SAF-RC-189
100N Field Remediation –
Soil Full Protocol
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 7/24/12
INITIAL/DATE

COMMENTS:

SDG K3939 SAF-RC-189

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: UPR-100-N-19 Verification Sample

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

2 July 2012

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

Subject: Analytical Data Package

Dear Ms. Kessner:

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

LvLI Batch #	1206072
SDG #	K3939
SAF #	RC-189
Date Received	06/22/12
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	X
Glycols	
DRO/KRO/GRO	X
PAHs	X
Herbicides	
Metals	X
Inorganics	

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

Sincerely,

Lionville Laboratory
A Division of Eberline Analytical Corporation

Orlette S. Johnson
Project Manager

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 48 pages.

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

CHAIN OF CUSTODY

Lionville Laboratory Use Only: 1206072

Custody Transfer Record/Lab Work Request

Page 1 of 1

Lionville Laboratory
A Division of Eberline Analytical Corporation

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: W C Hanford SAF# RC-189
Est. Final Proj. Sampling Date:
Project#:
Project Contact/Phone#:
Lionville Laboratory Project Manager: O. Johnson
QC: SW Del: Std TAT: 21 Days

Date Rec'd: 6.22.12 Date Due: 7-13-12

Refrigerator #		A		B	C		D							
#/Type Container	Liquid													
	Solid		1AG		1AG	1AG		1AG						
Volume	Liquid													
	Solid		120		120	120		120						
Preservatives			—		—	—		—						
ANALYSES REQUESTED →		ORGANIC						INORG						
		VOA	BNA	~~Pest/~~ PCB	Herb	PAHs	WAND		Metal	CN				
		Lionville Laboratory Use Only												
				8082 PCB		8310 PAH	DRO/MO		METALS Hg					

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

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected															
01	J1PR33	✓	✓	Soil	6-14-12	0553			X		X	X		X							

Special Instructions:
Met =
① HSL + B, Mo, Si (No TL)

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

Relinquished by	Received by	Date	Time
Fed Ex	[signature]	6/22/12	10:10

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-078	Page 1 of 1

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8L	Data Turnaround: 21 Days		
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: UPR-100-N-19 Verification Sample		SAF No.: RC-189
Ice Chest No.: WCH-11-008	Field Logbook No.: El-1652-06	COA: RUP119N6W0	Method of Shipment: ~~Hand Deliver~~ / Fed Ex 6/14/12
Shipped To: ~~Eberline~~ / Livonville ~~TestAmerica Incorporated, Richland~~ 6/14/12	Offsite Property No.: A110396/372 6-20-12		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS
~~Potential~~ Radioactivity < DOT limits 6-20-12 CMB

Special Handling and/or Storage
Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None					
Type of Container	G/P	G	aG	aG	G/P					
No. of Container(s)	1	1	1	1	1					
Volume	120mL	120mL	120mL	120mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	TPH-Diesel Range - WTPH-D +	PCBs - 8082	PAHs - 8310	RCF GEA Shipping Screen 6/14/12		RCF	33557		
Sample No. / Matrix * / Sample Date / Sample Time										
J1PR30 / SOIL										
J1PR31 / SOIL										
J1PR32 / SOIL										
J1PR33 / SOIL / 6-14-12 / 0853	X	X	X	X						
~~J1PR34 / SOIL~~	~~6/14/12~~									

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	6/14/12 1050	Dennis Newman	6/14/12 1050
Dennis Newman	6/14/12 1300	Cindy Bingham	6-14-12 1300
Cindy Bingham	WCH 6-20-12 1045	Fed EX	
Fed EX	6.22.12 10:10	[illegible]	6.22.12 10:10

SPECIAL INSTRUCTIONS

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

REVIEWED BY AJ DATE 6-20-12

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

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

WCH-EE-011

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC. Hanford
Project/SAF/SOW/Release #: RC-189

Date: 6-22-12

LvL Batch #: 1206072

Sample Custodian: [illegible]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7985 3343 1600
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 5.7 °C		Cooler # WCH-11-008
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify):
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☑ Yes	☐ No	
Short holds taken to wet lab?	☐ Yes	☐ No	☑ N/A
13. VOA, TOC, TOX free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☑ Yes	☐ No	☐ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted _____ Date _____

SR-002-B.doc

DIESEL

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/02/2012 19:36

Analytical Report for Extractable Petroleum Hydrocarbons by SW846 8015

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PR33	1206072-01	Soil	06/14/2012 08:53	06/22/2012 10:10

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-189 K3939
LVL #: 1206072

W.O. #: 60049-001-001-0001-00
Date Received: 06-22-2012

DIESEL RANGE ORGANICS

One (1) soil sample was collected on 06-14-2012.

The sample and associated QC samples were extracted 06-26-2012 and analyzed 06-30-2012 and 07-01-2012 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 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.
2. All required holding times for extraction and analysis have been met.
3. All obtainable surrogate recoveries were within acceptance criteria.
4. The method blank was below the reporting limits for all target compounds.
5. All blank spike recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. The sample was 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 hardcopy data package has been authorized by the laboratory manager or a designee as verified by the following signature.

Iam Daniels
LvL Laboratory Manager

7/3/12
Date

r:\group\data\2012\dro\wc hanford\1206072jes.doc

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LIONVILLE LABORATORY INC.

GLOSSARY OF DATA

DATA QUALIFIERS

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

ABBREVIATIONS

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

264 Welsh Pool Road
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Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/02/2012 19:36

J1PR33
1206072-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Extractable Petroleum Hydrocarbons by SW846 8015									
Diesel Range Organics	**1560**	J	3380	ug/kg dry	1	L206217	06/26/2012	07/01/2012	8015M
Motor Oil	10100	U	10100	ug/kg dry	1	L206217	06/26/2012	07/01/2012	8015M
Surrogate: p-Terphenyl	*98 %*		*39-129*			*L206217*	*06/26/2012*	*07/01/2012*	*8015M*

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/02/2012 19:36

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 L206217 - SW 3540C										
Blank (L206217-BLK1)				Prepared: 06/26/2012 Analyzed: 06/30/2012						
Diesel Range Organics	3330	U	3330	ug/kg wet						
Motor Oil	10000	U	10000	ug/kg wet						
Surrogate: p-Terphenyl	*5420*			*ug/kg wet*	*6666.7*		*81*	*39-129*		
LCS (L206217-BS1)				Prepared: 06/26/2012 Analyzed: 06/30/2012						
Diesel Range Organics	51100		3330	ug/kg wet	66667		77	42-133		
Surrogate: p-Terphenyl	*5350*			*ug/kg wet*	*6666.7*		*80*	*39-129*		
Matrix Spike (L206217-MS3)		**Source: 1206072-01**		Prepared: 06/26/2012 Analyzed: 07/01/2012						
Diesel Range Organics	46200		3380	ug/kg dry	67575	1560	66	42-133		
Surrogate: p-Terphenyl	*4760*			*ug/kg dry*	*6757.5*		*70*	*39-129*		
Matrix Spike Dup (L206217-MSD3)		**Source: 1206072-01**		Prepared: 06/26/2012 Analyzed: 07/01/2012						
Diesel Range Organics	57400		3370	ug/kg dry	67463	1560	83	42-133	23	40
Surrogate: p-Terphenyl	*6010*			*ug/kg dry*	*6746.3*		*89*	*39-129*		

PREPARATION BENCH SHEET

L206217

Lionville Laboratory

Printed: 6/27/2012 3:14:05PM

00000012

Matrix: Solid **Prepared using: GC - SW 3540C** **Surrogate used: 1200549**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1206068-01	8015M DRO	06/26/2012 15:08	30.26	1				1000	WC-Hanford, Inc.	
1206068-02	8015M DRO	06/26/2012 15:08	30.37	1				1000	WC-Hanford, Inc.	
1206071-01	8015M DRO	06/26/2012 15:08	30.3	1				1000	WC-Hanford, Inc.	
1206072-01	8015M DRO	06/26/2012 15:08	30.01	1				1000	WC-Hanford, Inc.	
1206075-02	8015M DRO	06/26/2012 15:08	30.94	1				1000	WC-Hanford, Inc.	
1206075-03	8015M DRO	06/26/2012 15:08	30.59	1				1000	WC-Hanford, Inc.	
1206075-04	8015M DRO	06/26/2012 15:08	30.27	4				1000	WC-Hanford, Inc.	
L206217-BLK1	QC	06/26/2012 15:08	30	1				1000		
L206217-BS1	QC	06/26/2012 15:08	30	1	1101936		1000	1000		
L206217-MS1	QC	06/26/2012 15:08	30.73	1	1101936	1206068-01	1000	1000		
L206217-MS2	QC	06/26/2012 15:08	30.04	1	1101936	1206071-01	1000	1000		
L206217-MS3	QC	06/26/2012 15:08	30.05	1	1101936	1206072-01	1000	1000		
L206217-MS4	QC	06/26/2012 15:08	31.16	1	1101936	1206075-02	1000	1000		
L206217-MSD1	QC	06/26/2012 15:08	31.5	1	1101936	1206068-01	1000	1000		
L206217-MSD2	QC	06/26/2012 15:08	30.72	1	1101936	1206071-01	1000	1000		
L206217-MSD3	QC	06/26/2012 15:08	30.1	1	1101936	1206072-01	1000	1000		
L206217-MSD4	QC	06/26/2012 15:08	30.2	1	1101936	1206075-02	1000	1000		

Extracts Relinquished By 6/27/12 15:15 Date

Extracts Received By 6-27-12 Date

PCBS

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/06/2012 05:53

Analytical Report for Polychlorinated Biphenyls by SW846 8082

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PR33	1206072-01	Soil	06/14/2012 08:53	06/22/2012 10:10

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-189 K3939
LVL #: 1206072

W.O. #: 60049-001-001-0001-00
Received: 06-22-2012

PCBs

One (1) soil sample was collected on 06-14-2012.

The sample and associated QC samples were extracted 06-27-2012 and analyzed 06-29-2012 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.

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

3. All obtainable surrogate recoveries were within acceptance criteria.

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

5. All blank spike recoveries were within acceptance criteria.

6. All matrix spike recoveries were within acceptance criteria.

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

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

9. 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. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria with the exceptions noted on the 8082A PCBs Analytes with %Difference or %Drift>15%, Where Mean is Used for Continuing Calibration form.

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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

7-6-12
Date

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

Analyte	CCV1 06.29.12 7:22:55 AM		CCV2 06.29.12 1:04:32 PM		CCV3 06.29.12 9:10:48 PM		CCV4		CCV5		CCV6		CCV7		CCV8	
	OK Primary	Secondary	Primary	OK Secondary	OK Primary	OK Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Tetrachloro-meta-xylene (surrogate)																
Decachlorobiphenyl (surrogate)		✓														
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		✓														
Mean %D or %Drift	-0.2	14.1	-7.6	4.0	-0.7	-2.8										

Sample results reported from affected CCV:

CCV1: L206221-BLK2, BS2

CCV2: 1206072-01, L206221-MS, MSD6

CCV3:

CCV4:

CCV5:

CCV6:

CCV7:

CCV8:

GLOSSARY OF DATA

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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.
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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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Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/06/2012 05:53

J1PR33
1206072-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.4	U	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Aroclor 1221	13.4	U	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Aroclor 1232	13.4	U	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Aroclor 1242	13.4	U	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Aroclor 1248	13.4	U	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Aroclor 1254	13.4	U	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Aroclor 1260	**5.11**	J	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Aroclor 1262	13.4	U	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Aroclor 1268	13.4	U	13.4	ug/kg dry	1	L206221	06/27/2012	06/29/2012	8082
Surrogate: Decachlorobiphenyl	*66 %*		*43-144*			*L206221*	*06/27/2012*	*06/29/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*76 %*		*52-141*			*L206221*	*06/27/2012*	*06/29/2012*	*8082*

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/06/2012 05:53

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 L206221 - SW 3540C										
Blank (L206221-BLK2)				Prepared: 06/27/2012 Analyzed: 06/29/2012						
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	*38.2*			*ug/kg wet*	*33.333*		*115*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*32.6*			*ug/kg wet*	*33.337*		*98*	*52-141*		
LCS (L206221-BS2)				Prepared: 06/27/2012 Analyzed: 06/29/2012						
Aroclor 1016	103		13.3	ug/kg wet	166.67		62	50-138		
Aroclor 1260	125		13.3	ug/kg wet	166.67		75	50-148		
Surrogate: Decachlorobiphenyl	*29.7*			*ug/kg wet*	*33.333*		*89*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*27.7*			*ug/kg wet*	*33.337*		*83*	*52-141*		
Matrix Spike (L206221-MS6)		**Source: 1206072-01**		Prepared: 06/27/2012 Analyzed: 06/29/2012						
Aroclor 1016	119		13.4	ug/kg dry	167.93	13.4 U	71	50-138		
Aroclor 1260	127		13.4	ug/kg dry	167.93	5.11	73	50-148		
Surrogate: Decachlorobiphenyl	*23.7*			*ug/kg dry*	*33.586*		*70*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*26.5*			*ug/kg dry*	*33.590*		*79*	*52-141*		
Matrix Spike Dup (L206221-MSD6)		**Source: 1206072-01**		Prepared: 06/27/2012 Analyzed: 06/29/2012						
Aroclor 1016	118		13.1	ug/kg dry	164.66	13.4 U	71	50-138	0.7	40
Aroclor 1260	127		13.1	ug/kg dry	164.66	5.11	74	50-148	2	40
Surrogate: Decachlorobiphenyl	*23.6*			*ug/kg dry*	*32.933*		*72*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*27.4*			*ug/kg dry*	*32.936*		*83*	*52-141*		

PREPARATION BENCH SHEET

L206221

Lionville Laboratory

Printed: 6/28/2012 2:02:00PM

000000021

Matrix: Solid **Prepared using: GC - SW 3540C** **Surrogate used: 1200502**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1206058-01	8081A TCL Pesticides	06/27/2012 13:35	30.45	10				250	WC-Hanford, Inc.	
1206058-01	8082 PCBs	06/27/2012 13:35	30.45	10				250	WC-Hanford, Inc.	
1206058-02	8081A TCL Pesticides	06/27/2012 13:35	30.26	10				250	WC-Hanford, Inc.	
1206058-02	8082 PCBs	06/27/2012 13:35	30.26	10				250	WC-Hanford, Inc.	
~~1206068-01~~	~~8081A TCL Pesticides~~ VOID	~~06/27/2012 13:35~~	~~30.45~~	~~10~~		VOID		~~250~~	~~WC-Hanford, Inc.~~ 6/28/12	~~Added for BatchQC in: L206221~~
1206068-01	8082 PCBs	06/27/2012 13:35	30.45	10				250	WC-Hanford, Inc.	
1206068-02	8082 PCBs	06/27/2012 13:35	30.1	10				250	WC-Hanford, Inc.	
1206071-01	8081A TCL Pesticides	06/27/2012 13:35	30.14	10				250	WC-Hanford, Inc.	
1206071-01	8082 PCBs	06/27/2012 13:35	30.14	10				250	WC-Hanford, Inc.	
~~1206072-01~~	~~8081A TCL Pesticides~~ VOID	~~06/27/2012 13:35~~	~~30.22~~	~~10~~		VOID		~~250~~	~~WC-Hanford, Inc.~~ 6/28/12	~~Added for BatchQC in: L206221~~
1206072-01	8082 PCBs	06/27/2012 13:35	30.22	10				250	WC-Hanford, Inc.	
~~1206075-02~~	~~8081A TCL Pesticides~~ VOID	~~06/27/2012 13:35~~	~~30.42~~	~~10~~		VOID		~~250~~	~~WC-Hanford, Inc.~~ 6/28/12	~~Added for BatchQC in: L206221~~
1206075-02	8082 PCBs	06/27/2012 13:35	30.42	10				250	WC-Hanford, Inc.	
1206075-03	8082 PCBs	06/27/2012 13:35	30.59	10				250	WC-Hanford, Inc.	
1206075-04	8082 PCBs	06/27/2012 13:35	30.01	10				250	WC-Hanford, Inc.	
~~1206076-01~~	~~8081A TCL Pesticides~~ VOID	~~06/27/2012 13:35~~	~~30.18~~	~~10~~		VOID		~~250~~	~~Fluor-B&W Portsmouth~~ 6/28/12	~~Added for BatchQC in: L206221~~
1206076-01	8082 PCBs	06/27/2012 13:35	30.18	10				250	Fluor-B&W Portsmouth	Report wet weight
1206076-02	8082 PCBs	06/27/2012 13:35	30.8	10				250	Fluor-B&W Portsmouth	Report wet weight
1206076-03	8082 PCBs	06/27/2012 13:35	30.22	10				250	Fluor-B&W Portsmouth	Report wet weight
1206076-04	8082 PCBs	06/27/2012 13:35	30.43	10				250	Fluor-B&W Portsmouth	Report wet weight

S cleaned Cu lot G16W031

Extracts Relinquished By 6/28/12 1440 Date

Extracts Received By 06.28.12 14:10 Date

PREPARATION BENCH SHEET

L206221

Lionville Laboratory

Printed: 6/28/2012 2:02:00PM

000000022

Matrix: Solid **Prepared using: GC - SW 3540C** **Surrogate used: 1200502**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1206076-05	8082 PCBs	06/27/2012 13:35	30.71	10				250	Fluor-B&W Portsmouth	Report wet weight
1206076-06	8082 PCBs	06/27/2012 13:35	30.64	10				250	Fluor-B&W Portsmouth	Report wet weight
1206076-07	8082 PCBs	06/27/2012 13:35	30.89	10				250	Fluor-B&W Portsmouth	Report wet weight
1206076-08	8082 PCBs	06/27/2012 13:35	30.41	10				250	Fluor-B&W Portsmouth	Report wet weight
1206076-09	8082 PCBs	06/27/2012 13:35	30.19	10				250	Fluor-B&W Portsmouth	Report wet weight
L206221-BLK1	QC	06/27/2012 13:35	30	10				250		PEST
L206221-BLK2	QC	06/27/2012 13:35	30	10				250		PCB
L206221-BS1	QC	06/27/2012 13:35	30	10	1200281		250	250		PEST
L206221-BS2	QC	06/27/2012 13:35	30	10	1200123		250	250		PCB
L206221-MS1	QC	06/27/2012 13:35	30.7	10	1200281	1206058-01	250	250		Pest
L206221-MS2	QC	06/27/2012 13:35	30.6	10	1200123	1206058-01	250	250		PCB
L206221-MS3	QC	06/27/2012 13:35	30.09	10	1200123	1206068-01	250	250		PCB
L206221-MS4	QC	06/27/2012 13:35	30.17	10	1200281	1206071-01	250	250		PEST
L206221-MS5	QC	06/27/2012 13:35	30.1	10	1200123	1206071-01	250	250		PCB
L206221-MS6	QC	06/27/2012 13:35	30.23	10	1200123	1206072-01	250	250		PCB
L206221-MS7	QC	06/27/2012 13:35	30.11	10	1200123	1206075-02	250	250		PCB
L206221-MS8	QC	06/27/2012 13:35	30.03	10	1200123	1206076-01	250	250		PCB
L206221-MSD1	QC	06/27/2012 13:35	30.51	10	1200281	1206058-01	250	250		Pest
L206221-MSD2	QC	06/27/2012 13:35	30.51	10	1200123	1206058-01	250	250		PCB
L206221-MSD3	QC	06/27/2012 13:35	30.46	10	1200123	1206068-01	250	250		PCB

S cleaned Cu lot 616W031

Extracts Relinquished By 6/28/12 1410 Date

06.28.12 14.10 Extracts Received By Date

PREPARATION BENCH SHEET

L206221

Lionville Laboratory

Printed: 6/28/2012 2:02:00PM

000000023

Matrix: Solid **Prepared using: GC - SW 3540C** **Surrogate used: 1200502**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L206221-MSD4	QC	06/27/2012 13:35	30.58	10	1200281	1206071-01	250	250		PEST
L206221-MSD5	QC	06/27/2012 13:35	30.7	10	1200123	1206071-01	250	250		PCB
L206221-MSD6	QC	06/27/2012 13:35	30.83	10	1200123	1206072-01	250	250		PCB
L206221-MSD7	QC	06/27/2012 13:35	30.15	10	1200123	1206075-02	250	250		PCB
L206221-MSD8	QC	06/27/2012 13:35	30.07	10	1200123	1206076-01	250	250		PCB

S cleaned
Cu lot G160031

6/28/12 1410 S Zak 06.28.12 14.10

Extracts Relinquished By Date Extracts Received By Date

PAHs

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/08/2012 08:00

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PR33	1206072-01	Soil	06/14/2012 08:53	06/22/2012 10:10

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-189 K3939
LVL #: 1206072

W.O. #: 60049-001-001-0001-00
Date Received: 06-22-2012

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

One (1) soil sample was collected on 06-14-2012.

The sample and associated QC samples were extracted 06-26-2012 and analyzed 07-03,05-2012 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.

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

3. All obtainable surrogate recoveries were within acceptance criteria.

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

5. One (1) of sixteen (16) blank spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR#12GC112) has been enclosed.

6. Three (3) of thirty-two (32) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR#12GC112) has been enclosed.

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

8. Per SW846 Method 8000B, the attached Table 1 lists compounds where the % difference or drift was greater than 15%, and the mean across all compounds was used for evaluation of the continuing calibration. Results associated with these compounds are considered to have greater uncertainty.

9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria with the exception of LC3-070512 (SEQ#2070010) for target compound Benzo (a) pyrene. See attached Form Table 1. The data reflected an increase in instrument response, so the ability to identify Benzo (a) pyrene was not impaired.

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.

Iain Daniels
LvL Laboratory Manager

7/13/12
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12GC112

Initiator: Catherine Carey
Date: 07·08·12
Client: WC Hanford

Batch: 1206068, 071, 072
Samples: BS1, MS2, MSD2, MS3, MSD3
Method: SW846/MCAWW/CLP/ MS4, MSD4

Parameter: PAH
Matrix: SOIL
Prep Batch: L206218

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)

Napnthalene recovery is high in all spike samples

Acenaphthene recovery is low in MS4 (-15%) - okay in MSD4

2. Known or Probable Causes(s) Naphthalene recovery (high) suspected to be a problem w/ spiking solution - checking w/ vendor

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: Naphthalene BS/MS high recovery - not detected in sample J1PT73/74 Naphthalene present in J1PT97 and J1PR33

4. Project Manager Instructions...signature/date: [signature] for O Johnson 7.9.12
__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: [signature] 7/13/12 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

8310 PAH TABLE 1

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

Analyte	Inj 1336 7/5/12 0709 CCV1	CCV2	CCV3	CCV4	CCV5	CCV6	CCV7	CCV8
Triphenylene (surrogate)								
Naphthalene								
Acenaphthylene								
Acenaphthene								
Fluorene								
Phenanthrene								
Anthracene								
Fluoranthene								
Indeno[1,2,3-cd]pyrene								
Pyrene								
Benz[a]anthracene								
Chrysene								
Benzo[b]fluoranthene								
Benzo[k]fluoranthene								
Benzo[a]pyrene	+16.1							
Dibenz[a,h]anthracene								
Benzo[g,h,i]perylene								
Mean %D or %Drift	5.5							

Sample results reported from affected CCV:

CCV1: 1206068-01,02 120671-01 120672-01

CCV2:

CCV3:

CCV4:

CCV5:

CCV6:

CCV7:

CCV8:

LE 7-6-12

GLOSSARY OF DATA

DATA QUALIFIERS

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

ABBREVIATIONS

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

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/08/2012 08:00

J1PR33
1206072-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**47.8**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Acenaphthylene	**2.58**	J	3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Acenaphthene	**98.0**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Fluorene	3.34	U	3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Phenanthrene	**21.4**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Anthracene	**10.4**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Fluoranthene	**91.0**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Indeno[1,2,3-cd]pyrene	**16.0**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Pyrene	**105**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Benz[a]anthracene	**63.5**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Chrysene	**53.1**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Benzo[b] fluoranthene	**21.5**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Benzo[k] fluoranthene	**13.2**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Benzo[a] pyrene	**40.3**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Dibenz[a,h]anthracene	**1.89**	J	3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Benzo[g,h,i] perylene	**33.3**		3.34	ug/kg dry	1	L206218	06/26/2012	07/05/2012	8310
Surrogate: Triphenylene	*113 %*		*68-129*			*L206218*	*06/26/2012*	*07/05/2012*	*8310*

264 Welsh Pool Road
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Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/08/2012 08:00

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 L206218 - SW 3540C										
Blank (L206218-BLK1)				Prepared: 06/26/2012 Analyzed: 07/03/2012						
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	0.833	J	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	*163*			*ug/kg wet*	*166.67*		*98*	*68-129*		
LCS (L206218-BS1)				Prepared: 06/26/2012 Analyzed: 07/03/2012						
Naphthalene	539		3.33	ug/kg wet	166.67		323*	0-127		
Acenaphthylene	151		3.33	ug/kg wet	166.67		90	50-140		
Acenaphthene	142		3.33	ug/kg wet	166.67		85	17-139		
Fluorene	144		3.33	ug/kg wet	166.67		86	28-145		
Phenanthrene	141		3.33	ug/kg wet	166.67		85	30-152		
Anthracene	73.0		3.33	ug/kg wet	166.67		44	19-171		
Fluoranthene	145		3.33	ug/kg wet	166.67		87	34-159		
Indeno[1,2,3-cd]pyrene	148		3.33	ug/kg wet	166.67		89	31-156		
Pyrene	142		3.33	ug/kg wet	166.67		85	33-152		
Benz[a]anthracene	139		3.33	ug/kg wet	166.67		83	32-157		
Chrysene	150		3.33	ug/kg wet	166.67		90	31-159		
Benzo[b] fluoranthene	142		3.33	ug/kg wet	166.67		85	33-164		
Benzo[k] fluoranthene	148		3.33	ug/kg wet	166.67		89	28-161		
Benzo[a] pyrene	135		3.33	ug/kg wet	166.67		81	29-149		
Dibenz[a,h]anthracene	133		3.33	ug/kg wet	166.67		80	27-153		
Benzo[g,h,i] perylene	134		3.33	ug/kg wet	166.67		80	32-157		
Surrogate: Triphenylene	*170*			*ug/kg wet*	*166.67*		*102*	*68-129*		

264 Welsh Pool Road
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Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/08/2012 08:00

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 L206218 - SW 3540C									
Matrix Spike (L206218-MS4)	**Source: 1206072-01**		Prepared: 06/26/2012 Analyzed: 07/05/2012						
Naphthalene	475	3.38	ug/kg dry	168.94	47.8	253*	0-127		
Acenaphthylene	160	3.38	ug/kg dry	168.94	2.58	93	50-140		
Acenaphthene	73.2	3.38	ug/kg dry	168.94	98.0	-15*	17-139		
Fluorene	133	3.38	ug/kg dry	168.94	3.34 U	79	28-145		
Phenanthrene	164	3.38	ug/kg dry	168.94	21.4	85	30-152		
Anthracene	88.2	3.38	ug/kg dry	168.94	10.4	46	19-171		
Fluoranthene	282	3.38	ug/kg dry	168.94	91.0	113	34-159		
Indeno[1,2,3-cd]pyrene	163	3.38	ug/kg dry	168.94	16.0	87	31-156		
Pyrene	285	3.38	ug/kg dry	168.94	105	106	33-152		
Benz[a]anthracene	233	3.38	ug/kg dry	168.94	63.5	100	32-157		
Chrysene	249	3.38	ug/kg dry	168.94	53.1	116	31-159		
Benzo[b] fluoranthene	165	3.38	ug/kg dry	168.94	21.5	85	33-164		
Benzo[k] fluoranthene	153	3.38	ug/kg dry	168.94	13.2	83	28-161		
Benzo[a] pyrene	186	3.38	ug/kg dry	168.94	40.3	86	29-149		
Dibenz[a,h]anthracene	126	3.38	ug/kg dry	168.94	1.89	73	27-153		
Benzo[g,h,i] perylene	177	3.38	ug/kg dry	168.94	33.3	85	32-157		
Surrogate: Triphenylene	*195*		*ug/kg dry*	*168.94*		*116*	*68-129*		
Matrix Spike Dup (L206218-MSD4)	**Source: 1206072-01**		Prepared: 06/26/2012 Analyzed: 07/05/2012						
Naphthalene	442	3.35	ug/kg dry	167.82	47.8	235*	0-127	7	40
Acenaphthylene	140	3.35	ug/kg dry	167.82	2.58	82	50-140	13	40
Acenaphthene	165	3.35	ug/kg dry	167.82	98.0	40	17-139	433*	40
Fluorene	131	3.35	ug/kg dry	167.82	3.34 U	78	28-145	1	40
Phenanthrene	145	3.35	ug/kg dry	167.82	21.4	73	30-152	14	40
Anthracene	74.9	3.35	ug/kg dry	167.82	10.4	38	19-171	18	40
Fluoranthene	176	3.35	ug/kg dry	167.82	91.0	51	34-159	76*	40
Indeno[1,2,3-cd]pyrene	144	3.35	ug/kg dry	167.82	16.0	77	31-156	13	40
Pyrene	181	3.35	ug/kg dry	167.82	105	45	33-152	81*	40
Benz[a]anthracene	159	3.35	ug/kg dry	167.82	63.5	57	32-157	55*	40
Chrysene	164	3.35	ug/kg dry	167.82	53.1	66	31-159	55*	40
Benzo[b] fluoranthene	153	3.35	ug/kg dry	167.82	21.5	78	33-164	8	40
Benzo[k] fluoranthene	141	3.35	ug/kg dry	167.82	13.2	76	28-161	8	40
Benzo[a] pyrene	140	3.35	ug/kg dry	167.82	40.3	60	29-149	36	40
Dibenz[a,h]anthracene	122	3.35	ug/kg dry	167.82	1.89	71	27-153	2	40
Benzo[g,h,i] perylene	149	3.35	ug/kg dry	167.82	33.3	69	32-157	20	40
Surrogate: Triphenylene	*159*		*ug/kg dry*	*167.82*		*95*	*68-129*		

PREPARATION BENCH SHEET

L206218

Lionville Laboratory

Printed: 6/27/2012 3:12:16PM

00000034

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1206058-01	8310 PAH	06/26/2012 15:50	30.57	5				50	WC-Hanford, Inc.	
1206058-02	8310 PAH	06/26/2012 15:50	30.54	5				50	WC-Hanford, Inc.	
1206068-01	8310 PAH	06/26/2012 15:50	31.17	5				50	WC-Hanford, Inc.	
1206068-02	8310 PAH	06/26/2012 15:50	30.32	5				50	WC-Hanford, Inc.	
1206071-01	8310 PAH	06/26/2012 15:50	30.95	5				50	WC-Hanford, Inc.	
1206072-01	8310 PAH	06/26/2012 15:50	30.34	5				50	WC-Hanford, Inc.	
1206075-02	8310 PAH	06/26/2012 15:50	30.75	5				50	WC-Hanford, Inc.	
1206075-03	8310 PAH	06/26/2012 15:50	30.49	5				50	WC-Hanford, Inc.	
1206075-04	8310 PAH	06/26/2012 15:50	30.41	5				50	WC-Hanford, Inc.	
L206218-BLK1	QC	06/26/2012 15:50	30	5				50		
L206218-BS1	QC	06/26/2012 15:50	30	5	1200436		50	50		
L206218-MS1	QC	06/26/2012 15:50	30.59	5	1200436	1206058-02	50	50		
L206218-MS2	QC	06/26/2012 15:50	30.8	5	1200436	1206068-01	50	50		
L206218-MS3	QC	06/26/2012 15:50	30.31	5	1200436	1206071-01	50	50		
L206218-MS4	QC	06/26/2012 15:50	30.05	5	1200436	1206072-01	50	50		
L206218-MS5	QC	06/26/2012 15:50	31.06	5	1200436	1206075-02	50	50		
L206218-MSD1	QC	06/26/2012 15:50	30.38	5	1200436	1206058-02	50	50		
L206218-MSD2	QC	06/26/2012 15:50	30.6	5	1200436	1206068-01	50	50		
L206218-MSD3	QC	06/26/2012 15:50	30.8	5	1200436	1206071-01	50	50		
L206218-MSD4	QC	06/26/2012 15:50	30.25	5	1200436	1206072-01	50	50		

6/27/12 1515
Extracts Relinquished By Date

LK 6-27-12
Extracts Received By Date

PREPARATION BENCH SHEET

L206218

Lionville Laboratory

Printed: 6/27/2012 3:12:16PM

Matrix: Solid

Prepared using: GC - SW 3540C

Surrogate used: 1200612

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L206218-MSD5	QC	06/26/2012 15:50	30.87	5	1200436	1206075-02	50	50		

Extracts Relinquished By 6/27/12 1515 Date

UC 6-27-12
Extracts Received By Date

METALS

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/03/2012 14:07

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1PR33	1206072-01	Soil	06/14/2012 08:53	06/22/2012 10:10

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
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Case Narrative

Client: WC-HANFORD RC-189
LVL#: 1206072
SDG/SAF#: K3939/RC-189

W.O.#: 60049-001-001-0001-00
Date Received: 06-22-12

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 analysis of 1 soil sample.

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

   The metals internal standard, Yttrium, was not used in the calculation of these data due to the native concentrations of Yttrium in the client samples. Please refer to the SEQ-CAL1 page of the ICP raw data.

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

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

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

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

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

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

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

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

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

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1PR33	Aluminum	22,000	104.7
	Antimony	100	104.6
	Calcium	20,800	96.0
	Iron	42,000	85.7
	Silicon	2,100	139.5
	Vanadium	1,000	101.6

12. The duplicate analysis for 1 analyte was 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 result for Cadmium was 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

7/5/12
Date

alm/06-072

264 Welsh Pool Road
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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/03/2012 14:07

Notes and Definitions

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

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/03/2012 14:07

J1PR33
1206072-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**6810**		4.03	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Antimony	0.483	U	0.483	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Arsenic	**2.05**		0.806	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Barium	**58.5**		0.403	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Beryllium	**0.267**		0.161	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Boron	**0.757**	B	1.61	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Cadmium	**0.0676**	B	0.161	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Calcium	**7230**		80.6	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Chromium	**4.57**		0.161	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Cobalt	**8.27**		1.61	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Copper	**17.9**		0.806	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Iron	**26100**		16.1	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Lead	**3.70**		0.403	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Magnesium	**5510**		60.4	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Manganese	**336**		4.03	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Molybdenum	**0.517**	B	1.61	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Nickel	**12.0**		3.22	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Potassium	**959**		322	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Selenium	0.242	U	0.242	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Silicon	**166**		1.61	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Silver	0.161	U	0.161	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Sodium	**534**		40.3	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Vanadium	**67.5**		2.01	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Zinc	**47.2**		8.06	mg/kg dry	1	L206223	06/27/2012	06/28/2012	6010B
Mercury	0.0254	U	0.0254	mg/kg dry	1	L206232	06/28/2012	06/29/2012	7471A

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/03/2012 14:07

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 L206223 - SW 3050B										
Blank (L206223-BLK1)				Prepared: 06/27/2012 Analyzed: 06/28/2012						
Aluminum	4.46	U	4.46	mg/kg wet						
Antimony	0.536	U	0.536	mg/kg wet						
Arsenic	0.893	U	0.893	mg/kg wet						
Barium	0.446	U	0.446	mg/kg wet						
Beryllium	0.179	U	0.179	mg/kg wet						
Boron	1.79	U	1.79	mg/kg wet						
Cadmium	0.179	U	0.179	mg/kg wet						
Calcium	89.3	U	89.3	mg/kg wet						
Chromium	0.179	U	0.179	mg/kg wet						
Cobalt	1.79	U	1.79	mg/kg wet						
Copper	0.893	U	0.893	mg/kg wet						
Iron	17.9	U	17.9	mg/kg wet						
Lead	0.446	U	0.446	mg/kg wet						
Magnesium	67.0	U	67.0	mg/kg wet						
Manganese	4.46	U	4.46	mg/kg wet						
Molybdenum	1.79	U	1.79	mg/kg wet						
Nickel	3.57	U	3.57	mg/kg wet						
Potassium	357	U	357	mg/kg wet						
Selenium	0.268	U	0.268	mg/kg wet						
Silicon	1.79	U	1.79	mg/kg wet						
Silver	0.179	U	0.179	mg/kg wet						
Sodium	44.6	U	44.6	mg/kg wet						
Vanadium	2.23	U	2.23	mg/kg wet						
Zinc	8.93	U	8.93	mg/kg wet						
Duplicate (L206223-DUP2)		**Source: 1206072-01**		Prepared: 06/27/2012 Analyzed: 06/28/2012						
Aluminum	7360		4.16	mg/kg dry		6810			7.65	20
Antimony	0.499	U	0.499	mg/kg dry		0.483 U				20
Arsenic	2.24		0.832	mg/kg dry		2.05			8.91	20
Barium	64.3		0.416	mg/kg dry		58.5			9.43	20
Beryllium	0.285		0.166	mg/kg dry		0.267			6.58	20
Boron	0.798	B	1.66	mg/kg dry		0.757			5.26	20
Cadmium	0.0946	B	0.166	mg/kg dry		0.0676			33.3*	20
Calcium	7560		83.2	mg/kg dry		7230			4.48	20
Chromium	5.79		0.166	mg/kg dry		4.57			23.5*	20
Cobalt	8.71		1.66	mg/kg dry		8.27			5.25	20
Copper	17.4		0.832	mg/kg dry		17.9			3.08	20

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/03/2012 14:07

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 L206223 - SW 3050B										
Duplicate (L206223-DUP2)		**Source: 1206072-01**		Prepared: 06/27/2012 Analyzed: 06/28/2012						
Iron	25000		16.6	mg/kg dry		26100			4.33	20
Lead	3.90		0.416	mg/kg dry		3.70			5.40	20
Magnesium	5680		62.4	mg/kg dry		5510			3.12	20
Manganese	345		4.16	mg/kg dry		336			2.72	20
Molybdenum	0.442	B	1.66	mg/kg dry		0.517			15.5	20
Nickel	11.5		3.33	mg/kg dry		12.0			4.58	20
Potassium	1030		333	mg/kg dry		959			7.50	20
Selenium	0.250	U	0.250	mg/kg dry		0.242 U				20
Silicon	194		1.66	mg/kg dry		166			15.5	20
Silver	0.166	U	0.166	mg/kg dry		0.161 U				20
Sodium	535		41.6	mg/kg dry		534			0.300	20
Vanadium	65.9		2.08	mg/kg dry		67.5			2.39	20
Zinc	49.4		8.32	mg/kg dry		47.2			4.55	20
Matrix Spike (L206223-MS2)		**Source: 1206072-01**		Prepared: 06/27/2012 Analyzed: 06/28/2012						
Aluminum	7080		3.63	mg/kg dry	145.05	6810	181*	75-125		
Antimony	13.6		0.435	mg/kg dry	36.261	0.483 U	37.5*	75-125		
Arsenic	132		0.725	mg/kg dry	145.05	2.05	89.8	75-125		
Barium	192		0.363	mg/kg dry	145.05	58.5	92.1	75-125		
Beryllium	3.59		0.145	mg/kg dry	3.6261	0.267	91.6	75-125		
Boron	58.0		1.45	mg/kg dry	72.523	0.757	78.9	75-125		
Cadmium	3.02		0.145	mg/kg dry	3.6261	0.0676	81.3	75-125		
Calcium	8040		72.5	mg/kg dry	1813.1	7230	44.4*	75-125		
Chromium	18.3		0.145	mg/kg dry	14.505	4.57	94.6	75-125		
Cobalt	39.9		1.45	mg/kg dry	36.261	8.27	87.3	75-125		
Copper	32.7		0.725	mg/kg dry	18.131	17.9	81.5	75-125		
Iron	23000		14.5	mg/kg dry	72.523	26100	-4300*	75-125		
Lead	33.8		0.363	mg/kg dry	36.261	3.70	83.1	75-125		
Magnesium	6900		54.4	mg/kg dry	1813.1	5510	76.7	75-125		
Manganese	369		3.63	mg/kg dry	36.261	336	91.3	75-125		
Molybdenum	65.2		1.45	mg/kg dry	72.523	0.517	89.2	75-125		
Nickel	40.8		2.90	mg/kg dry	36.261	12.0	79.2	75-125		
Potassium	2780		290	mg/kg dry	1813.1	959	100	75-125		
Selenium	119		0.218	mg/kg dry	145.05	0.242 U	81.8	75-125		
Silicon	278		1.45	mg/kg dry	72.523	166	154*	75-125		
Silver	3.12		0.145	mg/kg dry	3.6261	0.161 U	86.1	75-125		
Sodium	2180		36.3	mg/kg dry	1813.1	534	91.0	75-125		

264 Welsh Pool Road
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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/03/2012 14:07

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 L206223 - SW 3050B									
Matrix Spike (L206223-MS2)		**Source: 1206072-01**	Prepared: 06/27/2012 Analyzed: 06/28/2012						
Vanadium	93.8	1.81	mg/kg dry	36.261	67.5	72.5*	75-125		
Zinc	77.5	7.25	mg/kg dry	36.261	47.2	83.3	75-125		
Reference (L206223-SRM1)			Prepared: 06/27/2012 Analyzed: 06/28/2012						
Aluminum	9360	14.4	mg/kg wet	6670.0		140	0-200.89		
Antimony	28.9	1.73	mg/kg wet	53.000		54.6	0-235.8		
Arsenic	112	2.88	mg/kg wet	114.00		98.6	82.8-117.54		
Barium	292	1.44	mg/kg wet	307.00		95.2	79.8-120.2		
Beryllium	103	0.577	mg/kg wet	108.00		95.6	82.8-117.6		
Boron	76.3	5.77	mg/kg wet	85.100		89.7	67.5-132.8		
Cadmium	219	0.577	mg/kg wet	225.00		97.4	83.6-116.4		
Calcium	3350	288	mg/kg wet	3360.0		99.8	83.3-116.9		
Chromium	81.2	0.577	mg/kg wet	77.200		105	73.3-126.4		
Cobalt	162	5.77	mg/kg wet	166.00		97.6	80.7-118.7		
Copper	259	2.88	mg/kg wet	271.00		95.6	80.8-119.2		
Iron	8400	57.7	mg/kg wet	8420.0		99.8	78.6-121.1		
Lead	186	1.44	mg/kg wet	190.00		97.9	81.6-118.4		
Magnesium	8280	216	mg/kg wet	8570.0		96.6	83.2-116.7		
Manganese	924	14.4	mg/kg wet	965.00		95.8	69.3-130.5		
Molybdenum	232	5.77	mg/kg wet	235.00		98.6	76.2-123.8		
Nickel	218	11.5	mg/kg wet	221.00		98.5	79.6-120.8		
Potassium	14400	1150	mg/kg wet	14400		99.9	81.9-118.1		
Selenium	179	0.865	mg/kg wet	187.00		95.6	75.9-124.6		
Silicon	335	5.77	mg/kg wet	807.00		41.5	0-219.3		
Silver	80.9	0.577	mg/kg wet	83.500		96.9	82.7-117.1		
Sodium	9360	144	mg/kg wet	9730.0		96.2	82.5-117.2		
Vanadium	109	7.21	mg/kg wet	98.700		111	75.9-123.6		
Zinc	193	28.8	mg/kg wet	199.00		96.8	78.4-121.6		

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K3939	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	07/03/2012 14:07

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 L206232 - SW 7471A Prep										
Blank (L206232-BLK1)				Prepared: 06/28/2012 Analyzed: 06/29/2012						
Mercury	0.0281	U	0.0281	mg/kg wet						
Duplicate (L206232-DUP2)		**Source: 1206072-01**		Prepared: 06/28/2012 Analyzed: 06/29/2012						
Mercury	0.0261	U	0.0261	mg/kg dry		0.0254 U				20
Matrix Spike (L206232-MS2)		**Source: 1206072-01**		Prepared: 06/28/2012 Analyzed: 06/29/2012						
Mercury	0.161		0.0261	mg/kg dry	0.14505	0.0254 U	111	75-125		20
Reference (L206232-SRM1)				Prepared: 06/28/2012 Analyzed: 06/29/2012						
Mercury	1.27		0.0290	mg/kg wet	1.2900		98.6	62.6-138		

Lionville Laboratory

Logbook #: 1128

SAMPLE DIGESTION RECORD

Digestion Batch #: L206223
Date/Time Initiated: 6/27/12 1070
Date/Time Completed: 6/27/12 1635
Analyst: DJS
Matrix (circle): Soil Water Other
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.

Digested / Undigested (circle one)
Balance #: B14
Balance Cal Verification: Y NA
Temp: 99
BLOCK 1 2 3 (circle one)

NOTE: All temperatures are recorded as corrected temperatures

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/ TC	Texture	Color / Appearance	Artifact	Turb
1206071-01		0.58	50		TO	Fine	Gray	Rocks	N/A
L206223-Bp1		0.75	50						
-MS1	0.5	0.58	50						
1206072-01		0.63	50			Fine	Brown	Rocks	
L206223-Bp2		0.61	50						
-MS2	0.5	0.70	50						
-BM1		0.56	50			Coarse	Boiling Chips		
-SRM1		0.52	50			Fine	pink sand		

DJS
6/27/12

Spiking IDs / Expiration Date:
MS#: 1200457

LCS#: 1101357

Reagent IDs:
HNO_3 L08023
HCl L01031
H_2O_2 I109103
1:1 HNO_3 637-66-02
1:1 HCl

File ID#:

Data Review By/Date: 7/2/12

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Signed\SPI\Metals Digestion log.doc

Page #:

Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 6/28/12
Start Time/Temp: 1930/95
End Time/Temp: 2000/98

Instrument ID: HG3.1
Balance # B29 /NA
Pipette Calibration (Daily) (Y)

Logbook # 1143
Prep Batch: L206232
Worksheet: HG062901
SOP No. ME-HgCVAA
BLOCK (1) 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures.

LvL Work Order#	pH < 2 (Liq)	Spike Vol (mL)	Spike Conc. (µg/L)	Initial Wt. or Vol (g or mL)	Final Sample Vol (mL)	Comments, % Solids, etc.
Blank				10 ml	50	
0.2 ug/l		0.100		10 ml	50	
1.0 ug/l		0.500		10 ml	50	
2.0 ug/l		1.000		10 ml	50	
5.0 ug/l		2.500		10 ml	50	
10.0 ug/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	
L206232-BLK1				0.32	50	
SRM1				0.31	50	
1206071-01				0.38	50	
L206232-DUP1				0.35	50	
MS1		0.500	1.0	0.34	50	
1206072-01				0.34	50	
L206232-DUP2				0.35	50	
MS2		0.500	1.0	0.35	50	
1206073-01 W.E.				0.35	50	
L206232-DUP3				0.33	50	
MS3		0.500	1.0	0.33	50	
1206073-02				0.34	50	
03				0.35	50	
04				0.37	50	
05				0.38	50	
06				0.35	50	
07				0.33	50	
08				0.35	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1200588	6/28/12 1515
ICV/CCV/LCS	(I.V. 1200532)	N/A

Reviewed By/Date: [illegible] 7/3/12

se book # 1143, pg 1 for std traceability information

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

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

PREPARATION BENCH SHEET

L206223

Lionville Laboratory

Printed: 6/27/2012 4:09:49PM

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
1206071-01	6010B HSL Metals	06/27/2012 10:07	0.58	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
1206072-01	6010B HSL Metals	06/27/2012 10:07	0.63	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
L206223-BLK1	QC	06/27/2012 10:07	0.56	50						
L206223-DUP1	QC	06/27/2012 10:07	0.75	50		1206071-01				
L206223-DUP2	QC	06/27/2012 10:07	0.61	50		1206072-01				
L206223-MS1	QC	06/27/2012 10:07	0.58	50	1200457	1206071-01	500			
L206223-MS2	QC	06/27/2012 10:07	0.7	50	1200457	1206072-01	500			
L206223-SRM1	QC	06/27/2012 10:07	0.52	50	1101357		520			

JJS 6/28/12
Extracts Relinquished By Date

Brooks 06/28/12
Extracts Received By Date