0093525

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

COMPLETE COPY OF FINAL VALIDATION PACKAGE TO:

Kathy Wendt (2) H4-21

COMMENTS:

SDG K2489 SAF-RC-029

Waste Site: 100-K-78

RECEIVED
JAN 13 2011
EDMC

Date: 20 December 2010
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Remaining Sites Confirmation Sampling – Soil Full Protocol - Waste Site 100-K-78
Subject: Inorganic - Data Package No. K2489-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K2489 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1CN19	11/5/10	Soil	C	See note 1
J1CN20	11/5/10	Soil	C	See note 1
J1CN21	11/5/10	Soil	C	See note 1
J1CDR4	11/5/10	Soil	C	See note 1
J1CDR5	11/5/10	Soil	C	See note 1
J1CDR6	11/5/10	Soil	C	See note 1

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

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

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

DATA QUALITY PARAMETERS

Holding Times

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

Due to preparation blank contamination, the calcium and sodium results in sample J1CN19 were qualified as undetected and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

One field blank (J1CN19) was submitted for analysis. Aluminum, arsenic, barium, beryllium, iron, lead, magnesium, manganese, potassium, silicon, vanadium and zinc were detected in the field blank. Under the WCH statement of work, no qualification is required.

- **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 (39%) results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits, all silicon (68%) 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.

Due to RPDs outside QC limits, all potassium (33%) and silicon (32%) results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J1CDR5/J1CDR6) were submitted for analysis. Laboratory 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 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data package No. K2489 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 preparation blank contamination, the calcium and sodium results in sample J1CN19 were qualified as undetected and flagged "UJ".
- Due to a matrix spike recovery outside QC limits, all antimony (39%) results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits, all silicon (68%) results were qualified as estimates and flagged "J".
- Due to RPDs outside QC limits, all potassium (33%) and silicon (32%) results were qualified as estimates and flagged "J".

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

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K2489	REVIEWER: ELR	Project: 100-K-78	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Calcium Sodium	UJ	J1CN19	Method blank contamination
Antimony	J	All	MS recovery
Silicon	J	All	LCS recovery
Potassium Silicon	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

LIONVILLE LABORATORY
A Division of Eberline Analytical Corporation

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

J1CN19
1011068-01 (Soil)

12/18/10

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			Lionville Laboratory						
Metals by SW846 6000/7000 series									
Aluminum	**168**		3.57	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Antimony	0.429	U J	0.429	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Arsenic	**0.254**	B	0.715	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Barium	**1.56**		0.357	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Beryllium	**0.0405**	B	0.143	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Boron	1.43	U	1.43	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cadmium	0.143	U	0.143	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Calcium	**34.7**	B UJ	71.5	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Chromium	0.143	U	0.143	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cobalt	1.43	U	1.43	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Copper	0.715	U	0.715	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Iron	**225**		14.3	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Lead	**0.458**		0.357	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Magnesium	**19.1**	B	53.6	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Manganese	**4.89**		3.57	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Molybdenum	1.43	U	1.43	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Nickel	2.86	U	2.86	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Potassium	**59.3**	B J	286	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Selenium	0.214	U	0.214	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silicon	**132**	J.	1.43	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silver	0.143	U	0.143	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Sodium	**9.96**	B UJ	35.7	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Vanadium	**0.316**	B	1.79	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Zinc	**0.810**	B	7.15	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Mercury	0.0265	U	0.0265	mg/kg dry	1	L011249	11/17/2010	11/17/2010	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

J1CN20
1011068-02 (Soil)

12/18/10

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	10800		4.20	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Antimony	0.334	B J	0.504	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Arsenic	4.33		0.841	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Barium	85.3		0.420	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Beryllium	0.357		0.168	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Boron	0.683	B	1.68	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cadmium	0.0921	B	0.168	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Calcium	3370		84.1	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Chromium	27.2		0.168	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cobalt	4.91		1.68	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Copper	19.5		0.841	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Iron	19600		16.8	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Lead	4.68		0.420	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Magnesium	5080		63.1	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Manganese	208		4.20	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Molybdenum	0.252	B	1.68	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Nickel	14.1		3.36	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Potassium	904	J	336	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Selenium	0.252	U	0.252	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silicon	833	J	1.68	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silver	0.168	U	0.168	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Sodium	178		42.0	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Vanadium	42.9		2.10	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Zinc	36.9		8.41	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Mercury	0.0288	U	0.0288	mg/kg dry	1	L011249	11/17/2010	11/18/2010	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

J1CN21
1011068-03 (Soil)

12/16/10

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	7330		3.90	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Antimony	0.391	B J	0.468	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Arsenic	2.15		0.780	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Barium	63.7		0.390	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Beryllium	0.213		0.156	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Boron	0.540	B	1.56	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cadmium	0.0577	B	0.156	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Calcium	2860		78.0	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Chromium	13.9		0.156	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cobalt	2.99		1.56	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Copper	12.1		0.780	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Iron	13400		15.6	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Lead	2.70		0.390	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Magnesium	3970		58.5	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Manganese	184		3.90	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Molybdenum	0.162	B	1.56	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Nickel	7.77		3.12	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Potassium	1140	J	312	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Selenium	0.234	U	0.234	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silicon	844	J	1.56	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silver	0.156	U	0.156	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Sodium	160		39.0	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Vanadium	29.8		1.95	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Zinc	32.8		7.80	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Mercury	0.0277	U	0.0277	mg/kg dry	1	L011249	11/17/2010	11/18/2010	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

J1CDR4
1011068-04 (Soil)

12/18/10

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	7020		4.31	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Antimony	0.518	U J	0.518	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Arsenic	2.17		0.863	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Barium	67.1		0.431	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Beryllium	0.234		0.173	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Boron	0.484	B	1.73	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cadmium	0.0492	B	0.173	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Calcium	2620		86.3	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Chromium	14.6		0.173	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cobalt	3.44		1.73	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Copper	13.2		0.863	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Iron	13300		17.3	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Lead	3.63		0.431	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Magnesium	4190		64.7	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Manganese	182		4.31	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Molybdenum	1.73	U	1.73	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Nickel	9.65		3.45	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Potassium	996	J	345	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Selenium	0.259	U	0.259	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silicon	393	J	1.73	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silver	0.173	U	0.173	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Sodium	125		43.1	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Vanadium	28.2		2.16	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Zinc	31.0		8.63	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Mercury	0.0296	U	0.0296	mg/kg dry	1	L011249	11/17/2010	11/18/2010	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

J1CDR5
1011068-05 (Soil)

12/18/10

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	5760		3.19	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Antimony	0.262	B J	0.383	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Arsenic	1.46		0.638	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Barium	46.4		0.319	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Beryllium	0.197		0.128	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Boron	0.379	B	1.28	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cadmium	0.0452	B	0.128	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Calcium	2320		63.8	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Chromium	11.0		0.128	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cobalt	3.09		1.28	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Copper	12.3		0.638	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Iron	11100		12.8	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Lead	2.70		0.319	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Magnesium	3490		47.8	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Manganese	162		3.19	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Molybdenum	1.28	U	1.28	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Nickel	8.37		2.55	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Potassium	895	J	255	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Selenium	0.191	U	0.191	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silicon	328	J	1.28	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silver	0.128	U	0.128	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Sodium	113		31.9	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Vanadium	22.9		1.59	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Zinc	29.2		6.38	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Mercury	0.0296	U	0.0296	mg/kg dry	1	L011249	11/17/2010	11/18/2010	7471A

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

J1CDR6
1011068-06 (Soil)

12/18/10

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	5750		3.70	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Antimony	0.388	B J	0.444	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Arsenic	1.53		0.741	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Barium	51.7		0.370	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Beryllium	0.178		0.148	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Boron	0.409	B	1.48	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cadmium	0.0458	B	0.148	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Calcium	2360		74.1	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Chromium	10.5		0.148	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Cobalt	3.06		1.48	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Copper	10.7		0.741	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Iron	11400		14.8	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Lead	2.50		0.370	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Magnesium	3620		55.5	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Manganese	149		3.70	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Molybdenum	1.48	U	1.48	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Nickel	8.23		2.96	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Potassium	827	J	296	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Selenium	0.222	U	0.222	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silicon	718	J	1.48	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Silver	0.148	U	0.148	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Sodium	110		37.0	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Vanadium	23.4		1.85	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Zinc	25.1		7.41	mg/kg dry	1	L011333	11/12/2010	11/19/2010	6010B
Mercury	0.0230	U	0.0230	mg/kg dry	1	L011249	11/17/2010	11/18/2010	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
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Case Narrative

Client: WC-HANFORD RC-029
LVL#: 1011068
SDG/SAF#: K2489/RC-029

W.O.#: 60049-001-001-0001-00
Date Received: 11-10-10

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 6 soil samples.

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

   To accommodate the data reporting system, samples J1CN19, J1CN20, J1CN21, J1CDR4, J1CDR5, and J1CDR6 digested in batch L011202, were moved to digestion batch L011333.

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

4. Please refer to the Sample Receipt Check List for any sample discrepancies in LvLI'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 (3-10X the LOD), or samples greater than 20X MB value}.

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

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

10. The matrix spike (MS) recoveries for 4 analytes were outside the 75-125% 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 24 pages.

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J1CN20	Aluminum	22,000	90.0
	Antimony	100	97.4
	Iron	42,000	72.8
	Manganese	1,000	89.7

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

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.

Alain Daniels
Laboratory Manager
Lionville Laboratory

11/24/10
Date

alm/11-068

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-097	Page 1 of 1

Collector: Weber	Company Contact: Matt Perrott	Telephone No.: 372-9088	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-K-78		SAF No.: RC-029
Ice Chest No.: ERC-96-069	Field Logbook No.: EL-1601-05	COA: C00K78A000	Method of Shipment: FEDEX
Shipped To: ~~EBERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A-100613		Bill of Lading/Air Bill No.: SEE OSPC

000000022

POSSIBLE SAMPLE HAZARDS/REMARKS

Possible Radiological Contamination <DOT Limits OKB 11-9-10

Special Handling and/or Storage

Cool 4°C OKB 11-9-10

Preservation	Cool 4C	Cool 4C	None	None	None	
Type of Container	G/P	G/P	G/P	G/P	G/P	
No. of Container(s)	1	1 BH 11/4/10	1	1	1	
Volume	~~60mL~~ 250 mL BH 11/4/10	~~60mL~~	500mL	~~60mL~~	60mL	

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions	Chromium Hex - 7196	See item (2) in Special Instructions	See item (3) in Special Instructions	Carbon-14 Low Level; Tritium - H3 Low Level Soil
J1CN19	SOIL	11/5/10	0830	X	X			
J1CN20	SOIL	11/5/10	0915	X	X			
J1CN21	SOIL	11/5/10	0935	X	X			

EB

000019

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
HW/Heather C. Weber	11-5-2010 1030	BHUDSON BHudson	11/5/10 1035
BHUDSON BHudson	11/5/10 1250	1060 #1C	11/5/10 1250
J.E. Benfield / 1060 1C	11-8-10 0830	J.E. Benfield	11-8-10 0830
J.E. Benfield WCH	11-9-10 0930	FED EX	
FED EX	11-10-10 0945	VICTOR HERNANDEZ	11-10-10 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) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gross Alpha & Gross Beta
(3) Americium-241; Nickel-63; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Strontium-89,90 -- Total Sr; Technetium-99 Low Level; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; Total Uranium

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

REVIEWED BY JR DATE 11/9/10

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-029-095	Page 1 of 1

Collector: Weber	Company Contact: Matt Perrott	Telephone No.: 372-9088	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil Pull Protocol	Sampling Location: 100-K-78		SAF No.: RC-029
Ice Chest No.: ERC-96-069	Field Logbook No.: EL-1601-05	COA: C00K78A000	Method of Shipment: FEDEX
Shipped To: BH 11/4/10 ~~EBERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A-100613		Bill of Lading/Air Bill No.: SEE OSPC

000000023

POSSIBLE SAMPLE HAZARDS/REMARKS

Potentially radioactive cdot Limits JEO 11-9-10

Special Handling and/or Storage

Cool 4°C JEO 11-9-10

Preservation	Cool 4C	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P	G/P						
No. of Container(s)	1	~~1~~ BH 11/4/10 Ø	1	1	1						
Volume BH 11/4/10	~~60mL~~ 250mL	~~60mL~~	60mL	~~60mL~~	60g						
SAMPLE ANALYSIS	See Item (1) in Special Instructions	Chromium Hex - 7196	See Item (2) in Special Instructions	Carbon-14 Low Level; Tritium - H3 Low Level Soil	RCF GEA Shipping Screen						

	Sample No.	Matrix *	Sample Date	Sample Time										
3	J1CDR4	SOIL	11/5/10	0955	X	X								
4	J1CDR5	SOIL	11/5/10	1010	X	X								
5	J1CDR6	SOIL	11/5/10	1015	X	X								
	~~J1CDR7~~	SOIL												
	~~J1CDR8~~ BH 11/5/10	SOIL												

000000020

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
HW/Heather Cillek	11-5-10 1035	BHUDSON BHudson	11/5/10 1035
BHUDSON BHudson	11/5/10 1250	1060 #1C	11/5/10 1250
J.E. Bender / 1060 1C	0830 11-8-10	J.E. Bender	0830 11-8-10
J.E. Bender	0930 11-9-10	FED EX	
FED EX	11-10-10 0945	VICTOR HERNANDEZ	11-10-10 0945

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) Americium-241; Nickel-63; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Strontium-89,90 -- Total Sr; Technetium-99 Low Level; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; Total Uranium

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

REVIEWED BY JR DATE 11/9/10

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

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-K-78			DATA PACKAGE: K2489		
VALIDATOR: ELR		LAB: LLI		DATE: 12/12/00	
			SDG: K2489		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J1CN19	J1CN20	J1CN21	J1CDR4	J1CDR5	J1CDR6
					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: N/a - calcium + sodium - UJ

FB - 13 detects

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: antimony (399%) - MS - J all

Silicon (68%) - LCS - J all

no PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

Duplicate results acceptable? no ..... 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 - potassium (33%) silicon (32%) - Jall

6. ICP QUALITY CONTROL (Levels D and E)

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

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

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

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

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

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

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

Duplicate injections performed as required? ..... Yes No N/A
Duplicate injection %RSD values acceptable? ..... Yes No N/A
Analytical spikes performed as required? ..... Yes No N/A
Analytical spike recoveries acceptable? ..... Yes No N/A
Standards traceable? ..... Yes No N/A
Standards expired? ..... Yes No N/A
MSA performed as required? ..... Yes No N/A
MSA results acceptable? ..... Yes No N/A
Transcription/calculation errors? ..... Yes No N/A

Comments:

8. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A
Sample holding times acceptable? ..... Yes No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

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 L011249 - SW 7471A Prep										
Blank (L011249-BLK1)				Prepared & Analyzed: 11/17/2010						
Mercury	0.0257	U	0.0257	mg/kg wet						
Duplicate (L011249-DUP2)		Source: 1011068-02		Prepared: 11/17/2010 Analyzed: 11/18/2010						
Mercury	0.0280	U	0.0280	mg/kg dry		0.0288 U				20
Matrix Spike (L011249-MS2)		Source: 1011068-02		Prepared: 11/17/2010 Analyzed: 11/18/2010						
Mercury	0.180		0.0280	mg/kg dry	0.15542	0.0288 U	116	75-125		
Reference (L011249-SRM1)				Prepared & Analyzed: 11/17/2010						
Mercury	1.31		0.0290	mg/kg wet	1.2600		104	65.9-133.3		
Batch L011333 - SW 3050B										
Blank (L011333-BLK1)				Prepared: 11/12/2010 Analyzed: 11/19/2010						
Aluminum	5.07		4.72	mg/kg wet						
Antimony	0.566	U	0.566	mg/kg wet						
Arsenic	0.943	U	0.943	mg/kg wet						
Barium	0.472	U	0.472	mg/kg wet						
Beryllium	0.189	U	0.189	mg/kg wet						
Boron	1.89	U	1.89	mg/kg wet						
Cadmium	0.189	U	0.189	mg/kg wet						
Calcium	7.41	B	94.3	mg/kg wet						
Chromium	0.189	U	0.189	mg/kg wet						
Cobalt	1.89	U	1.89	mg/kg wet						
Copper	0.943	U	0.943	mg/kg wet						
Iron	18.9	U	18.9	mg/kg wet						
Lead	0.472	U	0.472	mg/kg wet						
Magnesium	70.8	U	70.8	mg/kg wet						
Manganese	4.72	U	4.72	mg/kg wet						
Molybdenum	1.89	U	1.89	mg/kg wet						
Nickel	3.77	U	3.77	mg/kg wet						
Potassium	377	U	377	mg/kg wet						
Selenium	0.283	U	0.283	mg/kg wet						
Silicon	1.89	U	1.89	mg/kg wet						
Silver	0.189	U	0.189	mg/kg wet						
Sodium	11.2	B	47.2	mg/kg wet						
Vanadium	2.36	U	2.36	mg/kg wet						
Zinc	9.43	U	9.43	mg/kg wet						

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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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-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

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 L011333 - SW 3050B										
Duplicate (L011333-DUP2)		**Source: 1011068-02**		Prepared: 11/12/2010 Analyzed: 11/19/2010						
Aluminum	11200		4.35	mg/kg dry		10800			3	20
Antimony	0.522	U	0.522	mg/kg dry		0.334				20
Arsenic	4.04		0.869	mg/kg dry		4.33			7	20
Barium	85.6		0.435	mg/kg dry		85.3			0.4	20
Beryllium	0.312		0.174	mg/kg dry		0.357			13	20
Boron	0.579	B	1.74	mg/kg dry		0.683			17	20
Cadmium	0.0827	B	0.174	mg/kg dry		0.0921			11	20
Calcium	3330		86.9	mg/kg dry		3370			1	20
Chromium	30.8		0.174	mg/kg dry		27.2			13	20
Cobalt	5.32		1.74	mg/kg dry		4.91			8	20
Copper	19.3		0.869	mg/kg dry		19.5			1	20
Iron	20300		17.4	mg/kg dry		19600			4	20
Lead	4.30		0.435	mg/kg dry		4.68			8	20
Magnesium	5600		65.2	mg/kg dry		5080			10	20
Manganese	208		4.35	mg/kg dry		208			0.3	20
Molybdenum	0.235	B	1.74	mg/kg dry		0.252			7	20
Nickel	16.8		3.48	mg/kg dry		14.1			17	20
Potassium	1260		348	mg/kg dry		904			33*	20
Selenium	0.261	U	0.261	mg/kg dry		0.252 U				20
Silicon	605		1.74	mg/kg dry		833			32*	20
Silver	0.174	U	0.174	mg/kg dry		0.168 U				20
Sodium	169		43.5	mg/kg dry		178			5	20
Vanadium	44.8		2.17	mg/kg dry		42.9			4	20
Zinc	37.0		8.69	mg/kg dry		36.9			0.1	20
Matrix Spike (L011333-MS2)		**Source: 1011068-02**		Prepared: 11/12/2010 Analyzed: 11/19/2010						
Aluminum	11600		3.83	mg/kg dry	153.10	10800	549*	75-125		
Antimony	15.1		0.459	mg/kg dry	38.274	0.334	39*	75-125		
Arsenic	139		0.765	mg/kg dry	153.10	4.33	88	75-125		
Barium	230		0.383	mg/kg dry	153.10	85.3	95	75-125		
Beryllium	3.83		0.153	mg/kg dry	3.8274	0.357	91	75-125		
Boron	63.8		1.53	mg/kg dry	76.549	0.683	82	75-125		
Cadmium	3.80		0.153	mg/kg dry	3.8274	0.0921	97	75-125		
Calcium	5290		76.5	mg/kg dry	1913.7	3370	100	75-125		
Chromium	40.7		0.153	mg/kg dry	15.310	27.2	88	75-125		
Cobalt	38.7		1.53	mg/kg dry	38.274	4.91	88	75-125		
Copper	35.8		0.765	mg/kg dry	19.137	19.5	85	75-125		

LIONVILLE LABORATORY
A division of Elkins Analytical Corporation

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

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 L011333 - SW 3050B									
Matrix Spike (L011333-MS2)		**Source: 1011068-02**		Prepared: 11/12/2010 Analyzed: 11/19/2010					
Iron	20000	15.3	mg/kg dry	76.549	19600	572*	75-125		
Lead	36.6	0.383	mg/kg dry	38.274	4.68	83	75-125		
Magnesium	6720	57.4	mg/kg dry	1913.7	5080	85	75-125		
Manganese	272	3.83	mg/kg dry	38.274	208	169*	75-125		
Molybdenum	67.6	1.53	mg/kg dry	76.549	0.252	88	75-125		
Nickel	47.3	3.06	mg/kg dry	38.274	14.1	87	75-125		
Potassium	2670	306	mg/kg dry	1913.7	904	92	75-125		
Selenium	132	0.230	mg/kg dry	153.10	0.252 U	86	75-125		
Silicon	919	1.53	mg/kg dry	76.549	833	112	75-125		
Silver	3.22	0.153	mg/kg dry	3.8274	0.168 U	84	75-125		
Sodium	2020	38.3	mg/kg dry	1913.7	178	96	75-125		
Vanadium	78.4	1.91	mg/kg dry	38.274	42.9	93	75-125		
Zinc	68.0	7.65	mg/kg dry	38.274	36.9	81	75-125		
Reference (L011333-SRM1)				Prepared: 11/12/2010 Analyzed: 11/19/2010					
Aluminum	6870	10.7	mg/kg wet	6766.6		102	0-225.5		
Antimony	44.9	1.29	mg/kg wet	56.630		79	0-225.6		
Arsenic	116	2.14	mg/kg wet	113.85		102	85-115		
Barium	306	1.07	mg/kg wet	298.35		102	75.7-124.3		
Beryllium	110	0.429	mg/kg wet	108.32		102	85.2-114.8		
Boron	85.5	4.29	mg/kg wet	86.580		99	68.5-131.6		
Cadmium	233	0.429	mg/kg wet	224.09		104	84.9-115.1		
Calcium	3410	214	mg/kg wet	3305.9		103	82.8-117.2		
Chromium	81.9	0.429	mg/kg wet	77.590		106	76.8-123.2		
Cobalt	170	4.29	mg/kg wet	163.19		104	79.4-120.6		
Copper	261	2.14	mg/kg wet	265.65		98	82.4-117.6		
Iron	8320	42.9	mg/kg wet	8202.8		101	78.9-121.1		
Lead	191	1.07	mg/kg wet	187.62		102	81.5-118.5		
Magnesium	8710	161	mg/kg wet	8352.3		104	84.2-115.8		
Manganese	938	10.7	mg/kg wet	951.35		99	69-131		
Molybdenum	242	4.29	mg/kg wet	234.78		103	80.1-119.9		
Nickel	227	8.57	mg/kg wet	220.85		103	81.4-118.6		
Potassium	14600	857	mg/kg wet	14177		103	85.7-114.3		
Selenium	193	0.643	mg/kg wet	187.99		103	78.8-121.2		
Silicon	636	4.29	mg/kg wet	939.78		68	0-272.3		
Silver	83.2	0.429	mg/kg wet	83.960		99	81.9-118.1		
Sodium	9620	107	mg/kg wet	9587.1		100	83.5-116.4		

LIONVILLE LABORATORY
A division of Eurofins Analytical Corporation

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/23/2010 16:55

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 L011333 - SW 3050B									
Reference (L011333-SRM1)				Prepared: 11/12/2010 Analyzed: 11/19/2010					
Vanadium	103	5.36	mg/kg wet	97.430		106	75.8-124.2		
Zinc	201	21.4	mg/kg wet	196.52		102	78.9-121.1		

Date: 20 December 2010
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Remaining Sites Confirmation Sampling– Soil Full Protocol - Waste Site 100-K-78
Subject: Wet Chemistry - Data Package No. K2489-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K2489 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1CN19	11/5/10	Soil	C	See note 1
J1CN20	11/5/10	Soil	C	See note 1
J1CN21	11/5/10	Soil	C	See note 1
J1CDR4	11/5/10	Soil	C	See note 1
J1CDR5	11/5/10	Soil	C	See note 1
J1CDR6	11/5/10	Soil	C	See note 1

1 – Chromium VI by 7196A.

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

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

DATA QUALITY PARAMETERS

Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 30 days for chromium VI.

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 Blanks

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

All method blank results were acceptable.

Field (Equipment) Blank

One field blank (J1CN19) was submitted for analysis. No analytes were detected in the field blank.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

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

All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five

times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J1CDR5/J1CDR6) were submitted for analysis. Laboratory duplicates are compared using the same criteria as for laboratory results. All field duplicate results are 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 K2489 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.*

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K2489	REVIEWER: ELR	Project: 100-K-78	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

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	**Reported:** 11/24/2010 11:20

12/18/10

Wet Chemistry
Lionville Laboratory

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
J1CN19 (1011068-01) Soil									
%Solids	**99.9**	0.1	0.1	% by Weight	1	L011214	11/12/2010	11/12/2010	EPA 160.6
Hexavalent Chromium	0.20 U	0.20	0.50	mg/kg dry	1	L011283	11/16/2010	11/16/2010	SW846 7196A
J1CN20 (1011068-02) Soil									
%Solids	**97.5**	0.1	0.1	% by Weight	1	L011214	11/12/2010	11/12/2010	EPA 160.6
Hexavalent Chromium	0.21 U	0.21	0.51	mg/kg dry	1	L011283	11/16/2010	11/16/2010	SW846 7196A
J1CN21 (1011068-03) Soil									
%Solids	**98.6**	0.1	0.1	% by Weight	1	L011214	11/12/2010	11/12/2010	EPA 160.6
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L011283	11/16/2010	11/16/2010	SW846 7196A
J1CDR4 (1011068-04) Soil									
%Solids	**98.2**	0.1	0.1	% by Weight	1	L011214	11/12/2010	11/12/2010	EPA 160.6
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L011283	11/16/2010	11/16/2010	SW846 7196A
J1CDR5 (1011068-05) Soil									
%Solids	**98.0**	0.1	0.1	% by Weight	1	L011214	11/12/2010	11/12/2010	EPA 160.6
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L011283	11/16/2010	11/16/2010	SW846 7196A
J1CDR6 (1011068-06) Soil									
%Solids	**97.8**	0.1	0.1	% by Weight	1	L011214	11/12/2010	11/12/2010	EPA 160.6
Hexavalent Chromium	0.20 U	0.20	0.51	mg/kg dry	1	L011283	11/16/2010	11/16/2010	SW846 7196A

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

Case Narrative

Client: WC-HANFORD RC-029 K2489
LVL#: 1011068 **Date Received:** 11-10-10

INORGANIC NARRATIVE

1. This narrative covers the analyses of 6 soil samples.

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

   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.

4. The results presented in this report are derived from samples that met LvL's sample acceptance policy.

5. The method blank for Hexavalent Chromium (Cr^{6+}) was within the method criteria.

6. The Laboratory Control Samples (LCS) for Cr^{6+} were within the laboratory control limits.

7. The matrix spike recoveries for Cr^{6+} were within the 75-125% control limits.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory

11/30/10
Date

njp\il 1-068

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 9 pages.

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-097	Page 1 of 1

Collector: Weber	Company Contact: Matt Perrott	Telephone No.: 372-9088	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-K-78		SAF No.: RC-029
Ice Chest No.: ERC-96-069	Field Logbook No.: HL-1601-05	COA: C00K78A000	Method of Shipment: FEDEX
Shipped To: ~~EDERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A100613		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Possible Radiological Contamination <DOT Limits

Special Handling and/or Storage

Cool 4°C

Preservation	Cool 4C	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1						
Volume	~~60mL~~ 250 mL	~~60mL~~	500mL	~~60mL~~	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions	See item (3) in Special Instructions.	Carbon-14 Low Level; Tritium - H3 Low Level Soil						

Sample No.	Matrix *	Sample Date	Sample Time										
J1CN19	SOIL	11/5/10	0830	X	X								
J1CN20	SOIL	11/5/10	0915	X	X								
J1CN21	SOIL	11/5/10	0935	X	X								

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
HW/Heather Weber	11-5-2010 1035	BHUDSON	11/5/10 1035
BHUDSON	11/5/10 1250	1060 #1C	11/5/10 1250
J.E. Benbul / 1060 1C	11-8-10 0830	J.E. Benbul	11-8-10 0830
J.E. Benbul	11-9-10 0930	FED EX	
FED EX	11-10-10 0945	VICTOR HERNANDEZ	11-10-10 0945

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) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gross Alpha & Gross Beta.
(3) Americium-241; Nickel-63; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Strontium-89,90 – Total Sr; Technetium-99 Low Level; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; Total Uranium

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

REVIEWED BY JR DATE 11/9/10

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

WCH-EE-011

EB 1 2

00000007

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-095	Page 1 of 1

Collector: Weber	Company Contact: Matt Perrott — Telephone No.: 372-9088	Project Coordinator: KBSSNBR, JH	Price Code: 8C — Data Turnaround: 15 Days
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-K-78	SAF No.: RC-029	
Ice Chest No.: ERC-96-069	Field Logbook No.: EL-1601-05 — COA: C00K78A000	Method of Shipment: FEDEX	
Shipped To: ~~EDERLINE SERVICES~~ / LIONVILLE	Offsite Property No.: A100613	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potentially radioactive cDOT Limits JEO 11-9-10

Special Handling and/or Storage

Cool 4°C JEO 11-9-10

Preservation	Cool 4C	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P	G/P						
No. of Container(s)	1	~~1~~ BH 11/4/10	1	1	1						
Volume BH 11/4/10	~~60mL~~ 250mL	~~60mL~~	60mL	~~60mL~~	60g						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions	Carbon-14 Low Level; Tritium - H3 Low Level Soil	RCF OEA Shipping Screen						
Sample No.	Matrix *	Sample Date	Sample Time								
J1CDR4	SOIL	11/5/10	0955	X	X						
J1CDR5	SOIL	11/5/10	1010	X	X						
J1CDR6	SOIL	11/5/10	1015	X	X						
~~J1CDR7~~	SOIL										
~~J1CDR8~~ BH 11/5/10	SOIL										

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Heather Weber HW/Heather Weber	11-5-10 1085	BHudson BHudson	11/5/10 1035
BHudson BHudson	11/5/10 1250	1060 #1C	11/5/10 1250
J.E. Berlo / 1060 1C	11-8-10 0830	J.E. Berlo	11-8-10 0830
J.E. Berlo	11-9-10 0930	FED EX	
FED EX	11-10-10 0945	VICTOR HERNANDEZ	11-10-10 0945
Reliaquished 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) Americium-241; Nickel-63; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Strontium-89,90 – Total Sr; Technetium-99 Low Level; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; Total Uranium

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

REVIEWED BY JR DATE 11/9/10

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

WCH-EE-011

000000008

000000013

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-K-78		DATA PACKAGE:	K2489	
VALIDATOR:	PLR	LAB:	LLF	DATE:	12/17/10
			SDG:	K2489	

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
JICN19 JICN20 JICN21 JICDR4 JICDR5
JICDR6
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: _____

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: _____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

6. HOLDING TIMES (all levels)

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

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

Comments:

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-029 Project Number: K2489 Project Manager: Joan Kessner	Reported: 11/24/2010 11:20

Wet Chemistry - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L011214 - % Solids										
Duplicate (L011214-DUP5)	Source: 1011068-06			Prepared & Analyzed: 11/12/2010						
%Solids	97.8	0.1	0.1	% by Weight		97.8			0	20
Batch L011283 - Default Prep										
Blank (L011283-BLK1)				Prepared & Analyzed: 11/16/2010						
Hexavalent Chromium	0.20 U	0.20	0.50	mg/kg wet						
LCS (L011283-BS1)				Prepared & Analyzed: 11/16/2010						
Hexavalent Chromium	4.06	0.20	0.50	mg/kg wet	4.0000		102	80-120		
LCS (L011283-BS2)				Prepared & Analyzed: 11/16/2010						
Hexavalent Chromium	993 D	20.0	50.0	mg/kg wet	1024.0		97	80-120		
Duplicate (L011283-DUP2)	Source: 1011068-01			Prepared & Analyzed: 11/16/2010						
Hexavalent Chromium	0.20 U	0.20	0.50	mg/kg dry		0.20 U				20
Matrix Spike (L011283-MS3)	Source: 1011068-01			Prepared & Analyzed: 11/16/2010						
Hexavalent Chromium	4.13	0.20	0.50	mg/kg dry	4.0020	0.20 U	103	75-125		
Matrix Spike (L011283-MS4)	Source: 1011068-01			Prepared & Analyzed: 11/16/2010						
Hexavalent Chromium	999 D	20.0	50.0	mg/kg dry	985.82	0.20 U	101	75-125		

Date: 20 December 2010
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: ARRA Remaining Sites Confirmation Sampling – Soil Full Protocol - Waste Site 100-K-78
Subject: Radiochemistry - Data Package No. K2489-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K2489 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
J1CDR4	11/5/10	Soil	C	See note 1
J1CDR5	11/5/10	Soil	C	See note 1
J1CDR6	11/5/10	Soil	C	See note 1
J1CN20	11/5/10	Soil	C	See note 1
J1CN21	11/5/10	Soil	C	See note 1

1 – Gamma spectroscopy, alpha spectroscopy (isotopic uranium), carbon-14, tritium, nickel-63 and total strontium.

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

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional 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 (although three analytes exceeded the RQL).

Field (Equipment) Blank

No equipment 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 a matrix spike analysis, all tritium and carbon-14 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 (J1CDR5/J1CDR6) were submitted for analysis. Laboratory duplicates are compared using the same criteria as for laboratory results. All field duplicate results are 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. Eleven analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data package No. K2489 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 a matrix spike analysis, all tritium and carbon-14 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.

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

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with 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: K2489	REVIEWER: ELR	Project: 100-K-78	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Tritium Carbon-14	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 K2489

7735-001

DATA SHEET

J1CDR4

SDG	7735	Client/Case no	Hanford SDG K2489
Contact	N.Joseph Verville	Contract	No. S00W235A00
Lab sample id	S011055-01	Client sample id	J1CDR4
Dept sample id	7735-001	Location/Matrix	100-K-78 SOLID
Received	11/10/10	Collected/Weight	11/05/10 09:55 1452 g
% solids	98.4	Custody/SAF No	RC-029-095 RC-029

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-1.46	2.4	4.25	10.0	U J	H
Carbon 14	14762-75-5	1.66	0.46	0.728	1.00	J	C
Nickel 63	13981-37-8	-0.833	1.9	3.39	30.0	U	NI_L
Total Strontium	SR-RAD	-0.023	0.22	0.467	1.00	U	SR
Uranium 233/234	U-233/234	0.656	0.28	0.209	1.00		U
Uranium 235	15117-96-1	0.066	0.066	0.253	1.00	U	U
Uranium 238	U-238	0.684	0.28	0.209	1.00		U
Plutonium 238	13981-16-3	-0.034	0.067	0.257	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.067	0.257	1.00	U	PU
Potassium 40	13966-00-2	14.0	0.68	0.256			GAM
Cobalt 60	10198-40-0	U		0.032	0.050	U	GAM
Cesium 137	10045-97-3	U		0.024	0.100	U	GAM
Radium 226	13982-63-3	0.452	0.062	0.056	0.100		GAM
Radium 228	15262-20-1	0.689	0.14	0.134	0.200		GAM
Europium 152	14683-23-9	U		0.068	0.100	U	GAM
Europium 154	15585-10-1	U		0.104	0.100	U	GAM
Europium 155	14391-16-3	U		0.079	0.100	U	GAM
Thorium 228	14274-82-9	0.609	0.036	0.031			GAM
Thorium 232	TH-232	0.689	0.14	0.134			GAM
Uranium 235	15117-96-1	U		0.160		U	GAM
Uranium 238	U-238	U		3.85		U	GAM
Americium 241	14596-10-2	U		0.102		U	GAM

12/19/10

Remaining Sites Confirmation Sampling - Soil Full Protocol

Lab id	EBRLNE
Protocol	Hanford1
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	12/02/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K2489

7735-002 J1CDR5

DATA SHEET

SDG	7735	Client/Case no	Hanford	SDG K2489	
Contact	N.Joseph Verville	Contract	No. S00W235A00		
Lab sample id	S011055-02	Client sample id	J1CDR5		
Dept sample id	7735-002	Location/Matrix	100-K-78	SOLID	
Received	11/10/10	Collected/Weight	11/05/10 10:10	1148 g	
% solids	98.0	Custody/SAF No	RC-029-095	RC-029	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.37	2.3	4.14	10.0	U J	H
Carbon 14	14762-75-5	1.25	0.42	0.668	1.00	J	C
Nickel 63	13981-37-8	0.453	1.6	2.76	30.0	U	NI_L
Total Strontium	SR-RAD	0.007	0.12	0.246	1.00	U	SR
Uranium 233/234	U-233/234	0.380	0.22	0.207	1.00		U
Uranium 235	15117-96-1	0.033	0.066	0.251	1.00	U	U
Uranium 238	U-238	0.271	0.16	0.207	1.00		U
Plutonium 238	13981-16-3	0.048	0.19	0.370	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.097	0.370	1.00	U	PU
Potassium 40	13966-00-2	12.5	1.2	0.429			GAM
Cobalt 60	10198-40-0	U		0.053	0.050	U	GAM
Cesium 137	10045-97-3	U		0.063	0.100	U	GAM
Radium 226	13982-63-3	0.379	0.12	0.119	0.100		GAM
Radium 228	15262-20-1	0.640	0.29	0.256	0.200		GAM
Europium 152	14683-23-9	U		0.164	0.100	U	GAM
Europium 154	15585-10-1	U		0.181	0.100	U	GAM
Europium 155	14391-16-3	U		0.187	0.100	U	GAM
Thorium 228	14274-82-9	0.421	0.090	0.087			GAM
Thorium 232	TH-232	0.640	0.29	0.256			GAM
Uranium 235	15117-96-1	U		0.524		U	GAM
Uranium 238	U-238	U		7.29		U	GAM
Americium 241	14596-10-2	U		0.272		U	GAM

Remaining Sites Confirmation Sampling - Soil Full Protocol

12/18/10

Lab id	EBRLNE
Protocol	Hanford1
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	12/02/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K2489

7735-003 J1CDR6

DATA SHEET

SDG	7735	Client/Case no	Hanford	SDG K2489	
Contact	N.Joseph Verville	Contract	No. S00W235A00		
Lab sample id	S011055-03	Client sample id	J1CDR6		
Dept sample id	7735-003	Location/Matrix	100-K-78	SOLID	
Received	11/10/10	Collected/Weight	11/05/10 10:15	1158 g	
% solids	98.2	Custody/SAF No	RC-029-095	RC-029	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-1.15	2.3	3.98	10.0	U J	H
Carbon 14	14762-75-5	1.45	0.42	0.671	1.00	J	C
Nickel 63	13981-37-8	1.47	1.8	2.92	30.0	U	NI_L
Total Strontium	SR-RAD	0.011	0.22	0.441	1.00	U	SR
Uranium 233/234	U-233/234	0.424	0.26	0.250	1.00		U
Uranium 235	15117-96-1	0	0.079	0.302	1.00	U	U
Uranium 238	U-238	0.555	0.27	0.250	1.00		U
Plutonium 238	13981-16-3	0.150	0.20	0.383	1.00	U	PU
Plutonium 239/240	PU-239/240	0.200	0.20	0.383	1.00	U	PU
Potassium 40	13966-00-2	11.8	1.7	0.845			GAM
Cobalt 60	10198-40-0	U		0.092	0.050	U	GAM
Cesium 137	10045-97-3	U		0.075	0.100	U	GAM
Radium 226	13982-63-3	0.380	0.16	0.172	0.100		GAM
Radium 228	15262-20-1	0.626	0.39	0.388	0.200		GAM
Europium 152	14683-23-9	U		0.193	0.100	U	GAM
Europium 154	15585-10-1	U		0.271	0.100	U	GAM
Europium 155	14391-16-3	U		0.174	0.100	U	GAM
Thorium 228	14274-82-9	0.573	0.089	0.091			GAM
Thorium 232	TH-232	0.626	0.39	0.388			GAM
Uranium 235	15117-96-1	U		0.351		U	GAM
Uranium 238	U-238	U		12.0		U	GAM
Americium 241	14596-10-2	U		0.341		U	GAM

Remaining Sites Confirmation Sampling - Soil Full Protocol

12/18/10

Lab id	EBRLNE
Protocol	Hanford1
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	12/02/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K2489

7735-004

DATA SHEET

J1CN20

SDG	7735	Client/Case no	Hanford	SDG K2489	
Contact	N.Joseph Verville	Contract	No. S00W235A00		
Lab sample id	S011055-04	Client sample id	J1CN20		
Dept sample id	7735-004	Location/Matrix	100-K-78	SOLID	
Received	11/10/10	Collected/Weight	11/05/10 09:15	1445 g	
% solids	97.1	Custody/SAF No	RC-029-097	RC-029	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.53	2.2	3.96	10.0	U J	H
Carbon 14	14762-75-5	1.48	0.48	0.765	1.00	J	C
Nickel 63	13981-37-8	1.56	2.4	4.08	30.0	U	NI_L
Total Strontium	SR-RAD	0.118	0.21	0.397	1.00	U	SR
Uranium 233/234	U-233/234	0.819	0.35	0.216	1.00		U
Uranium 235	15117-96-1	0.239	0.21	0.262	1.00	U	U
Uranium 238	U-238	0.932	0.35	0.216	1.00		U
Plutonium 238	13981-16-3	0	0.078	0.297	1.00	U	PU
Plutonium 239/240	PU-239/240	0.039	0.078	0.297	1.00	U	PU
Potassium 40	13966-00-2	14.6	0.60	0.262			GAM
Cobalt 60	10198-40-0	U		0.030	0.050	U	GAM
Cesium 137	10045-97-3	U		0.026	0.100	U	GAM
Radium 226	13982-63-3	0.582	0.058	0.055	0.100		GAM
Radium 228	15262-20-1	0.905	0.12	0.122	0.200		GAM
Europium 152	14683-23-9	U		0.072	0.100	U	GAM
Europium 154	15585-10-1	U		0.093	0.100	U	GAM
Europium 155	14391-16-3	U		0.098	0.100	U	GAM
Thorium 228	14274-82-9	0.922	0.037	0.033			GAM
Thorium 232	TH-232	0.905	0.12	0.122			GAM
Uranium 235	15117-96-1	U		0.148		U	GAM
Uranium 238	U-238	U		3.36		U	GAM
Americium 241	14596-10-2	U		0.216		U	GAM

Remaining Sites Confirmation Sampling - Soil Full Protocol

12/18/10

Lab id	EBRLNE
Protocol	Hanford1
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	12/02/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K2489

7735-005 J1CN21

DATA SHEET

SDG	7735	Client/Case no	Hanford SDG K2489
Contact	N.Joseph Verville	Contract	No. S00W235A00
Lab sample id	S011055-05	Client sample id	J1CN21
Dept sample id	7735-005	Location/Matrix	100-K-78 SOLID
Received	11/10/10	Collected/Weight	11/05/10 09:35 1384 g
% solids	98.4	Custody/SAF No	RC-029-097 RC-029

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.44	2.4	4.20	10.0	U J	H
Carbon 14	14762-75-5	1.32	0.41	0.646	1.00	J	C
Nickel 63	13981-37-8	0.566	1.5	2.59	30.0	U	NI_L
Total Strontium	SR-RAD	-0.086	0.14	0.322	1.00	U	SR
Uranium 233/234	U-233/234	0.843	0.32	0.201	1.00		U
Uranium 235	15117-96-1	0.032	0.064	0.244	1.00	U	U
Uranium 238	U-238	0.632	0.27	0.201	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	13.4	0.60	0.240			GAM
Cobalt 60	10198-40-0	U		0.026	0.050	U	GAM
Cesium 137	10045-97-3	U		0.024	0.100	U	GAM
Radium 226	13982-63-3	0.369	0.044	0.040	0.100		GAM
Radium 228	15262-20-1	0.692	0.11	0.107	0.200		GAM
Europium 152	14683-23-9	U		0.056	0.100	U	GAM
Europium 154	15585-10-1	U		0.081	0.100	U	GAM
Europium 155	14391-16-3	U		0.063	0.100	U	GAM
Thorium 228	14274-82-9	0.569	0.033	0.028			GAM
Thorium 232	TH-232	0.692	0.11	0.107			GAM
Uranium 235	15117-96-1	U		0.144		U	GAM
Uranium 238	U-238	U		2.94		U	GAM
Americium 241	14596-10-2	U		0.037		U	GAM

12/18/10

Remaining Sites Confirmation Sampling - Soil Full Protocol

Lab id	EBRLNE
Protocol	Hanford1
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	12/02/10

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K2489 was composed of five solid (soil) samples designated under SAF No. RC-029 with a Project Designation of: Remaining Sites Confirmation Sampling – Soil Full Protocol

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist. The results were transmitted to WCH via e-mail on December 2, 2010.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analysis

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analysis

No problems were encountered during the course of the analyses.

2.4 Total Strontium Analysis

No 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 analyses.

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."

N. Joseph Verville
Client Services Manager

12/2/10
Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-095	Page 1 of 1

Collector: Weber	Company Contact: Matt Perrott	Telephone No.: 372-9088	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-K-78 K2489 (7735)		SAF No.: RC-029
Ice Chest No.: WCH-11-007	Field Logbook No.: EL-1601-05	COA: C00K78A000	Method of Shipment: FEDEX
Shipped To: EBERLINE SERVICES / ~~LIONVILLE~~ BH 11/4/10	Offsite Property No.: A100572		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Potentially radioactive <DOT Limit JEB 11-9-10

Special Handling and/or Storage

NONE JEB 11-9-10

Preservation	Cool 4C	Cool 4C	None	None	None							
Type of Container	G/P	G/P	G/P	G/P BH 11/4/10	G/P							
No. of Container(s)	1	1	1	1								
Volume	60mL	60mL	~~60mL~~ 1000mL	~~60mL~~	1kg							
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	Carbon-14 Low Level; Tritium - H3 Low Level Soil	RCF GEA Shipping Screen							
Sample No. / Matrix * / Sample Date / Sample Time												
J1CDR4 / SOIL / 11/5/10 / 0955			X	X								
J1CDR5 / SOIL / 11/5/10 / 1010			X	X								
J1CDR6 / SOIL / 11/5/10 / 1015			X	X								
~~J1CDR7~~ / SOIL												
~~J1CDR8~~ BH 11/5/10 / SOIL												

000018

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Heather Weber HWeber	11-5-10 1035	BHUDSON BHudson	11/5/10 1035
Relinquished By/Removed From	BHUDSON BHudson	11/5/10 1250	1060 IC	11/5/10 1250
Relinquished By/Removed From	J.E. Beckel / 1060 IC	0830 11-8-10	J.E. Beckel	0830 11-8-10
Relinquished By/Removed From	J.E. Beckel WCH	0930 11-9-10	FED EX	
Relinquished By/Removed From	FED EX		M. NATARAJAN	11/10/10 0920
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) ~~Americium-241~~; Nickel-63; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Strontium-89,90 -- Total Sr; ~~Technetium-99~~ Low Level; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; ~~Total Uranium~~; Gamma Spec (client List);
BH 11/5/10

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples 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, Le=Liquid, V=Vegetation, X=Other

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

REVIEWED BY JR DATE 11/9/10

WCH-EE-011

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-029-097	Page 1 of 1

Collector: Weber	Company Contact: Matt Perrott	Telephone No.: 372-9088	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil Full Protocol	Sampling Location: 100-K-78 K2489 (7735)		SAF No.: RC-029
Ice Chest No.: WCH-11-002	Field Logbook No.: EL-1601-05	COA: C00K78A000	Method of Shipment: FEDEX
Shipped To: EBERLINE SERVICES / ~~LIONVILLE~~ BH 11/4/10	Offsite Property No.: A100577		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Possible Radiological Contamination

<DOT Limits JES 11-9-10

Special Handling and/or Storage

NONE JES 11-9-10

000019

Preservation	Cool 4C	Cool 4C	None	None	None							
Type of Container	G/P	G/P	G/P	G/P	G/P							
No. of Container(s)	1	1	1	~~1~~ Ø	~~1~~ Ø	BH 11/4/10						
Volume	60mL	60mL	~~500mL~~ 1000 mL	~~60mL~~	~~60mL~~	BH 11/4/10						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Carbon-14 Low Level; Tritium - H3 Low Level Soil							
Sample No.	Matrix *	Sample Date	Sample Time									
~~J1CN19~~	~~SOIL~~	~~11/5/10~~	~~BH 11/5/10~~									
J1CN20	SOIL	11/5/10	0915			X	X	X				
J1CN21	SOIL	11/5/10	0935			X	X	X				

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Heather Weber	~~11-5-10~~ ~~10-5-2010~~ 1035	BHUDSON BHudson	11/5/10 1035
Relinquished By/Removed From	BHUDSON BHudson	BH 11/5/10 11/5/10 1250	1060 #1C	11/5/10 1250
Relinquished By/Removed From	J.E. Beuhl 1060 1C	11-8-10 0830	J.E. Beuhl	11-8-10 0830
Relinquished By/Removed From	J.E. Beuhl WCH	11-9-10 0920	FED EX	
Relinquished By/Removed From	FED EX		Received By/Stored In: F. WATANABE	11/10/10 0930
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) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; ~~Gross Alpha & Gross Beta~~
(3) ~~Americium-241~~; Nickel-63; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Strontium-89,90 – Total Sr; ~~Technetium-99 Low Level~~; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; ~~Total Uranium~~

BH 11/4/10

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples 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 JR DATE 11/9/10

WCH-EE-011

Appendix 5

Data Validation Supporting Documentation

Appendix 6

Additional Documentation Requested by Client

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-K-78		DATA PACKAGE:	K2489	
VALIDATOR:	ELR	LAB: ER		DATE: 12/17/10	
			SDG: K2489		
ANALYSES PERFORMED					
☐ Gross Alpha/Beta	X Strontium-90	☐ Technetium-99	X Alpha Spectroscopy	X Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	X Tritium	X C-14	X Ni-63	
SAMPLES/MATRIX					
JICPR4	JICDR5	JICPRL	JICN20	JICN21	
					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: MB - 3 over RQL 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:

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 MS - J 3H ← N1-63

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: RS/RC no FS 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: 11 over RQL

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K2489

7735-007 Method Blank

METHOD BLANK

SDG	7735	Client/Case no	Hanford SDG K2489
Contact	N.Joseph Verville	Contract	No. S00W235A00
Lab sample id	S011055-07	Client sample id	Method Blank
Dept sample id	7735-007	Material/Matrix	SOLID
		SAF No	RC-029

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.434	2.3	3.94	10.0	U	H
Carbon 14	14762-75-5	0.392	0.45	0.738	1.00	U	C
Nickel 63	13981-37-8	-0.650	1.6	2.80	30.0	U	NI_L
Total Strontium	SR-RAD	0.030	0.18	0.355	1.00	U	SR
Uranium 233/234	U-233/234	0	0.064	0.246	1.00	U	U
Uranium 235	15117-96-1	0	0.078	0.297	1.00	U	U
Uranium 238	U-238	0	0.064	0.246	1.00	U	U
Plutonium 238	13981-16-3	-0.050	0.20	0.479	1.00	U	PU
Plutonium 239/240	PU-239/240	0.050	0.10	0.383	1.00	U	PU
Potassium 40	13966-00-2	U		0.629		U	GAM
Cobalt 60	10198-40-0	U		0.044	0.050	U	GAM
Cesium 137	10045-97-3	U		0.035	0.100	U	GAM
Radium 226	13982-63-3	U		0.090	0.100	U	GAM
Radium 228	15262-20-1	U		0.176	0.200	U	GAM
Europium 152	14683-23-9	U		0.121	0.100	U	GAM
Europium 154	15585-10-1	U		0.105	0.100	U	GAM
Europium 155	14391-16-3	U		0.101	0.100	U	GAM
Thorium 228	14274-82-9	U		0.062		U	GAM
Thorium 232	TH-232	U		0.176		U	GAM
Uranium 235	15117-96-1	U		0.202		U	GAM
Uranium 238	U-238	U		5.74		U	GAM
Americium 241	14596-10-2	U		0.117		U	GAM

QC-BLANK #75983

Lab id	EBRLNE
Protocol	Hanford1
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	12/02/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K2489

7735-006

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7735
Contact N.Joseph Verville

Client/Case no Hanford SDG K2489
Contract No. S00W235A00

Lab sample id S011055-06
Dept sample id 7735-006

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No RC-029

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	130	5.8	3.79	10.0		H	143	5.7	91	84-116	80-120
Carbon 14	1020	31	6.69	1.00		C	1060	42	96	84-116	80-120
Nickel 63	203	5.9	2.88	30.0		NI_L	218	8.7	93	83-117	80-120
Total Strontium	8.92	0.53	0.236	1.00		SR	8.79	0.35	102	81-119	80-120
Uranium 233/234	9.63	1.3	0.694	1.00		U	9.28	0.37	104	75-125	80-120
Uranium 235	8.26	1.2	0.222	1.00		U	7.54	0.30	110	72-128	80-120
Uranium 238	10.1	1.3	0.663	1.00		U	10.1	0.40	100	76-124	80-120
Plutonium 238	11.4	1.8	0.338	1.00		PU	11.5	0.46	99	73-127	80-120
Plutonium 239/240	12.0	1.8	0.338	1.00		PU	13.2	0.53	91	76-124	80-120
Cobalt 60	1.13	0.11	0.077	0.050		GAM	1.16	0.046	97	81-119	80-120
Cesium 137	1.28	0.093	0.060	0.100		GAM	1.23	0.049	104	83-117	80-120

QC-LCS #75982

Lab id EBRLNE
Protocol Hanford1
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 12/02/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K2489

7735-008 J1CDR4

DUPLICATE

SDG	7735			Client/Case no	Hanford SDG K2489
Contact	N.Joseph Verville			Contract	No. S00W235A00
DUPLICATE		ORIGINAL			
Lab sample id	SQ11055-08	Lab sample id	SQ11055-01	Client sample id	J1CDR4
Dept sample id	7735-008	Dept sample id	7735-001	Location/Matrix	100-K-78 SOLID
		Received	11/10/10	Collected/Weight	11/05/10 09:55 1452 g
% solids	98.4	% solids	98.4	Custody/SAF No	RC-029-095 RC-029

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	0.393	2.8	4.75	10.0	U	H	-1.46	2.4	4.25	U	-		1.0
Carbon 14	1.22	0.42	0.678	1.00		C	1.66	0.46	0.728		31	68	1.3
Nickel 63	0.815	2.1	3.51	30.0	U	NI_L	-0.833	1.9	3.39	U	-		1.2
Total Strontium	-0.058	0.10	0.230	1.00	U	SR	-0.023	0.22	0.467	U	-		0.3
Uranium 233/234	0.485	0.23	0.218	1.00		U	0.656	0.28	0.209		30	97	0.9
Uranium 235	0	0.069	0.264	1.00	U	U	0.066	0.066	0.253	U	-		1.4
Uranium 238	0.827	0.29	0.218	1.00		U	0.684	0.28	0.209		19	82	0.7
Plutonium 238	0.043	0.17	0.412	1.00	U	PU	-0.034	0.067	0.257	U	-		0.8
Plutonium 239/240	0	0.086	0.329	1.00	U	PU	0	0.067	0.257	U	-		0
Potassium 40	14.3	0.48	0.179			GAM	14.0	0.68	0.256		2	17	0.4
Cobalt 60	U		0.018	0.050	U	GAM	U		0.032	U	-		0.8
Cesium 137	U		0.017	0.100	U	GAM	U		0.024	U	-		0.5
Radium 226	0.440	0.034	0.028	0.100		GAM	0.452	0.062	0.056		3	28	0.3
Radium 228	0.676	0.10	0.095	0.200		GAM	0.689	0.14	0.134		2	41	0.1
Europium 152	U		0.048	0.100	U	GAM	U		0.068	U	-		0.5
Europium 154	U		0.062	0.100	U	GAM	U		0.104	U	-		0.7
Europium 155	U		0.071	0.100	U	GAM	U		0.079	U	-		0.2
Thorium 228	0.668	0.032	0.027			GAM	0.609	0.036	0.031		9	19	1.5
Thorium 232	0.676	0.10	0.095			GAM	0.689	0.14	0.134		2	41	0.1
Uranium 235	U		0.116		U	GAM	U		0.160	U	-		0.4
Uranium 238	U		2.41		U	GAM	U		3.85	U	-		0.6
Americium 241	U		0.128		U	GAM	U		0.102	U	-		0.3

QC-DUP#1 75984

Remaining Sites Confirmation Sampling - Soil Full Protocol

Lab id	EBRLNE
Protocol	Hanford1
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	12/02/10