0070121

SAF-RC-032
100-F Remaining Sites Burial Grounds - Soil Full Protocol
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2) H9-02 mjd 06/01/06
INITIAL/DATE

COMMENTS:

SDG K0224 **SAF-RC-032**

Waste Site: 116-F-8

Date: 24 April 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 116-F-8
Subject: Radiochemistry - Data Package No. K0224-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0224 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
J117M8	2/14/06	Soil	C	See note 1
J117M9	2/14/06	Soil	C	See note 1 & 2
J117N0	2/14/06	Soil	C	See note 1
J117N1	2/14/06	Soil	C	See note 1
J117N2	2/14/06	Soil	C	See note 1

1 – Gamma spectroscopy.
2 - Recounted.

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.

All 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.

Due to RPDs outside QC limits (31% & 33%), all thorium-228 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicates

One set of field duplicates (J117M8/J117N2) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicates were acceptable.

- **Detection Levels**

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

- **Completeness**

Data package No. K0224 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 RPDs outside QC limits (31% & 33%), all thorium-228 results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI 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.

Twenty-five 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 BHI 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

PCB DATA QUALIFICATION SUMMARY*

SDG: K0224	REVIEWER: TLI	Project: 116-F-8 & 116-F-16	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Thorium-228	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

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: EB											
Case	SDG: K0224										
Sample Number		J117M8		J117M9		J117N0		J17N1		J117N2	
Remarks				Recount						Duplicate	
Sample Date		2/14/06		2/14/06		2/14/06		2/14/06		2/14/06	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Potassium-40		9.73		14.4		4.10		13.8		11.3	
Cobalt 60	0.05	U	U*	U	U*	U	U*	U	U*	U	U*
Cesium 137	0.05	U	U*	U	U*	U	U*	U	U*	U	U*
Radium-226		0.350		0.414		0.151		0.408		0.394	
Radium-228		U	U	0.546		U	U	0.700		U	U
Europium 152	0.1	U	U*	U	U*	U	U*	U	U*	U	U*
Europium 154	0.1	U	U*	U	U*	U	U*	U	U*	U	U*
Europium 155	0.1	U	U*	U	U*	U	U*	U	U*	U	U*
Thorium-228		0.666	J	0.506	J	0.399	J	0.401	J	0.744	J
Thorium-232		U	U	0.546		U	U	0.700		U	U
Uranium-235(gea)		U	U	U	U	U	U	U	U	U	U
Uranium-238(gea)		U	U	U	U	U	U	U	U	U	U
Americium-241(gea)		U	U	U	U	U	U	U	U	U	U
Silver-108m		U	U	U	U	U	U	U	U	U	U

000010

* - 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 K0224

R602105-01 J117M8

DATA SHEET

SDG 7388	Client/Case no Hanford		SDG K0224
Contact Melissa C. Mannion	Contract No. 630		
Lab sample id R602105-01	Client sample id J117M8		
Dept sample id 7388-001	Location/Matrix 116-F-8 Overburden		SOLID
Received 02/16/06	Collected/Weight 02/14/06 07:20	649 g	
% solids 97.3	Custody/SAF No RC-032-012	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Potassium 40	13966-00-2	9.73	1.4	1.1			GAM
Cobalt 60	10198-40-0	U		0.10	0.050	U	GAM
Cesium 137	10045-97-3	U		0.11	0.10	U	GAM
Radium 226	13982-63-3	0.350	0.19	0.18	0.10		GAM
Radium 228	15262-20-1	U		0.47	0.20	U	GAM
Europium 152	14683-23-9	U		0.32	0.10	U	GAM
Europium 154	15585-10-1	U		0.34	0.10	U	GAM
Europium 155	14391-16-3	U		0.23	0.10	U	GAM
Thorium 228	14274-82-9	0.666	0.15	0.15		J	GAM
Thorium 232	TH-232	U		0.47		U	GAM
Uranium 235	15117-96-1	U		0.35		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.21		U	GAM
Silver 108m	14391-65-2	U		0.074		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

4/22/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/06/06

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-02 J117M9

DATA SHEET

SDG	7388	Client/Case no	Hanford	SDG K0224	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602105-02	Client sample id	J117M9		
Dept sample id	7388-002	Location/Matrix	116-F-8 Overburden	SOLID	
Received	02/16/06	Collected/Weight	02/14/06 07:35	654 g	
% solids	97.1	Custody/SAF No	RC-032-012	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Potassium 40	13966-00-2	14.4	3.2	0.92			GAM
Cobalt 60	10198-40-0	U		0.093	0.050	U	GAM
Cesium 137	10045-97-3	U		0.083	0.10	U	GAM
Radium 226	13982-63-3	0.414	0.17	0.16	0.10		GAM
Radium 228	15262-20-1	0.546	0.34	0.35	0.20		GAM
Europium 152	14683-23-9	U		0.19	0.10	U	GAM
Europium 154	15585-10-1	U		0.25	0.10	U	GAM
Europium 155	14391-16-3	U		0.23	0.10	U J	GAM
Thorium 228	14274-82-9	0.506	0.10	0.10			GAM
Thorium 232	TH-232	0.546	0.34	0.35			GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		10		U	GAM
Americium 241	14596-10-2	U		0.29		U	GAM
Silver 108m	14391-65-2	U		0.052		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

5/24/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/11/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-03 J117N0

DATA SHEET

SDG	7388	Client/Case no	Hanford SDG K0224
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R602105-03	Client sample id	J117N0
Dept sample id	7388-003	Location/Matrix	116-F-8 Overburden SOLID
Received	02/16/06	Collected/Weight	02/14/06 07:45 622 g
% solids	96.3	Custody/SAF No	RC-032-012 RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Potassium 40	13966-00-2	4.10	2.8	0.60			GAM
Cobalt 60	10198-40-0	U		0.059	0.050	U	GAM
Cesium 137	10045-97-3	U		0.053	0.10	U	GAM
Radium 226	13982-63-3	0.151	0.12	0.11	0.10		GAM
Radium 228	15262-20-1	U		0.45	0.20	U	GAM
Europium 152	14683-23-9	U		0.14	0.10	U	GAM
Europium 154	15585-10-1	U		0.19	0.10	U	GAM
Europium 155	14391-16-3	U		0.16	0.10	U	GAM
Thorium 228	14274-82-9	0.399	0.11	0.093		J	GAM
Thorium 232	TH-232	U		0.45		U	GAM
Uranium 235	15117-96-1	U		0.19		U	GAM
Uranium 238	U-238	U		7.3		U	GAM
Americium 241	14596-10-2	U		0.20		U	GAM
Silver 108m	14391-65-2	U		0.036		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

R 4/22/6

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/06/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-04 J117N1

DATA SHEET

SDG	7388	Client/Case no	Hanford	SDG K0224	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602105-04	Client sample id	J117N1		
Dept sample id	7388-004	Location/Matrix	116-F-8 Overburden	SOLID	
Received	02/16/06	Collected/Weight	02/14/06 07:55	671 g	
% solids	97.8	Custody/SAF No	RC-032-012	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Potassium 40	13966-00-2	13.8	2.9	0.85			GAM
Cobalt 60	10198-40-0	U		0.090	0.050	U	GAM
Cesium 137	10045-97-3	U		0.087	0.10	U	GAM
Radium 226	13982-63-3	0.408	0.19	0.18	0.10		GAM
Radium 228	15262-20-1	0.700	0.37	0.34	0.20		GAM
Europium 152	14683-23-9	U		0.20	0.10	U	GAM
Europium 154	15585-10-1	U		0.30	0.10	U	GAM
Europium 155	14391-16-3	U		0.25	0.10	U	GAM
Thorium 228	14274-82-9	0.401	0.13	0.15		J	GAM
Thorium 232	TH-232	0.700	0.37	0.34			GAM
Uranium 235	15117-96-1	U		0.30		U	GAM
Uranium 238	U-238	U		11		U	GAM
Americium 241	14596-10-2	U		0.31		U	GAM
Silver 108m	14391-65-2	U		0.061		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

4/22/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/06/06

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-05 J117N2

DATA SHEET

SDG	7388	Client/Case no	Hanford	SDG	K0224
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602105-05	Client sample id	J117N2		
Dept sample id	7388-005	Location/Matrix	116-F-8 Overburden		SOLID
Received	02/16/06	Collected/Weight	02/14/06 07:20	633 g	
% solids	97.2	Custody/SAF No	RC-032-012	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Potassium 40	13966-00-2	11.3	1.6	1.0			GAM
Cobalt 60	10198-40-0	U		0.15	0.050	U	GAM
Cesium 137	10045-97-3	U		0.14	0.10	U	GAM
Radium 226	13982-63-3	0.394	0.21	0.22	0.10		GAM
Radium 228	15262-20-1	U		0.63	0.20	U	GAM
Europium 152	14683-23-9	U		0.42	0.10	U	GAM
Europium 154	15585-10-1	U		0.44	0.10	U	GAM
Europium 155	14391-16-3	U		0.29	0.10	U	GAM
Thorium 228	14274-82-9	0.744	0.22	0.20		J	GAM
Thorium 232	TH-232	U		0.63		U	GAM
Uranium 235	15117-96-1	U		0.43		U	GAM
Uranium 238	U-238	U		16		U	GAM
Americium 241	14596-10-2	U		0.27		U	GAM
Silver 108m	14391-65-2	U		0.097		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

4/22/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/06/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0224 was composed of five solid (soil) samples designated under SAF No. RC-032 with a Project Designation of: 100-F Remaining Sites Burial Grounds – Soil Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to WCH via e-mail on March 6, 2006.

2.0 ANALYSIS NOTES

2.1 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

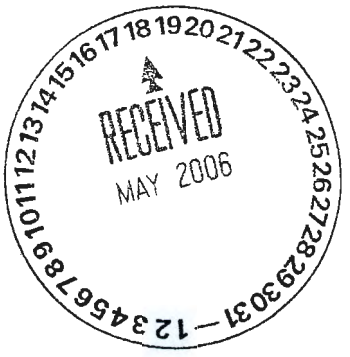
Case Narrative Certification Statement

"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 C. Mannion
Senior Program Manager

3/6/06
Date

EBERLINE
SERVICES



March 6, 2006

Ms. Joan Kessner
Washington Closure Hanford
3190 George Washington Way
MSIN H9-02
Richland, WA 99352

Reference: **P.O. #630**
Eberline Services R6-02-105-7388 & R6-04-197-7388, SDG K0224

Dear Ms. Kessner:

Enclosed is a revised data report for five solid (soil) samples designated under SAF No. RC-032 received at Eberline Services on February 16, 2006. The samples were analyzed according to the accompanying chain-of-custody documents. Results were originally reported o March 6, 2006. At the request of Washington Closure Hanford sample J117M9, the QC LCS, QC blank, and duplicate of sample J117M9 were recounted, recount results are reported herein.

Please call if you have any questions conceming this report.

Sincerely,

Melissa C. Mannion
Senior Program Manager

MCM/njv

Enclosure: Data Package

000017A

Analytical Services
2030 Wright Avenue
P.O. Box 4040
Richmond, California 94804-0040
(510) 235-2633 Fax (510) 235-0438
Toll Free (800) 841-5487
www.eberlineservices.com

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0224 was composed of five solid (soil) samples designated under SAF No. RC-032 with a Project Designation of: 100-F Remaining Sites Burial Grounds – Soil Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to WCH via e-mail on March 6 and 11, 2006.

2.0 ANALYSIS NOTES

2.1 Gamma Spectroscopy

No problems were encountered during the course of the original analyses, or the recounts of the specified samples.

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 — 5/17/6

Melissa C. Mannion
Senior Program Manager

Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-032-012	Page 1 of 1
Collector Coffman/Stankovich	Company Contact R.T. Coffman	Telephone No. 528-6409	Project Coordinator KESSNER, JH	Price Code 8L Data Turnaround
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location 116-F-8 Overburden K0224 (7388)		SAF No. RC-032	Air Quality ☐ 21 days
Ice Chest No. ERC-01-030	Field Logbook No. EFL-1174	COA R116F82000	Method of Shipment FedEx	
Shipped To EBERLINE SERVICES LIONVILLE	Offsite Property No. A060303		Bill of Lading/Air Bill No. See OSRC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

~~at 4 degrees C~~ MD 2/14/06
None

0000018

Preservation	Cool 4C	None									
Type of Container	G/P	G/P									
No. of Container(s)	MD 2/14/06	1									
Volume	160mL	500mL									
SAMPLE ANALYSIS	Chromium Hex 7196	See item (1) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time								
J117M8	SOIL	2-14-06	0720		X						
J117M9	SOIL	2-14-06	0735		X						
J117N0	SOIL	2-14-06	0745		X						
J117N1	SOIL	2-14-06	0755		X						
J117N2	SOIL	2-14-06	0720		X						

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From M Stankovich	Date/Time 2/14/06 1415	Received By/Stored In 3726/2C	Date/Time 2/14/06 1415
Relinquished By/Removed From 3728/2C	Date/Time 2-15-06 / 0845	Received By/Stored In RZ Steffler	Date/Time 2-15-06 0845
Relinquished By/Removed From RZ Steffler	Date/Time w/H 2-15-06 1600	Received By/Stored In Fed Ex	Date/Time
Relinquished By/Removed From Fed Ex	Date/Time	Received By/Stored In Alex Kennedy	Date/Time 2/16/06 10:00
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

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Silver-108 metastable)

Personnel not available to Relinquish samples from 3728
Ref # 2C on 2/15/06

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

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

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 116-F-8 116-F-15			DATA PACKAGE: K0224		
VALIDATOR: TLT		LAB: EB		DATE: 4/22/06	
			SDG: K0224		

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

SAMPLES/MATRIX
J117M8 J117M9 J117N0 J117N1 J117N2
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: 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: _____

_____

_____

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_____

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: _____

_____

_____

_____

_____

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: th -228 -317 J all +339

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 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: 25 over

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-07 Method Blank

METHOD BLANK

SDG	7388	Client/Case no	Hanford SDG K0224
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R602105-07	Client sample id	Method Blank
Dept sample id	7388-007	Material/Matrix	SOLID
		SAF No	RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Potassium 40	13966-00-2	U		1.1		U	GAM
Cobalt 60	10198-40-0	U		0.071	0.050	U	GAM
Cesium 137	10045-97-3	U		0.062	0.10	U	GAM
Radium 226	13982-63-3	U		0.11	0.10	U	GAM
Radium 228	15262-20-1	U		0.27	0.20	U	GAM
Europium 152	14683-23-9	U		0.15	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	U		0.084		U	GAM
Thorium 232	TH-232	U		0.27		U	GAM
Uranium 235	15117-96-1	U		0.23		U	GAM
Uranium 238	U-238	U		7.4		U	GAM
Americium 241	14596-10-2	U		0.23		U	GAM
Silver 108m	14391-65-2	U		0.045		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

QC-BLANK #56182

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/06/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-06 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7388 Client/Case no Hanford SDG K0224

Contact Melissa C. Mannion Contract No. 630

Lab sample id R602105-06 Client sample id Lab Control Sample

Dept sample id 7388-006 Material/Matrix SOLID

SAF No RC-032

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
Cobalt 60	2.84	0.28	0.15	0.050		GAM	2.78	0.11	102	72-128	80-120
Cesium 137	3.02	0.23	0.15	0.10		GAM	2.82	0.11	107	72-128	80-120

100F RemainSitesBurialGrnd-SoilFullP

QC-LCS #56181

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 03/06/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-08 J117N1

DUPLICATE

SDG 7388 Client/Case no Hanford SDG K0224

Contact Melissa C. Mannion Contract No. 630

DUPLICATE		ORIGINAL		
Lab sample id R602105-08	Lab sample id R602105-04	Client sample id J117N1		
Dept sample id 7388-008	Dept sample id 7388-004	Location/Matrix 116-F-8 Overburden	SOLID	
	Received 02/16/06	Collected/Weight 02/14/06 07:55	671 g	
% solids 97.8	% solids 97.8	Custody/SAF No RC-032-012	RC-032	

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
Potassium 40	13.3	1.9	0.81			GAM	13.8	2.9	0.85		4	50	0.2
Cobalt 60	U		0.085	0.050	U	GAM	U		0.090	U	-		0.1
Cesium 137	U		0.094	0.10	U	GAM	U		0.087	U	-		0.1
Radium 226	0.327	0.17	0.19	0.10		GAM	0.408	0.19	0.18		22	109	0.6
Radium 228	0.669	0.36	0.31	0.20		GAM	0.700	0.37	0.34		5	118	0.1
Europium 152	U		0.22	0.10	U	GAM	U		0.20	U	-		0.1
Europium 154	U		0.37	0.10	U	GAM	U		0.30	U	-		0.3
Europium 155	U		0.22	0.10	U	GAM	U		0.25	U	-		0.2
Thorium 228	0.547	0.10	0.12			GAM	0.401	0.13	0.15		31	61	1.5
Thorium 232	0.669	0.36	0.31			GAM	0.700	0.37	0.34		5	118	0.1
Uranium 235	U		0.31		U	GAM	U		0.30	U	-		0
Uranium 238	U		14		U	GAM	U		11	U	-		0.3
Americium 241	U		0.24		U	GAM	U		0.31	U	-		0.4
Silver 108m	U		0.064		U	GAM	U		0.061	U	-		0.1

100F RemainSitesBurialGrnd-SoilFullP

QC-DUP#4 56183

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 03/06/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-07 Method Blank

METHOD BLANK

SDG 7388 Client/Case no Hanford SDG K0224
Contact Melissa C. Mannion Contract No. 630

Lab sample id R602105-07 Client sample id Method Blank
Dept sample id 7388-007 Material/Matrix SOLID
SAF No RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Potassium 40	13966-00-2	U		2.2		U	GAM
Cobalt 60	10198-40-0	U		0.11	0.050	U	GAM
Cesium 137	10045-97-3	U		0.090	0.10	U	GAM
Radium 226	13982-63-3	U		0.28	0.10	U	GAM
Radium 228	15262-20-1	U		0.37	0.20	U	GAM
Europium 152	14683-23-9	U		0.20	0.10	U	GAM
Europium 154	15585-10-1	U		0.27	0.10	U	GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Thorium 228	14274-82-9	U		0.10		U	GAM
Thorium 232	TH-232	U		0.37		U	GAM
Uranium 235	15117-96-1	U		0.25		U	GAM
Uranium 238	U-238	U		10		U	GAM
Americium 241	14596-10-2	U		0.23		U	GAM
Silver 108m	14391-65-2	U		0.058		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

QC-BLANK #56182

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 05/11/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-06 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7388 Client/Case no Hanford SDG K0224

Contact Melissa C. Mannion Contract No. 630

Lab sample id R602105-06 Client sample id Lab Control Sample

Dept sample id 7388-006 Material/Matrix SOLID

SAF No RC-032

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
Cobalt 60	2.73	0.29	0.15	0.050		GAM	2.78	0.11	98	72-128	80-120
Cesium 137	2.91	0.25	0.18	0.10		GAM	2.82	0.11	103	73-127	80-120

100F RemainSitesBurialGrnd-SoilFullP

QC-LCS #56181

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 05/11/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0224

R602105-09 J117M9

DUPLICATE

SDG 7388 Client/Case no Hanford SDG K0224

Contact Melissa C. Mannion Contract No. 630

DUPLICATE		ORIGINAL		
Lab sample id	R602105-09	Lab sample id	R602105-02	Client sample id J117M9
Dept sample id	7388-009	Dept sample id	7388-002	Location/Matrix 116-F-8 Overburden SOLID
		Received	02/16/06	Collected/Weight 02/14/06 07:35 654 g
% solids	97.1	% solids	97.1	Custody/SAF No RC-032-012 RC-032

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
Potassium 40	12.7	1.8	1.0			GAM	14.4	3.2	0.92		13	52	0.7
Cobalt 60	U		0.12	0.050	U	GAM	U		0.093	U	-		0.4
Cesium 137	U		0.10	0.10	U	GAM	U		0.083	U	-		0.3
Radium 226	0.453	0.15	0.15	0.10		GAM	0.414	0.17	0.16		9	85	0.3
Radium 228	0.714	0.32	0.33	0.20		GAM	0.546	0.34	0.35		27	116	0.7
Europium 152	U		0.26	0.10	U	GAM	U		0.19	U	-		0.4
Europium 154	U		0.38	0.10	U	GAM	U		0.25	U	-		0.6
Europium 155	U		0.23	0.10	U	GAM	U		0.23	U	-		0
Thorium 228	0.705	0.15	0.17			GAM	0.506	0.10	0.10		33	55	1.8
Thorium 232	0.714	0.32	0.33			GAM	0.546	0.34	0.35		27	116	0.7
Uranium 235	U		0.34		U	GAM	U		0.29	U	-		0.2
Uranium 238	U		14		U	GAM	U		10	U	-		0.5
Americium 241	U		0.24		U	GAM	U		0.29	U	-		0.3
Silver 108m	U		0.065		U	GAM	U		0.052	U	-		0.3

100F RemainSitesBurialGrnd-SoilFullP

QC-DUP#2 56896

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 05/11/06

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(AUTO)

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Washington Closure Hanford

3190 George Washington Way
Richland, Washington 99354

Phone: (509) 375-9424
Fax: (509) 372-9292

FAX TRANSMISSION COVER SHEET

Date: 5-22-2006

To: Bruce Christian

Fax: 208-723-8944

Re: K0224 Reanalysis for Gamma Spec

Sender: [illegible]

Washington Closure Hanford

3190 George Washington Way
Richland, Washington 99354

Phone: (509) 375-9424
Fax: (509) 372-9292

FAX TRANSMISSION COVER SHEET

Date: 5-22-2006

To: Bruce Christian

Fax: 208-723-8944

Re: K0224 Reanalysis for Gamma Spec

Sender: Jeanette Duncan / Joan Kessner

YOU SHOULD RECEIVE -35- PAGE(S), INCLUDING THIS COVER SHEET. IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL.

Date: 24 April 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 116-F-8
Subject: Wet Chemistry - Data Package No. K0224-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0224 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
J117M8	2/14/06	Soil	C	See note 1
J117M9	2/14/06	Soil	C	See note 1
J117N0	2/14/06	Soil	C	See note 1
J117N1	2/14/06	Soil	C	See note 1
J117N2	2/14/06	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

One set of field duplicates (J117M8/J117N2) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

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

- **Completeness**

Data package K0224 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 BHI 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: K0224	REVIEWER: TLI	PROJECT: 116-F-8 & 116-F-16	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: K0224										
Sample Number		J117M8		J117M9		J117N0		J17N1		J117N2	
Remarks										Duplicate	
Sample Date		2/14/06		2/14/06		2/14/06		2/14/06		2/14/06	
Wet Chemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	0.20	U	0.22		0.21	U	0.22		0.25	

600009

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.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 03/06/06

CLIENT: TNUHANFORD RC-032 K0224 LVL LOT #: 0602L287
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J117M8	% Solids	97.4	%	0.01	1.0
		Chromium VI	0.20 u	MG/KG	0.20	1.0
-002	J117M9	% Solids	97.5	%	0.01	1.0
		Chromium VI	0.22	MG/KG	0.20	1.0
-003	J117N0	% Solids	96.5	%	0.01	1.0
		Chromium VI	0.21 u	MG/KG	0.21	1.0
-004	J117N1	% Solids	98.7	%	0.01	1.0
		Chromium VI	0.22	MG/KG	0.20	1.0
-005	J117N2	% Solids	97.3	%	0.01	1.0
		Chromium VI	0.25	MG/KG	0.21	1.0

2/22/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032 K0224
LVL#: 0602L287

W.O.#: 11343-606-001-9999-00
Date Received: 02-16-06

INORGANIC NARRATIVE

1. This narrative covers the analyses of 5 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.

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 Chromium VI was within the 20% Relative Percent Difference (RPD) control limit.

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.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

3/24/06
Date

njp\i02-287

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-032-012	Page 1 of 1
Collector Coffman/Stankovich	Company Contact R.T. Coffman	Telephone No. 528-6409	Project Coordinator KESSNER, JH	Price Code 8L Air Quality ☐	Data Turnaround C 21 days
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location 116-F-8 Overburden		SAF No. RC-032		
Ice Chest No. AFS-04-054	Field Logbook No. EFL-1174	COA R116F82000	Method of Shipment FedEx		
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060289		Bill of Lading/Air Bill No. See OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

ol 4 degrees C

Preservation	Cool 4C	None										
Type of Container	G/P	G/P										
No. of Container(s)	1	2										
Volume	60mL	500mL										
SAMPLE ANALYSIS	Chromium Hex - 7196	See Req (1) in Special Instructions.										

000013

Sample No.	Matrix *	Sample Date	Sample Time									
J117M8	SOIL	2-14-06	0720	X								
J117M9	SOIL	2-14-06	0735	X								
J117N0	SOIL	2-14-06	0745	X								
J117N1	SOIL	2-14-06	0755	X								
J117N2	SOIL	2-14-06	0720	X								

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From	Date/Time 1415	Received By/Stored In	Date/Time
mcc mstankovich	2/14/06	3728/2C	2/14/06 1415
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time 1100
3728/2C	2-15-06 1100	R2 Stauffer R.J. Stauffer	2-15-06
Relinquished By/Removed From	Date/Time 1600	Received By/Stored In	Date/Time
R2 Stauffer R.J. Stauffer	2-15-06	Fed Ex	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	2-16-06 0915	D Smith	2/16/06 0915
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

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on (Silver-108 metastable}

Personnel not available to Relinquish samples from 3728 Ref # 2C on 2/15/06

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

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

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 116-F-8 116-F-15			DATA PACKAGE: K0224		
VALIDATOR: TLT		LAB: LLI		DATE: 4/22/06	
			SDG: K0224		
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					
J117M8 J117M9 J117N0 J117N1 J117N2					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

_____

_____

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

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

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

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

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

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

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

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

Comments: _____

_____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A
ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Comments: no FB

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

Spike samples analyzed? ..... Yes No N/A
Spike recoveries acceptable? ..... Yes No N/A
Sike standards NIST traceable? (Levels D, E) ..... Yes No N/A
Spike standards expired? (Levels D, E) ..... Yes No N/A
LCS/BSS samples analyzed? ..... Yes No N/A
LCS/BSS results acceptable? ..... Yes No N/A
Standards traceable? (Levels D, E) ..... Yes No N/A
Standards expired? (Levels D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Performance audit sample(s) analyzed? ..... Yes No N/A
Performance audit sample results acceptable? ..... Yes No N/A
Comments: no PAS

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: _____

6. HOLDING TIMES (all levels)

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

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

Comments: _____

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 03/06/06

CLIENT: TNUHANFORD RC-032 K0224 LVL LOT #: 0602L287
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	06LVI012-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 03/06/06

CLIENT: TNUHANFORD RC-032 K0224 LVL LOT #: 0602L287
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J117M8	Soluble Chromium VI	4.3	0.20u	4.1	102.1	1.0
		Insoluble Chromium VI	1210	0.20u	1070	113.4	100
BLANK10	06LVI012-MB1	Soluble Chromium VI	4.0	0.20u	4.0	100.2	1.0
		Insoluble Chromium VI	1110	0.20u	1080	102.5	100

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 03/06/06

CLIENT: TNUHANFORD RC-032 K0224 LVL LOT #: 0602L287

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J117M8	Chromium VI	0.20u	0.20u	NC	1.0