dry		2850			4.02	20
Selenium	0.948	U	0.948	mg/kg dry		0.948 U				20
Silicon	592		6.32	mg/kg dry		313			61.8*	20
Silver	0.632	U	0.632	mg/kg dry		0.632 U				20
Sodium	245		158	mg/kg dry		242			1.21	20
Vanadium	53.9		7.90	mg/kg dry		50.7			6.28	20
Zinc	51.0		31.6	mg/kg dry		49.0			3.98	20
Matrix Spike (L302089-MS4)			**Source: 1302004-01**	Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	10400		14.2	mg/kg dry	189.23	9570	418*	75-125		
Antimony	14.3		1.70	mg/kg dry	47.308	1.90 U	30.2*	75-125		
Arsenic	170		2.84	mg/kg dry	189.23	4.60	87.6	75-125		
Barium	264		1.42	mg/kg dry	189.23	85.6	94.1	75-125		
Beryllium	4.64		0.568	mg/kg dry	4.7308	0.330	91.1	75-125		
Boron	82.4		5.68	mg/kg dry	94.616	2.85	84.0	75-125		
Cadmium	4.09		0.568	mg/kg dry	4.7308	0.632 U	86.5	75-125		
Calcium	6830		284	mg/kg dry	2365.4	3970	121	75-125		
Chromium	28.7		0.568	mg/kg dry	18.923	12.0	88.2	75-125		
Cobalt	49.3		5.68	mg/kg dry	47.308	6.95	89.5	75-125		
Copper	35.8		2.84	mg/kg dry	23.654	13.9	92.6	75-125		
Iron	23800		56.8	mg/kg dry	94.616	21700	2270*	75-125		
Lead	48.6		1.42	mg/kg dry	47.308	7.86	86.2	75-125		
Magnesium	6320		213	mg/kg dry	2365.4	4260	87.2	75-125		
Manganese	385		14.2	mg/kg dry	47.308	364	46.0*	75-125		
Molybdenum	82.4		5.68	mg/kg dry	94.616	6.32 U	87.1	75-125		
Nickel	52.1		11.4	mg/kg dry	47.308	10.5	88.0	75-125		
Potassium	4950		1140	mg/kg dry	2365.4	2850	88.7	75-125		
Selenium	166		0.852	mg/kg dry	189.23	0.948 U	87.7	75-125		
Silicon	376		5.68	mg/kg dry	94.616	313	67.1*	75-125		
Silver	4.10		0.568	mg/kg dry	4.7308	0.632 U	86.8	75-125		
Sodium	2560		142	mg/kg dry	2365.4	242	97.8	75-125		

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: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/19/2013 14:56

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302089 - SW 3050B									
Matrix Spike (L302089-MS4)		**Source: 1302004-01**	Prepared: 02/11/2013 Analyzed: 02/13/2013						
Vanadium	96.1	7.10	mg/kg dry	47.308	50.7	96.0	75-125		
Zinc	93.3	28.4	mg/kg dry	47.308	49.0	93.6	75-125		
Post Spike (L302089-PS4)		**Source: 1302004-01**	Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	154000		ug/L	66000	90900	96.1	75-125		
Antimony	312		ug/L	300.00	2.21	103	75-125		
Iron	317000		ug/L	126000	206000	88.0	75-125		
Manganese	6200		ug/L	3000.0	3450	91.5	75-125		
Silicon	9690		ug/L	6300.0	2970	107	75-125		
Reference (L302089-SRM1)			Prepared: 02/11/2013 Analyzed: 02/13/2013						
Aluminum	10300	14.7	mg/kg wet	6670.0		154	0-200.89		
Antimony	43.1	1.76	mg/kg wet	53.000		81.4	0-235.8		
Arsenic	115	2.94	mg/kg wet	114.00		101	82.8-117.54		
Barium	318	1.47	mg/kg wet	307.00		104	79.8-120.2		
Beryllium	107	0.588	mg/kg wet	108.00		99.1	82.8-117.6		
Boron	78.3	5.88	mg/kg wet	85.100		92.0	67.5-132.8		
Cadmium	224	0.588	mg/kg wet	225.00		99.7	83.6-116.4		
Calcium	3380	294	mg/kg wet	3360.0		100	83.3-116.9		
Chromium	84.0	0.588	mg/kg wet	77.200		109	73.3-126.4		
Cobalt	165	5.88	mg/kg wet	166.00		99.1	80.7-118.7		
Copper	263	2.94	mg/kg wet	271.00		97.1	80.8-119.2		
Iron	8580	58.8	mg/kg wet	8420.0		102	78.6-121.1		
Lead	195	1.47	mg/kg wet	190.00		103	81.6-118.4		
Magnesium	8400	221	mg/kg wet	8570.0		98.1	83.2-116.7		
Manganese	1010	14.7	mg/kg wet	965.00		104	69.3-130.5		
Molybdenum	237	5.88	mg/kg wet	235.00		101	76.2-123.8		
Nickel	226	11.8	mg/kg wet	221.00		102	79.6-120.8		
Potassium	14700	1180	mg/kg wet	14400		102	81.9-118.1		
Selenium	188	0.882	mg/kg wet	187.00		100	75.9-124.6		
Silicon	339	5.88	mg/kg wet	807.00		42.0	0-219.3		
Silver	84.2	0.588	mg/kg wet	83.500		101	82.7-117.1		
Sodium	9440	147	mg/kg wet	9730.0		97.0	82.5-117.2		
Vanadium	110	7.35	mg/kg wet	98.700		112	75.9-123.6		
Zinc	199	29.4	mg/kg wet	199.00		100	78.4-121.6		

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: K4060	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/19/2013 14:56

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302090 - SW 7471A Prep										
Blank (L302090-BLK1)				Prepared: 02/12/2013 Analyzed: 02/13/2013						
Mercury	0.0273	U	0.0273	mg/kg wet						
Duplicate (L302090-DUP4)		**Source: 1302004-01**		Prepared: 02/12/2013 Analyzed: 02/13/2013						
Mercury	0.0258	U	0.0258	mg/kg dry		0.0272 U				20
Matrix Spike (L302090-MS4)		**Source: 1302004-01**		Prepared: 02/12/2013 Analyzed: 02/13/2013						
Mercury	0.187		0.0264	mg/kg dry	0.14690	0.0272 U	127*	75-125		20
Reference (L302090-SRM1)				Prepared: 02/12/2013 Analyzed: 02/13/2013						
Mercury	1.37		0.0281	mg/kg wet	1.2900		106	62.6-138		

Logbook #: 1194

Lionville Laboratory

SAMPLE DIGESTION RECORD

Digestion Batch #: L302089
Date/Time Initiated: 2/11/13 1735
Date/Time Completed: 2/12/13 1300
Analyst: MJ
Matrix (circle): Soil Water Other
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.
NOTE: All temperatures are recorded as corrected temperatures

Digested / Undigested (circle one)
Balance #: B14
Balance Cal Verification: Y NA
Temp: 95°
BLOCK 1 2 (circle one)
3

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/TC	Texture	Color/Appearance	Artifact	Turb
1301049-01		0.61	50		TO	fine	light brown mud	H_2O, rocks	RAD
L302089-DUP1		0.69	50						
MS1	0.5*	0.63	50						
1301060-01		0.56	50			not fine	black, tan flecks granular	rocks	
L302089-DUP2		0.55	50						
MS2	0.5*	0.57	50						
1301060-02		0.54	50			not fine	dark brown, tan sandy	rocks	
03		0.53	50			not fine	dark brown, tan sandy	rocks	
04		0.60	50			coarse	ottawa sand	N/A	
1302003-01		0.53	50			fine	brown soil	rocks	
L302089-DUP3		0.54	50						
MS3	0.5	0.53	50						
1302004-01		0.53	50			fine	brown soil	rocks, vegetation	
L302089-DUP4		0.53	50						
MS4	0.5	0.59	50						
1302005-01		0.52	50			coarse	brown soil	rocks	
L302089-DUP5		0.52	50						
MS5	0.5	0.54	50						
1302005-02		0.64	50			fine	brown soil	rocks	
L302089-BL4		0.55	50			coarse	boring chips		
SPM1	*	0.51	50			fine	pink sandy		

MJ 2/11/13

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:
Rec 2/19/13

Rec 2/19/13 TE

*also 0.25 ml 1201380 (U-)
0.25 ml 1201386 (Zr)

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Signed\SPI\Metals Digestion log.doc

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Lionville Laboratory

MERCURY PREPARATION

Logbook # 1198

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

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

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

NOTE: All temperatures are recorded as corrected temperatures.

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

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

Reviewed By/Date: [illegible] 2/13

se book # 1198 for std traceability information

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

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

ME-HgCVAA-Prep0910

Page #:

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Lionville Laboratory

MERCURY PREPARATION

Logbook # 1198

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

Instrument ID: HG3.7
Balance # B14 /NA
Pipette Calibration (Daily) (Y) ____

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

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH < 2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
1302090-DUP5				0.33	50	
MS5		0.500	1.0	0.34	50	
1302085-02				0.38	50	

DNB 2/11/13

Standard:	ID	Prep Date/Time
ICAL/MS	See pg 040	
ICV/CCV/LCS		

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

se book # 1198 for std traceability information

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

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

ME-HgCVAA-Prep0910

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