SAF-RC-191
100N Field Remediation - Other
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

No Distribution Required

COMMENTS:

SDG KP0151 SAF RC-191

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 1904-NA Lift Station

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

5 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 #	1211067
SDG #	KP0151
SAF #	RC-191
Date Received	11/16/12
# Samples	1
Matrix	OTHER
Volatiles	
Semivolatiles	X
Pest/PCB	X
Glycols	
DRO/KRO/GRO	X
PAHs	X
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 90 pages.

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

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1211067

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-191 KP0151
Est. Final Proj. Sampling Date:
Project#:
Project Contact/Phone#:
Lionville Laboratory Project Manager: O. Johnson
QC: SW Del: STL TAT: 7 Days
Date Rec'd: 11-16-12 Date Due: 11-23-12

		A	B		C	D		E			F				
Refrigerator #		2	2		2	2		2			2				
#/Type Container	Liquid														
	Solid	1AG	1AG		1AG	1AG		1AG			1AG				
Volume	Liquid														
	Solid	60	60		60	60		60			60				
Preservatives		—	—		—	—		—			—				
ANALYSES REQUESTED		ORGANIC						INORG							
		VOA	BNA	~~Pest/~~ PCB	Herb	PAHs	WTHD	(2) Metal Hg	CN		(2) IC Anions NO2 NO3	NH			
Lionville Laboratory Use Only			8270	8082		8310	DRO/MO	METALS			ANIONS	N3N2 pH			

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected
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	J1R5L5	✓	✓	SOLID	11-14-12	1000

Special Instructions:

METALS = HSL + B, Mo, Si (NOTL)

Special Instructions:

1.
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
FedEx	[signature]	11-16-12	10:15

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-191-032	Page 1 of 1

Collector Q. Stowe	**Company Contact** Joan Kessner **Telephone No.** 375-4688	**Project Coordinator** KESSNER, JH	**Price Code** ~~9L~~ 9J DA 11/12/12 **Data Turnaround** ~~21~~ Days 7 DA 11/20/12
Project Designation 100N Field Remediation - Other	**Sampling Location** 1904-NA Lift Station	**SAF No.** RC-191	
Ice Chest No. WCH-12-023	**Field Logbook No.** EL-1652-07 **COA** 01N8452000	**Method of Shipment** Fed Ex	
Shipped To ~~EBERLINE SERVICES~~ LIONVILLE DA 11/12/12	**Offsite Property No.** A120643	**Bill of Lading/Air Bill No.** See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS
None

Special Handling and/or Storage
Cool 4C

Preservation			Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C		
Type of Container			G/P	G/P	G	G	aG	aG	aG	aG		
No. of Container(s)			1	1	1	1	1	1	1	1		
Volume			60mL	60mL	60mL	60mL	60mL	60mL	60mL	60mL		
SAMPLE ANALYSIS			See item (1) in Special Instructions.	See item (2) in Special Instructions.	TPH-Diesel Range - WTPH-D +	VOA - 8260A (TCL)	Semi-VOA - 8270A (TCL)	PAHs - 8310	PCBs - 8082	Pesticides - 8081	~~RCF~~	AJ 11-14-12
Sample No.	Matrix *	Sample Date	Sample Time									
J1R5L5	OTHER	11-14-12	1000	X	X	X		X	X	X		34969
~~J1R5L6~~	~~OTHER~~	AJ 11-14-12										

CHAIN OF POSSESSION	Sign/Print Names
Relinquished By/Removed From: Quincy Stowe — Date/Time: 11/14/12 1040	Received By/Stored In: Dennis Newman — Date/Time: 11/14/12 1040
Relinquished By/Removed From: Dennis Newman — Date/Time: 11/14/12 1205	Received By/Stored In: A. Freier — Date/Time: 11-14-12 1205
Relinquished By/Removed From: A. Freier WCH — Date/Time: 11-14-12 1230	Received By/Stored In: Fed Ex — Date/Time:
Relinquished By/Removed From: Fed Ex — Date/Time: 11-16-12 1015	Received By/Stored In: D. Smith — Date/Time: 11-16-12 1015
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 (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) IC Anions - 300.0 {Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; NO2/NO3 - 353.2 {Nitrogen in Nitrite and Nitrate}; pH - 9045 {pH Measurement}

REVIEWED BY CMB DATE 11-14-12

KP0151

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

0000000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAF/SOW/Release #: RC-191

Date: 11-16-12

LvL Batch #: 1211067

Sample Custodian: D. Smith

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7940 7643 8002
2. Custody Seals on coolers or shipping containers intact, signed & dated?	☑ Yes	☐ No	☐ No Seals
3. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	*Comments:*
4. All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible?	☑ Yes	☐ No	
5. Samples received cooled or ambient?	Temp 3.9	°C	Cooler # WCH-12-023
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 JJP 12/3/12	☑ No	NO_2, NO_3, Poy rec'd past hold
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 JJP, 12/3/12	☑ No	All #12
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted _____ Date _____

SR-002-B.doc

SEMIVOLATILES

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

WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Analytical Report for Semivolatile Organic Compounds by SW846 8270C

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5L5	1211067-01	Other Solid	11/14/2012 10:00	11/16/2012 10:15

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-191 KP0151
LVL #: 1211067

W.O. #: 60049-001-001-0001-00
Date Received: 11-16-2012

GCMS SEMIVOLATILE

One (1) other solid sample was collected on 11-14-2012.

The sample and associated QC samples were extracted 11-16-2012 and analyzed 11-25-2012 and 11-26-2012 according to Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C, and the analysis procedure was based on SW846 Method 8270C for client specified target compounds.

The sample had an elevated final volume of two (2) mLs due to sample matrix. The reporting limits have been adjusted to reflect this change.

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. The sample was extracted and analyzed within holding time.

3. Non-target compounds were detected in these samples.

4. Samples J1R5L5, L211132-MS1, and L211132-MSD1 required a 5-fold dilution due to sample matrix. The reporting limits have been adjusted to reflect the necessary dilutions.

5. All obtainable surrogate recoveries were within QC acceptance criteria.

6. The method blank was below the reporting limit for all target compounds.

7. Two (2) of sixty-four (64) blank spike recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 12MS200) has been enclosed.

8. Nine (9) of one hundred and twenty-eight (128) matrix spike recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 12MS200) has been enclosed.

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. The sample was reported on a dry weight basis.

10. All initial calibrations associated with this data set were within acceptance criteria.

11. All initial calibrations associated with this data set were within acceptance criteria. Per method 8000B/8270C, the attached Table 1 shows the target compounds where the RSD exceeded 15%, and the mean RSD was used for evaluation of the initial calibration. Results associated with these compounds are considered to have greater uncertainty. Refer to the Analysis Batch Sequence Summary Forms to associate the calibration with client samples.

12. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

13. Internal standard area and retention time criteria were met.

14. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

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

Iain Daniels
LvL Laboratory Manager

2/28/13
Date

TABLE 1

TCL - 8000B/8270C COMPOUNDS WHERE THE MEAN %RSD IS USED TO MEET CRITERIA FOR INITIAL CALIBRATION OF AN INDIVIDUAL COMPOUND

MEAN RSD USED FOR EVALUATION: 8.73 CALIBRATION: 121017

>15% RSD	Compound	>15% RSD	Compound	>15% RSD	Compound
	1,2,4-Trichlorobenzene		Di-n-butyl Phthalate		Surrogates:
	1,2-Dichlorobenzene	✓	Di-n-octyl Phthalate		2-Fluorophenol
	1,3-Dichlorobenzene		Fluoranthene		Phenol-d5
	1,4-Dichlorobenzene		Fluorene		Nitrobenzene-d5
	2,4,5-Trichlorophenol		Hexachlorobenzene		2-Fluorobiphenyl
	2,4,6-Trichlorophenol		Hexachlorobutadiene		2,4,6-Tribromophenol
	2,4-Dichlorophenol		Hexachlorocyclopentadiene		p-Terphenyl-d14
	2,4-Dimethylphenol		Hexachloroethane		
✓	2,4-Dinitrophenol		Indeno[1,2,3-cd]pyrene		
	2,4-Dinitrotoluene		Isophorone		
	2,6-Dinitrotoluene		Naphthalene		
	2-Chloronaphthalene		Nitrobenzene		
	2-Chlorophenol		N-Nitrosodi-n-propylamine		
	2-Methylnaphthalene		N-Nitrosodiphenylamine		
	2-Methylphenol	✓	Pentachlorophenol		
	2-Nitroaniline		Phenanthrene		
	2-Nitrophenol		Phenol		
	3- and/or 4-Methylphenol		Pyrene		
	3,3'-Dichlorobenzidine				
	3-Nitroaniline				
✓	4,6-Dinitro-2-methylphenol		**OLM04.2 TCL addons:**		
	4-Bromophenyl Phenyl Ether		1,1-Biphenyl		
	4-Chloro-3-methylphenol		Atrazine		
	4-Chloroaniline		Benzaldehyde		
	4-Chlorophenyl Phenyl Ether		Caprolactam		
	4-Nitroaniline				
✓	4-Nitrophenol		**NonTCL addons:**		
	Acenaphthene		1,2-Diphenylhydrazine		
	Acenaphthylene		1,4-Dioxane		
	Anthracene		1-Methylnapthalene		
	Benz[a]anthracene		2,3,4,6-Tetrachlorophenol		
	Benzo[a] pyrene		Acetophenone		
	Benzo[b] fluoranthene		Aniline		
	Benzo[g,h,i] perylene		Benzidine		
	Benzo[k] fluoranthene		Benzoic Acid		
	Benzyl alcohol		N-Nitrosodimethylamine		
	Bis(2-chloroethoxy) methane		Pyridine		
	Bis(2-chloroethyl) ether		Tributylphosphate		
	Bis(2-chloroisopropyl) ether				
✓	Bis(2-ethylhexyl) phthalate				
	Butyl Benzyl Phthalate				
	Carbazole				
	Chrysene				
	Dibenz[a,h]anthracene				
	Dibenzofuran				
	Diethyl Phthalate				
	Dimethyl Phthalate				

ANALYSIS BATCH (SEQUENCE) SUMMARY
8270C

Laboratory:	Lionville Laboratory	SDG:	KP0151
Client:	WC-Hanford, Inc.	Project:	RC-191
Sequence:	2110129	Instrument:	HP5972N
Matrix:	Solid	Calibration:	1211018

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	2110129-TUN1	N112401.D	11/24/12 13:19
Cal Standard	2110129-CAL5	N112402.D	11/24/12 13:46
Cal Standard	2110129-CAL2	N112404.D	11/24/12 15:19
Cal Standard	2110129-CAL3	N112405.D	11/24/12 16:06
Cal Standard	2110129-CAL4	N112406.D	11/24/12 16:52
Cal Standard	2110129-CAL1	N112408.D	11/24/12 18:25
Secondary Cal Check	2110129-SCV1	N112414.D	11/24/12 23:04

ANALYSIS BATCH (SEQUENCE) SUMMARY
8270C

Laboratory:	Lionville Laboratory	SDG:	KP0151
Client:	WC-Hanford, Inc.	Project:	RC-191
Sequence:	2110131	Instrument:	HP5972N
Matrix:	Solid	Calibration:	1211018

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	2110131-TUN1	N112501.D	11/25/12 08:28
Calibration Check	2110131-CCV1	N112502.D	11/25/12 08:53
LCS	L211132-BS1	N112506.D	11/25/12 11:57
Blank	L211132-BLK1	N112507.D	11/25/12 12:43
J1R5L5	1211067-01	N112515.D	11/25/12 18:56
J1R5L5	L211132-MS1	N112516.D	11/25/12 19:43

ANALYSIS BATCH (SEQUENCE) SUMMARY
8270C

Laboratory:	Lionville Laboratory	SDG:	KP0151
Client:	WC-Hanford, Inc.	Project:	RC-191
Sequence:	2110133	Instrument:	HP5972N
Matrix:	Solid	Calibration:	1211018

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	2110133-TUN1	N112601.D	11/26/12 06:12
Calibration Check	2110133-CCV1	N112602.D	11/26/12 06:39
J1R5L5	L211132-MSD1	N112604.D	11/26/12 08:16

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12MS200

Initiator: Shawn Saylor
Date: 11-26-12
Client: WC Hanford RC191 KP0151

Batch: 1211067
Samples: L211132-BS1, ms1, msd1
Method: SW846/MCAWW/CLP/

Parameter: 8270C
Matrix: SOIL
Prep Batch: L211132

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)

(1) several RW 11/29/12 Spike recoveries outside QC acceptance limits in L211132-BS1, L211132-ms1, L211132-msd1

2. Known or Probable Causes(s) MS/MSD - possible matrix effect samples had an elevated final volume of 2mls, in addition required a 5fold dilution for analysis. BS - acidic phenols are subject to erratic chromatographic behavior

RW 11/29/12

3. Discussion and Proposed Action Other Description: narrate

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

4. Project Manager Instructions...signature/date: 2/28/13

__ 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: 2/28/13 Other Explanation:

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

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

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

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

QA-139-A-0208

GLOSSARY

DATA QUALIFIERS

U	=	Indicates that the compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit, which is included and corrected for dilution and percent moisture.
J	=	Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection 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. This flag is also used for a TIC as well as for a positively identified TCL compound.
E	=	Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
D	=	Identifies all compounds identified in an analysis at a secondary dilution factor.
I	=	Interference.
NQ	=	Result qualitatively confirmed but not able to quantify.
A	=	Indicates that a TIC is a suspected aldol-condensation product.
N	=	Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
X	=	This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
Y	=	Additional qualifiers used as required are explained in the case narrative.

GLOSSARY

ABBREVIATIONS

BS	=	Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike 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	=	Suffix added to sample number to indicate that results are from a diluted analysis.
NA	=	Not Applicable.
DF	=	Dilution Factor.
NR	=	Not Required.
SP, Z	=	Indicates Spiked Compound.

TECHNICAL FLAGS FOR MANUAL INTEGRATION

Manual quantitation modifications are performed routinely to improve the data quality for a variety of technical reasons. Documentation of these modifications should be clear and concise. The following "flags" are used to indicate the technical reasons for quantitation modifications:

MP - Missed Peak: Manually added peak not found by automatic quantitation program.

PA - Peak Assignment: quantitation report was changed to reflect correct peak assignment.

RI - Routine Integration: routine integrations are performed for some analytes that are consistently integrated improperly by the automatic integration programs. Examples are the dichlorobenzene isomers on the VOA packed column and benzo(b)fluoranthene/benzo(k)fluoranthene, which are poorly resolved on the BNA column.

SP - Split Peak: the automatic integration improperly split the peak; a manual integration was performed to get the correct area.

CB - Coelution/Background: peak was manually integrated to eliminate contribution from coeluting compounds, background

PI - Proper Integration: a peak with poor or inconsistent integration (e.g., excessive tail) was properly integrated manually.

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

WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

J1R5L5
1211067-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
1,2-Dichlorobenzene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
1,3-Dichlorobenzene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
1,4-Dichlorobenzene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2,4,5-Trichlorophenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2,4,6-Trichlorophenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2,4-Dichlorophenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2,4-Dimethylphenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2,4-Dinitrophenol	34200	U	34200	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2,4-Dinitrotoluene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2,6-Dinitrotoluene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2-Chloronaphthalene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2-Chlorophenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2-Methylnaphthalene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2-Methylphenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2-Nitroaniline	34200	U	34200	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
2-Nitrophenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
3,3'-Dichlorobenzidine	13700	U	13700	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
3-Nitroaniline	34200	U	34200	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
4,6-Dinitro-2-methylphenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
4-Bromophenyl Phenyl Ether	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
4-Chloro-3-methylphenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
4-Chloroaniline	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
4-Chlorophenyl Phenyl Ether	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
3- and/or 4-Methylphenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
4-Nitroaniline	34200	U	34200	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
4-Nitrophenol	34200	U	34200	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Acenaphthene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Acenaphthylene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Anthracene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Benz[a]anthracene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Benzo[a] pyrene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Benzo[b] fluoranthene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Benzo[g,h,i] perylene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Benzo[k] fluoranthene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Bis(2-chloroethoxy) methane	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

J1R5L5
1211067-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Bis(2-chloroisopropyl) ether	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Bis(2-ethylhexyl) phthalate	**4230**	J, D	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Butyl Benzyl Phthalate	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Carbazole	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Chrysene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Dibenz[a,h]anthracene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Dibenzofuran	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Diethyl Phthalate	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Dimethyl Phthalate	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Di-n-butyl Phthalate	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Di-n-octyl Phthalate	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Fluoranthene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Fluorene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Hexachlorobenzene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Hexachlorobutadiene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Hexachlorocyclopentadiene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Hexachloroethane	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Indeno[1,2,3-cd]pyrene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Isophorone	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Naphthalene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Nitrobenzene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
N-Nitrosodi-n-propylamine	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
N-Nitrosodiphenylamine	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Pentachlorophenol	34200	U	34200	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Phenanthrene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Phenol	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Pyrene	6840	U	6840	ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
TIC:Aldol Condensate 1	**161000**	A, B, J, D		ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
TIC:Unknown 1	**25600**	J, D		ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
TIC:Unknown 2	**101000**	J, D		ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
TIC:Unknown 3	**45800**	J, D		ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
TIC:Unknown 4	**16000**	D, J		ug/kg dry	5	L211132	11/16/2012	11/25/2012	8270C
Surrogate: 2-Fluorophenol	*73 %*		*25-121*			*L211132*	*11/16/2012*	*11/25/2012*	*8270C*
Surrogate: Phenol-d5	*71 %*		*24-113*			*L211132*	*11/16/2012*	*11/25/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*69 %*		*23-120*			*L211132*	*11/16/2012*	*11/25/2012*	*8270C*

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

J1R5L5
1211067-01 (Other Solid)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*79 %*	*30-115*			*L211132*	*11/16/2012*	*11/25/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*56 %*	*19-122*			*L211132*	*11/16/2012*	*11/25/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*77 %*	*18-137*			*L211132*	*11/16/2012*	*11/25/2012*	*8270C*

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211132 - SW 3540C										
Blank (L211132-BLK1)				Prepared: 11/16/2012 Analyzed: 11/25/2012						
1,2,4-Trichlorobenzene	330	U	330	ug/kg wet						
1,2-Dichlorobenzene	330	U	330	ug/kg wet						
1,3-Dichlorobenzene	330	U	330	ug/kg wet						
1,4-Dichlorobenzene	330	U	330	ug/kg wet						
2,4,5-Trichlorophenol	330	U	330	ug/kg wet						
2,4,6-Trichlorophenol	330	U	330	ug/kg wet						
2,4-Dichlorophenol	330	U	330	ug/kg wet						
2,4-Dimethylphenol	330	U	330	ug/kg wet						
2,4-Dinitrophenol	1650	U	1650	ug/kg wet						
2,4-Dinitrotoluene	330	U	330	ug/kg wet						
2,6-Dinitrotoluene	330	U	330	ug/kg wet						
2-Chloronaphthalene	330	U	330	ug/kg wet						
2-Chlorophenol	330	U	330	ug/kg wet						
2-Methylnaphthalene	330	U	330	ug/kg wet						
2-Methylphenol	330	U	330	ug/kg wet						
2-Nitroaniline	1650	U	1650	ug/kg wet						
2-Nitrophenol	330	U	330	ug/kg wet						
3,3'-Dichlorobenzidine	660	U	660	ug/kg wet						
3-Nitroaniline	1650	U	1650	ug/kg wet						
4,6-Dinitro-2-methylphenol	330	U	330	ug/kg wet						
4-Bromophenyl Phenyl Ether	330	U	330	ug/kg wet						
4-Chloro-3-methylphenol	330	U	330	ug/kg wet						
4-Chloroaniline	330	U	330	ug/kg wet						
4-Chlorophenyl Phenyl Ether	330	U	330	ug/kg wet						
3- and/or 4-Methylphenol	330	U	330	ug/kg wet						
4-Nitroaniline	1650	U	1650	ug/kg wet						
4-Nitrophenol	1650	U	1650	ug/kg wet						
Acenaphthene	330	U	330	ug/kg wet						
Acenaphthylene	330	U	330	ug/kg wet						
Anthracene	330	U	330	ug/kg wet						
Benz[a]anthracene	330	U	330	ug/kg wet						
Benzo[a] pyrene	330	U	330	ug/kg wet						
Benzo[b] fluoranthene	330	U	330	ug/kg wet						
Benzo[g,h,i] perylene	330	U	330	ug/kg wet						
Benzo[k] fluoranthene	330	U	330	ug/kg wet						
Bis(2-chloroethoxy) methane	330	U	330	ug/kg wet						

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211132 - SW 3540C										
Blank (L211132-BLK1)				Prepared: 11/16/2012 Analyzed: 11/25/2012						
Bis(2-chloroethyl) ether	330	U	330	ug/kg wet						
Bis(2-chloroisopropyl) ether	330	U	330	ug/kg wet						
Bis(2-ethylhexyl) phthalate	330	U	330	ug/kg wet						
Butyl Benzyl Phthalate	330	U	330	ug/kg wet						
Carbazole	330	U	330	ug/kg wet						
Chrysene	330	U	330	ug/kg wet						
Dibenz[a,h]anthracene	330	U	330	ug/kg wet						
Dibenzofuran	330	U	330	ug/kg wet						
Diethyl Phthalate	330	U	330	ug/kg wet						
Dimethyl Phthalate	330	U	330	ug/kg wet						
Di-n-butyl Phthalate	330	U	330	ug/kg wet						
Di-n-octyl Phthalate	330	U	330	ug/kg wet						
Fluoranthene	330	U	330	ug/kg wet						
Fluorene	330	U	330	ug/kg wet						
Hexachlorobenzene	330	U	330	ug/kg wet						
Hexachlorobutadiene	330	U	330	ug/kg wet						
Hexachlorocyclopentadiene	330	U	330	ug/kg wet						
Hexachloroethane	330	U	330	ug/kg wet						
Indeno[1,2,3-cd]pyrene	330	U	330	ug/kg wet						
Isophorone	330	U	330	ug/kg wet						
Naphthalene	330	U	330	ug/kg wet						
Nitrobenzene	330	U	330	ug/kg wet						
N-Nitrosodi-n-propylamine	330	U	330	ug/kg wet						
N-Nitrosodiphenylamine	330	U	330	ug/kg wet						
Pentachlorophenol	1650	U	1650	ug/kg wet						
Phenanthrene	330	U	330	ug/kg wet						
Phenol	330	U	330	ug/kg wet						
Pyrene	330	U	330	ug/kg wet						
Unknown 1	1440	J		ug/kg wet						
Aldol Condensate 4	1980	A, J		ug/kg wet						
Aldol Condensate 3	1250	A, J		ug/kg wet						
Aldol Condensate 2	66700	A, J		ug/kg wet						
Aldol Condensate 1	3000	A, J		ug/kg wet						
Surrogate: 2-Fluorophenol	*1830*			*ug/kg wet*	*2500.0*		*73*	*25-121*		
Surrogate: Phenol-d5	*1870*			*ug/kg wet*	*2500.0*		*75*	*24-113*		
Surrogate: Nitrobenzene-d5	*1060*			*ug/kg wet*	*1666.7*		*63*	*23-120*		

TICs RW 1/29/13

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211132 - SW 3540C									
Blank (L211132-BLK1)			Prepared: 11/16/2012 Analyzed: 11/25/2012						
Surrogate: 2-Fluorobiphenyl	*1340*		*ug/kg wet*	*1666.7*		*81*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*1400*		*ug/kg wet*	*2500.0*		*56*	*19-122*		
Surrogate: p-Terphenyl-d14	*1430*		*ug/kg wet*	*1666.7*		*86*	*18-137*		
LCS (L211132-BS1)			Prepared: 11/16/2012 Analyzed: 11/25/2012						
1,2,4-Trichlorobenzene	1220		ug/kg wet	2000.0		61	45-110		
1,2-Dichlorobenzene	1280		ug/kg wet	2000.0		64	45-105		
1,3-Dichlorobenzene	1230		ug/kg wet	2000.0		62	40-100		
1,4-Dichlorobenzene	1240		ug/kg wet	2000.0		62	35-105		
2,4,5-Trichlorophenol	1260		ug/kg wet	2000.0		63	30-140		
2,4,6-Trichlorophenol	1010		ug/kg wet	2000.0		50	20-110		
2,4-Dichlorophenol	1270		ug/kg wet	2000.0		63	40-110		
2,4-Dimethylphenol	1150		ug/kg wet	2000.0		58	30-105		
2,4-Dinitrophenol	329		ug/kg wet	2000.0		16*	25-130		
2,4-Dinitrotoluene	1480		ug/kg wet	2000.0		74	50-115		
2,6-Dinitrotoluene	1400		ug/kg wet	2000.0		70	40-120		
2-Chloronaphthalene	1310		ug/kg wet	2000.0		66	45-115		
2-Chlorophenol	1310		ug/kg wet	2000.0		65	45-105		
2-Methylnaphthalene	1300		ug/kg wet	2000.0		65	45-110		
2-Methylphenol	1320		ug/kg wet	2000.0		66	40-120		
2-Nitroaniline	1470		ug/kg wet	2000.0		74	45-120		
2-Nitrophenol	1290		ug/kg wet	2000.0		65	40-110		
3,3'-Dichlorobenzidine	1230		ug/kg wet	2000.0		62	15-130		
3-Nitroaniline	1300		ug/kg wet	2000.0		65	40-130		
4,6-Dinitro-2-methylphenol	798		ug/kg wet	2000.0		40	20-140		
4-Bromophenyl Phenyl Ether	1330		ug/kg wet	2000.0		67	45-115		
4-Chloro-3-methylphenol	1370		ug/kg wet	2000.0		68	35-115		
4-Chloroaniline	977		ug/kg wet	2000.0		49	10-100		
4-Chlorophenyl Phenyl Ether	1300		ug/kg wet	2000.0		65	45-110		
3- and/or 4-Methylphenol	1350		ug/kg wet	2000.0		68	40-120		
4-Nitroaniline	1410		ug/kg wet	2000.0		71	40-130		
4-Nitrophenol	1300		ug/kg wet	2000.0		65	15-140		
Acenaphthene	1340		ug/kg wet	2000.0		67	45-110		
Acenaphthylene	1390		ug/kg wet	2000.0		69	45-115		
Anthracene	1350		ug/kg wet	2000.0		67	45-130		
Benz[a]anthracene	1440		ug/kg wet	2000.0		72	45-130		
Benzo[a] pyrene	1400		ug/kg wet	2000.0		70	45-130		

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211132 - SW 3540C									
LCS (L211132-BS1)			Prepared: 11/16/2012 Analyzed: 11/25/2012						
Benzo[b] fluoranthene	1470		ug/kg wet	2000.0		74	40-130		
Benzo[g,h,i] perylene	1470		ug/kg wet	2000.0		74	45-125		
Benzo[k] fluoranthene	1500		ug/kg wet	2000.0		75	45-125		
Bis(2-chloroethoxy) methane	1290		ug/kg wet	2000.0		65	45-110		
Bis(2-chloroethyl) ether	1250		ug/kg wet	2000.0		63	40-110		
Bis(2-chloroisopropyl) ether	1350		ug/kg wet	2000.0		67	30-115		
Bis(2-ethylhexyl) phthalate	1530		ug/kg wet	2000.0		76	40-145		
Butyl Benzyl Phthalate	1500		ug/kg wet	2000.0		75	50-125		
Carbazole	1440		ug/kg wet	2000.0		72	40-140		
Chrysene	1500		ug/kg wet	2000.0		75	45-130		
Dibenz[a,h]anthracene	1460		ug/kg wet	2000.0		73	45-125		
Dibenzofuran	1370		ug/kg wet	2000.0		69	45-120		
Diethyl Phthalate	1320		ug/kg wet	2000.0		66	50-125		
Dimethyl Phthalate	1280		ug/kg wet	2000.0		64	45-130		
Di-n-butyl Phthalate	1320		ug/kg wet	2000.0		66	50-130		
Di-n-octyl Phthalate	1540		ug/kg wet	2000.0		77	40-150		
Fluoranthene	1380		ug/kg wet	2000.0		69	45-130		
Fluorene	1330		ug/kg wet	2000.0		67	45-120		
Hexachlorobenzene	1380		ug/kg wet	2000.0		69	45-130		
Hexachlorobutadiene	1320		ug/kg wet	2000.0		66	45-105		
Hexachlorocyclopentadiene	750		ug/kg wet	2000.0		38	10-100		
Hexachloroethane	1220		ug/kg wet	2000.0		61	35-110		
Indeno[1,2,3-cd]pyrene	1460		ug/kg wet	2000.0		73	45-130		
Isophorone	1230		ug/kg wet	2000.0		61	40-110		
Naphthalene	1400		ug/kg wet	2000.0		70	40-110		
Nitrobenzene	1230		ug/kg wet	2000.0		61	40-105		
N-Nitrosodi-n-propylamine	1430		ug/kg wet	2000.0		71	30-130		
N-Nitrosodiphenylamine	1360		ug/kg wet	2000.0		68	50-120		
Pentachlorophenol	420		ug/kg wet	2000.0		21*	25-120		
Phenanthrene	1380		ug/kg wet	2000.0		69	50-120		
Phenol	1290		ug/kg wet	2000.0		65	40-115		
Pyrene	1420		ug/kg wet	2000.0		71	45-125		
Surrogate: 2-Fluorophenol	*1630*		*ug/kg wet*	*2500.0*		*65*	*25-121*		
Surrogate: Phenol-d5	*1690*		*ug/kg wet*	*2500.0*		*67*	*24-113*		
Surrogate: Nitrobenzene-d5	*1120*		*ug/kg wet*	*1666.7*		*67*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*1190*		*ug/kg wet*	*1666.7*		*71*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*1140*		*ug/kg wet*	*2500.0*		*46*	*19-122*		

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211132 - SW 3540C										
LCS (L211132-BS1)				Prepared: 11/16/2012 Analyzed: 11/25/2012						
Surrogate: p-Terphenyl-d14	*1150*			*ug/kg wet*	*1666.7*		*69*	*18-137*		
Matrix Spike (L211132-MS1)		**Source: 1211067-01**		Prepared: 11/16/2012 Analyzed: 11/25/2012						
1,2,4-Trichlorobenzene	3320	D		ug/kg dry	4082.6	6840 U	81	45-110		
1,2-Dichlorobenzene	3260	D		ug/kg dry	4082.6	6840 U	80	45-105		
1,3-Dichlorobenzene	2990	D		ug/kg dry	4082.6	6840 U	73	40-100		
1,4-Dichlorobenzene	3150	D		ug/kg dry	4082.6	6840 U	77	35-105		
2,4,5-Trichlorophenol	3490	D		ug/kg dry	4082.6	6840 U	86	30-140		
2,4,6-Trichlorophenol	3270	D		ug/kg dry	4082.6	6840 U	80	20-110		
2,4-Dichlorophenol	3280	D		ug/kg dry	4082.6	6840 U	80	40-110		
2,4-Dimethylphenol	3740	D		ug/kg dry	4082.6	6840 U	92	30-105		
2,4-Dinitrophenol	0.00	U		ug/kg dry	4082.6	34200 U	*	25-130		
2,4-Dinitrotoluene	3290	D		ug/kg dry	4082.6	6840 U	81	50-115		
2,6-Dinitrotoluene	3570	D		ug/kg dry	4082.6	6840 U	87	40-120		
2-Chloronaphthalene	3670	D		ug/kg dry	4082.6	6840 U	90	45-115		
2-Chlorophenol	3510	D		ug/kg dry	4082.6	6840 U	86	45-105		
2-Methylnaphthalene	3500	D		ug/kg dry	4082.6	6840 U	86	45-110		
2-Methylphenol	3770	D		ug/kg dry	4082.6	6840 U	92	40-120		
2-Nitroaniline	4760	D		ug/kg dry	4082.6	34200 U	116	45-120		
2-Nitrophenol	2950	D		ug/kg dry	4082.6	6840 U	72	40-110		
3,3'-Dichlorobenzidine	2070	D		ug/kg dry	4082.6	13700 U	51	15-130		
3-Nitroaniline	2930	D		ug/kg dry	4082.6	34200 U	72	40-130		
4,6-Dinitro-2-methylphenol	109	D		ug/kg dry	4082.6	6840 U	3*	20-140		
4-Bromophenyl Phenyl Ether	3750	D		ug/kg dry	4082.6	6840 U	92	45-115		
4-Chloro-3-methylphenol	3490	D		ug/kg dry	4082.6	6840 U	85	35-115		
4-Chloroaniline	2150	D		ug/kg dry	4082.6	6840 U	53	10-100		
4-Chlorophenyl Phenyl Ether	3400	D		ug/kg dry	4082.6	6840 U	83	45-110		
3- and/or 4-Methylphenol	3730	D		ug/kg dry	4082.6	6840 U	91	40-120		
4-Nitroaniline	3710	D		ug/kg dry	4082.6	34200 U	91	40-130		
4-Nitrophenol	3260	D		ug/kg dry	4082.6	34200 U	80	15-140		
Acenaphthene	3850	D		ug/kg dry	4082.6	6840 U	94	45-110		
Acenaphthylene	4010	D		ug/kg dry	4082.6	6840 U	98	45-115		
Anthracene	4010	D		ug/kg dry	4082.6	6840 U	98	45-130		
Benz[a]anthracene	4360	D		ug/kg dry	4082.6	6840 U	107	45-130		
Benzo[a] pyrene	3800	D		ug/kg dry	4082.6	6840 U	93	45-130		
Benzo[b] fluoranthene	3690	D		ug/kg dry	4082.6	6840 U	90	40-130		
Benzo[g,h,i] perylene	3890	D		ug/kg dry	4082.6	6840 U	95	45-125		

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211132 - SW 3540C										
Matrix Spike (L211132-MS1)		**Source: 1211067-01**		Prepared: 11/16/2012 Analyzed: 11/25/2012						
Benzo[k] fluoranthene	3590	D		ug/kg dry	4082.6	6840 U	88	45-125		
Bis(2-chloroethoxy) methane	3680	D		ug/kg dry	4082.6	6840 U	90	45-110		
Bis(2-chloroethyl) ether	3430	D		ug/kg dry	4082.6	6840 U	84	40-110		
Bis(2-chloroisopropyl) ether	3690	D		ug/kg dry	4082.6	6840 U	90	30-115		
Bis(2-ethylhexyl) phthalate	7090	D		ug/kg dry	4082.6	4230	70	40-145		
Butyl Benzyl Phthalate	4290	D		ug/kg dry	4082.6	6840 U	105	50-125		
Carbazole	4120	D		ug/kg dry	4082.6	6840 U	101	40-140		
Chrysene	4590	D		ug/kg dry	4082.6	6840 U	112	45-130		
Dibenz[a,h]anthracene	3700	D		ug/kg dry	4082.6	6840 U	91	45-125		
Dibenzofuran	3830	D		ug/kg dry	4082.6	6840 U	94	45-120		
Diethyl Phthalate	3760	D		ug/kg dry	4082.6	6840 U	92	50-125		
Dimethyl Phthalate	3810	D		ug/kg dry	4082.6	6840 U	93	45-130		
Di-n-butyl Phthalate	4180	D		ug/kg dry	4082.6	6840 U	102	50-130		
Di-n-octyl Phthalate	4210	D		ug/kg dry	4082.6	6840 U	103	40-150		
Fluoranthene	4700	D		ug/kg dry	4082.6	6840 U	115	45-130		
Fluorene	3750	D		ug/kg dry	4082.6	6840 U	92	45-120		
Hexachlorobenzene	3700	D		ug/kg dry	4082.6	6840 U	91	45-130		
Hexachlorobutadiene	3280	D		ug/kg dry	4082.6	6840 U	80	45-105		
Hexachlorocyclopentadiene	0.00	U		ug/kg dry	4082.6	6840 U	*	10-100		
Hexachloroethane	2370	D		ug/kg dry	4082.6	6840 U	58	35-110		
Indeno[1,2,3-cd]pyrene	3870	D		ug/kg dry	4082.6	6840 U	95	45-130		
Isophorone	3560	D		ug/kg dry	4082.6	6840 U	87	40-110		
Naphthalene	4040	D		ug/kg dry	4082.6	6840 U	99	40-110		
Nitrobenzene	3420	D		ug/kg dry	4082.6	6840 U	84	40-105		
N-Nitrosodi-n-propylamine	3770	D		ug/kg dry	4082.6	6840 U	92	30-130		
N-Nitrosodiphenylamine	3950	D		ug/kg dry	4082.6	6840 U	97	50-120		
Pentachlorophenol	2840	D		ug/kg dry	4082.6	34200 U	70	25-120		
Phenanthrene	4500	D		ug/kg dry	4082.6	6840 U	110	50-120		
Phenol	3500	D		ug/kg dry	4082.6	6840 U	86	40-115		
Pyrene	4700	D		ug/kg dry	4082.6	6840 U	115	45-125		
Surrogate: 2-Fluorophenol	*4450*			*ug/kg dry*	*5103.2*		*87*	*25-121*		
Surrogate: Phenol-d5	*4560*			*ug/kg dry*	*5103.2*		*89*	*24-113*		
Surrogate: Nitrobenzene-d5	*3010*			*ug/kg dry*	*3402.1*		*88*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*3210*			*ug/kg dry*	*3402.1*		*94*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*3840*			*ug/kg dry*	*5103.2*		*75*	*19-122*		
Surrogate: p-Terphenyl-d14	*3060*			*ug/kg dry*	*3402.1*		*90*	*18-137*		

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211132 - SW 3540C										
Matrix Spike Dup (L211132-MSD1)		**Source: 1211067-01**		Prepared: 11/16/2012 Analyzed: 11/26/2012						
1,2,4-Trichlorobenzene	3530	D		ug/kg dry	4173.0	6840 U	85	45-110	4	40
1,2-Dichlorobenzene	3470	D		ug/kg dry	4173.0	6840 U	83	45-105	4	40
1,3-Dichlorobenzene	3230	D		ug/kg dry	4173.0	6840 U	77	40-100	5	40
1,4-Dichlorobenzene	3760	D		ug/kg dry	4173.0	6840 U	90	35-105	15	40
2,4,5-Trichlorophenol	3600	D		ug/kg dry	4173.0	6840 U	86	30-140	0.9	40
2,4,6-Trichlorophenol	3470	D		ug/kg dry	4173.0	6840 U	83	20-110	4	40
2,4-Dichlorophenol	3690	D		ug/kg dry	4173.0	6840 U	88	40-110	10	40
2,4-Dimethylphenol	4220	D		ug/kg dry	4173.0	6840 U	101	30-105	10	40
2,4-Dinitrophenol	211	D		ug/kg dry	4173.0	34200 U	5*	25-130		40
2,4-Dinitrotoluene	4070	D		ug/kg dry	4173.0	6840 U	98	50-115	19	40
2,6-Dinitrotoluene	4090	D		ug/kg dry	4173.0	6840 U	98	40-120	12	40
2-Chloronaphthalene	3860	D		ug/kg dry	4173.0	6840 U	93	45-115	3	40
2-Chlorophenol	3850	D		ug/kg dry	4173.0	6840 U	92	45-105	7	40
2-Methylnaphthalene	4270	D		ug/kg dry	4173.0	6840 U	102	45-110	18	40
2-Methylphenol	4120	D		ug/kg dry	4173.0	6840 U	99	40-120	7	40
2-Nitroaniline	4680	D		ug/kg dry	4173.0	34200 U	112	45-120	4	40
2-Nitrophenol	3450	D		ug/kg dry	4173.0	6840 U	83	40-110	14	40
3,3'-Dichlorobenzidine	2200	D		ug/kg dry	4173.0	13700 U	53	15-130	4	40
3-Nitroaniline	3460	D		ug/kg dry	4173.0	34200 U	83	40-130	14	40
4,6-Dinitro-2-methylphenol	499	D		ug/kg dry	4173.0	6840 U	12*	20-140	127*	40
4-Bromophenyl Phenyl Ether	3870	D		ug/kg dry	4173.0	6840 U	93	45-115	1	40
4-Chloro-3-methylphenol	3870	D		ug/kg dry	4173.0	6840 U	93	35-115	8	40
4-Chloroaniline	2940	D		ug/kg dry	4173.0	6840 U	71	10-100	29	40
4-Chlorophenyl Phenyl Ether	3690	D		ug/kg dry	4173.0	6840 U	88	45-110	6	40
3- and/or 4-Methylphenol	4170	D		ug/kg dry	4173.0	6840 U	100	40-120	9	40
4-Nitroaniline	4310	D		ug/kg dry	4173.0	34200 U	103	40-130	13	40
4-Nitrophenol	3680	D		ug/kg dry	4173.0	34200 U	88	15-140	10	40
Acenaphthene	4070	D		ug/kg dry	4173.0	6840 U	97	45-110	3	40
Acenaphthylene	4200	D		ug/kg dry	4173.0	6840 U	101	45-115	2	40
Anthracene	4100	D		ug/kg dry	4173.0	6840 U	98	45-130	0.1	40
Benz[a]anthracene	4320	D		ug/kg dry	4173.0	6840 U	103	45-130	3	40
Benzo[a] pyrene	3850	D		ug/kg dry	4173.0	6840 U	92	45-130	1	40
Benzo[b] fluoranthene	3740	D		ug/kg dry	4173.0	6840 U	90	40-130	0.9	40
Benzo[g,h,i] perylene	3820	D		ug/kg dry	4173.0	6840 U	91	45-125	4	40
Benzo[k] fluoranthene	3780	D		ug/kg dry	4173.0	6840 U	90	45-125	3	40
Bis(2-chloroethoxy) methane	4120	D		ug/kg dry	4173.0	6840 U	99	45-110	9	40

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:37

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211132 - SW 3540C										
Matrix Spike Dup (L211132-MSD1)		**Source: 1211067-01**		Prepared: 11/16/2012 Analyzed: 11/26/2012						
Bis(2-chloroethyl) ether	3610	D		ug/kg dry	4173.0	6840 U	86	40-110	3	40
Bis(2-chloroisopropyl) ether	3880	D		ug/kg dry	4173.0	6840 U	93	30-115	3	40
Bis(2-ethylhexyl) phthalate	13100	D		ug/kg dry	4173.0	4230	214*	40-145	101*	40
Butyl Benzyl Phthalate	4870	D		ug/kg dry	4173.0	6840 U	117	50-125	10	40
Carbazole	4270	D		ug/kg dry	4173.0	6840 U	102	40-140	1	40
Chrysene	4410	D		ug/kg dry	4173.0	6840 U	106	45-130	6	40
Dibenz[a,h]anthracene	3660	D		ug/kg dry	4173.0	6840 U	88	45-125	3	40
Dibenzofuran	4160	D		ug/kg dry	4173.0	6840 U	100	45-120	6	40
Diethyl Phthalate	3990	D		ug/kg dry	4173.0	6840 U	96	50-125	4	40
Dimethyl Phthalate	4040	D		ug/kg dry	4173.0	6840 U	97	45-130	4	40
Di-n-butyl Phthalate	7800	D		ug/kg dry	4173.0	6840 U	187*	50-130	58*	40
Di-n-octyl Phthalate	4780	D		ug/kg dry	4173.0	6840 U	115	40-150	11	40
Fluoranthene	4120	D		ug/kg dry	4173.0	6840 U	99	45-130	15	40
Fluorene	3950	D		ug/kg dry	4173.0	6840 U	95	45-120	3	40
Hexachlorobenzene	3810	D		ug/kg dry	4173.0	6840 U	91	45-130	0.8	40
Hexachlorobutadiene	3510	D		ug/kg dry	4173.0	6840 U	84	45-105	5	40
Hexachlorocyclopentadiene	0.00	U		ug/kg dry	4173.0	6840 U	*	10-100		40
Hexachloroethane	2660	D		ug/kg dry	4173.0	6840 U	64	35-110	9	40
Indeno[1,2,3-cd]pyrene	3820	D		ug/kg dry	4173.0	6840 U	92	45-130	3	40
Isophorone	3750	D		ug/kg dry	4173.0	6840 U	90	40-110	3	40
Naphthalene	4650	D		ug/kg dry	4173.0	6840 U	111*	40-110	12	40
Nitrobenzene	3680	D		ug/kg dry	4173.0	6840 U	88	40-105	5	40
N-Nitrosodi-n-propylamine	4590	D		ug/kg dry	4173.0	6840 U	110	30-130	17	40
N-Nitrosodiphenylamine	4250	D		ug/kg dry	4173.0	6840 U	102	50-120	5	40
Pentachlorophenol	3330	D		ug/kg dry	4173.0	34200 U	80	25-120	14	40
Phenanthrene	4420	D		ug/kg dry	4173.0	6840 U	106	50-120	4	40
Phenol	3970	D		ug/kg dry	4173.0	6840 U	95	40-115	10	40
Pyrene	4600	D		ug/kg dry	4173.0	6840 U	110	45-125	4	40
Surrogate: 2-Fluorophenol	*4560*			*ug/kg dry*	*5216.2*		*87*	*25-121*		
Surrogate: Phenol-d5	*4720*			*ug/kg dry*	*5216.2*		*90*	*24-113*		
Surrogate: Nitrobenzene-d5	*3110*			*ug/kg dry*	*3477.5*		*89*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*3240*			*ug/kg dry*	*3477.5*		*93*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*3590*			*ug/kg dry*	*5216.2*		*69*	*19-122*		
Surrogate: p-Terphenyl-d14	*3180*			*ug/kg dry*	*3477.5*		*92*	*18-137*		

PREPARATION BENCH SHEET

L211132

Lionville Laboratory

Printed: 11/19/2012 12:51:46PM

000000029

Matrix: Solid **Prepared using: Extraction - SW 3540C** **Surrogate used: 1201164**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1211067-01	8270C TCL SVOC	11/16/2012 15:00	30.01	2				500	WC-Hanford, Inc.	
L211132-BLK1	QC	11/16/2012 15:00	30	1				500		
L211132-BS1	QC	11/16/2012 15:00	30	1	1201082		600	500		
L211132-MS1	QC	11/16/2012 15:00	30.47	2	1201082	1211067-01	600	500		
L211132-MSD1	QC	11/16/2012 15:00	29.81	2	1201082	1211067-01	600	500		

12 52

11/19/12

Extracts Relinquished By Date

11/19/12 1300

Extracts Received By Date

PCBs

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:34

Analytical Report for Polychlorinated Biphenyls by SW846 8082

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5L5	1211067-01	Other Solid	11/14/2012 10:00	11/16/2012 10:15

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-191 KP0151
LVL #: 1211067

W.O. #: 60049-001-001-0001-00
Received: 11-16-2012

PCBs

One (1) other solid sample was collected on 11-14-2012.

The sample and associated QC samples were extracted 11-16-2012 and analyzed 11-20, 21-2012 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 8082. All samples received Copper-Sulfur and Sulfuric Acid cleanups based on SW846 methods 3660A and 3665A.

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. All obtainable surrogate recoveries were within QC acceptance criteria.

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

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

6. All matrix spike recoveries were within QC acceptance criteria.

7. Samples J1R5L5, L211137-MS1, and L211137-MSD1 required 10-fold instrument dilutions due to sample matrix. Reporting limits have been adjusted to reflect the necessary dilutions.

8. The sample was reported on a dry weight basis.

9. All initial calibrations associated with this data set were within acceptance criteria.

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

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

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

Iain Daniels
LvL Laboratory Manager

2/28/13
Date

8082A PCBs
Analytes with %Difference or %Drift >15%, Where Mean is Used for Continuing Calibration

Analyte	CCV1 11-20-12 8:50:10 AM		CCV2 11-20-12 12:32:38 PM		CCV3 11-20-12 06:15:17 PM		CCV4 11-21-12 8:53:22 AM		CCV5 11-21-12 12:24:40 PM		CCV6		CCV7		CCV8	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Tetrachloro-meta-xylene (surrogate)																
Decachlorobiphenyl (surrogate)	-20.1		-16.5						-16.3							
Aroclor 1016-1																
Aroclor 1016-2																
Aroclor 1016-3																
Aroclor 1016-4																
Aroclor 1016-5																
Aroclor 1260-1																
Aroclor 1260-2																
Aroclor 1260-3																
Aroclor 1260-4																
Aroclor 1260-5	-15.9															
Mean %D or %Drift	-4.2	-3.1	-3.0	-3.7	0.3	0.7	1.3	-3.3	-1.3	-4.1						

Sample results reported from affected CCV:

CCV1: L211137- BLK1, BS1

CCV2: L211137-MS1, MS2, MSD2 1211073-01, 02 1211067-01

CCV3:

CCV4: 1211067-01 L211137-MS1, MSD1

CCV5:

CCV6:

CCV7:

CCV8:

GLOSSARY OF DATA

DATA QUALIFIERS

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

ABBREVIATIONS

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

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Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:34

J1R5L5
1211067-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Aroclor 1221	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Aroclor 1232	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Aroclor 1242	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Aroclor 1248	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Aroclor 1254	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Aroclor 1260	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Aroclor 1262	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Aroclor 1268	276	U	276	ug/kg dry	10	L211137	11/16/2012	11/21/2012	8082
Surrogate: Decachlorobiphenyl	*75 %*		*43-144*			*L211137*	*11/16/2012*	*11/21/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*82 %*		*52-141*			*L211137*	*11/16/2012*	*11/21/2012*	*8082*

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Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:34

Polychlorinated Biphenyls by SW846 8082 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211137 - SW 3540C										
Blank (L211137-BLK1)				Prepared: 11/16/2012 Analyzed: 11/20/2012						
Aroclor 1016	13.3	U	13.3	ug/kg wet						
Aroclor 1221	13.3	U	13.3	ug/kg wet						
Aroclor 1232	13.3	U	13.3	ug/kg wet						
Aroclor 1242	13.3	U	13.3	ug/kg wet						
Aroclor 1248	13.3	U	13.3	ug/kg wet						
Aroclor 1254	13.3	U	13.3	ug/kg wet						
Aroclor 1260	13.3	U	13.3	ug/kg wet						
Aroclor 1262	13.3	U	13.3	ug/kg wet						
Aroclor 1268	13.3	U	13.3	ug/kg wet						
Surrogate: Decachlorobiphenyl	*26.3*			*ug/kg wet*	*33.333*		*79*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*28.2*			*ug/kg wet*	*33.337*		*85*	*52-141*		
LCS (L211137-BS1)				Prepared: 11/16/2012 Analyzed: 11/20/2012						
Aroclor 1016	137		13.3	ug/kg wet	166.67		82	50-138		
Aroclor 1260	151		13.3	ug/kg wet	166.67		90	50-148		
Surrogate: Decachlorobiphenyl	*25.7*			*ug/kg wet*	*33.333*		*77*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*29.0*			*ug/kg wet*	*33.337*		*87*	*52-141*		
Matrix Spike (L211137-MS1)		**Source: 1211067-01**		Prepared: 11/16/2012 Analyzed: 11/21/2012						
Aroclor 1016	372	D	275	ug/kg dry	344.17	276 U	108	50-138		
Aroclor 1260	327	D	275	ug/kg dry	344.17	276 U	95	50-148		
Surrogate: Decachlorobiphenyl	*67.7*			*ug/kg dry*	*68.834*		*98*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*63.7*			*ug/kg dry*	*68.841*		*92*	*52-141*		
Matrix Spike Dup (L211137-MSD1)		**Source: 1211067-01**		Prepared: 11/16/2012 Analyzed: 11/21/2012						
Aroclor 1016	296	D	273	ug/kg dry	342.01	276 U	86	50-138	22	40
Aroclor 1260	286	D	273	ug/kg dry	342.01	276 U	84	50-148	13	40
Surrogate: Decachlorobiphenyl	*68.8*			*ug/kg dry*	*68.402*		*101*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*44.2*			*ug/kg dry*	*68.409*		*65*	*52-141*		

PREPARATION BENCH SHEET

L211137

Lionville Laboratory

Printed: 11/20/2012 9:44:55AM

000000038

Matrix: Solid **Prepared using: Extraction - SW 3540/3550** **Surrogate used: 1201397**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1211067-01	8082 PCBs	11/16/2012 16:19	30	10				250	WC-Hanford, Inc.	
1211073-01	8082 PCBs	11/16/2012 16:19	30.81	10				250	WC-Hanford, Inc.	
1211073-02	8082 PCBs	11/16/2012 16:19	30.74	10				250	WC-Hanford, Inc.	
L211137-BLK1	QC	11/16/2012 16:19	30	10				250		
L211137-BS1	QC	11/16/2012 16:19	30	10	1200902		250	250		
L211137-MS1	QC	11/16/2012 16:19	30.12	10	1200902	1211067-01	250	250		
L211137-MS2	QC	11/16/2012 16:19	30.37	10	1200902	1211073-01	250	250		
L211137-MSD1	QC	11/16/2012 16:19	30.31	10	1200902	1211067-01	250	250		
L211137-MSD2	QC	11/16/2012 16:19	30.05	10	1200902	1211073-01	250	250		

S cleared 11.20.12
Cu lot # B10X036

11/20/12 09:45 Shah 11.20. 09:45

Extracts Relinquished By Date Extracts Received By Date

DRO/MO

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-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:35

Analytical Report for Extractable Petroleum Hydrocarbons by SW846 8015

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5L5	1211067-01	Other Solid	11/14/2012 10:00	11/16/2012 10:15

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Exton, Pennsylvania 19341
Phone (610) 280-3000
Fax (610) 280-3041

Case Narrative

Client: WC-HANFORD RC-191 KP0151
LVL #: 1211067

W.O. #: 60049-001-001-0001-00
Date Received: 11-16-2012

DIESEL RANGE ORGANICS

One (1) other solid sample was collected on 11-14-2012.

The sample and associated QC samples were extracted 11-16-2012 and analyzed 11-21, 22-2012 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 8015B for Diesel Range Organics.

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

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

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

3. All obtainable surrogate recoveries were within QC acceptance criteria.

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

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

6. Two (2) of two (2) matrix spike recoveries were outside QC acceptance criteria. A copy of the Discrepancy Report (SDR# 12GC196) has been enclosed. The matrix spike recoveries were unobtainable due to high concentrations of analytes in sample J1R565 requiring a 50-fold instrument dilution.

7. Samples J1R5L5, L211133-MS1, and L211133-MSD1 required a 50-fold instrument dilution due to high concentrations of target analytes. Reporting limits have been adjusted to reflect the necessary dilutions.

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

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

10. The sample was reported on a dry weight basis.

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

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

Iain Daniels
LvL Laboratory Manager

1/30/13
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 126196

Initiator: Catherine Carey
Date: 11/23/12
Client: WC Hanford

Batch: 1211067
Samples: MS1 + MSD1
Method: SW846/MCAWW/CLP/

Parameter: DRO
Matrix: SOIID
Prep Batch: L211133

1. Reason for SDR

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

b. General Discrepancy

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

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

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

spike recoveries high in MS1 (750%) + MSD1 (2490%)

2. Known or Probable Causes(s)

high concentration of target analytes

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
JD.

4. Project Manager Instructions...signature/date: 1/30/13

__ 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: 1/30/13 Other Explanation:

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

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

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

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

QA-139-A-0208

GLOSSARY OF DATA

DATA QUALIFIERS

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

ABBREVIATIONS

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

264 Welsh Pool Road
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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:35

J1R5L5
1211067-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Extractable Petroleum Hydrocarbons by SW846 8015									
Diesel Range Organics	345000	U	345000	ug/kg dry	50	L211133	11/16/2012	11/22/2012	8015M
Motor Oil	**11700000**		1040000	ug/kg dry	50	L211133	11/16/2012	11/22/2012	8015M
Surrogate: p-Terphenyl	*90 %*		*39-129*			*L211133*	*11/16/2012*	*11/22/2012*	*8015M*

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Phone: 610-280-3000
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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:35

Extractable Petroleum Hydrocarbons by SW846 8015 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211133 - SW 3540C										
Blank (L211133-BLK1)				Prepared: 11/16/2012 Analyzed: 11/21/2012						
Diesel Range Organics	3330	U	3330	ug/kg wet						
Motor Oil	10000	U	10000	ug/kg wet						
Surrogate: p-Terphenyl	*6650*			*ug/kg wet*	*6666.7*		*100*	*39-129*		
LCS (L211133-BS1)				Prepared: 11/16/2012 Analyzed: 11/21/2012						
Diesel Range Organics	50200		3330	ug/kg wet	66667		75	42-133		
Surrogate: p-Terphenyl	*5880*			*ug/kg wet*	*6666.7*		*88*	*39-129*		
Matrix Spike (L211133-MS1)		**Source: 1211067-01**		Prepared: 11/16/2012 Analyzed: 11/22/2012						
Diesel Range Organics	3800000		346000	ug/kg dry	138220	345000 U	2750*	42-133		
Surrogate: p-Terphenyl	*11700*			*ug/kg dry*	*13822*		*84*	*39-129*		
Matrix Spike Dup (L211133-MSD1)		**Source: 1211067-01**		Prepared: 11/16/2012 Analyzed: 11/22/2012						
Diesel Range Organics	3400000		340000	ug/kg dry	136130	345000 U	2490*	42-133	10	40
Surrogate: p-Terphenyl	*9440*			*ug/kg dry*	*13613*		*69*	*39-129*		

PREPARATION BENCH SHEET

L211133

Lionville Laboratory

Printed: 11/19/2012 9:03:29PM

00000047

Matrix: Solid **Prepared using: Extraction - SW 3540C** **Surrogate used: 1201102**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1211067-01	8015M DRO	11/16/2012 15:41	30.02	1				1000	WC-Hanford, Inc.	
1211069-01	8015M DRO	11/16/2012 15:41	30.14	1				1000	WC-Hanford, Inc.	
1211073-01	8015M DRO	11/16/2012 15:41	30	1				1000	WC-Hanford, Inc.	
1211073-02	8015M DRO	11/16/2012 15:41	30.24	1				1000	WC-Hanford, Inc.	
L211133-BLK1	QC	11/16/2012 15:41	30	1				1000		
L211133-BS1	QC	11/16/2012 15:41	30	1	1200846		1000	1000		
L211133-MS1	QC	11/16/2012 15:41	30	1	1200846	1211067-01	1000	1000		
L211133-MS2	QC	11/16/2012 15:41	30.67	1	1200846	1211069-01	1000	1000		
L211133-MS3	QC	11/16/2012 15:41	30.57	1	1200846	1211073-01	1000	1000		
L211133-MSD1	QC	11/16/2012 15:41	30.46	1	1200846	1211067-01	1000	1000		
L211133-MSD2	QC	11/16/2012 15:41	30	1	1200846	1211069-01	1000	1000		
L211133-MSD3	QC	11/16/2012 15:41	30.24	1	1200846	1211073-01	1000	1000		

Extracts Relinquished By Date 11/19/12 2105

Catherine Cary Extracts Received By Date 11/19/12

PAHs

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

WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:35

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5L5	1211067-01	Other Solid	11/14/2012 10:00	11/16/2012 10:15

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Exton, Pennsylvania 19341
Phone (610) 280-3000
Fax (610) 280-3041

Case Narrative

Client: WC-HANFORD RC-191 KP0151
LVL #: 1211067

W.O. #: 60049-001-001-0001-00
Date Received: 11-16-2012

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

One (1) other solid sample was collected on 11-14-2012.

The sample and associated QC samples were extracted 11-28-2012 and analyzed 12-01-2012 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 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. All obtainable surrogate recoveries were within QC acceptance criteria.
4. The method blank was below the reporting limits for all target compounds.
5. All blank spike recoveries were within QC acceptance criteria.
6. Twelve (12) of thirty-two (32) matrix spike recoveries were outside criteria. A copy of the Sample Discrepancy Report (SDR# 12GC201) has been enclosed.
7. The sample and associated QC required 20-fold instrument dilutions due to poor sample matrix. Reporting limits have been adjusted to reflect the necessary dilutions.
8. The initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. The sample was reported on a dry weight basis.

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

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.

for Iain Daniels
LvL Laboratory Manager

1/30/13
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12GC201

Initiator: Catherine Carey
Date: 12/03/12
Client: WC Hanford

Batch: 1211067
Samples: MS1 +MSD1
Method: SW846/MCAWW/CLP/

Parameter: PAH
Matrix: SOLID
Prep Batch: L211237

1. Reason for SDR

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

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

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

c. Problem (Include all relevant specific results; attach data if necessary)
several spike recoveries out high in matrix spikes

2. Known or Probable Causes(s) Dilution and interference from non targets

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:
Sample had a lot of matrix that required dilution
Narrate
JD.

1/30/13

4. Project Manager Instructions...signature/date: 1/30/13
__ 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: 1/30/13
__ Verified re-[log][leach][extract][digest][analysis] (circle)
__ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

Other Explanation:

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

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

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

QA-139-A-0208

GLOSSARY OF DATA

DATA QUALIFIERS

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

ABBREVIATIONS

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

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:35

J1R5L5

1211067-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Acenaphthylene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Acenaphthene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Fluorene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Phenanthrene	**87.8**	J, D	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Anthracene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Fluoranthene	**160**	J, D	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Indeno[1,2,3-cd]pyrene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Pyrene	**73.3**	J, D	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Benz[a]anthracene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Chrysene	**82.5**	J, D	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Benzo[b] fluoranthene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Benzo[k] fluoranthene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Benzo[a] pyrene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Dibenz[a,h]anthracene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Benzo[g,h,i] perylene	266	U	266	ug/kg dry	20	L211237	11/28/2012	12/01/2012	8310
Surrogate: Triphenylene	*90 %*		*68-129*			*L211237*	*11/28/2012*	*12/01/2012*	*8310*

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

WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:35

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 L211237 - SW 3540C										
Blank (L211237-BLK1)				Prepared: 11/28/2012 Analyzed: 12/01/2012						
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	*140*			*ug/kg wet*	*166.67*		*84*	*68-129*		
LCS (L211237-BS1)				Prepared: 11/28/2012 Analyzed: 12/01/2012						
Naphthalene	113		3.33	ug/kg wet	166.67		68	0-127		
Acenaphthylene	140		3.33	ug/kg wet	166.67		84	50-140		
Acenaphthene	128		3.33	ug/kg wet	166.67		77	17-139		
Fluorene	142		3.33	ug/kg wet	166.67		85	28-145		
Phenanthrene	137		3.33	ug/kg wet	166.67		82	30-152		
Anthracene	142		3.33	ug/kg wet	166.67		85	19-171		
Fluoranthene	140		3.33	ug/kg wet	166.67		84	34-159		
Indeno[1,2,3-cd]pyrene	147		3.33	ug/kg wet	166.67		88	31-156		
Pyrene	144		3.33	ug/kg wet	166.67		86	33-152		
Benz[a]anthracene	151		3.33	ug/kg wet	166.67		90	32-157		
Chrysene	145		3.33	ug/kg wet	166.67		87	31-159		
Benzo[b] fluoranthene	154		3.33	ug/kg wet	166.67		92	33-164		
Benzo[k] fluoranthene	153		3.33	ug/kg wet	166.67		92	28-161		
Benzo[a] pyrene	157		3.33	ug/kg wet	166.67		94	29-149		
Dibenz[a,h]anthracene	156		3.33	ug/kg wet	166.67		94	27-153		
Benzo[g,h,i] perylene	158		3.33	ug/kg wet	166.67		95	32-157		
Surrogate: Triphenylene	*143*			*ug/kg wet*	*166.67*		*86*	*68-129*		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:35

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 L211237 - SW 3540C										
Matrix Spike (L211237-MS1)		**Source: 1211067-01**		Prepared: 11/28/2012 Analyzed: 12/01/2012						
Naphthalene	557	D	276	ug/kg dry	689.71	266 U	81	0-127		
Acenaphthylene	689	D	276	ug/kg dry	689.71	266 U	100	50-140		
Acenaphthene	439	D	276	ug/kg dry	689.71	266 U	64	17-139		
Fluorene	628	D	276	ug/kg dry	689.71	266 U	91	28-145		
Phenanthrene	625	D	276	ug/kg dry	689.71	87.8	78	30-152		
Anthracene	375	D	276	ug/kg dry	689.71	266 U	54	19-171		
Fluoranthene	708	D	276	ug/kg dry	689.71	160	79	34-159		
Indeno[1,2,3-cd]pyrene	4100	D	276	ug/kg dry	689.71	266 U	595*	31-156		
Pyrene	579	D	276	ug/kg dry	689.71	73.3	73	33-152		
Benz[a]anthracene	438	D	276	ug/kg dry	689.71	266 U	64	32-157		
Chrysene	517	D	276	ug/kg dry	689.71	82.5	63	31-159		
Benzo[b] fluoranthene	382	D	276	ug/kg dry	689.71	266 U	55	33-164		
Benzo[k] fluoranthene	491	D	276	ug/kg dry	689.71	266 U	71	28-161		
Benzo[a] pyrene	554	D	276	ug/kg dry	689.71	266 U	80	29-149		
Dibenz[a,h]anthracene	491	D	276	ug/kg dry	689.71	266 U	71	27-153		
Benzo[g,h,i] perylene	538	D	276	ug/kg dry	689.71	266 U	78	32-157		
Surrogate: Triphenylene	*550*			*ug/kg dry*	*689.71*		*80*	*68-129*		
Matrix Spike Dup (L211237-MSD1)		**Source: 1211067-01**		Prepared: 11/28/2012 Analyzed: 12/01/2012						
Naphthalene	2470	D	271	ug/kg dry	677.54	266 U	364*	0-127	127*	40
Acenaphthylene	1610	D	271	ug/kg dry	677.54	266 U	238*	50-140	82*	40
Acenaphthene	5180	D	271	ug/kg dry	677.54	266 U	764*	17-139	169*	40
Fluorene	840	D	271	ug/kg dry	677.54	266 U	124	28-145	31	40
Phenanthrene	2650	D	271	ug/kg dry	677.54	87.8	378*	30-152	132*	40
Anthracene	793	D	271	ug/kg dry	677.54	266 U	117	19-171	73*	40
Fluoranthene	2870	D	271	ug/kg dry	677.54	160	399*	34-159	134*	40
Indeno[1,2,3-cd]pyrene	1130	D	271	ug/kg dry	677.54	266 U	167*	31-156	112*	40
Pyrene	2310	D	271	ug/kg dry	677.54	73.3	330*	33-152	127*	40
Benz[a]anthracene	1210	D	271	ug/kg dry	677.54	266 U	178*	32-157	95*	40
Chrysene	1220	D	271	ug/kg dry	677.54	82.5	168*	31-159	91*	40
Benzo[b] fluoranthene	1220	D	271	ug/kg dry	677.54	266 U	180*	33-164	106*	40
Benzo[k] fluoranthene	838	D	271	ug/kg dry	677.54	266 U	124	28-161	54*	40
Benzo[a] pyrene	1390	D	271	ug/kg dry	677.54	266 U	205*	29-149	87*	40
Dibenz[a,h]anthracene	555	D	271	ug/kg dry	677.54	266 U	82	27-153	14	40
Benzo[g,h,i] perylene	756	D	271	ug/kg dry	677.54	266 U	112	32-157	35	40
Surrogate: Triphenylene	*732*			*ug/kg dry*	*677.54*		*108*	*68-129*		

PREPARATION BENCH SHEET

L211237

Lionville Laboratory

Printed: 12/3/2012 9:05:16PM

000000057

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
1211067-01	8310 PAH	11/28/2012 14:35	15.59	5				50	WC-Hanford, Inc.	
1211069-01RE1	8310 PAH	11/28/2012 14:35	30.08	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
1211073-01RE1	8310 PAH	11/28/2012 14:35	30.47	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
1211073-02RE1	8310 PAH	11/28/2012 14:35	30.13	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
L211237-BLK1	QC	11/28/2012 14:35	30	5				50		
L211237-BS1	QC	11/28/2012 14:35	30	5	1200963		50	50		
L211237-MS1	QC	11/28/2012 14:35	15.03	5	1200963	1211067-01	50	50		
L211237-MS2	QC	11/28/2012 14:35	30.02	5	1200963	211069-01RE	50	50		
L211237-MS3	QC	11/28/2012 14:35	30.76	5	1200963	211073-01RE	50	50		
L211237-MSD1	QC	11/28/2012 14:35	15.3	5	1200963	1211067-01	50	50		
L211237-MSD2	QC	11/28/2012 14:35	30.98	5	1200963	211069-01RE	50	50		
L211237-MSD3	QC	11/28/2012 14:35	30	5	1200963	211073-01RE	50	50		

From L211136 on 11/28/2012 by MLF

Revision for BSD CAC 12/03/12

Extracts Relinquished By Date

Extracts Received By Date

PREPARATION BENCH SHEET

L211237

Lionville Laboratory

Printed: 12/3/2012 10:56:25AM

00000058

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
1211067-01	8310 PAH	11/28/2012 14:35	15.59	5				50	WC-Hanford, Inc.	
1211069-01RE1	8310 PAH	11/28/2012 14:35	30.08	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
1211073-01RE1	8310 PAH	11/28/2012 14:35	30.47	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
1211073-02RE1	8310 PAH	11/28/2012 14:35	30.13	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
L211237-BLK1	QC	11/28/2012 14:35	30	5				50		
L211237-BS1	QC	11/28/2012 14:35	30	5	1200963		50	50		
L211237-BSD1	QC	11/28/2012 14:35	30	5				50		
L211237-MS1	QC	11/28/2012 14:35	15.03	5	1200963	1211067-01	50	50		
L211237-MS2	QC	11/28/2012 14:35	30.02	5	1200963	211069-01RE	50	50		
L211237-MS3	QC	11/28/2012 14:35	30.76	5	1200963	211073-01RE	50	50		
L211237-MSD1	QC	11/28/2012 14:35	15.3	5	1200963	1211067-01	50	50		
L211237-MSD2	QC	11/28/2012 14:35	30.98	5	1200963	211069-01RE	50	50		
L211237-MSD3	QC	11/28/2012 14:35	30	5	1200963	211073-01RE	50	50		

From L211136 on 11/28/2012 by MLF

LC 12-3-12 Revista

Extracts Relinquished By Date Extracts Received By Date

PREPARATION BENCH SHEET

L211237

Lionville Laboratory

Printed: 11/29/2012 2:55:03PM

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1211067-01RE1	8310 PAH	11/28/2012 14:35	15.59	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
1211069-01RE1	8310 PAH	11/28/2012 14:35	30.08	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
1211073-01RE1	8310 PAH	11/28/2012 14:35	30.47	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
1211073-02RE1	8310 PAH	11/28/2012 14:35	30.13	5				50	WC-Hanford, Inc.	From L211136 by MLF on 11/28/2012
L211237-BLK1	QC	11/28/2012 14:35	30	5				50		
L211237-BS1	QC	11/28/2012 14:35	30	5	1200963		50	50		
L211237-MS1	QC	11/28/2012 14:35	15.03	5	1200963	211067-01RE	50	50		
L211237-MS2	QC	11/28/2012 14:35	30.02	5	1200963	211069-01RE	50	50		
L211237-MS3	QC	11/28/2012 14:35	30.76	5	1200963	211073-01RE	50	50		
L211237-MSD1	QC	11/28/2012 14:35	15.3	5	1200963	211067-01RE	50	50		
L211237-MSD2	QC	11/28/2012 14:35	30.98	5	1200963	211069-01RE	50	50		
L211237-MSD3	QC	11/28/2012 14:35	30	5	1200963	211073-01RE	50	50		

From L211136 on 11/28/2012 by MLF

11/29/12 1525 — Extracts Relinquished By — Date

11/30/12 — Extracts Received By — Date

METALS

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-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:29

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5L5	1211067-01	Other Solid	11/14/2012 10:00	11/16/2012 10:15

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-191
LVL#: 1211067
SDG/SAF#: KP0151/RC-191

W.O.#: 60049-001-001-0001-00
Date Received: 11-16-12

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 1 other solid sample.

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

   The sample was analyzed with a 3-fold dilution for ICP metals due to sample matrix.

   Sample L211166-MS1 was reanalyzed with a 12-fold dilution for Zinc due to high concentration of Zinc in the sample.

   The sample was analyzed and reported with a 120-fold dilution for Mercury due to the high concentration of Mercury in the sample possibly resulting from a nonhomogenous sample. The sample was redigested and reanalyzed for Mercury and reported with the suffix RE1 in order to confirm the original Mercury result due to sample matrix. Please refer to SDR#: 12MR024A.

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).

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.

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 14 analytes were outside the 75-125% control limits.

11. For analytes where the MS is out of control, a post-digestion MS (PDS) is performed. A serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration levels for the following analytes: Mercury, Aluminum, Antimony, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. The Iron post digestion spike recovery is outside the 75-125% control limit possibly due to matrix effect.

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1R5L5	Mercury	1.0	102.6

12. The duplicate analyses for 12 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 Antimony, Arsenic, Cadmium, Lead, 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

1/3/13
Date

alm/11-067hgn%.doc

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12MR024A

Initiator: [illegible]
Date: 12/3/12
Client: WC Hanford

Batch: 1211067
Samples: 01
Method: SW846/MCAWW/CLP/

Parameter: Hg
Matrix: solid
Prep Batch: L211168

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)

Initial analysis of sample was extremely higher than the duplicate and matrix spike in prep batch L211168 (HG-117203). Sample redigested in L211202, where results were much more similar to the duplicate and matrix spike from L211168.

2. Known or Probable Causes(s)

Sample was non-homogeneous, liquid study with lumpy solids.

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)

report both runs and narrate

4. Project Manager Instructions...signature/date: [illegible] 12/3/12

✓ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
✓ Client Contacted:
Date/Person Jan Kessner 12/3/12
__ Add
__ Cancel

5. Final Action...signature/date: [illegible] 12/3/12

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

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

WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:29

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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:29

J1R5L5
1211067-01 (Other Solid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**2260**		25.9	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Antimony	**3.91**		3.11	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Arsenic	**11.7**		5.18	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Barium	**140**		2.59	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Beryllium	1.04	U	1.04	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Boron	10.4	U	10.4	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Cadmium	**0.508**	B	1.04	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Calcium	**8690**		518	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Chromium	**79.5**		1.04	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Cobalt	**10.7**		10.4	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Copper	**318**		5.18	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Iron	**180000**		104	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Lead	**13.3**		2.59	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Magnesium	**1430**		389	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Manganese	**638**		25.9	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Molybdenum	**47.2**		10.4	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Nickel	**464**		20.7	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Potassium	**541**	B	2070	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Selenium	**1.89**		1.55	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Silicon	**684**		10.4	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Silver	1.04	U	1.04	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Sodium	**261**		259	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Vanadium	**15.6**		13.0	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Zinc	**799**		51.8	mg/kg dry	3	L211166	11/20/2012	11/29/2012	6010B
Mercury	**224**		6.22	mg/kg dry	120	L211168	11/20/2012	11/21/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:29

J1R5L5

1211067-01RE1 (Other Solid)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Metals by SW846 6000/7000 series								
Mercury	**0.415**	0.0583	mg/kg dry	1	L211202	11/26/2012	11/28/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:29

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 L211166 - SW 3050B										
Blank (L211166-BLK1)				Prepared: 11/20/2012 Analyzed: 11/29/2012						
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	96.2	U	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	1.90	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	1.92	U	1.92	mg/kg wet						
Silver	0.192	U	0.192	mg/kg wet						
Sodium	48.1	U	48.1	mg/kg wet						
Vanadium	2.40	U	2.40	mg/kg wet						
Zinc	9.62	U	9.62	mg/kg wet						
Duplicate (L211166-DUP1)			**Source: 1211067-01**	Prepared: 11/20/2012 Analyzed: 11/29/2012						
Aluminum	4010		25.5	mg/kg dry		2260			56*	20
Antimony	1.82	B	3.06	mg/kg dry		3.91			73*	20
Arsenic	3.20	B	5.10	mg/kg dry		11.7			114*	20
Barium	346		2.55	mg/kg dry		140			85*	20
Beryllium	1.02	U	1.02	mg/kg dry		1.04 U				20
Boron	10.2	U	10.2	mg/kg dry		10.4 U				20
Cadmium	0.978	B	1.02	mg/kg dry		0.508			63*	20
Calcium	7980		510	mg/kg dry		8690			8	20
Chromium	56.0		1.02	mg/kg dry		79.5			35*	20
Cobalt	10.2	U	10.2	mg/kg dry		10.7				20
Copper	123		5.10	mg/kg dry		318			89*	20

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:29

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 L211166 - SW 3050B										
Duplicate (L211166-DUP1)		**Source: 1211067-01**		Prepared: 11/20/2012 Analyzed: 11/29/2012						
Iron	104000		102	mg/kg dry		180000			54*	20
Lead	120		2.55	mg/kg dry		13.3			160*	20
Magnesium	1550		382	mg/kg dry		1430			8	20
Manganese	335		25.5	mg/kg dry		638			62*	20
Molybdenum	11.6		10.2	mg/kg dry		47.2			121*	20
Nickel	26.4		20.4	mg/kg dry		464			178*	20
Potassium	568	B	2040	mg/kg dry		541			5	20
Selenium	2.02		1.53	mg/kg dry		1.89			6	20
Silicon	787		10.2	mg/kg dry		684			14	20
Silver	1.02	U	1.02	mg/kg dry		1.04 U				20
Sodium	351		255	mg/kg dry		261			29*	20
Vanadium	23.6		12.7	mg/kg dry		15.6			41*	20
Zinc	2810		51.0	mg/kg dry		799			111*	20
Matrix Spike (L211166-MS1)		**Source: 1211067-01**		Prepared: 11/20/2012 Analyzed: 11/29/2012						
Aluminum	6210		25.1	mg/kg dry	334.40	2260	1180*	75-125		
Antimony	55.6		3.01	mg/kg dry	83.600	3.91	62*	75-125		
Arsenic	320		5.02	mg/kg dry	334.40	11.7	92	75-125		
Barium	422		2.51	mg/kg dry	334.40	140	84	75-125		
Beryllium	8.20		1.00	mg/kg dry	8.3600	1.04 U	98	75-125		
Boron	155		10.0	mg/kg dry	167.20	10.4 U	93	75-125		
Cadmium	9.43		1.00	mg/kg dry	8.3600	0.508	107	75-125		
Calcium	12900		502	mg/kg dry	4180.0	8690	100	75-125		
Chromium	60.9		1.00	mg/kg dry	33.440	79.5	-56*	75-125		
Cobalt	85.3		10.0	mg/kg dry	83.600	10.7	89	75-125		
Copper	144		5.02	mg/kg dry	41.800	318	-416*	75-125		
Iron	63200		100	mg/kg dry	167.20	180000	-70200*	75-125		
Lead	134		2.51	mg/kg dry	83.600	13.3	144*	75-125		
Magnesium	6810		376	mg/kg dry	4180.0	1430	129*	75-125		
Manganese	351		25.1	mg/kg dry	83.600	638	-344*	75-125		
Molybdenum	163		10.0	mg/kg dry	167.20	47.2	69*	75-125		
Nickel	108		20.1	mg/kg dry	83.600	464	-426*	75-125		
Potassium	4800		2010	mg/kg dry	4180.0	541	102	75-125		
Selenium	271		1.50	mg/kg dry	334.40	1.89	80	75-125		
Silicon	1130		10.0	mg/kg dry	167.20	684	264*	75-125		
Silver	8.38		1.00	mg/kg dry	8.3600	1.04 U	100	75-125		
Sodium	4860		251	mg/kg dry	4180.0	261	110	75-125		

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:29

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 L211166 - SW 3050B									
Matrix Spike (L211166-MS1)		**Source: 1211067-01**	Prepared: 11/20/2012 Analyzed: 11/29/2012						
Vanadium	128	12.5	mg/kg dry	83.600	15.6	134*	75-125		
Zinc	5930	201	mg/kg dry	83.600	799	6140*	75-125		
Post Spike (L211166-PS1)		**Source: 1211067-01**	Prepared: 11/20/2012 Analyzed: 11/29/2012						
Aluminum	78400		ug/L	66000	13100	99	75-125		
Antimony	341		ug/L	300.00	22.7	106	75-125		
Chromium	778		ug/L	300.00	460	106	75-125		
Copper	5200		ug/L	3300.0	1840	102	75-125		
Iron	1110000		ug/L	126000	1040000	54*	75-125		
Lead	395		ug/L	300.00	76.8	106	75-125		
Magnesium	71600		ug/L	64800	8300	98	75-125		
Manganese	6610		ug/L	3000.0	3690	97	75-125		
Molybdenum	598		ug/L	300.00	273	108	75-125		
Nickel	5910		ug/L	3300.0	2690	98	75-125		
Silicon	10500		ug/L	6300.0	3960	104	75-125		
Vanadium	3180		ug/L	3000.0	90.5	103	75-125		
Zinc	7880		ug/L	24000	4630	14*	75-125		
Reference (L211166-SRM1)			Prepared: 11/20/2012 Analyzed: 11/29/2012						
Aluminum	12000	14.7	mg/kg wet	6670.0		180	0-200.89		
Antimony	34.3	1.76	mg/kg wet	53.000		65	0-235.8		
Arsenic	117	2.94	mg/kg wet	114.00		103	82.8-117.54		
Barium	331	1.47	mg/kg wet	307.00		108	79.8-120.2		
Beryllium	111	0.588	mg/kg wet	108.00		103	82.8-117.6		
Boron	81.9	5.88	mg/kg wet	85.100		96	67.5-132.8		
Cadmium	231	0.588	mg/kg wet	225.00		102	83.6-116.4		
Calcium	3400	294	mg/kg wet	3360.0		101	83.3-116.9		
Chromium	85.0	0.588	mg/kg wet	77.200		110	73.3-126.4		
Cobalt	168	5.88	mg/kg wet	166.00		101	80.7-118.7		
Copper	273	2.94	mg/kg wet	271.00		101	80.8-119.2		
Iron	8760	58.8	mg/kg wet	8420.0		104	78.6-121.1		
Lead	189	1.47	mg/kg wet	190.00		99	81.6-118.4		
Magnesium	9120	221	mg/kg wet	8570.0		106	83.2-116.7		
Manganese	865	14.7	mg/kg wet	965.00		90	69.3-130.5		
Molybdenum	230	5.88	mg/kg wet	235.00		98	76.2-123.8		
Nickel	223	11.8	mg/kg wet	221.00		101	79.6-120.8		
Potassium	14500	1180	mg/kg wet	14400		101	81.9-118.1		
Selenium	196	0.882	mg/kg wet	187.00		105	75.9-124.6		

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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:29

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 L211166 - SW 3050B										
Reference (L211166-SRM1)				Prepared: 11/20/2012 Analyzed: 11/29/2012						
Silicon	1500		5.88	mg/kg wet	807.00		185	0-219.3		
Silver	83.6		0.588	mg/kg wet	83.500		100	82.7-117.1		
Sodium	9710		147	mg/kg wet	9730.0		100	82.5-117.2		
Vanadium	111		7.35	mg/kg wet	98.700		112	75.9-123.6		
Zinc	204		29.4	mg/kg wet	199.00		102	78.4-121.6		
Batch L211168 - SW 7471A Prep										
Blank (L211168-BLK1)				Prepared: 11/20/2012 Analyzed: 11/21/2012						
Mercury	0.0281	U	0.0281	mg/kg wet						
Duplicate (L211168-DUP1)		**Source: 1211067-01**		Prepared: 11/20/2012 Analyzed: 11/21/2012						
Mercury	0.513		0.0478	mg/kg dry		224			199*	20
Matrix Spike (L211168-MS1)		**Source: 1211067-01**		Prepared: 11/20/2012 Analyzed: 11/21/2012						
Mercury	0.510		0.0504	mg/kg dry	0.28017	224	-79900*	75-125		
Reference (L211168-SRM1)				Prepared: 11/20/2012 Analyzed: 11/21/2012						
Mercury	1.24		0.0281	mg/kg wet	1.2900		95.9	62.6-138		
Batch L211202 - SW 7471A Prep										
Blank (L211202-BLK1)				Prepared: 11/26/2012 Analyzed: 11/28/2012						
Mercury	0.0290	U	0.0290	mg/kg wet						
Duplicate (L211202-DUP2)		**Source: 1211067-01RE1**		Prepared: 11/26/2012 Analyzed: 11/28/2012						
Mercury	0.279		0.0565	mg/kg dry		0.415			39.2*	20

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:29

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 L211202 - SW 7471A Prep									
Matrix Spike (L211202-MS2)		**Source: 1211067-01RE1**	Prepared: 11/26/2012 Analyzed: 11/28/2012						
Mercury	0.777	0.0518	mg/kg dry	0.28795	0.415	126*	75-125		
Reference (L211202-SRM1)			Prepared: 11/26/2012 Analyzed: 11/28/2012						
Mercury	1.32	0.0273	mg/kg wet	1.2900		102	62.6-138		

Lionville Laboratory

Logbook #: 1154

SAMPLE DIGESTION RECORD

Digestion Batch #: L211166
Date/Time Initiated: 11/20/12 1100
Date/Time Completed: 11/21/12 1345
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)

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/TC	Texture	Color / Appearance	Artifact	Turb
1211067-01		0.60	50		TO	coarse	black sludge	liquid/rocks	
L211166-DUP1		0.61	50						
MS1	0.5	0.62	50						
1211069-01		0.56	50			fine	brown powdery soil	rocks/veg.	
L211166-DUP2		0.60	50						
MS2	0.5	0.61	50						
1211073-01		0.64	50			fine	dk brown powdery soil	veg.	
L211166-DUP3		0.59	50						
MS3	0.5	0.57	50						
1211073-02		0.59	50			fine	dk brown soil	rocks/veg	
1211083-01		0.59	50			fine	dk brown soil	rocks/veg	
L211166-DUP4		0.56	50						
MS4	0.5	0.57	50						
1211083-02		0.58	50			fine	dk brown soil	rocks/veg	
03		0.56	50			fine	dk brown soil	rocks	
L211166-BLK1		0.52	50						
SRM1	(*)	0.51	50						

MW 11/20/12

Spiking IDs / Expiration Date:
MS#: 1201377
LCS#: 1201014 (*)

Reagent IDs:
HNO_3 0000003390
HCl L13029
H_2O_2 L11A03
1:1 HNO_3 637-076-07
1:1 HCl

File ID#:

Data Review By/Date: 11/26/12

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

Page #:

PREPARATION BENCH SHEET

L211166

Lionville Laboratory

Printed: 11/30/2012 12:31:26PM

00000074

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
1211067-01	6010B ICP Trace	11/20/2012 11:00	0.6	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1211069-01	6010B ICP Trace	11/20/2012 11:00	0.56	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211073-01	6010B ICP Trace	11/20/2012 11:00	0.64	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211073-02	6010B ICP Trace	11/20/2012 11:00	0.59	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211083-01	6010B ICP Trace	11/20/2012 11:00	0.59	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211083-02	6010B ICP Trace	11/20/2012 11:00	0.58	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211083-03	6010B ICP Trace	11/20/2012 11:00	0.56	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
L211166-BLK1	QC	11/20/2012 11:00	0.52	50						
L211166-DUP1	QC	11/20/2012 11:00	0.61	50		1211067-01				
L211166-DUP2	QC	11/20/2012 11:00	0.6	50		1211069-01				
L211166-DUP3	QC	11/20/2012 11:00	0.59	50		1211073-01				
L211166-DUP4	QC	11/20/2012 11:00	0.56	50		1211083-01				
L211166-MS1	QC	11/20/2012 11:00	0.62	50	1201377	1211067-01	500			
L211166-MS2	QC	11/20/2012 11:00	0.61	50	1201377	1211069-01	500			
L211166-MS3	QC	11/20/2012 11:00	0.57	50	1201377	1211073-01	500			
L211166-MS4	QC	11/20/2012 11:00	0.57	50	1201377	1211083-01	500			
L211166-PS1	QC	11/20/2012 11:00	0.6	50	1001493	1211067-01	100			
L211166-PS2	QC	11/20/2012 11:00	0.56	50	1001902	1211069-01	100			
L211166-PS3	QC	11/20/2012 11:00	0.64	50	1001902	1211073-01	100			
L211166-PS4	QC	11/20/2012 11:00	0.59	50	1001493	1211083-01	100			

Revision for time/post spike

Extracts Relinquished By Date

Extracts Received By Date

AJM 11/30/12

PREPARATION BENCH SHEET

L211166

Lionville Laboratory

Printed: 11/30/2012 12:31:26PM

00000075

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
L211166-SRM1	QC	11/20/2012 11:00	0.51	50	1201014		510			

Revision for time / post spike
AJM 11/30/12

Extracts Relinquished By Date

Extracts Received By Date

PREPARATION BENCH SHEET

L211166

Lionville Laboratory

Printed: 11/21/2012 2:22:11PM

000000076

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
1211067-01	6010B ICP Trace	11/20/2012 10:49	0.6	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
1211069-01	6010B ICP Trace	11/20/2012 10:49	0.56	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211073-01	6010B ICP Trace	11/20/2012 10:49	0.64	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211073-02	6010B ICP Trace	11/20/2012 10:49	0.59	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211083-01	6010B ICP Trace	11/20/2012 10:49	0.59	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211083-02	6010B ICP Trace	11/20/2012 10:49	0.58	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1211083-03	6010B ICP Trace	11/20/2012 10:49	0.56	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
L211166-BLK1	QC	11/20/2012 10:49	0.52	50						
L211166-DUP1	QC	11/20/2012 10:49	0.61	50		1211067-01				
L211166-DUP2	QC	11/20/2012 10:49	0.6	50		1211069-01				
L211166-DUP3	QC	11/20/2012 10:49	0.59	50		1211073-01				
L211166-DUP4	QC	11/20/2012 10:49	0.56	50		1211083-01				
L211166-MS1	QC	11/20/2012 10:49	0.62	50	1201377	1211067-01	500			
L211166-MS2	QC	11/20/2012 10:49	0.61	50	1201377	1211069-01	500			
L211166-MS3	QC	11/20/2012 10:49	0.57	50	1201377	1211073-01	500			
L211166-MS4	QC	11/20/2012 10:49	0.57	50	1201377	1211083-01	500			
L211166-PS1	QC	11/20/2012 10:49	0.5	50						
L211166-SRM1	QC	11/20/2012 10:49	0.51	50	1201014		510			

Extracts Relinquished By — Date: 11/21/12

Extracts Received By — Date: 11/28/12

Lionville Laboratory

MERCURY PREPARATION

Logbook # 1153

Analyst: [illegible]
Date 11/26/12 – 11/27/12
Start Time/Temp: 1350/94°
End Time/Temp: 1420/95

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

Prep Batch: L211202
Worksheet: HG112801
SOP No. ME-HgCVAA
BLOCK 1 (3) 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 µg/l		0.100		10ml	50	
1.0 µg/l		0.500		10ml	50	
2.0 µg/l		1.000		10ml	50	
5.0 µg/l		2.500		10ml	50	
10.0 µg/l		5.000		10ml	50	
ICV		0.125	2.5	10ml	50	
CCV		0.250	5.0	10ml	50	
ICB/CCB				10ml	50	
L211202-BL44				0.31	50	
SRM1		⊗	⊗	0.33	50	
1211075-02				0.36	50	
L211202-DUP1				0.34	50	
MS1		0.5	1.0	0.38	50	
1211075-03				0.38	50	
04				0.39	50	
05				0.32	50	
06				0.36	50	
07				0.33	50	
08				0.36	50	
09				0.33	50	
10				0.35	50	
11				0.33	50	
12				0.38	50	
13				0.35	50	
14				0.36	50	
15				0.38	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	11/27/12 1105
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: [illegible] 11/29/12

se book # 1153 for std traceability information

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

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

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 11/27/12
Start Time/Temp: See page 080
End Time/Temp:

Instrument ID: HG3.1/HG3.2
Balance # 614 /NA
Pipette Calibration (Daily) (Y) ____

Logbook # 1153
Prep Batch: L211202
Worksheet: HG112801/HG112802
SOP No. ME-HgCVAA
BLOCK 1 (3) 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.
1211067-01				0.32	50	
L211202-DUP2				0.33	50	
MS2				0.36	50	

[illegible] 11/27/12

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

See page 080

Reviewed By/Date: [illegible] 11/29/12

se book # 1153 for std traceability information

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

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

ME-HgCVAA-Prep0910

Page #:

000000078

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 11/20/12
Start Time/Temp: 1755/94°
End Time/Temp: 1830/96°

Instrument ID: HG3.2/HG3.3
Balance # B14 /NA
Pipette Calibration (Daily) (Y)

Logbook # 1153
Prep Batch: L211168
Worksheet: HG112102/HG112103
SOP No. ME-HgCVAA
BLOCK 1 2 (3) (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				10 ml	50	
0.2 µg/l		0.100		10 ml	50	
1.0 µg/l		0.500		10 ml	50	
2.0 µg/l		1.000		10 ml	50	
5.0 µg/l		2.500		10 ml	50	
10.0 µg/l		5.000		10 ml	50	
ICV		0.125	2.5	10 ml	50	
CCV		0.250	5.0	10 ml	50	
ICB/CCB				10 ml	50	
L211168-BLK1				0.32	50	
SRM1		(*)	(*)	0.32	50	
1211067-01				0.36	50	
L211168-DUP1				0.39	50	
MS1		0.500	1.0	0.37	50	
1211069-01				0.36	50	
L211168-DUP2				0.39	50	
MS2		0.500	1.0	0.33	50	
1211073-01				0.34	50	
L211168-DUP3				0.36	50	
MS3		0.500	1.0	0.38	50	
1211073-02				0.35	50	
1211082-01				0.35	50	RAD (?)
L211168-DUP4				0.36	50	↓
MS4		0.500	1.0	0.34	50	↓
1211083-01				0.34	50	
L211168-DUP5				0.39	50	
MS5		0.500	1.0	0.39	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	11/20/12 1130
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: [illegible] 11/26/12

se book # 1153 for std traceability information

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

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

Lionville Laboratory

MERCURY PREPARATION

Logbook # 1153

Analyst: [illegible]
Date 11/20/12
Start Time/Temp: See page 074
End Time/Temp: See page 074

Instrument ID: HG3.2/HG3.3
Balance # B14 /NA
Pipette Calibration (Daily) (Y) ____

Prep Batch: L211168
Worksheet: HG112102/HG112103
SOP No. ME-HgCVAA
BLOCK 1 2 (circle one) (3)

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.
1211083-02				0.32	50	
03				0.37	50	

[illegible] 11/20/12

Standard:	ID	Prep Date/Time
ICAL/MS		
ICV/CCV/LCS	See page 074	

Reviewed By/Date: [illegible] 11/20/12

See book # 1153 for std traceability information

Soil LCS True Value = See page 074 mg/Kg
Standard # See page 074

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

ME-HgCVAA-Prep0910

Page #:

000000080

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.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:30

Analytical Report for Wet Chemistry

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5L5	1211067-01	Other Solid	11/14/2012 10:00	11/16/2012 10:15

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-191 KP0151
LVL#: 1211067 **Date Received:** 11-16-12

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 solid sample. The pH analysis was not performed as the oily matrix type was not amenable to the requested method.

2. The sample was prepared and analyzed in accordance with the methods 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.

   Elevated reporting limits for IC anions by EPA Method 300.0 are the result of the necessity to dilute the sample to diminish the possible adverse effect on the analytical column by the mixed waste sample matrix as noted on the attached Sample Discrepancy Report (SDR) 12WC043.

   For Nitrate Nitrite analysis by EPA Method 353.2, the calibration reductor check was below the minimum efficiency of 90% at 86% that would indicate biased low results. Re-analysis was not performed due to the possible coating effect on the cadmium reduction column that could further deteriorate the columns effectiveness as noted on the attached SDR 12WC042.

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

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

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 12 pages.

7. The matrix spike recoveries were within the applicable control limits as noted in the Analytical Report.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit with the exceptions of Nitrate Nitrite at 83.7% and Chloride at 34.6% for which the replicate results were below the limits of quantiation and Sulfate at 30% that may be attributed to sample inhomogeneity.

9. Results for solid 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

1/30/13
Date

njp\i11-067

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12WC043

Initiator: Chad Sochu
Date: 11-29-12
Client: WL Hanford

Batch: 1211067
Samples: 01
Method: SW846/MCAWW/CLP/

Parameter: ANIONS
Matrix: SOLID
Prep Batch: L211244

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)

Due to the waste sample matrix, elevated reporting limits for: F, Cl, NO_2, Br, NO_3, PO_4.

2. Known or Probable Causes(s)

Mixed matrix sample with oily properties may be detrimental to the analytical column.

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:

Prepare to narrate
MJP 11/30/12

4. Project Manager Instructions...signature/date: [illegible] 1/30/13

__ 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: M Perrone 12/3/12

Other Explanation:

__ Verified re-[log][leach][extract][digest][analysis] (circle)
X 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
(2) Project Mgr (circle): Johnson / Stone
__ Sample Prep (circle): ~~Ford~~
__ Log-in: King

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

QA-139-A-0208

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12WC042

Initiator: Chris Sul
Date: 11-21-12
Client: WC Hanford

Batch: 1211067, 1211068
Samples: 01 —
Method: SW846/MCAWW/CLP/

Parameter: N_3N_2 by Lachat
Matrix: Solid
Prep Batch: L211185

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)

Initial Cal reduction check was borderline @ 40% efficiency.
Re-run @ end of batch had efficiency @ 86%
QC was within limits for the batch and individual samples.
Coating effect of matrix may contribute to further column deterioration.

2. Known or Probable Causes(s)

all required matrix qc and LCS met acceptance criteria. Sample results may be slightly biased low.

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: Column to be re-copperized. Cadmium
Propose to narrate. 11/30/12

4. Project Manager Instructions...signature/date: 1/30/13

__ 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: N Perrone 12/3/12

__ Verified re-[log][leach][extract][digest][analysis] (circle)
X Included in Case Narrative 12/3/12 for 1211067 (*)
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

Other Explanation: Copy to be included with 1211068 WO#.

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

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

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

QA-139-A-0208

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-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:30

Notes and Definitions

U	Analyte included in the analysis, but not detected
B	Analyte is found in the associated blank as well as in the sample (CLP B-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
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
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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:30

Wet Chemistry

Lionville Laboratory

Analyte	Result and Qualifier		LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1R5L5 (1211067-01) Other Solid										
%Solids	**48.2**			0.1	% by Weight	1	L212128	12/14/2012 13:50	12/14/2012 13:50	SM2540G
Bromide	40.9	U	40.9	204	mg/kg dry	20	L211244	11/27/2012 08:50	11/27/2012 14:25	EPA 300.0 (1993)
Chloride	**68.6**	B	40.9	204	mg/kg dry	20	L211244	11/27/2012 08:50	11/27/2012 14:25	EPA 300.0 (1993)
Fluoride	40.9	U	40.9	204	mg/kg dry	20	L211244	11/27/2012 08:50	11/27/2012 14:25	EPA 300.0 (1993)
Nitrate	40.9	U	40.9	204	mg/kg dry	20	L211244	11/27/2012 08:50	11/27/2012 14:25	EPA 300.0 (1993)
Nitrite	40.9	U	40.9	204	mg/kg dry	20	L211244	11/27/2012 08:50	11/27/2012 14:25	EPA 300.0 (1993)
Orthophosphate	81.7	U	81.7	409	mg/kg dry	20	L211244	11/27/2012 08:50	11/27/2012 14:25	EPA 300.0 (1993)
Sulfate	**389**		40.9	204	mg/kg dry	20	L211244	11/27/2012 08:50	11/27/2012 14:25	EPA 300.0 (1993)
Nitrate/Nitrite as N	**0.26**	B	0.18	0.92	mg/kg dry	1	L211185	11/19/2012 07:30	11/19/2012 13:19	EPA 353.2

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-191 Project Number: KP0151 Project Manager: Joan Kessner	**Reported:** 01/03/2013 10:30

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211185 - Default Prep GenChem										
Blank (L211185-BLK1)				Prepared: 11/19/2012 07:30 Analyzed: 11/19/2012 13:18						
Nitrate/Nitrite as N	0.10 U	0.10	0.50	mg/kg wet						
LCS (L211185-BS1)				Prepared: 11/19/2012 07:30 Analyzed: 11/19/2012 13:17						
Nitrate/Nitrite as N	4.53	0.10	0.50	mg/kg wet	5.0000		90.6	90-110		
Duplicate (L211185-DUP1)	**Source: 1211067-01**			Prepared: 11/19/2012 07:30 Analyzed: 11/19/2012 13:20						
Nitrate/Nitrite as N	0.63 B	0.19	0.97	mg/kg dry		0.26			83.7*	20
Matrix Spike (L211185-MS1)	**Source: 1211067-01**			Prepared: 11/19/2012 07:30 Analyzed: 11/19/2012 13:21						
Nitrate/Nitrite as N	8.58	0.18	0.90	mg/kg dry	9.0352	0.26	92.1	75-125		
Batch L211244 - Default Prep GenChem										
Blank (L211244-BLK1)				Prepared: 11/27/2012 08:50 Analyzed: 11/27/2012 14:25						
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						
LCS (L211244-BS1)				Prepared: 11/27/2012 08:50 Analyzed: 11/27/2012 14:25						
Fluoride	50.0	1.0	5.0	mg/kg wet	50.000		100	80-120		
Chloride	56.9	1.0	5.0	mg/kg wet	50.000		114	80-120		
Bromide	49.4	1.0	5.0	mg/kg wet	50.000		98.8	80-120		
Orthophosphate	49.7	2.0	10.0	mg/kg wet	50.000		99.4	80-120		
Sulfate	53.3	1.0	5.0	mg/kg wet	50.000		107	80-120		
Nitrate	49.2	1.0	5.0	mg/kg wet	50.000		98.4	80-120		
Nitrite	49.7	1.0	5.0	mg/kg wet	50.000		99.4	80-120		

Lionville Laboratory, PADEP Lab ID# 15-00009
264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-191	
2620 Fermi Avenue	Project Number: KP0151	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/03/2013 10:30

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L211244 - Default Prep GenChem											
Duplicate (L211244-DUP1)		**Source: 1211067-01**			Prepared: 11/27/2012 08:50 Analyzed: 11/27/2012 14:25						
Fluoride	40.0	U	40.0	200	mg/kg dry		40.9 U				20
Chloride	48.4	B	40.0	200	mg/kg dry		68.6			34.6*	20
Bromide	40.0	U	40.0	200	mg/kg dry		40.9 U				20
Orthophosphate	79.9	U	79.9	400	mg/kg dry		81.7 U				20
Sulfate	288		40.0	200	mg/kg dry		389			30.0*	20
Nitrate	40.0	U	40.0	200	mg/kg dry		40.9 U				20
Nitrite	40.0	U	40.0	200	mg/kg dry		40.9 U				20
Matrix Spike (L211244-MS1)		**Source: 1211067-01**			Prepared: 11/27/2012 08:50 Analyzed: 11/27/2012 14:25						
Fluoride	1910		40.7	203	mg/kg dry	2033.3	40.9 U	94.2	75-125		
Chloride	2030		40.7	203	mg/kg dry	2033.3	68.6	96.3	75-125		
Bromide	2010		40.7	203	mg/kg dry	2033.3	40.9 U	98.6	75-125		
Orthophosphate	1920		81.3	407	mg/kg dry	2033.3	81.7 U	94.3	75-125		
Sulfate	2330		40.7	203	mg/kg dry	2033.3	389	95.5	75-125		
Nitrate	2010		40.7	203	mg/kg dry	2033.3	40.9 U	98.9	75-125		
Nitrite	2020		40.7	203	mg/kg dry	2033.3	40.9 U	99.4	75-125		
Batch L212128 - % Solids											
Duplicate (L212128-DUP2)		**Source: 1211067-01**			Prepared & Analyzed: 12/14/2012 13:50						
%Solids	42.0			0.1	% by Weight		48.2			14	20