SAF-RC-234
100-IU-2 & 100-IU-6 Remaining Waste Sites – Other
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

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

COMMENTS:

SDG K4052 SAF-RC-234

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 600-368

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

12 March 2013

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

Subject: Analytical Data Package

Dear Ms. Kessner:

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

LvLI Batch #	1301066
SDG #	K4052
SAF #	RC-234
Date Received	01/25/13
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	X
Herbicides	
Metals	X
TCLP 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 55 pages.

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

CHAIN OF CUSTODY

Lionville Laboratory Use Only: 1301066

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Lionville Laboratory
A Division of Eberline Analytical Corporation

Client: W.C. Hanford SAF# RC-234
Est. Final Proj. Sampling Date:
Project#:
Project Contact/Phone#:
Lionville Laboratory Project Manager: Arlette Johnson
QC: SW Del: Std TAT: 15

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

		A	B	C	D	E
Refrigerator #		2	2	2	2	2
#/Type Container	Liquid					
	Solid	1aql	1pl	1aql	1pl	1aql
Volume	Liquid					
	Solid	125	125	125	125	125
Preservatives		—	—	—	—	—
ANALYSES REQUESTED	ORGANIC: VOA					
	ORGANIC: BNA					
	ORGANIC: Pest/PCB					
	ORGANIC: Herb					
	PAHs 8310					
	INORG: Metal + Hg					
	INORG: CN					
	TCLP Metals					
	F + T					
	Arsenic					
	202, 203					
	pH					
	SFD					

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

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	8310	METALS	TCLP METALS	Arsenic	N3N2	pH	SFD
01	J1RD31	✓	✓	SE	1-22-13	0840	X	X	X	X	X	X	X

Special Instructions:
METALS = HSL + B, Mo, Si (NOTL)

Special Instructions:
1. Please Leach + Hold TCLP until directed to run by Joan Kessner
2.
3.
4.
5.
6.

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

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-234-001	Page 1 of 1

Collector Brackett, RA	Company Contact Joan Kessner	Telephone No. 509-375-4688	Project Coordinator KESSNER, JH
Price Code ~~9L~~ 8C 1-22-13 CMB	Data Turnaround ~~21 Days~~ 15 day 22-13 CMB		
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites - Other	Sampling Location 600-368		SAF No. RC-234
Ice Chest No. WCH-11-011	Field Logbook No. EL-1666	COA 0603682600	Method of Shipment fed EX
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A120716		Bill of Lading/Air Bill No. See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

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

Special Handling and/or Storage

Maintain preservation as indicated in header

Preservation	None	None	Cool 4C	Cool 4C	Cool 4C						
Type of Container	G/P	aG	G/P	aG	aG						
No. of Container(s)	1	1	1	1	1						
Volume	125mL	125mL	125mL	125mL	~~60mL~~ 125mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	~~Total Cyanide - 9010,~~ Sulfides - 9030	PAHs - 8310						
Sample No.	Matrix *	Sample Date	Sample Time								
J1RD31	OTHER	1-22-13	0840	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 1345	Received By/Stored In	Date/Time
Rob Brackett RBB	1-22-13	BHudson BHudson	1/22/13 1345
Relinquished By/Removed From	Date/Time 1425	Received By/Stored In	Date/Time 1060H1
BHudson BHudson	1/22/13	Amy	1-22-13 1425
Relinquished By/Removed From	Date/Time 1060H1	Received By/Stored In	Date/Time
Amy WCH	1-23-13 0915	fed EX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
fed Ex	1-25-13 0945	[illegible]	1-25-13 0945
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

** 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, Selenium, 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}
(3) IC Anions - 300.0 {Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; NO2/NO3 - 353.2 {Nitrogen in Nitrite and Nitrate}; pH (Water) - 9040 {pH Measurement}

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

REVIEWED BY AJ DATE 1-23-13

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

WCH-EE-011

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAF/SOW/Release #: RC-234

Date: 1-25-13

LvL Batch #: 1301066

Sample Custodian: [illegible]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7945 8178 8957
2. Custody Seals on coolers or shipping containers intact, signed & dated?	☑ Yes	☐ No	☐ No Seals
3. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	*Comments:*
4. All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible?	☑ Yes	☐ No	
5. Samples received cooled or ambient?	Temp 2.0	°C	Cooler # WCH-11-011
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☑ Yes OSJ 1/25/13	☑ No	NO2, NO3, OP04 rec'd 004
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	see item 12
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted_____ Date _____

PAHs

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

WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 17:21

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD31	1301066-01	Other Solid	01/22/2013 08:40	01/25/2013 09:45

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

Case Narrative

Client: WC-HANFORD RC-234 K4052
LVL #: 1301066

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

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

One (1) sediment sample was collected on 01-22-2013.

The sample and associated QC samples were extracted 01-29-2013 and analyzed 02-08,14-2013 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 25mLs 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 with exceptions noted on the Sample Receipt Checklist.

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

3. One (1) of five (5) surrogate recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 13GC019) has been enclosed.

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

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

6. Thirty-two (32) of thirty-two (32) matrix spike recoveries were outside QC acceptance criteria. Matrix spike recoveries were unobtainable to due dilution required for analysis due to high concentration of non-target analytes and chromatographic anomalies in the sample. A copy of the Sample Discrepancy Report (SDR# 13GC019) has been enclosed.

7. The sample and associated QC required a 100-fold instrument dilution due to high concentration of non-target analytes and chromatographic anomalies. Reporting limits have been adjusted to reflect these necessary dilutions.

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

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.

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

10. The sample was reported on a wet weight 'as received' 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

6/12/13
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 130019

Initiator: Catherine Carey
Date: 02/12/13
Client: WC Hanford

Batch: 1301064
Samples: MS4, MSD4 + 01
Method: SW846/MCAWW/CLP/

Parameter: PAH
Matrix: SOLID
Prep Batch: L301202

1. Reason for SDR

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

b. General Discrepancy

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

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

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

multiple spike recoveries outside qc limits

surrogate recoveries are low in sample #01

2. Known or Probable Causes(s)

High dilutions, so analytes are diluted below LOD.

3. Discussion and Proposed Action

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

Other Description:

Samples had large broad peaks at lower dilutions, which were being misidentified as targets, or were masking analytes.

Narrate, D

4. Project Manager Instructions...signature/date: 2/12/13

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

5. Final Action...signature/date: 2/12/13

Other Explanation:

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

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

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

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

QA-139-A-0208

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-BIK1, BS1, 1301065-01, 1301066-01, L301202-MS3 MS; MSD3, MSD4

CCV2:

CCV3:

CCV4:

CCV5:

CCV6:

CCV7:

CCV8:

LIONVILLE LABORATORY INC.

GLOSSARY OF DATA

DATA QUALIFIERS

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

ABBREVIATIONS

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

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

WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 17:21

J1RD31

1301066-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Acenaphthylene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Acenaphthene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Fluorene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Phenanthrene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Anthracene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Fluoranthene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Indeno[1,2,3-cd]pyrene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Pyrene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Benz[a]anthracene	**1850**	D	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Chrysene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Benzo[b] fluoranthene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Benzo[k] fluoranthene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Benzo[a] pyrene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Dibenz[a,h]anthracene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Benzo[g,h,i] perylene	1640	U	1640	ug/kg wet	100	L301202	01/29/2013	02/14/2013	8310
Surrogate: Triphenylene	*58 % **		*68-129*			*L301202*	*01/29/2013*	*02/14/2013*	*8310*

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WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 17:21

Polynuclear Aromatic Compounds by SW846 8310 - Quality Control

Lionville Laboratory

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

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WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 17:21

Polynuclear Aromatic Compounds by SW846 8310 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L301202 - SW 3540C										
Matrix Spike (L301202-MS4)		**Source: 1301066-01**		Prepared: 01/29/2013 Analyzed: 02/14/2013						
Naphthalene	1650	U	1650	ug/kg wet	165.56	1640 U		0-127		
Acenaphthylene	1650	U	1650	ug/kg wet	165.56	1640 U	*	50-140		
Acenaphthene	1650	U	1650	ug/kg wet	165.56	1640 U	*	17-139		
Fluorene	1650	U	1650	ug/kg wet	165.56	1640 U	*	28-145		
Phenanthrene	1650	U	1650	ug/kg wet	165.56	1640 U	*	30-152		
Anthracene	1650	U	1650	ug/kg wet	165.56	1640 U	*	19-171		
Fluoranthene	617	J, D	1650	ug/kg wet	165.56	1640 U	373*	34-159		
Indeno[1,2,3-cd]pyrene	1650	U	1650	ug/kg wet	165.56	1640 U	*	31-156		
Pyrene	1650	U	1650	ug/kg wet	165.56	1640 U	*	33-152		
Benz[a]anthracene	2170	D	1650	ug/kg wet	165.56	1850	194*	32-157		
Chrysene	1650	U	1650	ug/kg wet	165.56	1640 U	*	31-159		
Benzo[b] fluoranthene	1650	U	1650	ug/kg wet	165.56	1640 U	*	33-164		
Benzo[k] fluoranthene	1650	U	1650	ug/kg wet	165.56	1640 U	*	28-161		
Benzo[a] pyrene	1650	U	1650	ug/kg wet	165.56	1640 U	*	29-149		
Dibenz[a,h]anthracene	1650	U	1650	ug/kg wet	165.56	1640 U	*	27-153		
Benzo[g,h,i] perylene	1650	U	1650	ug/kg wet	165.56	1640 U	*	32-157		
Surrogate: Triphenylene	*207*			*ug/kg wet*	*165.56*		*125*	*68-129*		
Matrix Spike Dup (L301202-MSD4)		**Source: 1301066-01**		Prepared: 01/29/2013 Analyzed: 02/14/2013						
Naphthalene	1650	U	1650	ug/kg wet	165.07	1640 U		0-127		40
Acenaphthylene	1650	U	1650	ug/kg wet	165.07	1640 U	*	50-140		40
Acenaphthene	725	J, D	1650	ug/kg wet	165.07	1640 U	439*	17-139		40
Fluorene	1650	U	1650	ug/kg wet	165.07	1640 U	*	28-145		40
Phenanthrene	1650	U	1650	ug/kg wet	165.07	1640 U	*	30-152		40
Anthracene	1650	U	1650	ug/kg wet	165.07	1640 U	*	19-171		40
Fluoranthene	820	J, D	1650	ug/kg wet	165.07	1640 U	497*	34-159	29	40
Indeno[1,2,3-cd]pyrene	1650	U	1650	ug/kg wet	165.07	1640 U	*	31-156		40
Pyrene	1650	U	1650	ug/kg wet	165.07	1640 U	*	33-152		40
Benz[a]anthracene	2070	D	1650	ug/kg wet	165.07	1850	138	32-157	33	40
Chrysene	1650	U	1650	ug/kg wet	165.07	1640 U	*	31-159		40
Benzo[b] fluoranthene	1650	U	1650	ug/kg wet	165.07	1640 U	*	33-164		40
Benzo[k] fluoranthene	1650	U	1650	ug/kg wet	165.07	1640 U	*	28-161		40
Benzo[a] pyrene	1650	U	1650	ug/kg wet	165.07	1640 U	*	29-149		40
Dibenz[a,h]anthracene	1650	U	1650	ug/kg wet	165.07	1640 U	*	27-153		40
Benzo[g,h,i] perylene	1650	U	1650	ug/kg wet	165.07	1640 U	*	32-157		40
Surrogate: Triphenylene	*213*			*ug/kg wet*	*165.07*		*129*	*68-129*		

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

00000016

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301060-01	8310 PAH	01/29/2013 13:26	31.71	5				50	WC-Hanford, Inc.	
1301060-02	8310 PAH	01/29/2013 13:26	30.12	5				50	WC-Hanford, Inc.	
1301060-03	8310 PAH	01/29/2013 13:26	30.68	5				50	WC-Hanford, Inc.	
1301062-01	8310 PAH	01/29/2013 13:26	30.64	5				50	WC-Hanford, Inc.	
1301065-01	8310 PAH	01/29/2013 13:26	30.1	25				50	WC-Hanford, Inc.	
1301066-01	8310 PAH	01/29/2013 13:26	30.52	25				50	WC-Hanford, Inc.	
1301067-01	8310 PAH	01/29/2013 13:26	30.12	40				50	WC-Hanford, Inc.	
1301067-02	8310 PAH	01/29/2013 13:26	30.87	40				50	WC-Hanford, Inc.	
1301067-03	8310 PAH	01/29/2013 13:26	30.13	40				50	WC-Hanford, Inc.	
L301202-BLK1	QC	01/29/2013 13:26	30	5				50		
L301202-BS1	QC	01/29/2013 13:26	30	5	1300078		50	50		
L301202-MS1	QC	01/29/2013 13:26	30.69	5	1300078	1301060-01	50	50		
L301202-MS2	QC	01/29/2013 13:26	30.18	5	1300078	1301062-01	50	50		
L301202-MS3	QC	01/29/2013 13:26	30.25	25	1300078	1301065-01	50	50		
L301202-MS4	QC	01/29/2013 13:26	30.2	25	1300078	1301066-01	50	50		
L301202-MS5	QC	01/29/2013 13:26	30.11	40	1300078	1301067-02	50	50		
L301202-MSD1	QC	01/29/2013 13:26	30.27	5	1300078	1301060-01	50	50		
L301202-MSD2	QC	01/29/2013 13:26	30.48	5	1300078	1301062-01	50	50		
L301202-MSD3	QC	01/29/2013 13:26	30.25	25	1300078	1301065-01	50	50		
L301202-MSD4	QC	01/29/2013 13:26	30.29	25	1300078	1301066-01	50	50		

Revision CAC 2/12/13

Extracts Relinquished By Date Extracts Received By Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

00000017

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L301202-MSD5	QC	01/29/2013 13:26	30.19	40	1300078	1301067-02	50	50		

Revision CAL 2/12/13

Extracts Relinquished By Date

Extracts Received By Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301060-01	8310 PAH	01/29/2013 13:26	31.71	5				50	WC-Hanford, Inc.	
1301060-02	8310 PAH	01/29/2013 13:26	30.12	5				50	WC-Hanford, Inc.	
1301060-03	8310 PAH	01/29/2013 13:26	30.68	5				50	WC-Hanford, Inc.	
1301062-01	8310 PAH	01/29/2013 13:26	30.64	5				50	WC-Hanford, Inc.	
1301065-01	8310 PAH	01/29/2013 13:26	30.1	25				50	WC-Hanford, Inc.	
1301066-01	8310 PAH	01/29/2013 13:26	30.52	25				50	WC-Hanford, Inc.	
1301067-01	8310 PAH	01/29/2013 13:26	30.12	40				50	WC-Hanford, Inc.	
1301067-02	8310 PAH	01/29/2013 13:26	30.87	40				50	WC-Hanford, Inc.	
1301067-03	8310 PAH	01/29/2013 13:26	30.13	40				50	WC-Hanford, Inc.	
L301202-BLK1	QC	01/29/2013 13:26	30	5				50		
L301202-BS1	QC	01/29/2013 13:26	30	5	1300078		50	50		
L301202-MS1	QC	01/29/2013 13:26	30.69	5	1300078	1301060-01	50	50		
L301202-MS2	QC	01/29/2013 13:26	30.18	5	1300078	1301062-01	50	50		
L301202-MS3	QC	01/29/2013 13:26	30.25	25	1300078	1301065-01	50	50		
L301202-MS4	QC	01/29/2013 13:26	30.2	25	1300078	1301~~067~~066-01	50	50		
L301202-MS5	QC	01/29/2013 13:26	30.11	40	1300078	1301067-02	50	50		
L301202-MSD1	QC	01/29/2013 13:26	30.27	5	1300078	1301060-01	50	50		
L301202-MSD2	QC	01/29/2013 13:26	30.48	5	1300078	1301062-01	50	50		
L301202-MSD3	QC	01/29/2013 13:26	30.25	25	1300078	1301065-01	50	50		
L301202-MSD4	QC	01/29/2013 13:26	30.29	25	1300078	1301~~067~~066-01	50	50		

Revision — Extracts Relinquished By — Date

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

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

00000019

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L301202-MSD5	QC	01/29/2013 13:26	30.19	40	1300078	1301067-02	50	50		

Revision

Extracts Relinquished By Date

LC 2-11-13

Extracts Received By Date

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

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

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

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

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

PREPARATION BENCH SHEET

L301202

Lionville Laboratory

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

000000021

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

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

Extracts Relinquished By 1/31/13 1455 Date

Extracts Received By UC 2-1-13 Date

METALS

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

WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 14:57

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD31	1301066-01	Other Solid	01/22/2013 08:40	01/25/2013 09:45

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

Case Narrative

Client: WC-HANFORD RC-234
LVL#: 1301066
SDG/SAF#: K4052/RC-234

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

METALS

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

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

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

2. The sample was prepared and analyzed in accordance with methods listed on the data report forms. The sample was reported on a wet weight 'as received' basis.

   The sample was analyzed and reported 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 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 10 analytes were outside the 75-125% control limits.

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

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

12. The duplicate analyses for 6 analytes were outside 20% Relative Percent Difference (RPD) control limit criteria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL. The sample results for Boron, Cadmium, Mercury, and Sodium 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

3/12/13
Date

m1301066hgno%rgc.doc

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 14:57

Notes and Definitions

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

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

WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 14:57

J1RD31
1301066-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**6320**		52.6	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Antimony	2.63	U	2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Arsenic	**3.07**		2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Barium	**352**		1.32	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Beryllium	**0.279**	B	0.526	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Boron	**3.32**	B	5.26	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Cadmium	**0.412**	B	0.658	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Calcium	**7580**		52.6	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Chromium	**373**		2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Cobalt	**10.9**		7.89	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Copper	**10.9**		5.26	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Iron	**18500**		52.6	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Lead	**2090**		2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Magnesium	**5440**		13.2	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Manganese	**235**		2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Molybdenum	2.63	U	2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Nickel	**7.39**		6.58	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Potassium	**1010**		263	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Selenium	2.63	U	2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Silicon	**231**		15.8	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Silver	2.63	U	2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Sodium	**244**		132	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Vanadium	**51.2**		2.63	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Zinc	**17700**		7.89	mg/kg wet	3	L302012	02/04/2013	02/06/2013	6010B
Mercury	**0.0142**		0.0273	mg/kg wet	1	L302014	02/04/2013	02/05/2013	7471A

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

WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 14:57

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302012 - SW 3050B										
Blank (L302012-BLK1)				Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	4.81	U	4.81	mg/kg wet						
Antimony	0.577	U	0.577	mg/kg wet						
Arsenic	0.962	U	0.962	mg/kg wet						
Barium	0.481	U	0.481	mg/kg wet						
Beryllium	0.192	U	0.192	mg/kg wet						
Boron	1.92	U	1.92	mg/kg wet						
Cadmium	0.192	U	0.192	mg/kg wet						
Calcium	8.94	B	96.2	mg/kg wet						
Chromium	0.192	U	0.192	mg/kg wet						
Cobalt	1.92	U	1.92	mg/kg wet						
Copper	0.962	U	0.962	mg/kg wet						
Iron	19.2	U	19.2	mg/kg wet						
Lead	0.481	U	0.481	mg/kg wet						
Magnesium	3.72	B	72.1	mg/kg wet						
Manganese	4.81	U	4.81	mg/kg wet						
Molybdenum	1.92	U	1.92	mg/kg wet						
Nickel	3.85	U	3.85	mg/kg wet						
Potassium	385	U	385	mg/kg wet						
Selenium	0.288	U	0.288	mg/kg wet						
Silicon	1.99		1.92	mg/kg wet						
Silver	0.192	U	0.192	mg/kg wet						
Sodium	9.73	B	48.1	mg/kg wet						
Vanadium	2.40	U	2.40	mg/kg wet						
Zinc	9.62	U	9.62	mg/kg wet						
Duplicate (L302012-DUP5)		**Source: 1301066-01**		Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	5730		13.2	mg/kg wet		6320			9.70	20
Antimony	1.58	U	1.58	mg/kg wet		2.63 U				20
Arsenic	2.65		2.63	mg/kg wet		3.07			14.6	20
Barium	263		1.32	mg/kg wet		352			28.9*	20
Beryllium	0.247	B	0.526	mg/kg wet		0.279			12.2	20
Boron	4.18	B	5.26	mg/kg wet		3.32			22.8*	20
Cadmium	0.544		0.526	mg/kg wet		0.412			27.7*	20
Calcium	9270		263	mg/kg wet		7580			20.1*	20
Chromium	518		0.526	mg/kg wet		373			32.6*	20
Cobalt	12.2		5.26	mg/kg wet		10.9			11.1	20
Copper	9.96		2.63	mg/kg wet		10.9			9.04	20

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

WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 14:57

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302012 - SW 3050B										
Duplicate (L302012-DUP5)		**Source: 1301066-01**		Prepared: 02/04/2013 Analyzed: 02/06/2013						
Iron	16300		52.6	mg/kg wet		18500			12.8	20
Lead	2800		1.32	mg/kg wet		2090			29.1*	20
Magnesium	5820		197	mg/kg wet		5440			6.73	20
Manganese	214		13.2	mg/kg wet		235			9.28	20
Molybdenum	5.26	U	5.26	mg/kg wet		2.63 U				20
Nickel	8.18	B	10.5	mg/kg wet		7.39			10.1	20
Potassium	980	B	1050	mg/kg wet		1010			2.78	20
Selenium	0.789	U	0.789	mg/kg wet		2.63 U				20
Silicon	329		5.26	mg/kg wet		231			35.1*	20
Silver	0.526	U	0.526	mg/kg wet		2.63 U				20
Sodium	182		132	mg/kg wet		244			28.7*	20
Vanadium	46.8		6.58	mg/kg wet		51.2			9.02	20
Zinc	23400		26.3	mg/kg wet		17700			28.1*	20
Matrix Spike (L302012-MS5)		**Source: 1301066-01**		Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	7080		12.5	mg/kg wet	166.67	6320	456*	75-125		
Antimony	12.5		1.50	mg/kg wet	41.667	2.63 U	30.1*	75-125		
Arsenic	157		2.50	mg/kg wet	166.67	3.07	92.6	75-125		
Barium	440		1.25	mg/kg wet	166.67	352	52.6*	75-125		
Beryllium	4.08		0.500	mg/kg wet	4.1667	0.279	91.2	75-125		
Boron	79.2		5.00	mg/kg wet	83.333	3.32	91.0	75-125		
Cadmium	4.52		0.500	mg/kg wet	4.1667	0.412	98.5	75-125		
Calcium	10800		250	mg/kg wet	2083.3	7580	153*	75-125		
Chromium	436		0.500	mg/kg wet	16.667	373	382*	75-125		
Cobalt	48.7		5.00	mg/kg wet	41.667	10.9	90.8	75-125		
Copper	29.6		2.50	mg/kg wet	20.833	10.9	90.0	75-125		
Iron	17200		50.0	mg/kg wet	83.333	18500	-1540*	75-125		
Lead	2370		1.25	mg/kg wet	41.667	2090	662*	75-125		
Magnesium	7430		188	mg/kg wet	2083.3	5440	95.4	75-125		
Manganese	262		12.5	mg/kg wet	41.667	235	65.3*	75-125		
Molybdenum	74.7		5.00	mg/kg wet	83.333	2.63 U	89.7	75-125		
Nickel	44.3		10.0	mg/kg wet	41.667	7.39	88.6	75-125		
Potassium	2870		1000	mg/kg wet	2083.3	1010	89.5	75-125		
Selenium	144		0.750	mg/kg wet	166.67	2.63 U	86.4	75-125		
Silicon	382		5.00	mg/kg wet	83.333	231	181*	75-125		
Silver	3.54		0.500	mg/kg wet	4.1667	2.63 U	85.0	75-125		
Sodium	2290		125	mg/kg wet	2083.3	244	98.3	75-125		

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WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 14:57

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302012 - SW 3050B									
Matrix Spike (L302012-MS5)		**Source: 1301066-01**	Prepared: 02/04/2013 Analyzed: 02/06/2013						
Vanadium	90.7	6.25	mg/kg wet	41.667	51.2	94.8	75-125		
Zinc	19400	25.0	mg/kg wet	41.667	17700	4090*	75-125		
Post Spike (L302012-PS5)		**Source: 1301066-01**	Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	133000		ug/L	66000	72000	92.0	75-125		
Antimony	314		ug/L	300.00	0.773	105	75-125		
Barium	4280		ug/L	300.00	4010	89.0	75-125		
Calcium	141000		ug/L	62400	86400	88.2	75-125		
Chromium	4490		ug/L	300.00	4250	80.0	75-125		
Iron	319000		ug/L	126000	211000	85.5	75-125		
Manganese	5350		ug/L	3000.0	2670	89.2	75-125		
Silicon	9310		ug/L	6300.0	2630	106	75-125		
Reference (L302012-SRM1)			Prepared: 02/04/2013 Analyzed: 02/06/2013						
Aluminum	10800	14.2	mg/kg wet	6670.0		162	0-200.89		
Antimony	45.9	1.70	mg/kg wet	53.000		86.7	0-235.8		
Arsenic	115	2.83	mg/kg wet	114.00		101	82.8-117.54		
Barium	290	1.42	mg/kg wet	307.00		94.6	79.8-120.2		
Beryllium	108	0.566	mg/kg wet	108.00		100	82.8-117.6		
Boron	80.2	5.66	mg/kg wet	85.100		94.3	67.5-132.8		
Cadmium	230	0.566	mg/kg wet	225.00		102	83.6-116.4		
Calcium	3310	283	mg/kg wet	3360.0		98.4	83.3-116.9		
Chromium	81.5	0.566	mg/kg wet	77.200		106	73.3-126.4		
Cobalt	166	5.66	mg/kg wet	166.00		99.9	80.7-118.7		
Copper	276	2.83	mg/kg wet	271.00		102	80.8-119.2		
Iron	8570	56.6	mg/kg wet	8420.0		102	78.6-121.1		
Lead	181	1.42	mg/kg wet	190.00		95.0	81.6-118.4		
Magnesium	7490	212	mg/kg wet	8570.0		87.4	83.2-116.7		
Manganese	968	14.2	mg/kg wet	965.00		100	69.3-130.5		
Molybdenum	235	5.66	mg/kg wet	235.00		100	76.2-123.8		
Nickel	222	11.3	mg/kg wet	221.00		100	79.6-120.8		
Potassium	13900	1130	mg/kg wet	14400		96.9	81.9-118.1		
Selenium	190	0.849	mg/kg wet	187.00		101	75.9-124.6		
Silicon	501	5.66	mg/kg wet	807.00		62.1	0-219.3		
Silver	84.5	0.566	mg/kg wet	83.500		101	82.7-117.1		
Sodium	9610	142	mg/kg wet	9730.0		98.8	82.5-117.2		
Vanadium	106	7.08	mg/kg wet	98.700		107	75.9-123.6		
Zinc	198	28.3	mg/kg wet	199.00		99.6	78.4-121.6		

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WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/12/2013 14:57

Metals by SW846 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302012 - SW 3050B										
Batch L302014 - SW 7471A Prep										
Blank (L302014-BLK1)				Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	0.0290	U	0.0290	mg/kg wet						
Duplicate (L302014-DUP5)		**Source: 1301066-01**		Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	0.0239		0.0257	mg/kg wet		0.0142			50.5*	20
Matrix Spike (L302014-MS5)		**Source: 1301066-01**		Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	0.173		0.0257	mg/kg wet	0.14286	0.0142	111	75-125		
Reference (L302014-SRM1)				Prepared: 02/04/2013 Analyzed: 02/05/2013						
Mercury	1.29		0.0290	mg/kg wet	1.2900		99.8	62.6-138		

Lionville Laboratory **Logbook #:** 1194

SAMPLE DIGESTION RECORD

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

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

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/ TC	Texture	Color / Appearance	Artifact	Turb
1301062-01		0.56	50		TO	fine	dark brown soil	roots	
L302012-DUP1		0.53	50			↓	↓	↓	↓
MS1	0.5	0.58	50			↓	↓	↓	↓
1302063-01		0.54	50			fine	light brown, dusty	vegetation, moss, roots	
L302012-DUP2		0.55	50			↓	↓	↓	↓
MS2	0.5	0.54	50			↓	↓	↓	↓
1302064-01		0.57	50			fine	light brown dusty	moss, chalk/gypsum (?)	
L302012-DUP3		0.53	50			↓	↓	↓	↓
MS3	0.5	0.58	50			↓	↓	↓	↓
1302065-01		0.58	50			not fine	brown soil	green flakes (?)	
L302012-DUP4		0.56	50			↓	↓	↓	↓
MS4	0.5	0.58	50			↓	↓	↓	↓
1302066-01		0.57	50			not fine	brown, soil	green chunks/flakes, roots	
L302012-DUP5		0.57	50			↓	↓	↓	↓
MS5	0.5	0.60	50			↓	↓	↓	↓
1302067-01		0.59	50			fine	nearly black soil	vegetation	
L302012-DUP6		0.56	50			↓	↓	↓	↓
MS6	0.5	0.59	50			↓	↓	↓	↓
1302067-02		0.54	50			fine	brown soil	roots	
03		0.62	50			fine	brown soil	vegetation	
L302012-BLK1		0.52	50			coarse	boiling chips		
SRM1	(*)	0.53	50			fine	pink, sandy		

MW 2/4/13

Spiking IDs / Expiration Date:
MS#: 1300144

LCS#: 1201014 (*)

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

File ID#:

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

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Signed\SPI\Metals Digestion log.doc

Page #:

Lionville Laboratory

MERCURY PREPARATION

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

Instrument ID: H631
Balance # B14 /NA
Pipette Calibration (Daily) (Y) ____

Logbook # 1198
Prep Batch: L302014
Worksheet: HG020501
SOP No. ME-HgCVAA
BLOCK (1) 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH < 2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
Blank				10ml	50	
0.2ug/l		0.100		10ml	50	
1.0ug/l		0.500		10ml	50	
2.0ug/l		1.000		10ml	50	
5.0ug/l		2.500		10ml	50	
10.0ug/l		5.000		10ml	50	
ICV		0.125	2.5	10ml	50	
CCV		0.250	5.0	10ml	50	
ICB/CCB				10ml	50	
L302014-BLK1				0.31	50	
w.e. 2/4/13 1 SRM1		(*)	(*)	0.31	50	
1302062-01			w.e. 2/4/13	~~0.34~~ 0.37	50	
L302014-DUP1				0.38 0.39	50	
w.e. 2/4/13 1 MS1		0.500	1.0	0.35	50	
1302063-01				0.32	50	
L302014-DUP2				0.36	50	
w.e. 2/4/13 1 MS2		0.500	1.0	0.33	50	
1302064-01				0.32	50	
L302014-DUP3				0.37	50	
w.e. 2/4/13 1 MS3		0.500	1.0	0.34	50	
1302065-01				0.37	50	
L302014-DUP4				0.34	50	
w.e. 2/4/13 1 MS4		0.500	1.0	0.38	50	
1302066-01				0.33	50	
L302014-DUP5				0.35	50	
w.e. 2/4/13 1 MS5		0.500	1.0	0.35	50	
1302067-01				0.32	50	

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

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

se book # 1198 for std traceability information

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

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

ME-HgCVAA-Prep0910

Page #:

Lionville Laboratory

MERCURY PREPARATION

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

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

Logbook # 1198
Prep Batch: L302014
Worksheet: HG020501
SOP No. ME-HgCVAA
BLOCK (1) 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH <2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
L302014-0086				0.33	50	
MSG		0.500	1.0	0.38	50	
1308067-02				0.39	50	
w.e. AW 2/4/13 03				0.36	50	

AW 2/4/13

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

034

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

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

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

ME-HgCVAA-Prep0910

Page #:

000000034

TCLP METALS

264 Welsh Pool Road
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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-234 Project Number: K4052 Project Manager: Joan Kessner	**Reported:** 02/27/2013 14:08

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

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD31	1301066-01	Other Solid	01/22/2013 08:40	01/25/2013 09:45

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Case Narrative

Client: WC-HANFORD RC-234
LVL#: 1301066
SDG/SAF#: K4052/RC-234

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

METALS

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

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

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

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

   The TCLP leachate sample was analyzed and reported with a 5-fold dilution for ICP metals due to sample matrix.

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

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

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

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

7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation, MB value less than 5% of the RCRA limit, or samples were greater than 20X MB value}.

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

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

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

10. The TCLP leachate duplicate analyses were within the 20% Relative Percent Difference (RPD) control limit critieria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL.

11. The TCLP extract from sample J1RD31 was selected for the matrix spike (MS) for this analytical batch. All MS recoveries were greater than 50% as per method criteria

    The matrix spike (MS) concentration for Mercury was equivalent to the regulatory level (200 ppb) as per SW846 method 1311. The required spike concentration is above the linear range of the instrument, resulting in a 50-fold dilution. The MS recovery was greater than 50% as per method criteria.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

3/12/13
Date

jjw/m01-066tc2013

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-234 Project Number: K4052 Project Manager: Joan Kessner	**Reported:** 02/27/2013 14:08

Notes and Definitions

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

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-234 Project Number: K4052 Project Manager: Joan Kessner	**Reported:** 02/27/2013 14:08

J1RD31
1301066-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
TCLP Metals by SW846 1311 6000/7000 series									
Arsenic	0.0750	U	0.0750	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Barium	**1.56**		0.00500	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Cadmium	0.0150	U	0.0150	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Chromium	**0.110**		0.0250	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Lead	**1.71**		0.0500	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Selenium	0.100	U	0.100	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Silver	0.0300	U	0.0300	mg/L	5	L302145	02/21/2013	02/22/2013	6010
Mercury	0.000200	U	0.000200	mg/L	1	L302147	02/26/2013	02/27/2013	7470

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-234 Project Number: K4052 Project Manager: Joan Kessner	**Reported:** 02/27/2013 14:08

TCLP Metals by SW846 1311 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302145 - SW 3010A										
Blank (L302145-BLK1)				Prepared: 02/21/2013 Analyzed: 02/22/2013						
Arsenic	0.0150	U	0.0150	mg/L						
Barium	0.00100	U	0.00100	mg/L						
Cadmium	0.00300	U	0.00300	mg/L						
Chromium	0.00500	U	0.00500	mg/L						
Lead	0.0100	U	0.0100	mg/L						
Selenium	0.0200	U	0.0200	mg/L						
Silver	0.00600	U	0.00600	mg/L						
Blank (L302145-BLK2)				Prepared: 02/21/2013 Analyzed: 02/22/2013						
Arsenic	0.0750	U	0.0750	mg/L						
Barium	0.00500	U	0.00500	mg/L						
Cadmium	0.0150	U	0.0150	mg/L						
Chromium	0.0250	U	0.0250	mg/L						
Lead	0.0500	U	0.0500	mg/L						
Selenium	0.100	U	0.100	mg/L						
Silver	0.0300	U	0.0300	mg/L						
LCS (L302145-BS1)				Prepared: 02/21/2013 Analyzed: 02/22/2013						
Arsenic	10.0		0.0150	mg/L	10.000		100	80-120		
Barium	5.13		0.00100	mg/L	5.0000		103	80-120		
Cadmium	0.257		0.00300	mg/L	0.25000		103	80-120		
Chromium	0.506		0.00500	mg/L	0.50000		101	80-120		
Lead	2.46		0.0100	mg/L	2.5000		98.2	80-120		
Selenium	9.68		0.0200	mg/L	10.000		96.8	80-120		
Silver	0.504		0.00600	mg/L	0.50000		101	80-120		
Duplicate (L302145-DUP3)		**Source: 1301066-01**		Prepared: 02/21/2013 Analyzed: 02/22/2013						
Arsenic	0.0750	U	0.0750	mg/L		0.0750 U				20
Barium	1.50		0.00500	mg/L		1.56			3.53	20
Cadmium	0.0150	U	0.0150	mg/L		0.0150 U				20
Chromium	0.107		0.0250	mg/L		0.110			2.95	20
Lead	1.67		0.0500	mg/L		1.71			2.69	20
Selenium	0.100	U	0.100	mg/L		0.100 U				20
Silver	0.0300	U	0.0300	mg/L		0.0300 U				20

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Phone: 610-280-3000
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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-234 Project Number: K4052 Project Manager: Joan Kessner	**Reported:** 02/27/2013 14:08

TCLP Metals by SW846 1311 6000/7000 series - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302145 - SW 3010A										
Matrix Spike (L302145-MS3)		**Source: 1301066-01**		Prepared: 02/21/2013 Analyzed: 02/22/2013						
Arsenic	5.24		0.0750	mg/L	5.0000	0.0750 U	105	50-1000		
Barium	98.8		0.00500	mg/L	100.00	1.56	97.3	50-1000		
Cadmium	1.03		0.0150	mg/L	1.0000	0.0150 U	103	50-1000		
Chromium	5.16		0.0250	mg/L	5.0000	0.110	101	50-1000		
Lead	6.55		0.0500	mg/L	5.0000	1.71	96.7	50-1000		
Selenium	1.02		0.100	mg/L	1.0000	0.100 U	102	50-1000		
Silver	5.16		0.0300	mg/L	5.0000	0.0300 U	103	50-1000		
Batch L302147 - SW 7470A Prep										
Blank (L302147-BLK1)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L						
Blank (L302147-BLK2)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L						
Blank (L302147-BLK3)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L						
LCS (L302147-BS1)				Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.00527		0.000200	mg/L	0.0050000		105	80-120		
Duplicate (L302147-DUP4)		**Source: 1301066-01**		Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.000200	U	0.000200	mg/L		0.000200 U				20
Matrix Spike (L302147-MS4)		**Source: 1301066-01**		Prepared: 02/26/2013 Analyzed: 02/27/2013						
Mercury	0.192		0.0100	mg/L	0.20000	0.000200 U	96.2	50-1000		

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

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

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

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

SPI-1311.1-A-0310

Reviewed By/Date _____ 2/1/13

Page #

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

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

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

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

SPI-1311.1-A-0310 Reviewed By/Date RH 2/1/13 Page #

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

Start Date: 1/30/13 Start Time: 12:08 Analyst: RH SOP: SPI-1311.1	End Date: 1/31/13 End Time: 8:00 Analyst: RH Method: 1311/1	Tumbler Speed: 31 RPM Leachate Batch #: L301209 Leachate Page: 3 of 3 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria: 23°C ± 2°**

LvL #: 1301067-01 Client ID#: JIRD32 pH After 5 Min: 6.52 pH After Acid/Heat: 1.96 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.93	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1301067-02 Client ID#: JIRD33 pH After 5 Min: 6.56 pH After Acid/Heat: 2.03 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.89	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1301067-03 Client ID#: JIRD34 pH After 5 Min: 6.36 pH After Acid/Heat: 2.04 Extraction Fluid/pH: #1 4.92 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 4.89	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: L301209 Client ID#: N/A pH After 5 Min: N/A pH After Acid/Heat: N/A Extraction Fluid/pH: N/A Sample Wt.(g): N/A Extract Fluid Vol.(mL): N/A pH After Extraction: N/A	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: BLANK

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

SPI-1311.1-A-0310 Reviewed By/Date 1/31/13 Page #

Lionville Laboratory

Logbook #: 1194

SAMPLE DIGESTION RECORD

Digestion Batch #: L302145
Date/Time Initiated: 2/21/13 1330
Date/Time Completed: 2/22/13 1310
Analyst: MW
Matrix (circle): Soil Water Other TCLP
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.
NOTE: All temperatures are recorded as corrected temperatures

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

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/ TC	Texture	Color / Appearance	Artifact	Turb
1301062-01		50	50	<	TC		clear, nearly colorless		
L302145-DUP1		50	50	<					
MS1	0.5	50	50						
1301065-01		50	50	<			clear, nearly colorless		
L302145-DUP2		50	50	<					
MS2	0.5	50	50						
1301066-01		50	50	<			clear, nearly colorless		
L302145-DUP3		50	50	<					
MS3	0.5	50	50						
BL4		50	50				clear, colorless		
BS1	0.5	50	50						
BLK2		50	50	<					

MW 2/21/13

Spiking IDs / Expiration Date:
MS#: 1201195
1200388
LCS#: 1201583

Reagent IDs:
HNO_3 0000005390
HCl
H_2O_2
1:1 HNO_3
1:1 HCl 637-069-01

File ID#:

Data Review By/Date:
PMP, 02/28/13

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

Page #:

Lionville Laboratory

MERCURY PREPARATION

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

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

Logbook # 1198
Prep Batch: L302147
Worksheet: HG-022701
SOP No. ME-HgCVAA
BLOCK 1 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH <2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
Blank				35	35	
0.2 µg/L		0.070		35	35	
1.0 µg/L		0.350		35	35	
2.0 µg/L		0.700		35	35	
5.0 µg/L		1.750		35	35	
10.0 µg/L		3.500		35	35	
ICV		0.0875	2.5	35	35	
CCV		0.175	5.0	35	35	
ICB/CCB				35	35	
L302147-BLK1				35	35	
BS1		0.175	5.0	35	35	
BLK2	<			35	35	
BLK3	<			35	35	
1301060-01	<			35	35	
02	<			35	35	
03	<			35	35	
L302147-DUP1	<			35	35	
MS1		0.700	200 *	35	35	
1301062-01	<			35	35	
L302147-DUP2	<			35	35	
MS2		0.700	200 *	35	35	
1301065-01	<			35	35	
L302147-DUP3	<			35	35	
MS3		0.700	200 *	35	35	
1301066-01	<			35	35	
L302147-DUP4	<			35	35	
MS4		0.700	200 *	35	35	

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

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

se book # 1198 for std traceability information

Soil LCS True Value = N/A mg/Kg
Standard #

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

* used 1201234 (10 µg/ml)

ME-HgCVAA-Prep0910

Page #:

Lionville Laboratory

MERCURY PREPARATION

Logbook # 1198

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

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

Prep Batch: L302147
Worksheet: HG022701
SOP No. ME-HgCVAA
BLOCK (1) 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH < 2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol. (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
1302003-01				35	35	
L302147-DUP5				35	35	
MS5		0.700	200*	35	35	
1302004-01				35	35	cancelled
L302147-DUP6				35	35	
MS6		0.700	200*	35	35	
1302005-01				35	35	
L302147-DUP7				35	35	
MS7		0.700	200*	35	35	
1302005-02				35	35	
1302013-01				35	35	
L302147-DUP8				35	35	
MS8		0.700	200*	35	35	
1302-013-02				35	35	
03				35	35	
04				35	35	
1302014-01				35	35	cancelled
L302147-DUP9				35	35	
MS9		0.700	200*	35	35	

[illegible] 2/26/13

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

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

se book # 1198 for std traceability information

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

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

see see pg 051A

ME-HgCVAA-Prep0910

Page #:

WET CHEMISTRY

Lionville Laboratory, PADEP Lab ID# 15-00009
264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-234 Project Number: K4052 Project Manager: Joan Kessner	**Reported:** 02/05/2013 14:05

Analytical Report for Wet Chemistry

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD31	1301066-01	Other Solid	01/22/2013 08:40	01/25/2013 09:45

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

Case Narrative

Client: WC-HANFORD RC-234 K4052
LVL#: 1301066 **Date Received:** 01-25-13

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 solid sample. The sample was found to contain a Sulfide amount that exceeds the range of the requested method at the prescribed sample size of 10g. The sample was re-prepared at 1g and still exceeded the range; the reported result for Sulfide had no accompanying quality control analyses due to this exceedence and possible contamination of the Laboratory Control Samples.

2. The sample was 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 received past hold and Sulfide that was analyzed past hold.

4. The results presented in this report are derived from samples that met LvL's sample acceptance policy with the exception noted on the Sample Receipt Checklist.

5. The method blanks were within the method criteria.

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

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.

9. Results for solid samples are reported on an "as-received" 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. The Laboratory Manager or a designee, as verified by the following signature, has authorized release of the data contained in this hard copy package.

Iain Daniels
Laboratory Manager
Lionville Laboratory

3/12/13
Date

njp\i01-066

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, PADEP Lab ID# 15-00009
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-234 Project Number: K4052 Project Manager: Joan Kessner	**Reported:** 02/05/2013 14:05

Notes and Definitions

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

Lionville Laboratory, PADEP Lab ID# 15-00009
264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/05/2013 14:05

Wet Chemistry

Lionville Laboratory

Analyte	Result and Qualifier		LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1RD31 (1301066-01) Other Solid										
Bromide	0.9	U	0.9	4.7	mg/kg wet	1	L301221	01/30/2013 13:30	01/30/2013 20:04	EPA 300.0 (1993)
Chloride	**1.5**	B	0.9	4.7	mg/kg wet	1	L301221	01/30/2013 13:30	01/30/2013 20:04	EPA 300.0 (1993)
Fluoride	0.9	U	0.9	4.7	mg/kg wet	1	L301221	01/30/2013 13:30	01/30/2013 20:04	EPA 300.0 (1993)
Nitrate	**12.2**		0.9	4.7	mg/kg wet	1	L301221	01/30/2013 13:30	01/30/2013 20:04	EPA 300.0 (1993)
Nitrite	0.9	U	0.9	4.7	mg/kg wet	1	L301221	01/30/2013 13:30	01/30/2013 20:04	EPA 300.0 (1993)
Orthophosphate	1.9	U	1.9	9.4	mg/kg wet	1	L301221	01/30/2013 13:30	01/30/2013 20:04	EPA 300.0 (1993)
Sulfate	**121**		1.9	9.4	mg/kg wet	2	L301221	01/30/2013 13:30	01/31/2013 11:36	EPA 300.0 (1993)
Nitrate/Nitrite as N	**2.97**		0.09	0.47	mg/kg wet	1	L301215	01/30/2013 13:30	01/30/2013 15:44	EPA 353.2
Sulfide	**8120**		397	993	mg/kg wet	1	L302036	02/04/2013 10:00	02/04/2013 11:00	SW846 9034
pH	**6.55**		0.10	0.10	pH Units	1	L301204	01/29/2013 12:20	01/29/2013 14:09	SW846 9045D

Lionville Laboratory, PADEP Lab ID# 15-00009
264 Welsh Pool Road
Exton, PA 19341
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WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/05/2013 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 L301204 - Default Prep GenChem										
Duplicate (L301204-DUP3)	**Source: 1301066-01**			Prepared: 01/29/2013 12:20 Analyzed: 01/29/2013 14:10						
pH	6.65	0.10	0.10	pH Units		6.55			1.52	20
Reference (L301204-SRM1)				Prepared: 01/29/2013 12:20 Analyzed: 01/29/2013 14:13						
pH	6.98	0.10	0.10	pH Units	7.0000		99.7	99-101		
Batch L301215 - Default Prep GenChem										
Blank (L301215-BLK1)				Prepared: 01/30/2013 13:30 Analyzed: 01/30/2013 15:38						
Nitrate/Nitrite as N	0.10 U	0.10	0.50	mg/kg wet						
LCS (L301215-BS1)				Prepared: 01/30/2013 13:30 Analyzed: 01/30/2013 15:37						
Nitrate/Nitrite as N	4.97	0.10	0.50	mg/kg wet	5.0000		99.4	90-110		
Duplicate (L301215-DUP3)	**Source: 1301066-01**			Prepared: 01/30/2013 13:30 Analyzed: 01/30/2013 15:52						
Nitrate/Nitrite as N	2.87	0.10	0.49	mg/kg wet		2.97			3.17	20
Matrix Spike (L301215-MS3)	**Source: 1301066-01**			Prepared: 01/30/2013 13:30 Analyzed: 01/30/2013 15:54						
Nitrate/Nitrite as N	7.94	0.10	0.49	mg/kg wet	4.9245	2.97	101	75-125		
Batch L301221 - Default Prep GenChem										
Blank (L301221-BLK1)				Prepared: 01/30/2013 13:30 Analyzed: 01/30/2013 18:49						
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						

Lionville Laboratory, PADEP Lab ID# 15-00009
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WC-Hanford, Inc.	Project: RC-234	
2620 Fermi Avenue	Project Number: K4052	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/05/2013 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 L301221 - Default Prep GenChem										
LCS (L301221-BS1)				Prepared: 01/30/2013 13:30 Analyzed: 01/30/2013 18:49						
Fluoride	48.7	1.0	5.0	mg/kg wet	50.000		97.4	80-120		
Chloride	47.4	1.0	5.0	mg/kg wet	50.000		94.8	80-120		
Bromide	47.3	1.0	5.0	mg/kg wet	50.000		94.6	80-120		
Orthophosphate	48.3	2.0	10.0	mg/kg wet	50.000		96.6	80-120		
Sulfate	47.9	1.0	5.0	mg/kg wet	50.000		95.8	80-120		
Nitrate	47.7	1.0	5.0	mg/kg wet	50.000		95.4	80-120		
Nitrite	46.7	1.0	5.0	mg/kg wet	50.000		93.4	80-120		
Duplicate (L301221-DUP3)		**Source: 1301066-01**		Prepared: 01/30/2013 13:30 Analyzed: 01/30/2013 20:04						
Fluoride	1.0 U	1.0	4.9	mg/kg wet		0.9 U				20
Chloride	1.6 B	1.0	4.9	mg/kg wet		1.5			4.76	20
Bromide	1.0 U	1.0	4.9	mg/kg wet		0.9 U				20
Orthophosphate	2.0 U	2.0	9.9	mg/kg wet		1.9 U				20
Sulfate	117	2.0	9.9	mg/kg wet		121			3.92	20
Nitrate	11.4	1.0	4.9	mg/kg wet		12.2			7.50	20
Nitrite	1.0 U	1.0	4.9	mg/kg wet		0.9 U				20
Matrix Spike (L301221-MS4)		**Source: 1301066-01**		Prepared: 01/30/2013 13:30 Analyzed: 01/30/2013 20:04						
Fluoride	47.8	1.0	4.9	mg/kg wet	49.245	0.9 U	97.0	75-125		
Chloride	48.2	1.0	4.9	mg/kg wet	49.245	1.5	94.7	75-125		
Bromide	47.5	1.0	4.9	mg/kg wet	49.245	0.9 U	96.4	75-125		
Orthophosphate	45.1	2.0	9.8	mg/kg wet	49.245	1.9 U	91.6	75-125		
Nitrate	60.5	1.0	4.9	mg/kg wet	49.245	12.2	97.9	75-125		
Nitrite	46.3	1.0	4.9	mg/kg wet	49.245	0.9 U	94.0	75-125		
Matrix Spike (L301221-MS5)		**Source: 1301066-01**		Prepared: 01/30/2013 13:30 Analyzed: 01/31/2013 11:36						
Sulfate	373	4.9	24.6	mg/kg wet	246.22	121	102	75-125		