SAF-RC-029
Remaining Sites Confirmation Sampling – Soil Full Protocol
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 10/2/12
INITIAL/DATE

COMMENTS:

SDG K3920 SAF RC-029

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

INCLUDES ADD-ON CrVI AND PAH

Waste Site: 100-D-96 French Drain Soils

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

11 June 2012

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, WA 99354

Subject: Analytical Data Package

Dear Ms. Kessner:

Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	1206024
SDG #	K3920
SAF #	RC-029
Date Received	06/08/12
# Samples	2
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	
Herbicides	
Metals	X
Inorganics	X

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 27 pages.

CHAIN OF CUSTODY

Lionville Laboratory Use Only
1206024

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-029
Est. Final Proj. Sampling Date:
Project#:
Project Contact/Phone#:
Lionville Laboratory Project Manager: O. Johnson
QC: SW Del: STD TAT: 15 Day

Date Rec'd: 6-8-12 Date Due: 6-23-12

Refrigerator #:
#/Type Container: Liquid / Solid
Volume: Liquid / Solid
Preservatives:

ANALYSES REQUESTED →

	A	B
ORGANIC: VOA		
ORGANIC: BNA		
ORGANIC: Pest/PCB		
ORGANIC: Herb		
INORG: Metal Hg	2	2
INORG: CN		
INORG: Fe Anions	1AG	1AG
Lionville Laboratory Use Only	125	125
	—	—
	Met①	Anions N3N2

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	Met①	Anions N3N2
01	J1PRA6			Soil	6-6-12	1350	X	X
02	1 47			1	1	1400	X	X

Special Instructions: Run matrix QC

Met① = HSL + B, Mo, Si (NO-TL)

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

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	6/8/12	1020

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

QW 6/6/12

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-142	Page 1 of 1

Collector: Q Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-D-96 French Drain Soils		SAF No.: RC-029
Ice Chest No.: WCH-11-072	Field Logbook No.: EL-1601-06	COA: C10D96A000	Method of Shipment: fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A110364		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples may contain hazardous chemicals at levels that pose a risk to human health and/or the environment. Please handle accordingly.

Special Handling and/or Storage

Please keep cool (4 deg C) those requiring coolness, as shown on "Preservation" heading. Thank You.

Preservation	Cool 4C	Cool 4C									
Type of Container	G/P	G/P									
No. of Container(s)	1	1									
Volume	125mL	125mL									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
J1PR46	SOIL	6/6/12	1350	X	X								
J1PR47	SOIL	6/6/12	1400	X	X								
~~J1PR48~~	~~SOIL~~		QW 6/6/12										
~~J1PR49~~	~~SOIL~~		QW 6/6/12										
~~J1PR50~~	~~SOIL~~		QW 6/6/12										

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Quincy Stowe	6/6/2012 1430	JV Fullmer	6/6/12 1430
Relinquished By/Removed From: JV Fullmer	6/6/12 1555	Cindy Bingham	6-6-12 1555
Relinquished By/Removed From: Cindy Bingham WCH	6-7-12 1300	Fed Ex	
Relinquished By/Removed From: Fed Ex	6-8-12 1020	Victor Hernandez	6-8-12 1020
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) {Aluminum, Antimony, Arsenic, Barium,Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium,Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7471 - (CV)
(2) IC Anions - 300.0 {Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; NO2/NO3 - 353.2

REVIEWED BY AJ DATE 6-7-12

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
Project/SAF/SOW/Release #: RC-029

Date: 6/8/12

LvL Batch #: 1206 024

Sample Custodian: Victor Hernandez

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7936 5530 1747
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 2.1°	°C	Cooler # WCH-11-072
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☑ Yes	☐ No	
Short holds taken to wet lab?	☐ Yes	☐ No	☑ N/A
13. VOA, TOC, TOX free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☐ Yes	☐ No	☑ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted _____ Date _____

SR-002-B.doc

METALS

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 09:26

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PR46	1206024-01	Soil	06/06/2012 13:50	06/08/2012 10:20
J1PR47	1206024-02	Soil	06/06/2012 14:00	06/08/2012 10:20

LIONVILLE LABORATORY
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Case Narrative

Client: WC-HANFORD RC-029
LVL#: 1206024
SDG/SAF#: K3920/RC-029

W.O.#: 60049-001-001-0001-00
Date Received: 06-08-12

METALS

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

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

1. This narrative covers the analyses of 2 soil samples.

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

3. All analyses were performed within the required holding times.

4. Please refer to the Sample Receipt Check List for any sample discrepancies in LvL's sample acceptance policy.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the LOQ).

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

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

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

10. The matrix spike (MS) recoveries for 7 analytes were outside the 75-125% control limits.

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

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following analytes:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1PR46	Aluminum	22,000	100.0
	Antimony	100	94.6
	Iron	42,000	93.3
	Lead	100	89.8
	Manganese	1,000	94.1
	Nickel	100	94.1
	Silicon	2,100	122.7

12. The duplicate analyses for 3 analytes were outside the 20% Relative Percent Difference (RPD) control limit critieria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL. The sample results for Mercury, Beryllium, and Boron were less than ten times the MDL.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

6/18/12
Date

alm/06-024

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 09:26

Notes and Definitions

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

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 09:26

J1PR46
1206024-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**4660**		5.17	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Antimony	0.621	U	0.621	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Arsenic	**2.63**		1.03	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Barium	**99.4**		0.517	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Beryllium	**0.219**		0.207	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Boron	**4.24**		2.07	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Cadmium	**0.175**	B	0.207	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Calcium	**5940**		103	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Chromium	**8.70**		0.207	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Cobalt	**4.82**		2.07	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Copper	**14.3**		1.03	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Iron	**14900**		20.7	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Lead	**8.47**		0.517	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Magnesium	**3120**		77.6	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Manganese	**215**		5.17	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Molybdenum	**0.431**	B	2.07	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Nickel	**8.45**		4.14	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Potassium	**755**		414	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Selenium	0.310	U	0.310	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Silicon	**309**		2.07	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Silver	0.207	U	0.207	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Sodium	**160**		51.7	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Vanadium	**38.8**		2.59	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Zinc	**42.9**		10.3	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Mercury	**0.0307**		0.0290	mg/kg dry	1	L206082	06/11/2012	06/12/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 09:26

J1PR47
1206024-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**5560**		4.63	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Antimony	**0.498**	B	0.556	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Arsenic	**2.70**		0.926	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Barium	**80.6**		0.463	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Beryllium	**0.254**		0.185	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Boron	**3.04**		1.85	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Cadmium	**0.112**	B	0.185	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Calcium	**7480**		92.6	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Chromium	**8.86**		0.185	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Cobalt	**5.21**		1.85	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Copper	**13.9**		0.926	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Iron	**15800**		18.5	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Lead	**3.55**		0.463	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Magnesium	**4170**		69.5	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Manganese	**240**		4.63	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Molybdenum	**0.443**	B	1.85	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Nickel	**8.60**		3.71	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Potassium	**842**		371	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Selenium	0.278	U	0.278	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Silicon	**403**		1.85	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Silver	0.185	U	0.185	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Sodium	**206**		46.3	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Vanadium	**42.7**		2.32	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Zinc	**36.0**		9.26	mg/kg dry	1	L206072	06/09/2012	06/12/2012	6010B
Mercury	0.0289	U	0.0289	mg/kg dry	1	L206082	06/11/2012	06/12/2012	7471A

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WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	06/19/2012 09:26

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 L206072 - SW 3050B										
Blank (L206072-BLK1)				Prepared: 06/09/2012 Analyzed: 06/12/2012						
Aluminum	3.97	U	3.97	mg/kg wet						
Antimony	0.476	U	0.476	mg/kg wet						
Arsenic	0.794	U	0.794	mg/kg wet						
Barium	0.397	U	0.397	mg/kg wet						
Beryllium	0.159	U	0.159	mg/kg wet						
Boron	1.59	U	1.59	mg/kg wet						
Cadmium	0.159	U	0.159	mg/kg wet						
Calcium	5.84	B	79.4	mg/kg wet						
Chromium	0.159	U	0.159	mg/kg wet						
Cobalt	1.59	U	1.59	mg/kg wet						
Copper	0.794	U	0.794	mg/kg wet						
Iron	15.9	U	15.9	mg/kg wet						
Lead	0.397	U	0.397	mg/kg wet						
Magnesium	1.89	B	59.5	mg/kg wet						
Manganese	3.97	U	3.97	mg/kg wet						
Molybdenum	0.162	B	1.59	mg/kg wet						
Nickel	3.17	U	3.17	mg/kg wet						
Potassium	317	U	317	mg/kg wet						
Selenium	0.238	U	0.238	mg/kg wet						
Silicon	1.59	U	1.59	mg/kg wet						
Silver	0.159	U	0.159	mg/kg wet						
Sodium	39.7	U	39.7	mg/kg wet						
Vanadium	1.98	U	1.98	mg/kg wet						
Zinc	7.94	U	7.94	mg/kg wet						
Duplicate (L206072-DUP3)		**Source: 1206024-01**		Prepared: 06/09/2012 Analyzed: 06/12/2012						
Aluminum	5900		5.08	mg/kg dry		4660			23.5*	20
Antimony	0.468	B	0.609	mg/kg dry		0.621 U				20
Arsenic	2.68		1.02	mg/kg dry		2.63			1.80	20
Barium	135		0.508	mg/kg dry		99.4			30.5*	20
Beryllium	0.287		0.203	mg/kg dry		0.219			27.1*	20
Boron	11.0		2.03	mg/kg dry		4.24			88.6*	20
Cadmium	0.162	B	0.203	mg/kg dry		0.175			8.02	20
Calcium	6610		102	mg/kg dry		5940			10.6	20
Chromium	8.48		0.203	mg/kg dry		8.70			2.56	20
Cobalt	5.09		2.03	mg/kg dry		4.82			5.43	20
Copper	16.0		1.02	mg/kg dry		14.3			11.2	20

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 09:26

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 L206072 - SW 3050B										
Duplicate (L206072-DUP3)		**Source: 1206024-01**		Prepared: 06/09/2012 Analyzed: 06/12/2012						
Iron	15300		20.3	mg/kg dry		14900			2.68	20
Lead	9.90		0.508	mg/kg dry		8.47			15.6	20
Magnesium	3460		76.2	mg/kg dry		3120			10.1	20
Manganese	215		5.08	mg/kg dry		215			0.00981	20
Molybdenum	0.474	B	2.03	mg/kg dry		0.431			9.58	20
Nickel	8.20		4.06	mg/kg dry		8.45			3.05	20
Potassium	800		406	mg/kg dry		755			5.73	20
Selenium	0.305	U	0.305	mg/kg dry		0.310 U				20
Silicon	306		2.03	mg/kg dry		309			1.04	20
Silver	0.203	U	0.203	mg/kg dry		0.207 U				20
Sodium	277		50.8	mg/kg dry		160			53.2*	20
Vanadium	40.4		2.54	mg/kg dry		38.8			4.01	20
Zinc	44.5		10.2	mg/kg dry		42.9			3.81	20
Matrix Spike (L206072-MS3)		**Source: 1206024-01**		Prepared: 06/09/2012 Analyzed: 06/12/2012						
Aluminum	5970		4.42	mg/kg dry	176.94	4660	743*	75-125		
Antimony	17.3		0.531	mg/kg dry	44.235	0.621 U	39.1*	75-125		
Arsenic	146		0.885	mg/kg dry	176.94	2.63	80.9	75-125		
Barium	238		0.442	mg/kg dry	176.94	99.4	78.5	75-125		
Beryllium	3.79		0.177	mg/kg dry	4.4235	0.219	80.8	75-125		
Boron	72.6		1.77	mg/kg dry	88.469	4.24	77.2	75-125		
Cadmium	3.67		0.177	mg/kg dry	4.4235	0.175	78.9	75-125		
Calcium	8460		88.5	mg/kg dry	2211.7	5940	114	75-125		
Chromium	23.3		0.177	mg/kg dry	17.694	8.70	82.6	75-125		
Cobalt	38.8		1.77	mg/kg dry	44.235	4.82	76.9	75-125		
Copper	32.7		0.885	mg/kg dry	22.117	14.3	83.0	75-125		
Iron	16700		17.7	mg/kg dry	88.469	14900	2100*	75-125		
Lead	39.4		0.442	mg/kg dry	44.235	8.47	70.0*	75-125		
Magnesium	5650		66.4	mg/kg dry	2211.7	3120	114	75-125		
Manganese	278		4.42	mg/kg dry	44.235	215	143*	75-125		
Molybdenum	70.7		1.77	mg/kg dry	88.469	0.431	79.4	75-125		
Nickel	41.1		3.54	mg/kg dry	44.235	8.45	73.9*	75-125		
Potassium	2710		354	mg/kg dry	2211.7	755	88.3	75-125		
Selenium	136		0.265	mg/kg dry	176.94	0.310 U	77.0	75-125		
Silicon	556		1.77	mg/kg dry	88.469	309	279*	75-125		
Silver	3.48		0.177	mg/kg dry	4.4235	0.207 U	78.7	75-125		
Sodium	2010		44.2	mg/kg dry	2211.7	160	83.4	75-125		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 09:26

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 L206072 - SW 3050B									
Matrix Spike (L206072-MS3)		**Source: 1206024-01**	Prepared: 06/09/2012 Analyzed: 06/12/2012						
Vanadium	77.8	2.21	mg/kg dry	44.235	38.8	88.3	75-125		
Zinc	84.5	8.85	mg/kg dry	44.235	42.9	94.0	75-125		
Reference (L206072-SRM1)			Prepared: 06/09/2012 Analyzed: 06/12/2012						
Aluminum	6130	15.0	mg/kg wet	6670.0		91.8	0-200.89		
Antimony	35.3	1.80	mg/kg wet	53.000		66.6	0-235.8		
Arsenic	111	3.00	mg/kg wet	114.00		97.6	82.8-117.54		
Barium	285	1.50	mg/kg wet	307.00		92.7	79.8-120.2		
Beryllium	100	0.600	mg/kg wet	108.00		93.0	82.8-117.6		
Boron	76.6	6.00	mg/kg wet	85.100		90.1	67.5-132.8		
Cadmium	214	0.600	mg/kg wet	225.00		95.2	83.6-116.4		
Calcium	3100	300	mg/kg wet	3360.0		92.4	83.3-116.9		
Chromium	76.1	0.600	mg/kg wet	77.200		98.6	73.3-126.4		
Cobalt	155	6.00	mg/kg wet	166.00		93.1	80.7-118.7		
Copper	253	3.00	mg/kg wet	271.00		93.5	80.8-119.2		
Iron	8030	60.0	mg/kg wet	8420.0		95.4	78.6-121.1		
Lead	178	1.50	mg/kg wet	190.00		93.9	81.6-118.4		
Magnesium	8500	225	mg/kg wet	8570.0		99.2	83.2-116.7		
Manganese	907	15.0	mg/kg wet	965.00		94.0	69.3-130.5		
Molybdenum	231	6.00	mg/kg wet	235.00		98.2	76.2-123.8		
Nickel	214	12.0	mg/kg wet	221.00		96.7	79.6-120.8		
Potassium	13500	1200	mg/kg wet	14400		93.7	81.9-118.1		
Selenium	176	0.900	mg/kg wet	187.00		94.1	75.9-124.6		
Silicon	440	6.00	mg/kg wet	807.00		54.5	0-219.3		
Silver	81.3	0.600	mg/kg wet	83.500		97.4	82.7-117.1		
Sodium	8620	150	mg/kg wet	9730.0		88.6	82.5-117.2		
Vanadium	101	7.50	mg/kg wet	98.700		103	75.9-123.6		
Zinc	188	30.0	mg/kg wet	199.00		94.5	78.4-121.6		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 09:26

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 L206082 - SW 7471A Prep										
Blank (L206082-BLK1)				Prepared: 06/11/2012 Analyzed: 06/12/2012						
Mercury	0.0281	U	0.0281	mg/kg wet						
Duplicate (L206082-DUP6)		**Source: 1206024-01**		Prepared: 06/11/2012 Analyzed: 06/12/2012						
Mercury	0.0161	B	0.0299	mg/kg dry		0.0307			62.1*	20
Matrix Spike (L206082-MS6)		**Source: 1206024-01**		Prepared: 06/11/2012 Analyzed: 06/12/2012						
Mercury	0.182		0.0282	mg/kg dry	0.15672	0.0307	96.4	75-125		
Reference (L206082-SRM1)				Prepared: 06/11/2012 Analyzed: 06/12/2012						
Mercury	1.25		0.0290	mg/kg wet	1.2900		96.5	62.6-138		

Lionville Laboratory

Logbook #: 1128

SAMPLE DIGESTION RECORD

Digestion Batch #: L206072
Date/Time Initiated: 6/9/12 1050
Date/Time Completed: 6/9/12 1645
Analyst: JJS
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)

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/ TC	Texture	Color / Appearance	Artifact	Turb
1206021-01		0.66	50		TO	Coarse	Ottawa Sand		N/A
-02		0.69	50			Coarse	Black	Rocks	
L206072-Dup1		0.53	50						
-MS1	0.5	0.68	50						
1206021-03		0.52	50			Coarse	Black	Rocks	
-04		0.58	50			Coarse	Black	Rocks	
1206022-01 ~~BLANK~~		0.76	50			Coarse	Brown	Rocks/H2O	
L206072-Dup2 ~~Blank~~		0.57	50						
-MS2	0.5	0.57	50						
1206022-02		0.53	50			Coarse	Brown	Rocks	
-03		0.61	50			Coarse	Brown	Rocks	
1206024-01		0.53	50			Fine	Brown		
L206072-Dup3		0.54	50						
L206072-MS3	0.5	0.62	50						
-MS4		0.63	50			Coarse	Boiling Chips		
SRM1		0.50	50			Fine	pink sand		
1206024-02		0.59	50			Fine	Brown		

JJS
6/9/12

Spiking IDs / Expiration Date:
MS#: 1200457

LCS#: 1101357

Reagent IDs:
HNO_3 K49023
HCl L01031
H_2O_2 K04A03
1:1 HNO_3 637-66-02
1:1 HCl

File ID#:

Data Review By/Date:
6/12/12

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Signed\SPI\Metals Digestion log.doc

Page #:

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 6/11/12
Start Time/Temp: 2020/94°
End Time/Temp: 2050/97°

Instrument ID: HG3.2
Balance # B29 /NA
Pipette Calibration (Daily) (Y) ____

Logbook # 1132
Prep Batch: L206082
Worksheet: HG061202
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	
L206082-BLK1				0.32	50	
SRM1		(*)	(*)	0.31	50	
1206018-01				0.35	50	
L206082-DUP1				0.33	50	
MS 1		0.500	1.0	0.35	50	
1206018-02				0.35	50	
03				0.38	50	
1206019-01				0.37	50	
L206082-DUP2				0.34	50	
MS2		0.500	1.0	0.37	50	
1206019-02				0.39	50	
03				0.37	50	
1206020-01				0.37	50	
L206082-DUP3				0.37	50	
MS3		0.500	1.0	0.36	50	
1206021-01				0.38	50	
L206082-DUP4				0.37	50	?acon02
MS4		0.500	1.0	0.35	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1200585	6/11/12 1115
ICV/CCV/LCS	(I.V. 1200552)	n/a

Reviewed By/Date: [illegible] 6/13/12

se book # 9368 for std traceability information

Soil LCS True Value = 1.29 mg/Kg
Standard # 1101357 (*)

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

ME-HgCVAA-Prep0910

Page #:

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Lionville Laboratory

MERCURY PREPARATION

Analyst: Mlelph
Date 6/11/12
Start Time/Temp: 0931
End Time/Temp: see pg

Instrument ID: HG3.2
Balance # B29 /NA
Pipette Calibration (Daily) (Y)

Logbook # 1132
Prep Batch: L206082
Worksheet: HG061202
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.
1206021-02				0.38	50	
03				0.38	50	
04				0.39	50	
1206022-01				0.34	50	
L206082-DUP5				0.36	50	
MS5		0.500	1.0	0.34	50	
1206022-02				0.34	50	
03				0.39	50	
1206024-01				0.34	50	
L206082-DUP6				0.33	50	
MS6		0.500	1.0	0.35	50	
1206024-02				0.34	50	

MW 6/11/12

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

Reviewed By/Date: 6/13/12

Soil LCS True Value = see page 031 mg/Kg
Standard # _____

se book # 9368 for std traceability information
Water Matrix Spiking Solution Concentration = 0.1 µg/ml
after LCS Spiking Concentration: 1.0 µg/ml

ME-HgCVAA-Prep0910

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PREPARATION BENCH SHEET

L206072

Lionville Laboratory

Printed: 6/12/2012 10:37:05AM

Matrix: Solid **Prepared using: METALS - SW 3050B** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1206021-01	6010B ICP Metals	06/09/2012 10:39	0.66	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1206021-02	6010B ICP Metals	06/09/2012 10:39	0.69	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1206021-03	6010B ICP Metals	06/09/2012 10:39	0.52	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1206021-04	6010B ICP Metals	06/09/2012 10:39	0.58	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1206022-01	6010B ICP Metals	06/09/2012 10:39	0.76	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1206022-02	6010B ICP Metals	06/09/2012 10:39	0.53	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1206022-03	6010B ICP Metals	06/09/2012 10:39	0.61	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1206024-01	6010B ICP Metals	06/09/2012 10:39	0.53	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1206024-02	6010B ICP Metals	06/09/2012 10:39	0.59	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
L206072-BLK1	QC	06/09/2012 10:39	0.63	50						
L206072-DUP1	QC	06/09/2012 10:39	0.53	50		1206021-02				
L206072-DUP2	QC	06/09/2012 10:39	0.57	50		1206022-01				
L206072-DUP3	QC	06/09/2012 10:39	0.54	50		1206024-01				
L206072-MS1	QC	06/09/2012 10:39	0.68	50	1200457	1206021-02	500			
L206072-MS2	QC	06/09/2012 10:39	0.57	50	1200457	1206022-01	500			
L206072-MS3	QC	06/09/2012 10:39	0.62	50	1200457	1206024-01	500			
L206072-SRM1	QC	06/09/2012 10:39	0.5	50	1101357		500			

JJS — Extracts Relinquished By — 6/11/12 — Date

Preeti — Extracts Received By — 06/11/12 — Date

INORGANICS

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 14:05

Analytical Report for Wet Chemistry

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PR46	1206024-01	Soil	06/06/2012 13:50	06/08/2012 10:20
J1PR47	1206024-02	Soil	06/06/2012 14:00	06/08/2012 10:20

LIONVILLE LABORATORY
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Case Narrative

Client: WC-HANFORD RC-029 K3920
LVL#: 1206024 **Date Received:** 06-08-12

INORGANIC NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

2. The samples were prepared and analyzed in accordance with the methods indicated on the data summary report. Results for soil or solid pH are measured in water at 25°C unless otherwise specified.

   Lionville Lab (LvL) is NELAP accredited by the State of Pennsylvania. For a complete list 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.

3. Sample holding times as required by the method and/or contract were met with the exception of Nitrite, Nitrate and Orthophosphate that were analyzed past hold.

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

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits.

7. The matrix spike recoveries were within the 75-125% control limits.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit with the exception of Nitrite at 21.8% for which the replicate results were below the limit of quantitation.

9. Results for soil samples are reported on a dry weight basis.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

6/20/12
Date

njp\i06-024

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 9 pages.

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A division of Eberline Analytical Corporation

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 06/19/2012 14:05

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Results reported from a dilution; related reporting limits are elevated due to the presence of an interference or a high target value.
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
LOD	Limit of Detection (LOD): the minimum estimated concentration of a target analyte that can be detected reliably. Concentrations at the LOD or between the LOD and LOQ are flagged estimated with either a 'J' qualifier or client-specific qualifier.
LOQ	Limit of Quantitation (LOQ): the minimum concentration of a target analyte that can be quantified reliably

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WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	06/19/2012 14:05

Wet Chemistry
Lionville Laboratory

Analyte	Result and Qualifier		LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1PR46 (1206024-01) Soil										
%Solids	**91.2**			0.1	% by Weight	1	L206093	06/13/2012	06/13/2012	SM2540G
Bromide	1.1	U	1.1	5.3	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Chloride	**6.6**		1.1	5.3	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Fluoride	1.1	U	1.1	5.3	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate	**651**		10.5	52.6	mg/kg dry	10	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrite	**2.1**	B	1.1	5.3	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Orthophosphate	**36.0**		2.1	10.5	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Sulfate	**136**	D	2.1	10.5	mg/kg dry	2	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate/Nitrite as N	**161**	D	2.63	13.2	mg/kg dry	25	L206089	06/12/2012	06/12/2012	EPA 353.2
J1PR47 (1206024-02) Soil										
%Solids	**91.5**			0.1	% by Weight	1	L206093	06/13/2012	06/13/2012	SM2540G
Bromide	1.1	U	1.1	5.4	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Chloride	**1.3**	B	1.1	5.4	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Fluoride	1.1	U	1.1	5.4	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate	**21.3**		1.1	5.4	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrite	1.1	U	1.1	5.4	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Orthophosphate	**2.9**	B	2.2	10.8	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Sulfate	**10.8**		1.1	5.4	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate/Nitrite as N	**4.84**		0.10	0.50	mg/kg dry	1	L206089	06/12/2012	06/12/2012	EPA 353.2

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WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	06/19/2012 14:05

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206089 - Default Prep GenChem										
Blank (L206089-BLK1)				Prepared & Analyzed: 06/12/2012						
Nitrate/Nitrite as N	0.10 U	0.10	0.49	mg/kg wet						
LCS (L206089-BS1)				Prepared & Analyzed: 06/12/2012						
Nitrate/Nitrite as N	5.08	0.10	0.48	mg/kg wet	4.8294		105	90-110		
Duplicate (L206089-DUP9)	**Source: 1206024-01**			Prepared & Analyzed: 06/12/2012						
Nitrate/Nitrite as N	159 D	2.72	13.6	mg/kg dry		161			1.28	20
Matrix Spike (L206089-MS9)	**Source: 1206024-01**			Prepared & Analyzed: 06/12/2012						
Nitrate/Nitrite as N	433 D	5.19	26.0	mg/kg dry	259.71	161	105	75-125		
Batch L206093 - % Solids										
Duplicate (L206093-DUP1)	**Source: 1206024-01**			Prepared & Analyzed: 06/13/2012						
%Solids	91.1		0.1	% by Weight		91.2			0.06	20
Batch L206139 - Default Prep GenChem										
Blank (L206139-BLK1)				Prepared & Analyzed: 06/17/2012						
Fluoride	1.0 U	1.0	5.0	mg/kg wet						
Chloride	1.0 U	1.0	5.0	mg/kg wet						
Bromide	1.0 U	1.0	5.0	mg/kg wet						
Orthophosphate	2.0 U	2.0	10.0	mg/kg wet						
Sulfate	1.0 U	1.0	5.0	mg/kg wet						
Nitrate	1.0 U	1.0	5.0	mg/kg wet						
Nitrite	1.0 U	1.0	5.0	mg/kg wet						

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

WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	06/19/2012 14:05

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206139 - Default Prep GenChem											
LCS (L206139-BS1)					Prepared & Analyzed: 06/17/2012						
Fluoride	49.2		1.0	5.0	mg/kg wet	50.000		98.4	80-120		
Chloride	46.5		1.0	5.0	mg/kg wet	50.000		93.0	80-120		
Bromide	48.0		1.0	5.0	mg/kg wet	50.000		96.0	80-120		
Orthophosphate	47.8		2.0	10.0	mg/kg wet	50.000		95.6	80-120		
Sulfate	48.2		1.0	5.0	mg/kg wet	50.000		96.4	80-120		
Nitrate	47.8		1.0	5.0	mg/kg wet	50.000		95.6	80-120		
Nitrite	48.4		1.0	5.0	mg/kg wet	50.000		96.8	80-120		
Duplicate (L206139-DUP7)		**Source: 1206024-01**			Prepared & Analyzed: 06/17/2012						
Fluoride	1.0	U	1.0	5.2	mg/kg dry		1.1 U				20
Chloride	7.1		1.0	5.2	mg/kg dry		6.6			7.25	20
Bromide	1.0	U	1.0	5.2	mg/kg dry		1.1 U				20
Orthophosphate	36.8		2.1	10.5	mg/kg dry		36.0			2.21	20
Sulfate	131	D	2.1	10.5	mg/kg dry		136			3.68	20
Nitrate	677		10.5	52.4	mg/kg dry		651			4.00	20
Nitrite	2.6	B	1.0	5.2	mg/kg dry		2.1			21.8*	20
Matrix Spike (L206139-MS9)		**Source: 1206024-01**			Prepared & Analyzed: 06/17/2012						
Fluoride	55.4		1.1	5.4	mg/kg dry	54.058	1.1 U	102	75-125		
Chloride	60.9		1.1	5.4	mg/kg dry	54.058	6.6	100	75-125		
Bromide	54.1		1.1	5.4	mg/kg dry	54.058	1.1 U	100	75-125		
Orthophosphate	95.8		2.2	10.8	mg/kg dry	54.058	36.0	111	75-125		
Nitrite	56.9		1.1	5.4	mg/kg dry	54.058	2.1	101	75-125		
Matrix Spike (L206139-MSA)		**Source: 1206024-01**			Prepared & Analyzed: 06/17/2012						
Sulfate	416	D	5.4	27.0	mg/kg dry	270.29	136	104	75-125		
Matrix Spike (L206139-MSB)		**Source: 1206024-01**			Prepared & Analyzed: 06/17/2012						
Nitrate	1800		21.6	108	mg/kg dry	1081.2	651	107	75-125		

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

28 September 2012

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, WA 99354

Subject: Analytical Data Package

Dear Ms. Kessner:

Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	1206024
SDG #	K3920 ADDON
SAF #	RC-029
Date Received	06/06/12
# Samples	2
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	X
Herbicides	
Metals	
Inorganics	X

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 23 pages.

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1206024

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: WC Hanford SAF# RC-029
Est. Final Proj. Sampling Date:
Project#:
Project Contact/Phone#:
Lionville Laboratory Project Manager: O. Johnson
QC: SW Del: STD TAT: 15Day

Date Rec'd: 6-8-12 Date Due: 6-23-12

Refrigerator #		A		B	
		2		2	
#/Type Container	Liquid				
	Solid	1AG		1AG	
Volume	Liquid				
	Solid	125		125	
Preservatives		–		–	

ANALYSES REQUESTED →

ORGANIC				INORG		
VOA	BNA	Pest/PCB	Herb	Metal Hg	CN	IC Anions

Lionville Laboratory Use Only

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	8310 PAH	Met①	Anions N3N2	Cr6
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	J1PRA6			Soil	6-6-12	1350	X	X	X	X
	02	1 47			1	1	1400	X	X	X	X

Special Instructions: Run matrix QC

Met① = HSL + B, Mo, Si (NO-TL)

Special Instructions:
9/13/12 1. Cr6 and PAH analyses added 'out of hold' per client due 9/21/12
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	6/8/12	1020

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Qw 6/6/12

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-142	Page 1 of 1

Collector: Q Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-D-96 French Drain Soils		SAF No.: RC-029
Ice Chest No.: WCH-11-072	Field Logbook No.: EL-1601-06	COA: C10D96A000	Method of Shipment: fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A110364		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples may contain hazardous chemicals at levels that pose a risk to human health and/or the environment. Please handle accordingly.

Special Handling and/or Storage

Please keep cool (4 deg C) those requiring coolness, as shown on "Preservation" heading. Thank You.

Preservation	Cool 4C	Cool 4C									
Type of Container	G/P	G/P									
No. of Container(s)	1	1									
Volume	125mL	125mL									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
J1PR46	SOIL	6/6/12	1350	X	X								
J1PR47	SOIL	6/6/12	1400	X	X								
~~J1PR48~~	~~SOIL~~		~~Qw 6/6/12~~										
~~J1PR49~~	~~SOIL~~		~~Qw 6/6/12~~										
~~J1PR50~~	~~SOIL~~		~~Qw 6/6/12~~										

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Quincy Stowe	Date/Time: 6/6/2012 1430	Received By/Stored In: JV Fullmer	Date/Time: 6/6/12 1430
Relinquished By/Removed From: JV Fullmer	Date/Time: 6/6/12 1555	Received By/Stored In: Bingham	Date/Time: 6-6-12 1060#1 1555
Relinquished By/Removed From: Bingham WCH	Date/Time: 6-7-12 1060#1 1300	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: FedEx	Date/Time: 6-8-12 1020	Received By/Stored In: VICTOR HERNANDEZ	Date/Time: 6-8-12 1020
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) {Aluminum, Antimony, Arsenic, Barium,Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium,Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 471 - (CV)
(2) IC Anions - 300.0 {Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; NO2/NO3 - 353.2

REVIEWED BY AJ DATE 6-7-12

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

00000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford

Project/SAF/SOW/Release #: RC-029

Date: 6/8/12

LvL Batch #: 1206 024

Sample Custodian: Victor Hernandez

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7936 5530 1747
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 2.1°	°C	Cooler # WCH-11-072
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☑ Yes	☐ No	
Short holds taken to wet lab?	☐ Yes	☐ No	☑ N/A
13. VOA, TOC, TOX free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☐ Yes	☐ No	☑ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted _____ Date _____

SR-002-B.doc

PAHs

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

WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	09/20/2012 19:07

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PR46	1206024-01	Soil	06/06/2012 13:50	06/08/2012 10:20
J1PR47	1206024-02	Soil	06/06/2012 14:00	06/08/2012 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-029 K3920
LVL #: 1206024

W.O. #: 60049-001-001-0001-00
Date Received: 06-08-2012

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

Two (2) soil samples were collected on 06-06-2012.

The samples and associated QC samples were extracted 09-13-2012 and analyzed 09-18,19-2012 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C and the analysis procedure was based on SW846 Method 8310.

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

1. The results presented in this report are derived from samples that met LvL's sample acceptance policy with exceptions noted on the Sample Receipt Checklist.
2. The samples were extracted outside of the recommended holding time. A copy of the Sample Discrepancy Report (SDR# 12PM001) has been enclosed.
3. Samples J1PR46 and its matrix QC required 10-fold instrument dilution due to high concentrations of both target and non-target analytes. Reporting limits have been adjusted to reflect the necessary dilutions.
4. One (1) of six (6) surrogate recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 12GC156) has been enclosed.
5. The method blank was below the reporting limits for all target compounds.
6. All blank spike recoveries were within acceptance criteria.
7. Nine (9) of thirty-two (32) matrix spike recoveries were outside acceptance criteria.
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.
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

9/27/12
Date

r:\group\data\2012\pah 8310\wc hanford\1206024oj.doc

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12PA001

Initiator: Q. Johnson
Date: 9/13/12
Client: WC-Hanford

Batch: 1206024, 1206026
Samples: ALL except 6026-01
Method: SW846/MCAWW/CLP/

Parameter: Cr6 PAH
Matrix: Soil
Prep Batch: —

1. Reason for SDR

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

b. General Discrepancy

__ Missing Sample/Extract* __ Container Broken* __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample* __ Preservation Wrong X Received Past Hold – additional analyses request noticed
__ 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)

Samples analyzed outside of holding time

2. Known or Probable Causes(s)

Client request received past holding time

3. Discussion and Proposed Action

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

Other Description:
1. Notify client of holdtime exceedance prior to performing additional analyses
2. Analyze, report and narrate

4. Project Manager Instructions...signature/date: 9/13/12

✓ Concur with Proposed Action 1 + 2
__ Disagree with Proposed Action; See Instruction
✓ Include in Case Narrative
✓ Client Contacted
Date/Person Jon Messner 9/13/12
__ Add
__ Cancel

5. Final Action...signature/date: 9/27/12 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 Sample Discrepancy Report (SDR)

SDR #: 12GC156

Initiator: Catherine Carey
Date: 09/20/12
Client: LOC Hanford

Batch: 1206024
Samples: MS1 + MSD1
Method: SW846/MCAWW/CLP/

Parameter: PAH
Matrix: SOIL
Prep Batch: L209084

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)

several spike results outside QC limits in MS1 + MSD1

Triphenylene recovery is high in MS1

2. Known or Probable Causes(s)

Intergerence from target & non target compounds

3. Discussion and Proposed Action Other Description:

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

Narrate ID

4. Project Manager Instructions...signature/date: 9/27/12

__ 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: 9/27/12 Other Explanation:

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

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

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

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

QA-139-A-0208

GLOSSARY OF DATA

DATA QUALIFIERS

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

ABBREVIATIONS

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

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

WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	09/20/2012 19:07

J1PR46
1206024-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**210**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Acenaphthylene	**94.8**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Acenaphthene	36.5	U	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Fluorene	36.5	U	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Phenanthrene	**218**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Anthracene	**30.8**	J, D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Fluoranthene	**149**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Indeno[1,2,3-cd]pyrene	**60.4**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Pyrene	**96.5**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Benz[a]anthracene	**118**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Chrysene	**440**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Benzo[b] fluoranthene	**142**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Benzo[k] fluoranthene	**62.8**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Benzo[a] pyrene	**103**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Dibenz[a,h]anthracene	**12.6**	J, D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Benzo[g,h,i] perylene	**263**	D	36.5	ug/kg dry	10	L209084	09/13/2012	09/18/2012	8310
Surrogate: Triphenylene	*99 %*		*68-129*			*L209084*	*09/13/2012*	*09/18/2012*	*8310*

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

WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	09/20/2012 19:07

J1PR47
1206024-02 (Soil)

Lionville Laboratory

Polynuclear Aromatic Compounds by SW846 8310

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Naphthalene	**1.05**	J	3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Acenaphthylene	**5.52**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Acenaphthene	3.63	U	3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Fluorene	3.63	U	3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Phenanthrene	**4.78**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Anthracene	3.63	U	3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Fluoranthene	**13.3**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Indeno[1,2,3-cd]pyrene	**9.12**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Pyrene	**9.47**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Benz[a]anthracene	**8.23**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Chrysene	**6.85**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Benzo[b] fluoranthene	**9.81**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Benzo[k] fluoranthene	**3.43**	J	3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Benzo[a] pyrene	**10.6**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Dibenz[a,h]anthracene	3.63	U	3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Benzo[g,h,i] perylene	**4.00**		3.63	ug/kg dry	1	L209084	09/13/2012	09/18/2012	8310
Surrogate: Triphenylene	*94 %*		*68-129*			*L209084*	*09/13/2012*	*09/18/2012*	*8310*

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 09/20/2012 19:07

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 L209084 - SW 3540C										
Blank (L209084-BLK1)				Prepared: 09/13/2012 Analyzed: 09/18/2012						
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	*156*			*ug/kg wet*	*166.67*		*94*	*68-129*		
LCS (L209084-BS1)				Prepared: 09/13/2012 Analyzed: 09/18/2012						
Naphthalene	132		3.33	ug/kg wet	166.67		79	0-127		
Acenaphthylene	141		3.33	ug/kg wet	166.67		85	50-140		
Acenaphthene	135		3.33	ug/kg wet	166.67		81	17-139		
Fluorene	141		3.33	ug/kg wet	166.67		84	28-145		
Phenanthrene	142		3.33	ug/kg wet	166.67		85	30-152		
Anthracene	141		3.33	ug/kg wet	166.67		85	19-171		
Fluoranthene	145		3.33	ug/kg wet	166.67		87	34-159		
Indeno[1,2,3-cd]pyrene	145		3.33	ug/kg wet	166.67		87	31-156		
Pyrene	142		3.33	ug/kg wet	166.67		85	33-152		
Benz[a]anthracene	149		3.33	ug/kg wet	166.67		89	32-157		
Chrysene	142		3.33	ug/kg wet	166.67		85	31-159		
Benzo[b] fluoranthene	154		3.33	ug/kg wet	166.67		93	33-164		
Benzo[k] fluoranthene	150		3.33	ug/kg wet	166.67		90	28-161		
Benzo[a] pyrene	151		3.33	ug/kg wet	166.67		91	29-149		
Dibenz[a,h]anthracene	151		3.33	ug/kg wet	166.67		90	27-153		
Benzo[g,h,i] perylene	150		3.33	ug/kg wet	166.67		90	32-157		
Surrogate: Triphenylene	*165*			*ug/kg wet*	*166.67*		*99*	*68-129*		

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WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	09/20/2012 19:07

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 L209084 - SW 3540C										
Matrix Spike (L209084-MS1)		**Source: 1206024-01**		Prepared: 09/13/2012 Analyzed: 09/19/2012						
Naphthalene	371	D	36.3	ug/kg dry	181.93	210	88	0-127		
Acenaphthylene	392	D	36.3	ug/kg dry	181.93	94.8	164*	50-140		
Acenaphthene	651	D	36.3	ug/kg dry	181.93	36.5 U	358*	17-139		
Fluorene	1400	D	36.3	ug/kg dry	181.93	36.5 U	770*	28-145		
Phenanthrene	494	D	36.3	ug/kg dry	181.93	218	152	30-152		
Anthracene	252	D	36.3	ug/kg dry	181.93	30.8	122	19-171		
Fluoranthene	707	D	36.3	ug/kg dry	181.93	149	307*	34-159		
Indeno[1,2,3-cd]pyrene	230	D	36.3	ug/kg dry	181.93	60.4	93	31-156		
Pyrene	274	D	36.3	ug/kg dry	181.93	96.5	98	33-152		
Benz[a]anthracene	490	D	36.3	ug/kg dry	181.93	118	204*	32-157		
Chrysene	227	D	36.3	ug/kg dry	181.93	440	-117*	31-159		
Benzo[b] fluoranthene	275	D	36.3	ug/kg dry	181.93	142	73	33-164		
Benzo[k] fluoranthene	192	D	36.3	ug/kg dry	181.93	62.8	71	28-161		
Benzo[a] pyrene	254	D	36.3	ug/kg dry	181.93	103	83	29-149		
Dibenz[a,h]anthracene	161	D	36.3	ug/kg dry	181.93	12.6	81	27-153		
Benzo[g,h,i] perylene	299	D	36.3	ug/kg dry	181.93	263	20*	32-157		
Surrogate: Triphenylene	*306*			*ug/kg dry*	*181.93*		*168**	*68-129*		
Matrix Spike Dup (L209084-MSD1)		**Source: 1206024-01**		Prepared: 09/13/2012 Analyzed: 09/19/2012						
Naphthalene	241	D	36.0	ug/kg dry	180.25	210	17	0-127	135*	40
Acenaphthylene	241	D	36.0	ug/kg dry	180.25	94.8	81	50-140	67*	40
Acenaphthene	49.1	D	36.0	ug/kg dry	180.25	36.5 U	27	17-139	172*	40
Fluorene	109	D	36.0	ug/kg dry	180.25	36.5 U	61	28-145	171*	40
Phenanthrene	322	D	36.0	ug/kg dry	180.25	218	58	30-152	90*	40
Anthracene	151	D	36.0	ug/kg dry	180.25	30.8	67	19-171	59*	40
Fluoranthene	234	D	36.0	ug/kg dry	180.25	149	47	34-159	147*	40
Indeno[1,2,3-cd]pyrene	211	D	36.0	ug/kg dry	180.25	60.4	83	31-156	11	40
Pyrene	188	D	36.0	ug/kg dry	180.25	96.5	51	33-152	64*	40
Benz[a]anthracene	214	D	36.0	ug/kg dry	180.25	118	53	32-157	117*	40
Chrysene	186	D	36.0	ug/kg dry	180.25	440	-140*	31-159	-18	40
Benzo[b] fluoranthene	213	D	36.0	ug/kg dry	180.25	142	39	33-164	60*	40
Benzo[k] fluoranthene	166	D	36.0	ug/kg dry	180.25	62.8	57	28-161	21	40
Benzo[a] pyrene	201	D	36.0	ug/kg dry	180.25	103	54	29-149	42*	40
Dibenz[a,h]anthracene	149	D	36.0	ug/kg dry	180.25	12.6	75	27-153	8	40
Benzo[g,h,i] perylene	219	D	36.0	ug/kg dry	180.25	263	-25*	32-157	-1830	40
Surrogate: Triphenylene	*195*			*ug/kg dry*	*180.25*		*108*	*68-129*		

PREPARATION BENCH SHEET

L209084

Lionville Laboratory

Printed: 9/14/2012 1:33:52PM

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
1206024-01	8310 PAH	09/13/2012 16:35	30.02	5				50	WC-Hanford, Inc.	
1206024-02	8310 PAH	09/13/2012 16:35	30.08	5				50	WC-Hanford, Inc.	
1206026-02	8310 PAH	09/13/2012 16:35	30.48	5				50	WC-Hanford, Inc.	
1206026-03	8310 PAH	09/13/2012 16:35	30.03	5				50	WC-Hanford, Inc.	
1206026-04	8310 PAH	09/13/2012 16:35	30.41	5				50	WC-Hanford, Inc.	
1206026-05	8310 PAH	09/13/2012 16:35	30.85	5				50	WC-Hanford, Inc.	
1206026-06	8310 PAH	09/13/2012 16:35	30.93	5				50	WC-Hanford, Inc.	
1209039-01	8310 PAH	09/13/2012 16:35	30.15	5				50	WC-Hanford, Inc.	
L209084-BLK1	QC	09/13/2012 16:35	30	5				50		
L209084-BS1	QC	09/13/2012 16:35	30	5	1200963		50	50		
L209084-BSD1	QC	09/13/2012 16:35	30	5	1200963		50	50		
L209084-MS1	QC	09/13/2012 16:35	30.15	5	1200963	1206024-01	50	50		
L209084-MS2	QC	09/13/2012 16:35	30.07	5	1200963	1206026-02	50	50		
L209084-MS3	QC	09/13/2012 16:35	30.72	5	1200963	1209039-01	50	50		
L209084-MSD1	QC	09/13/2012 16:35	30.43	5	1200963	1206024-01	50	50		
L209084-MSD2	QC	09/13/2012 16:35	30.27	5	1200963	1206026-02	50	50		
L209084-MSD3	QC	09/13/2012 16:35	30.34	5	1200963	1209039-01	50	50		

Extracts Relinquished By — Date 9/14/12

Extracts Received By — Date 09.14.12 10:50

WET CHEMISTRY

Lionville Laboratory, PADEP Lab ID# 15-00009
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WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	09/26/2012 12:36

Analytical Report for Wet Chemistry

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PR46	1206024-01	Soil	06/06/2012 13:50	06/08/2012 10:20
J1PR47	1206024-02	Soil	06/06/2012 14:00	06/08/2012 10:20

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Case Narrative

Client: WC-HANFORD RC-029 K3920
LVL#: 1206024 **Date Received:** 06-08-12

INORGANIC NARRATIVE

1. This narrative covers the analysis of 2 soil samples.

2. The samples were prepared and analyzed in accordance with the method indicated on the data summary report.

   Lionville Lab (LvL) is NELAP accredited by the State of Pennsylvania. For a complete list 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.

3. Sample holding times as required by the method and/or contract were not met as the client requested analysis past the holding times as noted on the attached Sample Discrepancy Report 12PM001.

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

5. The method blank was within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits.

7. The matrix spike recoveries were within the 75-125% control limits.

8 The replicate analysis was within the 20% Relative Percent Difference (RPD) control limit.

9. Results for soil samples are reported on a dry weight basis.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

9/26/12
Date

njp\i06-024

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 9 pages.

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12PA001

Initiator: Q. Johnson
Date: 9/13/12
Client: WC-Hanford

Batch: 1206024, 1206026
Samples: ALL except 6026-01
Method: SW846/MCAWW/CLP/

Parameter: Cr6, PAH
Matrix: Soil
Prep Batch: —

1. Reason for SDR

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

b. General Discrepancy

__ Missing Sample/Extract* __ Container Broken* __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample* __ Preservation Wrong X Received Past Hold – additional analyses request noticed
__ 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)

Samples analyzed outside of holding time

2. Known or Probable Causes(s)

client request received past holding time

3. Discussion and Proposed Action

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

Other Description:
1. Notify client of holdtime exceedance prior to performing additional analyses
2. Analyze, report and narrate

4. Project Manager Instructions...signature/date: 9/13/12

✓ Concur with Proposed Action 1 + 2
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
✓ Client Contacted:
Date/Person John Hessner 9/13/12
__ Add
__ Cancel

5. Final Action...signature/date: 9/25/12 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

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WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	09/26/2012 12:36

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Results reported from a dilution; related reporting limits are elevated due to the presence of an interference or a high target value.
*	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
LOD	Limit of Detection (LOD): the minimum estimated concentration of a target analyte that can be detected reliably. Concentrations at the LOD or between the LOD and LOQ are flagged estimated with either a 'J' qualifier or client-specific qualifier.
LOQ	Limit of Quantitation (LOQ): the minimum concentration of a target analyte that can be quantified reliably

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3920 Project Manager: Joan Kessner	**Reported:** 09/26/2012 12:36

Wet Chemistry

Lionville Laboratory

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1PR46 (1206024-01) Soil									
Hexavalent Chromium	0.22 U	0.22	0.55	mg/kg dry	1	L209124	09/19/2012 11:00	09/21/2012 10:30	SW846 7196A
J1PR47 (1206024-02) Soil									
Hexavalent Chromium	0.22 U	0.22	0.55	mg/kg dry	1	L209124	09/19/2012 11:00	09/21/2012 10:30	SW846 7196A

Lionville Laboratory, PADEP Lab ID# 15-00009
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WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3920	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	09/26/2012 12:36

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L209124 - Default Prep GenChem										
Blank (L209124-BLK1)				Prepared: 09/19/2012 11:00 Analyzed: 09/21/2012 10:30						
Hexavalent Chromium	0.20 U	0.20	0.50	mg/kg wet						
LCS (L209124-BS1)				Prepared: 09/19/2012 11:00 Analyzed: 09/21/2012 10:30						
Hexavalent Chromium	4.25	0.20	0.50	mg/kg wet	4.0000		106	80-120		
LCS (L209124-BS2)				Prepared: 09/19/2012 11:00 Analyzed: 09/21/2012 10:30						
Hexavalent Chromium	1060 D	20.0	50.0	mg/kg wet	1204.3		88	80-120		
Duplicate (L209124-DUP1)	**Source: 1206024-01**			Prepared: 09/19/2012 11:00 Analyzed: 09/21/2012 10:30						
Hexavalent Chromium	0.22 U	0.22	0.55	mg/kg dry		0.22 U				20
Matrix Spike (L209124-MS1)	**Source: 1206024-01**			Prepared: 09/19/2012 11:00 Analyzed: 09/21/2012 10:30						
Hexavalent Chromium	3.82	0.22	0.55	mg/kg dry	4.3881	0.22 U	87	75-125		
Matrix Spike (L209124-MS2)	**Source: 1206024-01**			Prepared: 09/19/2012 11:00 Analyzed: 09/21/2012 10:30						
Hexavalent Chromium	1020 D	21.9	54.9	mg/kg dry	1179.8	0.22 U	86	75-125		