0070028

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 mjp 5/23/06
INITIAL/DATE

COMMENTS:

SDG K0228 **SAF-RC-032**

RECEIVED
JUN 2 2 2006
EDMC

Waste Site: 116-F-16

Date: 1 May 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 & 116-F-16
Subject: Metals - Data Package No. K0228-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0228 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
J118J1	2/15/06	Soil	C	See note 1
J117N8	2/15/06	Soil	C	See note 1
J117N9	2/15/06	Soil	C	See note 1
J117P0	2/15/06	Soil	C	See note 1
J117P1	2/15/06	Soil	C	See note 1
J117P2	2/15/06	Soil	C	See note 1

1 - ICP metals by 6010B (lead).

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 Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

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

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

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

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

All preparation blank results were acceptable.

Field (Equipment) Blank

One equipment blank (J118J1) were submitted for analysis. No analytes were detected in the equipment blank.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

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

All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

Field Duplicate

One sets of field duplicates (J117N8/J117P2) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicates were acceptable.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K0228 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

METALS DATA QUALIFICATION SUMMARY*

SDG: K0228	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: K0228												
Sample Number		J117N8		J117N9		J117P0		J117P1		J117P2		J118J1	
Remarks										Duplicate		E. Blank	
Sample Date		2/15/06		2/15/06		2/15/06		2/15/06		2/15/06		2/15/06	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Lead	5	3.4		5.3		3.5		3.9		3.4		0.30	U

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 03/10/06

CLIENT: TNUKANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J118J1	Lead, Total	0.30 u	MG/KG	0.30	1.0
-002	J117N8	Lead, Total	3.4	MG/KG	0.93	3.0
-003	J117N9	Lead, Total	5.3	MG/KG	0.92	3.0
-004	J117P0	Lead, Total	3.5	MG/KG	0.96	3.0
-005	J117P1	Lead, Total	3.9	MG/KG	0.93	3.0
-006	J117P2	Lead, Total	3.4	MG/KG	0.89	3.0

4/30/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032
LVL#: 0602L300
SDG/SAF#: K0228/RC-032

W.O.#: 11343-606-001-9999-00
Date Received: 02-17-06

METALS CASE NARRATIVE

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

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary. All samples except J118J1 were reported with 3-fold dilutions due to sample matrix.

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

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

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

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

7. The preparation/method blank (MB) was within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

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

9. The laboratory control sample (LCS) was within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. The matrix spike (MS) recovery was within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. The duplicate analysis was within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

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(IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

13. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

3/13/02
Date

jjw/m02-300

LVLI
LIONVILLE LABORATORY INC.

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-014	Page 1 of 1

Collector Coffman/Stankovich	Company Contact R.T. Coffman	Telephone No. 528-6409	Project Coordinator KESSNER, JH
Price Code 8C	Data Turnaround 21 days		
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location 116-F-16 ~~Deep~~ Shallow mo 2-8-06		SAF No. RC-032
Air Quality ☐			
Ice Chest No. ERC-03-103	Field Logbook No. EFL-1174	COA R16F162000	Method of Shipment FedEx
Shipped To EBERLINE SERVICES LIONVILLE	Offsite Property No. A060290		Bill of Lading/Air Bill No. See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	None	None	None					
Type of Container	G/P	G/P	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1					
Volume	250g	60mL	500mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	~~Nickel 63,~~ Strontium-89,90 - Total Sr mo 2/8/06	Isotopic Plutonium					
Sample No.	Matrix *	Sample Date	Sample Time							
J117N8	SOIL	2-15-08	0815	X	X					
J117N9	SOIL	2-15-08	0830	X	X					
J117P0	SOIL	2-15-08	0830	X	X					
J117P1	SOIL	2-15-08	0830	X	X					
J117P2	SOIL	2-15-08	0815	X	X					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 1450	Received By/Stored In	Date/Time
NZ Stankovich	2/15/06	3728/2C	2/15/06 1430
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time 1130
3728/2C	2-16-06 1130	RZ Stoffler R.J. Stoffler	2-16-06
Relinquished By/Removed From	Date/Time 1600	Received By/Stored In	Date/Time
RZ Stoffler R.J. Stoffler	mch 2-16-06	Fed Ex	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	2-17-06 / 0920	D. Johnson	2-17-06 / 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 mo 2/8/06

(1) ICP Metals - 6010 (Client List) (~~Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron~~; Lead, ~~Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc~~); Mercury - 7470 - (CV)

(2) 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 2/16/06

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)

000015

00000012

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-032-022

Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 21 days	Air Quality ☐	
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 116-F-16 Shallow		SAF No.: RC-032
Ice Chest No.: ERC-03-103	Field Logbook No.: EFL-1174	COA: R16F162000	Method of Shipment: Fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060290		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	None	None	None					
Type of Container	G/P	G/P	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1					
Volume	250g	60mL	500mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	Nickel-63, Strontium 89,90 -- Total Sr	Isotopic Plutonium					
Sample No.	Matrix *	Sample Date	Sample Time							
J118J1	SOIL	2-15-06	745	X	X					

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature] instantouch	1430 2/15/06	3728/2C	2/15/06 1450
3728 / 2C	2-16-06 1130	RZ Steffler [signature]	1130 2-16-06
RZ Steffler [signature]	1600 WCH 2-16-06	Fed Ex	
Fed Ex	2.17.06 0920	W Smith	2-17-06 0920

SPECIAL INSTRUCTIONS

NA 2/15/06

(1) ICP Metals - 6010 (Client List) (~~Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron~~, Lead, ~~Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc~~); ~~Mercury - 7470 - (CV)~~

(2) 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 2/16/06

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)

0000016

0000013

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-F-8/14			DATA PACKAGE: K0228		
VALIDATOR: TLJ		LAB: LLI		DATE: 4/28/06	
			SDG: K0228		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J117J1 J117N8 J117N9 J117P0					
J117P1 J117P2					
					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

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

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

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

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

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

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

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

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

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

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

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

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

Comments: no PA

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: _____

6. ICP QUALITY CONTROL (Levels D and E)

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

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

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

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

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

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

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

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

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

Comments: _____

8. HOLDING TIMES (all levels)

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

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 03/10/06

CLIENT: TNUHANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	06L0117-MB1	Lead, Total	0.31 u	MG/KG	0.31	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 03/10/06

CLIENT: TNUHANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	J117N8	Lead, Total	49.9	3.4	49.3	94.3	3.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 03/10/06

CLIENT: TNUHANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-002REP	J117N8	Lead, Total	3.4	4.1	18.7	3.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 03/10/06

CLIENT: TNUHANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	06L0117-LC1	Lead, LCS	238	250	MG/KG	95.1

Date: 1 May 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 & 116-F-16
Subject: Wet Chemistry - Data Package No. K0228-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0228 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
J118J1	2/15/06	Soil	C	See note 1
J117N8	2/15/06	Soil	C	See note 1
J117N9	2/15/06	Soil	C	See note 1
J117P0	2/15/06	Soil	C	See note 1
J117P1	2/15/06	Soil	C	See note 1
J117P2	2/15/06	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
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Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

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

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

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

All holding times were acceptable.

- **Method Blanks**

Method Blanks

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

All method blank results were acceptable.

Field (Equipment) Blank

One field blank (J118J1) was submitted for analysis. No analytes were detected in the field blank.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

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

All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J117N8/J117P2) 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 K0228 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: K0228	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: K0228												
Sample Number		J117N8		J117N9		J117P0		J117P1		J117P2		J118J1	
Remarks										Duplicate		E. Blank	
Sample Date		2/15/06		2/15/06		2/15/06		2/15/06		2/15/06		2/15/06	
Wet Chemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	0.20	U	0.29		0.42		0.28		0.34		0.20	U

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: TNU-HANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J118J1	% Solids	100	%	0.01	1.0
		Chromium VI	0.20 u	MG/KG	0.20	1.0
-002	J117N8	% Solids	95.7	%	0.01	1.0
		Chromium VI	0.29	MG/KG	0.21	1.0
-003	J117N9	% Solids	95.9	%	0.01	1.0
		Chromium VI	0.42	MG/KG	0.21	1.0
-004	J117P0	% Solids	91.4	%	0.01	1.0
		Chromium VI	0.28	MG/KG	0.22	1.0
-005	J117P1	% Solids	94.7	%	0.01	1.0
		Chromium VI	0.34	MG/KG	0.21	1.0
-006	J117P2	% Solids	98.1	%	0.01	1.0
		Chromium VI	0.20 u	MG/KG	0.20	1.0

4/30/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032 K0228
LVL#: 0602L300

W.O.#: 11343-606-001-9999-00
Date Received: 02-17-06

INORGANIC NARRATIVE

1. This narrative covers the analyses of 6 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.

Judy Stm
for Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

3/24/06
Date

njp\i02-300

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-032-014	Page 1 of 1

Collector Coffman/Stankovich	Company Contact R.T. Coffman	Telephone No. 528-6409	Project Coordinator KESSNER, JH
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location 116-F-16 ~~Deep~~ Shallow mo 2-8-06		SAF No. RC-032
Ice Chest No. ERC-03-103	Field Logbook No. EFL-1174	COA R16F162000	Method of Shipment FedEx
Shipped To EBERLINE SERVICES, LIONVILLE	Offsite Property No. A060290		Bill of Lading/Air Bill No. See OSPC

Price Code 8C

Data Turnaround 21 days

Air Quality ☐

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1						
Volume	250g	60mL	500mL	60mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	~~Nickel 263,~~ Strontium 89,90 - Total Sr mo 2/8/06	Isotopic Plutonium						
Sample No.	Matrix *	Sample Date	Sample Time								
J117N8	SOIL	2-15-06	0815	X	X						
J117N9	SOIL	2-15-06	0830	X	X						
J117P0	SOIL	2-15-06	0840	X	X						
J117P1	SOIL	2-15-06	0850	X	X						
J117P2	SOIL	2-15-06	0815	X	X						

000014

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 1430	Received By/Stored In	Date/Time
M.T. Stankovich	2/15/06	3728/2C	2/15/06 1430
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time 1170
3728/2C	2-16-06 1130	RZ Steffler R.J. Steffler	2-16-06
Relinquished By/Removed From	Date/Time 1600	Received By/Stored In	Date/Time
RZ Steffler R.J. Steffler	2-16-06	Fed Ex	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	2.17.06 1092	[illegible]	2.17.06 1092
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

mo 2/8/06

(1) ICP Metals - 6010 (Client List) {~~Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron~~ Lead, ~~Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc~~}, Mercury - 7470 - (CV)

(2) 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 2/16/06

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)

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-022	Page 1 of 1

Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 21 Days	Air Quality ☐	
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 116-F-16 Shallow	SAF No.: RC-032	
Ice Chest No.: ERC-03-103	Field Logbook No.: EFL-1174	COA: R16F162000	Method of Shipment: Fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060290	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1						
Volume	250g	60mL	500mL	60mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	Nickel-63, Strontium 89,90 -- Total Sr	Isotopic Plutonium						
Sample No.	Matrix *	Sample Date	Sample Time								
J118J1	SOIL	2-15-06	745	X	X						

00001

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 1430	Received By/Stored In	Date/Time
[signature]	[signature] 2/15/06	3728/2C	2/15/06 1450
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time 1120
3728 / 2C	2-16-06 1120	RZ Stoffler [signature]	2-16-06
Relinquished By/Removed From	Date/Time 1600 WCH	Received By/Stored In	Date/Time
RZ Stoffler [signature]	2-16-06	Fed Ex	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	2-17-06 / 0920	W J Smith	2-17-06 / 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

wa 2/15/06

(1) ICP Metals - 6010 (Client List) {~~Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium~~, Calcium, Chromium, Cobalt, ~~Copper, Iron~~, Lead, ~~Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium~~, Silicon, Silver, Sodium, Vanadium, ~~Zinc~~}, ~~Mercury - 7470 - (CV)~~

(2) 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 2/16/06

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)

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100F 116-F-8&16			DATA PACKAGE: 4/28/06 K0228		
VALIDATOR: TLT		LAB: LCP		DATE: 4/28/06	
			SDG: K0228		
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					
J117N8	J117N9	J117P0	J117P1	J117P2	J118J1
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

Comments:

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

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

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

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

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

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

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

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

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

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

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

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

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

Comments: 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: TNU-HANFORD RC-032 K0228 LVL LOT #: 0602L300

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: TNU-HANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J118J1	Soluble Chromium VI	4.0	0.20u	4.0	96.4	1.0
		Insoluble Chromium VI	1080	0.20u	979	110.0	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 DUPLICATE SPIKE REPORT 03/06/06

CLIENT: TNU-HANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
-001	J118J1	Chromium VI	96.4	110.0	13.2
BLANK10	06LVI012-MB1	Chromium VI	100.2	102.5	2.3

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 03/06/06

CLIENT: TNU-HANFORD RC-032 K0228 LVL LOT #: 0602L300

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J118J1	Chromium VI	0.20u	0.24	51.2	1.0

Date: 1 May 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 & 116-F-16
Subject: Radiochemistry - Data Package No. K0228-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0228 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
J118J1	2/15/06	Soil	C	See note 1 & 2
J117N8	2/15/06	Soil	C	See note 1
J117N9	2/15/06	Soil	C	See note 1
J117P0	2/15/06	Soil	C	See note 1
J117P1	2/15/06	Soil	C	See note 1
J117P2	2/15/06	Soil	C	See note 1

1 – Gamma spectroscopy, total strontium and alpha spectroscopy (isotopic plutonium).
2 – Nickel-63.

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

One equipment blank (J118J1) was submitted for analysis. Potassium-40 was detected in the equipment blank. Under the WCH statement of work, no qualification is required.

- **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.

All duplicate results were acceptable.

Field Duplicates

One set of field duplicates (J117N8/J117P2) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPD for potassium-40(43%) was outside QC limits. Under the WCH statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Detection Levels**

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

- **Completeness**

Data package No. K0228 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

Thirty 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

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0228	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													
Laboratory: EB													
Case	SDG: K0228												
Sample Number		J117N8		J117N9		J117P0		J117P1		J117P2		J118J1	
Remarks										Duplicate		E. Blank	
Sample Date		2/15/06		2/15/06		2/15/06		2/15/06		2/15/06		2/15/06	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Nickel-63	30	NA		NA		NA		NA		NA		0.035	
Total Strontium	1	-0.032		-0.012		-0.028		-0.016		0.058		-0.014	
Plutonium-238	1	0		-0.065		-0.065		0		0		-0.027	
Plutonium-239/240	1	0		0.065		0		0		0		0.027	
Potassium-40		11.2		9.86		8.41		8.86		17.4		3.65	
Cobalt 60	0.05	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*
Radium-226		U	U	U	U	0.343		U	U	U	U	U	U
Radium-228		U	U	U	U	U	U	U	U	U	U	U	U
Europium 152	0.1	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*
Europium 155	0.1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*
Thorium-228		0.387		0.629		0.472		0.552		0.448		U	U
Thorium-232		U	U	U	U	U	U	U	U	U	U	U	U
Uranium-235(gea)		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
Americium-241(gea)		U	U	U	U	U	U	U	U	U	U	U	U
Silver-108m		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 K0228

R602124-01 J117N8

DATA SHEET

SDG	7390	Client/Case no	Hanford	SDG K0228	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602124-01	Client sample id	J117N8		
Dept sample id	7390-001	Location/Matrix	116-F-16 Shallow	SOLID	
Received	02/17/06	Collected/Weight	02/15/06 08:15	746 g	
% solids	96.8	Custody/SAF No	RC-032-014	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.032	0.14	0.30	1.0	U	SR
Plutonium 238	13981-16-3	0	0.092	0.35	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.092	0.35	1.0	U	PU
Potassium 40	13966-00-2	11.2	7.7	0.72			GAM
Cobalt 60	10198-40-0	U		0.10	0.050	U	GAM
Cesium 137	10045-97-3	U		0.090	0.10	U	GAM
Radium 226	13982-63-3	U		0.21	0.10	U	GAM
Radium 228	15262-20-1	U		0.75	0.20	U	GAM
Europium 152	14683-23-9	U		0.19	0.10	U	GAM
Europium 154	15585-10-1	U		0.28	0.10	U	GAM
Europium 155	14391-16-3	U		0.18	0.10	U	GAM
Thorium 228	14274-82-9	0.387	0.17	0.097			GAM
Thorium 232	TH-232	U		0.75		U	GAM
Uranium 235	15117-96-1	U		0.28		U	GAM
Uranium 238	U-238	U		11		U	GAM
Americium 241	14596-10-2	U		0.27		U	GAM
Silver 108m	14391-65-2	U		0.057		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

4/30/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/14/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0228

R602124-02 J117N9

DATA SHEET

SDG	7390	Client/Case no	Hanford	SDG_K0228	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602124-02	Client sample id	J117N9		
Dept sample id	7390-002	Location/Matrix	116-F-16 Shallow	SOLID	
Received	02/17/06	Collected/Weight	02/15/06 08:30	798 g	
% solids	96.0	Custody/SAF No	RC-032-014	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.012	0.14	0.29	1.0	U	SR
Plutonium 238	13981-16-3	-0.065	0.13	0.50	1.0	U	PU
Plutonium 239/240	PU-239/240	0.065	0.13	0.50	1.0	U	PU
Potassium 40	13966-00-2	9.86	1.3	0.97			GAM
Cobalt 60	10198-40-0	U		0.11	0.050	U	GAM
Cesium 137	10045-97-3	U		0.11	0.10	U	GAM
Radium 226	13982-63-3	U		0.22	0.10	U	GAM
Radium 228	15262-20-1	U		0.46	0.20	U	GAM
Europium 152	14683-23-9	U		0.32	0.10	U	GAM
Europium 154	15585-10-1	U		0.39	0.10	U	GAM
Europium 155	14391-16-3	U		0.26	0.10	U	GAM
Thorium 228	14274-82-9	0.629	0.17	0.16			GAM
Thorium 232	TH-232	U		0.46		U	GAM
Uranium 235	15117-96-1	U		0.39		U	GAM
Uranium 238	U-238	U		14		U	GAM
Americium 241	14596-10-2	U		0.23		U	GAM
Silver 108m	14391-65-2	U		0.079		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

4/30/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/14/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0228

R602124-03 J117P0

DATA SHEET

SDG	7390	Client/Case no	Hanford	SDG K0228	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602124-03	Client sample id	J117P0		
Dept sample id	7390-003	Location/Matrix	116-F-16 Shallow	SOLID	
Received	02/17/06	Collected/Weight	02/15/06 08:40	851 g	
% solids	94.3	Custody/SAF No	RC-032-014	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.028	0.14	0.29	1.0	U	SR
Plutonium 238	13981-16-3	-0.065	0.13	0.50	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.13	0.50	1.0	U	PU
Potassium 40	13966-00-2	8.41	1.6	1.3			GAM
Cobalt 60	10198-40-0	U		0.13	0.050	U	GAM
Cesium 137	10045-97-3	U		0.11	0.10	U	GAM
Radium 226	13982-63-3	0.343	0.18	0.18	0.10		GAM
Radium 228	15262-20-1	U		0.52	0.20	U	GAM
Europium 152	14683-23-9	U		0.32	0.10	U	GAM
Europium 154	15585-10-1	U		0.40	0.10	U	GAM
Europium 155	14391-16-3	U		0.25	0.10	U	GAM
Thorium 228	14274-82-9	0.472	0.14	0.15			GAM
Thorium 232	TH-232	U		0.52		U	GAM
Uranium 235	15117-96-1	U		0.39		U	GAM
Uranium 238	U-238	U		13		U	GAM
Americium 241	14596-10-2	U		0.23		U	GAM
Silver 108m	14391-65-2	U		0.083		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

R 4/30/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/14/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0228

R602124-04 J117P1

DATA SHEET

SDG	7390	Client/Case no	Hanford		SDG K0228
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602124-04	Client sample id	J117P1		
Dept sample id	7390-004	Location/Matrix	116-F-16 Shallow		SOLID
Received	02/17/06	Collected/Weight	02/15/06 08:50	746 g	
% solids	95.1	Custody/SAF No	RC-032-014	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.016	0.16	0.32	1.0	U	SR
Plutonium 238	13981-16-3	0	0.13	0.48	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.13	0.48	1.0	U	PU
Potassium 40	13966-00-2	8.86	1.7	1.3			GAM
Cobalt 60	10198-40-0	U		0.14	0.050	U	GAM
Cesium 137	10045-97-3	U		0.13	0.10	U	GAM
Radium 226	13982-63-3	U		0.50	0.10	U	GAM
Radium 228	15262-20-1	U		0.64	0.20	U	GAM
Europium 152	14683-23-9	U		0.39	0.10	U	GAM
Europium 154	15585-10-1	U		0.44	0.10	U	GAM
Europium 155	14391-16-3	U		0.28	0.10	U	GAM
Thorium 228	14274-82-9	0.552	0.17	0.17			GAM
Thorium 232	TH-232	U		0.64		U	GAM
Uranium 235	15117-96-1	U		0.43		U	GAM
Uranium 238	U-238	U		17		U	GAM
Americium 241	14596-10-2	U		0.27		U	GAM
Silver 108m	14391-65-2	U		0.092		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

4/30/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/14/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0228

R602124-05 J117P2

DATA SHEET

SDG	7390	Client/Case no	Hanford	SDG K0228	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602124-05	Client sample id	J117P2		
Dept sample id	7390-005	Location/Matrix	116-F-16 Shallow	SOLID	
Received	02/17/06	Collected/Weight	02/15/06 08:15	757 g	
% solids	96.8	Custody/SAF No	RC-032-014	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.058	0.18	0.36	1.0	U	SR
Plutonium 238	13981-16-3	0	0.043	0.16	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.043	0.16	1.0	U	PU
Potassium 40	13966-00-2	17.4	3.1	0.84			GAM
Cobalt 60	10198-40-0	U		0.099	0.050	U	GAM
Cesium 137	10045-97-3	U		0.091	0.10	U	GAM
Radium 226	13982-63-3	U		0.48	0.10	U	GAM
Radium 228	15262-20-1	U		1.0	0.20	U	GAM
Europium 152	14683-23-9	U		0.23	0.10	U	GAM
Europium 154	15585-10-1	U		0.30	0.10	U	GAM
Europium 155	14391-16-3	U		0.26	0.10	U	GAM
Thorium 228	14274-82-9	0.448	0.13	0.15			GAM
Thorium 232	TH-232	U		1.0		U	GAM
Uranium 235	15117-96-1	U		0.33		U	GAM
Uranium 238	U-238	U		11		U	GAM
Americium 241	14596-10-2	U		0.32		U	GAM
Silver 108m	14391-65-2	U		0.063		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

4/30/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/14/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0228

R602124-06 J118J1

DATA SHEET

SDG	7390	Client/Case no	Hanford	SDG K0228	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602124-06	Client sample id	J118J1		
Dept sample id	7390-006	Location/Matrix	116-F-16 Shallow	SOLID	
Received	02/17/06	Collected/Weight	02/15/06 07:45	908 g	
% solids	100.0	Custody/SAF No	RC-032-022	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Nickel 63	13981-37-8	0.035	1.8	3.1	30	U	NI_L
Total Strontium	SR-RAD	-0.014	0.16	0.32	1.0	U	SR
Plutonium 238	13981-16-3	-0.027	0.055	0.21	1.0	U	PU
Plutonium 239/240	PU-239/240	0.027	0.055	0.21	1.0	U	PU
Potassium 40	13966-00-2	3.65	1.1	0.60			GAM
Cobalt 60	10198-40-0	U		0.084	0.050	U	GAM
Cesium 137	10045-97-3	U		0.075	0.10	U	GAM
Radium 226	13982-63-3	U		0.37	0.10	U	GAM
Radium 228	15262-20-1	U		0.40	0.20	U	GAM
Europium 152	14683-23-9	U		0.18	0.10	U	GAM
Europium 154	15585-10-1	U		0.24	0.10	U	GAM
Europium 155	14391-16-3	U		0.18	0.10	U	GAM
Thorium 228	14274-82-9	U		0.35		U	GAM
Thorium 232	TH-232	U		0.40		U	GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.19		U	GAM
Silver 108m	14391-65-2	U		0.053		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

4/30/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/14/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0228 was composed of six 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 ere transmitted to WCH via e-mail on March 14, 2006.

2.0 ANALYSIS NOTES

2.1 Nickel-63 Analysis

No problems were encountered during the course of the analyses.

2.1 Total Strontium Analysis

No problems were encountered during the course of the analyses.

2.2 Isotopic Plutonium 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

3/15/06
Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-014	Page 1 of 1

Collector: Coffman/Stankovich	Company Contact: R.T. Coffman; Telephone No.: 528-6409 K0228	Project Coordinator: KESSNER, JH	Price Code: 8L; Data Turnaround
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 116-F-16 ~~Deep~~ Shallow ms 2-8-06 (7390)	SAF No.: RC-032	Air Quality ☐; 21 day
Ice Chest No.: AFS-04-122	Field Logbook No.: EFL-1174; COA: R16F162000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060304	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

< DOT Limits

Special Handling and/or Storage

~~0 + degrees C~~ None

RZS 2-16-06

Preservation	None	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1						
Volume	250g	60mL	500mL	60mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	~~Chromium Hex - 7196~~ ms 2-8-06	See item (2) in Special Instructions.	~~Nickel 63,~~ Strontium-89,90 -- Total Sr ms 2/8/06	Isotopic Plutonium						
Sample No.	Matrix *	Sample Date	Sample Time								
J117N8	SOIL	2-15-06	0815			X	X	X			
J117N9	SOIL	2-15-06	0830			X	X	X			
J117P0	SOIL	2-15-06	0840			X	X	X			
J117P1	SOIL	2-15-06	0850			X	X	X			
J117P2	SOIL	2-15-06	0815			X	X	X			

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CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From: MLK MStankovich	1430 2/15/06	Received By/Stored In: 3725/2C	2/15/06 1430
Relinquished By/Removed From: 3728 / 2C	2-16-06 1030	Received By/Stored In: RZ Steffler RJ Steffler	1030 2-16-06
Relinquished By/Removed From: RZ Steffler RJ Steffler	1600 2-16-06	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: FEDEX		Received By/Stored In: Alex Kellerf	2/17/06 10:00
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

ms 2/8/06

(1) ICP Metals - 6010 (Client List) (~~Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron,~~ Cadmium, Calcium, ~~Chromium, Cobalt, Copper, Iron,~~ Lead, ~~Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc~~); ~~Mercury - 7470 (CV)~~

(2) 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 2/16/06

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-032-022	Page 1 of 1

Collector Coffman/Stankovich	**Company Contact** R.T. Coffman	**Telephone No.** 528-6409	**Project Coordinator** KESSNER, JH
Price Code 8C	**Data Turnaround** 21 days		
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	**Sampling Location** 116-F-16 Shallow K0228 (7390)	**SAF No.** RC-032	**Air Quality** ☐
Ice Chest No. AFS-04-122	**Field Logbook No.** EFL-1174	**COA** R16F162000	**Method of Shipment** Fed Ex
Shipped To EBERLINE SERVICES, LIONVILLE	**Offsite Property No.** A060304	**Bill of Lading/Air Bill No.** See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

~~Cool 4 degrees C~~ R25 2-16-06

None

Preservation	None	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1						
Volume	250g	60mL	500mL	60mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	~~Chromium Hex - 7196~~	See item (2) in Special Instructions.	Nickel-63; Strontium-89,90 -- Total Sr	Isotopic Plutonium						
Sample No. / Matrix * / Sample Date / Sample Time											
J118J1 / SOIL / 2-15-06 / 745			X	X	X						

020000

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
MLL mstankovich	1430 2/15/06	3728/2C	2/15/06 1430
3728/2C	2-16-06 / 1030	RZ Steffler R.J. Steffler	1030 2-16-06
RZ Steffler R.J. Steffler	1600 2-16-06	Fed Ex	
FED EX		Alex Kelly	2/17/06 10:00

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010 (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7470 - (CV)
(2) 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 2/16/06

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-8/16			DATA PACKAGE: 120225		
VALIDATOR: TCT		LAB: EB		DATE: 4/28/06	
			SDG: K0228		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium	Nickel-63		
SAMPLES/MATRIX					
J117N8	J117N9	J117P0	J117P1	J117P2	J117P3
					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: K-40 in 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: _____

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 PAs or FS

K40 – 43% RPD

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: 30 days

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0228

R602124-08 Method Blank

METHOD BLANK

SDG	7390	Client/Case no	Hanford	SDG_K0228	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602124-08	Client sample id	Method Blank		
Dept sample id	7390-008	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
Nickel 63	13981-37-8	-0.532	1.8	3.1	30	U	NI_L
Total Strontium	SR-RAD	-0.042	0.15	0.30	1.0	U	SR
Plutonium 238	13981-16-3	0.115	0.23	0.44	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.11	0.44	1.0	U	PU
Potassium 40	13966-00-2	U		1.3		U	GAM
Cobalt 60	10198-40-0	U		0.062	0.050	U	GAM
Cesium 137	10045-97-3	U		0.067	0.10	U	GAM
Radium 226	13982-63-3	U		0.11	0.10	U	GAM
Radium 228	15262-20-1	U		0.23	0.20	U	GAM
Europium 152	14683-23-9	U		0.12	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		0.090		U	GAM
Thorium 232	TH-232	U		0.23		U	GAM
Uranium 235	15117-96-1	U		0.24		U	GAM
Uranium 238	U-238	U		5.7		U	GAM
Americium 241	14596-10-2	U		0.26		U	GAM
Silver 108m	14391-65-2	U		0.053		U	GAM

100F RemainSitesBurialGrnd-SoilFullP

QC-BLANK #56204

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	03/14/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0228

R602124-07

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7390

Contact Melissa C. Mannion

Client/Case no Hanford SDG K0228

Contract No. 630

Lab sample id R602124-07

Dept sample id 7390-007

Client sample id Lab Control Sample

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
Nickel 63	222	7.1	3.7	30		NI_L	224	9.0	99	83-117	80-120
Total Strontium	9.46	0.56	0.26	1.0		SR	9.84	0.39	96	82-118	80-120
Plutonium 238	23.5	2.5	0.33	1.0		PU	23.8	0.95	99	82-118	80-120
Plutonium 239/240	27.9	2.9	0.23	1.0		PU	26.4	1.1	106	81-119	80-120
Cobalt 60	3.01	0.30	0.12	0.050		GAM	2.76	0.11	109	70-130	80-120
Cesium 137	2.87	0.24	0.17	0.10		GAM	2.80	0.11	102	73-127	80-120

100F RemainSitesBurialGrnd-SoilFullP

QC-LCS #56203

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 03/14/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0228

R602124-09 J118J1

DUPLICATE

SDG	7390			Client/Case no	Hanford SDG K0228
Contact	Melissa C. Mannion			Contract	No. 630
	DUPLICATE		ORIGINAL		
Lab sample id	R602124-09	Lab sample id	R602124-06	Client sample id	J118J1
Dept sample id	7390-009	Dept sample id	7390-006	Location/Matrix	116-F-16 Shallow SOLID
		Received	02/17/06	Collected/Weight	02/15/06 07:45 908 g
% solids	100.0	% solids	100.0	Custody/SAF No	RC-032-022 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
Nickel 63	0.385	1.8	3.0	30	U	NI_L	0.035	1.8	3.1	U	-		0.3
Total Strontium	-0.014	0.12	0.25	1.0	U	SR	-0.014	0.16	0.32	U	-		0
Plutonium 238	0.037	0.15	0.36	1.0	U	PU	-0.027	0.055	0.21	U	-		0.8
Plutonium 239/240	0.075	0.075	0.29	1.0	U	PU	0.027	0.055	0.21	U	-		1.0
Potassium 40	4.15	1.2	0.79			GAM	3.65	1.1	0.60		13	70	0.5
Cobalt 60	U		0.092	0.050	U	GAM	U		0.084	U	-		0.1
Cesium 137	U		0.070	0.10	U	GAM	U		0.075	U	-		0.1
Radium 226	U		0.16	0.10	U	GAM	U		0.37	U	-		1.0
Radium 228	U		0.38	0.20	U	GAM	U		0.40	U	-		0.1
Europium 152	U		0.20	0.10	U	GAM	U		0.18	U	-		0.1
Europium 154	U		0.25	0.10	U	GAM	U		0.24	U	-		0.1
Europium 155	U		0.16	0.10	U	GAM	U		0.18	U	-		0.2
Thorium 228	U		0.20		U	GAM	U		0.35	U	-		0.7
Thorium 232	U		0.38		U	GAM	U		0.40	U	-		0.1
Uranium 235	U		0.25		U	GAM	U		0.29	U	-		0.2
Uranium 238	U		9.2		U	GAM	U		12	U	-		0.4
Americium 241	U		0.19		U	GAM	U		0.19	U	-		0
Silver 108m	U		0.055		U	GAM	U		0.053	U	-		0.1

100F RemainSitesBurialGrnd-SoilFullP

QC-DUP#6 56205

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	03/14/06