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

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 1/16/13
INITIAL/DATE

COMMENTS:

SDG K4036 SAF-RC-189

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 100-N-23 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

11 January 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 #	1211120
SDG #	K4036
SAF #	RC-189
Date Received	11/29/12
# Samples	2
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	X
Glycols	
DRO/KRO/GRO	
PAHs	X
Herbicides	
Metals	
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 23 pages.

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

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1211120

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-189

Est. Final Proj. Sampling Date

Project#

Project Contact/Phone#

Lionville Laboratory Project Manager O. Johnson

QC SW Del SW TAT 15 Days

Date Rec'd 11-29-12 Date Due 12-14-12

		A		B
Refrigerator #		2		2
#/Type Container	Liquid			
	Solid	1AG		1AG
Volume	Liquid			
	Solid	250		250
Preservatives		—		—

ANALYSES REQUESTED →

ORGANIC						INORG	
VOA	BNA	~~Pest~~ PCB	Herb	PAHs		Metal	CN
		8082		8310			

Lionville Laboratory Use Only

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	J1R5W0			Soil	11-26-12	1345					X										
02	J1R5W1			Soil	11-26-12	1337			X		X										

Special Instructions:

Special Instructions:

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

Relinquished by	Received by	Date	Time
EW Eo	[signature]	11/29/12	1000

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-189-147	Page 1 of 1
Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 11/26/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 100-N-23 Verification Sample		SAF No.: RC-189	Data Turnaround: ~~21~~ 15 Days 11/26/12
Ice Chest No.: WCH-12-021	Field Logbook No.: El-1652-07	COA: RUP123N6W0	Method of Shipment: Fed Ex	
Shipped To: ~~EBERLINE SERVICES~~ LIONVILLE 11/26/12	Offsite Property No.: A 20 647		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

~~Potential~~ Rad < DOT Limits AJ 11-26-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C									
Type of Container	aG	aG									
No. of Container(s)	1	1									
Volume	~~120mL~~ 250ml	~~120mL~~ 250ml	AJ 11-26-12								
SAMPLE ANALYSIS	PCBs - 8082	PAHs - 8310	RCF	27440							
Sample No. / Matrix * / Sample Date / Sample Time											
J1R5W0 / SOIL / 11-26-12 / 1345		X									
J1R5W1 / SOIL / 11-26-12 / 1337	X	X									

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS
Relinquished By/Removed From: Quincy Stowe, Date/Time: 1355 11/26/12	Received By/Stored In: Dennis Newman, Date/Time: 1355 11/26/12	
Relinquished By/Removed From: Dennis Newman, Date/Time: 11/26/12 1530	Received By/Stored In: 1060#3 A. Freier, Date/Time: 1530 11-26-12	
Relinquished By/Removed From: 1060#3 A. Freier, Date/Time: WCH 11-27-12 0945	Received By/Stored In: Fed Ex, Date/Time:	
Relinquished By/Removed From: Fed Ex, Date/Time: 11-29-12 1000	Received By/Stored In: Victor Hernandez, Date/Time: 11-29-12 1000	
Relinquished By/Removed From: Date/Time:	Received By/Stored In: Date/Time:	
Relinquished By/Removed From: Date/Time:	Received By/Stored In: Date/Time:	

REVIEWED BY CMB DATE 11-27-12

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

0000000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

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

Date: 11/29/12

LvL Batch #: 1211120

Sample Custodian: Victor Hernandez

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7941571 63425
2. Custody Seals on coolers or shipping containers intact, signed & dated?	☑ Yes	☐ No	☐ No Seals
3. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	*Comments:*
4. All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible?	☑ Yes	☐ No	
5. Samples received cooled or ambient?	Temp 2.2°	°C	Cooler # WCH-12-021
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-0412.doc

PCBs

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-189 Project Number: K4036 Project Manager: Joan Kessner	**Reported:** 12/14/2012 09:01

Analytical Report for Polychlorinated Biphenyls by SW846 8082

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5W1	1211120-02	Soil	11/26/2012 13:37	11/29/2012 10:00

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Case Narrative

Client: WC-HANFORD RC-189 K4036
LVL #: 1211120

W.O. #: 60049-001-001-0001-00
Received: 11-29-2012

PCBs

One (1) soil sample was collected on 11-26-2012.

The sample and associated QC samples were extracted 12-06-2012 and analyzed 12-13-2012 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. Sample J1R5W1, L212047-MS2, and L212047-MSD2 required 4-fold instrument dilutions due to high concentrations of target analytes.
8. The samples were 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.
11. Patterns for Aroclors 1254 and 1260 were identified in these samples. The reported Aroclors were chosen based on the best pattern match and fit. Quantitation was performed using congeners common to both Aroclors to give the best overall total PCB concentration.

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

12. 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

1/4/13
Date

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.

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4036 Project Manager: Joan Kessner	**Reported:** 12/14/2012 09:01

J1R5W1

1211120-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	70.5	U	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Aroclor 1221	70.5	U	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Aroclor 1232	70.5	U	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Aroclor 1242	70.5	U	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Aroclor 1248	70.5	U	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Aroclor 1254	**369**	D	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Aroclor 1260	**90.3**	D	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Aroclor 1262	70.5	U	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Aroclor 1268	70.5	U	70.5	ug/kg dry	4	L212047	12/06/2012	12/13/2012	8082
Surrogate: Decachlorobiphenyl	*86 %*		*43-144*			*L212047*	*12/06/2012*	*12/13/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*89 %*		*52-141*			*L212047*	*12/06/2012*	*12/13/2012*	*8082*

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4036 Project Manager: Joan Kessner	**Reported:** 12/14/2012 09:01

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 L212047 - SW 3540C										
Blank (L212047-BLK1)				Prepared: 12/06/2012 Analyzed: 12/13/2012						
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	*29.0*			*ug/kg wet*	*33.333*		*87*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*33.1*			*ug/kg wet*	*33.337*		*99*	*52-141*		
LCS (L212047-BS1)				Prepared: 12/06/2012 Analyzed: 12/13/2012						
Aroclor 1016	141		13.3	ug/kg wet	166.67		84	50-138		
Aroclor 1260	155		13.3	ug/kg wet	166.67		93	50-148		
Surrogate: Decachlorobiphenyl	*28.6*			*ug/kg wet*	*33.333*		*86*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*32.8*			*ug/kg wet*	*33.337*		*98*	*52-141*		
Matrix Spike (L212047-MS2)		**Source: 1211120-02**		Prepared: 12/06/2012 Analyzed: 12/13/2012						
Aroclor 1016	230	D	70.1	ug/kg dry	219.72	70.5 U	105	50-138		
Aroclor 1260	278	D	70.1	ug/kg dry	219.72	90.3	86	50-148		
Surrogate: Decachlorobiphenyl	*41.8*			*ug/kg dry*	*43.945*		*95*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*43.6*			*ug/kg dry*	*43.949*		*99*	*52-141*		
Matrix Spike Dup (L212047-MSD2)		**Source: 1211120-02**		Prepared: 12/06/2012 Analyzed: 12/13/2012						
Aroclor 1016	231	D	69.6	ug/kg dry	218.01	70.5 U	106	50-138	1	40
Aroclor 1260	285	D	69.6	ug/kg dry	218.01	90.3	89	50-148	4	40
Surrogate: Decachlorobiphenyl	*41.6*			*ug/kg dry*	*43.601*		*95*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*43.7*			*ug/kg dry*	*43.606*		*100*	*52-141*		

PREPARATION BENCH SHEET

L212047

Lionville Laboratory

Printed: 12/13/2012 11:47:49AM

00000013

Matrix: Solid **Prepared using: GC - SW 3540C** **Surrogate used: 1201397**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1211118-01	8082 PCBs	12/06/2012 15:40	30.18	10				250	WC-Hanford, Inc.	
1211120-02	8082 PCBs	12/06/2012 15:40	30.32	10				250	WC-Hanford, Inc.	
L212047-BLK1	QC	12/06/2012 15:40	30	10				250		
L212047-BS1	QC	12/06/2012 15:40	30	10	1200902		250	250		
L212047-MS1	QC	12/06/2012 15:40	30.19	10	1200902	1211118-01	250	250		
L212047-MS2	QC	12/06/2012 15:40	30.48	10	1200902	1211120-02	250	250		
L212047-MSD1	QC	12/06/2012 15:40	30.52	10	1200902	1211118-01	250	250		
L212047-MSD2	QC	12/06/2012 15:40	30.72	10	1200902	1211120-02	250	250		

S decanted 12.13.12 SZ

Cu lot # B10X036

12/13/12 1230

Extracts Relinquished By Date

S Lah 12.13.12 12:30

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: K4036	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/17/2012 19:10

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R5W0	1211120-01	Soil	11/26/2012 13:45	11/29/2012 10:00
J1R5W1	1211120-02	Soil	11/26/2012 13:37	11/29/2012 10:00

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 K4036
LVL #: 1211120

W.O. #: 60049-001-001-0001-00
Date Received: 11-29-2012

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

Two (2) soil samples were collected on 11-26-2012.

The samples and associated QC samples were extracted 12-06-2012 and analyzed 12-14-2012 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C and the analysis procedure was based on SW846 Method 8310.

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

1. The results presented in this report are derived from samples that met LvL's sample acceptance policy.
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. Two (2) of thirty-two matrix spike recoveries were within acceptance criteria. A copy of the Sample Discrepancy Report (SDR # 12GC217) has been enclosed.
7. The initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. The samples were 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 data package has been authorized by the laboratory manager or a designee as verified by the following signature.

Iain Daniels
LvL Laboratory Manager

1/11/13
Date

r:\group\data\2012\pah 8310\wc hanford\1211120alm.doc
The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of pages.

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12GC217

Initiator: Catherine Carey
Date: 12/17/12
Client: WC Hanford

Batch: 1211120
Samples: MSD2
Method: SW846/MCAWW/CLP/

Parameter: PAH
Matrix: SOIL
Prep Batch: L212048

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)

Benzo(a)pyrene (164%) and Benzo(ghi)perylene (162%) spike recoveries are high in MSD2

BS+MS2 okay

2. Known or Probable Causes(s)

Possible non homogeneous sample giving variable interference from target compounds indiginous to the sample

3. Discussion and Proposed Action

Other Description:

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

N analte ID

4. Project Manager Instructions...signature/date: 1/11/13

__ 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: 1/11/13

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.

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Fax: 610-280-3041

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4036	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/17/2012 19:10

J1R5W0
1211120-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**4.11**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Acenaphthylene	3.42	U	3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Acenaphthene	**26.1**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Fluorene	3.42	U	3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Phenanthrene	**2.06**	J	3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Anthracene	3.42	U	3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Fluoranthene	**14.4**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Indeno[1,2,3-cd]pyrene	**8.16**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Pyrene	**19.0**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benz[a]anthracene	**19.4**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Chrysene	**21.4**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benzo[b] fluoranthene	3.42	U	3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benzo[k] fluoranthene	**7.88**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benzo[a] pyrene	**22.1**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Dibenz[a,h]anthracene	**1.75**	J	3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benzo[g,h,i] perylene	**15.0**		3.42	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Surrogate: Triphenylene	*92 %*		*68-129*			*L212048*	*12/06/2012*	*12/14/2012*	*8310*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4036	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/17/2012 19:10

J1R5W1

1211120-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**164**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Acenaphthylene	4.39	U	4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Acenaphthene	**497**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Fluorene	**3.96**	J	4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Phenanthrene	**108**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Anthracene	**34.7**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Fluoranthene	**341**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Indeno[1,2,3-cd]pyrene	**35.6**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Pyrene	**242**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benz[a]anthracene	**147**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Chrysene	**117**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benzo[b] fluoranthene	**78.9**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benzo[k] fluoranthene	**42.6**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benzo[a] pyrene	**88.0**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Dibenz[a,h]anthracene	**6.48**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Benzo[g,h,i] perylene	**59.9**		4.39	ug/kg dry	1	L212048	12/06/2012	12/14/2012	8310
Surrogate: Triphenylene	*116 %*		*68-129*			*L212048*	*12/06/2012*	*12/14/2012*	*8310*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4036	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/17/2012 19:10

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 L212048 - SW 3540C										
Blank (L212048-BLK1)				Prepared: 12/06/2012 Analyzed: 12/14/2012						
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	*172*			*ug/kg wet*	*166.67*		*103*	*68-129*		
LCS (L212048-BS1)				Prepared: 12/06/2012 Analyzed: 12/14/2012						
Naphthalene	127		3.33	ug/kg wet	166.67		76	0-127		
Acenaphthylene	132		3.33	ug/kg wet	166.67		79	50-140		
Acenaphthene	134		3.33	ug/kg wet	166.67		81	17-139		
Fluorene	139		3.33	ug/kg wet	166.67		84	28-145		
Phenanthrene	141		3.33	ug/kg wet	166.67		84	30-152		
Anthracene	144		3.33	ug/kg wet	166.67		87	19-171		
Fluoranthene	146		3.33	ug/kg wet	166.67		88	34-159		
Indeno[1,2,3-cd]pyrene	151		3.33	ug/kg wet	166.67		91	31-156		
Pyrene	144		3.33	ug/kg wet	166.67		86	33-152		
Benz[a]anthracene	158		3.33	ug/kg wet	166.67		95	32-157		
Chrysene	147		3.33	ug/kg wet	166.67		88	31-159		
Benzo[b] fluoranthene	162		3.33	ug/kg wet	166.67		97	33-164		
Benzo[k] fluoranthene	155		3.33	ug/kg wet	166.67		93	28-161		
Benzo[a] pyrene	156		3.33	ug/kg wet	166.67		94	29-149		
Dibenz[a,h]anthracene	158		3.33	ug/kg wet	166.67		95	27-153		
Benzo[g,h,i] perylene	161		3.33	ug/kg wet	166.67		96	32-157		
Surrogate: Triphenylene	*149*			*ug/kg wet*	*166.67*		*90*	*68-129*		

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4036	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	12/17/2012 19:10

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 L212048 - SW 3540C									
Matrix Spike (L212048-MS2)		**Source: 1211120-01**	Prepared: 12/06/2012 Analyzed: 12/14/2012						
Naphthalene	153	3.45	ug/kg dry	172.67	4.11	86	0-127		
Acenaphthylene	137	3.45	ug/kg dry	172.67	3.42 U	79	50-140		
Acenaphthene	142	3.45	ug/kg dry	172.67	26.1	67	17-139		
Fluorene	148	3.45	ug/kg dry	172.67	3.42 U	86	28-145		
Phenanthrene	160	3.45	ug/kg dry	172.67	2.06	91	30-152		
Anthracene	159	3.45	ug/kg dry	172.67	3.42 U	92	19-171		
Fluoranthene	175	3.45	ug/kg dry	172.67	14.4	93	34-159		
Indeno[1,2,3-cd]pyrene	177	3.45	ug/kg dry	172.67	8.16	98	31-156		
Pyrene	176	3.45	ug/kg dry	172.67	19.0	91	33-152		
Benz[a]anthracene	186	3.45	ug/kg dry	172.67	19.4	96	32-157		
Chrysene	181	3.45	ug/kg dry	172.67	21.4	92	31-159		
Benzo[b] fluoranthene	178	3.45	ug/kg dry	172.67	3.42 U	103	33-164		
Benzo[k] fluoranthene	174	3.45	ug/kg dry	172.67	7.88	96	28-161		
Benzo[a] pyrene	192	3.45	ug/kg dry	172.67	22.1	98	29-149		
Dibenz[a,h]anthracene	177	3.45	ug/kg dry	172.67	1.75	102	27-153		
Benzo[g,h,i] perylene	204	3.45	ug/kg dry	172.67	15.0	110	32-157		
Surrogate: Triphenylene	*168*		*ug/kg dry*	*172.67*		*98*	*68-129*		
Matrix Spike Dup (L212048-MSD2)		**Source: 1211120-01**	Prepared: 12/06/2012 Analyzed: 12/14/2012						
Naphthalene	155	3.47	ug/kg dry	173.86	4.11	87	0-127	0.6	40
Acenaphthylene	138	3.47	ug/kg dry	173.86	3.42 U	79	50-140	0.3	40
Acenaphthene	192	3.47	ug/kg dry	173.86	26.1	95	17-139	35	40
Fluorene	143	3.47	ug/kg dry	173.86	3.42 U	82	28-145	4	40
Phenanthrene	152	3.47	ug/kg dry	173.86	2.06	86	30-152	5	40
Anthracene	151	3.47	ug/kg dry	173.86	3.42 U	87	19-171	6	40
Fluoranthene	169	3.47	ug/kg dry	173.86	14.4	89	34-159	4	40
Indeno[1,2,3-cd]pyrene	205	3.47	ug/kg dry	173.86	8.16	113	31-156	14	40
Pyrene	198	3.47	ug/kg dry	173.86	19.0	103	33-152	12	40
Benz[a]anthracene	262	3.47	ug/kg dry	173.86	19.4	140	32-157	37	40
Chrysene	291	3.47	ug/kg dry	173.86	21.4	155	31-159	51*	40
Benzo[b] fluoranthene	256	3.47	ug/kg dry	173.86	3.42 U	147	33-164	35	40
Benzo[k] fluoranthene	208	3.47	ug/kg dry	173.86	7.88	115	28-161	18	40
Benzo[a] pyrene	308	3.47	ug/kg dry	173.86	22.1	164*	29-149	50*	40
Dibenz[a,h]anthracene	162	3.47	ug/kg dry	173.86	1.75	92	27-153	10	40
Benzo[g,h,i] perylene	297	3.47	ug/kg dry	173.86	15.0	162*	32-157	39	40
Surrogate: Triphenylene	*174*		*ug/kg dry*	*173.86*		*100*	*68-129*		

PREPARATION BENCH SHEET

L212048

Lionville Laboratory

Printed: 12/13/2012 11:28:52AM

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1211118-01	8310 PAH	12/06/2012 15:43	30.05	5				50	WC-Hanford, Inc.	
1211120-01	8310 PAH	12/06/2012 15:43	30.84	5				50	WC-Hanford, Inc.	
1211120-02	8310 PAH	12/06/2012 15:43	30.47	5				50	WC-Hanford, Inc.	
L212048-BLK1	QC	12/06/2012 15:43	30	5				50		
L212048-BS1	QC	12/06/2012 15:43	30	5	1200963		50	50		
L212048-MS1	QC	12/06/2012 15:43	30.59	5	1200963	1211118-01	50	50		
L212048-MS2	QC	12/06/2012 15:43	30.61	5	1200963	1211120-01	50	50		
L212048-MSD1	QC	12/06/2012 15:43	30.65	5	1200963	1211118-01	50	50		
L212048-MSD2	QC	12/06/2012 15:43	30.4	5	1200963	1211120-01	50	50		

12/13/12 1130 LC 12-13-12

Extracts Relinquished By Date Extracts Received By Date