0071353

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

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2) H4-21 _____
INITIAL/DATE

COMMENTS:

SDG K0501 SAF-RC-032

Waste Site: 118-F-3

RECEIVED
OCT 24 2006
EDMC

Date: 2 October 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 118-F-3
Subject: Inorganic - Data Package No. K0501-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0501 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
J134V0	8/2/06	Soil	C	See note 1
J134T9	8/2/06	Soil	C	See note 1

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

Data validation was conducted in accordance with the Washington Closure Hanford Incorporated (WCH) validation statement of work and the 100 Area Burial Grounds Remedial Action Sampling and Analysis Plan (DOE/RL-2001-35, December 2001). 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 mercury and 6 months for ICP metals.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "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

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 75% to 125%. 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 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 74% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (58%), all antimony results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (33%), all silicon results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 35%, 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 an RPD outside QC limits (49%), all silicon results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J134T9/J134V0) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPD for silicon (42%) was outside QC limits. Under the WCH statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K0501 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to a matrix spike recovery outside QC limits (58%), all antimony results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits (33%), all silicon results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (49%), all silicon results were qualified as estimates and flagged "J".

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

REFERENCES

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

DOE/RL-2001-35, Rev. 0, *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K0501	REVIEWER: TLI	Project: 118-F-3	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	All	MS recovery
Silicon	J	All	LCS recovery
Silicon	J	All	RPD

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD							
Lab: LLI	SDG: K0501						
Sample Number		J134T9		J134V0			
Remarks				Duplicate			
Sample Date		8/2/06		8/2/06			
Inorganics	RQL	Result	Q	Result	Q	Result	Q
Silver		0.21	U	0.21	U		
Aluminum		4820		4410			
Arsenic	10	2.2		1.8	U		
Boron		0.81		1.2			
Barium	20	52.3		49.0			
Beryllium		0.08		0.10			
Calcium		3790		3700			
Cadmium	0.5	0.21	U	0.21	U		
Cobalt		5.6		5.1			
Chromium	1	8.3		6.8			
Copper		12.0		11.6			
Iron		14700		13500			
Mercury	0.2	0.01	U	0.02	U		
Potassium		914		843			
Magnesium		3340		3150			
Manganese		264		238			
Molybdenum		0.85	U	0.85	U		
Sodium		101		97.7			
Nickel		8.8		8.1			
Lead	10	4.2		3.8			
Antimony		1.3	UJ	1.3	UJ		
Selenium	10	1.4	U	1.4	U		
Silicon		508	J	780	J		
Vanadium		33.0		28.9			
Zinc		37.3		33.5			

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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 08/16/06

LIENT: TNUHANFORD RC-032 K0501 LVL LOT #: 0608L644

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

AMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
002	J134T9	Silver, Total	0.21 u	MG/KG	0.21	3.0
		Aluminum, Total	4820	MG/KG	8.4	3.0
		Arsenic, Total	2.2	MG/KG	1.8	3.0
		Boron, Total	0.81	MG/KG	0.70	3.0
		Barium, Total	52.3	MG/KG	0.06	3.0
		Beryllium, Total	0.08	MG/KG	0.06	3.0
		Calcium, Total	3790	MG/KG	4.8	3.0
		Cadmium, Total	0.21 u	MG/KG	0.21	3.0
		Cobalt, Total	5.6	MG/KG	0.41	3.0
		Chromium, Total	8.3 J	MG/KG	0.38	3.0
		Copper, Total	12.0	MG/KG	0.35	3.0
		Iron, Total	14700	MG/KG	10.2	3.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Potassium, Total	914	MG/KG	6.7	3.0
		Magnesium, Total	3340	MG/KG	2.8	3.0
		Manganese, Total	264	MG/KG	0.09	3.0
		Molybdenum, Total	0.85 u	MG/KG	0.85	3.0
		Sodium, Total	101	MG/KG	2.2	3.0
		Nickel, Total	8.8	MG/KG	0.70	3.0
		Lead, Total	4.2	MG/KG	0.91	3.0
		Antimony, Total	1.3 u J	MG/KG	1.3	3.0
		Selenium, Total	1.4 u	MG/KG	1.4	3.0
		Silicon, Total	508 J	MG/KG	6.7	3.0
		Vanadium, Total	33.0	MG/KG	0.26	3.0
		Zinc, Total	37.3	MG/KG	0.47	3.0

10/1/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 08/16/06

LIENT: TNUHANFORD RC-032 K0501 LVL LOT #: 0608L644

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

AMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
001	J134V0	Silver, Total	0.21	u	MG/KG	0.21	3.0
		Aluminum, Total	4410		MG/KG	8.5	3.0
		Arsenic, Total	1.8	u	MG/KG	1.8	3.0
		Boron, Total	1.2		MG/KG	0.70	3.0
		Barium, Total	49.0		MG/KG	0.06	3.0
		Beryllium, Total	0.10		MG/KG	0.06	3.0
		Calcium, Total	3700		MG/KG	4.8	3.0
		Cadmium, Total	0.21	u	MG/KG	0.21	3.0
		Cobalt, Total	5.1		MG/KG	0.41	3.0
		Chromium, Total	6.8		MG/KG	0.38	3.0
		Copper, Total	11.6		MG/KG	0.35	3.0
		Iron, Total	13500		MG/KG	10.3	3.0
		Mercury, Total	0.02	u	MG/KG	0.02	1.0
		Potassium, Total	843		MG/KG	6.7	3.0
		Magnesium, Total	3150		MG/KG	2.8	3.0
		Manganese, Total	238		MG/KG	0.09	3.0
		Molybdenum, Total	0.85	u	MG/KG	0.85	3.0
		Sodium, Total	97.7		MG/KG	2.2	3.0
		Nickel, Total	8.1		MG/KG	0.70	3.0
		Lead, Total	3.8		MG/KG	0.91	3.0
		Antimony, Total	1.3	uJ	MG/KG	1.3	3.0
		Selenium, Total	1.4	u	MG/KG	1.4	3.0
		Silicon, Total	780	J	MG/KG	6.7	3.0
		Vanadium, Total	28.9		MG/KG	0.26	3.0
		Zinc, Total	33.5		MG/KG	0.47	3.0

10/1/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032
LVL#: 0608L644
SDG/SAF#: K0501/RC-032

W.O.#: 11343-606-001-9999-00
Date Received: 08-04-06

METALS CASE NARRATIVE

The following is a summary of the QC results accompanying the sample results. Lionville Laboratory (LvLI) certifies that all test results meet the requirements of NELAC except as noted below.

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

1. This narrative covers the analyses of 2 soil samples.

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

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

4. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

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

6. All preparation/method blanks (MB) were 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.

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

8. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 32.6%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

9. The matrix spike (MS) recoveries for 5 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

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 19 pages.

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

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J134V0	Aluminum	66,000	96.6
	Iron	66,000	102.2
	Manganese	6,000	97.9
	Antimony	300	97.1
	Silicon	6,300	94.6

11. The duplicate analyses for 8 analytes were outside 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 (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

8/17/02
Date

jjw/m08-644

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround
Coffman	R.T. Coffman	528-6409	KESSNER, JH		

Project Designation	Sampling Location	SAF No.	Air Quality ☐
100-F Remaining Sites Burial Grounds - Soil Full Protocol	118-F-3 Shallow Zone Verification A4-D	RC-032	15 DAY

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
SAW3-114	EFL-1174-1	R118F32000	Fed Ex See OSPC

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
EBERLINE SERVICES (LIONVILLE)	~~SAW3-114~~ A060570	See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

NA

Preservation	None	Cool 4C	None	None	None						
Type of Container	P	aG	P	P	G/P						
No. of Container(s)	1	1	1	1	1						
Volume	250mL RTC 8/2/06	60mL	500mL	120mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.	Nickel-63; Strontium-89,90 – Total Sr	Gross Alpha; Gross Beta						

Sample No.	Matrix *	Sample Date	Sample Time										
J134V0	SOIL	8/2/06	1400	X	X								S-A4D

RTC 8/2/06

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R Coffman / RT Coffman	8/2/06 1730	REFER #3C, 3728	8/2/06 1730
3728/3C	8/3/06 0830	[illegible]	8/3/06 0830
[illegible]	8/3/06 1500	Fed Ex	
Fed Ex	8/4/06 0950	[illegible]	8/4/06 0950

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 - 7471 - (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 # 3C on 8/3/06

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)

000016

7100000007

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround
Coffman	R.T. Coffman	528-6409	KESSNER, JH		

Project Designation	Sampling Location	SAF No.	Air Quality ☐
100-F Remaining Sites Burial Grounds - Soil Full Protocol	118-F-3 Shallow Zone Verification A4	RC-032	15 DAY

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
SAWS-114	EFL-1174-1	R118F32000	Fed Ex

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
EBERLINE SERVICES (LIONVILLE)	A060590	see ospe

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

NA RTC 8/2/06
Cool 4C

Preservation	None	Cool 4C	None	None	None						
Type of Container	P	aG	P	P	G/P						
No. of Container(s)	1	1	1	1	1						
Volume	250~~g~~mL RTC 8/2/06	60mL	500mL	120mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.	Nickel-63; Strontium-89,90 -- Total Sr	Gross Alpha; Gross Beta						
Sample No.	Matrix *	Sample Date	Sample Time								
J134T9	SOIL	8/2/06	1400	X	X		RTC 8/2/06				S-A4

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CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From: RT COFFMAN / RT Coffman	8/2/06 1730	Received By/Stored In: REFER #3C, 3728	8/2/06 1730
Relinquished By/Removed From: 3728/3C	8/3/06 0830	Received By/Stored In: MStankovich	8/3/06 0830
Relinquished By/Removed From: well MStankovich	8/3/06 1300	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: Fed Ex	8/4/06 0950	Received By/Stored In: [signature]	8/4/06 0950
Relinquished By/Removed From:		Received By/Stored In:	
Relinquished By/Removed From:		Received By/Stored In:	

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 - 7471 - (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 # 3C on 8/3/06

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)

0000018

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	118-F-1		DATA PACKAGE:	K0501	
VALIDATOR:	TLI	LAB: LLI		DATE: 10/1/06	
			SDG:	K0501	

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

SAMPLES/MATRIX
J134T9 J134V0
Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FD

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

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

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

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

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

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

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

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

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

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

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

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

Comments: MS - antimony -57.9% - J all no PAS
LCS - Silicon 32.6% - J all

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: ~~Chromium - 33.1% - J~~ 10/2/04
Silicon - 49.3% - J
FB - Silicon - 42%

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 08/16/06

CLIENT: TNUHANFORD RC-032 K0501 LVL LOT #: 0608L644

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	06L0498-MB1	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	2.4 u	MG/KG	2.4	1.0
		Arsenic, Total	0.61 u	MG/KG	0.61	1.0
		Boron, Total	0.24 u	MG/KG	0.24	1.0
		Barium, Total	0.02	MG/KG	0.02	1.0
		Beryllium, Total	0.02 u	MG/KG	0.02	1.0
		Calcium, Total	2.2 u	MG/KG	2.2	1.0
		Cadmium, Total	0.07 u	MG/KG	0.07	1.0
		Cobalt, Total	0.14 u	MG/KG	0.14	1.0
		Chromium, Total	0.13 u	MG/KG	0.13	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		Iron, Total	3.0	MG/KG	0.54	1.0
		Potassium, Total	77.1 u	MG/KG	77.1	1.0
		Magnesium, Total	3.9 u	MG/KG	3.9	1.0
		Manganese, Total	0.03 u	MG/KG	0.03	1.0
		Molybdenum, Total	0.29 u	MG/KG	0.29	1.0
		Sodium, Total	2.5 u	MG/KG	2.5	1.0
		Nickel, Total	0.24 u	MG/KG	0.24	1.0
		Lead, Total	0.31 u	MG/KG	0.31	1.0
		Antimony, Total	0.44 u	MG/KG	0.44	1.0
		Selenium, Total	0.47 u	MG/KG	0.47	1.0
		Silicon, Total	2.3 u	MG/KG	2.3	1.0
		Vanadium, Total	0.09 u	MG/KG	0.09	1.0
		Zinc, Total	0.16 u	MG/KG	0.16	1.0
BLANK1	06C0154-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 08/16/06

CLIENT: TNUHANFORD RC-032.K0501 LVL LOT #: 0608L644

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J134V0	Silver, Total	4.7	0.21u	4.9	95.9	3.0
		Aluminum, Total	6290	4410	196	960.1*	3.0
		Arsenic, Total	185	1.8 u	196	94.6	3.0
		Boron, Total	90.2	1.2	97.9	90.9	3.0
		Barium, Total	243	49.0	196	99.2	3.0
		Beryllium, Total	4.7	0.10	4.9	93.8	3.0
		Calcium, Total	6150	3700	2450	100.2	3.0
		Cadmium, Total	4.8	0.21u	4.9	98.0	3.0
		Cobalt, Total	52.9	5.1	48.9	97.8	3.0
		Chromium, Total	28.0	6.8	19.6	108.2	3.0
		Copper, Total	36.3	11.6	24.5	100.8	3.0
		Iron, Total	16400	13500	97.9	2986 *	3.0
		Mercury, Total	0.16	0.02u	0.15	110.9	1.0
		Potassium, Total	3240	843	2450	98.0	3.0
		Magnesium, Total	6060	3150	2450	119.1	3.0
		Manganese, Total	329	238	48.9	185.7*	3.0
		Molybdenum, Total	92.9	0.85u	97.9	94.9	3.0
		Sodium, Total	2410	97.7	2450	94.6	3.0
		Nickel, Total	57.8	8.1	48.9	101.6	3.0
		Lead, Total	50.0	3.8	48.9	94.5	3.0
		Antimony, Total	28.3	1.3 u	48.9	57.9	3.0
		Selenium, Total	182	1.4 u	196	93.1	3.0
		Silicon, Total	662	780	97.9	-120. *	3.0
		Vanadium, Total	85.2	28.9	48.9	115.1	3.0
		Zinc, Total	85.2	33.5	48.9	105.7	3.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 08/16/06

CLIENT: TNUHANFORD RC-032 K0501 LVL LOT #: 0608L644

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J134V0	Silver, Total	0.21u	0.21u	NC	3.0
		Aluminum, Total	4410	5650	24.6	3.0
		Arsenic, Total	1.8 u	2.1	~~NC~~ 200	3.0
		Boron, Total	1.2	0.70u	~~NC~~ 200	3.0
		Barium, Total	49.0	53.8	9.3	3.0
		Beryllium, Total	0.10	0.10	0.00	3.0
		Calcium, Total	3700	3900	5.2	3.0
		Cadmium, Total	0.21u	0.21u	NC	3.0
		Cobalt, Total	5.1	6.2	19.5	3.0
		Chromium, Total	6.8	9.5	33.1	3.0
		Copper, Total	11.6	13.3	13.7	3.0
		Iron, Total	13500	17700	26.9	3.0
		Mercury, Total	0.02u	0.01u	NC	1.0
		Potassium, Total	843	998	16.9	3.0
		Magnesium, Total	3150	3660	14.9	3.0
		Manganese, Total	238	285	17.8	3.0
		Molybdenum, Total	0.85u	0.85u	NC	3.0
		Sodium, Total	97.7	109	10.7	3.0
		Nickel, Total	8.1	10.2	23.0	3.0
		Lead, Total	3.8	4.3	12.3	3.0
		Antimony, Total	1.3 u	1.3 u	NC	3.0
		Selenium, Total	1.4 u	1.4 u	NC	3.0
		Silicon, Total	780	472	49.3	3.0
		Vanadium, Total	28.9	38.8	29.2	3.0
		Zinc, Total	33.5	40.3	18.4	3.0

corrected values MW 8/16/06

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 08/16/06

CLIENT: TNUHANFORD RC-032 K0501 LVL LOT #: 0608L644

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	06L0498-LC1	Silver, LCS	49.5	50.0	MG/KG	99.0
		Aluminum, LCS	448	500	MG/KG	89.5
		Arsenic, LCS	957	1000	MG/KG	95.7
		Boron, LCS	476	500	MG/KG	95.2
		Barium, LCS	495	500	MG/KG	99.0
		Beryllium, LCS	23.8	25.0	MG/KG	95.2
		Calcium, LCS	2230	2500	MG/KG	89.1
		Cadmium, LCS	24.4	25.0	MG/KG	97.6
		Cobalt, LCS	248	250	MG/KG	99.0
		Chromium, LCS	50.2	50.0	MG/KG	100.4
		Copper, LCS	124	125	MG/KG	99.0
		Iron, LCS	463	500	MG/KG	92.6
		Potassium, LCS	2190	2500	MG/KG	87.5
		Magnesium, LCS	2220	2500	MG/KG	88.6
		Manganese, LCS	75.4	75.0	MG/KG	100.5
		Molybdenum, LCS	499	500	MG/KG	99.8
		Sodium, LCS	2310	2500	MG/KG	92.5
		Nickel, LCS	198	200	MG/KG	98.9
		Lead, LCS	245	250	MG/KG	98.1
		Antimony, LCS	289	300	MG/KG	96.4
		Selenium, LCS	922	1000	MG/KG	92.2
		Silicon, LCS	163	500	MG/KG	32.6
		Vanadium, LCS	250	250	MG/KG	99.8
		Zinc, LCS	96.4	100	MG/KG	96.4
LCS1	06C0154-LC1	Mercury, LCS	2.9	2.8	MG/KG	103.1

Date: 2 October 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 118-F-3
Subject: Radiochemistry - Data Package No. K0501-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0501 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
J134V0	8/2/06	Soil	C	See note 1
J134T9	8/2/06	Soil	C	See note 1

1 – Gamma spectroscopy, gross alpha, gross beta, nickel-63, total strontium.

Data validation was conducted in accordance with the Washington Closure Hanford Incorporated (WCH) validation statement of work and the 100 Area Burial Grounds Remedial Action Sampling and Analysis Plan (DOE/RL-2001-35, December 2001). 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 65-135%. 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 35%, 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 (J134T9/J134V0) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPDs for potassium-40 (30.1%), thorium-228 (46%) and thorium-232 (55%) were 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. Five analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0501 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

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-2001-35, Rev. 0, *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0501	REVIEWER: TLI	Project: 118-F-3	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: K0501				
Sample Number		J134T9		J134V0	
Remarks				Duplicate	
Sample Date		8/2/06		8/2/06	
Radiochemistry	RQL	Result	Q	Result	Q
Gross alpha		2.82	U	12.4	
Gross beta		16.1		17.6	
Nickel-63	30	4.21		2.06	U
Total strontium	1	0.276	U	-0.045	U
Potassium-40		11.7		8.64	
Cobalt 60	0.05	U	U*	U	U*
Cesium 137	0.1	U	U*	0.094	
Radium-226		0.279		0.340	
Radium-228		0.833		0.473	
Europium 152	0.2	U	U	U	U
Europium 154	0.2	U	U*	U	U*
Europium 155		U	U	U	U
Thorium-228		0.255		0.407	
Thorium-232		0.833		0.473	
Uranium-235(gea)		U	U	U	U
Uranium-238(gea)		U	U	U	U
Silver-108m	0.1	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 K0501

7847-001 J134T9

DATA SHEET

SDG	7847	Client/Case no	Hanford SDG K0501
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R608021-01	Client sample id	J134T9
Dept sample id	7847-001	Location/Matrix	118-F-3 Shallow Zn.Verif SOLID
Received	08/03/06	Collected/Weight	08/02/06 14:00 1022 g
% solids	97.9	Custody/SAF No	RC-032-046 RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	2.82	2.8	4.0	10	U	93A
Gross Beta	12587-47-2	16.1	5.2	7.6	15		93B
Nickel 63	13981-37-8	4.21	2.0	3.2	30		NI_L
Total Strontium	SR-RAD	0.276	0.25	0.44	1.0	U	SR
Potassium 40	13966-00-2	11.7	2.1	1.2			GAM
Cobalt 60	10198-40-0	U		0.14	0.050	U	GAM
Cesium 137	10045-97-3	U		0.11	0.10	U	GAM
Radium 226	13982-63-3	0.279	0.17	0.19	0.10		GAM
Radium 228	15262-20-1	0.833	0.71	0.62	0.20		GAM
Europium 152	14683-23-9	U		0.18	0.10	U	GAM
Europium 154	15585-10-1	U		0.45	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.255	0.090	0.093			GAM
Thorium 232	TH-232	0.833	0.71	0.62			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		16		U	GAM
Americium 241	14596-10-2	U		0.11		U	GAM
Silver 108m	14391-65-2	U		0.061		U	GAM

100-F RemainSitesBurialGrnds-Soil FP

10/1/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/23/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0501

7847-002 J134V0

DATA SHEET

SDG	7847	Client/Case no	Hanford SDG K0501
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R608021-02	Client sample id	J134V0
Dept sample id	7847-002	Location/Matrix	118-F-3 Shallow Zn.Verif SOLID
Received	08/03/06	Collected/Weight	08/02/06 14:00 854 g
% solids	97.3	Custody/SAF No	RC-032-047 RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	12.4	5.0	5.3	10		93A
Gross Beta	12587-47-2	17.6	4.5	5.8	15		93B
Nickel 63	13981-37-8	2.06	2.0	3.3	30	U	NI_L
Total Strontium	SR-RAD	-0.045	0.18	0.39	1.0	U	SR
Potassium 40	13966-00-2	8.64	2.6	0.78			GAM
Cobalt 60	10198-40-0	U		0.093	0.050	U	GAM
Cesium 137	10045-97-3	0.094	0.063	0.069	0.10		GAM
Radium 226	13982-63-3	0.340	0.14	0.14	0.10		GAM
Radium 228	15262-20-1	0.473	0.34	0.34	0.20		GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.23	0.10	U	GAM
Europium 155	14391-16-3	U		0.20	0.10	U	GAM
Thorium 228	14274-82-9	0.407	0.084	0.083			GAM
Thorium 232	TH-232	0.473	0.34	0.34			GAM
Uranium 235	15117-96-1	U		0.27		U	GAM
Uranium 238	U-238	U		8.8		U	GAM
Americium 241	14596-10-2	U		0.25		U	GAM
Silver 108m	14391-65-2	U		0.048		U	GAM

100-F RemainSitesBurialGrnds-Soil FP

10/1/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/23/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0501 was composed of two 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 August 23, 2006.

2.0 ANALYSIS NOTES

2.1 Gross Alpha/Gross Beta Analysis

No problems were encountered during the course of the analyses.

2.2 Nickel-63 Analysis

No problems were encountered during the course of the analyses.

2.3 Total Strontium Analysis

No problems were encountered during the course of the analyses.

2.4 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

3.0 Case Narrative Certification Statement

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

Mel Mannion — 8/24/06

Melissa C. Mannion
Senior Program Manager

Date

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409 K0501	Project Coordinator: KESSNER, JH
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 118-F-3 Shallow Zone Verification (7847)		SAF No.: RC-032
Ice Chest No.: SAWS-107	Field Logbook No.: EFL-1174-1	COA: R118F32000	Method of Shipment: Fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060573		Bill of Lading/Air Bill No.: See OSPC

Price Code: Air Quality ☐

Data Turnaround: 15 DAY

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

~~NA~~ RTC 8/2/06
Cool 4C

SAMPLE ANALYSIS												
Preservation				None	Cool 4C	None	None	None				
Type of Container				P	aG	P	P	G/P				
No. of Container(s)				1	1	1	1	1				
Volume				250g	60mL	500mL	120mL	60mL				
				See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.	Nickel-63; Strontium-89,90 -- Total Sr	Gross Alpha; Gross Beta				
Sample No.	Matrix *	Sample Date	Sample Time									
J134T9	SOIL	8/2/06	1400			X	X	X				

8/3/06 RTC

0000015

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: RT COFFMAN / RT Coffman	8/2/06 1730	Received By/Stored In: REFER # 3C, 3728	8/2/06 1730
Relinquished By/Removed From: 3728/3C	8/3/06 0800	Received By/Stored In: MEH MSHumbarch	8/3/06 0800
Relinquished By/Removed From: MEH MSHumbarch	8/3/06 1500	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: FED EX		Received By/Stored In: KMJ	08/04/06 9:30
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

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 - 7471 - (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 # 3C on 8/2/06

Matrix *
S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wt=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-032-047	Page 1 of 1

Collector Coffman	Company Contact R.T. Coffman	Telephone No. 528-6409 K0501	Project Coordinator KESSNER, JH
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location 118-F-3 Shallow Zone Verification (7847)		SAF No. RC-032
Ice Chest No. SAWS-107	Field Logbook No. EFL-1174-1	COA R118F32000	Method of Shipment Fed Ex
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060573		Bill of Lading/Air Bill No. See OSPC

Price Code: Air Quality ☐

Data Turnaround: 15 DAY

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

NA

000016

			Preservation	None	Cool 4C	None	None	None				
			Type of Container	P	aG	P	P	G/P				
			No. of Container(s)	1	1	1	1	1				
			Volume	250g	60mL	500mL	120mL	60mL				
			SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.	Nickel-63; Strontium-89,90 -- Total Sr	Gross Alpha; Gross Beta				
Sample No.	Matrix *	Sample Date	Sample Time									
J134V0	SOIL	8/2/06	1400			X	X	X				

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From R COFFMAN / RT Coffman	Date/Time 1730 8/2/06	Received By/Stored In REFER #3C, 3728	Date/Time 1730 8/2/06
Relinquished By/Removed From 3728/3C	Date/Time 8/3/06 0800	Received By/Stored In MSTankovich	Date/Time 8/3/06 0800
Relinquished By/Removed From WCH MStankovich	Date/Time 8/3/06	Received By/Stored In Fed Ex	Date/Time
Relinquished By/Removed From FED EX	Date/Time	Received By/Stored In FM	Date/Time 08/04/06 9:20
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) 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 - 7471 - (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 # 3C on 8/3/06

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:	118-F-3		DATA PACKAGE:	K0501	
VALIDATOR:	JLJ	LAB: FD		DATE: 10/11/06	
			SDG:	K0501	
ANALYSES PERFORMED					
Gross Alpha/Beta Total Uranium	Strontium-90 Radium-22	Technetium-99 Tritium	Alpha Spectroscopy Ni-63	Gamma Spectroscopy	
SAMPLES/MATRIX					
J134T9	J134U0				
					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: _____

_____

_____

_____

_____

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: FD no FS or PAS

K-40 - 30.1%

th-228 4.1%

th-232 55%

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: 5 over

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0501

7847-004 Method Blank

METHOD BLANK

SDG	7847	Client/Case no	Hanford SDG K0501
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R608021-04	Client sample id	Method Blank
Dept sample id	7847-004	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
Gross Alpha	12587-46-1	-0.149	1.7	3.9	10	U	93A
Gross Beta	12587-47-2	-0.561	3.7	6.4	15	U	93B
Nickel 63	13981-37-8	0.998	1.7	2.8	30	U	NI_L
Total Strontium	SR-RAD	-0.149	0.14	0.31	1.0	U	SR
Potassium 40	13966-00-2	U		1.8		U	GAM
Cobalt 60	10198-40-0	U		0.075	0.050	U	GAM
Cesium 137	10045-97-3	U		0.071	0.10	U	GAM
Radium 226	13982-63-3	U		0.22	0.10	U	GAM
Radium 228	15262-20-1	U		0.29	0.20	U	GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.19	0.10	U	GAM
Europium 155	14391-16-3	U		0.18	0.10	U	GAM
Thorium 228	14274-82-9	U		0.087		U	GAM
Thorium 232	TH-232	U		0.29		U	GAM
Uranium 235	15117-96-1	U		0.25		U	GAM
Uranium 238	U-238	U		7.4		U	GAM
Americium 241	14596-10-2	U		0.20		U	GAM
Silver 108m	14391-65-2	U		0.043		U	GAM

100-F RemainSitesBurialGrnds-Soil FP

QC-BLANK #58092

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/23/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0501

7847-003

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7847
Contact Melissa C. Mannion

Client/Case no Hanford SDG K0501
Contract No. 630

Lab sample id R608021-03
Dept sample id 7847-003

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
Gross Alpha	73.1	11	5.6	10		93A	102	4.1	72	72-128	70-130
Gross Beta	103	7.7	5.7	15		93B	97.3	3.9	106	73-127	70-130
Nickel 63	212	6.8	3.6	30		NI_L	224	9.0	95	84-116	80-120
Total Strontium	10.6	0.65	0.30	1.0		SR	9.73	0.39	109	80-120	80-120
Cobalt 60	1.05	0.13	0.069	0.050		GAM	1.07	0.043	98	71-129	80-120
Cesium 137	1.19	0.12	0.087	0.10		GAM	1.14	0.046	104	71-129	80-120

100-F RemainSitesBurialGrnds-Soil FP

QC-LCS #58091

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 08/23/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0501

7847-005 J134T9

DUPLICATE

SDG	7847			Client/Case no	Hanford SDG K0501
Contact	Melissa C. Mannion			Contract	No. 630
	DUPLICATE		ORIGINAL		
b sample id	R608021-05	Lab sample id	R608021-01	Client sample id	J134T9
t sample id	7847-005	Dept sample id	7847-001	Location/Matrix	118-F-3 Shallow Zn.Verif SOLID
		Received	08/03/06	Collected/Weight	08/02/06 14:00 1022 g
% solids	97.9	% solids	97.9	Custody/SAF No	RC-032-046 RC-032

LYTE	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
·ss Alpha	7.32	3.8	4.2	10		93A	2.82	2.8	4.0	U	89	147	1.8
·ss Beta	16.9	4.1	5.3	15		93B	16.1	5.2	7.6		5	68	0.2
·kel 63	2.82	2.0	3.2	30	U	NI_L	4.21	2.0	3.2		40	123	1.0
.al Strontium	-0.213	0.17	0.38	1.0	U	SR	0.276	0.25	0.44	U	-		3.2
.assium 40	10.7	1.0	0.71			GAM	11.7	2.1	1.2		9	45	0.6
·alt 60	U		0.068	0.050	U	GAM	U		0.14	U	-		0.9
·ium 137	U		0.051	0.10	U	GAM	U		0.11	U	-		1.0
lium 226	0.310	0.090	0.096	0.10		GAM	0.279	0.17	0.19		11	103	0.3
lium 228	0.685	0.26	0.26	0.20		GAM	0.833	0.71	0.62		20	153	0.4
·opium 152	U		0.085	0.10	U	GAM	U		0.18	U	-		0.9
·opium 154	U		0.19	0.10	U	GAM	U		0.45	U	-		1.1
·opium 155	U		0.051	0.10	U	GAM	U		0.11	U	-		1.0
·rium 228	0.277	0.037	0.036			GAM	0.255	0.090	0.093		8	63	0.4
·rium 232	0.685	0.26	0.26			GAM	0.833	0.71	0.62		20	153	0.4
·nium 235	U		0.078		U	GAM	U		0.17	U	-		1.0
·nium 238	U		7.1		U	GAM	U		16	U	-		1.0
·ricium 241	U		0.049		U	GAM	U		0.11	U	-		1.0
.ver 108m	U		0.023		U	GAM	U		0.061	U	-		1.2

)-F RemainSitesBurialGrnds-Soil FP

·DUP#1 58093

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	08/23/06

Date: 2 October 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 118-F-3
Subject: PCB - Data Package No. K0501-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0501 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
J134V0	8/2/06	Soil	C	See note 1
J134T9	8/2/06	Soil	C	See note 1

1 – PCBs by 8082.

Data validation was conducted in accordance with the Washington Closure Hanford Incorporated (WCH) validation statement of work and the 100 Area Burial Grounds Remedial Action Sampling and Analysis Plan (DOE/RL-2001-35, December 2001). Appendices 1 through 5 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

DATA QUALITY OBJECTIVES

- **Holding Times**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less 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 detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blank**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & 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%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows

have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J134T9/J134V0) 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 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All analytes in sample J134V0 exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data Package No. K0501 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

All analytes in sample J134V0 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-2001-35, Rev. 0, *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein 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 quantitation limit is an estimate.

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

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

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

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

Appendix 2

Summary of Data Qualification

PCB DATA QUALIFICATION SUMMARY*

SDG: K0501	REVIEWER: TLI	Project: 118-F-3	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

PCB ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD					
Laboratory: LLI	SDG: K0501				
Sample Number		J134T9		J134V0	
Remarks				Duplicate	
Sample Date		8/2/06		8/2/06	
Extraction Date		8/8/06		8/8/06	
Analysis Date		8/16/06		8/17/06	
PCB	RQL	Result	Q	Result	Q
Aroclor-1016	16.5	14	U	21	U
Aroclor-1221	16.5	14	U	21	U
Aroclor-1232	16.5	14	U	21	U
Aroclor-1242	16.5	14	U	21	U
Aroclor-1248	16.5	14	U	21	U
Aroclor-1254	16.5	14	U	21	U
Aroclor-1260	16.5	14	U	21	U

000010

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.

000000005

	Cust ID:	J134V0	J134V0	J134V0	J134T9	PBLKNB	PBLKNB BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	06LE0642-MB1	06LE0642-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	110 %	103 %	107 %	107 %	101 %	108 %
	Decachlorobiphenyl	103 %	95 %	96 %	95 %	96 %	101 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		21 U	93 %	95 %	14 U	13 U	102 %
Aroclor-1221		21 U	21 U	21 U	14 U	13 U	13 U
Aroclor-1232		21 U	21 U	21 U	14 U	13 U	13 U
Aroclor-1242		21 U	21 U	21 U	14 U	13 U	13 U
Aroclor-1248		21 U	21 U	21 U	14 U	13 U	13 U
Aroclor-1254		21 U	21 U	21 U	14 U	13 U	13 U
Aroclor-1260		21 U	91 %	93 %	14 U	13 U	102 %

000011

R 10/1/06

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0608L644
SDG/SAF # K0501/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 07-27-2006

PCB

Two (2) soil samples were collected on 08-02-2006.

The samples and their associated QC samples were extracted on 08-08-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 08-16,17-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

1. All samples were extracted and analyzed within required holding time.

2. The sample results were reported on a wet-weight basis.

3. The samples and their associated QC samples received Copper-Sulfur and Sulfuric Acid cleanups according to Lionville Laboratory SOPs based on SW846 methods 3660A and 3665A respectively.

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

5. All obtainable surrogate recoveries were within acceptance criteria.

6. The blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

8. The initial calibrations associated with this data set were within acceptance criteria.

9. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 10 pages.

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10. 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.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

8/18/06
Date

kim\r:\group\data\pest\tmu hanford\0608-644pcbs

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround
Coffman	R.T. Coffman	528-6409	KESSNER, JH		

Project Designation	Sampling Location	SAF No.	Air Quality ☐
100-F Remaining Sites Burial Grounds - Soil Full Protocol	118-F-3 Shallow Zone Verification A4-D	RC-032	15 DDY

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
SAW3-114	EFL-1174-1	R118F32000	Fed Ex See ospc

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
EBERLINE SERVICES (LIONVILLE)	~~SAW3-114~~ A060580	See ospc

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

NA

Preservation	None	Cool 4C	None	None	None						
Type of Container	P	aG	P	P	G/P						
No. of Container(s)	1	1	1	1	1						
Volume	250mL RTC 8/2/06	60mL	500mL	120mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.	Nickel-63; Strontium-89,90 -- Total Sr	Gross Alpha; Gross Beta						

Sample No.	Matrix *	Sample Date	Sample Time										
J134V0	SOIL	8/2/06	1400	X	X								S-A4D

RTC 8/2/06

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	R Coffman / RT Coffman	8/2/06 1730	Received By/Stored In	REFER #3C, 3728 8/2/06 1730
Relinquished By/Removed From	3728/3C	8/3/06 0830	Received By/Stored In	mstankovich 8/3/06 0830
Relinquished By/Removed From	weld mstankovich	8/3/06 1500	Received By/Stored In	Fed Ex
Relinquished By/Removed From	Fed Ex	8/4/06 0950	Received By/Stored In	[illegible] 8/4/06 0950
Relinquished By/Removed From			Received By/Stored In	
Relinquished By/Removed From			Received By/Stored In	

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 - 7471 - (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 # 3C on 8/3/06

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

000000002

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround
Coffman	R.T. Coffman	528-6409	KESSNER, JH		

Project Designation	Sampling Location	SAF No.	Air Quality ☐
100-F Remaining Sites Burial Grounds - Soil Full Protocol	118-F-3 Shallow Zone Verification A4	RC-032	15 DAY

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
SAWS-114	EFL-1174-1	R118F32000	Fed Ex

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
EBERLINE SERVICES (LIONVILLE)	A060590	See ospe

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

NA RTC 8/2/06
Cool 4C

00000016

SAMPLE ANALYSIS

Preservation				None	Cool 4C	None	None	None					
Type of Container				P	aG	P	P	G/P					
No. of Container(s)				1	1	1	1	1					
Volume				250~~g~~mL RTC 8/2/06	60mL	500mL	120mL	60mL					
				See item (1) in Special Instructions.	PCBs - 8082	See item (2) in Special Instructions.	Nickel-63; Strontium-89,90 -- Total Sr	Gross Alpha; Gross Beta					
Sample No.	Matrix *	Sample Date	Sample Time										
J134T9	SOIL	8/2/06	1400	X	X		8/2/06 RTC						S-A4

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RT Coffman / RT Coffman	8/2/06 1730	REFER #3C, 3728	8/2/06 1730
3728/3C	8/3/06 0850	MStankovich	8/3/06 0850
MStankovich	8/3/06 1500	Fed Ex	
Fed Ex	8/4/06 0950		8/4/06 0950

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 - 7471 - (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 # 3C on 8/13/06

Matrix *

S=Soil
SD=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
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

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 118-F-3			DATA PACKAGE: K0501		
VALIDATOR: TLI		LAB: LLI		DATE: 10/1/06	
			SDG: K0501		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J134V0 J134T9					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

Comments:

PCB DATA VALIDATION CHECKLIST

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

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A
Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: no FB

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

Surrogates analyzed? ..... Yes No N/A
Surrogate recoveries acceptable? ..... Yes No N/A
Surrogates traceable? (Levels D, E) ..... Yes No N/A
Surrogates expired? (Levels D, E) ..... Yes No N/A
MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD results acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A
LCS/BSS samples analyzed? ..... Yes No N/A
LCS/BSS results acceptable? ..... Yes No N/A
Standards traceable? (Levels D, E) ..... Yes No N/A
Standards expired? (Levels D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Performance audit sample(s) analyzed? ..... Yes No N/A
Performance audit sample results acceptable? ..... Yes No N/A

Comments: no PAS

PCB DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

6. SYSTEM PERFORMANCE (Levels D and E)

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

Positive results resolved acceptably? ..... Yes No N/A

Comments:

7. HOLDING TIMES (all levels)

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

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

Comments:

PCB DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A

Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A

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

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

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

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

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

Comments: VO - all area

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

GPC cleanup performed? ..... Yes No N/A

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

GPC check recoveries acceptable? ..... Yes No N/A

GPC calibration performed? ..... Yes No N/A

GPC calibration check performed? ..... Yes No N/A

GPC calibration check retention times acceptable? ..... Yes No N/A

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

Check/calibration materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments: