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

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 3/6/13
INITIAL/DATE

COMMENTS:

SDG KP0184 SAF-RC-189

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 124-N-2 Verification

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

5 March 2013

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

Subject: Analytical Data Package

Dear Ms. Kessner:

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

LvLI Batch #	1301069
SDG #	KP0184
SAF #	RC-189
Date Received	01/29/13
# Samples	6
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
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 22 pages.

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

PAHs

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: KP0184 Project Manager: Joan Kessner	**Reported:** 02/07/2013 20:11

Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1RD68	1301069-01	Soil	01/24/2013 10:22	01/29/2013 11:15
J1RD69	1301069-02	Soil	01/24/2013 10:32	01/29/2013 11:15
J1RD70	1301069-03	Soil	01/24/2013 10:16	01/29/2013 11:15
J1RD71	1301069-04	Soil	01/24/2013 10:12	01/29/2013 11:15
J1RD72	1301069-05	Soil	01/24/2013 10:20	01/29/2013 11:15
J1RD73	1301069-06	Soil	01/24/2013 10:10	01/29/2013 11:15

LIONVILLE LABORATORY
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Case Narrative

Client: WC-HANFORD RC-189 KP0184
LVL #: 1301069

W.O. #: 60049-001-001-0001-00
Date Received: 01-29-2013

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

Six (6) soil samples were collected on 01-24-2013.

The samples and associated QC samples were extracted 01-29-2013 and analyzed 02-04,05-2013 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C and the analysis procedure was based on SW846 Method 8310.

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. Seven (7) of ten (10) surrogate recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 13GC016) has been enclosed.

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

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

6. Twenty-nine (29) of thirty-two (32) matrix spike recoveries were outside QC acceptance criteria. Matrix spike recoveries were unobtainable to due dilution required for analysis due to high concentration of target analytes. A copy of the Sample Discrepancy Report (SDR# 13GC016) has been enclosed.

7. The following samples required instrument dilutions due to high concentrations target analytes J1RD68 (100-fold), J1RD069 (25-fold), J1RD70 (100-fold), J1RD072 (10-fold), J1RD73 (10-fold), L301203-MS1 and L301203-MSD1 (100-fold). Reporting limits have been adjusted to reflect these necessary dilutions.

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

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

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

10. The samples were reported on a dry weight basis.

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

Iain Daniels
LvL Laboratory Manager

2/11/13
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 13GC016

Initiator: Catherine Carey
Date: 02/07/13
Client: WC Hanford

Batch: 1301069
Samples: 01, 02, 03, 05, 06, MS1/MSD1
Method: SW846/MCAWW/CLP/

Parameter: PAH
Matrix: SOIL
Prep Batch: L301203

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)

surrogate recoveries outside QC limits for all samples (01, 02, 03, 05, 06, MS1/MSD1)

multiple spike recoveries outside QC limits in MS1/MSD1

2. Known or Probable Causes(s)

high concentration of target analytes / high dilutions

Interference from non targets also

3. Discussion and Proposed Action

Other Description:

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

Narrate ID.

4. Project Manager Instructions...signature/date: 2/11/13

__ 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: 2/11/13

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

8310 PAH
Analytes with %Difference or %Drift >15%, Where Mean is Used for Continuing Calibration

Analyte	02/04/13 2:18:14 PM CCV1	02/04/13 7:34:24 PM 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		-86.4						
Dibenz[a,h]anthracene								
Benzo[g,h,i]perylene								
Mean %D or %Drift	0.9/5.2	4.9/5.0						

Sample results reported from affected CCV:

CCV1:_____

CCV2:_____

CCV3:_____

CCV4:_____

CCV5:_____

CCV6:_____

CCV7:_____

CCV8:_____

GLOSSARY OF DATA

DATA QUALIFIERS

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

ABBREVIATIONS

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

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: KP0184	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/07/2013 20:11

J1RD68
1301069-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**14100**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Acenaphthylene	355	U	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Acenaphthene	355	U	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Fluorene	**3150**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Phenanthrene	**36600**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Anthracene	**12800**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Fluoranthene	**51900**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Indeno[1,2,3-cd]pyrene	**3040**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Pyrene	**46300**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benz[a]anthracene	**18200**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Chrysene	**16400**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benzo[b] fluoranthene	**6220**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benzo[k] fluoranthene	**4860**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benzo[a] pyrene	**14700**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Dibenz[a,h]anthracene	**472**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benzo[g,h,i] perylene	**8120**	D	355	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Surrogate: Triphenylene	*1700 % **		*68-129*			*L301203*	*01/29/2013*	*02/05/2013*	*8310*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: KP0184	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/07/2013 20:11

J1RD69
1301069-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**1680**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Acenaphthylene	**186**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Acenaphthene	92.5	U	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Fluorene	**124**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Phenanthrene	**3170**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Anthracene	**1300**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Fluoranthene	**9470**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Indeno[1,2,3-cd]pyrene	**676**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Pyrene	**8000**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Benz[a]anthracene	**2770**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Chrysene	**3290**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Benzo[b] fluoranthene	**1240**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Benzo[k] fluoranthene	**972**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Benzo[a] pyrene	**2720**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Dibenz[a,h]anthracene	**123**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Benzo[g,h,i] perylene	**1680**	D	92.5	ug/kg dry	25	L301203	01/29/2013	02/05/2013	8310
Surrogate: Triphenylene	*422 % **		*68-129*			*L301203*	*01/29/2013*	*02/05/2013*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: KP0184 Project Manager: Joan Kessner	**Reported:** 02/07/2013 20:11

J1RD70
1301069-03 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**16500**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Acenaphthylene	**7820**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Acenaphthene	389	U	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Fluorene	**3610**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Phenanthrene	**42500**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Anthracene	**14700**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Fluoranthene	**75600**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Indeno[1,2,3-cd]pyrene	**5170**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Pyrene	**58100**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benz[a]anthracene	**32000**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Chrysene	**47100**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benzo[b] fluoranthene	**9800**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benzo[k] fluoranthene	**8940**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benzo[a] pyrene	**24100**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Dibenz[a,h]anthracene	**604**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Benzo[g,h,i] perylene	**14700**	D	389	ug/kg dry	100	L301203	01/29/2013	02/05/2013	8310
Surrogate: Triphenylene	*2840 % **		*68-129*			*L301203*	*01/29/2013*	*02/05/2013*	*8310*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: KP0184	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/07/2013 20:11

J1RD71
1301069-04 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**6.29**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Acenaphthylene	3.56	U	3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Acenaphthene	3.56	U	3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Fluorene	3.56	U	3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Phenanthrene	**14.2**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Anthracene	**2.41**	J	3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Fluoranthene	**31.0**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Indeno[1,2,3-cd]pyrene	**5.13**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Pyrene	**31.8**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Benz[a]anthracene	**12.5**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Chrysene	**19.5**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Benzo[b] fluoranthene	**5.03**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Benzo[k] fluoranthene	**6.54**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Benzo[a] pyrene	**15.8**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Dibenz[a,h]anthracene	**0.927**	J	3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Benzo[g,h,i] perylene	**12.0**		3.56	ug/kg dry	1	L301203	01/29/2013	02/04/2013	8310
Surrogate: Triphenylene	*97 %*		*68-129*			*L301203*	*01/29/2013*	*02/04/2013*	*8310*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: KP0184	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/07/2013 20:11

J1RD72
1301069-05 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**1380**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Acenaphthylene	37.0	U	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Acenaphthene	37.0	U	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Fluorene	**204**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Phenanthrene	**2650**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Anthracene	**980**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Fluoranthene	**4080**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Indeno[1,2,3-cd]pyrene	**385**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Pyrene	**3880**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benz[a]anthracene	**1550**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Chrysene	**1510**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benzo[b] fluoranthene	**693**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benzo[k] fluoranthene	**756**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benzo[a] pyrene	**1730**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Dibenz[a,h]anthracene	37.0	U	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benzo[g,h,i] perylene	**1070**	D	37.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Surrogate: Triphenylene	*210 % **		*68-129*			*L301203*	*01/29/2013*	*02/04/2013*	*8310*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: KP0184	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/07/2013 20:11

J1RD73
1301069-06 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**1490**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Acenaphthylene	**62.4**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Acenaphthene	36.0	U	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Fluorene	**130**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Phenanthrene	**2190**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Anthracene	**866**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Fluoranthene	**4870**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Indeno[1,2,3-cd]pyrene	36.0	U	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Pyrene	**4330**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benz[a]anthracene	**2120**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Chrysene	**2360**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benzo[b] fluoranthene	**659**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benzo[k] fluoranthene	**684**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benzo[a] pyrene	**1800**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Dibenz[a,h]anthracene	**78.4**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Benzo[g,h,i] perylene	**1320**	D	36.0	ug/kg dry	10	L301203	01/29/2013	02/04/2013	8310
Surrogate: Triphenylene	*270 % **		*68-129*			*L301203*	*01/29/2013*	*02/04/2013*	*8310*

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: KP0184	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/07/2013 20:11

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 L301203 - SW 3540C										
Blank (L301203-BLK1)				Prepared: 01/29/2013 Analyzed: 02/04/2013						
Naphthalene	3.33	U	3.33	ug/kg wet						
Acenaphthylene	3.33	U	3.33	ug/kg wet						
Acenaphthene	3.33	U	3.33	ug/kg wet						
Fluorene	3.33	U	3.33	ug/kg wet						
Phenanthrene	3.33	U	3.33	ug/kg wet						
Anthracene	3.33	U	3.33	ug/kg wet						
Fluoranthene	3.33	U	3.33	ug/kg wet						
Indeno[1,2,3-cd]pyrene	3.33	U	3.33	ug/kg wet						
Pyrene	3.33	U	3.33	ug/kg wet						
Benz[a]anthracene	3.33	U	3.33	ug/kg wet						
Chrysene	3.33	U	3.33	ug/kg wet						
Benzo[b] fluoranthene	3.33	U	3.33	ug/kg wet						
Benzo[k] fluoranthene	3.33	U	3.33	ug/kg wet						
Benzo[a] pyrene	3.33	U	3.33	ug/kg wet						
Dibenz[a,h]anthracene	3.33	U	3.33	ug/kg wet						
Benzo[g,h,i] perylene	3.33	U	3.33	ug/kg wet						
Surrogate: Triphenylene	*143*			*ug/kg wet*	*166.67*		*86*	*68-129*		
LCS (L301203-BS1)				Prepared: 01/29/2013 Analyzed: 02/04/2013						
Naphthalene	178		3.33	ug/kg wet	166.67		107	0-127		
Acenaphthylene	147		3.33	ug/kg wet	166.67		88	50-140		
Acenaphthene	144		3.33	ug/kg wet	166.67		87	17-139		
Fluorene	144		3.33	ug/kg wet	166.67		86	28-145		
Phenanthrene	145		3.33	ug/kg wet	166.67		87	30-152		
Anthracene	140		3.33	ug/kg wet	166.67		84	19-171		
Fluoranthene	146		3.33	ug/kg wet	166.67		87	34-159		
Indeno[1,2,3-cd]pyrene	145		3.33	ug/kg wet	166.67		87	31-156		
Pyrene	151		3.33	ug/kg wet	166.67		91	33-152		
Benz[a]anthracene	148		3.33	ug/kg wet	166.67		89	32-157		
Chrysene	142		3.33	ug/kg wet	166.67		85	31-159		
Benzo[b] fluoranthene	149		3.33	ug/kg wet	166.67		89	33-164		
Benzo[k] fluoranthene	148		3.33	ug/kg wet	166.67		89	28-161		
Benzo[a] pyrene	149		3.33	ug/kg wet	166.67		89	29-149		
Dibenz[a,h]anthracene	152		3.33	ug/kg wet	166.67		91	27-153		
Benzo[g,h,i] perylene	159		3.33	ug/kg wet	166.67		96	32-157		
Surrogate: Triphenylene	*147*			*ug/kg wet*	*166.67*		*88*	*68-129*		

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: KP0184	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	02/07/2013 20:11

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 L301203 - SW 3540C										
Matrix Spike (L301203-MS1)		**Source: 1301069-01**		Prepared: 01/29/2013 Analyzed: 02/05/2013						
Naphthalene	26200	D	363	ug/kg dry	181.54	14100	6680*	0-127		
Acenaphthylene	8970	D	363	ug/kg dry	181.54	355 U	4940*	50-140		
Acenaphthene	51300	D	363	ug/kg dry	181.54	355 U	28300*	17-139		
Fluorene	2680	D	363	ug/kg dry	181.54	3150	-262*	28-145		
Phenanthrene	41800	D	363	ug/kg dry	181.54	36600	2900*	30-152		
Anthracene	12900	D	363	ug/kg dry	181.54	12800	87	19-171		
Fluoranthene	67000	D	363	ug/kg dry	181.54	51900	8340*	34-159		
Indeno[1,2,3-cd]pyrene	3450	D	363	ug/kg dry	181.54	3040	226*	31-156		
Pyrene	47200	D	363	ug/kg dry	181.54	46300	471*	33-152		
Benz[a]anthracene	17700	D	363	ug/kg dry	181.54	18200	-298*	32-157		
Chrysene	21300	D	363	ug/kg dry	181.54	16400	2660*	31-159		
Benzo[b] fluoranthene	8280	D	363	ug/kg dry	181.54	6220	1140*	33-164		
Benzo[k] fluoranthene	5130	D	363	ug/kg dry	181.54	4860	146	28-161		
Benzo[a] pyrene	11400	D	363	ug/kg dry	181.54	14700	-1770*	29-149		
Dibenz[a,h]anthracene	702	D	363	ug/kg dry	181.54	472	127	27-153		
Benzo[g,h,i] perylene	10300	D	363	ug/kg dry	181.54	8120	1180*	32-157		
Surrogate: Triphenylene	*2730*			*ug/kg dry*	*181.54*		*1500**	*68-129*		
Matrix Spike Dup (L301203-MSD1)		**Source: 1301069-01**		Prepared: 01/29/2013 Analyzed: 02/05/2013						
Naphthalene	27000	D	358	ug/kg dry	179.17	14100	7210*	0-127	8	40
Acenaphthylene	15800	D	358	ug/kg dry	179.17	355 U	8820*	50-140	56*	40
Acenaphthene	104000	D	358	ug/kg dry	179.17	355 U	57900*	17-139	69*	40
Fluorene	15000	D	358	ug/kg dry	179.17	3150	6640*	28-145	216*	40
Phenanthrene	127000	D	358	ug/kg dry	179.17	36600	50500*	30-152	178*	40
Anthracene	51900	D	358	ug/kg dry	179.17	12800	21800*	19-171	198*	40
Fluoranthene	172000	D	358	ug/kg dry	179.17	51900	66900*	34-159	156*	40
Indeno[1,2,3-cd]pyrene	8640	D	358	ug/kg dry	179.17	3040	3120*	31-156	173*	40
Pyrene	127000	D	358	ug/kg dry	179.17	46300	45000*	33-152	196*	40
Benz[a]anthracene	45400	D	358	ug/kg dry	179.17	18200	15200*	32-157	208*	40
Chrysene	49400	D	358	ug/kg dry	179.17	16400	18400*	31-159	149*	40
Benzo[b] fluoranthene	16500	D	358	ug/kg dry	179.17	6220	5710*	33-164	134*	40
Benzo[k] fluoranthene	14800	D	358	ug/kg dry	179.17	4860	5560*	28-161	190*	40
Benzo[a] pyrene	39900	D	358	ug/kg dry	179.17	14700	14100*	29-149	257*	40
Dibenz[a,h]anthracene	1630	D	358	ug/kg dry	179.17	472	647*	27-153	134*	40
Benzo[g,h,i] perylene	21400	D	358	ug/kg dry	179.17	8120	7400*	32-157	145*	40
Surrogate: Triphenylene	*5850*			*ug/kg dry*	*179.17*		*3260**	*68-129*		

PREPARATION BENCH SHEET

L301203

Lionville Laboratory

Printed: 1/30/2013 12:29:00PM

00000017

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

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301069-01	8310 PAH	01/29/2013 13:28	30.8	5				50	WC-Hanford, Inc.	
1301069-02	8310 PAH	01/29/2013 13:28	30.06	5				50	WC-Hanford, Inc.	
1301069-03	8310 PAH	01/29/2013 13:28	30.48	5				50	WC-Hanford, Inc.	
1301069-04	8310 PAH	01/29/2013 13:28	30.8	5				50	WC-Hanford, Inc.	
1301069-05	8310 PAH	01/29/2013 13:28	30.7	5				50	WC-Hanford, Inc.	
1301069-06	8310 PAH	01/29/2013 13:28	30.11	5				50	WC-Hanford, Inc.	
L301203-BLK1	QC	01/29/2013 13:28	30	5				50		
L301203-BS1	QC	01/29/2013 13:28	30	5	1300078		50	50		
L301203-MS1	QC	01/29/2013 13:28	30.16	5	1300078	1301069-01	50	50		
L301203-MSD1	QC	01/29/2013 13:28	30.56	5	1300078	1301069-01	50	50		

1/30/13 1229
Extracts Relinquished By — Date

LK 1-30-13 1230
Extracts Received By — Date

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1301069

Custody Transfer Record/Lab Work Request

Page 1 of 1

Lionville Laboratory
A Division of Eberline Analytical Corporation

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

KP0184

Client WC Hanford SAF# RC-189

Est. Final Proj. Sampling Date

Project#

Project Contact/Phone#

Lionville Laboratory Project Manager O. Johnson

QC SW Del SD TAT 7 Days

Date Rec'd 1-29-13 Date Due 2-5-13

Refrigerator #							A										
#/Type Container	Liquid						2										
	Solid						1AG										
Volume	Liquid																
	Solid						120										
Preservatives							–										
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb		PAHs		Metal	CN							
		Lionville Laboratory Use Only															
							8310										

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	J1RD68			Soil	1-24-13	1022						X									
02	J1RD69			Soil	1-24-13	1032						X									
03	J1RD70			Soil	1-24-13	1016						X									
04	J1RD71			Soil	1-24-13	1012						X									
05	J1RD72			Soil	1-24-13	1020						X									
06	J1RD73			Soil	1-24-13	1010						X									

Special Instructions:

Special Instructions:

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

Relinquished by	Received by	Date	Time
F.D. Ee	R. Hernandez	1-29-13	1005

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

0000000019

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-157	Page 1 of 2

Collector Q. Stowe	**Company Contact** Joan Kessner	**Telephone No.** 375-4688	**Project Coordinator** KESSNER, JH
Project Designation 100N Field Remediation - Soil Full Protocol	**Sampling Location** 124-N-2 Verification		**SAF No.** RC-189
Ice Chest No. WCH-11-025	**Field Logbook No.** EI-1652-08	**COA** R124N22000	**Method of Shipment** Fed Ex
Shipped To ~~EBERLINE SERVICES~~ LIONVILLE AA 1/23/13	**Offsite Property No.** A 120719		**Bill of Lading/Air Bill No.** See OSPC

Price Code ~~8L~~ 8B AA 1/23/13 **Data Turnaround** ~~21~~ Days 7 AA 1/23/13

POSSIBLE SAMPLE HAZARDS/REMARKS

~~Potential~~ Rad & DOT Limits AA 1-24-13

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C									
Type of Container	aG	G									
No. of Container(s)	1	1									
Volume	120mL	120mL									
SAMPLE ANALYSIS	PAHs - 8310	TPH-Diesel Range - WTPH-D +									
			RCF	34424							

Sample No.	Matrix *	Sample Date	Sample Time										
J1RD65	SOIL	1/24/13											
J1RD66	SOIL												
J1RD67	SOIL												
J1RD68	SOIL	1-24-13	1022	X									
J1RD69	SOIL	1-24-13	1032	X									

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From: Quincy Stowe		1055 1/24/13
Received By/Stored In: Dennis Newman		1055 1-24-13
Relinquished By/Removed From: Dennis Newman		1338 1-24-13
Received By/Stored In: A. Freier		1060 #3 1338 1-24-13
Relinquished By/Removed From: A. Freier	WCH	1060 #3 1-28-13 1150
Received By/Stored In: Fed Ex		
Relinquished By/Removed From: Fed Ex		1-29-13 1005
Received By/Stored In: Victor Hernandez		1-29-13 1005
Relinquished By/Removed From		
Received By/Stored In		
Relinquished By/Removed From		
Received By/Stored In		

SPECIAL INSTRUCTIONS

RECEIVED BY CMB DATE 1-28-13

KP0184

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

000000020

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-157	Page 2 of 2

Collector Q. Stowe	**Company Contact** Joan Kessner	**Telephone No.** 375-4688	**Project Coordinator** KESSNER, JH
Price Code ~~8L~~ 8B 1/28/13	**Data Turnaround** ~~21~~ Days 7 1/23/13		
Project Designation 100N Field Remediation - Soil Full Protocol	**Sampling Location** 124-N-2 Verification		**SAF No.** RC-189
Ice Chest No. WCH-11-025	**Field Logbook No.** EI-1652-08	**COA** R124N22000	**Method of Shipment** Fed Ex
Shipped To ~~EDERLINE SERVICES~~/ LIONVILLE 1/23/13	**Offsite Property No.** A120719		**Bill of Lading/Air Bill No.** See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

~~Potential~~ Rad < DOT Limits
AJ 1-24-13

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C									
Type of Container	aG	G									
No. of Container(s)	1	1									
Volume	120mL	120mL									
SAMPLE ANALYSIS	PAHs - 8310	TPH-Diesel Range - NWTPH-D +		RCF	34424						

Sample No.	Matrix *	Sample Date	Sample Time										
J1RD70	SOIL	1-24-13	1016	X									
J1RD71	SOIL	1-24-13	1012	X									
J1RD72	SOIL	1-24-13	1020	X									
J1RD73	SOIL	1-24-13	1010	X									

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Quincy Stowe	Date/Time 1055 1/24/13	Received By/Stored In: Dennis Newman	Date/Time 1055 1-24-13
Relinquished By/Removed From: Dennis Newman	Date/Time 1338 1-24-13	Received By/Stored In: 1060#3 A. Freier	Date/Time 1338 1-24-13
Relinquished By/Removed From: WCH A. Freier	Date/Time 1060#3 1-28-13 1150	Received By/Stored In: Fed Ex	Date/Time
Relinquished By/Removed From: Fed Ex	Date/Time 1-29-13 1005	Received By/Stored In: Victor Hernandez	Date/Time 1-29-13 1005
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

REVIEWED BY CMB DATE 1-28-13

KP0184

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

000000021

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAF/SOW/Release #: RC-189 HP0184 **Date:** 1-29-13

LvL Batch #: 1301069 **Sample Custodian:** Victor Hernandez

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier Fed. Ex		Airbill # 7946 1895 9291
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 # WOH-11-025
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, RSK-175, Sulfides, Non-Halogenated VOAs (Alcohol/Glycol) free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☐ Yes	☐ No	☑ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted_____ Date _____

SR-002-A-0113