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

COMPLETE COPY OF FINAL VALIDATION PACKAGE TO:

Kathy Wendt H4-21

COMMENTS:

SDG K4009 SAF-RC-189

Sample Location: 116-N-2

Date: 28 January 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100N Field Remediation – Soil Full Protocol – Waste Site 116-N-2
Subject: Inorganics - Data Package No. K4009-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K4009 prepared by Lionville Laboratories 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
J1R3J2	10/18/12	Soil	C	See note 1
J1R3J3	10/18/12	Soil	C	See note 1
J1R3J4	10/18/12	Soil	C	See note 1
J1R3J5	10/18/12	Soil	C	See note 1
J1R3J6	10/18/12	Soil	C	See note 1
J1R3J7	10/18/12	Soil	C	See note 1
J1R3J8	10/18/12	Soil	C	See note 1
J1R3J9	10/18/12	Soil	C	See note 1
J1R3K0	10/18/12	Soil	C	See note 1
J1R3K1	10/18/12	Soil	C	See note 1
J1R3K2	10/18/12	Soil	C	See note 1
J1R3K3	10/18/12	Soil	C	See note 1
J1R3K4	10/18/12	Soil	C	See note 1

1 – ICP metals (6010B) and mercury (7471A).

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 300 Area Remedial Action Sampling and Analysis Plan (DOE/RL-2001-48, Rev. 3). 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 28 days for mercury and 6 months for ICP metals.

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 (37.8%) results were qualified as estimates and flagged "J".

Due to LCS recoveries outside QC limits, all aluminum and silicon 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

One set of field duplicates (J1R3J4/J1R3K4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 300 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data package No. K4009 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 (37.8%) results were qualified as estimates and flagged "J".

- Due to LCS recoveries outside QC limits, all aluminum and silicon 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-2001-48, Rev. 3, *300 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 2004.

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

INORGANICS DATA QUALIFICATION SUMMARY*

SDG: K4009	REVIEWER: ELR	Project: 116-N-2	PAGE_1_OF_1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

11/29/13

J1R3J2
1210071-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Metals by SW846 6000/7000 series									
Aluminum	**4740**	J	12.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.44	U J	1.44	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**2.21**	B	2.39	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**59.5**		1.20	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.226**	B	0.478	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	4.78	U	4.78	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.478	U	0.478	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**6910**		239	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**3.82**		0.478	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**8.38**		4.78	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**15.6**		2.39	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**26600**		47.8	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**2.44**		1.20	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**4350**		179	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**319**		12.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	**0.590**	B	4.78	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**6.61**	B	9.57	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**605**	B	957	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.718	U	0.718	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**111**	J	4.78	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.478	U	0.478	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**417**		120	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**77.2**		5.98	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**45.7**		23.9	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0274	U	0.0274	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

V 1/29/13

J1R3J3
1210071-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Metals by SW846 6000/7000 series									
Aluminum	**7430**	J	11.9	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.42	U J	1.42	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**2.82**		2.37	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**68.6**		1.19	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.277**	B	0.474	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	4.74	U	4.74	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.474	U	0.474	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**8480**		237	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**41.3**		0.474	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**8.88**		4.74	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**20.8**		2.37	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**24900**		47.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**6.29**		1.19	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**5420**		178	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**338**		11.9	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	**0.648**	B	4.74	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**9.81**		9.48	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**1040**		948	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.711	U	0.711	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**189**	J	4.74	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.474	U	0.474	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**441**		119	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**61.3**		5.93	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**90.1**		23.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0276	U	0.0276	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

11/29/13

J1R3J4
1210071-03 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**4480**	J	14.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.76	UJ	1.76	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**1.36**	B	2.94	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**52.3**		1.47	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.248**	B	0.587	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	5.87	U	5.87	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.587	U	0.587	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**7080**		294	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**3.44**		0.587	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**10.0**		5.87	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**15.1**		2.94	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**31500**		58.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**1.95**		1.47	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**4480**		220	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**344**		14.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	5.87	U	5.87	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**6.28**	B	11.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**494**	B	1170	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.881	UJ	0.881	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**98.9**	J	5.87	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.587	U	0.587	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**470**		147	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**90.3**		7.34	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**54.1**		29.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0262	U	0.0262	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

M 1/29/13

J1R3J5
1210071-04 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**8680**	J	14.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.76	UJ	1.76	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**2.38**	B	2.94	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**73.7**		1.47	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.329**	B	0.588	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	**1.65**	B	5.88	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.588	U	0.588	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**7140**		294	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**38.9**		0.588	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**8.33**		5.88	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**25.7**		2.94	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**23600**		58.8	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**9.28**		1.47	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**4970**		221	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**353**		14.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	5.88	U	5.88	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**11.3**	B	11.8	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**1500**		1180	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.882	U	0.882	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**262**	J	5.88	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.588	U	0.588	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**454**		147	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**57.7**		7.35	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**87.6**		29.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0296	U	0.0296	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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1/29/13

J1R3J6
1210071-05 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**5410**	J	13.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.64	U J	1.64	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**1.75**	B	2.74	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**58.7**		1.37	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.253**	B	0.548	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	5.48	U	5.48	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.548	U	0.548	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**5980**		274	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**5.05**		0.548	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**9.08**		5.48	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**15.7**		2.74	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**26900**		54.8	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**2.95**		1.37	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**4390**		205	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**337**		13.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	5.48	U	5.48	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**7.88**	B	11.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**821**	B	1100	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.822	U	0.822	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**129**	J	5.48	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.548	U	0.548	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**353**		137	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**78.8**		6.85	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**51.4**		27.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0249	U	0.0249	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	**Reported:** 10/30/2012 12:10

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J1R3J7
1210071-06 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Metals by SW846 6000/7000 series									
Aluminum	**5140**	J	14.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.68	U J	1.68	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**1.69**	B	2.80	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**56.6**		1.40	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.243**	B	0.559	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	5.59	U	5.59	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.559	U	0.559	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**6700**		280	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**6.46**		0.559	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**10.1**		5.59	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**14.6**		2.80	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**30000**		55.9	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**2.71**		1.40	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**5150**		210	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**349**		14.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	5.59	U	5.59	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**8.78**	B	11.2	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**629**	B	1120	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.839	U	0.839	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**166**	J	5.59	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.559	U	0.559	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**366**		140	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**79.9**		6.99	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**52.4**		28.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0256	U	0.0256	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

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J1R3J8
1210071-07 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**7590**	J	13.1	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.57	U J	1.57	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**2.66**		2.61	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**62.0**		1.31	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.296**	B	0.522	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	5.22	U	5.22	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.522	U	0.522	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**14100**		261	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**6.78**		0.522	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**8.72**		5.22	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**16.5**		2.61	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**24400**		52.2	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**3.83**		1.31	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**5390**		196	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**376**		13.1	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	5.22	U	5.22	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**9.74**	B	10.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**1080**		1040	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.783	U	0.783	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**176**	J	5.22	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.522	U	0.522	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**523**		131	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**60.3**		6.53	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**46.8**		26.1	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0237	U	0.0237	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	10/30/2012 12:10

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J1R3J9
1210071-08 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**6490**	J	12.6	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.51	U J	1.51	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**2.88**		2.51	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**52.5**		1.26	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.296**	B	0.502	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	5.02	U	5.02	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.502	U	0.502	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**8260**		251	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**6.43**		0.502	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**8.64**		5.02	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**15.5**		2.51	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**26800**		50.2	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**3.58**		1.26	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**5450**		188	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**332**		12.6	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	**0.513**	B	5.02	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**9.32**	B	10.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**940**	B	1000	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.754	U	0.754	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**159**	J	5.02	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.502	U	0.502	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**383**		126	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**70.3**		6.28	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**49.1**		25.1	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0270	U	0.0270	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

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J1R3K0
1210071-09 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Metals by SW846 6000/7000 series									
Aluminum	**6510**	J	14.2	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.70	U J	1.70	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**1.96**	B	2.84	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**59.4**		1.42	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.302**	B	0.568	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	5.68	U	5.68	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.568	U	0.568	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**5500**		284	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**6.22**		0.568	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**9.01**		5.68	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**15.5**		2.84	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**27300**		56.8	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**3.85**		1.42	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**4760**		213	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**324**		14.2	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	5.68	U	5.68	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**9.48**	B	11.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**945**	B	1140	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.852	U	0.852	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**136**	J	5.68	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.568	U	0.568	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**425**		142	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**73.8**		7.10	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**47.4**		28.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0242	U	0.0242	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

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J1R3K1
1210071-10 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Metals by SW846 6000/7000 series									
Aluminum	**5730**	J	14.5	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.74	U J	1.74	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**1.80**	B	2.90	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**58.5**		1.45	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.251**	B	0.580	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	5.80	U	5.80	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.580	U	0.580	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**6090**		290	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**6.72**		0.580	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**9.22**		5.80	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**15.8**		2.90	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**28200**		58.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**3.09**		1.45	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**5000**		218	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**341**		14.5	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	5.80	U	5.80	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**9.29**	B	11.6	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**883**	B	1160	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.870	U	0.870	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**137**	J	5.80	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.580	U	0.580	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**435**		145	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**83.7**		7.25	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**50.3**		29.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0237	U	0.0237	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

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J1R3K2
1210071-11 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Metals by SW846 6000/7000 series									
Aluminum	**4260**	J J	13.5	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.62	U J	1.62	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**1.69**	B	2.70	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**47.3**		1.35	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.219**	B	0.540	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	5.40	U	5.40	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.540	U	0.540	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**6940**		270	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**3.12**		0.540	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**10.4**		5.40	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**14.2**		2.70	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**30500**		54.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**2.30**		1.35	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**4710**		203	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**376**		13.5	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	5.40	U	5.40	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**8.55**	B	10.8	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**516**	B	1080	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.811	U	0.811	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**164**	J	5.40	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.540	U	0.540	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**372**		135	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**87.8**		6.76	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**53.1**		27.0	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0239	U	0.0239	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	10/30/2012 12:10

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J1R3K3
1210071-12 (Soil)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**6030**	J	11.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.36	U J	1.36	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**2.40**		2.27	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**53.4**		1.14	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.247**	B	0.454	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	4.54	U	4.54	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.454	U	0.454	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**7470**		227	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**6.86**		0.454	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**7.68**		4.54	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**14.0**		2.27	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**22600**		45.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**3.79**		1.14	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**4740**		170	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**301**		11.4	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	4.54	U	4.54	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**10.0**		9.09	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**905**	B	909	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.682	U	0.682	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**154**	J	4.54	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.454	U	0.454	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**442**		114	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**60.2**		5.68	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**42.5**		22.7	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0299	U	0.0299	mg/kg dry	1	L210211	10/24/2012	10/25/2012	7471A

000000188

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	**Reported:** 11/12/2012 14:08

M 1/28/13

J1R3K4
1210071-13 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Metals by SW846 6000/7000 series									
Aluminum	**4440**	J	12.3	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Antimony	1.48	U J	1.48	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Arsenic	**1.23**	B	2.46	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Barium	**47.0**		1.23	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Beryllium	**0.205**	B	0.492	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Boron	4.92	U	4.92	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cadmium	0.492	U	0.492	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Calcium	**6470**		246	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Chromium	**2.84**		0.492	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Cobalt	**9.65**		4.92	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Copper	**14.4**		2.46	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Iron	**31400**		49.2	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Lead	**2.22**		1.23	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Magnesium	**4540**		185	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Manganese	**341**		12.3	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Molybdenum	4.92	U	4.92	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Nickel	**6.29**	B	9.85	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Potassium	**503**	B	985	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Selenium	0.739	U	0.739	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silicon	**97.5**	J	4.92	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Silver	0.492	U	0.492	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Sodium	**468**		123	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Vanadium	**90.2**		6.16	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Zinc	**52.3**		24.6	mg/kg dry	3	L210203	10/24/2012	10/26/2012	6010B
Mercury	0.0269	U	0.0269	mg/kg dry	1	L210211	10/24/2012	10/25/2012	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-189
LVL#: 1210071
SDG/SAF#: K4009/RC-189

W.O.#: 60049-001-001-0001-00
Date Received: 10-24-12

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 13 soil samples.

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

   The client samples were analyzed and reported with 3-fold dilutions for ICP metals from file ICP102612B due to sample matrix. The metals internal standard, Yttrium, was not used in the calculation of digestion batch QC samples L210203-BLK1 and L210203-SRM1 data due to the native concentrations of Yttrium in the client samples reported from file ICP102512C.

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.

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

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

10. The matrix spike (MS) recoveries for 4 analytes were outside the 75-125% control limits.

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

12. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limit critieria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL. The sample result for Arsenic was less than ten times the MDL.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

11/1/12
Date

alm/10-071

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 1 of 3

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ Days 15		
Project Designation: 100N Field Remediation - Soil Pull Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: (Fed Ex) ~~Hand Deliver~~
Shipped To: ~~EBERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120 631/632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad < DOT Limits At 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	sG	sG	sG	sG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1		0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See Item (1) in Special Instructions.	Chromium Hex - 7196	See Item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See Item (3) in Special Instructions.	Isotopic Uranium
J1R3J2	SOIL	10-18-12	1010	X	X	X	X	X	X	X	X	X	RCF 34720
J1R3J3	SOIL	10-18-12	1020	X	X	X	X	X	X	X		X	
J1R3J4	SOIL	10-18-12	1050	X	X	X	X	X	X	X		X	34721
J1R3J5	SOIL	10-18-12	1035	X	X	X	X	X	X	X		X	34722
J1R3J6	SOIL	10-18-12	1200	X	X	X	X	X	X	X		X	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	10/18/12 1700	Dennis Newman	10/18/12 1700
Dennis Newman	10/18/12 2020	Ref #3 1060 Battelle	10/18/12 2020
Ref. #3 1060 Battelle	10-19-12 0800	[illegible]	10-19-12 0800
[illegible]	10-23-12 1245	Fed EX	
Fed EX	10/24/12 0950	Victor Hernandez	10/24/12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* freeze upon receipt At 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil; SB=Sediment; SO=Solid; SL=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; Wh=Wipe; L=Liquid; V=Vegetation; X=Other

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

REVIEWED BY AJ Title DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 2 of 3

Collector: Q. Stowe	Company Contact: Joan Kessner — Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12 — Data Turnaround: ~~21~~ Days 15 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification	SAF No.: RC-189	
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07 — COA: R116N22000	Method of Shipment: ~~Fed Ex~~ ~~Hand Deliver~~ 10/18/12	
Shipped To: ~~EBERLINE SERVICES~~ LIONVILLE 10/18/12	Offsite Property No.: A120631/632	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AS 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium
J1R3J7	SOIL	10-18-12	1040	X	X	X	X	X	X	X			
J1R3J8	SOIL	10-18-12	1255	X	X	X	X	X	X	X			
J1R3J9	SOIL	10-18-12	1207	X	X	X	X	X	X	X			
J1R3K0	SOIL	10-18-12	1237	X	X	X	X	X	X	X			
J1R3K1	SOIL	10-18-12	1247	X	X	X	X	X	X	X			

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Rainey Stowe	1700 10/18/12	Dennis Neuman	1700 10/18/12
Dennis Neuman	2020 10/18/12	Ref #3, 1060 Battelle	2020 10/18/12
Ref. #3 Battelle	10-19-12 0800	Dennis Neuman	10-19-12 0800
Dennis Neuman	1060#3 10-23-12 1245	Fed Ex	
Fed Ex	10/24/12 0950	Victor Hernandez	0950
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) [Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226]

* Freeze upon receipt AS 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *
S=Soil
SB=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	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method — Disposed By	Date/Time

REVIEWED BY AS DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 3 of 53

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ Days 15		
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~
Shipped To: ~~BEERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120631/632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE ~~HAZARDS~~/REMARKS

Potential Rad & DOT Limits A# 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3K2	SOIL	10-18-12	1218	X	X	X	X	X	X	X	RCF		
J1R3K3	SOIL	10-18-12	1229	X	X	X	X	X	X	X	34719		
J1R3K4	SOIL	10-18-12	1050	X	X	X	X	X	X	X			

10/18/12

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	10/18/12 1700	Dennis Newman	10/18/12 1700
Dennis Newman	10/18/12 2020	Ref #3, 1060 Battelle	10/18/12 2020
Ref #3, 1060 Battelle	10-19-12 0800	[illegible]	10-19-12 0800
[illegible]	10-23-12 1245	Fed Ex	
Fed Ex	10/24/12 0950	Vicente Hernandez	10-24-12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}
* freeze upon receipt. A# 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-N-2			DATA PACKAGE: K4009		
VALIDATOR: ELR		LAB: LLI		DATE: 1/17/13	
			SDG: K4009		

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

SAMPLES/MATRIX				
J1R3J2	J1R3J3	J1R3J4	J1R3J5	J1R3J6
J1R3J7	J1R3J8	J1R3J9	J1R3K0	J1R3K1
J1R3K2	J1R3K3	J1R3K4		
				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 (37%) – J all

1/29/13

~~– no LCS analysis – J all~~

LCS – silicon + aluminum – J all

no PAT

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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

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 L210203 - SW 3050B										
Blank (L210203-BLK1)				Prepared: 10/24/2012 Analyzed: 10/25/2012						
Aluminum	4.55	U	4.55	mg/kg wet						
Antimony	0.545	U	0.545	mg/kg wet						
Arsenic	0.909	U	0.909	mg/kg wet						
Barium	0.455	U	0.455	mg/kg wet						
Beryllium	0.182	U	0.182	mg/kg wet						
Boron	1.82	U	1.82	mg/kg wet						
Cadmium	0.182	U	0.182	mg/kg wet						
Calcium	90.9	U	90.9	mg/kg wet						
Chromium	0.182	U	0.182	mg/kg wet						
Cobalt	1.82	U	1.82	mg/kg wet						
Copper	0.909	U	0.909	mg/kg wet						
Iron	18.2	U	18.2	mg/kg wet						
Lead	0.455	U	0.455	mg/kg wet						
Magnesium	68.2	U	68.2	mg/kg wet						
Manganese	4.55	U	4.55	mg/kg wet						
Molybdenum	1.82	U	1.82	mg/kg wet						
Nickel	3.64	U	3.64	mg/kg wet						
Potassium	364	U	364	mg/kg wet						
Selenium	0.273	U	0.273	mg/kg wet						
Silicon	1.82	U	1.82	mg/kg wet						
Silver	0.182	U	0.182	mg/kg wet						
Sodium	45.5	U	45.5	mg/kg wet						
Vanadium	2.27	U	2.27	mg/kg wet						
Zinc	9.09	U	9.09	mg/kg wet						
Duplicate (L210203-DUP2)		Source: 1210071-01		Prepared: 10/24/2012 Analyzed: 10/26/2012						
Aluminum	4930		12.0	mg/kg dry		4740			3.96	20
Antimony	1.44	U	1.44	mg/kg dry		1.44 U				20
Arsenic	1.41	B	2.39	mg/kg dry		2.21			43.8*	20
Barium	58.5		1.20	mg/kg dry		59.5			1.70	20
Beryllium	0.233	B	0.478	mg/kg dry		0.226			2.69	20
Boron	4.78	U	4.78	mg/kg dry		4.78 U				20
Cadmium	0.478	U	0.478	mg/kg dry		0.478 U				20
Calcium	6060		239	mg/kg dry		6910			13.1	20
Chromium	4.12		0.478	mg/kg dry		3.82			7.65	20
Cobalt	10.0		4.78	mg/kg dry		8.38			17.7	20
Copper	14.8		2.39	mg/kg dry		15.6			5.20	20

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 10/30/2012 12:10

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 L210203 - SW 3050B										
Duplicate (L210203-DUP2)		**Source: 1210071-01**		Prepared: 10/24/2012 Analyzed: 10/26/2012						
Iron	29300		47.8	mg/kg dry		26600			9.84	20
Lead	2.59		1.20	mg/kg dry		2.44			5.90	20
Magnesium	4600		179	mg/kg dry		4350			5.56	20
Manganese	357		12.0	mg/kg dry		319			11.3	20
Molybdenum	0.493	B	4.78	mg/kg dry		0.590			17.8	20
Nickel	7.63	B	9.57	mg/kg dry		6.61			14.3	20
Potassium	624	B	957	mg/kg dry		605			3.08	20
Selenium	0.718	U	0.718	mg/kg dry		0.718 U				20
Silicon	121		4.78	mg/kg dry		111			8.43	20
Silver	0.478	U	0.478	mg/kg dry		0.478 U				20
Sodium	405		120	mg/kg dry		417			3.14	20
Vanadium	84.8		5.98	mg/kg dry		77.2			9.39	20
Zinc	52.0		23.9	mg/kg dry		45.7			13.0	20
Matrix Spike (L210203-MS2)		**Source: 1210071-01**		Prepared: 10/24/2012 Analyzed: 10/26/2012						
Aluminum	6390		11.8	mg/kg dry	157.06	4740	1050*	75-125		
Antimony	14.9		1.41	mg/kg dry	39.265	1.44 U	37.8*	75-125		
Arsenic	130		2.36	mg/kg dry	157.06	2.21	81.3	75-125		
Barium	204		1.18	mg/kg dry	157.06	59.5	92.0	75-125		
Beryllium	3.56		0.471	mg/kg dry	3.9265	0.226	85.0	75-125		
Boron	64.6		4.71	mg/kg dry	78.530	4.78 U	82.3	75-125		
Cadmium	3.34		0.471	mg/kg dry	3.9265	0.478 U	85.1	75-125		
Calcium	9000		236	mg/kg dry	1963.3	6910	107	75-125		
Chromium	16.4		0.471	mg/kg dry	15.706	3.82	80.2	75-125		
Cobalt	42.6		4.71	mg/kg dry	39.265	8.38	87.1	75-125		
Copper	31.6		2.36	mg/kg dry	19.633	15.6	81.7	75-125		
Iron	29500		47.1	mg/kg dry	78.530	26600	3720*	75-125		
Lead	34.3		1.18	mg/kg dry	39.265	2.44	81.0	75-125		
Magnesium	6750		177	mg/kg dry	1963.3	4350	122	75-125		
Manganese	369		11.8	mg/kg dry	39.265	319	127*	75-125		
Molybdenum	65.7		4.71	mg/kg dry	78.530	0.590	82.9	75-125		
Nickel	41.1		9.42	mg/kg dry	39.265	6.61	87.7	75-125		
Potassium	2330		942	mg/kg dry	1963.3	605	88.0	75-125		
Selenium	126		0.707	mg/kg dry	157.06	0.718 U	80.3	75-125		
Silicon	198		4.71	mg/kg dry	78.530	111	111	75-125		
Silver	3.09		0.471	mg/kg dry	3.9265	0.478 U	78.7	75-125		
Sodium	2310		118	mg/kg dry	1963.3	417	96.2	75-125		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 01/28/2013 15:22

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 L210203 - SW 3050B									
Matrix Spike (L210203-MS2)		**Source: 1210071-01**	Prepared: 10/24/2012 Analyzed: 10/26/2012						
Vanadium	110	5.89	mg/kg dry	39.265	77.2	82.7	75-125		
Zinc	83.4	23.6	mg/kg dry	39.265	45.7	96.0	75-125		
Post Spike (L210203-PS2)		**Source: 1210071-01**	Prepared: 10/24/2012 Analyzed: 10/26/2012						
Aluminum	112000		ug/L	66000	59400	80.1	75-125		
Antimony	263		ug/L	300.00	-0.0876	87.8	75-125		
Iron	416000		ug/L	126000	333000	65.2*	75-125		
Manganese	6260		ug/L	3000.0	4000	75.2	75-125		
Reference (L210203-SRM1)			Prepared: 10/24/2012 Analyzed: 10/25/2012						
Aluminum	13000	13.9	mg/kg wet	6670.0		194	0-200.89		
Antimony	37.6	1.67	mg/kg wet	53.000		70.9	0-235.8		
Arsenic	113	2.78	mg/kg wet	114.00		99.4	82.8-117.54		
Barium	341	1.39	mg/kg wet	307.00		111	79.8-120.2		
Beryllium	114	0.556	mg/kg wet	108.00		105	82.8-117.6		
Boron	77.3	5.56	mg/kg wet	85.100		90.8	67.5-132.8		
Cadmium	215	0.556	mg/kg wet	225.00		95.5	83.6-116.4		
Calcium	3550	278	mg/kg wet	3360.0		106	83.3-116.9		
Chromium	80.7	0.556	mg/kg wet	77.200		105	73.3-126.4		
Cobalt	156	5.56	mg/kg wet	166.00		94.1	80.7-118.7		
Copper	265	2.78	mg/kg wet	271.00		97.6	80.8-119.2		
Iron	9310	55.6	mg/kg wet	8420.0		111	78.6-121.1		
Lead	180	1.39	mg/kg wet	190.00		94.5	81.6-118.4		
Magnesium	8740	208	mg/kg wet	8570.0		102	83.2-116.7		
Manganese	991	13.9	mg/kg wet	965.00		103	69.3-130.5		
Molybdenum	230	5.56	mg/kg wet	235.00		97.8	76.2-123.8		
Nickel	217	11.1	mg/kg wet	221.00		98.0	79.6-120.8		
Potassium	16100	1110	mg/kg wet	14400		112	81.9-118.1		
Selenium	185	0.833	mg/kg wet	187.00		98.8	75.9-124.6		
Silicon	441	5.56	mg/kg wet	807.00		54.6	0-219.3		
Silver	82.2	0.556	mg/kg wet	83.500		98.4	82.7-117.1		
Sodium	10600	139	mg/kg wet	9730.0		109	82.5-117.2		
Vanadium	114	6.94	mg/kg wet	98.700		115	75.9-123.6		
Zinc	189	27.8	mg/kg wet	199.00		94.9	78.4-121.6		

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264 Welsh Pool Road
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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 01/28/2013 15:22

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 L210211 - SW 7471A Prep										
Blank (L210211-BLK1)				Prepared: 10/24/2012 Analyzed: 10/25/2012						
Mercury	0.0290	U	0.0290	mg/kg wet						
Duplicate (L210211-DUP1)		Source: 1210071-01		Prepared: 10/24/2012 Analyzed: 10/25/2012						
Mercury	0.0239	U	0.0239	mg/kg dry		0.0274 U				20
Matrix Spike (L210211-MS1)		Source: 1210071-01		Prepared: 10/24/2012 Analyzed: 10/25/2012						
Mercury	0.153		0.0259	mg/kg dry	0.14397	0.0274 U	106	75-125		20
Reference (L210211-SRM1)				Prepared: 10/24/2012 Analyzed: 10/25/2012						
Mercury	1.30		0.0273	mg/kg wet	1.2900		101	62.6-138		

192A

Date: 28 January 2012
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100N Field Remediation - Soil Full Protocol - Waste Site 116-N-2
Subject: Wet Chemistry - Data Package No. K4009-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K4009 prepared by Lionville Laboratories 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
J1R3J2	10/18/12	Soil	C	See note 1
J1R3J3	10/18/12	Soil	C	See note 1
J1R3J4	10/18/12	Soil	C	See note 1
J1R3J5	10/18/12	Soil	C	See note 1
J1R3J6	10/18/12	Soil	C	See note 1
J1R3J7	10/18/12	Soil	C	See note 1
J1R3J8	10/18/12	Soil	C	See note 1
J1R3J9	10/18/12	Soil	C	See note 1
J1R3K0	10/18/12	Soil	C	See note 1
J1R3K1	10/18/12	Soil	C	See note 1
J1R3K2	10/18/12	Soil	C	See note 1
J1R3K3	10/18/12	Soil	C	See note 1
J1R3K4	10/18/12	Soil	C	See note 1

1 – IC anions by 300.0, hexavalent chromium by 7196A, pH by 7196A and nitrate/nitrite by 353.2.

Data validation was conducted in accordance with the Washington Closure Hanford Incorporated (WCH) validation statement of work and the 300 Area Remedial Action Sampling and Analysis Plan (DOE/RL-2001-48, Rev. 3). 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 28 days for nitrate/nitrite, chloride, fluoride, bromide, sulfate; 48 hours for nitrate, nitrite and

orthophosphate; and immediate (24 hours) for pH.

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 Blanks

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 the lack of a matrix spike analysis, the sulfate result in samples J1R3J8 were qualified as estimates and flagged "J".

Due to the lack of a matrix analysis, all IC anion results in samples J1R3K2, J1R3K3 and J1R3K4 were qualified as estimates and flagged "J" (not all qualifiers applied due to rejection of some data).

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.

Due to the lack of a duplicate analysis, the sulfate result in samples J1R3J8 were qualified as estimates and flagged "J".

Due to the lack of a duplicate analysis, all IC anion results in samples J1R3K2, J1R3K3 and J1R3K4 were qualified as estimates and flagged "J" (not all qualifiers applied due to rejection of some data).

All other laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J1R3J4/J1R3K4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **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 K4009 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 deficiency was 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 nitrate, nitrite and orthophosphate results were qualified as estimates and flagged "J".

- Due to the lack of a matrix spike analysis, the sulfate result in samples J1R3J8 were qualified as estimates and flagged "J".

- Due to the lack of a matrix analysis, all IC anion results in samples J1R3K2, J1R3K3 and J1R3K4 were qualified as estimates and flagged "J" (not all qualifiers applied due to rejection of some data).

- Due to the lack of a duplicate analysis, the sulfate result in samples J1R3J8 were qualified as estimates and flagged "J".

- Due to the lack of a duplicate analysis, all IC anion results in samples J1R3K2, J1R3K3 and J1R3K4 were qualified as estimates and flagged "J" (not all qualifiers applied due to rejection of some data).

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-2001-48, Rev. 3, *300 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 2004.

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: K4009	**REVIEWER: ELR**	**Project: 116-N-2**	**PAGE_1_OF_1**
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nitrate	J	J1R3J3, J1R3J4 J1R3J5, J1R3J6 J1R3J7, J1R3J8 J1R3J9, J1R3K0 J1R3K1, J1R3K3 J1R3K4	Hold time
Nitrate	UR	J1R3J2, J1R3K2	Hold time
Nitrite	UR	All	Hold time
Orthophosphate	UR	J1R3J2, J1R3J4 J1R3J6, J1R3J7 J1R3J8, J1R3J9 J1R3K0, J1R3K1 J1R3K2, J1R3K3 J1R3K4	Hold time
Orthophosphate	J	J1R3J3, J1R3J5	Hold time
All IC anions	J	J1R3K2, J1R3K3 J1R3K4	No MS or duplicate analysis
Sulfate	J	J1R3J8	No MS or duplicate analysis

* - 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

Lionville Laboratory, PADEP Lab ID# 15-00009
264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/02/2012 16:34

1/26/13

Wet Chemistry
Lionville Laboratory

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1R3J2 (1210071-01) Soil									
%Solids	96.5		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	0.9 U	0.9	4.7	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	0.9 U	0.9	4.7	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	0.9 U	0.9	4.7	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	0.9 U R	0.9	4.7	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	0.9 U R	0.9	4.7	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	1.9 U R	1.9	9.4	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	2.5 B	0.9	4.7	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	0.16 B	0.09	0.47	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:43	EPA 353.2
Hexavalent Chromium	0.21 U	0.21	0.52	mg/kg dry	1	L210258	11/01/2012 13:30	11/02/2012 13:30	SW846 7196A
pH	9.04 J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 14:02	SW846 9045D
%Moisture	3.53	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216
J1R3J3 (1210071-02) Soil									
%Solids	95.8		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.1 U	1.1	5.3	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	9.4	1.1	5.3	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	1.1 U	1.1	5.3	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	7.3 J	1.1	5.3	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	1.1 U R	1.1	5.3	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	2.6 B J	2.1	10.5	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	31.3	1.1	5.3	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	1.65	0.11	0.53	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:47	EPA 353.2
Hexavalent Chromium	0.21 U	0.21	0.52	mg/kg dry	1	L210258	11/01/2012 13:30	11/02/2012 13:30	SW846 7196A
pH	8.95 J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 14:06	SW846 9045D
%Moisture	4.15	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216

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Wet Chemistry
Lionville Laboratory

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1R3J4 (1210071-03) Soil									
%Solids	**98.3**		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0 U	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	**1.1** B	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	**1.4** B J	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	2.0 U R	2.0	9.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	**4.7** B	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	**0.38** B	0.10	0.49	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:48	EPA 353.2
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	**8.52** J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 14:09	SW846 9045D
%Moisture	**1.72**	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216
J1R3J5 (1210071-04) Soil									
%Solids	**98.1**		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	**59.1**	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	**4.3** B J	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	**4.1** B J	2.0	10.1	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	**94.2**	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	**1.00**	0.10	0.50	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:49	EPA 353.2
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	**8.44** J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 14:45	SW846 9045D
%Moisture	**1.94**	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216

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2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/02/2012 16:34

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Wet Chemistry

Lionville Laboratory

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1R3J6 (1210071-05) Soil									
%Solids	**97.8**		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	**1.7 B**	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	**4.7 B** J	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	2.0 U R	2.0	10.1	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	**3.7 B**	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	**1.07**	0.10	0.50	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:53	EPA 353.2
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	**9.00** J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 14:46	SW846 9045D
%Moisture	**2.23**	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216
J1R3J7 (1210071-06) Soil									
%Solids	**97.5**		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	**1.9 B**	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	**2.7 B** J	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	2.0 U R	2.0	10.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	**5.9**	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	**0.63**	0.10	0.50	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:54	EPA 353.2
Hexavalent Chromium	0.21 U	0.21	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	**9.03** J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 14:52	SW846 9045D
%Moisture	**2.50**	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216

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2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/02/2012 16:34

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Wet Chemistry
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Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1R3J8 (1210071-07) Soil									
%Solids	97.4		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0 U	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	3.6 B	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	6.1 J	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	4.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	2.0 U R	2.0	9.9	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	259 D J	5.0	24.8	mg/kg dry	5	L210257	10/31/2012 13:00	10/31/2012 13:58	EPA 300.0 (1993)
Nitrate/Nitrite as N	1.37	0.10	0.49	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:55	EPA 353.2
Hexavalent Chromium	0.21 U	0.21	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	8.36 J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 14:54	SW846 9045D
%Moisture	2.64	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216
J1R3J9 (1210071-08) Soil									
%Solids	97.9		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	2.9 B	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	1.2 B J	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	2.0 U R	2.0	10.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	2.6 B	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	0.41 B	0.10	0.50	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:57	EPA 353.2
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	9.18 J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 14:56	SW846 9045D
%Moisture	2.11	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216

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Wet Chemistry
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Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1R3K0 (1210071-09) Soil									
%Solids	97.8		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	4.6 B	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	1.0 U	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	5.0 J	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	2.0 U R	2.0	10.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	22.7	1.0	5.0	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	1.24	0.10	0.50	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:58	EPA 353.2
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	8.82 J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 15:31	SW846 9045D
%Moisture	2.18	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216
J1R3K1 (1210071-10) Soil									
%Solids	97.6		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	0.9 U	0.9	4.5	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Chloride	1.3 B	0.9	4.5	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Fluoride	0.9 U	0.9	4.5	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate	1.8 B J	0.9	4.5	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrite	0.9 U R	0.9	4.5	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Orthophosphate	1.8 U R	1.8	9.1	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Sulfate	19.9	0.9	4.5	mg/kg dry	1	L210240	10/25/2012 07:15	10/25/2012 09:08	EPA 300.0 (1993)
Nitrate/Nitrite as N	0.44 B	0.09	0.45	mg/kg dry	1	L210243	10/25/2012 07:15	10/26/2012 15:59	EPA 353.2
Hexavalent Chromium	0.21 U	0.21	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	9.13 J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 15:34	SW846 9045D
%Moisture	2.44	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216

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Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1R3K2 (1210071-11) Soil									
%Solids	**99.1**		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0 U J	1.0	4.9	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Chloride	**2.0** B J	1.0	4.9	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Fluoride	1.0 U J	1.0	4.9	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrate	1.0 U R	1.0	4.9	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrite	1.0 U R	1.0	4.9	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Orthophosphate	1.9 U R	1.9	9.7	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Sulfate	**5.3** J	1.0	4.9	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrate/Nitrite as N	**0.25** B	0.10	0.48	mg/kg dry	1	L210245	10/25/2012 07:15	10/26/2012 16:03	EPA 353.2
Hexavalent Chromium	0.20 U	0.20	0.50	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	**8.59** J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 15:37	SW846 9045D
%Moisture	**0.88**	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216
J1R3K3 (1210071-12) Soil									
%Solids	**97.1**		0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	0.9 U J	0.9	4.7	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Chloride	**32.1** J	0.9	4.7	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Fluoride	0.9 U J	0.9	4.7	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrate	**30.1** J	0.9	4.7	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrite	0.9 U R	0.9	4.7	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Orthophosphate	1.9 U R	1.9	9.4	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Sulfate	**450** D J	9.4	46.8	mg/kg dry	10	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrate/Nitrite as N	**6.05**	0.10	0.50	mg/kg dry	1	L210245	10/25/2012 07:15	10/26/2012 16:04	EPA 353.2
Hexavalent Chromium	0.21 U	0.21	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	**8.34** J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 15:42	SW846 9045D
%Moisture	**2.91**	0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/12/2012 14:14

1/26/13

Wet Chemistry
Lionville Laboratory

Analyte	Result and Qualifier		LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1R3K4 (1210071-13) Soil										
%Solids	**98.3**			0.1	% by Weight	1	L210204	10/24/2012 16:35	10/25/2012 08:25	SM2540G
Bromide	1.0	U J	1.0	5.0	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Chloride	**1.3**	B J	1.0	5.0	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Fluoride	1.0	U J	1.0	5.0	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrate	**1.9**	B J	1.0	5.0	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrite	1.0	U R	1.0	5.0	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Orthophosphate	2.0	U R	2.0	10.0	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Sulfate	**4.9**	B J	1.0	5.0	mg/kg dry	1	L210241	10/31/2012 06:30	10/31/2012 12:45	EPA 300.0 (1993)
Nitrate/Nitrite as N	**0.45**	B	0.10	0.49	mg/kg dry	1	L210245	10/25/2012 07:15	10/26/2012 16:07	EPA 353.2
Hexavalent Chromium	0.20	U	0.20	0.51	mg/kg dry	1	L210258	11/01/2012 14:50	11/02/2012 13:30	SW846 7196A
pH	**8.68**	J		0.10	pH Units	1	L211004	11/01/2012 11:30	11/01/2012 15:45	SW846 9045D
%Moisture	**1.73**		0.10	0.10	% by Weight	1	L210207	10/24/2012 16:35	10/25/2012 08:25	D2216

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-189 K4009
LVL#: 1210071 **Date Received:** 10-24-12

INORGANIC NARRATIVE

1. This narrative covers the analyses of 13 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 exceptions of Nitrate, Nitrite and Orthophosphate that were received past hold.

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

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits and method criteris with the exception of L210258-BS1 for Soluble Hexavalent Chromium that was above the 80-120% control limits at 125% however the associated sample results are less than the limit of detection and therefore are not considered biased high.

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 with the exception of Percent Moisture that was outside the control limit at 20.5%.

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

12/3/12
Date

njp\i10-071

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 21 pages.

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-189-128	Page 1 of 3
Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ Days 15
Project Designation: 100N Field Remediation - Soil Pull Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189	
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~	
Shipped To: ~~EBERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120 631/632		Bill of Lading/Air Bill No.: See OSDC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AJ 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	sG	sG	sG	sG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1		0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time											RCF
J1R3J2	SOIL	10-18-12	1010	X	X	X	X	X	X	X	X	X		34720
J1R3J3	SOIL	10-18-12	1020	X	X	X	X	X	X	X		X		
J1R3J4	SOIL	10-18-12	1050	X	X	X	X	X	X	X		X		34721
J1R3J5	SOIL	10-18-12	1035	X	X	X	X	X	X	X		X		34722
J1R3J6	SOIL	10-18-12	1200	X	X	X	X	X	X	X		X		

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Quincy Stowe	10/18/12 1700	Dennis Newman	10/18/12 1700
Relinquished By/Removed From	Dennis Newman	10/18/12 2020	Ref #3, 1060 Battelle	10/18/12 2020
Relinquished By/Removed From	Ref #3 1060 Battelle	10-19-12 0800	Chris Bingham	10-19-12 0800
Relinquished By/Removed From	Chris Bingham	10-23-12 1245	Fed EX	
Relinquished By/Removed From	Fed EX	10/24/12 0950	Victor Hernandez	10/24/12 09:30
Relinquished By/Removed From			Received By/Stored In	

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* freeze upon receipt AJ 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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, Li=Liquid, V=Vegetation, X=Other

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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 2 of 13

Collector Q. Stowe	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Price Code ~~8L~~ 8K	Data Turnaround ~~21~~ Days 15		
Project Designation 100N Field Remediation - Soil Full Protocol	Sampling Location 115-N-2 Verification		SAF No. RC-189
Ice Chest No. RCC-07-011	Field Logbook No. EI-1652-07	COA R116N22000	Method of Shipment ~~Fed Ex~~ ~~Hand Deliver~~
Shipped To ~~SBERLINE SERVICES~~ LIONVILLE	Offsite Property No. A120631/632		Bill of Lading/Air Bill No. See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AS 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J7	SOIL	10-18-12	1040	X	X	X	X	X	X	X			
J1R3J8	SOIL	10-18-12	1255	X	X	X	X	X	X	X			
J1R3J9	SOIL	10-18-12	1207	X	X	X	X	X	X	X			
J1R3K0	SOIL	10-18-12	1237	X	X	X	X	X	X	X			
J1R3K1	SOIL	10-18-12	1247	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From Quincy Stowe	Date/Time 1700 10/18/12	Received By/Stored In Dennis Neuman	Date/Time 1700 10/18/12
Relinquished By/Removed From Dennis Neuman	Date/Time 2020 10/18/12	Received By/Stored In Ref #3, 1060 Battelle	Date/Time 2020 10/18/12
Relinquished By/Removed From Ref. #3 Battelle	Date/Time 10-19-12 10-18-12 0800	Received By/Stored In Bingham	Date/Time 1060#3 10-19-12 0800
Relinquished By/Removed From WCH	Date/Time 1060#3 10-23-12 1245	Received By/Stored In Fed EX	Date/Time
Relinquished By/Removed From Fed Ex	Date/Time 10/24/12 0950	Received By/Stored In Victor Hernandez	Date/Time 10/24/12 0950
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* Freeze upon receipt AS 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *
S=Soil
SS=Sediment
SO=Solid
St=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

REVIEWED BY AS DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 2 of 53

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ Days 15		
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed EX ~~Hand Deliver~~
Shipped To: ~~GREENLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120631/632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE ~~HAZARDS~~/REMARKS

Potential Rad & DDT Limits A# 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	sG	sG	sG	sG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3K2	SOIL	10-18-12	1218	X	X	X	X	X	X	X			
J1R3K3	SOIL	10-18-12	1229	X	X	X	X	X	X	X	34719		
J1R3K4	SOIL	10-18-12	1050	X	X	X	X	X	X	X			

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	10/18/12 1700	Dennis Newman	10/18/12 1700
Dennis Newman	10/18/12 2020	Ref #3, 1060 Battelle	10/18/12 2020
Ref #3, 1060 Battelle	10-19-12 0800	[illegible]	10-19-12 0800
[illegible] WCH	10-23-12 1245	Fed EX	
Fed EX	10/24/12 0950	Victor Fernandez	10-24-12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}
* freeze upon receipt. A# 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil; SD=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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT:	116-N-2	DATA PACKAGE:	K4009
VALIDATOR: ELR	LAB: LLI	DATE: 1/26/13	
		SDG:	K4009

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

J1R3J2	J1R3J3	J1R3J4	J1R3J5	J1R3J6
J1R3J7	J1R3J8	J1R3J9	J1R3K0	J1R3K1
J1R3K2	J1R3K3	J1R3K4		
				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:

sulfate - J8 no MS/MSD - J all

IC anions - no MS/MSD - J all (K2, K3, K4)

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:

sulfate - J8 - no dup - J

Kanions. no dup (K2, K3, K4) - J all

6. HOLDING TIMES (all levels)

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

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

Comments: Ortho, nitrate, nitrite, pH >2x - J/UR all

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

Lionville Laboratory, PADEP Lab ID# 15-00009
264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/02/2012 16:34

Wet Chemistry - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210204 - % Solids										
Duplicate (L210204-DUP1)		**Source: 1210071-01**		Prepared: 10/24/2012 16:35 Analyzed: 10/25/2012 08:25						
%Solids	97.1		0.1	% by Weight		96.5			0.7	20
Batch L210207 - Default Prep GenChem										
Duplicate (L210207-DUP1)		**Source: 1210071-01**		Prepared: 10/24/2012 16:35 Analyzed: 10/25/2012 08:25						
%Moisture	2.87	0.10	0.10	% by Weight		3.53			20.5*	20
Batch L210240 - Default Prep GenChem										
Blank (L210240-BLK1)				Prepared: 10/25/2012 07:15 Analyzed: 10/25/2012 09:08						
Fluoride	1.0 U	1.0	5.0	mg/kg wet						
Chloride	1.0 U	1.0	5.0	mg/kg wet						
Bromide	1.0 U	1.0	5.0	mg/kg wet						
Orthophosphate	2.0 U	2.0	10.0	mg/kg wet						
Sulfate	1.0 U	1.0	5.0	mg/kg wet						
Nitrate	1.0 U	1.0	5.0	mg/kg wet						
Nitrite	1.0 U	1.0	5.0	mg/kg wet						
LCS (L210240-BS1)				Prepared: 10/25/2012 07:15 Analyzed: 10/25/2012 09:08						
Fluoride	49.2	1.0	5.0	mg/kg wet	50.000		98.4	80-120		
Chloride	46.6	1.0	5.0	mg/kg wet	50.000		93.2	80-120		
Bromide	48.0	1.0	5.0	mg/kg wet	50.000		96.0	80-120		
Orthophosphate	47.2	2.0	10.0	mg/kg wet	50.000		94.4	80-120		
Sulfate	48.1	1.0	5.0	mg/kg wet	50.000		96.2	80-120		
Nitrate	47.6	1.0	5.0	mg/kg wet	50.000		95.2	80-120		
Nitrite	48.0	1.0	5.0	mg/kg wet	50.000		96.0	80-120		

Lionville Laboratory, PADEP Lab ID# 15-00009
264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/02/2012 16:34

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210240 - Default Prep GenChem										
Duplicate (L210240-DUP2)	**Source: 1210071-01**			Prepared: 10/25/2012 07:15 Analyzed: 10/25/2012 09:08						
Fluoride	1.0 U	1.0	4.9	mg/kg dry		0.9 U				20
Chloride	1.0 U	1.0	4.9	mg/kg dry		0.9 U				20
Bromide	1.0 U	1.0	4.9	mg/kg dry		0.9 U				20
Orthophosphate	2.0 U	2.0	9.8	mg/kg dry		1.9 U				20
Sulfate	2.1 B	1.0	4.9	mg/kg dry		2.5			17.4	20
Nitrate	1.0 U	1.0	4.9	mg/kg dry		0.9 U				20
Nitrite	1.0 U	1.0	4.9	mg/kg dry		0.9 U				20
Matrix Spike (L210240-MS3)	**Source: 1210071-01**			Prepared: 10/25/2012 07:15 Analyzed: 10/25/2012 09:08						
Fluoride	50.8	1.0	5.0	mg/kg dry	50.435	0.9 U	101	75-125		
Chloride	48.5	1.0	5.0	mg/kg dry	50.435	0.9 U	96.2	75-125		
Bromide	49.8	1.0	5.0	mg/kg dry	50.435	0.9 U	98.8	75-125		
Orthophosphate	49.2	2.0	10.1	mg/kg dry	50.435	1.9 U	97.6	75-125		
Sulfate	51.6	1.0	5.0	mg/kg dry	50.435	2.5	97.5	75-125		
Nitrate	49.8	1.0	5.0	mg/kg dry	50.435	0.9 U	98.8	75-125		
Nitrite	49.6	1.0	5.0	mg/kg dry	50.435	0.9 U	98.4	75-125		
Batch L210241 - Default Prep GenChem										
Blank (L210241-BLK1)				Prepared: 10/31/2012 06:30 Analyzed: 10/31/2012 12:45						
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						

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/02/2012 16:34

Wet Chemistry - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210241 - Default Prep GenChem										
LCS (L210241-BS1)				Prepared: 10/31/2012 06:30 Analyzed: 10/31/2012 12:45						
Fluoride	50.2	1.0	5.0	mg/kg wet	50.000		100	80-120		
Chloride	47.4	1.0	5.0	mg/kg wet	50.000		94.8	80-120		
Bromide	48.6	1.0	5.0	mg/kg wet	50.000		97.2	80-120		
Orthophosphate	48.8	2.0	10.0	mg/kg wet	50.000		97.6	80-120		
Sulfate	48.9	1.0	5.0	mg/kg wet	50.000		97.8	80-120		
Nitrate	48.6	1.0	5.0	mg/kg wet	50.000		97.2	80-120		
Nitrite	49.2	1.0	5.0	mg/kg wet	50.000		98.4	80-120		
Batch L210243 - Default Prep GenChem										
Blank (L210243-BLK1)				Prepared: 10/25/2012 07:15 Analyzed: 10/26/2012 15:26						
Nitrate/Nitrite as N	0.10 U	0.10	0.50	mg/kg wet						
LCS (L210243-BS1)				Prepared: 10/25/2012 07:15 Analyzed: 10/26/2012 15:24						
Nitrate/Nitrite as N	4.70	0.10	0.50	mg/kg wet	5.0000		94.0	90-110		
Duplicate (L210243-DUP2)	Source: 1210071-01			Prepared: 10/25/2012 07:15 Analyzed: 10/26/2012 15:45						
Nitrate/Nitrite as N	0.10 U	0.10	0.49	mg/kg dry		0.16				20
Matrix Spike (L210243-MS2)	Source: 1210071-01			Prepared: 10/25/2012 07:15 Analyzed: 10/26/2012 15:46						
Nitrate/Nitrite as N	5.10	0.10	0.50	mg/kg dry	5.0435	0.16	98.0	75-125		
Batch L210245 - Default Prep GenChem										
Blank (L210245-BLK1)				Prepared: 10/25/2012 07:15 Analyzed: 10/26/2012 16:01						
Nitrate/Nitrite as N	0.10 U	0.10	0.50	mg/kg wet						

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/02/2012 16:34

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210245 - Default Prep GenChem										
LCS (L210245-BS1)				Prepared: 10/25/2012 07:15 Analyzed: 10/26/2012 16:00						
Nitrate/Nitrite as N	4.71	0.10	0.50	mg/kg wet	5.0000		94.2	90-110		
Batch L210257 - Default Prep GenChem										
Blank (L210257-BLK1)				Prepared: 10/31/2012 13:00 Analyzed: 10/31/2012 13:58						
Sulfate	1.0 U	1.0	5.0	mg/kg wet						
LCS (L210257-BS1)				Prepared: 10/31/2012 13:00 Analyzed: 10/31/2012 13:58						
Sulfate	47.5	1.0	5.0	mg/kg wet	50.000		95.0	80-120		
Batch L210258 - Default Prep GenChem										
Blank (L210258-BLK1)				Prepared: 11/01/2012 13:30 Analyzed: 11/02/2012 13:30						
Hexavalent Chromium	0.20 U	0.20	0.50	mg/kg wet						
LCS (L210258-BS1)				Prepared: 11/01/2012 13:30 Analyzed: 11/02/2012 13:30						
Hexavalent Chromium	5.02	0.20	0.50	mg/kg wet	4.0000		125*	80-120		
LCS (L210258-BS2)				Prepared: 11/01/2012 13:30 Analyzed: 11/02/2012 13:30						
Hexavalent Chromium	1070 D	20.0	50.0	mg/kg wet	1107.7		97	80-120		
Duplicate (L210258-DUP1)		Source: 1210071-01		Prepared: 11/01/2012 13:30 Analyzed: 11/02/2012 13:30						
Hexavalent Chromium	0.21 U	0.21	0.52	mg/kg dry		0.21 U				20
Matrix Spike (L210258-MS1)		Source: 1210071-01		Prepared: 11/01/2012 13:30 Analyzed: 11/02/2012 13:30						
Hexavalent Chromium	3.80	0.21	0.52	mg/kg dry	4.1464	0.21 U	92	75-125		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/02/2012 16:34

Wet Chemistry - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210258 - Default Prep GenChem										
Matrix Spike (L210258-MS2)		**Source: 1210071-01**		Prepared: 11/01/2012 13:30 Analyzed: 11/02/2012 13:30						
Hexavalent Chromium	1050 D	20.7	51.8	mg/kg dry	1201.6	0.21 U	87	75-125		
Batch L211004 - Default Prep GenChem										
Duplicate (L211004-DUP2)		**Source: 1210071-01**		Prepared: 11/01/2012 11:30 Analyzed: 11/01/2012 14:05						
pH	8.86		0.10	pH Units		9.04			2.01	20
Reference (L211004-SRM1)				Prepared: 11/01/2012 11:30 Analyzed: 11/01/2012 12:57						
pH	7.03		0.10	pH Units	7.0000		100	99-101		
Reference (L211004-SRM2)				Prepared: 11/01/2012 11:30 Analyzed: 11/01/2012 14:58						
pH	10.0		0.10	pH Units	10.000		100	99-101		
Reference (L211004-SRM3)				Prepared: 11/01/2012 11:30 Analyzed: 11/01/2012 16:00						
pH	10.0		0.10	pH Units	10.000		100	99-101		
Reference (L211004-SRM4)				Prepared: 11/01/2012 11:30 Analyzed: 11/01/2012 16:50						
pH	10.0		0.10	pH Units	10.000		100	99-101		

Date: 28 January 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100N Field Remediation – Soil Full Protocol – Waste Site 116-N-2
Subject: Pesticide/PCB - Data Package No. K4009-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K4009 prepared by Lionville Laboratories 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
J1R3J2	10/18/12	Soil	C	See note 1 & 2
J1R3J3	10/18/12	Soil	C	See note 1
J1R3J4	10/18/12	Soil	C	See note 1
J1R3J5	10/18/12	Soil	C	See note 1
J1R3J6	10/18/12	Soil	C	See note 1
J1R3J7	10/18/12	Soil	C	See note 1
J1R3J8	10/18/12	Soil	C	See note 1
J1R3J9	10/18/12	Soil	C	See note 1
J1R3K0	10/18/12	Soil	C	See note 1
J1R3K1	10/18/12	Soil	C	See note 1
J1R3K2	10/18/12	Soil	C	See note 1
J1R3K3	10/18/12	Soil	C	See note 1
J1R3K4	10/18/12	Soil	C	See note 1

1 - PCBs by 8082.
2 - Pesticides by 8081A.

Data validation was conducted in accordance with the Washington Closure Hanford Incorporated (WCH) validation statement of work and the 300 Area Remedial Action Sampling and Analysis Plan (DOE/RL-2001-48, Rev. 3). 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. Holding times are not applicable to PCB analytes.

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 Blanks

No field blanks were 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 matrix spike recoveries outside QC limits, all delta-BHC (37.5%) and endrin aldehyde (22%) results were qualified as estimates and flagged "J".

Due to the lack of a matrix spike, matrix spike duplicate and LCS analysis, all toxaphene 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".

Due to a surrogate recovery outside QC limits, all PCB results in sample J1R3K0 were qualified as estimates and flagged "J".

All other 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 the lack of a matrix spike and matrix spike duplicate, all toxaphene results were qualified as estimates and flagged "J".

Due to RPDs outside QC limits, all delta-BHC (45.4%), endrin aldehyde (97.7%) and endosulfan sulfate (49.1%) results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1R3J4/J1R3K4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **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. K4009 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 matrix spike recoveries outside QC limits, all delta-BHC (37.5%) and endrin aldehyde (22%) results were qualified as estimates and flagged "J".

- Due to the lack of a matrix spike, matrix spike duplicate and LCS analysis, all toxaphene results were qualified as estimates and flagged "J",

- Due to a surrogate recovery outside QC limits, all PCB results in sample J1R3K0 were qualified as estimates and flagged "J".

- Due to RPDs outside QC limits, all delta-BHC (45.4%), endrin aldehyde (97.7%) and endosulfan sulfate (49.1%) 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-2001-48, Rev. 3, *300 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 2004.

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

PESTICIDE/PCB DATA QUALIFICATION SUMMARY*

SDG: K4009	**REVIEWER: ELR**	**Project: 116-N-2**	**PAGE_1_OF_1**
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
delta-BHC endrin aldehyde	J	All	MS recovery
All PCB analytes	J	J1R3K0	Surrogate recovery
Toxaphene	J	All	No LCS, MS or MSD analysis
delta-BHC endrin aldehyde endosulfan sulfate	J	All	RPD

* - 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

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Phone: 610-280-3000
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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/07/2012 19:42

J1R3J2
1210071-01 (Soil)

1/24/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Organochlorine Pesticides by SW846 8081A									
alpha-BHC	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
gamma-BHC	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
beta-BHC	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
delta-BHC	1.36	U J	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Heptachlor	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Aldrin	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Heptachlor epoxide	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
gamma-Chlordane	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
alpha-Chlordane	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Endosulfan I	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
4,4'-DDE	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Dieldrin	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Endrin	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
4,4'-DDD	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Endosulfan II	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
4,4'-DDT	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Endrin aldehyde	1.36	U J	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Endosulfan sulfate	1.36	U J	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Methoxychlor	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Endrin ketone	1.36	U	1.36	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Toxaphene	13.6	U J	13.6	ug/kg dry	4	L210233	10/26/2012	11/02/2012	8081A
Surrogate: Tetrachloro-meta-xylene	*96.3 %*		*28-166*			*L210233*	*10/26/2012*	*11/02/2012*	*8081A*
Surrogate: Decachlorobiphenyl	*114 %*		*37-153*			*L210233*	*10/26/2012*	*11/02/2012*	*8081A*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3J2
1210071-01 (Soil)

1/20/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Aroclor 1221	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Aroclor 1232	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Aroclor 1242	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Aroclor 1248	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Aroclor 1254	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Aroclor 1260	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Aroclor 1262	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Aroclor 1268	13.7	U	13.7	ug/kg dry	1	L210233	10/26/2012	11/07/2012	8082
Surrogate: Decachlorobiphenyl	*102 %*		*43-144*			*L210233*	*10/26/2012*	*11/07/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*95 %*		*52-141*			*L210233*	*10/26/2012*	*11/07/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3J3
1210071-02 (Soil)

1/24/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.9	U	13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.9	U	13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.9	U	13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.9	U	13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.9	U	13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	**17.4**		13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	**10.4**	J	13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.9	U	13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.9	U	13.9	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*106 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*101 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3J4
1210071-03 (Soil)

V 11/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*113 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*104 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3J5
1210071-04 (Soil)

11/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	**10.4**	J	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	**11.1**	J	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*99 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*88 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

000000138

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3J6
1210071-05 (Soil)

11/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*105 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*91 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3J7
1210071-06 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*107 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*91 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3J8
1210071-07 (Soil)

1/20/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*101 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*74 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3J9
1210071-08 (Soil)

1/22/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.1	U	13.1	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*100 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*92 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3K0
1210071-09 (Soil)

V 11/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.2	U	13.2	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*75 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*44 % **		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/08/2012 14:25

J1R3K1
1210071-10 (Soil)

V 1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.6	U	13.6	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*113 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*100 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3K2
1210071-11 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.3	U	13.3	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*68 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*83 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/08/2012 14:25

J1R3K3
1210071-12 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.5	U	13.5	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*106 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*101 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/12/2012 14:15

J1R3K4

1210071-13 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polychlorinated Biphenyls by SW846 8082									
Aroclor 1016	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1221	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1232	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1242	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1248	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1254	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1260	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1262	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Aroclor 1268	13.4	U	13.4	ug/kg dry	1	L210233	10/26/2012	11/08/2012	8082
Surrogate: Decachlorobiphenyl	*100 %*		*43-144*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*
Surrogate: Tetrachloro-meta-xylene	*88 %*		*52-141*			*L210233*	*10/26/2012*	*11/08/2012*	*8082*

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-189 K4009
LVL #: 1210071

W.O. #: 60049-001-001-0001-00
Date Received: 10-24-2012

CHLORINATED PESTICIDES

One (1) soil sample was collected on 10-18-2012.

The sample and associated QC samples were extracted 10-26-2012 and analyzed 11-02-2012 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C, and the analysis procedure was based on SW846 Method 8081A for client specified target compounds. The sample received Copper-Sulfur cleanup based on SW846 method 3660A.

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

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

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

3. Four (4) of ten (10) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR#12GC184) has been enclosed.

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

5. All blank spike recoveries were within acceptance criteria.

6. Four (4) of forty (40) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 12GC184) has been enclosed.

7. All samples required instrument dilutions due to the nature of the matrix. Reporting limits have been adjusted to reflect the necessary dilutions.

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

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

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

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

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

Iain Daniels
LvL Laboratory Manager

11/12/12
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12GC184

Initiator: Catherine Carey
Date: 11/07/12
Client: WC Hanford

Batch: L210233
Samples: BS1, MS1, MSD1
Method: SW846/MCAWW/CLP/

Parameter: Pest
Matrix: SOIL
Prep Batch: L

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)

DCB recovery is high in BS1, MS1, +MSD1
TCX recovery is high in BS1, ~~+MSD1~~ CAC 11/07/12
CAC 11/07/12

several spike recoveries are low in MS1 +MSD1

2. Known or Probable Causes(s)

double surrogated by extraction

LOW MS = MATRIX EFFECT ID.

3. Discussion and Proposed Action Other Description:

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

Narrate ID

4. Project Manager Instructions...signature/date: 11/13/12

✓ 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: 11/13/12 Other Explanation:

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

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

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

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

Case Narrative

Client: WC-HANFORD RC-189 K4009
LVL #: 1210071

W.O. #: 60049-001-001-0001-00
Received: 10-24-2012

PCBs

Thirteen (13) soil samples were collected on 10-18-2012.

The samples and associated QC samples were extracted 10-26-2012 and analyzed 11-07,08-2012 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C and the analysis procedure was based on SW846 Method 8082. All samples received Copper-Sulfur and Sulfuric Acid cleanups based on SW846 methods 3660A and 3665A.

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

1. The results presented in this report are derived from samples that met LvL's sample acceptance policy with exceptions noted on the Sample Receipt Checklist.
2. All required holding times for extraction and analysis have been met.
3. One (1) of thirty-four (34) surrogate recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR#12GC185) has been enclosed.
4. The method blank was below the reporting limits for all target compounds.
5. All blank spike recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. The samples are reported on a dry weight basis.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria. Per SW846 Method 8000B, the attached table lists compounds where the %difference or drift was greater than 15%, and the mean across all compounds was used for evaluation of the continuing calibration. Results associated with these compounds are considered to have greater uncertainty.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or a designee as verified by the following signature.

Iain Daniels
LvL Laboratory Manager

11/12/12
Date

r:\group\data\2012\pcb\wc hanford\1210071.doc

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12GC185

Initiator: Catherine Carey
Date: 11/08/12
Client: WC Hanford

Batch: 1210071
Samples: 09
Method: SW846/MCAWW/CLP/

Parameter: PCB
Matrix: SOIL
Prep Batch: L210233

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)

TCX recovery is low in #09 (44.5%)

2. Known or Probable Causes(s) TCX is more volatile than target analytes and is easily lost during blow down/boil down. DCB is good

3. Discussion and Proposed Action Other Description:

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

Narrate

4. Project Manager Instructions...signature/date: 11/13/12

✓ 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: 11/13/12 Other Explanation:

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

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

Route
__ Lab Manager: Daniele
✓ 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

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 1 of 3

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ Days 15		
Project Designation: 100N Field Remediation - Soil Pull Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: (Fed Ex) ~~Hand Deliver~~
Shipped To: ~~EDERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120 631/632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad < DOT Limits AJ 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	sG	sG	sG	sG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1		0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time											RCF
J1R3J2	SOIL	10-18-12	1010	X	X	X	X	X	X	X	X	X		34720
J1R3J3	SOIL	10-18-12	1020	X	X	X	X	X	X	X		X		
J1R3J4	SOIL	10-18-12	1050	X	X	X	X	X	X	X		X		34721
J1R3J5	SOIL	10-18-12	1035	X	X	X	X	X	X	X		X		34722
J1R3J6	SOIL	10-18-12	1200	X	X	X	X	X	X	X		X		

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1700 10/18/12	Dennis Newman	1700 10/18/12
Dennis Newman	2020 10/18/12	Ref #3, 1060 Battelle	2020 10/18/12
Ref. #3 1060 Battelle	0800 10-19-12	[illegible]	0800 10-19-12
[illegible] WCH	1045 10-23-12	Fed EX	
Fed Ex	0950 10/24/12	Victor Hernandez	0950 10/24/12

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) [Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226]

* freeze upon receipt AJ 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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00000005

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 2 of 3

Collector: Q. Stowe	Company Contact: Joan Kessner; Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12; Data Turnaround: ~~21~~ 15 Days 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification	SAF No.: RC-189	
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07; COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~ 10/18/12	
Shipped To: ~~EBERLINE SERVICES~~ LIONVILLE 10/18/12	Offsite Property No.: A120631/632	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AS 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J7	SOIL	10-18-12	1040	X	X	X	X	X	X	X			
J1R3J8	SOIL	10-18-12	1255	X	X	X	X	X	X	X			
J1R3J9	SOIL	10-18-12	1207	X	X	X	X	X	X	X			
J1R3K0	SOIL	10-18-12	1237	X	X	X	X	X	X	X			
J1R3K1	SOIL	10-18-12	1247	X	X	X	X	X	X	X			

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1700 10/18/12	Dennis Newman	1700 10/18/12
Dennis Newman	2020 10/18/12	Ref #3, 1060 Battelle	2020 10/18/12
Ref. #3 Battelle	10-19-12 10-18-12 0800	Cindy Burnham	1060#3 0800
Cindy Burnham WCH	1060#3 10-23-12 1245	Fed Ex	
Fed Ex	10/24/12 0950	Victor Hernandez	10/24/12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* Freeze upon receipt AS 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil, SB=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

REVIEWED BY AF DATE 10-23-12

WCH-EE-011

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 1 of 83

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K 10/18/12	Data Turnaround: ~~21~~ Days 15 10/18/12		
Project Designation: 100N Field Remediation - Soil Pull Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~ 10/18/12
Shipped To: ~~BREERLINE SERVICES~~ / LIONVILLE 10/18/12	Offsite Property No.: A120631/632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE ~~HAZARDS~~/REMARKS

Potential Rad & DOT Limits A# 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	sG	sG	sG	sG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium
J1R3K2	SOIL	10-18-12	1218	X	X	X	X	X	X	X			
J1R3K3	SOIL	10-18-12	1229	X	X	X	X	X	X	X	34719		
J1R3K4	SOIL	10-18-12	1050	X	X	X	X	X	X	X			

RCE 10/18/12

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1700 10/18/12	Dennis Newman	1700 10/18/12
Dennis Newman	2020 10/18/12	Ref #3, 1060 Battelle	2020 10/18/12
Ref #3, 1060 Battelle	0800 10-19-12	[illegible]	1060#3 0800 10-19-12
[illegible] WCH	1060#3 10-23-12 1245	Fed Ex	
Fed Ex	10/24/12 0950	[illegible] Rodriguez	10-24-12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* freeze upon receipt. A# 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, W=Wipe, L=Liquid, V=Vegetation, X=Other

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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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Appendix 5

Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-N-2			DATA PACKAGE: K4009		
VALIDATOR: ELR		LAB: LLI		DATE: 1/17/13	
			SDG: K4009		

ANALYSES PERFORMED

SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		

SAMPLES/MATRIX

J1R3J2	J1R3J3	J1R3J4	J1R3J5	J1R3J6
J1R3J7	J1R3J8	J1R3J9	J1R3K0	J1R3K1
J1R3K2	J1R3K3	J1R3K4		
				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 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

DDT and endrin breakdowns acceptable? ..... Yes No N/A

Comments:

PCB 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 analyzed? ..... Yes No N/A

Surrogate 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 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/MSD - pest - 2 out - J all

surr - pcb - ko - J all

tox - no MS/MSD/LCS - J all

PCB 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: MSD - pest - 111 out - J all

no tox MS/MSD - J all

JY/KY

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? ..... Yes No N/A

Positive results resolved acceptably? ..... 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: Hold time PCB - N/A

PCB 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

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)

Fluoricil ® (or other absorbent) cleanup performed? ..... Yes No N/A

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

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

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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/07/2012 19:42

Organochlorine Pesticides by SW846 8081A - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210233 - SW 3540C										
Blank (L210233-BLK1)				Prepared: 10/26/2012 Analyzed: 11/02/2012						
alpha-BHC	0.330	U	0.330	ug/kg wet						
gamma-BHC	0.330	U	0.330	ug/kg wet						
beta-BHC	0.330	U	0.330	ug/kg wet						
delta-BHC	0.330	U	0.330	ug/kg wet						
Heptachlor	0.330	U	0.330	ug/kg wet						
Aldrin	0.330	U	0.330	ug/kg wet						
Heptachlor epoxide	0.330	U	0.330	ug/kg wet						
gamma-Chlordane	0.330	U	0.330	ug/kg wet						
alpha-Chlordane	0.330	U	0.330	ug/kg wet						
Endosulfan I	0.330	U	0.330	ug/kg wet						
4,4'-DDE	0.330	U	0.330	ug/kg wet						
Dieldrin	0.330	U	0.330	ug/kg wet						
Endrin	0.330	U	0.330	ug/kg wet						
4,4'-DDD	0.330	U	0.330	ug/kg wet						
Endosulfan II	0.330	U	0.330	ug/kg wet						
4,4'-DDT	0.330	U	0.330	ug/kg wet						
Endrin aldehyde	0.330	U	0.330	ug/kg wet						
Endosulfan sulfate	0.330	U	0.330	ug/kg wet						
Methoxychlor	0.330	U	0.330	ug/kg wet						
Endrin ketone	0.330	U	0.330	ug/kg wet						
Toxaphene	3.30	U	3.30	ug/kg wet						
Surrogate: Tetrachloro-meta-xylene	*32.7*			*ug/kg wet*	*33.337*		*98.1*	*28-166*		
Surrogate: Decachlorobiphenyl	*37.5*			*ug/kg wet*	*33.333*		*112*	*37-153*		
LCS (L210233-BS1)				Prepared: 10/26/2012 Analyzed: 11/02/2012						
alpha-BHC	32.4		0.330	ug/kg wet	33.333		97.3	65-145		
gamma-BHC	32.7		0.330	ug/kg wet	33.333		98.1	70-143		
beta-BHC	32.0		0.330	ug/kg wet	33.333		96.1	75-143		
delta-BHC	34.7		0.330	ug/kg wet	33.333		104	65-143		
Heptachlor	33.1		0.330	ug/kg wet	33.333		99.4	70-139		
Aldrin	30.9		0.330	ug/kg wet	33.333		92.7	70-143		
Heptachlor epoxide	32.8		0.330	ug/kg wet	33.333		98.5	71-138		
gamma-Chlordane	33.3		0.330	ug/kg wet	33.333		100	71-137		
alpha-Chlordane	33.5		0.330	ug/kg wet	33.333		100	72-136		
Endosulfan I	33.3		0.330	ug/kg wet	33.333		99.9	72-139		
4,4'-DDE	35.3		0.330	ug/kg wet	33.333		106	70-154		
Dieldrin	34.5		0.330	ug/kg wet	33.333		103	73-143		

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/07/2012 19:42

Organochlorine Pesticides by SW846 8081A - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210233 - SW 3540C										
LCS (L210233-BS1)				Prepared: 10/26/2012 Analyzed: 11/02/2012						
Endrin	36.1		0.330	ug/kg wet	33.333		108	74-137		
4,4'-DDD	38.7		0.330	ug/kg wet	33.333		116	52-153		
Endosulfan II	34.6		0.330	ug/kg wet	33.333		104	72-139		
4,4'-DDT	37.8		0.330	ug/kg wet	33.333		114	58-148		
Endrin aldehyde	19.3		0.330	ug/kg wet	33.333		58.0	49-129		
Endosulfan sulfate	35.1		0.330	ug/kg wet	33.333		105	66-139		
Methoxychlor	39.1		0.330	ug/kg wet	33.333		117	50-144		
Endrin ketone	36.2		0.330	ug/kg wet	33.333		108	70-139		
Surrogate: Tetrachloro-meta-xylene	*53.3*			*ug/kg wet*	*33.337*		*160*	*28-166*		
Surrogate: Decachlorobiphenyl	*66.7*			*ug/kg wet*	*33.333*		*200**	*37-153*		
Matrix Spike (L210233-MS1)		**Source: 1210071-01**		Prepared: 10/26/2012 Analyzed: 11/02/2012						
alpha-BHC	23.9	D	1.36	ug/kg dry	34.461	1.36 U	69.4	65-145		
gamma-BHC	26.2	D	1.36	ug/kg dry	34.461	1.36 U	76.0	70-143		
beta-BHC	31.0	D	1.36	ug/kg dry	34.461	1.36 U	90.1	75-143		
delta-BHC	12.9	D	1.36	ug/kg dry	34.461	1.36 U	37.5*	65-143		
Heptachlor	30.3	D	1.36	ug/kg dry	34.461	1.36 U	88.0	70-139		
Aldrin	28.8	D	1.36	ug/kg dry	34.461	1.36 U	83.7	70-143		
Heptachlor epoxide	30.3	D	1.36	ug/kg dry	34.461	1.36 U	88.0	71-138		
gamma-Chlordane	30.5	D	1.36	ug/kg dry	34.461	1.36 U	88.5	71-137		
alpha-Chlordane	31.0	D	1.36	ug/kg dry	34.461	1.36 U	90.0	72-136		
Endosulfan I	30.1	D	1.36	ug/kg dry	34.461	1.36 U	87.3	72-139		
4,4'-DDE	32.6	D	1.36	ug/kg dry	34.461	1.36 U	94.6	70-154		
Dieldrin	30.2	D	1.36	ug/kg dry	34.461	1.36 U	87.5	73-143		
Endrin	32.6	D	1.36	ug/kg dry	34.461	1.36 U	94.7	74-137		
4,4'-DDD	30.5	D	1.36	ug/kg dry	34.461	1.36 U	88.6	52-153		
Endosulfan II	30.4	D	1.36	ug/kg dry	34.461	1.36 U	88.3	72-139		
4,4'-DDT	32.7	D	1.36	ug/kg dry	34.461	1.36 U	95.0	58-148		
Endrin aldehyde	7.58	D	1.36	ug/kg dry	34.461	1.36 U	22.0*	49-129		
Endosulfan sulfate	17.9	D	1.36	ug/kg dry	34.461	1.36 U	51.8*	66-139		
Methoxychlor	39.0	D	1.36	ug/kg dry	34.461	1.36 U	113	50-144		
Endrin ketone	34.3	D	1.36	ug/kg dry	34.461	1.36 U	99.6	70-139		
Surrogate: Tetrachloro-meta-xylene	*57.7*			*ug/kg dry*	*34.465*		*167**	*28-166*		
Surrogate: Decachlorobiphenyl	*75.7*			*ug/kg dry*	*34.461*		*220**	*37-153*		

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2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/07/2012 19:42

Organochlorine Pesticides by SW846 8081A - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210233 - SW 3540C										
Matrix Spike Dup (L210233-MSD1)		**Source: 1210071-01**		Prepared: 10/26/2012 Analyzed: 11/02/2012						
alpha-BHC	25.0	D	1.37	ug/kg dry	34.530	1.36 U	72.4	65-145	4.23	40
gamma-BHC	26.6	D	1.37	ug/kg dry	34.530	1.36 U	77.1	70-143	1.44	40
beta-BHC	30.2	D	1.37	ug/kg dry	34.530	1.36 U	87.6	75-143	2.81	40
delta-BHC	20.5	D	1.37	ug/kg dry	34.530	1.36 U	59.5*	65-143	45.4*	40
Heptachlor	29.1	D	1.37	ug/kg dry	34.530	1.36 U	84.3	70-139	4.29	40
Aldrin	26.9	D	1.37	ug/kg dry	34.530	1.36 U	78.0	70-143	7.05	40
Heptachlor epoxide	28.7	D	1.37	ug/kg dry	34.530	1.36 U	83.0	71-138	5.85	40
gamma-Chlordane	28.8	D	1.37	ug/kg dry	34.530	1.36 U	83.4	71-137	5.93	40
alpha-Chlordane	29.2	D	1.37	ug/kg dry	34.530	1.36 U	84.7	72-136	6.07	40
Endosulfan I	28.6	D	1.37	ug/kg dry	34.530	1.36 U	82.7	72-139	5.41	40
4,4'-DDE	29.5	D	1.37	ug/kg dry	34.530	1.36 U	85.3	70-154	10.3	40
Dieldrin	28.4	D	1.37	ug/kg dry	34.530	1.36 U	82.3	73-143	6.12	40
Endrin	30.5	D	1.37	ug/kg dry	34.530	1.36 U	88.4	74-137	6.88	40
4,4'-DDD	29.0	D	1.37	ug/kg dry	34.530	1.36 U	84.0	52-153	5.33	40
Endosulfan II	29.7	D	1.37	ug/kg dry	34.530	1.36 U	86.0	72-139	2.64	40
4,4'-DDT	31.0	D	1.37	ug/kg dry	34.530	1.36 U	89.7	58-148	5.74	40
Endrin aldehyde	22.1	D	1.37	ug/kg dry	34.530	1.36 U	64.0	49-129	97.7*	40
Endosulfan sulfate	29.5	D	1.37	ug/kg dry	34.530	1.36 U	85.5	66-139	49.1*	40
Methoxychlor	35.4	D	1.37	ug/kg dry	34.530	1.36 U	102	50-144	9.83	40
Endrin ketone	31.8	D	1.37	ug/kg dry	34.530	1.36 U	92.0	70-139	7.93	40
Surrogate: Tetrachloro-meta-xylene	*56.6*			*ug/kg dry*	*34.534*		*164*	*28-166*		
Surrogate: Decachlorobiphenyl	*67.8*			*ug/kg dry*	*34.530*		*196**	*37-153*		

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/08/2012 14:25

Polychlorinated Biphenyls by SW846 8082 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210233 - SW 3540C										
Blank (L210233-BLK2)				Prepared: 10/26/2012 Analyzed: 11/07/2012						
Aroclor 1016	13.3	U	13.3	ug/kg wet						
Aroclor 1221	13.3	U	13.3	ug/kg wet						
Aroclor 1232	13.3	U	13.3	ug/kg wet						
Aroclor 1242	13.3	U	13.3	ug/kg wet						
Aroclor 1248	13.3	U	13.3	ug/kg wet						
Aroclor 1254	13.3	U	13.3	ug/kg wet						
Aroclor 1260	13.3	U	13.3	ug/kg wet						
Aroclor 1262	13.3	U	13.3	ug/kg wet						
Aroclor 1268	13.3	U	13.3	ug/kg wet						
Surrogate: Decachlorobiphenyl	*36.2*			*ug/kg wet*	*33.333*		*109*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*34.0*			*ug/kg wet*	*33,337*		*102*	*52-141*		
LCS (L210233-BS2)				Prepared: 10/26/2012 Analyzed: 11/07/2012						
Aroclor 1016	129		13.3	ug/kg wet	166.67		77	50-138		
Aroclor 1260	154		13.3	ug/kg wet	166.67		92	50-148		
Surrogate: Decachlorobiphenyl	*31.8*			*ug/kg wet*	*33.333*		*95*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*29.3*			*ug/kg wet*	*33.337*		*88*	*52-141*		
Matrix Spike (L210233-MS2)		**Source: 1210071-01**		Prepared: 10/26/2012 Analyzed: 11/08/2012						
Aroclor 1016	133		13.5	ug/kg dry	168.66	13.7 U	79	50-138		
Aroclor 1260	157		13.5	ug/kg dry	168.66	13.7 U	93	50-148		
Surrogate: Decachlorobiphenyl	*32.5*			*ug/kg dry*	*33.733*		*96*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*29.8*			*ug/kg dry*	*33.736*		*88*	*52-141*		
Matrix Spike Dup (L210233-MSD2)		**Source: 1210071-01**		Prepared: 10/26/2012 Analyzed: 11/08/2012						
Aroclor 1016	144		13.5	ug/kg dry	168.77	13.7 U	85	50-138	8	40
Aroclor 1260	173		13.5	ug/kg dry	168.77	13.7 U	103	50-148	10	40
Surrogate: Decachlorobiphenyl	*35.7*			*ug/kg dry*	*33.754*		*106*	*43-144*		
Surrogate: Tetrachloro-meta-xylene	*32.3*			*ug/kg dry*	*33.758*		*96*	*52-141*		

Date: 28 January 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100N Field Remediation – Soil Full Protocol – Waste Site 116-N-2
Subject: Polyaromatic Hydrocarbons - Data Package No. K4009-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K4009 prepared by Lionville Laboratories 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
J1R3J2	10/18/12	Soil	C	See note 1
J1R3J3	10/18/12	Soil	C	See note 1
J1R3J4	10/18/12	Soil	C	See note 1
J1R3J5	10/18/12	Soil	C	See note 1
J1R3J6	10/18/12	Soil	C	See note 1
J1R3J7	10/18/12	Soil	C	See note 1
J1R3J8	10/18/12	Soil	C	See note 1
J1R3J9	10/18/12	Soil	C	See note 1
J1R3K0	10/18/12	Soil	C	See note 1
J1R3K1	10/18/12	Soil	C	See note 1
J1R3K2	10/18/12	Soil	C	See note 1
J1R3K3	10/18/12	Soil	C	See note 1
J1R3K4	10/18/12	Soil	C	See note 1

1 – Polyaromatic hydrocarbons by 8310..

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 300 Area Remedial Action Sampling and Analysis Plan (DOE/RL-2001-48, Rev. 3). 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 Blanks

No field blanks were 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.

All 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

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.

All laboratory results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1R3J4/J1R3K4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **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 RQLs were met.

- **Completeness**

Data package No. K4009 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

None found.

REFERENCES

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

DOE/RL-2001-48, Rev. 3, *300 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 2004.

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

POLYAROMATIC HYDROCARBON DATA QUALIFICATION SUMMARY*

SDG: K4009	REVIEWER: ELR	Project: 116-N-2	PAGE_1_OF_1
COMMENTS: No qualifiers assigned			

* - 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

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3J2
1210071-01 (Soil)

V 11/26/12

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	3.27	J	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	2.48	J	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	1.77	J	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	1.38	J	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	1.27	J	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	0.877	J	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	3.44	U	3.44	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*83 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3J3
1210071-02 (Soil)

1/20/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	**2.18**	J	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	**7.17**		3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	**9.14**		3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	**7.05**		3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	**6.06**		3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	**5.08**		3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	**7.25**		3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	**0.894**	J	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	**5.03**		3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*96 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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LIONVILLE LABORATORY
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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3J4
1210071-03 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	**2.30**	J	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	3.35	U	3.35	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*90 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3J5
1210071-04 (Soil)

V 1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	9.02		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.34	U	3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.34	U	3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.34	U	3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	2.07	J	3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.34	U	3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	11.5		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	11.7		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	14.2		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	12.5		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	12.1		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	6.52		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	4.64		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	10.5		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	1.39	J	3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	11.3		3.34	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*85 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3J6
1210071-05 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**2.10**	J	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.23	U	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.23	U	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.23	U	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	**0.970**	J	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.23	U	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	**1.73**	J	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	3.23	U	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	**1.20**	J	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	**0.890**	J	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	**1.62**	J	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	**1.46**	J	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.23	U	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	**0.890**	J	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.23	U	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	3.23	U	3.23	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*94 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	**Reported:** 11/06/2012 20:32

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J1R3J7
1210071-06 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	3.37	U	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.37	U	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.37	U	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.37	U	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	**2.61**	J	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.37	U	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	**5.11**		3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	**1.20**	J	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	**4.74**		3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	**3.10**	J	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	**2.12**	J	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	**1.47**	J	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.37	U	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	**2.33**	J	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.37	U	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	**1.62**	J	3.37	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*95 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3J8
1210071-07 (Soil)

1/24/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**1.20**	J	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	**0.941**	J	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.30	U	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	**0.842**	J	3.30	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*104 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

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J1R3J9
1210071-08 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	3.25	U	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.25	U	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.25	U	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.25	U	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	**1.22**	J	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.25	U	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	**7.60**		3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	**2.24**	J	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	**6.67**		3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	**5.86**		3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	**4.68**		3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	**4.15**		3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	**2.00**	J	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	**4.28**		3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.25	U	3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	**3.46**		3.25	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*88 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3K0
1210071-09 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**2.41**	J	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.40	U	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.40	U	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.40	U	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	**1.07**	J	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.40	U	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	**3.28**	J	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	3.40	U	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	**2.46**	J	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	**2.29**	J	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	**1.72**	J	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	3.40	U	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.40	U	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	**1.58**	J	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.40	U	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	**0.901**	J	3.40	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*85 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3K1
1210071-10 (Soil)

VT 1/22/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**1.63**	J	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	3.39	U	3.39	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*84 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3K2
1210071-11 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Fluorene	**22.2**	J, D	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Anthracene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	**136**	D	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Pyrene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	**160**	D	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Chrysene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	**454**	D	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	**450**	D	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	81.7	U	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	**859**	D	81.7	ug/kg dry	25	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*72 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

J1R3K3
1210071-12 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	**2.11**	J	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.31	U	3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	**21.1**		3.31	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*91 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/12/2012 14:16

J1R3K4
1210071-13 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Polynuclear Aromatic Compounds by SW846 8310									
Naphthalene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthylene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Acenaphthene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluorene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Phenanthrene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Anthracene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Fluoranthene	**0.966**	J	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Indeno[1,2,3-cd]pyrene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Pyrene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benz[a]anthracene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Chrysene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[b] fluoranthene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[k] fluoranthene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[a] pyrene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Dibenz[a,h]anthracene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Benzo[g,h,i] perylene	3.33	U	3.33	ug/kg dry	1	L210219	10/25/2012	11/01/2012	8310
Surrogate: Triphenylene	*90 %*		*68-129*			*L210219*	*10/25/2012*	*11/01/2012*	*8310*

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-189 K4009
LVL #: 1210071

W.O. #: 60049-001-001-0001-00
Date Received: 10-24-2012

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

Thirteen (13) soil samples were collected on 10-18-2012.

The samples and associated QC samples were extracted 10-25-2012 and analyzed 11-01-2012 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C and the analysis procedure was based on SW846 Method 8310.

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

1. The results presented in this report are derived from samples that met LvL's sample acceptance policy with exceptions noted on the Sample Receipt Checklist.
2. All required holding times for extraction and analysis have been met.
3. Sample J1R3K2 required a 25-fold instrument dilution. The sample contained a large amount of non-target interference and the data user is advised to be cautious in making decisions based on this data for this samples (check the 8270 semivolatiles data also).
4. All obtainable surrogate recoveries were within acceptance criteria.
5. The method blank was below the reporting limits for all target compounds.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. The initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. The samples were reported on a dry weight basis.

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

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

Iain Daniels
LvL Laboratory Manager

11/12/12
Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-189-128	Page 1 of 3
Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12
Project Designation: 100N Field Remediation - Soil Pull Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189	Data Turnaround: ~~21~~ Days 15 10/18/12
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex, ~~Hand Deliver~~ 10/18/12	
Shipped To: ~~EBERLINE SERVICES~~ LIONVILLE 10/18/12	Offsite Property No.: A120 631/632		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limit At 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	sG	sG	sG	sG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1		0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time											RCF
J1R3J2	SOIL	10-18-12	1010	X	X	X	X	X	X	X	X	X		34720
J1R3J3	SOIL	10-18-12	1020	X	X	X	X	X	X	X		X		
J1R3J4	SOIL	10-18-12	1050	X	X	X	X	X	X	X		X	X	34721
J1R3J5	SOIL	10-18-12	1035	X	X	X	X	X	X	X		X	X	34722
J1R3J6	SOIL	10-18-12	1200	X	X	X	X	X	X	X		X	X	

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From: Quincy Stowe	Received By/Stored In: Dennis Newman	1700 10/18/12
Relinquished By/Removed From: Dennis Newman	Received By/Stored In: Ref #3, 1060 Battelle	2020 10/18/12
Relinquished By/Removed From: Ref. #3 1060 Battelle	Received By/Stored In: [illegible]	0800 10-19-12
Relinquished By/Removed From: [illegible]	Received By/Stored In: Fed EX	1060#3 10-23-12 1245
Relinquished By/Removed From: Fed EX	Received By/Stored In: VICTOR HERNANDEZ	10/24/12 0950
Relinquished By/Removed From:	Received By/Stored In:	

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* freeze upon receipt At 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil, SB=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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-189-128	Page 2 of 3
Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189	Data Turnaround: ~~21~~ 15 Days 10/18/12
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~ 10/18/12	
Shipped To: ~~EBERLINE SERVICES~~ LIONVILLE 10/18/12	Offsite Property No.: A120631/632		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AS 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J7	SOIL	10-18-12	1040	X	X	X	X	X	X	X			
J1R3J8	SOIL	10-18-12	1255	X	X	X	X	X	X	X			
J1R3J9	SOIL	10-18-12	1207	X	X	X	X	X	X	X			
J1R3K0	SOIL	10-18-12	1237	X	X	X	X	X	X	X			
J1R3K1	SOIL	10-18-12	1247	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From: Quincy Stowe Date/Time: 1700 10/18/12	Received By/Stored In: Dennis Newman Date/Time: 1700 10/18/12	
Relinquished By/Removed From: Dennis Newman Date/Time: 2020 10/18/12	Received By/Stored In: Ref #3, 1060 Battelle Date/Time: 2020 10/18/12	
Relinquished By/Removed From: Ref. #3 Battelle Date/Time: 10-19-12 ~~10-18-12~~ 0800	Received By/Stored In: Lindsay Bingham Date/Time: 10-19-12 0800	
Relinquished By/Removed From: Lindsay Bingham Date/Time: 1060 #3 WCH 10-23-12 1245	Received By/Stored In: Fed Ex Date/Time:	
Relinquished By/Removed From: Fed Ex Date/Time: 10/24/12 0950	Received By/Stored In: Victor Hernandez Date/Time: 10/24/12 0950	
Relinquished By/Removed From: Date/Time:	Received By/Stored In: Date/Time:	

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* Freeze upon receipt AS 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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	Time	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

REVIEWED BY AF DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 2 of 53

Collector: Q. Stowe	Company Contact: Joan Kessner — Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K ej 10/18/12 — Data Turnaround: ~~21~~ Days 15 ej 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification	SAF No.: RC-189	
Ice Chest No.: RCC-07-011	Field Logbook No.: BI-1652-07 — COA: R116N22000	Method of Shipment: Fed EX ~~Hand Deliver~~ ej 10/18/12	
Shipped To: ~~SHERLINE SERVICES~~ / LIONVILLE ej 10/18/12	Offsite Property No.: A120631/1632	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE ~~HAZARDS~~/REMARKS

Potential Rad & DOT Limits A# 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	sG	sG	sG	sG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3K2	SOIL	10-18-12	1218	X	X	X	X	X	X	X			
J1R3K3	SOIL	10-18-12	1229	X	X	X	X	X	X	X	34719		
J1R3K4	SOIL	10-18-12	1050	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Quincy Stowe	10/18/12 1700	Dennis Newman	10/18/12 1700
Relinquished By/Removed From	Dennis Newman	10/18/12 2020	Ref #3, 1060 Battelle	10/18/12 2020
Relinquished By/Removed From	Ref #3, 1060 Battelle	10-19-12 0800	[illegible]	10-19-12 0800
Relinquished By/Removed From	[illegible]	10-23-12 1245	Fed EX	
Relinquished By/Removed From	Fed Ex	10/24/12 0950	Victor Hernandez	10-24-12 0950
Relinquished By/Removed From			Received By/Stored In	

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}
* freeze upon receipt. A# 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *
S=Soil
SD=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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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Appendix 5

Data Validation Supporting Documentation

GENERAL ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-N-2			DATA PACKAGE: K4009		
VALIDATOR: ELR		LAB: LLF		DATE: 1/17/13	
			SDG: K4009		

ANALYSES PERFORMED					
8015	8021	8141	8151	8315	8310
		WTPH-HCID	WTPH-G	WTPH-D	

SAMPLES/MATRIX:

J1R3J2	J1R3J3	J1R3J4	J1R3J5	J1R3J6
J1R3J7	J1R3J8	J1R3J9	J1R3K0	J1R3K1
J1R3K2	J1R3K3	J1R3K4		
				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)

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:

GENERAL 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 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 ORGANIC 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: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, 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: _____

9. SAMPLE CLEANUP (Levels D and E)

Fluoricil ® (or other aborbant) cleanup performed? ..... Yes No N/A

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

Check recoveries aceptable? ..... Yes No N/A

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

Check 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

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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

Polynuclear Aromatic Compounds by SW846 8310 - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210219 - SW 3540C										
Blank (L210219-BLK1)				Prepared: 10/25/2012 Analyzed: 11/01/2012						
Naphthalene	3.33	U	3.33	ug/kg wet						
Acenaphthylene	3.33	U	3.33	ug/kg wet						
Acenaphthene	3.33	U	3.33	ug/kg wet						
Fluorene	3.33	U	3.33	ug/kg wet						
Phenanthrene	3.33	U	3.33	ug/kg wet						
Anthracene	3.33	U	3.33	ug/kg wet						
Fluoranthene	3.33	U	3.33	ug/kg wet						
Indeno[1,2,3-cd]pyrene	3.33	U	3.33	ug/kg wet						
Pyrene	3.33	U	3.33	ug/kg wet						
Benz[a]anthracene	3.33	U	3.33	ug/kg wet						
Chrysene	3.33	U	3.33	ug/kg wet						
Benzo[b] fluoranthene	3.33	U	3.33	ug/kg wet						
Benzo[k] fluoranthene	3.33	U	3.33	ug/kg wet						
Benzo[a] pyrene	3.33	U	3.33	ug/kg wet						
Dibenz[a,h]anthracene	3.33	U	3.33	ug/kg wet						
Benzo[g,h,i] perylene	3.33	U	3.33	ug/kg wet						
Surrogate: Triphenylene	*152*			*ug/kg wet*	*166.67*		*91*	*68-129*		
LCS (L210219-BS1)				Prepared: 10/25/2012 Analyzed: 11/01/2012						
Naphthalene	139		3.33	ug/kg wet	166.67		84	0-127		
Acenaphthylene	128		3.33	ug/kg wet	166.67		77	50-140		
Acenaphthene	132		3.33	ug/kg wet	166.67		79	17-139		
Fluorene	134		3.33	ug/kg wet	166.67		80	28-145		
Phenanthrene	141		3.33	ug/kg wet	166.67		85	30-152		
Anthracene	145		3.33	ug/kg wet	166.67		87	19-171		
Fluoranthene	151		3.33	ug/kg wet	166.67		90	34-159		
Indeno[1,2,3-cd]pyrene	152		3.33	ug/kg wet	166.67		91	31-156		
Pyrene	153		3.33	ug/kg wet	166.67		92	33-152		
Benz[a]anthracene	156		3.33	ug/kg wet	166.67		94	32-157		
Chrysene	150		3.33	ug/kg wet	166.67		90	31-159		
Benzo[b] fluoranthene	160		3.33	ug/kg wet	166.67		96	33-164		
Benzo[k] fluoranthene	158		3.33	ug/kg wet	166.67		95	28-161		
Benzo[a] pyrene	163		3.33	ug/kg wet	166.67		98	29-149		
Dibenz[a,h]anthracene	161		3.33	ug/kg wet	166.67		97	27-153		
Benzo[g,h,i] perylene	161		3.33	ug/kg wet	166.67		97	32-157		
Surrogate: Triphenylene	*156*			*ug/kg wet*	*166.67*		*94*	*68-129*		

000000169

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 20:32

Polynuclear Aromatic Compounds by SW846 8310 - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210219 - SW 3540C									
Matrix Spike (L210219-MS1)		**Source: 1210071-01**	Prepared: 10/25/2012 Analyzed: 11/01/2012						
Naphthalene	111	3.31	ug/kg dry	165.70	3.27	65	0-127		
Acenaphthylene	129	3.31	ug/kg dry	165.70	3.44 U	78	50-140		
Acenaphthene	133	3.31	ug/kg dry	165.70	2.48	79	17-139		
Fluorene	131	3.31	ug/kg dry	165.70	3.44 U	79	28-145		
Phenanthrene	132	3.31	ug/kg dry	165.70	3.44 U	80	30-152		
Anthracene	135	3.31	ug/kg dry	165.70	3.44 U	82	19-171		
Fluoranthene	136	3.31	ug/kg dry	165.70	1.77	81	34-159		
Indeno[1,2,3-cd]pyrene	135	3.31	ug/kg dry	165.70	3.44 U	82	31-156		
Pyrene	134	3.31	ug/kg dry	165.70	1.38	80	33-152		
Benz[a]anthracene	140	3.31	ug/kg dry	165.70	3.44 U	84	32-157		
Chrysene	133	3.31	ug/kg dry	165.70	1.27	79	31-159		
Benzo[b] fluoranthene	145	3.31	ug/kg dry	165.70	3.44 U	87	33-164		
Benzo[k] fluoranthene	140	3.31	ug/kg dry	165.70	3.44 U	84	28-161		
Benzo[a] pyrene	144	3.31	ug/kg dry	165.70	0.877	86	29-149		
Dibenz[a,h]anthracene	140	3.31	ug/kg dry	165.70	3.44 U	84	27-153		
Benzo[g,h,i] perylene	142	3.31	ug/kg dry	165.70	3.44 U	86	32-157		
Surrogate: Triphenylene	*142*		*ug/kg dry*	*165.70*		*86*	*68-129*		
Matrix Spike Dup (L210219-MSD1)		**Source: 1210071-01**	Prepared: 10/25/2012 Analyzed: 11/01/2012						
Naphthalene	121	3.31	ug/kg dry	165.49	3.27	71	0-127	9	40
Acenaphthylene	127	3.31	ug/kg dry	165.49	3.44 U	77	50-140	2	40
Acenaphthene	131	3.31	ug/kg dry	165.49	2.48	78	17-139	2	40
Fluorene	128	3.31	ug/kg dry	165.49	3.44 U	77	28-145	2	40
Phenanthrene	129	3.31	ug/kg dry	165.49	3.44 U	78	30-152	2	40
Anthracene	132	3.31	ug/kg dry	165.49	3.44 U	80	19-171	2	40
Fluoranthene	136	3.31	ug/kg dry	165.49	1.77	81	34-159	0.2	40
Indeno[1,2,3-cd]pyrene	133	3.31	ug/kg dry	165.49	3.44 U	81	31-156	1	40
Pyrene	134	3.31	ug/kg dry	165.49	1.38	80	33-152	0.1	40
Benz[a]anthracene	142	3.31	ug/kg dry	165.49	3.44 U	86	32-157	2	40
Chrysene	133	3.31	ug/kg dry	165.49	1.27	79	31-159	0.2	40
Benzo[b] fluoranthene	150	3.31	ug/kg dry	165.49	3.44 U	91	33-164	4	40
Benzo[k] fluoranthene	140	3.31	ug/kg dry	165.49	3.44 U	85	28-161	0.4	40
Benzo[a] pyrene	144	3.31	ug/kg dry	165.49	0.877	87	29-149	0.7	40
Dibenz[a,h]anthracene	143	3.31	ug/kg dry	165.49	3.44 U	86	27-153	2	40
Benzo[g,h,i] perylene	142	3.31	ug/kg dry	165.49	3.44 U	86	32-157	0.2	40
Surrogate: Triphenylene	*141*		*ug/kg dry*	*165.49*		*86*	*68-129*		

Date: 28 January 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100N Field Remediation – Soil Full Protocol – Waste Site 116-N-2
Subject: Radiochemistry - Data Package No. K4009-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K4009 prepared by Eberline Services (EB). 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
J1R3J2	10/18/12	Soil	C	See note 1
J1R3J3	10/18/12	Soil	C	See note 1
J1R3J4	10/18/12	Soil	C	See note 1
J1R3J5	10/18/12	Soil	C	See note 1
J1R3J6	10/18/12	Soil	C	See note 1
J1R3J7	10/18/12	Soil	C	See note 1
J1R3J8	10/18/12	Soil	C	See note 1
J1R3J9	10/18/12	Soil	C	See note 1
J1R3K0	10/18/12	Soil	C	See note 1
J1R3K1	10/18/12	Soil	C	See note 1
J1R3K2	10/18/12	Soil	C	See note 1
J1R3K3	10/18/12	Soil	C	See note 1
J1R3K4	10/18/12	Soil	C	See note 1

1 – Alpha spectroscopy, tritium, nickel-63, total strontium and gamma spectroscopy.

Data validation was conducted in accordance with the Washington Closure Hanford Incorporated (WCH) validation statement of work and the 300 Area Remedial Action Sampling and Analysis Plan (DOE/RL-2001-48, Rev. 3). 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 PARAMETERS

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All laboratory blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

Due to the lack of an LCS analysis, all uranium-235 (aspec), thorium-228 (aspec) and thorium-232(aspec) results were qualified as estimates and flagged "J".

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike 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 contract required detection limit (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 duplicate results were acceptable.

Field Duplicates

One set of field duplicates (J1R3J4/J1R3K4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. Sixteen analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQLs.

- **Completeness**

Data package No. K4009 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 the lack of an LCS analysis, all uranium-235 (aspec), thorium-228 (aspec) and thorium-232(aspec) results were qualified as estimates and flagged "J".

- Due to the lack of a matrix spike analysis, all tritium 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.

Sixteen analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

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

DOE/RL-2001-48, Rev. 3, *300 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 2004.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

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.

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.

Appendix 2

Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K4009	**REVIEWER: ELR**	**Project: 116-N-2**	**PAGE_1_OF_1**
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Uranium-235 (aspec) thorium-228 (aspec) thorium-232(aspec)	J	All	No LCS analysis
Tritium	J	All	No MS analysis

* - 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

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-001 J1R3J2

DATA SHEET

SDG	7783	Client/Case no	Hanford SDG K4009
Contact	Joseph Verville	Contract	No. S00W235A01
Lab sample id	S210067-01	Client sample id	J1R3J2
Dept sample id	7783-001	Location/Matrix	116-N-2 Verification SOIL
Received	10/24/12	Collected/Weight	10/18/12 10:10 847 g
% solids	96.7	Custody/SAF No	RC-189-128 RC-189

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.637	2.2	3.88	10.0	U J	H
Nickel 63	13981-37-8	0.816	1.9	3.17	30.0	U	NI_L
Total Strontium	SR-RAD	0.182	0.14	0.238	1.00	U	SR
Thorium 228	14274-82-9	0.446	0.12	0.095	1.00	J	TH
Thorium 230	14269-63-7	0.223	0.26	0.239	1.00	U	TH
Thorium 232	TH-232	0.522	0.12	0.056	1.00	J	TH
Uranium 233/234	U-233/234	0.454	0.22	0.204	1.00		U
Uranium 235	15117-96-1	0.032	0.065	0.247	1.00	U J	U
Uranium 238	U-238	0.294	0.16	0.204	1.00		U
Plutonium 238	13981-16-3	-0.031	0.061	0.234	1.00	U	PU
Plutonium 239/240	PU-239/240	0.031	0.061	0.234	1.00	U	PU
Potassium 40	13966-00-2	10.7	0.18	0.077			GAM
Cobalt 60	10198-40-0	U		0.007	0.050	U	GAM
Cesium 137	10045-97-3	0.061	0.009	0.009	0.100		GAM
Radium 226	13982-63-3	0.391	0.016	0.014	0.100		GAM
Radium 228	15262-20-1	0.589	0.033	0.031	0.200		GAM
Europium 152	14683-23-9	U		0.020	0.100	U	GAM
Europium 154	15585-10-1	U		0.023	0.100	U	GAM
Europium 155	14391-16-3	U		0.043	0.100	U	GAM
Thorium 228	14274-82-9	0.560	0.014	0.011			GAM
Thorium 232	TH-232	0.589	0.033	0.031			GAM
Uranium 235	15117-96-1	U		0.084	0.300	U	GAM
Uranium 238	U-238	U		1.24	10.0	U	GAM
Americium 241	14596-10-2	U		0.033	0.300	U	GAM

1/26/13

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-002 J1R3J3

DATA SHEET

SDG	7783	Client/Case no	Hanford SDG K4009
Contact	Joseph Verville	Contract	No. S00W235A01
Lab sample id	S210067-02	Client sample id	J1R3J3
Dept sample id	7783-002	Location/Matrix	116-N-2 Verification SOIL
Received	10/24/12	Collected/Weight	10/18/12 10:20 917 g
% solids	96.1	Custody/SAF No	RC-189-128 RC-189

1/24/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.223	2.0	3.38	10.0	U J	H
Nickel 63	13981-37-8	0.172	1.9	3.17	30.0	U	NI_L
Total Strontium	SR-RAD	-0.045	0.10	0.212	1.00	U	SR
Thorium 228	14274-82-9	0.985	0.17	0.093	1.00	J	TH
Thorium 230	14269-63-7	0.527	0.28	0.251	1.00		TH
Thorium 232	TH-232	0.919	0.16	0.071	1.00	J	TH
Uranium 233/234	U-233/234	0.469	0.22	0.211	1.00		U
Uranium 235	15117-96-1	0.067	0.067	0.255	1.00	U J	U
Uranium 238	U-238	0.634	0.28	0.211	1.00		U
Plutonium 238	13981-16-3	-0.046	0.092	0.351	1.00	U	PU
Plutonium 239/240	PU-239/240	-0.046	0.092	0.350	1.00	U	PU
Potassium 40	13966-00-2	10.3	0.42	0.215			GAM
Cobalt 60	10198-40-0	U		0.022	0.050	U	GAM
Cesium 137	10045-97-3	0.036	0.021	0.023	0.100		GAM
Radium 226	13982-63-3	0.354	0.044	0.040	0.100		GAM
Radium 228	15262-20-1	0.580	0.090	0.086	0.200		GAM
Europium 152	14683-23-9	U		0.058	0.100	U	GAM
Europium 154	15585-10-1	U		0.066	0.100	U	GAM
Europium 155	14391-16-3	U		0.065	0.100	U	GAM
Thorium 228	14274-82-9	0.628	0.035	0.031			GAM
Thorium 232	TH-232	0.580	0.090	0.086			GAM
Uranium 235	15117-96-1	U		0.125	0.300	U	GAM
Uranium 238	U-238	U		2.35	10.0	U	GAM
Americium 241	14596-10-2	U		0.026	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-003 J1R3J4

DATA SHEET

SDG	7783	Client/Case no	Hanford	SDG K4009	
Contact	Joseph Verville	Contract	No. S00W235A01		
Lab sample id	S210067-03	Client sample id	J1R3J4		
Dept sample id	7783-003	Location/Matrix	116-N-2 Verification	SOIL	
Received	10/24/12	Collected/Weight	10/18/12 10:50	975 g	
% solids	97.4	Custody/SAF No	RC-189-128	RC-189	

1/24/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-1.78	2.1	3.72	10.0	U J	H
Nickel 63	13981-37-8	0.894	2.0	3.30	30.0	U	NI_L
Total Strontium	SR-RAD	0.078	0.16	0.298	1.00	U	SR
Thorium 228	14274-82-9	0.472	0.17	0.174	1.00	J	TH
Thorium 230	14269-63-7	0.350	0.31	0.359	1.00	U	TH
Thorium 232	TH-232	0.604	0.17	0.116	1.00	J	TH
Uranium 233/234	U-233/234	0.538	0.24	0.229	1.00		U
Uranium 235	15117-96-1	0.036	0.072	0.277	1.00	U J	U
Uranium 238	U-238	0.688	0.31	0.229	1.00		U
Plutonium 238	13981-16-3	0	0.10	0.384	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.10	0.384	1.00	U	PU
Potassium 40	13966-00-2	8.99	0.20	0.091			GAM
Cobalt 60	10198-40-0	0.028	0.012	0.012	0.050		GAM
Cesium 137	10045-97-3	0.085	0.010	0.010	0.100		GAM
Radium 226	13982-63-3	0.326	0.018	0.016	0.100		GAM
Radium 228	15262-20-1	0.513	0.048	0.044	0.200		GAM
Europium 152	14683-23-9	U		0.023	0.100	U	GAM
Europium 154	15585-10-1	U		0.034	0.100	U	GAM
Europium 155	14391-16-3	U		0.041	0.100	U	GAM
Thorium 228	14274-82-9	0.463	0.012	0.010			GAM
Thorium 232	TH-232	0.513	0.048	0.044			GAM
Uranium 235	15117-96-1	U		0.073	0.300	U	GAM
Uranium 238	U-238	U		1.21	10.0	U	GAM
Americium 241	14596-10-2	U		0.031	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-004 J1R3J5

DATA SHEET

SDG	7783	Client/Case no	Hanford	SDG K4009	
Contact	Joseph Verville	Contract	No. S00W235A01		
Lab sample id	S210067-04	Client sample id	J1R3J5		
Dept sample id	7783-004	Location/Matrix	116-N-2 Verification	SOIL	
Received	10/24/12	Collected/Weight	10/18/12 10:35	820 g	
% solids	96.6	Custody/SAF No	RC-189-128	RC-189	

V 1/26/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.589	2.1	3.59	10.0	U J	H
Nickel 63	13981-37-8	0	1.9	3.27	30.0	U	NI_L
Total Strontium	SR-RAD	-0.109	0.097	0.234	1.00	U	SR
Thorium 228	14274-82-9	0.919	0.16	0.085	1.00	J	TH
Thorium 230	14269-63-7	0.645	0.28	0.249	1.00		TH
Thorium 232	TH-232	0.929	0.15	0.070	1.00	J	TH
Uranium 233/234	U-233/234	0.453	0.23	0.217	1.00		U
Uranium 235	15117-96-1	0.034	0.069	0.262	1.00	U J	U
Uranium 238	U-238	0.453	0.23	0.217	1.00		U
Plutonium 238	13981-16-3	-0.028	0.057	0.216	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.057	0.216	1.00	U	PU
Potassium 40	13966-00-2	12.5	0.36	0.178			GAM
Cobalt 60	10198-40-0	U		0.019	0.050	U	GAM
Cesium 137	10045-97-3	0.063	0.024	0.023	0.100		GAM
Radium 226	13982-63-3	0.537	0.041	0.038	0.100		GAM
Radium 228	15262-20-1	0.846	0.096	0.085	0.200		GAM
Europium 152	14683-23-9	U		0.050	0.100	U	GAM
Europium 154	15585-10-1	U		0.062	0.100	U	GAM
Europium 155	14391-16-3	U		0.061	0.100	U	GAM
Thorium 228	14274-82-9	1.02	0.040	0.037			GAM
Thorium 232	TH-232	0.846	0.096	0.085			GAM
Uranium 235	15117-96-1	U		0.112	0.300	U	GAM
Uranium 238	U-238	U		2.13	10.0	U	GAM
Americium 241	14596-10-2	U		0.151	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id EBRLNE
Protocol RC-189
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-005 J1R3J6

DATA SHEET

SDG	7783	Client/Case no	Hanford	SDG K4009	
Contact	Joseph Verville	Contract	No. S00W235A01		
Lab sample id	S210067-05	Client sample id	J1R3J6		
Dept sample id	7783-005	Location/Matrix	116-N-2 Verification	SOIL	
Received	10/24/12	Collected/Weight	10/18/12 12:00	1097 g	
% solids	97.4	Custody/SAF No	RC-189-128	RC-189	

1/24/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.733	2.2	3.77	10.0	UJ	H
Nickel 63	13981-37-8	-0.521	1.8	3.21	30.0	U	NI_L
Total Strontium	SR-RAD	0.197	0.13	0.221	1.00	U	SR
Thorium 228	14274-82-9	0.527	0.12	0.108	1.00	J	TH
Thorium 230	14269-63-7	0.461	0.26	0.230	1.00		TH
Thorium 232	TH-232	0.648	0.12	0.053	1.00	J	TH
Uranium 233/234	U-233/234	0.540	0.23	0.217	1.00		U
Uranium 235	15117-96-1	0	0.069	0.263	1.00	UJ	U
Uranium 238	U-238	0.568	0.23	0.217	1.00		U
Plutonium 238	13981-16-3	-0.026	0.052	0.199	1.00	U	PU
Plutonium 239/240	PU-239/240	0.156	0.10	0.199	1.00	U	PU
Potassium 40	13966-00-2	8.35	0.35	0.156			GAM
Cobalt 60	10198-40-0	0.050	0.020	0.020	0.050		GAM
Cesium 137	10045-97-3	0.174	0.021	0.022	0.100		GAM
Radium 226	13982-63-3	0.320	0.039	0.038	0.100		GAM
Radium 228	15262-20-1	0.522	0.092	0.082	0.200		GAM
Europium 152	14683-23-9	U		0.054	0.100	U	GAM
Europium 154	15585-10-1	U		0.055	0.100	U	GAM
Europium 155	14391-16-3	U		0.047	0.100	U	GAM
Thorium 228	14274-82-9	0.405	0.030	0.026			GAM
Thorium 232	TH-232	0.522	0.092	0.082			GAM
Uranium 235	15117-96-1	U		0.101	0.300	U	GAM
Uranium 238	U-238	U		2.30	10.0	U	GAM
Americium 241	14596-10-2	U		0.027	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-006 J1R3J7

DATA SHEET

SDG	7783	Client/Case no	Hanford SDG K4009
Contact	Joseph Verville	Contract	No. S00W235A01
Lab sample id	S210067-06	Client sample id	J1R3J7
Dept sample id	7783-006	Location/Matrix	116-N-2 Verification SOIL
Received	10/24/12	Collected/Weight	10/18/12 10:40 947 g
% solids	96.7	Custody/SAF No	RC-189-128 RC-189

N 1/26/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.37	2.2	3.98	10.0	U J	H
Nickel 63	13981-37-8	0.433	1.9	3.20	30.0	U	NI_L
Total Strontium	SR-RAD	0.172	0.12	0.206	1.00	U	SR
Thorium 228	14274-82-9	0.572	0.22	0.241	1.00	J	TH
Thorium 230	14269-63-7	0.476	0.30	0.376	1.00		TH
Thorium 232	TH-232	0.462	0.16	0.104	1.00	J	TH
Uranium 233/234	U-233/234	0.508	0.24	0.229	1.00		U
Uranium 235	15117-96-1	0.072	0.073	0.277	1.00	U J	U
Uranium 238	U-238	0.658	0.30	0.229	1.00		U
Plutonium 238	13981-16-3	-0.030	0.060	0.229	1.00	U	PU
Plutonium 239/240	PU-239/240	0.120	0.12	0.229	1.00	U	PU
Potassium 40	13966-00-2	7.97	0.38	0.221			GAM
Cobalt 60	10198-40-0	U		0.019	0.050	U	GAM
Cesium 137	10045-97-3	0.043	0.017	0.020	0.100		GAM
Radium 226	13982-63-3	0.270	0.046	0.037	0.100		GAM
Radium 228	15262-20-1	0.542	0.11	0.089	0.200		GAM
Europium 152	14683-23-9	U		0.049	0.100	U	GAM
Europium 154	15585-10-1	U		0.054	0.100	U	GAM
Europium 155	14391-16-3	U		0.054	0.100	U	GAM
Thorium 228	14274-82-9	0.386	0.029	0.026			GAM
Thorium 232	TH-232	0.542	0.11	0.089			GAM
Uranium 235	15117-96-1	U		0.147	0.300	U	GAM
Uranium 238	U-238	U		2.14	10.0	U	GAM
Americium 241	14596-10-2	U		0.076	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-007 J1R3J8

DATA SHEET

SDG	7783	Client/Case no	Hanford SDG K4009
Contact	Joseph Verville	Contract	No. S00W235A01
Lab sample id	S210067-07	Client sample id	J1R3J8
Dept sample id	7783-007	Location/Matrix	116-N-2 Verification SOIL
Received	10/24/12	Collected/Weight	10/18/12 12:55 989 g
% solids	96.9	Custody/SAF No	RC-189-128 RC-189

V 1/24/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.627	2.4	4.20	10.0	U J	H
Nickel 63	13981-37-8	-0.636	1.8	3.13	30.0	U	NI_L
Total Strontium	SR-RAD	-0.009	0.14	0.282	1.00	U	SR
Thorium 228	14274-82-9	0.390	0.22	0.290	1.00	J	TH
Thorium 230	14269-63-7	0.173	0.30	0.491	1.00	U J	TH
Thorium 232	TH-232	0.734	0.26	0.165	1.00		TH
Uranium 233/234	U-233/234	0.339	0.17	0.216	1.00		U
Uranium 235	15117-96-1	0.034	0.069	0.262	1.00	U J	U
Uranium 238	U-238	0.764	0.29	0.216	1.00		U
Plutonium 238	13981-16-3	0	0.057	0.220	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.057	0.220	1.00	U	PU
Potassium 40	13966-00-2	11.2	1.1	0.370			GAM
Cobalt 60	10198-40-0	U		0.057	0.050	U	GAM
Cesium 137	10045-97-3	U		0.091	0.100	U	GAM
Radium 226	13982-63-3	0.378	0.11	0.115	0.100		GAM
Radium 228	15262-20-1	0.613	0.23	0.242	0.200		GAM
Europium 152	14683-23-9	U		0.151	0.100	U	GAM
Europium 154	15585-10-1	U		0.164	0.100	U	GAM
Europium 155	14391-16-3	U		0.165	0.100	U	GAM
Thorium 228	14274-82-9	0.510	0.082	0.087			GAM
Thorium 232	TH-232	0.613	0.23	0.242			GAM
Uranium 235	15117-96-1	U		0.368	0.300	U	GAM
Uranium 238	U-238	U		6.47	10.0	U	GAM
Americium 241	14596-10-2	U		0.164	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-008 J1R3J9

DATA SHEET

SDG	7783	Client/Case no	Hanford SDG K4009
Contact	Joseph Verville	Contract	No. S00W235A01
Lab sample id	S210067-08	Client sample id	J1R3J9
Dept sample id	7783-008	Location/Matrix	116-N-2 Verification SOIL
Received	10/24/12	Collected/Weight	10/18/12 12:07 912 g
% solids	95.9	Custody/SAF No	RC-189-128 RC-189

✓ 1/24/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-1.08	2.3	4.03	10.0	U J	H
Nickel 63	13981-37-8	0.167	1.8	3.08	30.0	U	NI_L
Total Strontium	SR-RAD	0.042	0.12	0.230	1.00	U	SR
Thorium 228	14274-82-9	0.624	0.23	0.202	1.00	J	TH
Thorium 230	14269-63-7	0.262	0.30	0.422	1.00	U	TH
Thorium 232	TH-232	0.491	0.20	0.125	1.00	J	TH
Uranium 233/234	U-233/234	0.524	0.28	0.268	1.00		U
Uranium 235	15117-96-1	0	0.085	0.324	1.00	U J	U
Uranium 238	U-238	0.420	0.21	0.268	1.00		U
Plutonium 238	13981-16-3	0	0.072	0.277	1.00	U	PU
Plutonium 239/240	PU-239/240	0.036	0.072	0.277	1.00	U	PU
Potassium 40	13966-00-2	9.01	1.1	0.751			GAM
Cobalt 60	10198-40-0	U		0.069	0.050	U	GAM
Cesium 137	10045-97-3	0.249	0.062	0.064	0.100		GAM
Radium 226	13982-63-3	0.306	0.12	0.120	0.100		GAM
Radium 228	15262-20-1	0.501	0.26	0.272	0.200		GAM
Europium 152	14683-23-9	U		0.177	0.100	U	GAM
Europium 154	15585-10-1	U		0.190	0.100	U	GAM
Europium 155	14391-16-3	U		0.139	0.100	U	GAM
Thorium 228	14274-82-9	0.648	0.12	0.129			GAM
Thorium 232	TH-232	0.501	0.26	0.272			GAM
Uranium 235	15117-96-1	U		0.360	0.300	U	GAM
Uranium 238	U-238	U		7.05	10.0	U	GAM
Americium 241	14596-10-2	U		0.077	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
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EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-009 J1R3K0

DATA SHEET

SDG	7783	Client/Case no	Hanford	SDG K4009	
Contact	Joseph Verville	Contract	No. S00W235A01		
Lab sample id	S210067-09	Client sample id	J1R3K0		
Dept sample id	7783-009	Location/Matrix	116-N-2 Verification	SOIL	
Received	10/24/12	Collected/Weight	10/18/12 12:37	945 g	
% solids	97.0	Custody/SAF No	RC-189-128	RC-189	

✓ 1/26/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.27	2.3	4.05	10.0	U J	H
Nickel 63	13981-37-8	-0.609	2.1	3.55	30.0	U	NI_L
Total Strontium	SR-RAD	0.067	0.13	0.242	1.00	U	SR
Thorium 228	14274-82-9	0.717	0.22	0.181	1.00	J	TH
Thorium 230	14269-63-7	0.392	0.30	0.379	1.00		TH
Thorium 232	TH-232	0.675	0.19	0.103	1.00	J	TH
Uranium 233/234	U-233/234	0.640	0.31	0.288	1.00		U
Uranium 235	15117-96-1	0	0.091	0.349	1.00	U J	U
Uranium 238	U-238	0.602	0.31	0.288	1.00		U
Plutonium 238	13981-16-3	-0.035	0.070	0.266	1.00	U	PU
Plutonium 239/240	PU-239/240	0.070	0.070	0.266	1.00	U	PU
Potassium 40	13966-00-2	22.7	1.4	0.669			GAM
Cobalt 60	10198-40-0	0.148	0.066	0.060	0.050		GAM
Cesium 137	10045-97-3	0.184	0.072	0.083	0.100		GAM
Radium 226	13982-63-3	0.818	0.14	0.161	0.100		GAM
Radium 228	15262-20-1	1.09	0.30	0.324	0.200		GAM
Europium 152	14683-23-9	U		0.233	0.100	U	GAM
Europium 154	15585-10-1	U		0.233	0.100	U	GAM
Europium 155	14391-16-3	U		0.314	0.100	U	GAM
Thorium 228	14274-82-9	0.676	0.11	0.140			GAM
Thorium 232	TH-232	1.09	0.30	0.324			GAM
Uranium 235	15117-96-1	U		0.658	0.300	U	GAM
Uranium 238	U-238	U		8.43	10.0	U	GAM
Americium 241	14596-10-2	U		0.253	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
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EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-010 J1R3K1

DATA SHEET

SDG	7783	Client/Case no	Hanford	SDG_K4009	
Contact	Joseph Verville	Contract	No. S00W235A01		
Lab sample id	S210067-10	Client sample id	J1R3K1		
Dept sample id	7783-010	Location/Matrix	116-N-2 Verification	SOIL	
Received	10/24/12	Collected/Weight	10/18/12 12:47	1072 g	
% solids	97.4	Custody/SAF No	RC-189-128	RC-189	

✓ 1/20/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.27	2.1	3.71	10.0	UJ	H
Nickel 63	13981-37-8	-0.634	2.0	3.45	30.0	U	NI_L
Total Strontium	SR-RAD	0.116	0.13	0.242	1.00	U	SR
Thorium 228	14274-82-9	0.662	0.15	0.111	1.00	J	TH
Thorium 230	14269-63-7	0.319	0.28	0.267	1.00		TH
Thorium 232	TH-232	0.791	0.16	0.069	1.00	J	TH
Uranium 233/234	U-233/234	0.430	0.25	0.235	1.00		U
Uranium 235	15117-96-1	0.074	0.075	0.284	1.00	UJ	U
Uranium 238	U-238	0.338	0.19	0.235	1.00		U
Plutonium 238	13981-16-3	0.025	0.099	0.190	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.050	0.190	1.00	U	PU
Potassium 40	13966-00-2	10.9	0.47	0.197			GAM
Cobalt 60	10198-40-0	U		0.022	0.050	U	GAM
Cesium 137	10045-97-3	0.072	0.024	0.025	0.100		GAM
Radium 226	13982-63-3	0.378	0.047	0.046	0.100		GAM
Radium 228	15262-20-1	0.524	0.084	0.081	0.200		GAM
Europium 152	14683-23-9	U		0.056	0.100	U	GAM
Europium 154	15585-10-1	U		0.068	0.100	U	GAM
Europium 155	14391-16-3	U		0.071	0.100	U	GAM
Thorium 228	14274-82-9	0.598	0.034	0.031			GAM
Thorium 232	TH-232	0.524	0.084	0.081			GAM
Uranium 235	15117-96-1	U		0.131	0.300	U	GAM
Uranium 238	U-238	U		2.39	10.0	U	GAM
Americium 241	14596-10-2	U		0.128	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
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EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-011 J1R3K2

DATA SHEET

SDG	7783	Client/Case no	Hanford SDG K4009
Contact	Joseph Verville	Contract	No. S00W235A01
Lab sample id	S210067-11	Client sample id	J1R3K2
Dept sample id	7783-011	Location/Matrix	116-N-2 Verification SOIL
Received	10/24/12	Collected/Weight	10/18/12 12:18 986 g
% solids	98.8	Custody/SAF No	RC-189-128 RC-189

V 1/22/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.600	2.3	4.02	10.0	U J	H
Nickel 63	13981-37-8	0.803	2.2	3.64	30.0	U	NI_L
Total Strontium	SR-RAD	0.029	0.14	0.262	1.00	U	SR
Thorium 228	14274-82-9	0.242	0.19	0.308	1.00	U J	TH
Thorium 230	14269-63-7	0	0.29	0.415	1.00	U	TH
Thorium 232	TH-232	0.290	0.13	0.123	1.00	J	TH
Uranium 233/234	U-233/234	0.183	0.12	0.233	1.00	U	U
Uranium 235	15117-96-1	0.074	0.074	0.282	1.00	U J	U
Uranium 238	U-238	0.426	0.25	0.233	1.00		U
Plutonium 238	13981-16-3	0.026	0.10	0.196	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.051	0.196	1.00	U	PU
Potassium 40	13966-00-2	7.82	0.71	0.363			GAM
Cobalt 60	10198-40-0	U		0.050	0.050	U	GAM
Cesium 137	10045-97-3	0.337	0.048	0.039	0.100		GAM
Radium 226	13982-63-3	0.360	0.074	0.074	0.100		GAM
Radium 228	15262-20-1	0.603	0.22	0.183	0.200		GAM
Europium 152	14683-23-9	U		0.120	0.100	U	GAM
Europium 154	15585-10-1	U		0.134	0.100	U	GAM
Europium 155	14391-16-3	U		0.122	0.100	U	GAM
Thorium 228	14274-82-9	0.599	0.083	0.082			GAM
Thorium 232	TH-232	0.603	0.22	0.183			GAM
Uranium 235	15117-96-1	U		0.248	0.300	U	GAM
Uranium 238	U-238	U		4.98	10.0	U	GAM
Americium 241	14596-10-2	U		0.333	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-012 J1R3K3

DATA SHEET

SDG	7783	Client/Case no	Hanford	SDG K4009	
Contact	Joseph Verville	Contract	No. S00W235A01		
Lab sample id	S210067-12	Client sample id	J1R3K3		
Dept sample id	7783-012	Location/Matrix	116-N-2 Verification	SOIL	
Received	10/24/12	Collected/Weight	10/18/12 12:29	1092 g	
% solids	97.0	Custody/SAF No	RC-189-128	RC-189	

V 1/24/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.517	2.5	4.32	10.0	U J	H
Nickel 63	13981-37-8	-1.74	2.0	3.56	30.0	U	NI_L
Total Strontium	SR-RAD	-0.027	0.12	0.246	1.00	U	SR
Thorium 228	14274-82-9	0.844	0.53	0.496	1.00	J	TH
Thorium 230	14269-63-7	0.582	0.52	0.931	1.00	U	TH
Thorium 232	TH-232	0.906	0.53	0.495	1.00	J	TH
Uranium 233/234	U-233/234	0.579	0.30	0.277	1.00		U
Uranium 235	15117-96-1	0.044	0.088	0.335	1.00	U J	U
Uranium 238	U-238	0.724	0.30	0.277	1.00		U
Plutonium 238	13981-16-3	0.034	0.14	0.259	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.068	0.259	1.00	U	PU
Potassium 40	13966-00-2	11.9	0.62	0.288			GAM
Cobalt 60	10198-40-0	U		0.034	0.050	U	GAM
Cesium 137	10045-97-3	0.131	0.029	0.030	0.100		GAM
Radium 226	13982-63-3	0.468	0.062	0.054	0.100		GAM
Radium 228	15262-20-1	0.630	0.12	0.124	0.200		GAM
Europium 152	14683-23-9	U		0.074	0.100	U	GAM
Europium 154	15585-10-1	U		0.096	0.100	U	GAM
Europium 155	14391-16-3	U		0.102	0.100	U	GAM
Thorium 228	14274-82-9	0.642	0.045	0.042			GAM
Thorium 232	TH-232	0.630	0.12	0.124			GAM
Uranium 235	15117-96-1	U		0.180	0.300	U	GAM
Uranium 238	U-238	U		3.09	10.0	U	GAM
Americium 241	14596-10-2	U		0.173	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-013 J1R3K4

DATA SHEET

SDG	7783	Client/Case no	Hanford	SDG K4009	
Contact	Joseph Verville	Contract	No. S00W235A01		
Lab sample id	S210067-13	Client sample id	J1R3K4		
Dept sample id	7783-013	Location/Matrix	116-N-2 Verification	SOIL	
Received	10/24/12	Collected/Weight	10/18/12 10:50	1009 g	
% solids	97.5	Custody/SAF No	RC-189-128	RC-189	

K 1/26/13

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-2.06	2.2	4.06	10.0	U J	H
Nickel 63	13981-37-8	-1.98	1.9	3.45	30.0	U	NI_L
Total Strontium	SR-RAD	-0.014	0.12	0.254	1.00	U	SR
Thorium 228	14274-82-9	0.670	0.25	0.299	1.00	J	TH
Thorium 230	14269-63-7	0.211	0.32	0.437	1.00	U	TH
Thorium 232	TH-232	0.563	0.21	0.169	1.00	J	TH
Uranium 233/234	U-233/234	0.663	0.39	0.362	1.00		U
Uranium 235	15117-96-1	0.057	0.11	0.438	1.00	U J	U
Uranium 238	U-238	0.663	0.39	0.362	1.00		U
Plutonium 238	13981-16-3	0.054	0.11	0.208	1.00	U	PU
Plutonium 239/240	PU-239/240	0.082	0.11	0.208	1.00	U	PU
Potassium 40	13966-00-2	8.79	0.46	0.149			GAM
Cobalt 60	10198-40-0	U		0.035	0.050	U	GAM
Cesium 137	10045-97-3	0.067	0.019	0.024	0.100		GAM
Radium 226	13982-63-3	0.312	0.038	0.035	0.100		GAM
Radium 228	15262-20-1	0.471	0.089	0.083	0.200		GAM
Europium 152	14683-23-9	U		0.053	0.100	U	GAM
Europium 154	15585-10-1	U		0.061	0.100	U	GAM
Europium 155	14391-16-3	U		0.069	0.100	U	GAM
Thorium 228	14274-82-9	0.452	0.033	0.031			GAM
Thorium 232	TH-232	0.471	0.089	0.083			GAM
Uranium 235	15117-96-1	U		0.140	0.300	U	GAM
Uranium 238	U-238	U		2.40	10.0	U	GAM
Americium 241	14596-10-2	U		0.090	0.300	U	GAM

100N Field Remediation-Soil Full Protocol

Lab id EBRLNE
Protocol RC-189
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 11/08/12

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K4009 was composed of thirteen soil samples designated under SAF No. RC-189 with a Project Designation of: 100N Field Remediation-Soil Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist. The results were transmitted to WCH via e-mail on November 8, 2012.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis, Low Level

No problems were encountered during the course of the analyses.

2.2 Nickel-63 Analysis

No problems were encountered during the course of the analyses.

2.3 Total Strontium Analysis

No problems were encountered during the course of the analyses.

2.4 Isotopic Thorium Analysis

Due to an initial low tracer yield sample J1R3J6 was reworked and replated. The rework results were acceptable. No other problems were encountered during the course of the analyses.

2.5 Isotopic Uranium Analysis

No problems were encountered during the course of the analyses.

2.6 Isotopic Plutonium Analysis

No problems were encountered during the course of the reanalyses.

2.7 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

3.0 Case Narrative Certification Statement

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

11/8/12

Joseph Verville
Client Services Manager

Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 1 of 6

Collector: Q. Stowe	Company Contact: Joan Kessner; Telephone No. 375-4688 (7783)	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K; Data Turnaround: ~~21~~ 15 Days
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification K4009	SAF No.: RC-189	
Ice Chest No.: RCC-07-008	Field Logbook No.: EI-1652-07; COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~	
Shipped To: EBERLINE SERVICES/~~LIONVILLE~~	Offsite Property No.: A110563	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AS 10-23-12

Special Handling and/or Storage

~~Cool 4C~~ None

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL)	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J2	SOIL	10-18-12	1010			34720						X	X
J1R3J3	SOIL	10-18-12	1020									X	X
J1R3J4	SOIL	10-18-12	1050			34721						X	X
J1R3J5	SOIL	10-18-12	1035			~~34721~~	34722					X	X
J1R3J6	SOIL	10-18-12	1200									X	X

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1700 10/18/12	Dennis Newman	1700 10/18/12
Dennis Newman	1925 10/18/12	Ref. #3, 1060 Battelle	1925 10/18/12
Ref. #3, 1060 Battelle	0840 10-19-12	Bingham	1060#3 0840
Bingham WCH	1060#3 10-23-12 0830	Fed EX	
FED EX		[illegible]	10/24/12 0915

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) [Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226]

REVIEWED BY AJ DATE 10-23-12

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 3 of 6

Collector: Q. Stowe	Company Contact: Joan Kessner; Telephone No. 375-4688 (7783)	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12; Data Turnaround: ~~21~~ 15 Days 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification K4009	SAF No.: RC-189	
Ice Chest No.: RCC-07-008	Field Logbook No.: EI-1652-07; COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~ 10/18/12	
Shipped To: EBERLINE SERVICES ~~LIONVILLE~~ 10/18/12	Offsite Property No.: A110563	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad < DOT Limits Ad 10-22-12

Special Handling and/or Storage

~~Cool 4C~~ None 10/18/12

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) 10/18/12	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3K2	SOIL	10-18-12	1218									X	X
J1R3K3	SOIL	10-18-12	1229		34719							X	X
J1R3K4	SOIL	10-18-12	1050									X	X

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	10/18/12 1700	Dennis Newman	10/18/12 1700
Dennis Newman	10/18/12 1925	Ref. #3, 1060 Battelle Blvd.	10/18/12 1925
Ref. #3, 1060 Battelle Blvd	10-19-12 0840	[illegible]	10-19-12 0840
[illegible]	10-23-12 0830	Fed EX	
Fed EX		[illegible]	10/24/12 0915

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

REVIEWED BY AJ DATE 10-23-12

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil, SE=Sediment, SO=Solid, SI=Sludge, W = Water, O=Oil, A=Air, DS=Dense Solids, DL=Dense 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

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 2 of 6

Collector: Q. Stowe	Company Contact: Joan Kessner; Telephone No. 375-4688 (7783)	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12; Data Turnaround: ~~21~~ 15 Days 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification K4009	SAF No.: RC-189	
Ice Chest No.: RCC-07-008	Field Logbook No.: El-1652-07; COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~ 10/18/12	
Shipped To: EBERLINE SERVICES ~~LIONVILLE~~ 10/18/12	Offsite Property No.: A110563	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AS 10-22-12

Special Handling and/or Storage

~~Cool 4C~~ None 10/18/12

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL)	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J7	SOIL	10-18-12	1040									X	X
J1R3J8	SOIL	10-18-12	1255									X	X
J1R3J9	SOIL	10-18-12	1207									X	X
J1R3K0	SOIL	10-18-12	1237									X	X
J1R3K1	SOIL	10-18-12	1247									X	X

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From: Quincy Stowe Date/Time: 1700 10/18/12	Received By/Stored In: Dennis Newman Date/Time: 1700 10/18/12	
Relinquished By/Removed From: Dennis Newman Date/Time: 1925 10/18/12	Received By/Stored In: Ref. #3, 1060 Battelle Date/Time: 1925 10/18/12	
Relinquished By/Removed From: Ref #3, 1060 Battelle Date/Time: 0840 10-19-12	Received By/Stored In: Cornelia Bingham Date/Time: 1060#3 10-19-12 0840	
Relinquished By/Removed From: Cornelia Bingham Date/Time: 1060#3 WCHS 10-23-12 0830	Received By/Stored In: Fed Ex Date/Time:	
Relinquished By/Removed From: FED EX Date/Time:	Received By/Stored In: Mike Tawanna Date/Time: 10/24/12 0945	
Relinquished By/Removed From: Date/Time:	Received By/Stored In: Date/Time:	

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) [Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226]

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

REVIEWED BY AJ DATE 10-23-12

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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

WCH-EE-011

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-189-128	Page 4 of 6
Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No. 375-4688 (7783)	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12 — Data Turnaround: ~~21~~ 15 Days 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification	KN 009	SAF No.: RC-189	
Ice Chest No.: RCC-07-008	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~ 10/18/12	
Shipped To: EBERLINE SERVICES ~~LIONVILLE~~ 10/18/12	Offsite Property No.: A110563		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AS 10-22-12

Special Handling and/or Storage

~~Cool 4C~~ None 10/18/12

Preservation	None	None	None	None	None					
Type of Container	G/P	G/P	G	G/P	G/P					
No. of Container(s)	0	0	1	0	0					
Volume	500mL	500mL	60mL	500mL	500mL					
SAMPLE ANALYSIS	Isotopic Thorium	Isotopic Plutonium	Tritium - H3 Low Level Soil	Nickel-63	Strontium-89,90 – Total Sr					

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J2	SOIL	10-18-12	1010	X	X	X	X	X		34720			
J1R3J3	SOIL	10-18-12	1020	X	X	X	X	X					
J1R3J4	SOIL	10-18-12	1050	X	X	X	X	X		34721			
J1R3J5	SOIL	10-18-12	1035	X	X	X	X	X		34722			
J1R3J6	SOIL	10-18-12	1200	X	X	X	X	X					

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CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS
Relinquished By/Removed From: Quincy Stowe — Date/Time: 1700 10/18/12	Received By/Stored In: Dennis Newman — Date/Time: 1700 10/18/12	
Relinquished By/Removed From: Dennis Newman — Date/Time: 1925 10/18/12	Received By/Stored In: Ref #3, 1060 Battelle — Date/Time: 1925 10/18/12	
Relinquished By/Removed From: Ref #3 1060 Battelle — Date/Time: 0840 10-19-12	Received By/Stored In: Chris Bingham — Date/Time: 1060#3 0840 10-19-12	
Relinquished By/Removed From: Chris Bingham — Date/Time: 1060#3 WCH 10-23-12 0530	Received By/Stored In: Fed EX — Date/Time:	
Relinquished By/Removed From: FED EX — Date/Time:	Received By/Stored In: [illegible] — Date/Time: 10/24/12 0915	
Relinquished By/Removed From: — Date/Time:	Received By/Stored In: — Date/Time:	

REVIEWED BY

DATE

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 5 of 6

Collector: Q. Stowe	Company Contact: Joan Kessner; Telephone No. 375-4688 (7783)	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12; Data Turnaround: ~~21~~ 15 Days 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification K4009	SAF No.: RC-189	
Ice Chest No.: BCC-07-008	Field Logbook No.: EI-1652-07; COA: R116N22000	Method of Shipment: ~~Fed Ex~~ ~~Hand Deliver~~ 10/18/12	
Shipped To: EBERLINE SERVICES ~~LIONVILLE~~ 10/18/12	Offsite Property No.: A110563	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits A$ 10-22-12

Special Handling and/or Storage

~~Cool 4C~~ None 10/18/12

Preservation	None	None	None	None	None					
Type of Container	G/P	G/P	G	G/P	G/P					
No. of Container(s)	0	0	1	0	0					
Volume	500mL	500mL	60mL	500mL	500mL					
SAMPLE ANALYSIS	Isotopic Thorium	Isotopic Plutonium	Tritium - H3 Low Level Soil	Nickel-63	Strontium-89,90 -- Total Sr					

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J7	SOIL	10-18-12	1040	X	X	X	X	X					
J1R3J8	SOIL	10-18-12	1255	X	X	X	X	X					
J1R3J9	SOIL	10-18-12	1207	X	X	X	X	X					
J1R3K0	SOIL	10-18-12	1237	X	X	X	X	X					
J1R3K1	SOIL	10-18-12	1247	X	X	X	X	X					

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1700 10/18/12	Dennis Newman	1700 10/18/12
Dennis Newman	1925 10/18/12	Ref #3, 1060 Ba Helle	1925 10/18/12
Ref #3, 1060 Battelle	0840 10-19-12	Birnham	1060#3 0840
Birnham WCH	1060#3 10-23-12 0830	Fed Ex	
Fed Ex		[illegible]	10/24/12 0915

SPECIAL INSTRUCTIONS

REVIEWED BY AJ DATE 10-23-12

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 6 of 6

Collector: Q. Stowe	Company Contact: Joan Kessner — Telephone No.: 375-4688 (7783)	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12 — Data Turnaround: ~~21~~ Days 15 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification K4009	SAF No.: RC-189	
Ice Chest No.: RCC-07-008	Field Logbook No.: EI-1652-07 — COA: R116N22000	Method of Shipment: (Fed Ex) ~~Hand Deliver~~ 10/18/12	
Shipped To: (EBERLINE SERVICES) ~~LIONVILLE~~ 10/18/12	Offsite Property No.: A110 563	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AB 10-22-12

Special Handling and/or Storage

~~Cool to~~ Non 10/18/12

Preservation	None	None	None	None	None						
Type of Container	G/P	G/P	G	G/P	G/P						
No. of Container(s)	0	0	1	0	0						
Volume	500mL	500mL	60mL	500mL	500mL						
SAMPLE ANALYSIS	Isotopic Thorium	Isotopic Plutonium	Tritium - H3 Low Level Soil	Nickel-63	Strontium-89,90 -- Total Sr						
Sample No. / Matrix * / Sample Date / Sample Time											
J1R3K2 / SOIL / 10-18-12 / 1218	X	X	X	X	X						
J1R3K3 / SOIL / 10-18-12 / 1229	X	X	X	X	X	34719					
J1R3K4 / SOIL / 10-18-12 / 1050	X	X	X	X	X						

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Quincy Stowe	1700 10/18/12	Received By/Stored In: Dennis Newman	1700 10/18/12
Relinquished By/Removed From: Dennis Newman	1925 10/18/12	Received By/Stored In: Ref #3, 1060 Battelle	1925 10/18/12
Relinquished By/Removed From: Ref #3, 1060 Battelle	0840 10-19-12	Received By/Stored In: Bingham	0840 10-19-12
Relinquished By/Removed From: Bingham	1060#3 10-23-12 0830	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: Fed Ex		Received By/Stored In: [illegible]	10/24/12 0945
Relinquished By/Removed From:		Received By/Stored In:	

SPECIAL INSTRUCTIONS

REVIEWED BY AT DATE 10-23-12

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil; SD=Sediment; SO=Solid; SL=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; Wi=Wipe; L=Liquid; Ve=Vegetation; X=Other

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

WCH-EE-011

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Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	116-N-2		DATA PACKAGE:	K4009	
VALIDATOR:	ELR	LAB: EB		DATE: 1/16/13	
			SDG: K4009		

ANALYSES PERFORMED					
☐ Gross Alpha/Beta	☒ Strontium-90	☐ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☒ Tritium	XM1-6)		

SAMPLES/MATRIX				
J1R3J2	J1R3J3	J1R3J4	J1R3J5	J1R3J6
J1R3J7	J1R3J8	J1R3J9	J1R3K0	J1R3K1
J1R3K2	J1R3K3	J1R3K4		
				Soil

1. Completeness ..... ☐ N/A

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

Comments: _____

2. Initial Calibration (Levels D, E) ..... ☐ N/A

Instruments/detectors calibrated? ..... Yes No N/A

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

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

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

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

Comments: _____

3. Continuing Calibration (Levels D, E) ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

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

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

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

Comments: _____

_____

_____

_____

_____

4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

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

Comments: _____

_____

_____

_____

_____

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... Yes No N/A

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

Analytes detected in method blank? ..... Yes No N/A

Field blank(s) analyzed? ..... Yes No N/A

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

Analytes detected in field blank(s)? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: 2 ones no FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A

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

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

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

LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: no U-235, th 228, th 232 LCS - J all

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☒ N/A

Chemical carrier added? ..... Yes No N/A

Chemical recovery acceptable? ..... Yes No N/A

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

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

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

Comments: _____

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

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

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

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

Comments: _____

9. Matrix Spikes (Levels C, D, E) ..... ☐ N/A

Matrix spike analyzed? ..... Yes No N/A

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

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

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

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: NO 3H MS - Jall

10. Duplicates (Levels C, D, E) ..... ☐ N/A

Duplicates Analyzed at required frequency? ..... Yes No N/A

RPD Values Acceptable? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

11. Field QC Samples (Levels C, D E) ..... ☐ N/A

Field duplicate sample(s) analyzed? ..... Yes No N/A

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

Field split sample(s) analyzed? ..... Yes No N/A

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

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

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

Comments: JY/KY

no PS or PAS

12. Holding Times (All levels)

Are sample holding times acceptable? ..... Yes No N/A

Comments: _____

13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses? Yes No N/A

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

Results Acceptable? (Levels D, E) Yes No N/A

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

MDA's meet required detection limits? Yes No N/A

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

Comments: 16 over

Appendix 6

Additional Documentation Requested by Client

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-015

Method Blank

METHOD BLANK

SDG	7783	Client/Case no	Hanford SDG K4009
Contact	Joseph Verville	Contract	No. S00W235A01
Lab sample id	S210067-15	Client sample id	Method Blank
Dept sample id	7783-015	Material/Matrix	SOIL
		SAF No	RC-189

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.02	1.8	3.25	10.0	U	H
Nickel 63	13981-37-8	-0.663	1.8	3.18	30.0	U	NI_L
Total Strontium	SR-RAD	-0.085	0.11	0.247	1.00	U	SR
Thorium 228	14274-82-9	0.038	0.15	0.294	1.00	U	TH
Thorium 230	14269-63-7	-0.230	0.31	0.678	1.00	U	TH
Thorium 232	TH-232	0	0.077	0.293	1.00	U	TH
Uranium 233/234	U-233/234	0.030	0.060	0.231	1.00	U	U
Uranium 235	15117-96-1	0	0.073	0.280	1.00	U	U
Uranium 238	U-238	0	0.060	0.231	1.00	U	U
Plutonium 238	13981-16-3	-0.037	0.074	0.282	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.074	0.282	1.00	U	PU
Potassium 40	13966-00-2	U		0.558		U	GAM
Cobalt 60	10198-40-0	U		0.048	0.050	U	GAM
Cesium 137	10045-97-3	U		0.040	0.100	U	GAM
Radium 226	13982-63-3	U		0.085	0.100	U	GAM
Radium 228	15262-20-1	U		0.181	0.200	U	GAM
Europium 152	14683-23-9	U		0.104	0.100	U	GAM
Europium 154	15585-10-1	U		0.118	0.100	U	GAM
Europium 155	14391-16-3	U		0.099	0.100	U	GAM
Thorium 228	14274-82-9	U		0.056		U	GAM
Thorium 232	TH-232	U		0.181		U	GAM
Uranium 235	15117-96-1	U		0.198	0.300	U	GAM
Uranium 238	U-238	U		5.93	10.0	U	GAM
Americium 241	14596-10-2	U		0.113	0.300	U	GAM

QC-BLANK #82820

Lab id	EBRLNE
Protocol	RC-189
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/08/12

METHOD BLANKS
Page 1
SUMMARY DATA SECTION
Page 10

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

Lab Control Sample

7783-014

LAB CONTROL SAMPLE

SDG 7783
Contact Joseph Verville

Client/Case no Hanford SDG K4009
Contract No. S00W235A01

Lab sample id S210067-14
Dept sample id 7783-014

Client sample id Lab Control Sample
Material/Matrix SOIL
SAF No RC-189

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	127	5.3	3.21	10.0		H	128	5.1	99	83-117	80-120
Nickel 63	250	6.4	3.08	30.0		NI_L	256	10	98	82-118	80-120
Total Strontium	8.31	0.50	0.230	1.00		SR	9.23	0.37	90	83-117	80-120
Thorium 230	17.8	1.1	0.296	1.00		TH	18.9	0.76	94	84-116	80-120
Uranium 233/234	11.1	1.5	0.283	1.00		U	11.8	0.47	94	77-123	80-120
Uranium 238	13.1	1.7	0.283	1.00		U	11.8	0.47	111	74-126	80-120
Plutonium 238	13.3	1.8	0.257	1.00		PU	13.6	0.54	98	76-124	80-120
Plutonium 239/240	16.7	2.1	0.257	1.00		PU	15.8	0.63	106	76-124	80-120
Cobalt 60	1.03	0.16	0.096	0.050		GAM	1.01	0.040	102	73-127	80-120
Cesium 137	1.27	0.15	0.114	0.100		GAM	1.21	0.048	105	78-122	80-120

QC-LCS #82819

Lab id EBRLNE
Protocol RC-189
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 11/08/12

EBERLINE ANALYTICAL-RICHMOND

SAMPLE DELIVERY GROUP K4009

7783-016

J1R3J2

DUPLICATE

SDG 7783
Contact Joseph Verville

DUPLICATE
Lab sample id S210067-16
Dept sample id 7783-016
% solids 96.7

ORIGINAL
Lab sample id S210067-01
Dept sample id 7783-001
Received 10/24/12
% solids 96.7

Client/Case no Hanford SDG K4009
Contract No. S00W235A01

Client sample id J1R3J2
Location/Matrix 116-N-2 Verification SOIL
Collected/Weight 10/18/12 10:10 847 g
Custody/SAF No RC-189-128 RC-189

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	DER σ
Tritium	-1.54	2.1	3.82	10.0	U	H	-0.637	2.2	3.88	U	-		0.6
Nickel 63	-1.97	2.0	3.57	30.0	U	NI_L	0.816	1.9	3.17	U	-		2.0
Total Strontium	0.164	0.13	0.221	1.00	U	SR	0.182	0.14	0.238	U	-		0.2
Thorium 228	0.394	0.11	0.083	1.00		TH	0.446	0.12	0.095		12	61	0.6
Thorium 230	0.150	0.25	0.239	1.00	U	TH	0.223	0.26	0.239	U	-		0.4
Thorium 232	0.532	0.12	0.055	1.00		TH	0.522	0.12	0.056		2	51	0.1
Uranium 233/234	0.541	0.28	0.259	1.00		U	0.454	0.22	0.204		17	109	0.5
Uranium 235	0	0.082	0.313	1.00	U	U	0.032	0.065	0.247	U	-		0.6
Uranium 238	0.608	0.28	0.259	1.00		U	0.294	0.16	0.204		70	109	1.9
Plutonium 238	0	0.069	0.266	1.00	U	PU	-0.031	0.061	0.234	U	-		0.7
Plutonium 239/240	0	0.069	0.265	1.00	U	PU	0.031	0.061	0.234	U	-		0.7
Potassium 40	10.7	0.57	0.264			GAM	10.7	0.18	0.077		0	17	0
Cobalt 60	U		0.027	0.050	U	GAM	U		0.007	U	-		1.4
Cesium 137	0.092	0.027	0.027	0.100		GAM	0.061	0.009	0.009		41	58	2.1
Radium 226	0.374	0.058	0.056	0.100		GAM	0.391	0.016	0.014		4	28	0.5
Radium 228	0.536	0.13	0.125	0.200		GAM	0.589	0.033	0.031		9	39	0.7
Europium 152	U		0.066	0.100	U	GAM	U		0.020	U	-		1.3
Europium 154	U		0.087	0.100	U	GAM	U		0.023	U	-		1.4
Europium 155	U		0.086	0.100	U	GAM	U		0.043	U	-		0.9
Thorium 228	0.566	0.038	0.036			GAM	0.560	0.014	0.011		1	18	0.2
Thorium 232	0.536	0.13	0.125			GAM	0.589	0.033	0.031		9	39	0.7
Uranium 235	U		0.158	0.300	U	GAM	U		0.084	U	-		0.8
Uranium 238	U		2.75	10.0	U	GAM	U		1.24	U	-		1.0
Americium 241	U		0.148	0.300	U	GAM	U		0.033	U	-		1.5

QC-DUP#1 82821

100N Field Remediation-Soil Full Protocol

Lab id EBRLNE
Protocol RC-189
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 11/08/12

Date: 28 January 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100N Field Remediation – Soil Full Protocol – Waste Site 116-N-1
Subject: Semivolatile Organics - Data Package No. K4009-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K4009 prepared by Lionville Laboratories 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
J1R3J2	10/18/12	Soil	C	See note 1
J1R3J3	10/18/12	Soil	C	See note 1
J1R3J4	10/18/12	Soil	C	See note 1
J1R3J5	10/18/12	Soil	C	See note 1
J1R3J6	10/18/12	Soil	C	See note 1
J1R3J7	10/18/12	Soil	C	See note 1
J1R3J8	10/18/12	Soil	C	See note 1
J1R3J9	10/18/12	Soil	C	See note 1
J1R3K0	10/18/12	Soil	C	See note 1
J1R3K1	10/18/12	Soil	C	See note 1
J1R3K2	10/18/12	Soil	C	See note 1
J1R3K3	10/18/12	Soil	C	See note 1
J1R3K4	10/18/12	Soil	C	See note 1

1 - Semivolatile organics by 8270C.

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 blanks were 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-dimethylphenol (49%), 2,4-dinitrophenol (11%), 4,6-dinitro-2-methylphenol (23%), hexachlorocyclopentadiene (27%) and pentachlorophenol (37%) results were qualified as estimates and flagged "J".

Due to matrix spike recoveries outside QC limits, all 2,4,6-trichlorophenol (48%), 2,4-dinitrophenol (20%), 4,6-dinitro-2-methylphenol (36%), 4-chloroanaline (45%), hexachlorocyclopentadiene (29%) and pentachlorophenol (40%) results were qualified as estimates and flagged "J".

Due to matrix spike duplicate recoveries outside QC limits, all 2,4-dinitrophenol (11%), 4,6-dinitro-2-methylphenol (24%) and pentachlorophenol (44%) 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".

Due to the surrogate being diluted out, all semivolatile organic results in sample J1R3K2 were qualified as estimates and flagged "J".

All other 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 an RPD outside QC limits, all 2,4-dinitrophenol (60%) and 4,6-dinitro-2-methylphenol (39%) and hexachlorocyclopentadiene (69%) results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1R3J4/J1R3K4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **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. Ninety-one analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes exceeded the RQL.

- **Completeness**

Data package No. K4009 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-dimethylphenol (49%), 2,4-dinitrophenol (11%), 4,6-dinitro-2-methylphenol (23%), hexachlorocyclopentadiene (27%) and pentachlorophenol (37%) results were qualified as estimates and flagged "J".

- Due to matrix spike recoveries outside QC limits, all 2,4,6-trichlorophenol (48%), 2,4-dinitrophenol (20%), 4,6-dinitro-2-methylphenol (36%), 4-chloroanaline (45%), hexachlorocyclopentadiene (29%) and pentachlorophenol (40%) results were qualified as estimates and flagged "J".

- Due to matrix spike duplicate recoveries outside QC limits, all 2,4-dinitrophenol (11%), 4,6-dinitro-2-methylphenol (24%) and pentachlorophenol (44%) results were qualified as estimates and flagged "J".

- Due to the surrogate being diluted out, all semivolatile organic results in sample J1R3K2 were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits, all 2,4-dinitrophenol (60%) and 4,6-dinitro-2-methylphenol (39%) and hexachlorocyclopentadiene (69%) 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.

Ninety-one analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

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

DOE/RL-2001-48, Rev. 3, *300 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 2004.

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: K4009	**REVIEWER: ELR**	**Project: 116-N-2**	**PAGE_1_OF_1**
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
2,4-dimethylphenol 2,4-dinitrophenol 4,6-dinitro-2-methylphenol hexachlorocyclopentadiene pentachlorophenol	J	All	LCS recovery
2,4,6-trichlorophenol 2,4-dinitrophenol 4,6-dinitro-2-methylphenol 4-chloroanaline hexachlorocyclopentadiene pentachlorophenol	J	All	MS recovery
2,4-dinitrophenol 4,6-dinitro-2-methylphenol pentachlorophenol	J	All	MSD recovery
All	J	J1R3K2	Surrogate recovery
2,4-dinitrophenol 4,6-dinitro-2-methylphenol hexachlorocyclopentadiene	J	All	RPD

* - 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.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/14/2012 08:42

V 1/24/13

J1R3J2
1210071-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	670	U	670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

264 Welsh Pool Road
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Phone: 610-280-3000
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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/20/13

J1R3J2
1210071-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**216**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**501**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 4	**467**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**29500**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**1590**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*45 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*52 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*53 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

000000070

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

J1R3J2
1210071-01 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*56 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*32 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*64 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

11/26/13

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

11/26/13

J1R3J3
1210071-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	339	U J	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	339	U J	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1690	U J	1690	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1690	U	1690	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	677	U	677	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1690	U	1690	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	339	U J	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	339	U J	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1690	U	1690	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1690	U	1690	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/26/13

J1R3J3
1210071-02 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	339	U J	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1690	U J	1690	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	339	U	339	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**261**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**36500**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**595**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**1940**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 4	**614**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*53 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*57 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*63 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

J1R3J3
1210071-02 (Soil)

V 11/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*64 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*32 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*63 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/26/13

J1R3J4
1210071-03 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	323	U J	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	323	U J	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1620	U J	1620	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1620	U	1620	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	647	U	647	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1620	U	1620	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	323	U J	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	323	U J	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1620	U	1620	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1620	U	1620	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

11/20/13

J1R3J4
1210071-03 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	323	U J	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1620	U J	1620	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	323	U	323	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Unknown 1	**706**	J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**1730**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**2020**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**28400**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**1380**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*62 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*66 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*59 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

V 1/20/13

J1R3J4
1210071-03 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
		Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*70 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*47 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*66 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/24/13

J1R3J5
1210071-04 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	668	U	668	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

J1R3J5
1210071-04 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Unknown 1	**876**	**J**		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**2490**	**B, J**		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**2290**	**A, B, J**		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**689**	**A, B, J**		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**26000**	**A, B, J**		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*49 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*51 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*50 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/14/2012 08:42

1/24/13

J1R3J5
1210071-04 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
		Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*53 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*41 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*57 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/20/13

J1R3J6
1210071-05 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	668	U	668	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

J1R3J6
1210071-05 (Soil)

11/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**141**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 4	**200**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**383**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**29500**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**850**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*54 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*60 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*68 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

V 1/26/13

J1R3J6
1210071-05 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*69 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*32 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*67 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

V 1/24/13

J1R3J7
1210071-06 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	332	U J	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	332	U J	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1660	U J	1660	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1660	U	1660	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	664	U	664	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1660	U	1660	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	332	U J	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	332	U J	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1660	U	1660	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1660	U	1660	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

V 1/20/13

J1R3J7
1210071-06 (Soil)

Lionville Laboratory

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	332	U J	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1660	U J	1660	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	332	U	332	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 4	**198**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**210**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**369**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**30100**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**843**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*54 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*58 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*66 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

11/26/13

J1R3J7
1210071-06 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*65 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*40 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*65 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/26/13

J1R3J8
1210071-07 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1680	U J	1680	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1680	U	1680	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	670	U	670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1680	U	1680	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1680	U	1680	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1680	U	1680	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/24/13

J1R3J8
1210071-07 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1680	U J	1680	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**24500**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**604**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**2250**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**2100**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Unknown 1	**795**	J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*51 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*53 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*48 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/14/2012 08:42

1/20/13

J1R3J8
1210071-07 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*58 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*39 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*58 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

K 11/26/13

J1R3J9
1210071-08 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	668	U	668	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/14/2012 08:42

1/26/13

J1R3J9
1210071-08 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	334	U J	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	334	U	334	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**878**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Unknown 1	**314**	J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**882**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**29600**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**695**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*55 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*59 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*66 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

V 1/26/13

J1R3J9
1210071-08 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*68 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*44 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*70 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

M 1/24/13

J1R3K0
1210071-09 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1640	U J	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	658	U	658	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/24/13

J1R3K0
1210071-09 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1640	U J	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**73.9**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**382**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 4	**153**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**31600**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**1400**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*50 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*55 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*64 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/14/2012 08:42

V 11/26/13

J1R3K0
1210071-09 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*66 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*24 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*65 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/24/13

J1R3K1
1210071-10 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1640	U J	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	657	U	657	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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J1R3K1
1210071-10 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	329	U J	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1640	U J	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	329	U	329	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Unknown 1	**641**	J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**976**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**2070**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**31200**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**1330**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*45 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*47 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*42 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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J1R3K1
1210071-10 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*57 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*25 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*62 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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J1R3K2
1210071-11 (Soil)

Lionville Laboratory

Semivolatile Organic Compounds by SW846 8270C

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
1,2,4-Trichlorobenzene	32800	U J	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	164000	U	164000	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	164000	U	164000	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	65600	U	65600	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	164000	U	164000	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	164000	U	164000	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	164000	U	164000	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Anthracene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

V 1/26/13

J1R3K2
1210071-11 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	32800	U J	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Carbazole	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Chrysene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Fluorene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Isophorone	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	164000	U	164000	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Phenol	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Pyrene	32800	U	32800	ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**44600**	A, B, J, D		ug/kg dry	25	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*% **	*U*	*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*% **	*U*	*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*% **	*U*	*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2-Fluorobiphenyl	*% **	*U*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*% **	*U*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*% **	*U*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

V 11/26/13

J1R3K3
1210071-12 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Semivolatile Organic Compounds by SW846 8270C									
1,2,4-Trichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	670	U	670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1670	U	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/26/13

J1R3K3
1210071-12 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	335	U J	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1670	U J	1670	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	335	U	335	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Unknown 1	**643**	J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**1110**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**2170**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**36700**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**1710**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*60 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*65 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*65 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/14/2012 08:42

✓ 1/26/13

J1R3K3
1210071-12 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*73 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*39 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*79 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

V 1/26/13

J1R3K4
1210071-13 (Soil)

Lionville Laboratory

Semivolatile Organic Compounds by SW846 8270C

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
1,2,4-Trichlorobenzene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,2-Dichlorobenzene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,3-Dichlorobenzene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
1,4-Dichlorobenzene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,5-Trichlorophenol	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4,6-Trichlorophenol	328	U J	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dichlorophenol	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dimethylphenol	328	U J	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrophenol	1640	U J	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,4-Dinitrotoluene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2,6-Dinitrotoluene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chloronaphthalene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Chlorophenol	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylnaphthalene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Methylphenol	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
2-Nitrophenol	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3,3'-Dichlorobenzidine	657	U	657	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4,6-Dinitro-2-methylphenol	328	U J	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Bromophenyl Phenyl Ether	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloro-3-methylphenol	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chloroaniline	328	U J	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Chlorophenyl Phenyl Ether	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
3- and/or 4-Methylphenol	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitroaniline	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
4-Nitrophenol	1640	U	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Acenaphthylene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Anthracene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benz[a]anthracene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[a] pyrene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[b] fluoranthene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[g,h,i] perylene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Benzo[k] fluoranthene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroethoxy) methane	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/26/13

J1R3K4
1210071-13 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Semivolatile Organic Compounds by SW846 8270C									
Bis(2-chloroethyl) ether	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-chloroisopropyl) ether	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Bis(2-ethylhexyl) phthalate	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Butyl Benzyl Phthalate	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Carbazole	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Chrysene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenz[a,h]anthracene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dibenzofuran	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Diethyl Phthalate	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Dimethyl Phthalate	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-butyl Phthalate	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Di-n-octyl Phthalate	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluoranthene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Fluorene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobenzene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorobutadiene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachlorocyclopentadiene	328	U J	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Hexachloroethane	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Indeno[1,2,3-cd]pyrene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Isophorone	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Naphthalene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Nitrobenzene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodi-n-propylamine	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
N-Nitrosodiphenylamine	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pentachlorophenol	1640	U J	1640	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenanthrene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Phenol	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Pyrene	328	U	328	ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Trichloro-1-propene	**2460**	B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 4	**4210**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 3	**988**	A, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 2	**51400**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
TIC:Aldol Condensate 1	**1010**	A, B, J		ug/kg dry	1	L210220	10/25/2012	10/31/2012	8270C
Surrogate: 2-Fluorophenol	*64 %*		*25-121*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Phenol-d5	*68 %*		*24-113*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: Nitrobenzene-d5	*64 %*		*23-120*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*

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Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

1/26/13

J1R3K4
1210071-13 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Semivolatile Organic Compounds by SW846 8270C								
Surrogate: 2-Fluorobiphenyl	*84 %*	*30-115*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: 2,4,6-Tribromophenol	*53 %*	*19-122*			*L210220*	*10/25/2012*	*10/31/2012*	*8270C*
Surrogate: p-Terphenyl-d14	*80 %*	*18-137*			*L210220*	*10/25/2012*	*10/31/2012*	*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-189 K4009
LVL #: 1210071

W.O. #: 60049-001-001-0001-00
Date Received: 10-24-2012

SEMIVOLATILE

Thirteen (13) soil samples were collected on 10-18-2012.

The samples and associated QC samples were extracted 10-25-2012 and analyzed 10-29,31-2012 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. The results presented in this report are derived from samples that met LvL's sample acceptance policy with exceptions noted on the Sample Receipt Checklist.

2. Samples were extracted and analyzed within holding time.

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

4. Sample J1R3K2 required 25 fold instrument dilution due to the sample matrix. Reporting limits have been adjusted to reflect the necessary dilution.

5. Six (6) of one-hundred and two (102) surrogate recoveries were outside acceptance criteria due to the instrument dilution required for analysis. A copy of Sample Discrepancy Report (SDR#12MS189) has been enclosed.

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

7. One (1) of sixty-four (64) blank spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR#12MS189) has been enclosed.

8. Two (2) of one-hundred and twenty-eight (128) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR#12MS189) has been enclosed.

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

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

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

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

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

13. 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").

14. 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

10/27/12
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 12MS189

Initiator: Sharon Saylor
Date: 11-7-12
Client: WC Hanford K4009

Batch: 1210071
Samples: J1R3K2, L210220-BS1
Method: SW846/MCAWW/CLP/

Parameter: 8270C
Matrix: Soil
Prep Batch: L210220

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 Sample J1R3K2 had all 6 surrogates diluted out of QC acceptance limits
② 2,4 dinitrophenol recovery is outside QC acceptance limits in L210220-BS1, L210220-MS1, L210220-MSD1

2. Known or Probable Causes(s)

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

Other Description:
narrate

4. Project Manager Instructions...signature/date: [signature] 11/14/12
✓ 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] 11/14/12
✓ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

Other Explanation:

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

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

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

QA-139-A-0208

000000058

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 1 of 3

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ 15 Days		
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: (Fed Ex) ~~Hand Deliver~~
Shipped To: ~~EBERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120 631/632		Bill of Lading/Air Bill No.: See OSDC

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad ≤DOT Limits AJ 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	G*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1		0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time											RCIF
J1R3J2	SOIL	10-18-12	1010	X	X	X	X	X	X	X	X	X		34720
J1R3J3	SOIL	10-18-12	1020	X	X	X	X	X	X	X		X		
J1R3J4	SOIL	10-18-12	1050	X	X	X	X	X	X	X		X		34721
J1R3J5	SOIL	10-18-12	1035	X	X	X	X	X	X	X		X		34722
J1R3J6	SOIL	10-18-12	1200	X	X	X	X	X	X	X		X		

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From: Quincy Stowe	1700 10/18/12	Received By/Stored In: Dennis Newman	1700 10/18/12
Relinquished By/Removed From: Dennis Newman	2020 10/18/12	Received By/Stored In: Ref #3 1060 Battelle	2020 10/18/12
Relinquished By/Removed From: Ref #3 1060 Battelle	0800 10-19-12	Received By/Stored In: [illegible]	0800 10-19-12
Relinquished By/Removed From: [illegible] WCH	1060#3 10-23-12	Received By/Stored In: Fed EX	
Relinquished By/Removed From: Fed Ex	10/24/12 0950	Received By/Stored In: Victor Hernandez	10/24/12 0950
Relinquished By/Removed From		Received By/Stored In	

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* freeze upon receipt AJ 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil, SB=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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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000000085

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 2 of 3

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ 15 Days		
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: ~~Fed Ex~~ ~~Hand Deliver~~
Shipped To: ~~EBERLINE SERVICES~~ LIONVILLE	Offsite Property No.: A1206311632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits A$ 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J7	SOIL	10-18-12	1040	X	X	X	X	X	X	X			
J1R3J8	SOIL	10-18-12	1255	X	X	X	X	X	X	X			
J1R3J9	SOIL	10-18-12	1207	X	X	X	X	X	X	X			
J1R3K0	SOIL	10-18-12	1237	X	X	X	X	X	X	X			
J1R3K1	SOIL	10-18-12	1247	X	X	X	X	X	X	X			

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Rincy Stowe	1700 10/18/12	Dennis Neuman	1700 10/18/12
Dennis Neuman	10/18/12 2020	Ref #3, 1060 Battelle	2020 10/18/12
Ref. #3 Battelle	10-19-12 0800	[illegible] Bingham	10-19-12 0800
[illegible] Bingham	1060#3 10-23-12 1245	Fed Ex	
Fed Ex	10/24/12 0950	[illegible] Hernandez	10/24/12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}
* Freeze upon receipt A$ 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil, SB=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	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By / Date/Time

REVIEWED BY AF DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 3 of 83

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8E~~ 8K	Data Turnaround: ~~21~~ Days 15		
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~
Shipped To: ~~BEERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120631/632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE ~~HAZARDS/REMARKS~~

Potential Rad < DOT Limits

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3K2	SOIL	10-18-12	1218	X	X	X	X	X	X	X			
J1R3K3	SOIL	10-18-12	1229	X	X	X	X	X	X	X	34719		
J1R3K4	SOIL	10-18-12	1050	X	X	X	X	X	X	X			

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From: Quincy Stowe		10/18/12 1700	Received By/Stored In: Dennis Newman	10/18/12 1700
Relinquished By/Removed From: Dennis Newman		10/18/12 2020	Received By/Stored In: Ref #3, 1060 Battelle	10/18/12 2020
Relinquished By/Removed From: Ref #3, 1060 Battelle		10-19-12 0800	Received By/Stored In: 1060#3	010-19-12 0800
Relinquished By/Removed From: 1060#3		10-23-12 1245	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: Fed Ex		10/24/12 0950	Received By/Stored In: Victor Fernandez	10-24-12 0950
Relinquished By/Removed From		Date/Time	Received By/Stored In	Date/Time

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; pH (Soil) - 9045
(3) Gamma Spec (Client List) [Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226]
* freeze upon receipt. A# 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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0000000007

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	116-N-2		DATA PACKAGE:	K4009	
VALIDATOR:	ELR	LAB: LLI		DATE: 1/16/13	
			SDG:	K4009	

ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)

SAMPLES/MATRIX				
J1R3J2	J1R3J3	J1R3J4	J1R3J5	J1R3J6
J1R3J7	J1R3J8	J1R3J9	J1R3K0	J1R3K1
J1R3K2	J1R3K3	J1R3K4		
				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: Surr - K2 - J all
LCS - III - J all MS - III - J all
MSD - III - J all

no DAS

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 - III - J all

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: all over

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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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 L210220 - SW 3540C										
Blank (L210220-BLK1)				Prepared: 10/25/2012 Analyzed: 10/29/2012						
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						

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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 L210220 - SW 3540C										
Blank (L210220-BLK1)				Prepared: 10/25/2012 Analyzed: 10/29/2012						
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						
Trichloro-1-propene TICS	269	J		ug/kg wet						
Aldol Condensate 2	34600	A, J		ug/kg wet						
Aldol Condensate 4	544	A, J		ug/kg wet						
Aldol Condensate 3 PEC 11/14/12	601	A, J		ug/kg wet						
Aldol Condensate 1	1840	A, J		ug/kg wet						
Surrogate: 2-Fluorophenol	*1300*			*ug/kg wet*	*2500.0*		*52*	*25-121*		
Surrogate: Phenol-d5	*1460*			*ug/kg wet*	*2500.0*		*59*	*24-113*		
Surrogate: Nitrobenzene-d5	*1030*			*ug/kg wet*	*1666.7*		*62*	*23-120*		

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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 L210220 - SW 3540C									
Blank (L210220-BLK1)			Prepared: 10/25/2012 Analyzed: 10/29/2012						
Surrogate: 2-Fluorobiphenyl	*1010*		*ug/kg wet*	*1666.7*		*61*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*911*		*ug/kg wet*	*2500.0*		*36*	*19-122*		
Surrogate: p-Terphenyl-d14	*1070*		*ug/kg wet*	*1666.7*		*64*	*18-137*		
LCS (L210220-BS1)			Prepared: 10/25/2012 Analyzed: 10/29/2012						
1,2,4-Trichlorobenzene	1150		ug/kg wet	2000.0		57	45-110		
1,2-Dichlorobenzene	1170		ug/kg wet	2000.0		58	45-105		
1,3-Dichlorobenzene	1130		ug/kg wet	2000.0		57	40-100		
1,4-Dichlorobenzene	1160		ug/kg wet	2000.0		58	35-105		
2,4,5-Trichlorophenol	1250		ug/kg wet	2000.0		62	30-140		
2,4,6-Trichlorophenol	1110		ug/kg wet	2000.0		55	20-110		
2,4-Dichlorophenol	1190		ug/kg wet	2000.0		59	40-110		
2,4-Dimethylphenol	983		ug/kg wet	2000.0		49	30-105		
2,4-Dinitrophenol	230		ug/kg wet	2000.0		11*	25-130		
2,4-Dinitrotoluene	1300		ug/kg wet	2000.0		65	50-115		
2,6-Dinitrotoluene	1260		ug/kg wet	2000.0		63	40-120		
2-Chloronaphthalene	1160		ug/kg wet	2000.0		58	45-115		
2-Chlorophenol	1190		ug/kg wet	2000.0		59	45-105		
2-Methylnaphthalene	1160		ug/kg wet	2000.0		58	45-110		
2-Methylphenol	1220		ug/kg wet	2000.0		61	40-120		
2-Nitroaniline	1490		ug/kg wet	2000.0		74	45-120		
2-Nitrophenol	1230		ug/kg wet	2000.0		62	40-110		
3,3'-Dichlorobenzidine	1410		ug/kg wet	2000.0		71	15-130		
3-Nitroaniline	1210		ug/kg wet	2000.0		61	40-130		
4,6-Dinitro-2-methylphenol	456		ug/kg wet	2000.0		23	20-140		
4-Bromophenyl Phenyl Ether	1170		ug/kg wet	2000.0		58	45-115		
4-Chloro-3-methylphenol	1290		ug/kg wet	2000.0		65	35-115		
4-Chloroaniline	1020		ug/kg wet	2000.0		51	10-100		
4-Chlorophenyl Phenyl Ether	1160		ug/kg wet	2000.0		58	45-110		
3- and/or 4-Methylphenol	1230		ug/kg wet	2000.0		62	40-120		
4-Nitroaniline	1270		ug/kg wet	2000.0		64	40-130		
4-Nitrophenol	1310		ug/kg wet	2000.0		66	15-140		
Acenaphthene	1180		ug/kg wet	2000.0		59	45-110		
Acenaphthylene	1210		ug/kg wet	2000.0		60	45-115		
Anthracene	1180		ug/kg wet	2000.0		59	45-130		
Benz[a]anthracene	1250		ug/kg wet	2000.0		63	45-130		
Benzo[a] pyrene	1070		ug/kg wet	2000.0		54	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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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 L210220 - SW 3540C									
LCS (L210220-BS1)			Prepared: 10/25/2012 Analyzed: 10/29/2012						
Benzo[b] fluoranthene	1160		ug/kg wet	2000.0		58	40-130		
Benzo[g,h,i] perylene	1150		ug/kg wet	2000.0		57	45-125		
Benzo[k] fluoranthene	1120		ug/kg wet	2000.0		56	45-125		
Bis(2-chloroethoxy) methane	1170		ug/kg wet	2000.0		58	45-110		
Bis(2-chloroethyl) ether	1180		ug/kg wet	2000.0		59	40-110		
Bis(2-chloroisopropyl) ether	1150		ug/kg wet	2000.0		58	30-115		
Bis(2-ethylhexyl) phthalate	1560		ug/kg wet	2000.0		78	40-145		
Butyl Benzyl Phthalate	1330		ug/kg wet	2000.0		67	50-125		
Carbazole	1250		ug/kg wet	2000.0		63	40-140		
Chrysene	1300		ug/kg wet	2000.0		65	45-130		
Dibenz[a,h]anthracene	1220		ug/kg wet	2000.0		61	45-125		
Dibenzofuran	1210		ug/kg wet	2000.0		60	45-120		
Diethyl Phthalate	1210		ug/kg wet	2000.0		60	50-125		
Dimethyl Phthalate	1190		ug/kg wet	2000.0		59	45-130		
Di-n-butyl Phthalate	1220		ug/kg wet	2000.0		61	50-130		
Di-n-octyl Phthalate	1390		ug/kg wet	2000.0		69	40-150		
Fluoranthene	1230		ug/kg wet	2000.0		62	45-130		
Fluorene	1180		ug/kg wet	2000.0		59	45-120		
Hexachlorobenzene	1200		ug/kg wet	2000.0		60	45-130		
Hexachlorobutadiene	1240		ug/kg wet	2000.0		62	45-105		
Hexachlorocyclopentadiene	531		ug/kg wet	2000.0		27	10-100		
Hexachloroethane	1090		ug/kg wet	2000.0		54	35-110		
Indeno[1,2,3-cd]pyrene	1150		ug/kg wet	2000.0		57	45-130		
Isophorone	1200		ug/kg wet	2000.0		60	40-110		
Naphthalene	1280		ug/kg wet	2000.0		64	40-110		
Nitrobenzene	1150		ug/kg wet	2000.0		58	40-105		
N-Nitrosodi-n-propylamine	1440		ug/kg wet	2000.0		72	30-130		
N-Nitrosodiphenylamine	1190		ug/kg wet	2000.0		60	50-120		
Pentachlorophenol	733		ug/kg wet	2000.0		37	25-120		
Phenanthrene	1220		ug/kg wet	2000.0		61	50-120		
Phenol	1220		ug/kg wet	2000.0		61	40-115		
Pyrene	1240		ug/kg wet	2000.0		62	45-125		
Surrogate: 2-Fluorophenol	*1510*		*ug/kg wet*	*2500.0*		*61*	*25-121*		
Surrogate: Phenol-d5	*1600*		*ug/kg wet*	*2500.0*		*64*	*24-113*		
Surrogate: Nitrobenzene-d5	*1100*		*ug/kg wet*	*1666.7*		*66*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*1060*		*ug/kg wet*	*1666.7*		*64*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*1380*		*ug/kg wet*	*2500.0*		*55*	*19-122*		

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/14/2012 08:42

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 L210220 - SW 3540C									
LCS (L210220-BS1)			Prepared: 10/25/2012 Analyzed: 10/29/2012						
Surrogate: p-Terphenyl-d14	*1010*		*ug/kg wet*	*1666.7*		*61*	*18-137*		
Matrix Spike (L210220-MS1)		Source: 1210071-01	Prepared: 10/25/2012 Analyzed: 10/31/2012						
1,2,4-Trichlorobenzene	1120		ug/kg dry	2012.8	335 U	56	45-110		
1,2-Dichlorobenzene	1150		ug/kg dry	2012.8	335 U	57	45-105		
1,3-Dichlorobenzene	1090		ug/kg dry	2012.8	335 U	54	40-100		
1,4-Dichlorobenzene	1120		ug/kg dry	2012.8	335 U	56	35-105		
2,4,5-Trichlorophenol	1210		ug/kg dry	2012.8	335 U	60	30-140		
2,4,6-Trichlorophenol	957		ug/kg dry	2012.8	335 U	48	20-110		
2,4-Dichlorophenol	1210		ug/kg dry	2012.8	335 U	60	40-110		
2,4-Dimethylphenol	1100		ug/kg dry	2012.8	335 U	55	30-105		
2,4-Dinitrophenol	395		ug/kg dry	2012.8	1670 U	20*	25-130		
2,4-Dinitrotoluene	1510		ug/kg dry	2012.8	335 U	75	50-115		
2,6-Dinitrotoluene	1470		ug/kg dry	2012.8	335 U	73	40-120		
2-Chloronaphthalene	1230		ug/kg dry	2012.8	335 U	61	45-115		
2-Chlorophenol	1220		ug/kg dry	2012.8	335 U	60	45-105		
2-Methylnaphthalene	1220		ug/kg dry	2012.8	335 U	61	45-110		
2-Methylphenol	1280		ug/kg dry	2012.8	335 U	63	40-120		
2-Nitroaniline	1690		ug/kg dry	2012.8	1670 U	84	45-120		
2-Nitrophenol	1210		ug/kg dry	2012.8	335 U	60	40-110		
3,3'-Dichlorobenzidine	1290		ug/kg dry	2012.8	670 U	64	15-130		
3-Nitroaniline	1320		ug/kg dry	2012.8	1670 U	65	40-130		
4,6-Dinitro-2-methylphenol	717		ug/kg dry	2012.8	335 U	36	20-140		
4-Bromophenyl Phenyl Ether	1330		ug/kg dry	2012.8	335 U	66	45-115		
4-Chloro-3-methylphenol	1500		ug/kg dry	2012.8	335 U	74	35-115		
4-Chloroaniline	901		ug/kg dry	2012.8	335 U	45	10-100		
4-Chlorophenyl Phenyl Ether	1360		ug/kg dry	2012.8	335 U	67	45-110		
3- and/or 4-Methylphenol	1340		ug/kg dry	2012.8	335 U	66	40-120		
4-Nitroaniline	1410		ug/kg dry	2012.8	1670 U	70	40-130		
4-Nitrophenol	1210		ug/kg dry	2012.8	1670 U	60	15-140		
Acenaphthene	1330		ug/kg dry	2012.8	335 U	66	45-110		
Acenaphthylene	1400		ug/kg dry	2012.8	335 U	70	45-115		
Anthracene	1360		ug/kg dry	2012.8	335 U	68	45-130		
Benz[a]anthracene	1420		ug/kg dry	2012.8	335 U	70	45-130		
Benzo[a] pyrene	1280		ug/kg dry	2012.8	335 U	64	45-130		
Benzo[b] fluoranthene	1390		ug/kg dry	2012.8	335 U	69	40-130		
Benzo[g,h,i] perylene	1330		ug/kg dry	2012.8	335 U	66	45-125		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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 L210220 - SW 3540C									
Matrix Spike (L210220-MS1)	**Source: 1210071-01**		Prepared: 10/25/2012 Analyzed: 10/31/2012						
Benzo[k] fluoranthene	1270		ug/kg dry	2012.8	335 U	63	45-125		
Bis(2-chloroethoxy) methane	1190		ug/kg dry	2012.8	335 U	59	45-110		
Bis(2-chloroethyl) ether	1140		ug/kg dry	2012.8	335 U	56	40-110		
Bis(2-chloroisopropyl) ether	1100		ug/kg dry	2012.8	335 U	55	30-115		
Bis(2-ethylhexyl) phthalate	1710		ug/kg dry	2012.8	335 U	85	40-145		
Butyl Benzyl Phthalate	1500		ug/kg dry	2012.8	335 U	74	50-125		
Carbazole	1390		ug/kg dry	2012.8	335 U	69	40-140		
Chrysene	1450		ug/kg dry	2012.8	335 U	72	45-130		
Dibenz[a,h]anthracene	1420		ug/kg dry	2012.8	335 U	70	45-125		
Dibenzofuran	1390		ug/kg dry	2012.8	335 U	69	45-120		
Diethyl Phthalate	1410		ug/kg dry	2012.8	335 U	70	50-125		
Dimethyl Phthalate	1380		ug/kg dry	2012.8	335 U	69	45-130		
Di-n-butyl Phthalate	1380		ug/kg dry	2012.8	335 U	69	50-130		
Di-n-octyl Phthalate	1570		ug/kg dry	2012.8	335 U	78	40-150		
Fluoranthene	1390		ug/kg dry	2012.8	335 U	69	45-130		
Fluorene	1390		ug/kg dry	2012.8	335 U	69	45-120		
Hexachlorobenzene	1400		ug/kg dry	2012.8	335 U	70	45-130		
Hexachlorobutadiene	1190		ug/kg dry	2012.8	335 U	59	45-105		
Hexachlorocyclopentadiene	583		ug/kg dry	2012.8	335 U	29	10-100		
Hexachloroethane	1020		ug/kg dry	2012.8	335 U	51	35-110		
Indeno[1,2,3-cd]pyrene	1360		ug/kg dry	2012.8	335 U	68	45-130		
Isophorone	1250		ug/kg dry	2012.8	335 U	62	40-110		
Naphthalene	1280		ug/kg dry	2012.8	335 U	63	40-110		
Nitrobenzene	1130		ug/kg dry	2012.8	335 U	56	40-105		
N-Nitrosodi-n-propylamine	1380		ug/kg dry	2012.8	335 U	69	30-130		
N-Nitrosodiphenylamine	1350		ug/kg dry	2012.8	335 U	67	50-120		
Pentachlorophenol	815		ug/kg dry	2012.8	1670 U	40	25-120		
Phenanthrene	1390		ug/kg dry	2012.8	335 U	69	50-120		
Phenol	1250		ug/kg dry	2012.8	335 U	62	40-115		
Pyrene	1370		ug/kg dry	2012.8	335 U	68	45-125		
Surrogate: 2-Fluorophenol	*1530*		*ug/kg dry*	*2516.0*		*61*	*25-121*		
Surrogate: Phenol-d5	*1640*		*ug/kg dry*	*2516.0*		*65*	*24-113*		
Surrogate: Nitrobenzene-d5	*1070*		*ug/kg dry*	*1677.3*		*64*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*1120*		*ug/kg dry*	*1677.3*		*67*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*1090*		*ug/kg dry*	*2516.0*		*43*	*19-122*		
Surrogate: p-Terphenyl-d14	*1140*		*ug/kg dry*	*1677.3*		*68*	*18-137*		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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 L210220 - SW 3540C									
Matrix Spike Dup (L210220-MSD1)		**Source: 1210071-01**	**Prepared: 10/25/2012 Analyzed: 10/31/2012**						
1,2,4-Trichlorobenzene	1440		ug/kg dry	2060.8	335 U	70	45-110	23	40
1,2-Dichlorobenzene	1430		ug/kg dry	2060.8	335 U	70	45-105	20	40
1,3-Dichlorobenzene	1370		ug/kg dry	2060.8	335 U	67	40-100	21	40
1,4-Dichlorobenzene	1400		ug/kg dry	2060.8	335 U	68	35-105	20	40
2,4,5-Trichlorophenol	1510		ug/kg dry	2060.8	335 U	73	30-140	20	40
2,4,6-Trichlorophenol	1110		ug/kg dry	2060.8	335 U	54	20-110	12	40
2,4-Dichlorophenol	1460		ug/kg dry	2060.8	335 U	71	40-110	16	40
2,4-Dimethylphenol	1460		ug/kg dry	2060.8	335 U	71	30-105	26	40
2,4-Dinitrophenol	217		ug/kg dry	2060.8	1670 U	11*	25-130	60*	40
2,4-Dinitrotoluene	1760		ug/kg dry	2060.8	335 U	85	50-115	13	40
2,6-Dinitrotoluene	1710		ug/kg dry	2060.8	335 U	83	40-120	13	40
2-Chloronaphthalene	1520		ug/kg dry	2060.8	335 U	74	45-115	19	40
2-Chlorophenol	1470		ug/kg dry	2060.8	335 U	71	45-105	17	40
2-Methylnaphthalene	1460		ug/kg dry	2060.8	335 U	71	45-110	15	40
2-Methylphenol	1500		ug/kg dry	2060.8	335 U	73	40-120	13	40
2-Nitroaniline	2030		ug/kg dry	2060.8	1670 U	99	45-120	16	40
2-Nitrophenol	1540		ug/kg dry	2060.8	335 U	75	40-110	21	40
3,3'-Dichlorobenzidine	1690		ug/kg dry	2060.8	670 U	82	15-130	24	40
3-Nitroaniline	1580		ug/kg dry	2060.8	1670 U	77	40-130	16	40
4,6-Dinitro-2-methylphenol	496		ug/kg dry	2060.8	335 U	24	20-140	39	40
4-Bromophenyl Phenyl Ether	1610		ug/kg dry	2060.8	335 U	78	45-115	16	40
4-Chloro-3-methylphenol	1680		ug/kg dry	2060.8	335 U	82	35-115	9	40
4-Chloroaniline	1090		ug/kg dry	2060.8	335 U	53	10-100	17	40
4-Chlorophenyl Phenyl Ether	1610		ug/kg dry	2060.8	335 U	78	45-110	14	40
3- and/or 4-Methylphenol	1480		ug/kg dry	2060.8	335 U	72	40-120	8	40
4-Nitroaniline	1740		ug/kg dry	2060.8	1670 U	84	40-130	19	40
4-Nitrophenol	1470		ug/kg dry	2060.8	1670 U	72	15-140	17	40
Acenaphthene	1600		ug/kg dry	2060.8	335 U	77	45-110	15	40
Acenaphthylene	1680		ug/kg dry	2060.8	335 U	81	45-115	16	40
Anthracene	1620		ug/kg dry	2060.8	335 U	79	45-130	15	40
Benz[a]anthracene	1720		ug/kg dry	2060.8	335 U	84	45-130	17	40
Benzo[a] pyrene	1620		ug/kg dry	2060.8	335 U	79	45-130	21	40
Benzo[b] fluoranthene	1660		ug/kg dry	2060.8	335 U	80	40-130	15	40
Benzo[g,h,i] perylene	1620		ug/kg dry	2060.8	335 U	79	45-125	17	40
Benzo[k] fluoranthene	1670		ug/kg dry	2060.8	335 U	81	45-125	24	40
Bis(2-chloroethoxy) methane	1470		ug/kg dry	2060.8	335 U	71	45-110	18	40

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/14/2012 08:42

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 L210220 - SW 3540C									
Matrix Spike Dup (L210220-MSD1)	**Source: 1210071-01**		Prepared: 10/25/2012 Analyzed: 10/31/2012						
Bis(2-chloroethyl) ether	1400		ug/kg dry	2060.8	335 U	68	40-110	18	40
Bis(2-chloroisopropyl) ether	1350		ug/kg dry	2060.8	335 U	66	30-115	18	40
Bis(2-ethylhexyl) phthalate	2000		ug/kg dry	2060.8	335 U	97	40-145	13	40
Butyl Benzyl Phthalate	1800		ug/kg dry	2060.8	335 U	87	50-125	16	40
Carbazole	1680		ug/kg dry	2060.8	335 U	81	40-140	16	40
Chrysene	1760		ug/kg dry	2060.8	335 U	85	45-130	17	40
Dibenz[a,h]anthracene	1350		ug/kg dry	2060.8	335 U	65	45-125	7	40
Dibenzofuran	1650		ug/kg dry	2060.8	335 U	80	45-120	15	40
Diethyl Phthalate	1630		ug/kg dry	2060.8	335 U	79	50-125	12	40
Dimethyl Phthalate	1610		ug/kg dry	2060.8	335 U	78	45-130	13	40
Di-n-butyl Phthalate	1620		ug/kg dry	2060.8	335 U	79	50-130	13	40
Di-n-octyl Phthalate	1920		ug/kg dry	2060.8	335 U	93	40-150	18	40
Fluoranthene	1660		ug/kg dry	2060.8	335 U	81	45-130	16	40
Fluorene	1610		ug/kg dry	2060.8	335 U	78	45-120	12	40
Hexachlorobenzene	1690		ug/kg dry	2060.8	335 U	82	45-130	16	40
Hexachlorobutadiene	1570		ug/kg dry	2060.8	335 U	76	45-105	25	40
Hexachlorocyclopentadiene	1220		ug/kg dry	2060.8	335 U	59	10-100	69*	40
Hexachloroethane	1330		ug/kg dry	2060.8	335 U	64	35-110	23	40
Indeno[1,2,3-cd]pyrene	1570		ug/kg dry	2060.8	335 U	76	45-130	12	40
Isophorone	1500		ug/kg dry	2060.8	335 U	73	40-110	16	40
Naphthalene	1600		ug/kg dry	2060.8	335 U	78	40-110	20	40
Nitrobenzene	1430		ug/kg dry	2060.8	335 U	69	40-105	21	40
N-Nitrosodi-n-propylamine	1720		ug/kg dry	2060.8	335 U	84	30-130	20	40
N-Nitrosodiphenylamine	1650		ug/kg dry	2060.8	335 U	80	50-120	18	40
Pentachlorophenol	909		ug/kg dry	2060.8	1670 U	44	25-120	9	40
Phenanthrene	1660		ug/kg dry	2060.8	335 U	81	50-120	15	40
Phenol	1470		ug/kg dry	2060.8	335 U	72	40-115	14	40
Pyrene	1670		ug/kg dry	2060.8	335 U	81	45-125	18	40
Surrogate: 2-Fluorophenol	*1730*		*ug/kg dry*	*2576.0*		*67*	*25-121*		
Surrogate: Phenol-d5	*1810*		*ug/kg dry*	*2576.0*		*70*	*24-113*		
Surrogate: Nitrobenzene-d5	*1280*		*ug/kg dry*	*1717.4*		*75*	*23-120*		
Surrogate: 2-Fluorobiphenyl	*1290*		*ug/kg dry*	*1717.4*		*75*	*30-115*		
Surrogate: 2,4,6-Tribromophenol	*1130*		*ug/kg dry*	*2576.0*		*44*	*19-122*		
Surrogate: p-Terphenyl-d14	*1230*		*ug/kg dry*	*1717.4*		*71*	*18-137*		

Date: 28 January 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100N Field remediation – Soil Full Protocol – Waste Site 116-N-2
Subject: Volatile Organics - Data Package No. K4009-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K4009 prepared by Lionville Laboratories 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
J1R3J2	10/18/12	Soil	C	See note 1
J1R3J3	10/18/12	Soil	C	See note 1
J1R3J4	10/18/12	Soil	C	See note 1
J1R3J5	10/18/12	Soil	C	See note 1
J1R3J6	10/18/12	Soil	C	See note 1
J1R3J7	10/18/12	Soil	C	See note 1
J1R3J8	10/18/12	Soil	C	See note 1
J1R3J9	10/18/12	Soil	C	See note 1
J1R3K0	10/18/12	Soil	C	See note 1
J1R3K1	10/18/12	Soil	C	See note 1
J1R3K2	10/18/12	Soil	C	See note 1
J1R3K3	10/18/12	Soil	C	See note 1
J1R3K4	10/18/12	Soil	C	See note 1

1 – Volatiles by 8260.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 300 Area Remedial Action Sampling and Analysis Plan (DOE/RL-2001-48, Rev. 3). 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 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 analyzed within 14 days of the date of sample collection.

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 Blanks

No field blanks were 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 an LCS recovery outside QC limits (207%), the acetone results in samples J1R3J6, J1R3J7, J1R3J8, J1R3J9, J1R3K0 and J1R3K1 were qualified as estimates and flagged "J".

Due to a matrix spike (246%) and matrix spike duplicate (242%) recoveries outside QC limits (246%), the acetone results in samples J1R3J6, J1R3J7, J1R3J8, J1R3J9, J1R3K0 and J1R3K1 were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (202%), the acetone results in samples J1R3K2 and J1R3K3 were qualified as estimates and flagged "J".

Due to a matrix spike (183%) and matrix spike duplicate (241%) recoveries outside QC limits (246%), the acetone results in samples J1R3K2 and J1R3K3 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.

All duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1R3J4/J1R3K4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **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. Ninety-six analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data package No. K4009 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 an LCS recovery outside QC limits (207%), the acetone results in samples J1R3J6, J1R3J7, J1R3J8, J1R3J9, J1R3K0 and J1R3K1 were qualified as estimates and flagged "J".

- Due to a matrix spike (246%) and matrix spike duplicate (242%) recoveries outside QC limits (246%), the acetone results in samples J1R3J6, J1R3J7, J1R3J8, J1R3J9, J1R3K0 and J1R3K1 were qualified as estimates and flagged "J".

- Due to an LCS recovery outside QC limits (202%), the acetone results in samples J1R3K2 and J1R3K3 were qualified as estimates and flagged "J".

- Due to a matrix spike (183%) and matrix spike duplicate (241%) recoveries outside QC limits (246%), the acetone results in samples J1R3K2 and J1R3K3 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.

Ninety-six analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

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

DOE/RL-2001-48, Rev. 3, *300 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 2004.

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

VOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: K4009	**REVIEWER: ELR**	**Project: 116-N-2**	**PAGE_1_OF_1**
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Acetone	J	J1R3J6, J1R3J7 J1R3J8,J1R3J9 J1R3K0, J1R3K1	LCS, MS & MSD recovery
Acetone	J	J1R3K2, J1R3K3	LCS, MS & MSD 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

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J2
1210071-01 (Soil)

1/20/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	6.90	U	6.90	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	13.8	U	13.8	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	13.8	U	13.8	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	13.8	U	13.8	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	13.8	U	13.8	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	6.90	U	6.90	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	11.5	U	11.5	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	11.5	U	11.5	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	11.5	U	11.5	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	**2.67**	J	6.90	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	11.5	U	11.5	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	5.75	U	5.75	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*113 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J2
1210071-01 (Soil)

1/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*101 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*110 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J3
1210071-02 (Soil)

1/26/13

Lionville Laboratory

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	6.97	U	6.97	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	6.97	U	6.97	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	3.06	J	6.97	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*111 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

000000019

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J3
1210071-02 (Soil)

1/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*99 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*108 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J4
1210071-03 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	6.97	U	6.97	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	6.97	U	6.97	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	**3.21**	J	6.97	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*109 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J4
1210071-03 (Soil)

1/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*97 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*106 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J5
1210071-04 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	6.95	U	6.95	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	13.9	U	13.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	6.95	U	6.95	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	**3.33**	J	6.95	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	5.79	U	5.79	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*111 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J5
1210071-04 (Soil)

V 1/22/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*97 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*108 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J6
1210071-05 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	6.77	U	6.77	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	13.5	U	13.5	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	13.5	U	13.5	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	13.5	U	13.5	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	**4.74**	**J** J	13.5	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	6.77	U	6.77	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	11.3	U	11.3	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	11.3	U	11.3	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	11.3	U	11.3	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	**4.10**	**J**	6.77	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	11.3	U	11.3	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	5.64	U	5.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*113 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J6
1210071-05 (Soil)

1(26k)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*96 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*104 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J7
1210071-06 (Soil)

V 1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	11.6	U	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	**4.15**	J J	11.6	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	5.81	U	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	9.68	U	9.68	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	9.68	U	9.68	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	9.68	U	9.68	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	**3.65**	J	5.81	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	9.68	U	9.68	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	4.84	U	4.84	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*114 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J7
1210071-06 (Soil)

V 11/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*99 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*104 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J8
1210071-07 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	6.21	U	6.21	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	12.4	U	12.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	12.4	U	12.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	12.4	U	12.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	**5.55**	J	12.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	6.21	U	6.21	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	10.4	U	10.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	10.4	U	10.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	10.4	U	10.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	**2.15**	J	6.21	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	10.4	U	10.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	5.18	U	5.18	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*114 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J8
1210071-07 (Soil)

V 1/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*99 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*108 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J9
1210071-08 (Soil)

V 11/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	9.64	U	9.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	19.3	U	19.3	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	19.3	U	19.3	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	19.3	U	19.3	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	7.66	J J	19.3	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	9.64	U	9.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	16.1	U	16.1	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	16.1	U	16.1	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	16.1	U	16.1	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	4.36	J	9.64	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	16.1	U	16.1	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	8.03	U	8.03	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*111 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3J9
1210071-08 (Soil)

V 1/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
		Lionville Laboratory						
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*92 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*102 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3K0
1210071-09 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	5.47	U	5.47	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	10.9	U	10.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	10.9	U	10.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	10.9	U	10.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	**3.78**	J J	10.9	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	5.47	U	5.47	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	9.11	U	9.11	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	9.11	U	9.11	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	9.11	U	9.11	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	**2.51**	J	5.47	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	9.11	U	9.11	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	4.56	U	4.56	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*109 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3K0
1210071-09 (Soil)

V 11/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
		Lionville Laboratory						
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*96 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*105 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3K1
1210071-10 (Soil)

V 11/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2,2-Tetrachloroethane	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1,2-Trichloroethane	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethane	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,1-Dichloroethene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethane	6.71	U	6.71	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloroethene (total)	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
1,2-Dichloropropane	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Butanone	13.4	U	13.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
2-Hexanone	13.4	U	13.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
4-Methyl-2-pentanone	13.4	U	13.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Acetone	**4.70**	J J	13.4	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Benzene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromodichloromethane	6.71	U	6.71	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromoform	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Bromomethane	11.2	U	11.2	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Disulfide	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Carbon Tetrachloride	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chlorobenzene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroethane	11.2	U	11.2	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloroform	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Chloromethane	11.2	U	11.2	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,2-Dichloroethene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
cis-1,3-Dichloropropene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Dibromochloromethane	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Ethylbenzene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Methylene Chloride	6.71	U	6.71	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Styrene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Tetrachloroethene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,2-Dichloroethene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Toluene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
trans-1,3-Dichloropropene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Trichloroethene	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Vinyl chloride	11.2	U	11.2	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Xylenes, total	5.60	U	5.60	ug/kg dry	1	L210217	10/25/2012	10/25/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*110 %*		*60-130*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3K1
1210071-10 (Soil)

V 1/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*97 %*	*72-117*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*100 %*	*72-144*			*L210217*	*10/25/2012*	*10/25/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3K2
1210071-11 (Soil)

V 1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1,2,2-Tetrachloroethane	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1,2-Trichloroethane	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1-Dichloroethane	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1-Dichloroethene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloroethane	8.09	U	8.09	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloroethene (total)	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloropropane	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
2-Butanone	16.2	U	16.2	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
2-Hexanone	16.2	U	16.2	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
4-Methyl-2-pentanone	16.2	U	16.2	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Acetone	**7.65**	J J	16.2	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Benzene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromodichloromethane	8.09	U	8.09	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromoform	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromomethane	13.5	U	13.5	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Carbon Disulfide	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Carbon Tetrachloride	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chlorobenzene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloroethane	13.5	U	13.5	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloroform	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloromethane	13.5	U	13.5	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
cis-1,2-Dichloroethene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
cis-1,3-Dichloropropene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Dibromochloromethane	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Ethylbenzene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Methylene Chloride	8.09	U	8.09	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Styrene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Tetrachloroethene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
trans-1,2-Dichloroethene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Toluene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
trans-1,3-Dichloropropene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Trichloroethene	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Vinyl chloride	13.5	U	13.5	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Xylenes, total	6.74	U	6.74	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*106 %*		*60-130*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3K2
1210071-11 (Soil)

1/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory								
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*110 %*	*72-117*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*142 %*	*72-144*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

J1R3K3
1210071-12 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1,2,2-Tetrachloroethane	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1,2-Trichloroethane	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1-Dichloroethane	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1-Dichloroethene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloroethane	8.31	U	8.31	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloroethene (total)	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloropropane	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
2-Butanone	16.6	U	16.6	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
2-Hexanone	16.6	U	16.6	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
4-Methyl-2-pentanone	16.6	U	16.6	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Acetone	**5.94**	J J	16.6	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Benzene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromodichloromethane	8.31	U	8.31	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromoform	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromomethane	13.8	U	13.8	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Carbon Disulfide	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Carbon Tetrachloride	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chlorobenzene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloroethane	13.8	U	13.8	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloroform	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloromethane	13.8	U	13.8	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
cis-1,2-Dichloroethene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
cis-1,3-Dichloropropene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Dibromochloromethane	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Ethylbenzene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Methylene Chloride	8.31	U	8.31	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Styrene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Tetrachloroethene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
trans-1,2-Dichloroethene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Toluene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
trans-1,3-Dichloropropene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Trichloroethene	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Vinyl chloride	13.8	U	13.8	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Xylenes, total	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*106 %*		*60-130*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*

000000039

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	**Reported:** 11/06/2012 08:57

J1R3K3
1210071-12 (Soil)

V, 1/26/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
		Lionville Laboratory						
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*104 %*	*72-117*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*110 %*	*72-144*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/12/2012 14:17

J1R3K4
1210071-13 (Soil)

1/26/13

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Volatile Organic Compounds by SW846 8260B									
1,1,1-Trichloroethane	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1,2,2-Tetrachloroethane	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1,2-Trichloroethane	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1-Dichloroethane	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,1-Dichloroethene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloroethane	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloroethene (total)	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
1,2-Dichloropropane	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
2-Butanone	13.8	U	13.8	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
2-Hexanone	13.8	U	13.8	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
4-Methyl-2-pentanone	13.8	U	13.8	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Acetone	13.8	U	13.8	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Benzene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromodichloromethane	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromoform	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Bromomethane	11.5	U	11.5	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Carbon Disulfide	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Carbon Tetrachloride	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chlorobenzene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloroethane	11.5	U	11.5	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloroform	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Chloromethane	11.5	U	11.5	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
cis-1,2-Dichloroethene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
cis-1,3-Dichloropropene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Dibromochloromethane	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Ethylbenzene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Methylene Chloride	6.92	U	6.92	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Styrene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Tetrachloroethene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
trans-1,2-Dichloroethene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Toluene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
trans-1,3-Dichloropropene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Trichloroethene	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Vinyl chloride	11.5	U	11.5	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Xylenes, total	5.77	U	5.77	ug/kg dry	1	L210251	10/28/2012	10/28/2012	8260B
Surrogate: 1,2-Dichloroethane-d4	*110 %*		*60-130*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*

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

WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/12/2012 14:17

J1R3K4
1210071-13 (Soil)

1/20/13

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
		Lionville Laboratory						
Volatile Organic Compounds by SW846 8260B								
Surrogate: Toluene-d8	*101 %*	*72-117*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*
Surrogate: 4-Bromofluorobenzene	*107 %*	*72-144*			*L210251*	*10/28/2012*	*10/28/2012*	*8260B*

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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-189 K4009
LVL #: 1210071

W.O. #: 60049-001-001-0001-00
Date Received: 10-24-2012

GC/MS VOLATILE

Thirteen (13) soil samples were collected on 10-18-2012.

The samples and associated QC samples were prepared and analyzed 10-25,28-2012 according to criteria set forth in Lionville Laboratory SOPs. The preparation procedure was based on SW846 Method 5035A and the analysis procedure was based on SW846 Method 8260B for Client Specified Volatile 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. The results presented in this report are derived from samples that met LvL's sample acceptance policy with the exceptions noted on the Sample Receipt Checklist.

2. Samples were analyzed within hold time.

3. Non-target compounds were not detected in these samples.

4. One (1) of sixty-three (63) surrogate recoveries were outside acceptance criteria for sample L210251-MSD1. The analysis of an associated sample fulfills the reanalysis requirement.

5. Five (5) of one hundred and forty matrix spike recoveries were outside acceptance criteria.

6. All blank spike recoveries were within acceptance criteria.

7. The method blanks were below the reporting limit for all target analytes.

8. Samples are reported on a dry weight basis.

9. All initial calibrations associated with this data set were within acceptance criteria using the mean RSD described in method 8000B. Per method 8000B/8260B, the attached Table 1 provides the mean RSD and indicates the target compounds where the RSD exceeded 15%; results for the indicated target compounds are considered to have greater uncertainty.

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

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

11. All internal standard area and retention time were outside criteria for sample J1R3K2; the analysis of the associated matrix QC samples fulfills the reanalysis requirement.

12. Manual integrations are performed according to SOP QA-125 to produce quality data with 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").

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

Iain Daniels
LvL Laboratory Manager

12/3/12
Date

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 1 of 3

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ Days 15		
Project Designation: 100N Field Remediation - Soil Pull Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~
Shipped To: ~~EBERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120 631/632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad ≤DOT Limits At 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Gs*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1		0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium	RCF
J1R3J2	SOIL	10-18-12	1010	X	X	X	X	X	X	X	X	X		34720
J1R3J3	SOIL	10-18-12	1020	X	X	X	X	X	X	X		X		
J1R3J4	SOIL	10-18-12	1050	X	X	X	X	X	X	X		X		34721
J1R3J5	SOIL	10-18-12	1035	X	X	X	X	X	X	X		X		34722
J1R3J6	SOIL	10-18-12	1200	X	X	X	X	X	X	X		X		

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1700 10/18/12	Dennis Newman	1700 10/18/12
Dennis Newman	2020 10/18/12	Ref #3, 1060 Battelle	2020 10/18/12
Ref #3 1060 Battelle	0800 10-19-12	[illegible]	0800 10-19-12
[illegible] WCH	1060#3 10-23-12 1245	Fed EX	
Fed Ex	10/24/12 0950	VICTOR HERNANDEZ	10/24/12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* freeze upon receipt At 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-189-128	Page 2 of 3
Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: ~~8L~~ 8K 10/18/12 — Data Turnaround: ~~21~~ 15 Days 10/18/12
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189	
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed Ex ~~Hand Deliver~~ 10/18/12	
Shipped To: ~~EBERLINE SERVICES~~ LIONVILLE 10/18/12	Offsite Property No.: A120631/632		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potential Rad LDOT Limits AS 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Ga*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3J7	SOIL	10-18-12	1040	X	X	X	X	X	X	X			
J1R3J8	SOIL	10-18-12	1255	X	X	X	X	X	X	X			
J1R3J9	SOIL	10-18-12	1207	X	X	X	X	X	X	X			
J1R3K0	SOIL	10-18-12	1237	X	X	X	X	X	X	X			
J1R3K1	SOIL	10-18-12	1247	X	X	X	X	X	X	X			

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	1700 10/18/12	Dennis Newman	1700 10/18/12
Dennis Newman	2020 10/18/12	Ref #3, 1060 Battelle	2020 10/18/12
Ref. #3 Battelle	10-19-12 0800	Cindy Bingham	1060#3 10-19-12 0800
Cindy Bingham WCH	1060#3 10-23-12 1245	Fed EX	
Fed EX	10/24/12 0950	Victor Hernandez	10/24/12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226}

* Freeze upon receipt AS 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Matrix *: S=Soil, SB=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	Time	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

REVIEWED BY AF DATE 10-23-12

WCH-EE-011

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-189-128	Page 1 of 53

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: ~~8L~~ 8K	Data Turnaround: ~~21~~ 15 Days		
Project Designation: 100N Field Remediation - Soil Full Protocol	Sampling Location: 116-N-2 Verification		SAF No.: RC-189
Ice Chest No.: RCC-07-011	Field Logbook No.: EI-1652-07	COA: R116N22000	Method of Shipment: Fed EX ~~Hand Deliver~~
Shipped To: ~~BREERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A120631/632		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE ~~HAZARDS~~/REMARKS

Potential Rad & DOT Limits A# 10-22-12

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	Cool 4C	Cool 4C	Freeze	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	G/P	G/P	G/P	Ge*	aG	aG	aG	aG	G/P	G/P
No. of Container(s)	1	1	1	5	1	1	1	1	1	0
Volume	60mL	60mL	60mL	40mL	120mL	120mL	120mL	120mL	500mL	500mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 5035/8260 (TCL) *	Semi-VOA - 8270A (TCL)	PCBs - 8082	PAHs - 8310	Pesticides - 8081	See item (3) in Special Instructions.	Isotopic Uranium

Sample No.	Matrix *	Sample Date	Sample Time										
J1R3K2	SOIL	10-18-12	1218	X	X	X	X	X	X	X			
J1R3K3	SOIL	10-18-12	1229	X	X	X	X	X	X	X	34719		
J1R3K4	SOIL	10-18-12	1050	X	X	X	X	X	X	X			

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	10/18/12 1700	Dennis Newman	10/18/12 1700
Dennis Newman	10/18/12 2020	Ref #3, 1060 Battelle	10/18/12 2020
Ref #3, 1060 Battelle	10-19-12 0800	[illegible]	10-19-12 0800
[illegible] WCH	10-23-12 1245	Fed EX	
Fed EX	10/24/12 0950	Victor Fernandez	10-24-12 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; pH (Soil) - 9045
(3) Gamma Spec (Client List) [Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226]
* freeze upon receipt. A# 10-22-12

VOA samples frozen upon collection

Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

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, Ve=Vegetation, X=Other

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

REVIEWED BY AJ DATE 10-23-12

WCH-EE-011

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Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-N-2			DATA PACKAGE: K4009		
VALIDATOR: ELR		LAB: LLI		DATE: 1/16/13	
			SDG: K4009		

ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)

SAMPLES/MATRIX				
J1R3J2	J1R3J3	J1R3J4	J1R3J5	J1R3J6
J1R3J7	J1R3J8	J1R3J9	J1R3K0	J1R3K1
J1R3K2	J1R3K3	J1R3K4		
				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: methylene chloride - U all at RQL - detects

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 - acetone - over - J all
MS - acetone - J all

no PAS

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: _____

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: 104 over

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-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

Volatile Organic Compounds by SW846 8260B - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210217 - SW 5035A										
Blank (L210217-BLK1)				Prepared & Analyzed: 10/25/2012						
1,1,1-Trichloroethane	5.00	U	5.00	ug/kg wet						
1,1,2,2-Tetrachloroethane	5.00	U	5.00	ug/kg wet						
1,1,2-Trichloroethane	5.00	U	5.00	ug/kg wet						
1,1-Dichloroethane	5.00	U	5.00	ug/kg wet						
1,1-Dichloroethene	5.00	U	5.00	ug/kg wet						
1,2-Dichloroethane	6.00	U	6.00	ug/kg wet						
1,2-Dichloroethene (total)	5.00	U	5.00	ug/kg wet						
1,2-Dichloropropane	5.00	U	5.00	ug/kg wet						
2-Butanone	12.0	U	12.0	ug/kg wet						
2-Hexanone	12.0	U	12.0	ug/kg wet						
4-Methyl-2-pentanone	12.0	U	12.0	ug/kg wet						
Acetone	12.0	U	12.0	ug/kg wet						
Benzene	5.00	U	5.00	ug/kg wet						
Bromodichloromethane	6.00	U	6.00	ug/kg wet						
Bromoform	5.00	U	5.00	ug/kg wet						
Bromomethane	10.0	U	10.0	ug/kg wet						
Carbon Disulfide	5.00	U	5.00	ug/kg wet						
Carbon Tetrachloride	5.00	U	5.00	ug/kg wet						
Chlorobenzene	5.00	U	5.00	ug/kg wet						
Chloroethane	10.0	U	10.0	ug/kg wet						
Chloroform	5.00	U	5.00	ug/kg wet						
Chloromethane	10.0	U	10.0	ug/kg wet						
cis-1,2-Dichloroethene	5.00	U	5.00	ug/kg wet						
cis-1,3-Dichloropropene	5.00	U	5.00	ug/kg wet						
Dibromochloromethane	5.00	U	5.00	ug/kg wet						
Ethylbenzene	5.00	U	5.00	ug/kg wet						
Methylene Chloride	6.00	U	6.00	ug/kg wet						
Styrene	5.00	U	5.00	ug/kg wet						
Tetrachloroethene	5.00	U	5.00	ug/kg wet						
trans-1,2-Dichloroethene	5.00	U	5.00	ug/kg wet						
Toluene	5.00	U	5.00	ug/kg wet						
trans-1,3-Dichloropropene	5.00	U	5.00	ug/kg wet						
Trichloroethene	5.00	U	5.00	ug/kg wet						
Vinyl chloride	10.0	U	10.0	ug/kg wet						
Xylenes, total	5.00	U	5.00	ug/kg wet						
Surrogate: 1,2-Dichloroethane-d4	*51.5*			*ug/kg wet*	*50.000*		*103*	*60-130*		

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

Volatile Organic Compounds by SW846 8260B - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210217 - SW 5035A									
Blank (L210217-BLK1)			Prepared & Analyzed: 10/25/2012						
Surrogate: Toluene-d8	*50.1*		*ug/kg wet*	*50.000*		*100*	*72-117*		
Surrogate: 4-Bromofluorobenzene	*54.7*		*ug/kg wet*	*50.000*		*109*	*72-144*		
LCS (L210217-BS1)			Prepared & Analyzed: 10/25/2012						
1,1,1-Trichloroethane	51.1	5.00	ug/kg wet	50.000		102	65-130		
1,1,2,2-Tetrachloroethane	52.5	5.00	ug/kg wet	50.000		105	50-130		
1,1,2-Trichloroethane	50.6	5.00	ug/kg wet	50.000		101	60-125		
1,1-Dichloroethane	50.7	5.00	ug/kg wet	50.000		101	70-130		
1,1-Dichloroethene	47.5	5.00	ug/kg wet	50.000		95	60-130		
1,2-Dichloroethane	53.9	6.00	ug/kg wet	50.000		108	60-130		
1,2-Dichloroethene (total)	97.2	5.00	ug/kg wet	100.00		97	75-125		
1,2-Dichloropropane	52.6	5.00	ug/kg wet	50.000		105	70-130		
2-Butanone	84.9	12.0	ug/kg wet	50.000		170	20-200		
2-Hexanone	78.7	12.0	ug/kg wet	50.000		157	20-200		
4-Methyl-2-pentanone	62.4	12.0	ug/kg wet	50.000		125	40-150		
Acetone	104	12.0	ug/kg wet	50.000		207	15-240		
Benzene	50.8	5.00	ug/kg wet	50.000		102	75-125		
Bromodichloromethane	49.7	6.00	ug/kg wet	50.000		99	65-135		
Bromoform	47.3	5.00	ug/kg wet	50.000		95	60-130		
Bromomethane	34.0	10.0	ug/kg wet	50.000		68	40-150		
Carbon Disulfide	48.5	5.00	ug/kg wet	50.000		97	55-140		
Carbon Tetrachloride	51.6	5.00	ug/kg wet	50.000		103	60-135		
Chlorobenzene	51.9	5.00	ug/kg wet	50.000		104	70-125		
Chloroethane	50.0	10.0	ug/kg wet	50.000		100	50-150		
Chloroform	52.3	5.00	ug/kg wet	50.000		105	70-130		
Chloromethane	43.3	10.0	ug/kg wet	50.000		87	40-130		
cis-1,2-Dichloroethene	48.1	5.00	ug/kg wet	50.000		96	70-125		
cis-1,3-Dichloropropene	48.3	5.00	ug/kg wet	50.000		97	70-125		
Dibromochloromethane	47.8	5.00	ug/kg wet	50.000		96	65-125		
Ethylbenzene	55.0	5.00	ug/kg wet	50.000		110	70-125		
Methylene Chloride	45.7	6.00	ug/kg wet	50.000		91	45-140		
Styrene	54.8	5.00	ug/kg wet	50.000		110	70-125		
Tetrachloroethene	51.2	5.00	ug/kg wet	50.000		102	60-130		
trans-1,2-Dichloroethene	49.1	5.00	ug/kg wet	50.000		98	65-130		
Toluene	54.4	5.00	ug/kg wet	50.000		109	70-125		
trans-1,3-Dichloropropene	52.8	5.00	ug/kg wet	50.000		106	65-125		
Trichloroethene	50.4	5.00	ug/kg wet	50.000		101	70-130		

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/06/2012 08:57

Volatile Organic Compounds by SW846 8260B - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210217 - SW 5035A									
LCS (L210217-BS1)			Prepared & Analyzed: 10/25/2012						
Vinyl chloride	42.6	10.0	ug/kg wet	50.000		85	50-150		
Xylenes, total	167	5.00	ug/kg wet	150.00		112	70-125		
Surrogate: 1,2-Dichloroethane-d4	*50.2*		*ug/kg wet*	*50.000*		*100*	*60-130*		
Surrogate: Toluene-d8	*53.0*		*ug/kg wet*	*50.000*		*106*	*72-117*		
Surrogate: 4-Bromofluorobenzene	*54.0*		*ug/kg wet*	*50.000*		*108*	*72-144*		
Matrix Spike (L210217-MS2)		Source: 1210071-01	Prepared & Analyzed: 10/25/2012						
1,1,1-Trichloroethane	58.3	5.55	ug/kg dry	55.493	5.75 U	105	65-130		
1,1,2,2-Tetrachloroethane	60.9	5.55	ug/kg dry	55.493	5.75 U	110	50-130		
1,1,2-Trichloroethane	59.2	5.55	ug/kg dry	55.493	5.75 U	107	60-125		
1,1-Dichloroethane	60.0	5.55	ug/kg dry	55.493	5.75 U	108	70-130		
1,1-Dichloroethene	54.7	5.55	ug/kg dry	55.493	5.75 U	99	60-130		
1,2-Dichloroethane	65.7	6.66	ug/kg dry	55.493	6.90 U	118	60-130		
1,2-Dichloroethene (total)	111	5.55	ug/kg dry	110.98	5.75 U	100	75-125		
1,2-Dichloropropane	61.6	5.55	ug/kg dry	55.493	5.75 U	111	70-130		
2-Butanone	108	13.3	ug/kg dry	55.493	13.8 U	195	20-200		
2-Hexanone	94.0	13.3	ug/kg dry	55.493	13.8 U	169	20-200		
4-Methyl-2-pentanone	72.7	13.3	ug/kg dry	55.493	13.8 U	131	40-150		
Acetone	136	13.3	ug/kg dry	55.493	13.8 U	246*	15-240		
Benzene	59.1	5.55	ug/kg dry	55.493	5.75 U	106	75-125		
Bromodichloromethane	61.1	6.66	ug/kg dry	55.493	6.90 U	110	65-135		
Bromoform	56.9	5.55	ug/kg dry	55.493	5.75 U	103	60-130		
Bromomethane	38.8	11.1	ug/kg dry	55.493	11.5 U	70	40-150		
Carbon Disulfide	55.1	5.55	ug/kg dry	55.493	5.75 U	99	55-140		
Carbon Tetrachloride	61.1	5.55	ug/kg dry	55.493	5.75 U	110	60-135		
Chlorobenzene	58.7	5.55	ug/kg dry	55.493	5.75 U	106	70-125		
Chloroethane	56.1	11.1	ug/kg dry	55.493	11.5 U	101	50-150		
Chloroform	62.5	5.55	ug/kg dry	55.493	5.75 U	113	70-130		
Chloromethane	49.0	11.1	ug/kg dry	55.493	11.5 U	88	40-130		
cis-1,2-Dichloroethene	53.9	5.55	ug/kg dry	55.493	5.75 U	97	70-125		
cis-1,3-Dichloropropene	53.5	5.55	ug/kg dry	55.493	5.75 U	96	70-125		
Dibromochloromethane	56.6	5.55	ug/kg dry	55.493	5.75 U	102	65-125		
Ethylbenzene	60.7	5.55	ug/kg dry	55.493	5.75 U	109	70-125		
Methylene Chloride	55.4	6.66	ug/kg dry	55.493	2.67	95	45-140		
Styrene	62.0	5.55	ug/kg dry	55.493	5.75 U	112	70-125		
Tetrachloroethene	57.1	5.55	ug/kg dry	55.493	5.75 U	103	60-130		
trans-1,2-Dichloroethene	57.4	5.55	ug/kg dry	55.493	5.75 U	103	65-130		

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

Volatile Organic Compounds by SW846 8260B - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210217 - SW 5035A									
Matrix Spike (L210217-MS2)		**Source: 1210071-01**	Prepared & Analyzed: 10/25/2012						
Toluene	61.0	5.55	ug/kg dry	55.493	5.75 U	110	70-125		
trans-1,3-Dichloropropene	61.7	5.55	ug/kg dry	55.493	5.75 U	111	65-125		
Trichloroethene	60.5	5.55	ug/kg dry	55.493	5.75 U	109	70-130		
Vinyl chloride	46.0	11.1	ug/kg dry	55.493	11.5 U	83	50-150		
Xylenes, total	188	5.55	ug/kg dry	166.48	5.75 U	113	70-125		
Surrogate: 1,2-Dichloroethane-d4	*61.1*		*ug/kg dry*	*55.493*		*110*	*60-130*		
Surrogate: Toluene-d8	*58.8*		*ug/kg dry*	*55.493*		*106*	*72-117*		
Surrogate: 4-Bromofluorobenzene	*60.8*		*ug/kg dry*	*55.493*		*110*	*72-144*		
Matrix Spike Dup (L210217-MSD2)		**Source: 1210071-01**	Prepared & Analyzed: 10/25/2012						
1,1,1-Trichloroethane	67.7	6.20	ug/kg dry	61.998	5.75 U	109	65-130	4	20
1,1,2,2-Tetrachloroethane	64.9	6.20	ug/kg dry	61.998	5.75 U	105	50-130	5	20
1,1,2-Trichloroethane	66.8	6.20	ug/kg dry	61.998	5.75 U	108	60-125	1	20
1,1-Dichloroethane	69.6	6.20	ug/kg dry	61.998	5.75 U	112	70-130	4	20
1,1-Dichloroethene	63.8	6.20	ug/kg dry	61.998	5.75 U	103	60-130	4	20
1,2-Dichloroethane	73.5	7.44	ug/kg dry	61.998	6.90 U	119	60-130	0.2	20
1,2-Dichloroethene (total)	126	6.20	ug/kg dry	124.00	5.75 U	102	75-125	1	20
1,2-Dichloropropane	70.4	6.20	ug/kg dry	61.998	5.75 U	114	70-130	2	20
2-Butanone	117	14.9	ug/kg dry	61.998	13.8 U	189	20-200	3	20
2-Hexanone	98.4	14.9	ug/kg dry	61.998	13.8 U	159	20-200	7	20
4-Methyl-2-pentanone	77.8	14.9	ug/kg dry	61.998	13.8 U	125	40-150	4	20
Acetone	150	14.9	ug/kg dry	61.998	13.8 U	242*	15-240	2	20
Benzene	67.7	6.20	ug/kg dry	61.998	5.75 U	109	75-125	3	20
Bromodichloromethane	69.4	7.44	ug/kg dry	61.998	6.90 U	112	65-135	2	20
Bromoform	61.4	6.20	ug/kg dry	61.998	5.75 U	99	60-130	3	20
Bromomethane	45.9	12.4	ug/kg dry	61.998	11.5 U	74	40-150	6	20
Carbon Disulfide	63.4	6.20	ug/kg dry	61.998	5.75 U	102	55-140	3	20
Carbon Tetrachloride	67.7	6.20	ug/kg dry	61.998	5.75 U	109	60-135	0.9	20
Chlorobenzene	65.2	6.20	ug/kg dry	61.998	5.75 U	105	70-125	0.5	20
Chloroethane	65.7	12.4	ug/kg dry	61.998	11.5 U	106	50-150	5	20
Chloroform	71.0	6.20	ug/kg dry	61.998	5.75 U	114	70-130	2	20
Chloromethane	55.4	12.4	ug/kg dry	61.998	11.5 U	89	40-130	1	20
cis-1,2-Dichloroethene	61.1	6.20	ug/kg dry	61.998	5.75 U	99	70-125	1	20
cis-1,3-Dichloropropene	61.4	6.20	ug/kg dry	61.998	5.75 U	99	70-125	3	20
Dibromochloromethane	63.8	6.20	ug/kg dry	61.998	5.75 U	103	65-125	0.8	20
Ethylbenzene	68.5	6.20	ug/kg dry	61.998	5.75 U	111	70-125	1	20
Methylene Chloride	63.3	7.44	ug/kg dry	61.998	2.67	98	45-140	3	20

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

Volatile Organic Compounds by SW846 8260B - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210217 - SW 5035A										
Matrix Spike Dup (L210217-MSD2)			Source: 1210071-01	Prepared & Analyzed: 10/25/2012						
Styrene	69.3		6.20	ug/kg dry	61.998	5.75 U	112	70-125	0.07	20
Tetrachloroethene	63.2		6.20	ug/kg dry	61.998	5.75 U	102	60-130	0.9	20
trans-1,2-Dichloroethene	65.1		6.20	ug/kg dry	61.998	5.75 U	105	65-130	2	20
Toluene	69.8		6.20	ug/kg dry	61.998	5.75 U	113	70-125	2	20
trans-1,3-Dichloropropene	66.1		6.20	ug/kg dry	61.998	5.75 U	107	65-125	4	20
Trichloroethene	69.1		6.20	ug/kg dry	61.998	5.75 U	111	70-130	2	20
Vinyl chloride	53.2		12.4	ug/kg dry	61.998	11.5 U	86	50-150	3	20
Xylenes, total	210		6.20	ug/kg dry	185.99	5.75 U	113	70-125	0.3	20
Surrogate: 1,2-Dichloroethane-d4	*64.6*			*ug/kg dry*	*61.998*		*104*	*60-130*		
Surrogate: Toluene-d8	*63.3*			*ug/kg dry*	*61.998*		*102*	*72-117*		
Surrogate: 4-Bromofluorobenzene	*65.2*			*ug/kg dry*	*61.998*		*105*	*72-144*		
Batch L210251 - SW 5035A										
Blank (L210251-BLK1)				Prepared & Analyzed: 10/28/2012						
1,1,1-Trichloroethane	5.00	U	5.00	ug/kg wet						
1,1,2,2-Tetrachloroethane	5.00	U	5.00	ug/kg wet						
1,1,2-Trichloroethane	5.00	U	5.00	ug/kg wet						
1,1-Dichloroethane	5.00	U	5.00	ug/kg wet						
1,1-Dichloroethene	5.00	U	5.00	ug/kg wet						
1,2-Dichloroethane	6.00	U	6.00	ug/kg wet						
1,2-Dichloroethene (total)	5.00	U	5.00	ug/kg wet						
1,2-Dichloropropane	5.00	U	5.00	ug/kg wet						
2-Butanone	12.0	U	12.0	ug/kg wet						
2-Hexanone	12.0	U	12.0	ug/kg wet						
4-Methyl-2-pentanone	12.0	U	12.0	ug/kg wet						
Acetone	12.0	U	12.0	ug/kg wet						
Benzene	5.00	U	5.00	ug/kg wet						
Bromodichloromethane	6.00	U	6.00	ug/kg wet						
Bromoform	5.00	U	5.00	ug/kg wet						
Bromomethane	10.0	U	10.0	ug/kg wet						
Carbon Disulfide	5.00	U	5.00	ug/kg wet						
Carbon Tetrachloride	5.00	U	5.00	ug/kg wet						
Chlorobenzene	5.00	U	5.00	ug/kg wet						
Chloroethane	10.0	U	10.0	ug/kg wet						
Chloroform	5.00	U	5.00	ug/kg wet						
Chloromethane	10.0	U	10.0	ug/kg wet						
cis-1,2-Dichloroethene	5.00	U	5.00	ug/kg wet						

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Exton, PA 19341
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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/06/2012 08:57

Volatile Organic Compounds by SW846 8260B - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210251 - SW 5035A										
Blank (L210251-BLK1)				Prepared & Analyzed: 10/28/2012						
cis-1,3-Dichloropropene	5.00	U	5.00	ug/kg wet						
Dibromochloromethane	5.00	U	5.00	ug/kg wet						
Ethylbenzene	5.00	U	5.00	ug/kg wet						
Methylene Chloride	6.00	U	6.00	ug/kg wet						
Styrene	5.00	U	5.00	ug/kg wet						
Tetrachloroethene	5.00	U	5.00	ug/kg wet						
trans-1,2-Dichloroethene	5.00	U	5.00	ug/kg wet						
Toluene	5.00	U	5.00	ug/kg wet						
trans-1,3-Dichloropropene	5.00	U	5.00	ug/kg wet						
Trichloroethene	5.00	U	5.00	ug/kg wet						
Vinyl chloride	10.0	U	10.0	ug/kg wet						
Xylenes, total	5.00	U	5.00	ug/kg wet						
Surrogate: 1,2-Dichloroethane-d4	*49.3*			*ug/kg wet*	*50.000*		*99*	*60-130*		
Surrogate: Toluene-d8	*50.1*			*ug/kg wet*	*50.000*		*100*	*72-117*		
Surrogate: 4-Bromofluorobenzene	*55.4*			*ug/kg wet*	*50.000*		*111*	*72-144*		
LCS (L210251-BS1)				Prepared & Analyzed: 10/28/2012						
1,1,1-Trichloroethane	46.8		5.00	ug/kg wet	50.000		94	65-130		
1,1,2,2-Tetrachloroethane	50.3		5.00	ug/kg wet	50.000		101	50-130		
1,1,2-Trichloroethane	46.2		5.00	ug/kg wet	50.000		92	60-125		
1,1-Dichloroethane	47.7		5.00	ug/kg wet	50.000		95	70-130		
1,1-Dichloroethene	43.7		5.00	ug/kg wet	50.000		87	60-130		
1,2-Dichloroethane	49.8		6.00	ug/kg wet	50.000		100	60-130		
1,2-Dichloroethene (total)	88.6		5.00	ug/kg wet	100.00		89	75-125		
1,2-Dichloropropane	48.0		5.00	ug/kg wet	50.000		96	70-130		
2-Butanone	82.9		12.0	ug/kg wet	50.000		166	20-200		
2-Hexanone	71.8		12.0	ug/kg wet	50.000		144	20-200		
4-Methyl-2-pentanone	56.6		12.0	ug/kg wet	50.000		113	40-150		
Acetone	101		12.0	ug/kg wet	50.000		202	15-240		
Benzene	46.4		5.00	ug/kg wet	50.000		93	75-125		
Bromodichloromethane	47.8		6.00	ug/kg wet	50.000		96	65-135		
Bromoform	43.6		5.00	ug/kg wet	50.000		87	60-130		
Bromomethane	39.4		10.0	ug/kg wet	50.000		79	40-150		
Carbon Disulfide	44.0		5.00	ug/kg wet	50.000		88	55-140		
Carbon Tetrachloride	46.7		5.00	ug/kg wet	50.000		93	60-135		
Chlorobenzene	47.2		5.00	ug/kg wet	50.000		94	70-125		
Chloroethane	48.1		10.0	ug/kg wet	50.000		96	50-150		

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WC-Hanford, Inc.	Project: RC-189	
2620 Fermi Avenue	Project Number: K4009	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	11/06/2012 08:57

Volatile Organic Compounds by SW846 8260B - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210251 - SW 5035A									
LCS (L210251-BS1)			Prepared & Analyzed: 10/28/2012						
Chloroform	48.2	5.00	ug/kg wet	50.000		96	70-130		
Chloromethane	45.0	10.0	ug/kg wet	50.000		90	40-130		
cis-1,2-Dichloroethene	43.5	5.00	ug/kg wet	50.000		87	70-125		
cis-1,3-Dichloropropene	43.6	5.00	ug/kg wet	50.000		87	70-125		
Dibromochloromethane	45.2	5.00	ug/kg wet	50.000		90	65-125		
Ethylbenzene	49.7	5.00	ug/kg wet	50.000		99	70-125		
Methylene Chloride	42.9	6.00	ug/kg wet	50.000		86	45-140		
Styrene	50.3	5.00	ug/kg wet	50.000		101	70-125		
Tetrachloroethene	44.3	5.00	ug/kg wet	50.000		89	60-130		
trans-1,2-Dichloroethene	45.1	5.00	ug/kg wet	50.000		90	65-130		
Toluene	49.4	5.00	ug/kg wet	50.000		99	70-125		
trans-1,3-Dichloropropene	49.0	5.00	ug/kg wet	50.000		98	65-125		
Trichloroethene	45.0	5.00	ug/kg wet	50.000		90	70-130		
Vinyl chloride	43.1	10.0	ug/kg wet	50.000		86	50-150		
Xylenes, total	153	5.00	ug/kg wet	150.00		102	70-125		
Surrogate: 1,2-Dichloroethane-d4	*49.9*		*ug/kg wet*	*50.000*		*100*	*60-130*		
Surrogate: Toluene-d8	*50.6*		*ug/kg wet*	*50.000*		*101*	*72-117*		
Surrogate: 4-Bromofluorobenzene	*52.9*		*ug/kg wet*	*50.000*		*106*	*72-144*		
Matrix Spike (L210251-MS1)		**Source: 1210071-11**	Prepared & Analyzed: 10/28/2012						
1,1,1-Trichloroethane	60.6	6.08	ug/kg dry	60.775	6.74 U	100	65-130		
1,1,2,2-Tetrachloroethane	77.7	6.08	ug/kg dry	60.775	6.74 U	128	50-130		
1,1,2-Trichloroethane	63.4	6.08	ug/kg dry	60.775	6.74 U	104	60-125		
1,1-Dichloroethane	64.8	6.08	ug/kg dry	60.775	6.74 U	107	70-130		
1,1-Dichloroethene	57.9	6.08	ug/kg dry	60.775	6.74 U	95	60-130		
1,2-Dichloroethane	64.1	7.29	ug/kg dry	60.775	8.09 U	106	60-130		
1,2-Dichloroethene (total)	120	6.08	ug/kg dry	121.55	6.74 U	98	75-125		
1,2-Dichloropropane	65.2	6.08	ug/kg dry	60.775	6.74 U	107	70-130		
2-Butanone	96.8	14.6	ug/kg dry	60.775	16.2 U	159	20-200		
2-Hexanone	96.7	14.6	ug/kg dry	60.775	16.2 U	159	20-200		
4-Methyl-2-pentanone	75.4	14.6	ug/kg dry	60.775	16.2 U	124	40-150		
Acetone	119	14.6	ug/kg dry	60.775	7.65	183	15-240		
Benzene	60.7	6.08	ug/kg dry	60.775	6.74 U	100	75-125		
Bromodichloromethane	60.8	7.29	ug/kg dry	60.775	8.09 U	100	65-135		
Bromoform	54.9	6.08	ug/kg dry	60.775	6.74 U	90	60-130		
Bromomethane	49.3	12.2	ug/kg dry	60.775	13.5 U	81	40-150		
Carbon Disulfide	57.1	6.08	ug/kg dry	60.775	6.74 U	94	55-140		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-189 Project Number: K4009 Project Manager: Joan Kessner	Reported: 11/06/2012 08:57

Volatile Organic Compounds by SW846 8260B - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210251 - SW 5035A									
Matrix Spike (L210251-MS1)		**Source: 1210071-11**		Prepared & Analyzed: 10/28/2012					
Carbon Tetrachloride	60.1	6.08	ug/kg dry	60.775	6.74 U	99	60-135		
Chlorobenzene	62.7	6.08	ug/kg dry	60.775	6.74 U	103	70-125		
Chloroethane	61.1	12.2	ug/kg dry	60.775	13.5 U	100	50-150		
Chloroform	64.4	6.08	ug/kg dry	60.775	6.74 U	106	70-130		
Chloromethane	54.3	12.2	ug/kg dry	60.775	13.5 U	89	40-130		
cis-1,2-Dichloroethene	57.4	6.08	ug/kg dry	60.775	6.74 U	94	70-125		
cis-1,3-Dichloropropene	62.4	6.08	ug/kg dry	60.775	6.74 U	103	70-125		
Dibromochloromethane	60.9	6.08	ug/kg dry	60.775	6.74 U	100	65-125		
Ethylbenzene	64.6	6.08	ug/kg dry	60.775	6.74 U	106	70-125		
Methylene Chloride	56.0	7.29	ug/kg dry	60.775	8.09 U	92	45-140		
Styrene	63.8	6.08	ug/kg dry	60.775	6.74 U	105	70-125		
Tetrachloroethene	57.8	6.08	ug/kg dry	60.775	6.74 U	95	60-130		
trans-1,2-Dichloroethene	62.1	6.08	ug/kg dry	60.775	6.74 U	102	65-130		
Toluene	69.7	6.08	ug/kg dry	60.775	6.74 U	115	70-125		
trans-1,3-Dichloropropene	66.6	6.08	ug/kg dry	60.775	6.74 U	110	65-125		
Trichloroethene	58.2	6.08	ug/kg dry	60.775	6.74 U	96	70-130		
Vinyl chloride	56.0	12.2	ug/kg dry	60.775	13.5 U	92	50-150		
Xylenes, total	194	6.08	ug/kg dry	182.32	6.74 U	107	70-125		
Surrogate: 1,2-Dichloroethane-d4	*63.2*		*ug/kg dry*	*60.775*		*104*	*60-130*		
Surrogate: Toluene-d8	*69.4*		*ug/kg dry*	*60.775*		*114*	*72-117*		
Surrogate: 4-Bromofluorobenzene	*79.6*		*ug/kg dry*	*60.775*		*131*	*72-144*		
Matrix Spike Dup (L210251-MSD1)		**Source: 1210071-11**		Prepared & Analyzed: 10/28/2012					
1,1,1-Trichloroethane	61.0	5.80	ug/kg dry	57.981	6.74 U	105	65-130	5	20
1,1,2,2-Tetrachloroethane	88.7	5.80	ug/kg dry	57.981	6.74 U	153*	50-130	18	20
1,1,2-Trichloroethane	65.0	5.80	ug/kg dry	57.981	6.74 U	112	60-125	7	20
1,1-Dichloroethane	64.4	5.80	ug/kg dry	57.981	6.74 U	111	70-130	4	20
1,1-Dichloroethene	58.2	5.80	ug/kg dry	57.981	6.74 U	100	60-130	5	20
1,2-Dichloroethane	69.3	6.96	ug/kg dry	57.981	8.09 U	120	60-130	12	20
1,2-Dichloroethene (total)	118	5.80	ug/kg dry	115.96	6.74 U	102	75-125	4	20
1,2-Dichloropropane	62.6	5.80	ug/kg dry	57.981	6.74 U	108	70-130	0.5	20
2-Butanone	113	13.9	ug/kg dry	57.981	16.2 U	195	20-200	20	20
2-Hexanone	111	13.9	ug/kg dry	57.981	16.2 U	191	20-200	18	20
4-Methyl-2-pentanone	90.4	13.9	ug/kg dry	57.981	16.2 U	156*	40-150	23*	20
Acetone	147	13.9	ug/kg dry	57.981	7.65	241*	15-240	27*	20
Benzene	59.8	5.80	ug/kg dry	57.981	6.74 U	103	75-125	3	20
Bromodichloromethane	59.9	6.96	ug/kg dry	57.981	8.09 U	103	65-135	3	20

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Volatile Organic Compounds by SW846 8260B - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L210251 - SW 5035A									
Matrix Spike Dup (L210251-MSD1)		**Source: 1210071-11**	Prepared & Analyzed: 10/28/2012						
Bromoform	54.8	5.80	ug/kg dry	57.981	6.74 U	95	60-130	5	20
Bromomethane	51.7	11.6	ug/kg dry	57.981	13.5 U	89	40-150	10	20
Carbon Disulfide	56.8	5.80	ug/kg dry	57.981	6.74 U	98	55-140	4	20
Carbon Tetrachloride	59.2	5.80	ug/kg dry	57.981	6.74 U	102	60-135	3	20
Chlorobenzene	61.1	5.80	ug/kg dry	57.981	6.74 U	105	70-125	2	20
Chloroethane	61.8	11.6	ug/kg dry	57.981	13.5 U	107	50-150	6	20
Chloroform	63.7	5.80	ug/kg dry	57.981	6.74 U	110	70-130	4	20
Chloromethane	56.6	11.6	ug/kg dry	57.981	13.5 U	98	40-130	9	20
cis-1,2-Dichloroethene	58.0	5.80	ug/kg dry	57.981	6.74 U	100	70-125	6	20
cis-1,3-Dichloropropene	63.6	5.80	ug/kg dry	57.981	6.74 U	110	70-125	7	20
Dibromochloromethane	62.3	5.80	ug/kg dry	57.981	6.74 U	107	65-125	7	20
Ethylbenzene	62.3	5.80	ug/kg dry	57.981	6.74 U	107	70-125	1	20
Methylene Chloride	57.9	6.96	ug/kg dry	57.981	8.09 U	100	45-140	8	20
Styrene	60.8	5.80	ug/kg dry	57.981	6.74 U	105	70-125	0.2	20
Tetrachloroethene	55.8	5.80	ug/kg dry	57.981	6.74 U	96	60-130	1	20
trans-1,2-Dichloroethene	60.2	5.80	ug/kg dry	57.981	6.74 U	104	65-130	1	20
Toluene	69.5	5.80	ug/kg dry	57.981	6.74 U	120	70-125	4	20
trans-1,3-Dichloropropene	69.2	5.80	ug/kg dry	57.981	6.74 U	119	65-125	9	20
Trichloroethene	55.7	5.80	ug/kg dry	57.981	6.74 U	96	70-130	0.3	20
Vinyl chloride	55.2	11.6	ug/kg dry	57.981	13.5 U	95	50-150	3	20
Xylenes, total	190	5.80	ug/kg dry	173.94	6.74 U	109	70-125	2	20
Surrogate: 1,2-Dichloroethane-d4	*66.1*		*ug/kg dry*	*57.981*		*114*	*60-130*		
Surrogate: Toluene-d8	*68.2*		*ug/kg dry*	*57.981*		*118**	*72-117*		
Surrogate: 4-Bromofluorobenzene	*78.4*		*ug/kg dry*	*57.981*		*135*	*72-144*		