SAF-RC-029
Remaining Sites Confirmation Sampling – Soil Full Protocol
FINAL VALIDATION PACKAGE

COMPLETE COPY OF FINAL VALIDATION PACKAGE TO:

Kathy Wendt H4-21

COMMENTS:

SDG K3916 SAF-RC-029

Waste Site: 100-D-101

Date: 18 July 2012
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Remaining Sites Confirmation Sampling – Soil Full Protocol - Waste Site 100-D-101
Subject: Wet Chemistry - Data Package No. K3916-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K3916 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1PPN6	6/4/12	Soil	C	See note 1
J1PPN7	6/4/12	Soil	C	See note 1
J1PPN8	6/4/12	Soil	C	See note 1

1 – Chromium VI by 7196A, IC anions by 300.0, pH by 9045C & nitrate/nitrite by 353.2.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, Rev. 4, February 2005). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: 30 days for chromium VI; 28 days for chloride, fluoride, bromide, sulfate and nitrate/nitrite; 2 days for nitrate, nitrite and phosphate; and immediate for pH (24 hours).

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by greater than twice the limit, all detected pH nitrate, nitrite and orthophosphate results were qualified as estimates and flagged "J".

Due to the holding time being exceeded by greater than twice the limit, all undetected nitrate, nitrite and orthophosphate results were qualified as rejected and flagged "UR".

All other holding times were acceptable.

- **Method Blanks**

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

Precision

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

Completeness

Data package K3916 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 80%.

MAJOR DEFICIENCIES

The following major deficiencies were noted:

- Due to the holding time being exceeded by greater than twice the limit, all undetected nitrate, nitrite and orthophosphate results were qualified as rejected and flagged "UR".

Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the holding time being exceeded by greater than twice the limit, all detected pH, nitrate, nitrite and orthophosphate results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services.*

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K3916	REVIEWER: ELR	Project: 100-D-101	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nitrite	UR	All	Hold time
Nitrate Orthophosphate pH	J	All	Hold time

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Annotated Laboratory Reports

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/19/2012 14:00

7/18/12

Wet Chemistry
Lionville Laboratory

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1PPN6 (1206018-01) Soil									
%Solids	95.7		0.1	% by Weight	1	L206065	06/08/2012	06/08/2008	SM2540G
Bromide	1.0 U	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Chloride	1.0 U	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate	5.0 B J	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Orthophosphate	3.7 B J	2.0	10.2	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Sulfate	10.9	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate/Nitrite as N	1.24	0.10	0.51	mg/kg dry	1	L206089	06/12/2012	06/12/2012	EPA 353.2
Hexavalent Chromium	0.29 B	0.21	0.52	mg/kg dry	1	L206069	06/08/2012	06/11/2012	SW846 7196A
pH	9.39 J	0.10	0.10	pH Units	1	L206051	06/07/2012	06/07/2012	SW846 9045D
J1PPN7 (1206018-02) Soil									
%Solids	90.3		0.1	% by Weight	1	L206065	06/08/2012	06/08/2008	SM2540G
Bromide	1.1 U	1.1	5.5	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Chloride	18.0	1.1	5.5	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Fluoride	1.1 U	1.1	5.5	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate	15.4 J	1.1	5.5	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrite	1.1 U R	1.1	5.5	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Orthophosphate	4.4 B J	2.2	11.0	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Sulfate	97.3	1.1	5.5	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate/Nitrite as N	3.44	0.11	0.54	mg/kg dry	1	L206089	06/12/2012	06/12/2012	EPA 353.2
Hexavalent Chromium	0.31 B	0.22	0.55	mg/kg dry	1	L206069	06/08/2012	06/11/2012	SW846 7196A
pH	9.59 J	0.10	0.10	pH Units	1	L206051	06/07/2012	06/07/2012	SW846 9045D

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/19/2012 14:00

Wet Chemistry
Lionville Laboratory

V 7/18/12

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1PPN8 (1206018-03) Soil									
%Solids	**89.6**		0.1	% by Weight	1	L206065	06/08/2012	06/08/2008	SM2540G
Bromide	1.0 U	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Chloride	**21.9**	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate	**22.5** J	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	5.1	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Orthophosphate	**2.6** B J	2.1	10.3	mg/kg dry	1	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Sulfate	**112** D	2.1	10.3	mg/kg dry	2	L206139	06/17/2012	06/17/2012	EPA 300.0 (1993)
Nitrate/Nitrite as N	**5.45**	0.11	0.55	mg/kg dry	1	L206089	06/12/2012	06/12/2012	EPA 353.2
Hexavalent Chromium	**0.26** B	0.22	0.56	mg/kg dry	1	L206069	06/08/2012	06/11/2012	SW846 7196A
pH	**9.53** J	0.10	0.10	pH Units	1	L206051	06/07/2012	06/07/2012	SW846 9045D

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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-029 K3916
LVL#: 1206018 **Date Received:** 06-07-12

INORGANIC NARRATIVE

1. This narrative covers the analyses of 3 soil samples.

2. The samples were prepared and analyzed in accordance with the methods indicated on the data summary report. Results for soil or solid pH are measured in water at 25°C unless otherwise specified.

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

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

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

5. The method blanks were within the method criteria.

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

7. The matrix spike recoveries were within the 75-125% control limits.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for soil samples are reported on a dry weight basis.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

6/19/12
Date

njp\i06-018

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 11 pages.

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-141	Page 1 of ~~2~~ 1

Collector Q Stowe	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Price Code 8C	Data Turnaround 15 Days	AJ 6-4-12	
Project Designation Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location 100-D-101 Test Trenches		SAF No. RC-029
Ice Chest No. RCC-07-001	Field Logbook No. EL-1601-06	COA CID101A000	Method of Shipment FED EX
Shipped To EBERLINE SERVICES, LIONVILLE	Offsite Property No. A110362		Bill of Lading/Air Bill No. See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples may contain hazardous chemicals at levels that pose a risk to human health and/or the environment. Please handle accordingly.

Special Handling and/or Storage

Please keep cool (4 deg C) those requiring coolness, as shown on "Preservation" heading. Thank You.

Preservation			Cool 4C	Cool 4C	Cool 4C	None	Cool 4C				
Type of Container			G/P	G/P	G/P	G/P	aG				
No. of Container(s)			1	1	1	1	1				
Volume			125mL	125mL	125mL	125mL	120mL				
SAMPLE ANALYSIS			See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	pH (Soil) - 9045	Semi-VOA - 8270A (TCL)				
		MD 6/4/12									
Sample No.	Matrix *	Sample Date	Sample Time								
J1PPN6	SOIL	6/4/12	0905	X	X	X	X	X			
J1PPN7	SOIL	6/4/12	1025	X	X	X	X	X			
J1PPN8	SOIL	6/4/12	1300	X	X	X	X	X			
J1PPN9	SOIL										
J1PPP0	SOIL	AJ 6-5-12									

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1500 6/4/12	WCH M Stankovich	1500 6/4/12
WCH M Stankovich	6/4/12 1620	A. Freier	1060 #1 6-4-12 1620
WCH A. Freier	1060 #1 6-5-12 0825	Fed Ex	
Fed Ex	6-7-12 0950	KETTY HERNANDEZ	6-7-12 0950

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, BariumBeryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium,Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 471 - (CV)
(2) IC Anions - 300.0 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.2

REVIEWED BY CMB
DATE 6-5-12

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=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

00000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAF/SOW/Release #: RC-029

Date: 6/7/12

LvL Batch #: 1206018

Sample Custodian: [signature]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier Fed Ex		Airbill # 798472254714
2. Custody Seals on coolers or shipping containers intact, signed & dated?	☑ Yes	☐ No	☐ No Seals
3. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	*Comments:*
4. All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible?	☑ Yes	☐ No	
5. Samples received cooled or ambient?	Temp 3.9	°C	Cooler # RCC-07-001
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	NO_2, NO_3, PO_4 recv'd past recommended hold time JR 6/7/12
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	See item #12 JER 6/7/12
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted _____ Date _____

SR-002-B.doc

000000005

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 100-D-101		DATA PACKAGE: K3916	
VALIDATOR: ELR	LAB: LLI	DATE: 7/16/12	
		SDG: K3916	

ANALYSES PERFORMED

Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate		

SAMPLES/MATRIX

J1PP06 J1PP07 J1PP08

Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments:

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: no FB

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Sike standards NIST traceable? (Levels D, E) ..... Yes No N/A

Spike standards expired? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: no PAS

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/A

Duplicate results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:

6. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: >2x pH, ortho, nitrate, nitrite – J/UR

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:

Appendix 6

Additional Documentation Requested by Client

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/19/2012 14:00

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206051 - Default Prep GenChem										
Duplicate (L206051-DUP4)		**Source: 1206018-01**		Prepared & Analyzed: 06/07/2012						
pH	9.33	0.10	0.10	pH Units		9.39			0.641	20
Reference (L206051-SRM1)				Prepared & Analyzed: 06/07/2012						
pH	9.99	0.10	0.10	pH Units	10.000		99.9	99-101		
Batch L206065 - % Solids										
Duplicate (L206065-DUP1)		**Source: 1206018-01**		Prepared: 06/08/2012 Analyzed: 06/08/2008						
%Solids	96.1		0.1	% by Weight		95.7			0.5	20
Batch L206069 - SW 3060A										
Blank (L206069-BLK1)				Prepared: 06/08/2012 Analyzed: 06/11/2012						
Hexavalent Chromium	0.20 U	0.20	0.50	mg/kg wet						
LCS (L206069-BS1)				Prepared: 06/08/2012 Analyzed: 06/11/2012						
Hexavalent Chromium	3.73	0.20	0.50	mg/kg wet	4.0000		93	80-120		
LCS (L206069-BS2)				Prepared: 06/08/2012 Analyzed: 06/11/2012						
Hexavalent Chromium	981 D	20.0	50.0	mg/kg wet	1107.7		89	80-120		
Duplicate (L206069-DUP1)		**Source: 1206018-01**		Prepared: 06/08/2012 Analyzed: 06/11/2012						
Hexavalent Chromium	0.28 B	0.21	0.52	mg/kg dry		0.29			4	20
Matrix Spike (L206069-MS1)		**Source: 1206018-01**		Prepared: 06/08/2012 Analyzed: 06/11/2012						
Hexavalent Chromium	3.62	0.21	0.52	mg/kg dry	4.1799	0.29	80	75-125		

LIONVILLE LABORATORY
A division of Pearline Analytical Corporation

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/19/2012 14:00

Wet Chemistry - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206069 - SW 3060A										
Matrix Spike (L206069-MS2)	**Source: 1206018-01**			Prepared: 06/08/2012 Analyzed: 06/11/2012						
Hexavalent Chromium	947 D	20.9	52.2	mg/kg dry	1063.3	0.29	89	75-125		
Batch L206089 - Default Prep GenChem										
Blank (L206089-BLK1)				Prepared & Analyzed: 06/12/2012						
Nitrate/Nitrite as N	0.10 U	0.10	0.49	mg/kg wet						
LCS (L206089-BS1)				Prepared & Analyzed: 06/12/2012						
Nitrate/Nitrite as N	5.08	0.10	0.48	mg/kg wet	4.8294		105	90-110		
Duplicate (L206089-DUP4)	**Source: 1206018-01**			Prepared & Analyzed: 06/12/2012						
Nitrate/Nitrite as N	1.28	0.10	0.50	mg/kg dry		1.24			2.95	20
Matrix Spike (L206089-MS4)	**Source: 1206018-01**			Prepared & Analyzed: 06/12/2012						
Nitrate/Nitrite as N	6.09	0.09	0.47	mg/kg dry	4.7398	1.24	102	75-125		
Batch L206139 - Default Prep GenChem										
Blank (L206139-BLK1)				Prepared & Analyzed: 06/17/2012						
Fluoride	1.0 U	1.0	5.0	mg/kg wet						
Chloride	1.0 U	1.0	5.0	mg/kg wet						
Bromide	1.0 U	1.0	5.0	mg/kg wet						
Orthophosphate	2.0 U	2.0	10.0	mg/kg wet						
Sulfate	1.0 U	1.0	5.0	mg/kg wet						
Nitrate	1.0 U	1.0	5.0	mg/kg wet						
Nitrite	1.0 U	1.0	5.0	mg/kg wet						

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-029 Project Number: K3916 Project Manager: Joan Kessner	**Reported:** 06/19/2012 14:00

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206139 - Default Prep GenChem										
LCS (L206139-BS1)				Prepared & Analyzed: 06/17/2012						
Fluoride	49.2	1.0	5.0	mg/kg wet	50.000		98.4	80-120		
Chloride	46.5	1.0	5.0	mg/kg wet	50.000		93.0	80-120		
Bromide	48.0	1.0	5.0	mg/kg wet	50.000		96.0	80-120		
Orthophosphate	47.8	2.0	10.0	mg/kg wet	50.000		95.6	80-120		
Sulfate	48.2	1.0	5.0	mg/kg wet	50.000		96.4	80-120		
Nitrate	47.8	1.0	5.0	mg/kg wet	50.000		95.6	80-120		
Nitrite	48.4	1.0	5.0	mg/kg wet	50.000		96.8	80-120		
Duplicate (L206139-DUP3)		**Source: 1206018-01**		Prepared & Analyzed: 06/17/2012						
Fluoride	1.0 U	1.0	5.2	mg/kg dry		1.0 U				20
Chloride	1.0 U	1.0	5.2	mg/kg dry		1.0 U				20
Bromide	1.0 U	1.0	5.2	mg/kg dry		1.0 U				20
Orthophosphate	3.8 B	2.1	10.3	mg/kg dry		3.7			3.49	20
Sulfate	10.6	1.0	5.2	mg/kg dry		10.9			3.06	20
Nitrate	4.7 B	1.0	5.2	mg/kg dry		5.0			5.56	20
Nitrite	1.0 U	1.0	5.2	mg/kg dry		1.0 U				20
Matrix Spike (L206139-MS5)		**Source: 1206018-01**		Prepared & Analyzed: 06/17/2012						
Fluoride	50.8	1.0	5.1	mg/kg dry	51.091	1.0 U	99.4	75-125		
Chloride	48.6	1.0	5.1	mg/kg dry	51.091	1.0 U	95.2	75-125		
Bromide	49.0	1.0	5.1	mg/kg dry	51.091	1.0 U	96.0	75-125		
Orthophosphate	53.3	2.0	10.2	mg/kg dry	51.091	3.7	97.2	75-125		
Sulfate	60.8	1.0	5.1	mg/kg dry	51.091	10.9	97.6	75-125		
Nitrate	54.4	1.0	5.1	mg/kg dry	51.091	5.0	96.6	75-125		
Nitrite	49.6	1.0	5.1	mg/kg dry	51.091	1.0 U	97.0	75-125		

Date: 18 July 2012
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Remaining Sites Confirmation Sampling – Soil Full Protocol - Waste Site 100-D-101
Subject: Semivolatile Organics - Data Package No. K3916-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K3916 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1PPN6	6/4/12	Soil	C	See note 1
J1PPN7	6/4/12	Soil	C	See note 1
J1PPN8	6/4/12	Soil	C	See note 1

1 – Semivolatile organics by 8270.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all

associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field (equipment) Blanks

No field blank was submitted for analysis.

Accuracy

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to LCS recoveries outside QC limits, all 2,4,6-trichlorophenol (40%), 2,4-dinitrophenol (37%), 4-chloroanaline (42%) and hexachlorocyclopentadiene (16%) results were qualified as estimates and flagged "J".

Due to matrix spike recoveries outside QC limits, all 1,2,4-trichlorobenzene (39%), 1,2-dichlorobenzene (43%), 1,3-dichlorobenzene (40%), 1,4-dichlorobenzene (41%), 2,4,5-trichlorophenol (45%), 2,4,6-trichlorophenol (41%), 2,4-dichlorophenol (45%), 2,4-dimethylphenol (42%), 2,4-dinitrophenol (27%), 2,4-dinitrotoluene (47%), 2-chloronaphthalene (46%), 2-chlorophenol (44%), 2-methylnaphthalene (44%), 2-methylphenol (45%), 2-nitrophenol (42%), 3,3-dichlorobenzicine (31%), 4,6-dinitro-2-methylphenol (46%), 4-chloro-3-methylphenol (46%), 4-chloroanaline (36%), 4-chlorophenyl phenyl ether (48%), 3-and/or 4-methylphenol (44%), 4-nitroanaline (49%). 4-nitrophenol (23%), acenaphthene (47%), acenaphthylene (42%), benzo(a)pyrene (46%), benzo(g,h,i)perylene (48%), bis(2-chloroethoxy)methane (44%), bis(2-chloroethyl)ether (43%), bis(2-chloroisopropyl)ether (43%), bis(2-ethylhexyl)phthalate (49%), dibenz(a,h)anthracene (27%), dimethyl phthalate (48%), di-n-octyl phthalate (48%), hexachlorobutadiene (44%), hexachlorocyclopentadiene (22%), hexachloroethane (40%), ideno(1,2,3-cd)pyrene (40%), isophorone (44%), naphthalene (49%), nitrobenzene (42%), n-nitrosodi-n-propylamine (47%), pentachlorophenol (25%) and phenol (46%) results were qualified as estimates and flagged "J".

Due to matrix spike duplicate results outside QC limits, all 2,4,6-trichlorophenol (43%), 2,4-dinitrophenol (30%), 4,6-dinitro-2-methylphenol (49%), 4-nitrophenol (37%), dibenz(a,h)anthracene (41%), hexachlorocyclopentadiene (26%) and pentachlorophenol (28%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes.

Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to RPDs outside QC limits, all 1,2,4-trichlorobenzene (36%), 1,2-dichlorobenzene (32%), 1,3-dichlorobenzene (32%), 1,4-dichlorobenzene (35%), 2,4-dinitrotoluene (31%), 2-chlorophenol (33%), 2-methylphenol (38%), 3,3-dichlorobenzicine (47%), 3-nitroanaline (43%), 4-chloro-3-methylphenol (32%), 4-chloroanaline (46%), 3-and/or 4-methylphenol (36%), 4-nitroanaline (44%). 4-nitrophenol (48%), benzo(a)pyrene (33%), benzo(g,h,i)perylene (33%), bis(2-chloroethoxy)methane (32%), bis(2-chloroethyl)ether (36%), bis(2-chloroisopropyl)ether (41%), bis(2-ethylhexyl)phthalate (34%), carbazole (33%), dibenz(a,h)anthracene (41%), di-n-octyl phthalate (38%), hexachloroethane (33%), ideno(1,2,3-cd)pyrene (42%), nitrobenzene (35%), n-nitrosodi-n-propylamine (35%) and phenol (32%) results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

Completeness

Data package No. K3916 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to LCS recoveries outside QC limits, all 2,4,6-trichlorophenol (40%), 2,4-dinitrophenol (37%), 4-chloroanaline (42%) and hexachlorocyclopentadiene (16%) results were qualified as estimates and flagged "J".

- Due to matrix spike recoveries outside QC limits, all 1,2,4-trichlorobenzene (39%), 1,2-dichlorobenzene (43%), 1,3-dichlorobenzene (40%), 1,4-dichlorobenzene (41%), 2,4,5-trichlorophenol (45%), 2,4,6-trichlorophenol (41%), 2,4-dichlorophenol (45%), 2,4-dimethylphenol (42%), 2,4-dinitrophenol (27%), 2,4-dinitrotoluene (47%), 2-chloronaphthalene (46%), 2-chlorophenol (44%), 2-methylnaphthalene (44%), 2-methylphenol (45%), 2-nitrophenol (42%), 3,3-dichlorobenzicine (31%), 4,6-dinitro-2-methylphenol (46%), 4-chloro-3-methylphenol (46%), 4-chloroanaline (36%), 4-chlorophenyl phenyl ether (48%), 3-and/or 4-methylphenol (44%), 4-nitroanaline (49%). 4-nitrophenol (23%), acenaphthene (47%), acenaphthylene (42%), benzo(a)pyrene (46%), benzo(g,h,i)perylene (48%), bis(2-chloroethoxy)methane (44%), bis(2-chloroethyl)ether (43%), bis(2-chloroisopropyl)ether (43%), bis(2-ethylhexyl)phthalate (49%), dibenz(a,h)anthracene (27%), dimethyl phthalate (48%), di-n-octyl phthalate (48%), hexachlorobutadiene (44%), hexachlorocyclopentadiene (22%), hexachloroethane (40%), ideno(1,2,3-cd)pyrene (40%), isophorone (44%), naphthalene (49%), nitrobenzene (42%), n-nitrosodi-n-propylamine (47%), pentachlorophenol (25%) and phenol (46%) results were qualified as estimates and flagged "J".

- Due to matrix spike duplicate results outside QC limits, all 2,4,6-trichlorophenol (43%), 2,4-dinitrophenol (30%), 4,6-dinitro-2-methylphenol (49%), 4-nitrophenol (37%), dibenz(a,h)anthracene (41%), hexachlorocyclopentadiene (26%) and pentachlorophenol (28%) results were qualified as estimates and flagged "J".

- Due to RPDs outside QC limits, all 1,2,4-trichlorobenzene (36%), 1,2-dichlorobenzene (32%), 1,3-dichlorobenzene (32%), 1,4-dichlorobenzene (35%), 2,4-dinitrotoluene (31%), 2-chlorophenol (33%), 2-methylphenol (38%), 3,3-dichlorobenzicine (47%), 3-nitroanaline (43%), 4-chloro-3-methylphenol (32%), 4-chloroanaline (46%), 3-and/or 4-methylphenol (36%), 4-nitroanaline (44%). 4-nitrophenol (48%), benzo(a)pyrene (33%), benzo(g,h,i)perylene (33%), bis(2-chloroethoxy)methane (32%), bis(2-chloroethyl)ether (36%), bis(2-chloroisopropyl)ether (41%), bis(2-ethylhexyl)phthalate (34%), carbazole (33%), dibenz(a,h)anthracene (41%), di-n-octyl phthalate (38%), hexachloroethane (33%), ideno(1,2,3-cd)pyrene (42%), nitrobenzene (35%), n-nitrosodi-n-propylamine (35%) and phenol (32%) results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated

with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

SEMIVOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: K3916	REVIEWER: ELR	Project: 100-D-101	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
2,4,6-trichlorophenol 2,4-dinitrophenol 4-chloroanaline hexachlorocyclopentadiene	J	All	LCS recovery
1,2,4-trichlorobenzene 1,2-dichlorobenzene 1,3-dichlorobenzene 1,4-dichlorobenzene 2,4,5-trichlorophenol 2,4,6-trichlorophenol 2,4-dichlorophenol 2,4-dimethylphenol 2,4-dinitrophenol 2,4-dinitrotoluene 2-chloronaphthalene 2-chlorophenol 2-methylnaphthalene 2-methylphenol 2-nitrophenol 3,3-dichlorobenzicine 4,6-dinitro-2-methylphenol 4-chloro-3-methylphenol 4-chloroanaline 4-chlorophenyl phenyl ether 3-and/or 4-methylphenol 4-nitroanaline 4-nitrophenol Acenaphthene acenaphthylene benzo(a)pyrene benzo(g,h,i)perylene bis(2-chloroethoxy)methane bis(2-chloroethyl)ether bis(2-chloroisopropyl)ether bis(2-ethylhexyl)phthalate dibenz(a,h)anthracene dimethyl phthalate di-n-octyl phthalate hexachlorobutadiene hexachlorocyclopentadiene hexachloroethane	J	All	MS recovery

SEMIVOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: K3916	REVIEWER: ELR	Project: 100-D-101	PAGE_1_OF_1
ideno(1,2,3-cd)pyrene isophorone naphthalene nitrobenzene n-nitrosodi-n-propylamine pentachlorophenol phenol			
2,4,6-trichlorophenol 2,4-dinitrophenol 4,6-dinitro-2-methylphenol 4-nitrophenol dibenz(a,h)anthracene hexachlorocyclopentadiene pentachlorophenol	J	All	MSD recovery
1,2,4-trichlorobenzene 1,2-dichlorobenzene 1,3-dichlorobenzene 1,4-dichlorobenzene 2,4-dinitrotoluene 2-chlorophenol 2-methylphenol 3,3-dichlorobenzicine 3-nitroanaline 4-chloro-3-methylphenol 4-chloroanaline 3-and/or 4-methylphenol 4-nitroanaline 4-nitrophenol benzo(a)pyrene benzo(g,h,i)perylene bis(2-chloroethoxy)methane bis(2-chloroethyl)ether bis(2-chloroisopropyl)ether bis(2-ethylhexyl)phthalate carbazole dibenz(a,h)anthracene di-n-octyl phthalate hexachloroethane ideno(1,2,3-cd)pyrene nitrobenzene n-nitrosodi-n-propylamine phenol	J	All	RPD

SEMIVOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Annotated Laboratory Reports

LVL
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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

J1PPN6
1206018-01 (Soil)

7/18/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
1,2-Dichlorobenzene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
1,3-Dichlorobenzene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
1,4-Dichlorobenzene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2,4,5-Trichlorophenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2,4,6-Trichlorophenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2,4-Dichlorophenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2,4-Dimethylphenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2,4-Dinitrophenol	3250	U J	3250	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2,4-Dinitrotoluene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2,6-Dinitrotoluene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2-Chloronaphthalene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2-Chlorophenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2-Methylnaphthalene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2-Methylphenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2-Nitroaniline	3250	U	3250	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
2-Nitrophenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
3,3'-Dichlorobenzidine	1300	U J	1300	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
3-Nitroaniline	3250	U J	3250	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
4,6-Dinitro-2-methylphenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
4-Bromophenyl Phenyl Ether	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
4-Chloro-3-methylphenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
4-Chloroaniline	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
4-Chlorophenyl Phenyl Ether	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
3- and/or 4-Methylphenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
4-Nitroaniline	3250	U J	3250	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
4-Nitrophenol	3250	U J	3250	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Acenaphthene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Acenaphthylene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Anthracene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Benz[a]anthracene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Benzo[a] pyrene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Benzo[b] fluoranthene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Benzo[g,h,i] perylene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Benzo[k] fluoranthene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Bis(2-chloroethoxy) methane	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

J1PPN6
1206018-01 (Soil)

7/18/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Bis(2-chloroisopropyl) ether	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Bis(2-ethylhexyl) phthalate	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Butyl Benzyl Phthalate	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Carbazole	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Chrysene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Dibenz[a,h]anthracene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Dibenzofuran	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Diethyl Phthalate	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Dimethyl Phthalate	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Di-n-butyl Phthalate	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Di-n-octyl Phthalate	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Fluoranthene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Fluorene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Hexachlorobenzene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Hexachlorobutadiene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Hexachlorocyclopentadiene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Hexachloroethane	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Indeno[1,2,3-cd]pyrene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Isophorone	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Naphthalene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Nitrobenzene	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
N-Nitrosodi-n-propylamine	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
N-Nitrosodiphenylamine	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Pentachlorophenol	3250	U J	3250	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Phenanthrene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Phenol	651	U J	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Pyrene	651	U	651	ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
TIC:Aldol Condensate 2	**51900**	A, B, D, J		ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
TIC:Aldol Condensate 3	**294**	A, J, D		ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
TIC:Aldol Condensate 1	**743**	A, D, J		ug/kg dry	2	L206087	06/12/2012	06/13/2012	8270C
Surrogate: 2-Fluorophenol	*54 %*		*25-121*			*L206087*	*06/12/2012*	*06/13/2012*	*8270C*
Surrogate: Phenol-d5	*55 %*		*24-113*			*L206087*	*06/12/2012*	*06/13/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*53 %*		*23-120*			*L206087*	*06/12/2012*	*06/13/2012*	*8270C*
Surrogate: 2-Fluorobiphenyl	*50 %*		*30-115*			*L206087*	*06/12/2012*	*06/13/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*40 %*		*19-122*			*L206087*	*06/12/2012*	*06/13/2012*	*8270C*

000000015

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

J1PPN6
1206018-01 (Soil)

7/18/12

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
		Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: p-Terphenyl-d14	*66 %*	*18-137*			*L206087*	*06/12/2012*	*06/13/2012*	*8270C*

LVL
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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

J1PPN7
1206018-02 (Soil)

r 7/18/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
1,2-Dichlorobenzene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
1,3-Dichlorobenzene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
1,4-Dichlorobenzene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2,4,5-Trichlorophenol	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2,4,6-Trichlorophenol	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2,4-Dichlorophenol	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2,4-Dimethylphenol	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2,4-Dinitrophenol	36200	U	36200	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2,4-Dinitrotoluene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2,6-Dinitrotoluene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2-Chloronaphthalene	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2-Chlorophenol	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2-Methylnaphthalene	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2-Methylphenol	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2-Nitroaniline	36200	U	36200	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
2-Nitrophenol	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
3,3'-Dichlorobenzidine	14500	U J	14500	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
3-Nitroaniline	36200	U J	36200	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
4,6-Dinitro-2-methylphenol	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
4-Bromophenyl Phenyl Ether	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
4-Chloro-3-methylphenol	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
4-Chloroaniline	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
4-Chlorophenyl Phenyl Ether	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
3- and/or 4-Methylphenol	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
4-Nitroaniline	36200	U	36200	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
4-Nitrophenol	36200	U	36200	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Acenaphthene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Acenaphthylene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Anthracene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Benz[a]anthracene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Benzo[a] pyrene	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Benzo[b] fluoranthene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Benzo[g,h,i] perylene	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Benzo[k] fluoranthene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Bis(2-chloroethoxy) methane	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C

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

LVL
LIONVILLE LABORATORY
A division of Fibertine Analytical Corporation

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

J1PPN7
1206018-02 (Soil)

7/18/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Bis(2-chloroisopropyl) ether	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Bis(2-ethylhexyl) phthalate	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Butyl Benzyl Phthalate	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Carbazole	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Chrysene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Dibenz[a,h]anthracene	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Dibenzofuran	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Diethyl Phthalate	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Dimethyl Phthalate	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Di-n-butyl Phthalate	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Di-n-octyl Phthalate	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Fluoranthene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Fluorene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Hexachlorobenzene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Hexachlorobutadiene	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Hexachlorocyclopentadiene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Hexachloroethane	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Indeno[1,2,3-cd]pyrene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Isophorone	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Naphthalene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Nitrobenzene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
N-Nitrosodi-n-propylamine	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
N-Nitrosodiphenylamine	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Pentachlorophenol	36200	U J	36200	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Phenanthrene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Phenol	7230	U J	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Pyrene	7230	U	7230	ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
TIC:Aldol Condensate 1	**100000**	A, B, J, D		ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
TIC:Unknown 1	**1600**	J, D		ug/kg dry	5	L206087	06/12/2012	06/15/2012	8270C
Surrogate: 2-Fluorophenol	*76 %*		*25-121*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: Phenol-d5	*49 %*		*24-113*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*65 %*		*23-120*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: 2-Fluorobiphenyl	*78 %*		*30-115*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*21 %*		*19-122*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*91 %*		*18-137*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

J1PPN8
1206018-03 (Soil)

7/18/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
1,2-Dichlorobenzene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
1,3-Dichlorobenzene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
1,4-Dichlorobenzene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2,4,5-Trichlorophenol	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2,4,6-Trichlorophenol	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2,4-Dichlorophenol	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2,4-Dimethylphenol	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2,4-Dinitrophenol	3660	U	3660	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2,4-Dinitrotoluene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2,6-Dinitrotoluene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2-Chloronaphthalene	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2-Chlorophenol	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2-Methylnaphthalene	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2-Methylphenol	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2-Nitroaniline	3660	U	3660	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
2-Nitrophenol	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
3,3'-Dichlorobenzidine	1470	U J	1470	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
3-Nitroaniline	3660	U J	3660	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
4,6-Dinitro-2-methylphenol	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
4-Bromophenyl Phenyl Ether	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
4-Chloro-3-methylphenol	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
4-Chloroaniline	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
4-Chlorophenyl Phenyl Ether	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
3- and/or 4-Methylphenol	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
4-Nitroaniline	3660	U	3660	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
4-Nitrophenol	3660	U	3660	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Acenaphthene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Acenaphthylene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Anthracene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Benz[a]anthracene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Benzo[a] pyrene	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Benzo[b] fluoranthene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Benzo[g,h,i] perylene	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Benzo[k] fluoranthene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Bis(2-chloroethoxy) methane	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C

LVL
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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

J1PPN8
1206018-03 (Soil)

7/18/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Bis(2-chloroisopropyl) ether	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Bis(2-ethylhexyl) phthalate	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Butyl Benzyl Phthalate	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Carbazole	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Chrysene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Dibenz[a,h]anthracene	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Dibenzofuran	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Diethyl Phthalate	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Dimethyl Phthalate	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Di-n-butyl Phthalate	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Di-n-octyl Phthalate	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Fluoranthene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Fluorene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Hexachlorobenzene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Hexachlorobutadiene	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Hexachlorocyclopentadiene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Hexachloroethane	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Indeno[1,2,3-cd]pyrene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Isophorone	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Naphthalene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Nitrobenzene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
N-Nitrosodi-n-propylamine	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
N-Nitrosodiphenylamine	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Pentachlorophenol	3660	U J	3660	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Phenanthrene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Phenol	733	U J	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Pyrene	733	U	733	ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
TIC:Trichloro-1-propene	**977**	B, J, D		ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
TIC:Aldol Condensate 3	**1500**	A, J, D		ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
TIC:Aldol Condensate 2	**854**	A, J, D		ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
TIC:Aldol Condensate 1	**73800**	A, B, J, D		ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
TIC:Unknown 1	**857**	J, D		ug/kg dry	2	L206087	06/12/2012	06/15/2012	8270C
Surrogate: 2-Fluorophenol	*72 %*		*25-121*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: Phenol-d5	*74 %*		*24-113*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*67 %*		*23-120*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*

000000020

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

J1PPN8
1206018-03 (Soil)

7/18/12

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
		Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*72 %*	*30-115*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*48 %*	*19-122*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*89 %*	*18-137*			*L206087*	*06/12/2012*	*06/15/2012*	*8270C*

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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-029 K3916
LVL #: 1206018

W.O. #: 60049-001-001-0001-00
Date Received: 06-07-2012

SEMIVOLATILE

Three (3) soil samples were collected on 06-04-2012.

The samples and associated QC samples were extracted 06-12-2012 and analyzed 06-13,15,18-2012 according to Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C, and the analysis procedure was based on SW846 Method 8270C for TCL Semivolatile target compounds.

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. Discrepancies from the sample acceptance policy have been recorded on the Sample Receipt Checklist.

2. Samples were extracted and analyzed within holding time.

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

4. Five (5) samples required dilution due to the sample matrix. Samples J1PPN6, J1PPN8, L206087-MS1 and L206087-MSD1 required a 2-fold dilution; sample J1PPN7 required a 5-fold dilution. Reporting limits have been adjusted to reflect the necessary dilutions.

5. Sample J1PPN7 had an elevated final volume of 4 mL. Reporting limits have been adjusted to reflect this change.

6. All obtainable surrogate recoveries were within acceptance criteria.

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

8. All blank spike recoveries were within acceptance criteria.

9. Eleven (11) of one hundred and twenty-eight (128) obtainable matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR#12MS118) has been enclosed.

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

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

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

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

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

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

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

Iain Daniels
LvL Laboratory Manager

6/21/12
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12MS11P

Initiator: Sharon Saylor
Date: 6.20.12
Client: [illegible] PCOK3946

Batch: 1206D1P
Samples: L2060B7-MS1, MSD1
Method: SW846/MCAWW/CLP/

Parameter: 8270C
Matrix: Soil
Prep Batch: L2060F7-1

1. Reason for SDR

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

b. General Discrepancy

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

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

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

① Spike recoveries outside QC acceptance limits in L2060F7-MS1, L2060F7-MSD1 but L2060F7-BS1 is ok

2. Known or Probable Causes(s)

3. Discussion and Proposed Action Other Description:

narrate

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

4. Project Manager Instructions...signature/date: [signature] 6/21/12

✓ 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] 6/21/12 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

000000010

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-029-141

Page 1 of 1

AJ 6-4-12

Collector: Q Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-D-101 Test Trenches		SAF No.: RC-029
Ice Chest No.: RCC-07-001	Field Logbook No.: EL-1601-06	COA: C1D101A000	Method of Shipment: FED EX
Shipped To: EBERLINE SERVICES, LIONVILLE	Offsite Property No.: A110362		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples may contain hazardous chemicals at levels that pose a risk to human health and/or the environment. Please handle accordingly.

Special Handling and/or Storage

Please keep cool (4 deg C) those requiring coolness, as shown on "Preservation" heading. Thank You.

Preservation	Cool 4C	Cool 4C	Cool 4C	None	Cool 4C	
Type of Container	G/P	G/P	G/P	G/P	aG	
No. of Container(s)	1	1	1	1	1	
Volume	125mL	125mL	125mL	125mL	120mL	
SAMPLE ANALYSIS	See item (1) in Special Instructions	Chromium Hex - 7196	See item (2) in Special Instructions	pH (Soil) - 9045	Semi-VOA - 8270A (TCL)	

MO 6/4/12

Sample No.	Matrix *	Sample Date	Sample Time										
J1PPN6	SOIL	6/4/12	0905	X	X	X	X	X					
J1PPN7	SOIL	6/4/12	1025	X	X	X	X	X					
J1PPN8	SOIL	6/4/12	1300	X	X	X	X	X					
~~J1PPN9~~	~~SOIL~~												
J1PPP0	SOIL	AJ 6-5-12											

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	6/4/12 1500	WCH M Stankovich	6/4/12 1500
WCH M Stankovich	6/4/12 1620	A. Freier A. Freier	6-4-12 1620
WCH A. Freier A. Freier	6-5-12 0825	FedEx	
FedEx	6-7-12 0950	VICTOR HERNANDEZ	6-7-12 0950

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)
(2) IC Anions - 300.0 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.2

REVIEWED BY CMB DATE 6-5-12

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

00000004

92

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-D-101			DATA PACKAGE: K3916		
VALIDATOR: ELR		LAB: LLI		DATE: 7/16/12	
			SDG: K3916		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J1PPN6	J1PPN7	J1PPN8			
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments:

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

Continuing calibrations acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A

Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: no FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A

Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A

Surrogates traceable? (Levels D, E) ..... Yes No N/A

Surrogates expired? (Levels D, E) ..... Yes No N/A

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: LCS - 1111 - J all

MS - ~~1111~~ ~~1111~~ ~~1111~~ ~~1111~~ ~~1111~~ ~~1111~~ ~~1111~~ ~~1111~~ 1111 - J all

MSD - ~~1111~~ 11 - J all

no BA

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD RPD values acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: RPD ~~TTH~~ ~~TTH~~ TTH TTH TTH TTH |||

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A

Iinternal standard areas acceptable? ..... Yes No N/A

Internal standard retention times acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A

Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A

Results reported for all requested analyses? ..... Yes No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? ..... Yes No N/A

GPC check performed? ..... Yes No N/A

GPC check recoveries acceptable? ..... Yes No N/A

GPC calibration performed? ..... Yes No N/A

GPC calibration check performed? ..... Yes No N/A

GPC calibration check retention times acceptable? ..... Yes No N/A

Check/calibration materials traceable? ..... Yes No N/A

Check/calibration materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments:

Appendix 6

Additional Documentation Requested by Client

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

Semivolatile Organic Compounds by SW846 8270C - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206087 - SW 3540C										
Blank (L206087-BLK1)				Prepared: 06/12/2012 Analyzed: 06/13/2012						
1,2,4-Trichlorobenzene	330	U	330	ug/kg wet						
1,2-Dichlorobenzene	330	U	330	ug/kg wet						
1,3-Dichlorobenzene	330	U	330	ug/kg wet						
1,4-Dichlorobenzene	330	U	330	ug/kg wet						
2,4,5-Trichlorophenol	330	U	330	ug/kg wet						
2,4,6-Trichlorophenol	330	U	330	ug/kg wet						
2,4-Dichlorophenol	330	U	330	ug/kg wet						
2,4-Dimethylphenol	330	U	330	ug/kg wet						
2,4-Dinitrophenol	1650	U	1650	ug/kg wet						
2,4-Dinitrotoluene	330	U	330	ug/kg wet						
2,6-Dinitrotoluene	330	U	330	ug/kg wet						
2-Chloronaphthalene	330	U	330	ug/kg wet						
2-Chlorophenol	330	U	330	ug/kg wet						
2-Methylnaphthalene	330	U	330	ug/kg wet						
2-Methylphenol	330	U	330	ug/kg wet						
2-Nitroaniline	1650	U	1650	ug/kg wet						
2-Nitrophenol	330	U	330	ug/kg wet						
3,3'-Dichlorobenzidine	660	U	660	ug/kg wet						
3-Nitroaniline	1650	U	1650	ug/kg wet						
4,6-Dinitro-2-methylphenol	330	U	330	ug/kg wet						
4-Bromophenyl Phenyl Ether	330	U	330	ug/kg wet						
4-Chloro-3-methylphenol	330	U	330	ug/kg wet						
4-Chloroaniline	330	U	330	ug/kg wet						
4-Chlorophenyl Phenyl Ether	330	U	330	ug/kg wet						
3- and/or 4-Methylphenol	330	U	330	ug/kg wet						
4-Nitroaniline	1650	U	1650	ug/kg wet						
4-Nitrophenol	1650	U	1650	ug/kg wet						
Acenaphthene	330	U	330	ug/kg wet						
Acenaphthylene	330	U	330	ug/kg wet						
Anthracene	330	U	330	ug/kg wet						
Benz[a]anthracene	330	U	330	ug/kg wet						
Benzo[a] pyrene	330	U	330	ug/kg wet						
Benzo[b] fluoranthene	330	U	330	ug/kg wet						
Benzo[g,h,i] perylene	330	U	330	ug/kg wet						
Benzo[k] fluoranthene	330	U	330	ug/kg wet						
Bis(2-chloroethoxy) methane	330	U	330	ug/kg wet						

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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206087 - SW 3540C										
Blank (L206087-BLK1)				Prepared: 06/12/2012 Analyzed: 06/13/2012						
Bis(2-chloroethyl) ether	330	U	330	ug/kg wet						
Bis(2-chloroisopropyl) ether	330	U	330	ug/kg wet						
Bis(2-ethylhexyl) phthalate	330	U	330	ug/kg wet						
Butyl Benzyl Phthalate	330	U	330	ug/kg wet						
Carbazole	330	U	330	ug/kg wet						
Chrysene	330	U	330	ug/kg wet						
Dibenz[a,h]anthracene	330	U	330	ug/kg wet						
Dibenzofuran	330	U	330	ug/kg wet						
Diethyl Phthalate	330	U	330	ug/kg wet						
Dimethyl Phthalate	330	U	330	ug/kg wet						
Di-n-butyl Phthalate	330	U	330	ug/kg wet						
Di-n-octyl Phthalate	330	U	330	ug/kg wet						
Fluoranthene	330	U	330	ug/kg wet						
Fluorene	330	U	330	ug/kg wet						
Hexachlorobenzene	330	U	330	ug/kg wet						
Hexachlorobutadiene	330	U	330	ug/kg wet						
Hexachlorocyclopentadiene	330	U	330	ug/kg wet						
Hexachloroethane	330	U	330	ug/kg wet						
Indeno[1,2,3-cd]pyrene	330	U	330	ug/kg wet						
Isophorone	330	U	330	ug/kg wet						
Naphthalene	330	U	330	ug/kg wet						
Nitrobenzene	330	U	330	ug/kg wet						
N-Nitrosodi-n-propylamine	330	U	330	ug/kg wet						
N-Nitrosodiphenylamine	330	U	330	ug/kg wet						
Pentachlorophenol	1650	U	1650	ug/kg wet						
Phenanthrene	330	U	330	ug/kg wet						
Phenol	330	U	330	ug/kg wet						
Pyrene	330	U	330	ug/kg wet						
Unknown 1	2240	J		ug/kg wet						
Trichloro-1-propene	1250	J		ug/kg wet						
Aldol Condensate 2	924	A, J		ug/kg wet						
Aldol Condensate 3	740	A, J		ug/kg wet						
Aldol Condensate 1	10900	A, J		ug/kg wet						
Surrogate: 2-Fluorophenol	*1490*			*ug/kg wet*	*2500.0*		*60*	*25-121*		
Surrogate: Phenol-d5	*1570*			*ug/kg wet*	*2500.0*		*63*	*24-113*		
Surrogate: Nitrobenzene-d5	*756*			*ug/kg wet*	*1666.7*		*45*	*23-120*		

000000023

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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206087 - SW 3540C									
Blank (L206087-BLK1)			Prepared: 06/12/2012 Analyzed: 06/13/2012						
Surrogate: 2-Fluorobiphenyl	*1200*		*ug/kg wet*	*1666.7*		*72*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*1870*		*ug/kg wet*	*2500.0*		*75*	*19-122*		
Surrogate: p-Terphenyl-d14	*1250*		*ug/kg wet*	*1666.7*		*75*	*18-137*		
LCS (L206087-BS1)			Prepared: 06/12/2012 Analyzed: 06/18/2012						
1,2,4-Trichlorobenzene	1210		ug/kg wet	2000.0		60	45-110		
1,2-Dichlorobenzene	1380		ug/kg wet	2000.0		69	45-105		
1,3-Dichlorobenzene	1320		ug/kg wet	2000.0		66	40-100		
1,4-Dichlorobenzene	1360		ug/kg wet	2000.0		68	35-105		
2,4,5-Trichlorophenol	1350		ug/kg wet	2000.0		68	30-140		
2,4,6-Trichlorophenol	805		ug/kg wet	2000.0		40	20-110		
2,4-Dichlorophenol	1240		ug/kg wet	2000.0		62	40-110		
2,4-Dimethylphenol	1160		ug/kg wet	2000.0		58	30-105		
2,4-Dinitrophenol	744		ug/kg wet	2000.0		37	25-130		
2,4-Dinitrotoluene	1600		ug/kg wet	2000.0		80	50-115		
2,6-Dinitrotoluene	1550		ug/kg wet	2000.0		77	40-120		
2-Chloronaphthalene	1460		ug/kg wet	2000.0		73	45-115		
2-Chlorophenol	1350		ug/kg wet	2000.0		68	45-105		
2-Methylnaphthalene	1200		ug/kg wet	2000.0		60	45-110		
2-Methylphenol	1430		ug/kg wet	2000.0		71	40-120		
2-Nitroaniline	1570		ug/kg wet	2000.0		79	45-120		
2-Nitrophenol	1200		ug/kg wet	2000.0		60	40-110		
3,3'-Dichlorobenzidine	1210		ug/kg wet	2000.0		60	15-130		
3-Nitroaniline	1500		ug/kg wet	2000.0		75	40-130		
4,6-Dinitro-2-methylphenol	1040		ug/kg wet	2000.0		52	20-140		
4-Bromophenyl Phenyl Ether	1520		ug/kg wet	2000.0		76	45-115		
4-Chloro-3-methylphenol	1330		ug/kg wet	2000.0		67	35-115		
4-Chloroaniline	843		ug/kg wet	2000.0		42	10-100		
4-Chlorophenyl Phenyl Ether	1510		ug/kg wet	2000.0		76	45-110		
3- and/or 4-Methylphenol	1450		ug/kg wet	2000.0		73	40-120		
4-Nitroaniline	1540		ug/kg wet	2000.0		77	40-130		
4-Nitrophenol	1560		ug/kg wet	2000.0		78	15-140		
Acenaphthene	1470		ug/kg wet	2000.0		73	45-110		
Acenaphthylene	1220		ug/kg wet	2000.0		61	45-115		
Anthracene	1490		ug/kg wet	2000.0		75	45-130		
Benz[a]anthracene	1540		ug/kg wet	2000.0		77	45-130		
Benzo[a] pyrene	1500		ug/kg wet	2000.0		75	45-130		

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206087 - SW 3540C									
LCS (L206087-BS1)			Prepared: 06/12/2012 Analyzed: 06/18/2012						
Benzo[b] fluoranthene	1600		ug/kg wet	2000.0		80	40-130		
Benzo[g,h,i] perylene	1670		ug/kg wet	2000.0		83	45-125		
Benzo[k] fluoranthene	1510		ug/kg wet	2000.0		75	45-125		
Bis(2-chloroethoxy) methane	1200		ug/kg wet	2000.0		60	45-110		
Bis(2-chloroethyl) ether	1360		ug/kg wet	2000.0		68	40-110		
Bis(2-chloroisopropyl) ether	1310		ug/kg wet	2000.0		65	30-115		
Bis(2-ethylhexyl) phthalate	1590		ug/kg wet	2000.0		79	40-145		
Butyl Benzyl Phthalate	1510		ug/kg wet	2000.0		75	50-125		
Carbazole	1640		ug/kg wet	2000.0		82	40-140		
Chrysene	1620		ug/kg wet	2000.0		81	45-130		
Dibenz[a,h]anthracene	1060		ug/kg wet	2000.0		53	45-125		
Dibenzofuran	1510		ug/kg wet	2000.0		76	45-120		
Diethyl Phthalate	1540		ug/kg wet	2000.0		77	50-125		
Dimethyl Phthalate	1480		ug/kg wet	2000.0		74	45-130		
Di-n-butyl Phthalate	1480		ug/kg wet	2000.0		74	50-130		
Di-n-octyl Phthalate	1570		ug/kg wet	2000.0		78	40-150		
Fluoranthene	1560		ug/kg wet	2000.0		78	45-130		
Fluorene	1540		ug/kg wet	2000.0		77	45-120		
Hexachlorobenzene	1660		ug/kg wet	2000.0		83	45-130		
Hexachlorobutadiene	1340		ug/kg wet	2000.0		67	45-105		
Hexachlorocyclopentadiene	311		ug/kg wet	2000.0		16	10-100		
Hexachloroethane	1320		ug/kg wet	2000.0		66	35-110		
Indeno[1,2,3-cd]pyrene	1560		ug/kg wet	2000.0		78	45-130		
Isophorone	1140		ug/kg wet	2000.0		57	40-110		
Naphthalene	1300		ug/kg wet	2000.0		65	40-110		
Nitrobenzene	1150		ug/kg wet	2000.0		57	40-105		
N-Nitrosodi-n-propylamine	1430		ug/kg wet	2000.0		72	30-130		
N-Nitrosodiphenylamine	1480		ug/kg wet	2000.0		74	50-120		
Pentachlorophenol	1220		ug/kg wet	2000.0		61	25-120		
Phenanthrene	1570		ug/kg wet	2000.0		78	50-120		
Phenol	1420		ug/kg wet	2000.0		71	40-115		
Pyrene	1490		ug/kg wet	2000.0		75	45-125		
Surrogate: 2-Fluorophenol	*1800*		*ug/kg wet*	*2500.0*		*72*	*25-121*		
Surrogate: Phenol-d5	*1840*		*ug/kg wet*	*2500.0*		*74*	*24-113*		
Surrogate: Nitrobenzene-d5	*974*		*ug/kg wet*	*1666.7*		*58*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*1190*		*ug/kg wet*	*1666.7*		*71*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*959*		*ug/kg wet*	*2500.0*		*38*	*19-122*		

000000025

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

Semivolatile Organic Compounds by SW846 8270C - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206087 - SW 3540C										
LCS (L206087-BS1)				Prepared: 06/12/2012 Analyzed: 06/18/2012						
Surrogate: p-Terphenyl-d14	*1260*			*ug/kg wet*	*1666.7*		*75*	*18-137*		
Matrix Spike (L206087-MS1)		Source: 1206018-01		Prepared: 06/12/2012 Analyzed: 06/13/2012						
1,2,4-Trichlorobenzene	814	D		ug/kg dry	2070.6	651 U	39*	45-110		
1,2-Dichlorobenzene	881	D		ug/kg dry	2070.6	651 U	43*	45-105		
1,3-Dichlorobenzene	833	D		ug/kg dry	2070.6	651 U	40	40-100		
1,4-Dichlorobenzene	840	D		ug/kg dry	2070.6	651 U	41	35-105		
2,4,5-Trichlorophenol	940	D		ug/kg dry	2070.6	651 U	45	30-140		
2,4,6-Trichlorophenol	854	D		ug/kg dry	2070.6	651 U	41	20-110		
2,4-Dichlorophenol	927	D		ug/kg dry	2070.6	651 U	45	40-110		
2,4-Dimethylphenol	865	D		ug/kg dry	2070.6	651 U	42	30-105		
2,4-Dinitrophenol	555	D		ug/kg dry	2070.6	3250 U	27	25-130		
2,4-Dinitrotoluene	982	D		ug/kg dry	2070.6	651 U	47*	50-115		
2,6-Dinitrotoluene	1050	D		ug/kg dry	2070.6	651 U	51	40-120		
2-Chloronaphthalene	952	D		ug/kg dry	2070.6	651 U	46	45-115		
2-Chlorophenol	914	D		ug/kg dry	2070.6	651 U	44*	45-105		
2-Methylnaphthalene	904	D		ug/kg dry	2070.6	651 U	44*	45-110		
2-Methylphenol	932	D		ug/kg dry	2070.6	651 U	45	40-120		
2-Nitroaniline	1070	D		ug/kg dry	2070.6	3250 U	52	45-120		
2-Nitrophenol	866	D		ug/kg dry	2070.6	651 U	42	40-110		
3,3'-Dichlorobenzidine	633	D		ug/kg dry	2070.6	1300 U	31	15-130		
3-Nitroaniline	1070	D		ug/kg dry	2070.6	3250 U	52	40-130		
4,6-Dinitro-2-methylphenol	958	D		ug/kg dry	2070.6	651 U	46	20-140		
4-Bromophenyl Phenyl Ether	1080	D		ug/kg dry	2070.6	651 U	52	45-115		
4-Chloro-3-methylphenol	946	D		ug/kg dry	2070.6	651 U	46	35-115		
4-Chloroaniline	736	D		ug/kg dry	2070.6	651 U	36	10-100		
4-Chlorophenyl Phenyl Ether	984	D		ug/kg dry	2070.6	651 U	48	45-110		
3- and/or 4-Methylphenol	919	D		ug/kg dry	2070.6	651 U	44	40-120		
4-Nitroaniline	1010	D		ug/kg dry	2070.6	3250 U	49	40-130		
4-Nitrophenol	468	D		ug/kg dry	2070.6	3250 U	23	15-140		
Acenaphthene	969	D		ug/kg dry	2070.6	651 U	47	45-110		
Acenaphthylene	869	D		ug/kg dry	2070.6	651 U	42*	45-115		
Anthracene	1100	D		ug/kg dry	2070.6	651 U	53	45-130		
Benz[a]anthracene	1050	D		ug/kg dry	2070.6	651 U	51	45-130		
Benzo[a] pyrene	961	D		ug/kg dry	2070.6	651 U	46	45-130		
Benzo[b] fluoranthene	1070	D		ug/kg dry	2070.6	651 U	52	40-130		
Benzo[g,h,i] perylene	992	D		ug/kg dry	2070.6	651 U	48	45-125		

000000026

LVL
LIONVILLE LABORATORY
A division of Fibertine Analytical Corporation

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

Semivolatile Organic Compounds by SW846 8270C - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206087 - SW 3540C										
Matrix Spike (L206087-MS1)		**Source: 1206018-01**		Prepared: 06/12/2012 Analyzed: 06/13/2012						
Benzo[k] fluoranthene	1040	D		ug/kg dry	2070.6	651 U	50	45-125		
Bis(2-chloroethoxy) methane	921	D		ug/kg dry	2070.6	651 U	44*	45-110		
Bis(2-chloroethyl) ether	881	D		ug/kg dry	2070.6	651 U	43	40-110		
Bis(2-chloroisopropyl) ether	891	D		ug/kg dry	2070.6	651 U	43	30-115		
Bis(2-ethylhexyl) phthalate	1020	D		ug/kg dry	2070.6	651 U	49	40-145		
Butyl Benzyl Phthalate	1160	D		ug/kg dry	2070.6	651 U	56	50-125		
Carbazole	1710	D		ug/kg dry	2070.6	651 U	82	40-140		
Chrysene	1150	D		ug/kg dry	2070.6	651 U	55	45-130		
Dibenz[a,h]anthracene	559	D		ug/kg dry	2070.6	651 U	27*	45-125		
Dibenzofuran	1040	D		ug/kg dry	2070.6	651 U	50	45-120		
Diethyl Phthalate	1060	D		ug/kg dry	2070.6	651 U	51	50-125		
Dimethyl Phthalate	999	D		ug/kg dry	2070.6	651 U	48	45-130		
Di-n-butyl Phthalate	1110	D		ug/kg dry	2070.6	651 U	54	50-130		
Di-n-octyl Phthalate	999	D		ug/kg dry	2070.6	651 U	48	40-150		
Fluoranthene	1060	D		ug/kg dry	2070.6	651 U	51	45-130		
Fluorene	1030	D		ug/kg dry	2070.6	651 U	50	45-120		
Hexachlorobenzene	1060	D		ug/kg dry	2070.6	651 U	51	45-130		
Hexachlorobutadiene	915	D		ug/kg dry	2070.6	651 U	44*	45-105		
Hexachlorocyclopentadiene	453	D		ug/kg dry	2070.6	651 U	22	10-100		
Hexachloroethane	824	D		ug/kg dry	2070.6	651 U	40	35-110		
Indeno[1,2,3-cd]pyrene	830	D		ug/kg dry	2070.6	651 U	40*	45-130		
Isophorone	917	D		ug/kg dry	2070.6	651 U	44	40-110		
Naphthalene	1020	D		ug/kg dry	2070.6	651 U	49	40-110		
Nitrobenzene	873	D		ug/kg dry	2070.6	651 U	42	40-105		
N-Nitrosodi-n-propylamine	964	D		ug/kg dry	2070.6	651 U	47	30-130		
N-Nitrosodiphenylamine	1060	D		ug/kg dry	2070.6	651 U	51	50-120		
Pentachlorophenol	520	D		ug/kg dry	2070.6	3250 U	25	25-120		
Phenanthrene	1170	D		ug/kg dry	2070.6	651 U	56	50-120		
Phenol	949	D		ug/kg dry	2070.6	651 U	46	40-115		
Pyrene	1230	D		ug/kg dry	2070.6	651 U	60	45-125		
Surrogate: 2-Fluorophenol	*1330*			*ug/kg dry*	*2588.3*		*52*	*25-121*		
Surrogate: Phenol-d5	*1410*			*ug/kg dry*	*2588.3*		*54*	*24-113*		
Surrogate: Nitrobenzene-d5	*863*			*ug/kg dry*	*1725.5*		*50*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*899*			*ug/kg dry*	*1725.5*		*52*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*1140*			*ug/kg dry*	*2588.3*		*44*	*19-122*		
Surrogate: p-Terphenyl-d14	*1120*			*ug/kg dry*	*1725.5*		*65*	*18-137*		

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. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/20/2012 14:20

Semivolatile Organic Compounds by SW846 8270C - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206087 - SW 3540C										
Matrix Spike Dup (L206087-MSD1)		**Source: 1206018-01**		Prepared: 06/12/2012 Analyzed: 06/13/2012						
1,2,4-Trichlorobenzene	1160	D		ug/kg dry	2062.5	651 U	56	45-110	36	40
1,2-Dichlorobenzene	1210	D		ug/kg dry	2062.5	651 U	59	45-105	32	40
1,3-Dichlorobenzene	1140	D		ug/kg dry	2062.5	651 U	55	40-100	32	40
1,4-Dichlorobenzene	1190	D		ug/kg dry	2062.5	651 U	58	35-105	35	40
2,4,5-Trichlorophenol	1190	D		ug/kg dry	2062.5	651 U	58	30-140	24	40
2,4,6-Trichlorophenol	884	D		ug/kg dry	2062.5	651 U	43	20-110	4	40
2,4-Dichlorophenol	1210	D		ug/kg dry	2062.5	651 U	59	40-110	27	40
2,4-Dimethylphenol	1160	D		ug/kg dry	2062.5	651 U	56	30-105	30	40
2,4-Dinitrophenol	621	D		ug/kg dry	2062.5	3250 U	30	25-130	12	40
2,4-Dinitrotoluene	1340	D		ug/kg dry	2062.5	651 U	65	50-115	31	40
2,6-Dinitrotoluene	1380	D		ug/kg dry	2062.5	651 U	67	40-120	28	40
2-Chloronaphthalene	1270	D		ug/kg dry	2062.5	651 U	62	45-115	29	40
2-Chlorophenol	1280	D		ug/kg dry	2062.5	651 U	62	45-105	33	40
2-Methylnaphthalene	1200	D		ug/kg dry	2062.5	651 U	58	45-110	29	40
2-Methylphenol	1360	D		ug/kg dry	2062.5	651 U	66	40-120	38	40
2-Nitroaniline	1440	D		ug/kg dry	2062.5	3250 U	70	45-120	30	40
2-Nitrophenol	1130	D		ug/kg dry	2062.5	651 U	55	40-110	27	40
3,3'-Dichlorobenzidine	1020	D		ug/kg dry	2062.5	1300 U	50	15-130	47*	40
3-Nitroaniline	1650	D		ug/kg dry	2062.5	3250 U	80	40-130	43*	40
4,6-Dinitro-2-methylphenol	1020	D		ug/kg dry	2062.5	651 U	49	20-140	6	40
4-Bromophenyl Phenyl Ether	1380	D		ug/kg dry	2062.5	651 U	67	45-115	25	40
4-Chloro-3-methylphenol	1310	D		ug/kg dry	2062.5	651 U	63	35-115	32	40
4-Chloroaniline	1180	D		ug/kg dry	2062.5	651 U	57	10-100	46*	40
4-Chlorophenyl Phenyl Ether	1260	D		ug/kg dry	2062.5	651 U	61	45-110	25	40
3- and/or 4-Methylphenol	1320	D		ug/kg dry	2062.5	651 U	64	40-120	36	40
4-Nitroaniline	1580	D		ug/kg dry	2062.5	3250 U	77	40-130	44*	40
4-Nitrophenol	761	D		ug/kg dry	2062.5	3250 U	37	15-140	48*	40
Acenaphthene	1300	D		ug/kg dry	2062.5	651 U	63	45-110	30	40
Acenaphthylene	1150	D		ug/kg dry	2062.5	651 U	56	45-115	28	40
Anthracene	1370	D		ug/kg dry	2062.5	651 U	66	45-130	23	40
Benz[a]anthracene	1400	D		ug/kg dry	2062.5	651 U	68	45-130	29	40
Benzo[a] pyrene	1340	D		ug/kg dry	2062.5	651 U	65	45-130	33	40
Benzo[b] fluoranthene	1440	D		ug/kg dry	2062.5	651 U	70	40-130	30	40
Benzo[g,h,i] perylene	1380	D		ug/kg dry	2062.5	651 U	67	45-125	33	40
Benzo[k] fluoranthene	1360	D		ug/kg dry	2062.5	651 U	66	45-125	27	40
Bis(2-chloroethoxy) methane	1260	D		ug/kg dry	2062.5	651 U	61	45-110	32	40

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

WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3916	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	06/20/2012 14:20

Semivolatile Organic Compounds by SW846 8270C - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L206087 - SW 3540C										
Matrix Spike Dup (L206087-MSD1)		**Source: 1206018-01**		Prepared: 06/12/2012 Analyzed: 06/13/2012						
Bis(2-chloroethyl) ether	1270	D		ug/kg dry	2062.5	651 U	61	40-110	36	40
Bis(2-chloroisopropyl) ether	1340	D		ug/kg dry	2062.5	651 U	65	30-115	41*	40
Bis(2-ethylhexyl) phthalate	1430	D		ug/kg dry	2062.5	651 U	69	40-145	34	40
Butyl Benzyl Phthalate	1520	D		ug/kg dry	2062.5	651 U	74	50-125	27	40
Carbazole	2370	D		ug/kg dry	2062.5	651 U	115	40-140	33	40
Chrysene	1450	D		ug/kg dry	2062.5	651 U	70	45-130	24	40
Dibenz[a,h]anthracene	844	D		ug/kg dry	2062.5	651 U	41*	45-125	41*	40
Dibenzofuran	1280	D		ug/kg dry	2062.5	651 U	62	45-120	21	40
Diethyl Phthalate	1360	D		ug/kg dry	2062.5	651 U	66	50-125	26	40
Dimethyl Phthalate	1270	D		ug/kg dry	2062.5	651 U	62	45-130	25	40
Di-n-butyl Phthalate	1420	D		ug/kg dry	2062.5	651 U	69	50-130	25	40
Di-n-octyl Phthalate	1460	D		ug/kg dry	2062.5	651 U	71	40-150	38	40
Fluoranthene	1350	D		ug/kg dry	2062.5	651 U	65	45-130	24	40
Fluorene	1280	D		ug/kg dry	2062.5	651 U	62	45-120	22	40
Hexachlorobenzene	1320	D		ug/kg dry	2062.5	651 U	64	45-130	23	40
Hexachlorobutadiene	1190	D		ug/kg dry	2062.5	651 U	58	45-105	27	40
Hexachlorocyclopentadiene	538	D		ug/kg dry	2062.5	651 U	26	10-100	17	40
Hexachloroethane	1150	D		ug/kg dry	2062.5	651 U	56	35-110	33	40
Indeno[1,2,3-cd]pyrene	1270	D		ug/kg dry	2062.5	651 U	61	45-130	42*	40
Isophorone	1190	D		ug/kg dry	2062.5	651 U	58	40-110	26	40
Naphthalene	1350	D		ug/kg dry	2062.5	651 U	66	40-110	28	40
Nitrobenzene	1240	D		ug/kg dry	2062.5	651 U	60	40-105	35	40
N-Nitrosodi-n-propylamine	1360	D		ug/kg dry	2062.5	651 U	66	30-130	35	40
N-Nitrosodiphenylamine	1330	D		ug/kg dry	2062.5	651 U	64	50-120	23	40
Pentachlorophenol	580	D		ug/kg dry	2062.5	3250 U	28	25-120	11	40
Phenanthrene	1450	D		ug/kg dry	2062.5	651 U	70	50-120	22	40
Phenol	1300	D		ug/kg dry	2062.5	651 U	63	40-115	32	40
Pyrene	1470	D		ug/kg dry	2062.5	651 U	71	45-125	18	40
Surrogate: 2-Fluorophenol	*1750*			*ug/kg dry*	*2578.1*		*68*	*25-121*		
Surrogate: Phenol-d5	*1810*			*ug/kg dry*	*2578.1*		*70*	*24-113*		
Surrogate: Nitrobenzene-d5	*1100*			*ug/kg dry*	*1718.7*		*64*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*1070*			*ug/kg dry*	*1718.7*		*62*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*1050*			*ug/kg dry*	*2578.1*		*41*	*19-122*		
Surrogate: p-Terphenyl-d14	*1280*			*ug/kg dry*	*1718.7*		*74*	*18-137*		

000000029

Date: 18 July 2012
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Remaining Sites Confirmation Sampling – Soil Full Protocol - Waste Site 100-D-101
Subject: Inorganics - Data Package No. K3916-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K3916 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1PPN6	6/4/12	Soil	C	See note 1
J1PPN7	6/4/12	Soil	C	See note 1
J1PPN8	6/4/12	Soil	C	See note 1

1 - ICP metals (6010B) & mercury by 7471A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.

Preparation (Method) Blanks

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "UJ". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

Accuracy

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits, all antimony (33.6%), calcium (57.4%), lead (68.8%) and vanadium (65.7%) results were qualified as estimates and flagged "J".

Due to LCS recoveries outside QC limits, all aluminum (152%) and silicon (151%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data package No. K3916 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to a matrix spike recovery outside QC limits, all antimony (33.6%), calcium (57.4%), lead (68.8%) and vanadium (65.7%) results were qualified as estimates and flagged "J".

- Due to LCS recoveries outside QC limits, all aluminum (152%) and silicon (151%) results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K3916	REVIEWER: ELR	Project: 100-D-101	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony Calcium Lead Vanadium	J	All	MS recovery
Aluminum Silicon	J	All	LCS recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Annotated Laboratory Reports

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/13/2012 14:26

J1PPN6
1206018-01 (Soil)

7/18/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**6620**	J	4.58	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Antimony	0.550	U J	0.550	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Arsenic	**2.68**		0.917	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Barium	**72.6**		0.458	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Beryllium	**0.249**		0.183	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Boron	**2.16**		1.83	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Cadmium	**0.124**	B	0.183	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Calcium	**7230**	J	91.7	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Chromium	**10.2**		0.183	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Cobalt	**5.84**		1.83	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Copper	**14.5**		0.917	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Iron	**19800**		18.3	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Lead	**10.7**	J	0.458	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Magnesium	**4190**		68.7	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Manganese	**301**		4.58	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Molybdenum	**0.294**	B	1.83	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Nickel	**9.20**		3.67	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Potassium	**1070**		367	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Selenium	0.275	U	0.275	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Silicon	**521**	J	1.83	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Silver	0.183	U	0.183	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Sodium	**420**		45.8	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Vanadium	**52.9**	J	2.29	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Zinc	**41.9**		9.17	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Mercury	0.0269	U	0.0269	mg/kg dry	1	L206082	06/11/2012	06/12/2012	7471A

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

WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3916	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	06/13/2012 14:26

J1PPN7

1206018-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**5900**	J	5.54	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Antimony	0.664	U J	0.664	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Arsenic	**2.21**		1.11	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Barium	**59.5**		0.554	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Beryllium	**0.237**		0.221	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Boron	**2.97**		2.21	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Cadmium	**0.103**	B	0.221	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Calcium	**5580**	J	111	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Chromium	**8.13**		0.221	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Cobalt	**6.18**		2.21	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Copper	**12.8**		1.11	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Iron	**18800**		22.1	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Lead	**4.69**	J	0.554	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Magnesium	**4180**		83.0	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Manganese	**286**		5.54	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Molybdenum	**0.393**	B	2.21	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Nickel	**7.82**		4.43	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Potassium	**1090**		443	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Selenium	0.332	U	0.332	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Silicon	**654**	J	2.21	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Silver	0.221	U	0.221	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Sodium	**1010**		55.4	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Vanadium	**48.9**	J	2.77	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Zinc	**55.9**		11.1	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Mercury	**0.0176**	B	0.0285	mg/kg dry	1	L206082	06/11/2012	06/12/2012	7471A

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/13/2012 14:26

J1PPN8
1206018-03 (Soil)

✓ 7/18/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**5350**	J	3.82	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Antimony	0.459	U J	0.459	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Arsenic	**2.35**		0.764	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Barium	**60.9**		0.382	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Beryllium	**0.216**		0.153	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Boron	**3.16**		1.53	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Cadmium	**0.237**		0.153	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Calcium	**7520**	J	76.4	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Chromium	**7.47**		0.153	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Cobalt	**6.06**		1.53	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Copper	**12.6**		0.764	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Iron	**18100**		15.3	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Lead	**8.44**	J	0.382	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Magnesium	**4100**		57.3	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Manganese	**262**		3.82	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Molybdenum	**0.257**	B	1.53	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Nickel	**7.53**		3.06	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Potassium	**1130**		306	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Selenium	0.229	U	0.229	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Silicon	**433**	J	1.53	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Silver	0.153	U	0.153	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Sodium	**860**		38.2	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Vanadium	**43.5**	J	1.91	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Zinc	**192**		7.64	mg/kg dry	1	L206084	06/12/2012	06/12/2012	6010B
Mercury	**0.116**		0.0264	mg/kg dry	1	L206082	06/11/2012	06/12/2012	7471A

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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-029
LVL#: 1206018
SDG/SAF#: K3916/RC-029

W.O.#: 60049-001-001-0001-00
Date Received: 06-07-12

METALS

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

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

1. This narrative covers the analyses of 3 soil samples.

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

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

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

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

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

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

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

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

10. The matrix spike (MS) recoveries for 14 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:

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.

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1PPN6	Aluminum	22,000	60.1
	Antimony	100	85.8
	Boron	100	90.0
	Calcium	20,800	33.9
	Chromium	100	87.8
	Cobalt	100	83.0
	Copper	100	80.4
	Iron	22,000	44.0
	Lead	100	71.9
	Manganese	1,000	57.5
	Nickel	100	80.7
	Selenium	100	92.1
	Silicon	2,100	64.1
	Vanadium	1,000	69.2

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limit critieria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL. The sample results for Arsenic and Molybdenum were less than ten times the MDL.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

6/14/12
Date

alm/06-018

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-141	Page 1 of 1

Collector: Q Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days	AJ 6-4-12	
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-D-101 Test Trenches		SAF No.: RC-029
Ice Chest No.: RCC-07-001	Field Logbook No.: EL-1601-06	COA: C1D101A000	Method of Shipment: FED EX
Shipped To: EBERLINE SERVICES, LIONVILLE	Offsite Property No.: A110362		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples may contain hazardous chemicals at levels that pose a risk to human health and/or the environment. Please handle accordingly.

Special Handling and/or Storage

Please keep cool (4 deg C) those requiring coolness, as shown on "Preservation" heading. Thank You.

Preservation	Cool 4C	Cool 4C	Cool 4C	None	Cool 4C						
Type of Container	G/P	G/P	G/P	G/P	aG						
No. of Container(s)	1	1	1	1	1						
Volume	125mL	125mL	125mL	125mL	120mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See Item (2) in Special Instructions.	pH (Soil) - 9045	Semi-VOA - 8270A (TCL)						
MS 6/4/12											

Sample No.	Matrix *	Sample Date	Sample Time											
J1PPN6	SOIL	6/4/12	0905	X	X	X	X	X						
J1PPN7	SOIL	6/4/12	1025	X	X	X	X	X						
J1PPN8	SOIL	6/4/12	1300	X	X	X	X	X						
~~J1PPN9~~	~~SOIL~~													
~~J1PPP0~~	~~SOIL~~	AJ 6-5-12												

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1500 6/4/12	WCH MStankovich	1500 6/4/12
WCH MStankovich	6/4/12 1620	A. Freier	1060#1 6-4-12 1620
WCH A. Freier	1060#1 6-5-12 0825	Fed Ex	
Fed Ex	6-7-12 0950	KATIE HERNANDEZ	6-7-12 0950

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)
(2) IC Anions - 300.0 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.2

REVIEWED BY CMB DATE 6-5-12

Matrix *: S=Soil, SE=Sediment, SO=Solid, Sl=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

16

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 100-D-101		DATA PACKAGE: K3916	
VALIDATOR: FLR	LAB: LLI		DATE: 7/16/12
		SDG: K3916	

ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		

SAMPLES/MATRIX
J1PPN6 J1PPN7 J1PPN8
Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments:

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

ICP interference checks acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: no FB

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

Standards traceable? (Levels D, E) ..... Yes No N/A

Standards expired? (Levels D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: MS - antimony (33.6%) calcium (56.4%) lead (48.9%) vanadium (65.7%)) J all

LCS - aluminum (152%) silicon (151%) - J all

no PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/A

Duplicate results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed? ..... Yes No N/A

ICP serial dilution %D values acceptable? ..... Yes No N/A

ICP post digestion spike required? ..... Yes No N/A

ICP post digestion spike values acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required? ..... Yes No N/A

Duplicate injection %RSD values acceptable? ..... Yes No N/A

Analytical spikes performed as required? ..... Yes No N/A

Analytical spike recoveries acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

MSA performed as required? ..... Yes No N/A

MSA results acceptable? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments: _____

8. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:

Appendix 6

Additional Documentation Requested by Client

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/13/2012 14:26

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 L206082 - SW 7471A Prep										
Blank (L206082-BLK1)				Prepared: 06/11/2012 Analyzed: 06/12/2012						
Mercury	0.0281	U	0.0281	mg/kg wet						
Duplicate (L206082-DUP1)		Source: 1206018-01		Prepared: 06/11/2012 Analyzed: 06/12/2012						
Mercury	0.0285	U	0.0285	mg/kg dry		0.0269 U				20
Matrix Spike (L206082-MS1)		Source: 1206018-01		Prepared: 06/11/2012 Analyzed: 06/12/2012						
Mercury	0.164		0.0269	mg/kg dry	0.14928	0.0269 U	110	75-125		
Reference (L206082-SRM1)				Prepared: 06/11/2012 Analyzed: 06/12/2012						
Mercury	1.25		0.0290	mg/kg wet	1.2900		96.5	62.6-138		
Batch L206084 - SW 3050B										
Blank (L206084-BLK1)				Prepared & Analyzed: 06/12/2012						
Aluminum	3.85	U	3.85	mg/kg wet						
Antimony	0.462	U	0.462	mg/kg wet						
Arsenic	0.769	U	0.769	mg/kg wet						
Barium	0.385	U	0.385	mg/kg wet						
Beryllium	0.154	U	0.154	mg/kg wet						
Boron	1.54	U	1.54	mg/kg wet						
Cadmium	0.154	U	0.154	mg/kg wet						
Calcium	5.18	B	76.9	mg/kg wet						
Chromium	0.154	U	0.154	mg/kg wet						
Cobalt	1.54	U	1.54	mg/kg wet						
Copper	0.769	U	0.769	mg/kg wet						
Iron	15.4	U	15.4	mg/kg wet						
Lead	0.385	U	0.385	mg/kg wet						
Magnesium	0.942	B	57.7	mg/kg wet						
Manganese	3.85	U	3.85	mg/kg wet						
Molybdenum	1.54	U	1.54	mg/kg wet						
Nickel	3.08	U	3.08	mg/kg wet						
Potassium	308	U	308	mg/kg wet						
Selenium	0.231	U	0.231	mg/kg wet						
Silicon	1.54	U	1.54	mg/kg wet						
Silver	0.154	U	0.154	mg/kg wet						
Sodium	38.5	U	38.5	mg/kg wet						
Vanadium	1.92	U	1.92	mg/kg wet						
Zinc	7.69	U	7.69	mg/kg wet						

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

WC-Hanford, Inc.	Project: RC-029	
2620 Fermi Avenue	Project Number: K3916	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	06/13/2012 14:26

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 L206084 - SW 3050B										
Duplicate (L206084-DUP1)			**Source: 1206018-01**	Prepared & Analyzed: 06/12/2012						
Aluminum	6730		4.93	mg/kg dry		6620			1.71	20
Antimony	0.591	U	0.591	mg/kg dry		0.550 U				20
Arsenic	3.36		0.986	mg/kg dry		2.68			22.8*	20
Barium	68.3		0.493	mg/kg dry		72.6			6.08	20
Beryllium	0.246		0.197	mg/kg dry		0.249			0.867	20
Boron	2.02		1.97	mg/kg dry		2.16			6.75	20
Cadmium	0.135	B	0.197	mg/kg dry		0.124			8.45	20
Calcium	6700		98.6	mg/kg dry		7230			7.59	20
Chromium	11.7		0.197	mg/kg dry		10.2			13.9	20
Cobalt	5.81		1.97	mg/kg dry		5.84			0.438	20
Copper	16.1		0.986	mg/kg dry		14.5			10.3	20
Iron	25000		19.7	mg/kg dry		19800			23.1*	20
Lead	10.2		0.493	mg/kg dry		10.7			4.57	20
Magnesium	4440		73.9	mg/kg dry		4190			5.82	20
Manganese	338		4.93	mg/kg dry		301			11.4	20
Molybdenum	0.656	B	1.97	mg/kg dry		0.294			76.1*	20
Nickel	11.9		3.94	mg/kg dry		9.20			25.9*	20
Potassium	1110		394	mg/kg dry		1070			3.34	20
Selenium	0.296	U	0.296	mg/kg dry		0.275 U				20
Silicon	507		1.97	mg/kg dry		521			2.67	20
Silver	0.197	U	0.197	mg/kg dry		0.183 U				20
Sodium	402		49.3	mg/kg dry		420			4.17	20
Vanadium	48.6		2.46	mg/kg dry		52.9			8.56	20
Zinc	42.4		9.86	mg/kg dry		41.9			1.09	20
Matrix Spike (L206084-MS1)			**Source: 1206018-01**	Prepared & Analyzed: 06/12/2012						
Aluminum	7200		4.84	mg/kg dry	193.51	6620	303*	75-125		
Antimony	16.3		0.581	mg/kg dry	48.379	0.550 U	33.6*	75-125		
Arsenic	153		0.968	mg/kg dry	193.51	2.68	77.8	75-125		
Barium	219		0.484	mg/kg dry	193.51	72.6	75.9	75-125		
Beryllium	3.98		0.194	mg/kg dry	4.8379	0.249	77.2	75-125		
Boron	70.0		1.94	mg/kg dry	96.757	2.16	70.1*	75-125		
Cadmium	3.78		0.194	mg/kg dry	4.8379	0.124	75.6	75-125		
Calcium	8590		96.8	mg/kg dry	2418.9	7230	56.4*	75-125		
Chromium	24.3		0.194	mg/kg dry	19.351	10.2	72.6*	75-125		
Cobalt	41.2		1.94	mg/kg dry	48.379	5.84	73.1*	75-125		
Copper	32.3		0.968	mg/kg dry	24.189	14.5	73.8*	75-125		

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/13/2012 14:26

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 L206084 - SW 3050B									
Matrix Spike (L206084-MS1)		**Source: 1206018-01**		Prepared & Analyzed: 06/12/2012					
Iron	18700	19.4	mg/kg dry	96.757	19800	-1100*	75-125		
Lead	44.0	0.484	mg/kg dry	48.379	10.7	68.8*	75-125		
Magnesium	6150	72.6	mg/kg dry	2418.9	4190	80.8	75-125		
Manganese	303	4.84	mg/kg dry	48.379	301	3.00*	75-125		
Molybdenum	73.6	1.94	mg/kg dry	96.757	0.294	75.8	75-125		
Nickel	43.6	3.87	mg/kg dry	48.379	9.20	71.2*	75-125		
Potassium	2970	387	mg/kg dry	2418.9	1070	78.4	75-125		
Selenium	142	0.290	mg/kg dry	193.51	0.275 U	73.4*	75-125		
Silicon	674	1.94	mg/kg dry	96.757	521	158*	75-125		
Silver	3.63	0.194	mg/kg dry	4.8379	0.183 U	75.0	75-125		
Sodium	2370	48.4	mg/kg dry	2418.9	420	80.5	75-125		
Vanadium	84.7	2.42	mg/kg dry	48.379	52.9	65.7*	75-125		
Zinc	78.4	9.68	mg/kg dry	48.379	41.9	75.5	75-125		
Reference (L206084-SRM1)				Prepared: 06/12/2012 Analyzed: 06/13/2012					
Aluminum	10100	13.2	mg/kg wet	6670.0		152	0-200.89		
Antimony	44.9	1.58	mg/kg wet	53.000		84.8	0-235.8		
Arsenic	122	2.63	mg/kg wet	114.00		107	82.8-117.54		
Barium	304	1.32	mg/kg wet	307.00		98.9	79.8-120.2		
Beryllium	112	0.526	mg/kg wet	108.00		104	82.8-117.6		
Boron	84.4	5.26	mg/kg wet	85.100		99.2	67.5-132.8		
Cadmium	235	0.526	mg/kg wet	225.00		104	83.6-116.4		
Calcium	3300	263	mg/kg wet	3360.0		98.1	83.3-116.9		
Chromium	85.8	0.526	mg/kg wet	77.200		111	73.3-126.4		
Cobalt	169	5.26	mg/kg wet	166.00		102	80.7-118.7		
Copper	275	2.63	mg/kg wet	271.00		101	80.8-119.2		
Iron	8790	52.6	mg/kg wet	8420.0		104	78.6-121.1		
Lead	181	1.32	mg/kg wet	190.00		95.5	81.6-118.4		
Magnesium	9260	197	mg/kg wet	8570.0		108	83.2-116.7		
Manganese	973	13.2	mg/kg wet	965.00		101	69.3-130.5		
Molybdenum	247	5.26	mg/kg wet	235.00		105	76.2-123.8		
Nickel	228	10.5	mg/kg wet	221.00		103	79.6-120.8		
Potassium	14600	1050	mg/kg wet	14400		101	81.9-118.1		
Selenium	202	0.789	mg/kg wet	187.00		108	75.9-124.6		
Silicon	1220	5.26	mg/kg wet	807.00		151	0-219.3		
Silver	83.8	0.526	mg/kg wet	83.500		100	82.7-117.1		
Sodium	9560	132	mg/kg wet	9730.0		98.3	82.5-117.2		

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-029 Project Number: K3916 Project Manager: Joan Kessner	Reported: 06/13/2012 14:26

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 L206084 - SW 3050B									
Reference (L206084-SRM1)			Prepared: 06/12/2012 Analyzed: 06/13/2012						
Vanadium	110	6.58	mg/kg wet	98.700		111	75.9-123.6		
Zinc	206	26.3	mg/kg wet	199.00		103	78.4-121.6		