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SAF-RC-025
100-BC Remaining Pipelines and Sewers - Soil Full Protocol
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2) H9-02 JD 7/31/06
INITIAL/DATE

RECEIVED
AUG 14 2006
EDMC

COMMENTS:

SDG K0388 SAF-RC-025

Waste Site: 100-B-14:1

Date: 27 July 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Remaining Pipelines & Sewers – Soil Full Protocol - Waste Subsite 100-B-14:1
Subject: Radiochemistry - Data Package No. K0388-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0388 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	Date
J127H4	5/31/06	Soil	C	See note 1
J127H5	5/31/06	Soil	C	See note 1
J127K8	5/31/06	Soil	C	See note 1
J127K9	5/31/06	Soil	C	See note 1
J127L0	5/30/06	Soil	C	See note 1
J127L1	5/30/06	Soil	C	See note 1
J127L2	5/30/06	Soil	C	See note 1
J127L3	5/30/06	Soil	C	See note 1

1 – Gamma spectroscopy, tritium and carbon-14.

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. Qualified Data Summary and 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 blank results were acceptable.

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 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

No field duplicates were submitted for analysis.

- **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.

- **Completeness**

Data package No. K0388 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

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

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

REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

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: K0388	REVIEWER: TLJ	Project: 100-B-14:1	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Tritium	J	All	No MS

* - 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

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD																	
Laboratory: EB																	
Case	SDG: K0388																
Sample Number		J127H4		J127H5		J127K8		J127K9		J127L0		J127L1		J127L2		J127L3	
Remarks																	
Sample Date		5/31/06		5/31/06		5/31/06		5/31/06		5/30/06		5/30/06		5/30/06		5/30/06	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	10	-0.049	UJ	-0.514	UJ	-0.207	UJ	-1.89	UJ	0.147	UJ	-0.295	UJ	-0.458	UJ	-0.652	UJ
Carbon-14	1	0.509	U	-0.087	U	0.726	U	-2.04	U	-0.706	U	0.319	U	0.918	U	-0.485	U
Potassium-40		20.3		10.1		24.2		22.5		13.3		16.1		13.2		9.01	
Cobalt 60	0.05	U	U	U	U	U	U*	U	U	U	U	U	U	U	U	U	U
Cesium 137	0.05	U	U	U	U	U	U*	U	U	U	U	U	U	U	U	U	U
Radium-226		0.718		0.431		0.811		0.759		0.459		0.661		0.481		0.376	
Radium-228		1.15		0.658		1.37		1.37		0.745		0.966		0.654		0.516	
Europium 152	0.1	U	U	U	U	U	U*	U	U*	U	U	U	U	U	U	U	U
Europium 154	0.1	U	U	U	U	U	U*	U	U*	U	U*	U	U*	U	U	U	U
Europium 155	0.1	U	U	U	U	U	U*	U	U*	U	U	U	U*	U	U	U	U
Thorium-228		1.04		0.620		1.24		1.26		0.712		0.967		0.618		0.478	
Thorium-232		1.15		0.658		0.137		1.37		0.745		0.966		0.654		0.516	
Uranium-235(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Uranium-238(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Americium-241(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

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* - RQL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-01 J127H4

DATA SHEET

SDG	7470	Client/Case no	Hanford	SDG K0388	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R606016-01	Client sample id	J127H4		
Dept sample id	7470-001	Location/Matrix	100-B-14:1 SZ Close	SOLID	
Received	06/03/06	Collected/Weight	05/31/06 10:00	1719 g	
% solids	97.8	Custody/SAF No	RC-025-011	RC-025	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.049	1.5	2.5	400	UJ	H
Carbon 14	14762-75-5	0.509	1.9	3.2	50	U	C
Potassium 40	13966-00-2	20.3	0.62	0.14			GAM
Cobalt 60	10198-40-0	U		0.014	0.050	U	GAM
Cesium 137	10045-97-3	U		0.014	0.10	U	GAM
Radium 226	13982-63-3	0.718	0.035	0.027	0.10		GAM
Radium 228	15262-20-1	1.15	0.071	0.060	0.20		GAM
Europium 152	14683-23-9	U		0.036	0.10	U	GAM
Europium 154	15585-10-1	U		0.046	0.10	U	GAM
Europium 155	14391-16-3	U		0.072	0.10	U	GAM
Thorium 228	14274-82-9	1.04	0.026	0.019			GAM
Thorium 232	TH-232	1.15	0.071	0.060			GAM
Uranium 235	15117-96-1	U		0.062		U	GAM
Uranium 238	U-238	U		2.3		U	GAM
Americium 241	14596-10-2	U		0.14		U	GAM

100BC Remain.Piplns&Sewers-SoilFullP

7/26/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/28/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-02 J127H5

DATA SHEET

SDG	7470	Client/Case no	Hanford SDG K0388
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R606016-02	Client sample id	J127H5
Dept sample id	7470-002	Location/Matrix	100-B-14:1 SZ Close SOLID
Received	06/03/06	Collected/Weight	05/31/06 09:49 1772 g
% solids	97.8	Custody/SAF No	RC-025-011 RC-025

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.514	1.8	3.1	400	U J	H
Carbon 14	14762-75-5	-0.087	2.2	3.6	50	U	C
Potassium 40	13966-00-2	10.1	0.61	0.42			GAM
Cobalt 60	10198-40-0	U		0.021	0.050	U	GAM
Cesium 137	10045-97-3	U		0.026	0.10	U	GAM
Radium 226	13982-63-3	0.431	0.052	0.048	0.10		GAM
Radium 228	15262-20-1	0.658	0.16	0.14	0.20		GAM
Europium 152	14683-23-9	U		0.053	0.10	U	GAM
Europium 154	15585-10-1	U		0.089	0.10	U	GAM
Europium 155	14391-16-3	U		0.053	0.10	U	GAM
Thorium 228	14274-82-9	0.620	0.035	0.032			GAM
Thorium 232	TH-232	0.658	0.16	0.14			GAM
Uranium 235	15117-96-1	U		0.094		U	GAM
Uranium 238	U-238	U		2.9		U	GAM
Americium 241	14596-10-2	U		0.035		U	GAM

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7/24/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/28/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-03 J127K8

DATA SHEET

SDG	7470	Client/Case no	Hanford	SDG K0388	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R606016-03	Client sample id	J127K8		
Dept sample id	7470-003	Location/Matrix	100-B-14:1 SZ Close	SOLID	
Received	06/03/06	Collected/Weight	05/31/06 10:12	1518 g	
% solids	96.5	Custody/SAF No	RC-025-011	RC-025	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.207	1.5	2.6	400	U J	H
Carbon 14	14762-75-5	0.726	1.9	3.2	50	U	C
Potassium 40	13966-00-2	24.2	1.5	0.50			GAM
Cobalt 60	10198-40-0	U		0.057	0.050	U	GAM
Cesium 137	10045-97-3	U		0.055	0.10	U	GAM
Radium 226	13982-63-3	0.811	0.12	0.11	0.10		GAM
Radium 228	15262-20-1	1.37	0.22	0.20	0.20		GAM
Europium 152	14683-23-9	U		0.14	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.17	0.10	U	GAM
Thorium 228	14274-82-9	1.24	0.079	0.074			GAM
Thorium 232	TH-232	1.37	0.22	0.20			GAM
Uranium 235	15117-96-1	U		0.22		U	GAM
Uranium 238	U-238	U		7.2		U	GAM
Americium 241	14596-10-2	U		0.51		U	GAM

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7/26/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/28/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-04 J127K9

DATA SHEET

SDG	7470	Client/Case no	Hanford	SDG K0388	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R606016-04	Client sample id	J127K9		
Dept sample id	7470-004	Location/Matrix	100-B-14:1 SZ Close	SOLID	
Received	06/03/06	Collected/Weight	05/31/06 11:00	1403 g	
% solids	95.7	Custody/SAF No	RC-025-011	RC-025	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-1.89	1.7	3.0	400	U J	H
Carbon 14	14762-75-5	-2.04	2.2	3.8	50	U	C
Potassium 40	13966-00-2	22.5	1.1	0.35			GAM
Cobalt 60	10198-40-0	U		0.039	0.050	U	GAM
Cesium 137	10045-97-3	U		0.041	0.10	U	GAM
Radium 226	13982-63-3	0.759	0.085	0.081	0.10		GAM
Radium 228	15262-20-1	1.37	0.20	0.18	0.20		GAM
Europium 152	14683-23-9	U		0.11	0.10	U	GAM
Europium 154	15585-10-1	U		0.14	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	1.26	0.061	0.056			GAM
Thorium 232	TH-232	1.37	0.20	0.18			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		5.4		U	GAM
Americium 241	14596-10-2	U		0.40		U	GAM

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Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-05 J127L0

DATA SHEET

SDG	7470	Client/Case no	Hanford	SDG K0388	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R606016-05	Client sample id	J127L0		
Dept sample id	7470-005	Location/Matrix	100-B-14:1 SZ Close	SOLID	
Received	06/03/06	Collected/Weight	05/30/06 12:44	1388 g	
% solids	97.0	Custody/SAF No	RC-025-011	RC-025	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.147	1.5	2.5	400	U J	H
Carbon 14	14762-75-5	-0.706	1.8	3.0	50	U	C
Potassium 40	13966-00-2	13.3	0.64	0.26			GAM
Cobalt 60	10198-40-0	U		0.026	0.050	U	GAM
Cesium 137	10045-97-3	U		0.031	0.10	U	GAM
Radium 226	13982-63-3	0.459	0.058	0.059	0.10		GAM
Radium 228	15262-20-1	0.745	0.15	0.14	0.20		GAM
Europium 152	14683-23-9	U		0.063	0.10	U	GAM
Europium 154	15585-10-1	U		0.11	0.10	U	GAM
Europium 155	14391-16-3	U		0.058	0.10	U	GAM
Thorium 228	14274-82-9	0.712	0.038	0.030			GAM
Thorium 232	TH-232	0.745	0.15	0.14			GAM
Uranium 235	15117-96-1	U		0.10		U	GAM
Uranium 238	U-238	U		3.3		U	GAM
Americium 241	14596-10-2	U		0.039		U	GAM

100BC Remain.Piplns&Sewers-SoilFullP

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-06 J127L1

DATA SHEET

SDG	7470	Client/Case no	Hanford SDG K0388
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R606016-06	Client sample id	J127L1
Dept sample id	7470-006	Location/Matrix	100-B-14:1 SZ Close SOLID
Received	06/03/06	Collected/Weight	05/30/06 14:20 1782 g
% solids	97.1	Custody/SAF No	RC-025-011 RC-025

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.295	1.5	2.5	400	U J	H
Carbon 14	14762-75-5	0.319	1.8	3.1	50	U	C
Potassium 40	13966-00-2	16.1	0.97	0.40			GAM
Cobalt 60	10198-40-0	U		0.040	0.050	U	GAM
Cesium 137	10045-97-3	U		0.037	0.10	U	GAM
Radium 226	13982-63-3	0.661	0.081	0.076	0.10		GAM
Radium 228	15262-20-1	0.966	0.16	0.15	0.20		GAM
Europium 152	14683-23-9	U		0.099	0.10	U	GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.13	0.10	U	GAM
Thorium 228	14274-82-9	0.967	0.055	0.051			GAM
Thorium 232	TH-232	0.966	0.16	0.15			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		4.5		U	GAM
Americium 241	14596-10-2	U		0.35		U	GAM

100BC Remain.Piplns&Sewers-SoilFullP

7/24/06

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-07 J127L2

DATA SHEET

SDG	7470	Client/Case no	Hanford	SDG K0388	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R606016-07	Client sample id	J127L2		
Dept sample id	7470-007	Location/Matrix	100-B-14:1 SZ Close	SOLID	
Received	06/03/06	Collected/Weight	05/30/06 14:42	1497 g	
% solids	96.3	Custody/SAF No	RC-025-011	RC-025	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.458	1.5	2.6	400	UJ	H
Carbon 14	14762-75-5	0.918	2.0	3.3	50	U	C
Potassium 40	13966-00-2	13.2	0.65	0.26			GAM
Cobalt 60	10198-40-0	U		0.024	0.050	U	GAM
Cesium 137	10045-97-3	U		0.023	0.10	U	GAM
Radium 226	13982-63-3	0.481	0.048	0.045	0.10		GAM
Radium 228	15262-20-1	0.654	0.11	0.11	0.20		GAM
Europium 152	14683-23-9	U		0.059	0.10	U	GAM
Europium 154	15585-10-1	U		0.077	0.10	U	GAM
Europium 155	14391-16-3	U		0.081	0.10	U	GAM
Thorium 228	14274-82-9	0.618	0.032	0.029			GAM
Thorium 232	TH-232	0.654	0.11	0.11			GAM
Uranium 235	15117-96-1	U		0.10		U	GAM
Uranium 238	U-238	U		2.5		U	GAM
Americium 241	14596-10-2	U		0.13		U	GAM

100BC Remain.PipIns&Sewers-SoilFullP

7/24/06

Lab id	EBRLNE
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-08 J127L3

DATA SHEET

SDG	7470	Client/Case no	Hanford SDG K0388
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R606016-08	Client sample id	J127L3
Dept sample id	7470-008	Location/Matrix	100-B-14:1 SZ Close SOLID
Received	06/03/06	Collected/Weight	05/30/06 14:44 1709 g
% solids	97.0	Custody/SAF No	RC-025-011 RC-025

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.652	1.4	2.4	400	U J	H
Carbon 14	14762-75-5	-0.485	1.8	3.0	50	U	C
Potassium 40	13966-00-2	9.01	0.60	0.28			GAM
Cobalt 60	10198-40-0	U		0.030	0.050	U	GAM
Cesium 137	10045-97-3	U		0.028	0.10	U	GAM
Radium 226	13982-63-3	0.376	0.044	0.043	0.10		GAM
Radium 228	15262-20-1	0.516	0.15	0.15	0.20		GAM
Europium 152	14683-23-9	U		0.066	0.10	U	GAM
Europium 154	15585-10-1	U		0.093	0.10	U	GAM
Europium 155	14391-16-3	U		0.095	0.10	U	GAM
Thorium 228	14274-82-9	0.478	0.034	0.031			GAM
Thorium 232	TH-232	0.516	0.15	0.15			GAM
Uranium 235	15117-96-1	U		0.13		U	GAM
Uranium 238	U-238	U		3.7		U	GAM
Americium 241	14596-10-2	U		0.26		U	GAM

100BC Remain.Piplns&Sewers-SoilFullP

7/26/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/28/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0388 was composed of eight solid (soil) samples designated under SAF No. RC-025 with a Project Designation of: Remaining Pipelines and Sewers-Soil Full Protocol.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to WCH via e-mail on June 28, 2006.

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 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

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."

Melissa Mannion

Melissa C. Mannion
Senior Program Manager

6/29/6

Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-025-011	Page 3 of 26

Collector: C. Martinez / R. Voeks	Company Contact: C. Martinez; Telephone No.: 509-539-2816	Project Coordinator: KESSNER, JH	Price Code: 8D; Data Turnaround: 21 days
Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol	Sampling Location: 100-B-14:1 sz close K0388 (7470)	SAF No.: RC-025	Air Quality ☐
Ice Chest No.: ERC-03-103	Field Logbook No.: EL-1585-5; COA: R10B142000	Method of Shipment: fed ex	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: H060495	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

none

Special Handling and/or Storage

~~cool 4 degrees centigrade~~

TRE 6-1-06

N/A

Preservation	Cool 4C	None										
Type of Container	G/P	G/P										
No. of Container(s)	1	1										
Volume	125g	1L										
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions.										

000021

Sample No.	Matrix *	Sample Date	Sample Time									
~~J127H2~~	~~SOIL~~											
~~J127H3~~	~~SOIL~~											
J127H4	SOIL	5/31/06	10:00		✓							
J127H5	SOIL	5/31/06	09:49		✓							
~~J127H6~~	~~SOIL~~	5/31/06										

DTB 5-25-06

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: Rob Voeks [signature]	Date/Time: 5/31/06 17:25	Received By/Stored In: 3728 Ref 2B	Date/Time: 5/31/06 17:25
Relinquished By/Removed From: 3728 #2B	Date/Time: 6-1-06 1210	Received By/Stored In: [signature]	Date/Time: 6-1-06 1210
Relinquished By/Removed From: [signature] WCH	Date/Time: 6-1-06 1500	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: FED EX	Date/Time:	Received By/Stored In: [signature]	Date/Time: 06/02/06 9:15
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

RUN C-14 FROM EXCESS MATERIAL IN GEA 1-LITER BOTTLE

(1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]

Personnel not available to Relinquish samples from 3728 Ref #2B on 6/1/06

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

BHI-EE-011 (08/29/2005)

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-025-011	Page 8 of 26

Collector C. Martinez R. Jocks	Company Contact C. Martinez	Telephone No. 509-539-2816	Project Coordinator KESSNER, JH	Price Code 8D	Data Turnaround
Project Designation 100-BC Remaining Pipelines and Sewers - Soil Full Protocol	Sampling Location 100-B-14:1 sz close K0388 (7470)		SAF No. RC-025	Air Quality ☐ 21 days
Ice Chest No. ERC-03-103	Field Logbook No. EL-1585-5	COA R10B142000	Method of Shipment fed ex	
Shipped To EBERLINE SERVICES / LIONVILLE 5/31/06	Offsite Property No. H060495		Bill of Lading/Air Bill No. See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

none

Special Handling and/or Storage

~~cool 4 degrees centigrade~~

TRE 6-1-06

N/A

Preservation	Cool 4C	None	None								
Type of Container	G/P	G/P	G/P								
No. of Container(s)	1	1	1								
Volume	125g		1L								
SAMPLE ANALYSIS	Chromium Hex - 7196 RJB 5-31-06	See item (1) in Special Instructions.	See item 1 below								

000022

Sample No.	Matrix *	Sample Date	Sample Time										
~~J127K7~~	~~SOIL~~												
J127K8	SOIL	5-31-06	1012			✓							
J127K9	SOIL	5-31-06	1100			✓							
~~J127L0~~	~~SOIL~~												
~~J127L1~~	~~SOIL~~												

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Rob Jocks	5/31/06 17:40	3728 Ref 2B	5/31/06 17:40
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
3728 A 2B	6-1-06 1210	TR Edmundson	6-1-06 1210
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
TR Edmundson	6-1-06 1500	Fed Ex	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FED EX			06/02/06 9:15
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

~~RUN C-14 FROM EXCESS MATERIAL IN GEA 1 LITER BOTTLE~~

05125106

~~(1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]~~

Gamma Spec (TCL list) Cs-137 Co-60, Eu-152 Eu-154, Eu-155

Run C-14 from excess GEA

Personnel not available to Relinquish samples from 3728 Ref # 2B on 6/1/06

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
Li=Liquid
Ve=Vegetation
X=Other

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

BHI-EE-011 (08/29/2005)

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-025-011	Page 1 of __

Collector: C. Martinez / R. Voeks	Company Contact: C. Martinez — Telephone No.: 509-539-2816	Project Coordinator: KESSNER, JH	Price Code: 8D — Data Turnaround: Air Quality ☐ 21 days
Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol	Sampling Location: 100-B-14:1 sz close K0388 (7470)	SAF No.: RC-025	
Ice Chest No.: ERC-03-103	Field Logbook No.: EL-1585-5 — COA: R10B142000	Method of Shipment: fed ex	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060495	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

none

Special Handling and/or Storage

~~cool 4 degrees centigrade~~ TRB 6-1-06 N/A

000023

Preservation	Cool 4C	None										
Type of Container	G/P	G/P										
No. of Container(s)	1	1										
Volume	125g	1L										
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions.										

Sample No.	Matrix *	Sample Date	Sample Time										
J12760	SOIL	05/30/06	1244		✓								
J12761	SOIL	05/30/06	1420		✓								
J12762	SOIL	05/30/06	1442		✓								
J12763	SOIL	05/30/06	1444		✓								
[illegible]	SOIL	5/31/06											

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: Rob Voeks [signature]	Date/Time: 5/31/06 17:53	Received By/Stored In: 3728 Ref 2B	Date/Time: 5/31/06 17:53
Relinquished By/Removed From: 3728 #2B 6-1-06	Date/Time: 1210	Received By/Stored In: [signature] 6-1-06	Date/Time: 1210
Relinquished By/Removed From: [signature] WCH 6-1-06	Date/Time: 1500	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: FED EX	Date/Time:	Received By/Stored In: [signature]	Date/Time: 06/07/06 9:15
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

RUN C-14 FROM EXCESS MATERIAL IN GEA 1-LITER BOTTLE

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

Personnel not available to relinquish samples from 3728 Ref # 2B on 6/1/06

Matrix *: S=Soil, SE=Sediment, SO=Solid, SI=Sludge, W = Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

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

BHLEE-011 (08/29/2005)

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-B-1421			DATA PACKAGE: K0J88		
VALIDATOR: TLT		LAB: EB		DATE: 7/21/08	
			SDG: K0J88		

ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium	C-14		

SAMPLES/MATRIX					
J127H4	J127H5	J127K8	J127K9	J127L0	J127L1
J127L2	J127L3				

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: 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 3H MS - Jcelf

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: No Field QC

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 ow

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-10 Method Blank

METHOD BLANK

SDG	7470	Client/Case no	Hanford	SDG K0388	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R606016-10	Client sample id	Method Blank		
Dept sample id	7470-010	Material/Matrix		SOLID	
		SAF No	RC-025		

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.064	1.9	3.2	400	U	H
Carbon 14	14762-75-5	-0.709	2.5	4.2	50	U	C
Potassium 40	13966-00-2	U		0.17		U	GAM
Cobalt 60	10198-40-0	U		0.018	0.050	U	GAM
Cesium 137	10045-97-3	U		0.015	0.10	U	GAM
Radium 226	13982-63-3	U		0.030	0.10	U	GAM
Radium 228	15262-20-1	U		0.061	0.20	U	GAM
Europium 152	14683-23-9	U		0.031	0.10	U	GAM
Europium 154	15585-10-1	U		0.064	0.10	U	GAM
Europium 155	14391-16-3	U		0.024	0.10	U	GAM
Thorium 228	14274-82-9	U		0.019		U	GAM
Thorium 232	TH-232	U		0.061		U	GAM
Uranium 235	15117-96-1	U		0.046		U	GAM
Uranium 238	U-238	U		1.7		U	GAM
Americium 241	14596-10-2	U		0.015		U	GAM

100BC Remain.Piplns&Sewers-SoilFullP

QC-BLANK 57356

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/28/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-09

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7470

Contact Melissa C. Mannion

Client/Case no Hanford SDG K0388

Contract No. 630

Lab sample id R606016-09

Dept sample id 7470-009

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No RC-025

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	868	19	6.0	400		H	913	37	95	84-116	80-120
Carbon 14	2130	17	4.1	50		C	2130	85	100	84-116	80-120
Cobalt 60	0.842	0.083	0.043	0.050		GAM	0.803	0.032	105	71-129	80-120
Cesium 137	0.885	0.077	0.058	0.10		GAM	0.845	0.034	105	72-128	80-120

100BC Remain.Piplns&Sewers-SoilPullP

QC-LCS 57355

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 06/28/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0388

R606016-11 J127K9

DUPLICATE

SDG	7470			Client/Case no	Hanford SDG K0388
Contact	Melissa C. Mannion			Contract	No. 630
DUPLICATE		ORIGINAL			
Lab sample id	R606016-11	Lab sample id	R606016-04	Client sample id	J127K9
Dept sample id	7470-011	Dept sample id	7470-004	Location/Matrix	100-B-14:1 SE Close SOLID
		Received	06/03/06	Collected/Weight	05/31/06 11:00 1403 g
% solids	95.7	% solids	95.7	Custody/SAF No	RC-025-011 RC-025

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	0.611	1.8	3.0	400	U	H	-1.89	1.7	3.0	U	-		2.0
Carbon 14	-0.671	2.2	3.8	50	U	C	-2.04	2.2	3.8	U	-		0.9
Potassium 40	23.3	1.2	0.38			GAM	22.5	1.1	0.35		3	34	0.3
Cobalt 60	U		0.058	0.050	U	GAM	U		0.039	U	-		0.5
Cesium 137	U		0.042	0.10	U	GAM	U		0.041	U	-		0
Radium 226	0.865	0.084	0.072	0.10		GAM	0.759	0.085	0.081		13	39	1.0
Radium 228	1.57	0.22	0.19	0.20		GAM	1.37	0.20	0.18		14	44	0.9
Europium 152	U		0.12	0.10	U	GAM	U		0.11	U	-		0.1
Europium 154	U		0.16	0.10	U	GAM	U		0.14	U	-		0.2
Europium 155	U		0.15	0.10	U	GAM	U		0.14	U	-		0.1
Thorium 228	1.21	0.065	0.060			GAM	1.26	0.061	0.056		4	34	0.4
Thorium 232	1.57	0.22	0.19			GAM	1.37	0.20	0.18		14	44	0.9
Uranium 235	U		0.19		U	GAM	U		0.17	U	-		0.2
Uranium 238	U		5.5		U	GAM	U		5.4	U	-		0
Americium 241	U		0.41		U	GAM	U		0.40	U	-		0

100BC Remain.Piplns&Sewers-SoilFullP

QC-DUP#4 57357

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	06/28/06

Date: 27 July 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Remaining Pipelines & Sewers – Soil Full Protocol - Waste Subsite 100-B-14:1
Subject: Wet Chemistry - Data Package No. K0388-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0388 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	Date
J127H4	5/31/06	Soil	C	See note 1
J127H5	5/31/06	Soil	C	See note 1
J127K8	5/31/06	Soil	C	See note 1
J127K9	5/31/06	Soil	C	See note 1
J127L0	5/30/06	Soil	C	See note 1
J127L1	5/30/06	Soil	C	See note 1
J127L2	5/30/06	Soil	C	See note 1
J127L3	5/30/06	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. Qualified Data Summary and 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

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

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

All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

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

- **Completeness**

Data package K0388 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

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

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: K0388	REVIEWER: [illegible]	Project: 100-B-14:1	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

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD																	
Lab: LLI	SDG: K0388																
Sample Number		J127H4		J127H5		J127K8		J127K9		J127L0		J127L1		J127L2		J127L3	
Remarks																	
Sample Date		5/31/06		5/31/06		5/31/06		5/31/06		5/30/06		5/30/06		5/30/06		5/30/06	
Wet Chemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	0.33		0.31		2.6		0.34		0.21	U	0.32		0.21		0.24	

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

000010

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/20/06

CLIENT: TNUHANFORD RC-025 K0388
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0606L194

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J127H4	% Solids	98.1	%	0.01	1.0
		Chromium VI	0.33	MG/KG	0.20	1.0
-002	J127H5	% Solids	98.1	%	0.01	1.0
		Chromium VI	0.31	MG/KG	0.20	1.0
-003	J127K8	% Solids	95.7	%	0.01	1.0
		Chromium VI	2.6	MG/KG	0.21	1.0
-004	J127K9	% Solids	95.2	%	0.01	1.0
		Chromium VI	0.34	MG/KG	0.21	1.0
-005	J127L0	% Solids	96.2	%	0.01	1.0
		Chromium VI	0.21 u	MG/KG	0.21	1.0
-006	J127L1	% Solids	96.2	%	0.01	1.0
		Chromium VI	0.32	MG/KG	0.21	1.0
-007	J127L2	% Solids	97.0	%	0.01	1.0
		Chromium VI	0.21	MG/KG	0.21	1.0
-008	J127L3	% Solids	97.3	%	0.01	1.0
		Chromium VI	0.24	MG/KG	0.20	1.0

7/26/06

6

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-025 K0388
LVL#: 0606L194

W.O.#: 11343-606-001-9999-00
Date Received: 06-02-06

INORGANIC NARRATIVE

1. This narrative covers the analyses of 8 soil samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

   LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvLI 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 LvLI's sample acceptance policy.

5. The method blank for Chromium VI was within the method criteria.

6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.

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

8. The replicate analysis for Percent Solids was within the 20% Relative Percent Difference (RPD) control limit however replicate analysis for Chromium VI was outside the control limit that may be attributed to sample inhomogeneity.

9. Results for solid 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.

for Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

6/26/06
Date

njp\i06-194

The results presented in this report relate to the analytical testing and conditions of the samples upon 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 14 pages.

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-025-011	Page 3 of 26

Collector: C. Martinez / R. Voeks	Company Contact: C. Martinez — Telephone No.: 509-539-2816	Project Coordinator: KESSNER, JH	Price Code: 8D — Data Turnaround: Air Quality ☐ 21 days
Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol	Sampling Location: 100-B-14:1 sz close	SAF No.: RC-025	
Ice Chest No.: ERC-01-030	Field Logbook No.: EL-1585-5 — COA: R10B142000	Method of Shipment: fed ex	
Shipped To: EBERLINE SERVICES ALIONVILLE	Offsite Property No.: A060480	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

none

Special Handling and/or Storage

cool 4 degrees centigrade

Preservation	Cool 4C	None
Type of Container	G/P	G/P
No. of Container(s)	1	1
Volume	125g	125g
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
~~J127H2~~	~~SOIL~~												
~~J127H3~~	~~SOIL~~												
J127H4	SOIL	5/31/06	10:00	✓									
J127H5	SOIL	5/31/06	09:49	✓									
~~J127H6~~	~~SOIL~~												

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: Rob Voeks	Date/Time: 5/31/06 17:27	Received By/Stored In: 3728 Ref 2B	Date/Time: 5/31/06 17:27
Relinquished By/Removed From: 3728 #2B	Date/Time: 6-1-06 1300	Received By/Stored In: [signature]	Date/Time: 6-1-06 1300
Relinquished By/Removed From: [signature] WCH	Date/Time: 6-1-06 1500	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: [signature]	Date/Time: 6-2-06 0920	Received By/Stored In: [signature]	Date/Time: 6-2-06 0920
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

~~RUN C-14 FROM EXCESS MATERIAL IN GEA 1 LITER BOTTLE~~ 05/25/06

~~(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~

Personnel not available to relinquish samples from 3728 Ref # 2B on 6/1/06

Matrix *: S=Soil, SS=Sediment, SO=Solid, St=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solid, DL=Drum Liquid, 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

000014

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-025-011	Page 1 of 26

Collector: C. Martinez / R Voeks	Company Contact: C. Martinez — Telephone No.: 509-539-2816	Project Coordinator: KESSNER, JH	Price Code: 8 D — Data Turnaround: Air Quality ☐ 21 days
Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol	Sampling Location: 100-B-14:1 sz close	SAF No.: RC-025	
Ice Chest No.: ERC-01-030	Field Logbook No.: EL-1585-5 — COA: R10B142000	Method of Shipment: fed ex	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060480	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS
none

Special Handling and/or Storage
cool 4 degrees centigrade

Preservation	Cool 4C	None
Type of Container	G/P	G/P
No. of Container(s)	1	1
Volume	125g	

000015

SAMPLE ANALYSIS

				Chromium Hex - 7196	See item (1) in Special Instructions.								
Sample No.	Matrix *	Sample Date	Sample Time										
~~J127K7~~	~~SOIL~~												
J127K8	SOIL	5-31-06	1012	✓									
J127K9	SOIL	5-31-06	1100	✓									
~~J127L0~~	~~SOIL~~												
~~J127L1~~	~~SOIL~~												

SM 5-31-06

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: Rob Voeks	Date/Time: 5/31/06 17:42	Received By/Stored In: 3728 Ref 2B	Date/Time: 5/31/06 17:42
Relinquished By/Removed From: 3728 #2B	Date/Time: 6-1-06 1300	Received By/Stored In: JR Edmundson	Date/Time: 6-1-06 / 1300
Relinquished By/Removed From: JR Edmundson WCH	Date/Time: 6-1-06 1500	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 6-2-06 0920	Received By/Stored In: [signature]	Date/Time: 6-2-06 0920
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS
~~RUN C-14 FROM EXCESS MATERIAL IN GEA 1-LITER BOTTLE~~
05125106
~~(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~

Personnel not available to Relinquish samples from 3728 Ref # 2B on 6/1/06

Matrix *: S=Soil, SE=Sediment, SO=Solid, St=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

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

BHI-EE-011 (08/29/2005)

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-025-011	Page 1 of 1

Collector C. Martinez / R. Weeks	Company Contact C. Martinez	Telephone No. 509-539-2816	Project Coordinator KESSNER, JH	Price Code 8D	Data Turnaround
Project Designation 100-BC Remaining Pipelines and Sewers - Soil Full Protocol	Sampling Location 100-B-14:1 sz close		SAF No. RC-025	Air Quality ☐ 21 days ☑
Ice Chest No. ERC-01-030	Field Logbook No. EL-1585-5	COA R10B142000	Method of Shipment fed ex	
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060480		Bill of Lading/Air Bill No. See OTPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

none

Special Handling and/or Storage

cool 4 degrees centigrade

Preservation	Cool 4C	None									
Type of Container	G/P	G/P									
No. of Container(s)	1	1									
Volume	125g	1L									
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (7) of Special Instructions									

000016

Sample No.	Matrix *	Sample Date	Sample Time									
512760	SOIL	05/30/06	1244	✓								
512761	SOIL	05/30/06	1420	✓								
512762	SOIL	05/30/06	1442	✓								
512763	SOIL	05/30/06	1444	✓								
	SOIL	05/30/06										

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
J. Weeks / [signature]	5/31/06 17:28	3728 Ref 2B	5/31/06 17:28
3728 #2B	6-1-06 1300	[signature]	6-1-06 1300
[signature]	6-1-06 1500	Fed Ex	
Fed Ex	6-2-06 0920	[signature]	6-2-06 0920

Sign/Print Names

SPECIAL INSTRUCTIONS

RUN ~~C13~~ FROM EXCESS MATERIAL IN GEA 1-LITER BOTTLE

05/25/06

(1) ~~Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]~~

Personnel not available to Relinquish samples from 3728 Ref #2B on 6/1/06

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquid
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

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-B-14:1			DATA PACKAGE: K0388		
VALIDATOR: TLI		LAB: LLI		DATE: 7/21/06	
			SDG: K0388		

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				
J127H4	J127H5	J127K8	J117K9	J127L0
J117L1	J117L2	J117L3		
				Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

Comments:

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FB

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

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

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

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

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

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

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

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

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

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

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

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

Comments: no PA

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

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/20/06

CLIENT: TNUHANFORD RC-025 K0388 LVL LOT #: 0606L194
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	06LVI054-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/20/06

CLIENT: TNUHANFORD RC-025 K0388 LVL LOT #: 0606L194
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-004	J127K9	Soluble Chromium VI	4.1	0.34	4.2	88.5	1.0
		Insoluble Chromium VI	1290	0.34	1180	109.7	100
BLANK10	06LVI054-MB1	Soluble Chromium VI	4.0	0.20u	4.0	99.4	1.0
		Insoluble Chromium VI	1210	0.20u	1110	109.0	100