069304

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 3/30/06
INITIAL/DATE

COMMENTS:

SDG K0201 **SAF-RC-032**

Waste Site: 141-C

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Date: 17 March 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 141-C
Subject: Inorganics - Data Package No. K0201-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0201 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
J112W0	1/30/06	Soil	C	See note 1
J112W1	1/30/06	Soil	C	See note 1
J112W2	1/30/06	Soil	C	See note 1
J112W3	1/30/06	Soil	C	See note 1
J112W4	1/30/06	Soil	C	See note 1
J112W5	1/30/06	Soil	C	See note 1
J112W6	1/30/06	Soil	C	See note 1
J112W7	1/30/06	Soil	C	See note 1
J112W8	1/30/06	Soil	C	See note 1
J112W9	1/30/06	Soil	C	See note 1
J112X0	1/30/06	Soil	C	See note 1
J112X1	1/30/06	Soil	C	See note 1
J112X2	1/30/06	Soil	C	See note 1

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

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

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. 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

One field blank (J112X1) was submitted for analysis. Aluminum, barium, beryllium, calcium, chromium, iron, potassium, magnesium, manganese, sodium, lead, antimony, silicon and zinc were detected in the equipment blank. Under the WCH statement of work, no qualification is required.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

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

Due to a matrix spike recovery outside QC limits (47.1%), all antimony results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (53.7%), 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 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 (J112W6/J112X0) were submitted for analysis. Field duplicates are assessed 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 silver, 11 selenium and 11 cadmium results exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data package No. K0201 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 (47.1%), all antimony results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits (53.7%), all silicon results were qualified as estimates and flagged "J".

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

All silver, 11 selenium and 11 cadmium results 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 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: K0201	REVIEWER: TLI	Project: 141-C	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	All	MS recovery
Silicon	J	All	LCS recovery

* - 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: K0201																				
Sample Number		J112W0		J112W1		J112W2		J112W3		J112W4		J112W5		J112W6		J112W7		J112W8		J112W9	
Remarks																					
Sample Date		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	0.2	0.43	U	0.44	U	0.45	U	0.43	U	0.42	U	0.43	U	0.47	U	0.44	U	0.41	U	0.45	U
Aluminum		6540		6060		6260		6830		4650		4810		6510		5380		4240		6910	
Arsenic	10	7.70		2.7		1.1		1.5		1.8		2.3		1.2		2.1		1.8		2.2	
Boron		1.5		2.1		2.6		7.4		1.3		1.6		2.1		1.1		0.79	U	4.7	
Barium	2	70.1		70.2		86.2		135		48.4		65.4		88.9		47.8		27.9		108	
Beryllium		0.32		0.31		0.34		0.38		0.26		0.25		0.33		0.25		0.18		0.38	
Calcium		3710		4330		3030		7940		3470		3910		3090		3560		5120		4330	
Cadmium	0.2	0.21	U	0.22	U	0.22	U	0.21	U	0.21	U	0.22	U	0.23	U	0.22	U	0.20	U	0.22	U
Cobalt		5.4		5.8		6.4		6.1		5.0		5.5		6.2		5.0		3.9		6.3	
Chromium	1	9.7		8.8		8.2		8.4		8.1		7.0		8.9		8.3		7.6		9.5	
Copper		14.1		12.5		10.3		13.4		12.8		11.7		10.7		11.9		11.0		13.2	
Iron		16200		16500		17100		18900		13300		13700		16100		14100		11500		17900	
Mercury	0.2	0.02	U	0.01	U	0.01	U	0.03		0.02	U	0.02	U	0.02	U	0.02	U	0.01	U	0.02	U
Potassium		1090		1160		1470		1300		807		1040		1550		864		525		1360	
Magnesium		3920		3780		3540		4010		3370		3270		3660		3690		3460		4050	
Manganese		264		300		354		299		237		269		340		252		206		317	
Molybdenum		0.40	U	0.41	U	0.41	U	0.40	U.	0.39	U	0.40	U	0.43	U	0.41	U	0.38	U	0.42	U
Sodium		115		118		127		228		89.4		110		111		105		92.3		175	
Nickel		10.3		9.7		9.0		9.6		9.1		8.4		9.3		10.3		8.9		10.6	
Lead	5	22.9		6.7		4.6		5.9		4.8		10.7		4.8		4.0		3.0		5.4	
Antimony		1.2	UJ	1.3	UJ	1.3	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.3	UJ	1.2	UJ	1.2	UJ	1.3	UJ
Selenium	1	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.2	U	1.1	U	1.0	U	1.2	U
Silicon		569	J	812	J	531	J	656	J	522	J	628	J	687	J	1080	J	401	J	614	J
Vanadium		35.6		37.3		38.1		45.7		30.9		30.2		35.1		33.3		28.3		39.3	
Zinc	1	42.0		45.4		36.9		65.3		36.0		46.1		37.5		34.3		26.0		39.4	

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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.

Project: WASHINGTON CLOSURE HANFORD																							
Laboratory: EB																							
Case	SDG: K0201																						
Sample Numb		J112X0		J112X1		J112X2																	
Remarks		Duplicate		E. Blank																			
Sample Date		1/30/06		1/30/06		1/30/06																	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	0.2	0.46	U	0.39	U	0.44	U																
Aluminum		6620		138		5170																	
Arsenic	10	2.7		0.95	U	2.5																	
Boron		1.7		0.75	U	2.7																	
Barium	2	90.9		3.5		81.7																	
Beryllium		0.39		0.04		0.30																	
Calcium		3100		85.5		3420																	
Cadmium	0.2	0.23	U	0.19	U	0.22	U																
Cobalt		6.5		0.33	U	5.7																	
Chromium	1	9.0		0.71		7.0																	
Copper		11.1		0.33	U	10.9																	
Iron		17000		307		14200																	
Mercury	0.2	0.02	U	0.01	U	0.02	U																
Potassium		1600		62.8		1190																	
Magnesium		3750		23.1		3300																	
Manganese		364		9.7		285																	
Molybdenum		0.43	U	0.36	U	0.40	U																
Sodium		106		26.3		101																	
Nickel		9.9		0.36	U	8.6																	
Lead	5	5.4		1.4		5.3																	
Antimony		1.3	UJ	1.4	J	1.2	UJ																
Selenium	1	1.2	U	1.0	U	1.1	U																
Silicon		839	J	146	J	600	J																
Vanadium		35.4		0.25	U	33.4																	
Zinc	1	38.5		2.7		37.5																	

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 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-006	J112W0	Silver, Total	0.43 u	MG/KG	0.43	3.0
		Aluminum, Total	6450	MG/KG	5.6	3.0
		Arsenic, Total	7.7	MG/KG	1.0	3.0
		Boron, Total	1.5	MG/KG	0.83	3.0
		Barium, Total	70.1	MG/KG	0.06	3.0
		Beryllium, Total	0.32	MG/KG	0.03	3.0
		Calcium, Total	3710	MG/KG	3.7	3.0
		Cadmium, Total	0.21 u	MG/KG	0.21	3.0
		Cobalt, Total	5.4	MG/KG	0.37	3.0
		Chromium, Total	9.7	MG/KG	0.49	3.0
		Copper, Total	14.1	MG/KG	0.37	3.0
		Iron, Total	16200	MG/KG	9.9	3.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1090	MG/KG	17.0	3.0
		Magnesium, Total	3920	MG/KG	4.1	3.0
		Manganese, Total	264	MG/KG	0.06	3.0
		Molybdenum, Total	0.40 u	MG/KG	0.40	3.0
		Sodium, Total	115	MG/KG	0.52	3.0
		Nickel, Total	10.3	MG/KG	0.40	3.0
		Lead, Total	22.9	MG/KG	0.95	3.0
		Antimony, Total	1.2 u J	MG/KG	1.2	3.0
		Selenium, Total	1.1 u	MG/KG	1.1	3.0
		Silicon, Total	569 J	MG/KG	2.5	3.0
		Vanadium, Total	35.6	MG/KG	0.28	3.0
		Zinc, Total	42.0	MG/KG	0.15	3.0

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-007	J112W1	Silver, Total	0.44 u	MG/KG	0.44	3.0
		Aluminum, Total	6060	MG/KG	5.7	3.0
		Arsenic, Total	2.7	MG/KG	1.1	3.0
		Boron, Total	2.1	MG/KG	0.85	3.0
		Barium, Total	70.2	MG/KG	0.06	3.0
		Beryllium, Total	0.31	MG/KG	0.03	3.0
		Calcium, Total	4330	MG/KG	3.7	3.0
		Cadmium, Total	0.22 u	MG/KG	0.22	3.0
		Cobalt, Total	5.8	MG/KG	0.38	3.0
		Chromium, Total	8.8	MG/KG	0.50	3.0
		Copper, Total	12.5	MG/KG	0.38	3.0
		Iron, Total	16500	MG/KG	10.1	3.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Potassium, Total	1160	MG/KG	17.4	3.0
		Magnesium, Total	3780	MG/KG	4.2	3.0
		Manganese, Total	300	MG/KG	0.06	3.0
		Molybdenum, Total	0.41 u	MG/KG	0.41	3.0
		Sodium, Total	118	MG/KG	0.53	3.0
		Nickel, Total	9.7	MG/KG	0.41	3.0
		Lead, Total	6.7	MG/KG	0.97	3.0
		Antimony, Total	1.3 u J	MG/KG	1.3	3.0
		Selenium, Total	1.1 u	MG/KG	1.1	3.0
		Silicon, Total	812 J	MG/KG	2.6	3.0
		Vanadium, Total	37.3	MG/KG	0.28	3.0
		Zinc, Total	45.4	MG/KG	0.16	3.0

PV 3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-008	J112W2	Silver, Total	0.45 u	MG/KG	0.45	3.0
		Aluminum, Total	6260	MG/KG	5.8	3.0
		Arsenic, Total	1.1	MG/KG	1.1	3.0
		Boron, Total	2.6	MG/KG	0.86	3.0
		Barium, Total	86.2	MG/KG	0.06	3.0
		Beryllium, Total	0.34	MG/KG	0.03	3.0
		Calcium, Total	3030	MG/KG	3.8	3.0
		Cadmium, Total	0.22 u	MG/KG	0.22	3.0
		Cobalt, Total	6.4	MG/KG	0.38	3.0
		Chromium, Total	8.2	MG/KG	0.51	3.0
		Copper, Total	10.3	MG/KG	0.38	3.0
		Iron, Total	17100	MG/KG	10.2	3.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Potassium, Total	1470	MG/KG	17.7	3.0
		Magnesium, Total	3540	MG/KG	4.3	3.0
		Manganese, Total	354	MG/KG	0.06	3.0
		Molybdenum, Total	0.41 u	MG/KG	0.41	3.0
		Sodium, Total	127	MG/KG	0.54	3.0
		Nickel, Total	9.0	MG/KG	0.41	3.0
		Lead, Total	4.6	MG/KG	0.99	3.0
		Antimony, Total	1.3 u J	MG/KG	1.3	3.0
		Selenium, Total	1.1 u	MG/KG	1.1	3.0
		Silicon, Total	531 J	MG/KG	2.6	3.0
		Vanadium, Total	38.1	MG/KG	0.29	3.0
		Zinc, Total	36.9	MG/KG	0.16	3.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-009	J112W3	Silver, Total	0.43 u	MG/KG	0.43	3.0
		Aluminum, Total	6830	MG/KG	5.6	3.0
		Arsenic, Total	1.5	MG/KG	1.0	3.0
		Boron, Total	7.4	MG/KG	0.82	3.0
		Barium, Total	135	MG/KG	0.06	3.0
		Beryllium, Total	0.38	MG/KG	0.03	3.0
		Calcium, Total	7940	MG/KG	3.6	3.0
		Cadmium, Total	0.21 u	MG/KG	0.21	3.0
		Cobalt, Total	6.1	MG/KG	0.37	3.0
		Chromium, Total	8.4	MG/KG	0.49	3.0
		Copper, Total	13.4	MG/KG	0.37	3.0
		Iron, Total	18900	MG/KG	9.8	3.0
		Mercury, Total	0.03	MG/KG	0.02	1.0
		Potassium, Total	1300	MG/KG	16.9	3.0
		Magnesium, Total	4010	MG/KG	4.1	3.0
		Manganese, Total	299	MG/KG	0.06	3.0
		Molybdenum, Total	0.40 u	MG/KG	0.40	3.0
		Sodium, Total	228	MG/KG	0.52	3.0
		Nickel, Total	9.6	MG/KG	0.40	3.0
		Lead, Total	5.9	MG/KG	0.95	3.0
		Antimony, Total	1.2 u J	MG/KG	1.2	3.0
		Selenium, Total	1.1 u	MG/KG	1.1	3.0
		Silicon, Total	656 J	MG/KG	2.5	3.0
		Vanadium, Total	45.7	MG/KG	0.27	3.0
		Zinc, Total	65.3	MG/KG	0.15	3.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201

LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-010	J112W4	Silver, Total	0.42 u	MG/KG	0.42	3.0
		Aluminum, Total	4650	MG/KG	5.5	3.0
		Arsenic, Total	1.8	MG/KG	1.0	3.0
		Boron, Total	1.3	MG/KG	0.81	3.0
		Barium, Total	48.4	MG/KG	0.06	3.0
		Beryllium, Total	0.26	MG/KG	0.03	3.0
		Calcium, Total	3470	MG/KG	3.6	3.0
		Cadmium, Total	0.21 u	MG/KG	0.21	3.0
		Cobalt, Total	5.0	MG/KG	0.36	3.0
		Chromium, Total	8.1	MG/KG	0.48	3.0
		Copper, Total	12.8	MG/KG	0.36	3.0
		Iron, Total	13300	MG/KG	9.6	3.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	807	MG/KG	16.6	3.0
		Magnesium, Total	3370	MG/KG	4.0	3.0
		Manganese, Total	237	MG/KG	0.06	3.0
		Molybdenum, Total	0.39 u	MG/KG	0.39	3.0
		Sodium, Total	89.4	MG/KG	0.51	3.0
		Nickel, Total	9.1	MG/KG	0.39	3.0
		Lead, Total	4.8	MG/KG	0.93	3.0
		Antimony, Total	1.2 u J	MG/KG	1.2	3.0
		Selenium, Total	1.1 u	MG/KG	1.1	3.0
		Silicon, Total	522 J	MG/KG	2.5	3.0
		Vanadium, Total	30.9	MG/KG	0.27	3.0
		Zinc, Total	36.0	MG/KG	0.15	3.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J112W5	Silver, Total	0.43 u	MG/KG	0.43	3.0
		Aluminum, Total	4810	MG/KG	5.7	3.0
		Arsenic, Total	2.3	MG/KG	1.1	3.0
		Boron, Total	1.6	MG/KG	0.84	3.0
		Barium, Total	65.4	MG/KG	0.06	3.0
		Beryllium, Total	0.25	MG/KG	0.03	3.0
		Calcium, Total	3910	MG/KG	3.7	3.0
		Cadmium, Total	0.22 u	MG/KG	0.22	3.0
		Cobalt, Total	5.5	MG/KG	0.37	3.0
		Chromium, Total	7.0	MG/KG	0.50	3.0
		Copper, Total	11.7	MG/KG	0.37	3.0
		Iron, Total	13700	MG/KG	10	3.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1040	MG/KG	17.2	3.0
		Magnesium, Total	3270	MG/KG	4.2	3.0
		Manganese, Total	269	MG/KG	0.06	3.0
		Molybdenum, Total	0.40 u	MG/KG	0.40	3.0
		Sodium, Total	110	MG/KG	0.53	3.0
		Nickel, Total	8.4	MG/KG	0.40	3.0
		Lead, Total	10.7	MG/KG	0.96	3.0
		Antimony, Total	1.2 u J	MG/KG	1.2	3.0
		Selenium, Total	1.1 u	MG/KG	1.1	3.0
		Silicon, Total	628 J	MG/KG	2.5	3.0
		Vanadium, Total	30.2	MG/KG	0.28	3.0
		Zinc, Total	46.1	MG/KG	0.16	3.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	J112W6	Silver, Total	0.47 u	MG/KG	0.47	3.0
		Aluminum, Total	6510	MG/KG	6.1	3.0
		Arsenic, Total	1.2	MG/KG	1.1	3.0
		Boron, Total	2.1	MG/KG	0.90	3.0
		Barium, Total	88.9	MG/KG	0.07	3.0
		Beryllium, Total	0.33	MG/KG	0.03	3.0
		Calcium, Total	3090	MG/KG	4.0	3.0
		Cadmium, Total	0.23 u	MG/KG	0.23	3.0
		Cobalt, Total	6.2	MG/KG	0.40	3.0
		Chromium, Total	8.9	MG/KG	0.53	3.0
		Copper, Total	10.7	MG/KG	0.40	3.0
		Iron, Total	16100	MG/KG	10.7	3.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1550	MG/KG	18.4	3.0
		Magnesium, Total	3660	MG/KG	4.5	3.0
		Manganese, Total	340	MG/KG	0.07	3.0
		Molybdenum, Total	0.43 u	MG/KG	0.43	3.0
		Sodium, Total	111	MG/KG	0.57	3.0
		Nickel, Total	9.3	MG/KG	0.43	3.0
		Lead, Total	4.8	MG/KG	1.0	3.0
		Antimony, Total	1.3 u J	MG/KG	1.3	3.0
		Selenium, Total	1.2 u	MG/KG	1.2	3.0
		Silicon, Total	697 J	MG/KG	2.7	3.0
		Vanadium, Total	35.1	MG/KG	0.30	3.0
		Zinc, Total	37.5	MG/KG	0.17	3.0

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3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	J112W7	Silver, Total	0.44 u	MG/KG	0.44	3.0
		Aluminum, Total	5380	MG/KG	5.7	3.0
		Arsenic, Total	2.1	MG/KG	1.1	3.0
		Boron, Total	1.1	MG/KG	0.84	3.0
		Barium, Total	47.8	MG/KG	0.06	3.0
		Beryllium, Total	0.25	MG/KG	0.03	3.0
		Calcium, Total	3560	MG/KG	3.7	3.0
		Cadmium, Total	0.22 u	MG/KG	0.22	3.0
		Cobalt, Total	5.0	MG/KG	0.37	3.0
		Chromium, Total	8.3	MG/KG	0.50	3.0
		Copper, Total	11.9	MG/KG	0.37	3.0
		Iron, Total	14100	MG/KG	10.0	3.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	864	MG/KG	17.3	3.0
		Magnesium, Total	3690	MG/KG	4.2	3.0
		Manganese, Total	252	MG/KG	0.06	3.0
		Molybdenum, Total	0.41 u	MG/KG	0.41	3.0
		Sodium, Total	105	MG/KG	0.53	3.0
		Nickel, Total	10.3	MG/KG	0.41	3.0
		Lead, Total	4.0	MG/KG	0.97	3.0
		Antimony, Total	1.2 u J	MG/KG	1.2	3.0
		Selenium, Total	1.1 u	MG/KG	1.1	3.0
		Silicon, Total	1080 J	MG/KG	2.6	3.0
		Vanadium, Total	33.3	MG/KG	0.28	3.0
		Zinc, Total	34.3	MG/KG	0.16	3.0

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-004	J112W8	Silver, Total	0.41 u	MG/KG	0.41	3.0
		Aluminum, Total	4240	MG/KG	5.3	3.0
		Arsenic, Total	1.8	MG/KG	0.99	3.0
		Boron, Total	0.79 u	MG/KG	0.79	3.0
		Barium, Total	27.9	MG/KG	0.06	3.0
		Beryllium, Total	0.18	MG/KG	0.03	3.0
		Calcium, Total	5120	MG/KG	3.5	3.0
		Cadmium, Total	0.20 u	MG/KG	0.20	3.0
		Cobalt, Total	3.9	MG/KG	0.36	3.0
		Chromium, Total	7.6	MG/KG	0.47	3.0
		Copper, Total	11.0	MG/KG	0.35	3.0
		Iron, Total	11500	MG/KG	9.4	3.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Potassium, Total	526	MG/KG	16.1	3.0
		Magnesium, Total	3460	MG/KG	3.9	3.0
		Manganese, Total	206	MG/KG	0.06	3.0
		Molybdenum, Total	0.38 u	MG/KG	0.38	3.0
		Sodium, Total	92.3	MG/KG	0.50	3.0
		Nickel, Total	8.9	MG/KG	0.38	3.0
		Lead, Total	3.0	MG/KG	0.90	3.0
		Antimony, Total	1.2 u J	MG/KG	1.2	3.0
		Selenium, Total	1.0 u	MG/KG	1.0	3.0
		Silicon, Total	401 J	MG/KG	2.4	3.0
		Vanadium, Total	28.3	MG/KG	0.26	3.0
		Zinc, Total	26.0	MG/KG	0.15	3.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201

LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	J112W9	Silver, Total	0.45 u	MG/KG	0.45	3.0
		Aluminum, Total	6910	MG/KG	5.9	3.0
		Arsenic, Total	2.2	MG/KG	1.1	3.0
		Boron, Total	4.7	MG/KG	0.87	3.0
		Barium, Total	108	MG/KG	0.06	3.0
		Beryllium, Total	0.38	MG/KG	0.03	3.0
		Calcium, Total	4330	MG/KG	3.8	3.0
		Cadmium, Total	0.22 u	MG/KG	0.22	3.0
		Cobalt, Total	6.3	MG/KG	0.39	3.0
		Chromium, Total	9.5	MG/KG	0.51	3.0
		Copper, Total	13.2	MG/KG	0.39	3.0
		Iron, Total	17900	MG/KG	10.3	3.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1360	MG/KG	17.8	3.0
		Magnesium, Total	4050	MG/KG	4.3	3.0
		Manganese, Total	317	MG/KG	0.06	3.0
		Molybdenum, Total	0.42 u	MG/KG	0.42	3.0
		Sodium, Total	175	MG/KG	0.55	3.0
		Nickel, Total	10.6	MG/KG	0.42	3.0
		Lead, Total	5.4	MG/KG	1.0	3.0
		Antimony, Total	1.3 uJ	MG/KG	1.3	3.0
		Selenium, Total	1.2 u	MG/KG	1.2	3.0
		Silicon, Total	614 J	MG/KG	2.6	3.0
		Vanadium, Total	39.3	MG/KG	0.29	3.0
		Zinc, Total	39.4	MG/KG	0.16	3.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-011	J112X0	Silver, Total	0.46 u	MG/KG	0.46	3.0
		Aluminum, Total	6620	MG/KG	6.0	3.0
		Arsenic, Total	2.7	MG/KG	1.1	3.0
		Boron, Total	1.7	MG/KG	0.89	3.0
		Barium, Total	90.9	MG/KG	0.07	3.0
		Beryllium, Total	0.39	MG/KG	0.03	3.0
		Calcium, Total	3110	MG/KG	3.9	3.0
		Cadmium, Total	0.23 u	MG/KG	0.23	3.0
		Cobalt, Total	6.5	MG/KG	0.40	3.0
		Chromium, Total	9.0	MG/KG	0.53	3.0
		Copper, Total	11.1	MG/KG	0.40	3.0
		Iron, Total	17000	MG/KG	10.6	3.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1600	MG/KG	18.3	3.0
		Magnesium, Total	3750	MG/KG	4.5	3.0
		Manganese, Total	364	MG/KG	0.07	3.0
		Molybdenum, Total	0.43 u	MG/KG	0.43	3.0
		Sodium, Total	106	MG/KG	0.56	3.0
		Nickel, Total	9.9	MG/KG	0.43	3.0
		Lead, Total	5.4	MG/KG	1.0	3.0
		Antimony, Total	1.3 u J	MG/KG	1.3	3.0
		Selenium, Total	1.2 u	MG/KG	1.2	3.0
		Silicon, Total	839 J	MG/KG	2.7	3.0
		Vanadium, Total	35.4	MG/KG	0.30	3.0
		Zinc, Total	38.5	MG/KG	0.16	3.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-012	J112X1	Silver, Total	0.39 u	MG/KG	0.39	3.0
		Aluminum, Total	138	MG/KG	5.1	3.0
		Arsenic, Total	0.95 u	MG/KG	0.95	3.0
		Boron, Total	0.75 u	MG/KG	0.75	3.0
		Barium, Total	3.5	MG/KG	0.06	3.0
		Beryllium, Total	0.04	MG/KG	0.03	3.0
		Calcium, Total	85.5	MG/KG	3.3	3.0
		Cadmium, Total	0.19 u	MG/KG	0.19	3.0
		Cobalt, Total	0.33 u	MG/KG	0.33	3.0
		Chromium, Total	0.71	MG/KG	0.44	3.0
		Copper, Total	0.33 u	MG/KG	0.33	3.0
		Iron, Total	307	MG/KG	8.9	3.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Potassium, Total	62.8	MG/KG	15.4	3.0
		Magnesium, Total	23.1	MG/KG	3.8	3.0
		Manganese, Total	9.7	MG/KG	0.06	3.0
		Molybdenum, Total	0.36 u	MG/KG	0.36	3.0
		Sodium, Total	26.3	MG/KG	0.47	3.0
		Nickel, Total	0.36 u	MG/KG	0.36	3.0
		Lead, Total	1.4	MG/KG	0.86	3.0
		Antimony, Total	1.4 J	MG/KG	1.1	3.0
		Selenium, Total	1.0 u	MG/KG	1.0	3.0
		Silicon, Total	146 J	MG/KG	2.3	3.0
		Vanadium, Total	0.25 u	MG/KG	0.25	3.0
		Zinc, Total	2.7	MG/KG	0.14	3.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-013	J112X2	Silver, Total	0.44 u	MG/KG	0.44	3.0
		Aluminum, Total	5170	MG/KG	5.7	3.0
		Arsenic, Total	2.5	MG/KG	1.1	3.0
		Boron, Total	2.7	MG/KG	0.84	3.0
		Barium, Total	81.7	MG/KG	0.06	3.0
		Beryllium, Total	0.30	MG/KG	0.03	3.0
		Calcium, Total	3420	MG/KG	3.7	3.0
		Cadmium, Total	0.22 u	MG/KG	0.22	3.0
		Cobalt, Total	5.7	MG/KG	0.37	3.0
		Chromium, Total	7.0	MG/KG	0.50	3.0
		Copper, Total	10.9	MG/KG	0.37	3.0
		Iron, Total	14200	MG/KG	10	3.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1190	MG/KG	17.2	3.0
		Magnesium, Total	3300	MG/KG	4.2	3.0
		Manganese, Total	285	MG/KG	0.06	3.0
		Molybdenum, Total	0.40 u	MG/KG	0.40	3.0
		Sodium, Total	101	MG/KG	0.53	3.0
		Nickel, Total	8.6	MG/KG	0.40	3.0
		Lead, Total	5.3	MG/KG	0.96	3.0
		Antimony, Total	1.2 u J	MG/KG	1.2	3.0
		Selenium, Total	1.1 u	MG/KG	1.1	3.0
		Silicon, Total	600 J	MG/KG	2.5	3.0
		Vanadium, Total	33.4	MG/KG	0.28	3.0
		Zinc, Total	37.5	MG/KG	0.16	3.0

3/17/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032
LVL#: 0602L192
SDG/SAF#: K0201/RC-032

W.O.#: 11343-606-001-9999-00
Date Received: 02-01-06

METALS CASE NARRATIVE

1. This narrative covers the analyses of 13 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 high concentrations and 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 (80-120% for Mercury).

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

7. 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.

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

9. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 53.7%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

10. The matrix spike (MS) recoveries for 4 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

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

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 41 pages.

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J112W5	Aluminum	66,000	96.2
	Iron	66,000	92.4
	Antimony	300	96.4
	Silicon	6,300	96.2

12. The duplicate analyses for 4 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. 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.

14. 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.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

2/13/06
Date

jjw/m02-192

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-009	Page 2 of 3

Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 days	Air Quality:	
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation	SAF No.: RC-032	
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx
Shipped To: EBERLINE SERVICES/ LIONVILLE	Offsite Property No.: A060276	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	Cool 4C	None	None	None					
Type of Container	G/P A	G/P B	aG C	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	250g	500mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions	Carbon-14, Tritium	Nickel-63, Strontium-89,90 -- Total Sr					

8200028

	Sample No.	Matrix *	Sample Date	Sample Time										
1	J112W5	SOIL	1-30-06	0920	X	X	X							
2	J112W6	SOIL	1-30-06	0950	X	X	X							
3	J112W7	SOIL	1-30-06	0945	X	X	X							
4	J112W8	SOIL	1-30-06	0955	X	X	X							
5	J112W9	SOIL	1-30-06	1005	X	X	X							

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature] Stankovich	1450 1/30/06	3728/1C	1/30/06 1450
3728/1C	1-31-06 / 1240	RZ Steffler [signature]	1-31-06 1240
RZ Steffler [signature]	1500 1-31-06	Fed Ex	
[signature]	2-1-06 0910	[signature]	2-1-06 0910

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# 1C on 1/31/06

Matrix *
S=Soil
SE=Sediment
SD=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-032-009	Page 1 of 3
Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8C; Data Turnaround: 15 day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation		SAF No.: RC-032	Air Quality: ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060276		Bill of Lading/Air Bill No.: See OSPC	

000000038

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

000029

Preservation	None	Cool 4C	Cool 4C	None	None	None						
Type of Container	G/P	G/P	aG	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1	1						
Volume	250g	60mL	250g	500mL	60mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Cesium-14; Tritium-3	Nickel-63; Strontium-89,90 -- Total Sr						
Sample No.	Matrix *	Sample Date	Sample Time									
J112W0	SOIL	1-30-06	0830	X	X	X						
J112W1	SOIL	1-30-06	0840	X	X	X						
J112W2	SOIL	1-30-06	0850	X	X	X						
J112W3	SOIL	1-30-06	0900	X	X	X						
J112W4	SOIL	1-30-06	0910	X	X	X						

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: [signature] MS Stankovich	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/1C	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/1C	Date/Time: 1-31-06 1240	Received By/Stored In: RZ Steffler [signature]	Date/Time: 1240 1-31-06
Relinquished By/Removed From: RZ Steffler [signature]	Date/Time: 1500 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 2-1-06 0910	Received By/Stored In: V. Hernandez	Date/Time: 2-1-06 0910
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 - 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 # 1C on 1/31/06

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-032-009	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: 15 day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174; COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060276	Bill of Lading/Air Bill No.: See OSPC	

000000039

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	None	None	None					
Type of Container	G/P	G/P	aG	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	250g	500mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Carbon-14; Tritium-3	Nickel-63; Strontium-89,90 – Total Sr					

000030

	Sample No.	Matrix *	Sample Date	Sample Time										
11	J112X0	SOIL	1-30-06	0830	X	X	X							
12	J112X1	SOIL	1-30-06	0745	X									

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: [signature] mstankovich	Date/Time: 1/30/06 1430	Received By/Stored In: 3728/1C	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/1C	Date/Time: 1-31-06 1240	Received By/Stored In: RZ Steffler [signature]	Date/Time: 1-31-06 1240
Relinquished By/Removed From: RZ Steffler [signature]	Date/Time: 1-31-06 1500	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: FedEx	Date/Time: 2/1/06 0910	Received By/Stored In: [signature]	Date/Time: 2-1-06 0910
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 - 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 # 1C on 1/31/06

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-032-010	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: 15 Day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Staging Area		SAF No.: RC-032	Air Quality: ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060276		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	Cool 4C	None	None	None						
Type of Container	G/P	G/P	aG	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1	1						
Volume	250g	60mL	250g	500mL	60mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Carbon-14; Tritium-H3	Nickel-63; Strontium-89,90 – Total Sr						
Sample No.	Matrix *	Sample Date	Sample Time									
13 J112X2	SOIL	1-30-06	1015	X	X	X						

000031

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: [signature]	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/IC	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/IC 1-31-06	Date/Time: 1240	Received By/Stored In: [signature] 1-31-06	Date/Time: 1240 1-31-06
Relinquished By/Removed From: RZ Steffler RZ Steffler	Date/Time: 1500 WCH 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 2/1/06 0910	Received By/Stored In: Victor Hernandez	Date/Time: 2-1-06 0910
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 - 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 # IC on 1/31/06

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

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

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

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 141-C			DATA PACKAGE: K0201		
VALIDATOR: TLR		LAB: LLI		DATE: 3/14/06	
			SDG: K0201		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		

SAMPLES/MATRIX					
J112W0	J112W1	J112W2	J112W3	J111W4	J111W5
~~J112W6~~ J112W7	J112W7	J112W8	J112W9	J112X0	J112X1
J112W6	J112W6				J112X2

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:

FB - aluminum, barium, beryllium, calcium, chromium, Fe, potassium, magnesium, manganese, sodium, lead, antimony, Silicon, Zinc

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 - 47.1% J all
LCS - Silicon - 53.7% J all no PAS

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: all silver over
" selenium over
" cadmium over

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	06L0079-MB1	Silver, Total	0.14 u	MG/KG	0.14	1.0
		Aluminum, Total	1.8 u	MG/KG	1.8	1.0
		Arsenic, Total	0.34 u	MG/KG	0.34	1.0
		Boron, Total	0.27 u	MG/KG	0.27	1.0
		Barium, Total	0.02 u	MG/KG	0.02	1.0
		Beryllium, Total	0.01 u	MG/KG	0.01	1.0
		Calcium, Total	2.8	MG/KG	1.2	1.0
		Cadmium, Total	0.07 u	MG/KG	0.07	1.0
		Cobalt, Total	0.12 u	MG/KG	0.12	1.0
		Chromium, Total	0.16 u	MG/KG	0.16	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		Iron, Total	3.2 u	MG/KG	3.2	1.0
		Potassium, Total	5.5 u	MG/KG	5.5	1.0
		Magnesium, Total	1.4 u	MG/KG	1.4	1.0
		Manganese, Total	0.02	MG/KG	0.02	1.0
		Molybdenum, Total	0.13 u	MG/KG	0.13	1.0
		Sodium, Total	0.46	MG/KG	0.17	1.0
		Nickel, Total	0.13 u	MG/KG	0.13	1.0
		Lead, Total	0.31 u	MG/KG	0.31	1.0
		Antimony, Total	0.40 u	MG/KG	0.40	1.0
		Selenium, Total	0.36 u	MG/KG	0.36	1.0
		Silicon, Total	0.82 u	MG/KG	0.82	1.0
		Vanadium, Total	0.09 u	MG/KG	0.09	1.0
		Zinc, Total	0.05 u	MG/KG	0.05	1.0
BLANK1	06C0022-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J112W5	Silver, Total	4.5	0.43u	5.2	86.5	3.0
		Aluminum, Total	6600	4810	207	860.7*	3.0
		Arsenic, Total	186	2.3	207	88.5	3.0
		Boron, Total	92.0	1.6	104	87.3	3.0
		Barium, Total	265	65.4	207	96.5	3.0
		Beryllium, Total	5.1	0.25	5.2	93.2	3.0
		Calcium, Total	6510	3910	2590	100.4	3.0
		Cadmium, Total	4.5	0.22u	5.2	86.5	3.0
		Cobalt, Total	52.8	5.5	51.8	91.3	3.0
		Chromium, Total	28.0	7.0	20.7	101.4	3.0
		Copper, Total	36.1	11.7	25.9	94.2	3.0
		Iron, Total	16500	13700	104	2630 *	3.0
		Mercury, Total	0.27	0.02u	0.31	85.5	1.0
		Potassium, Total	3500	1040	2590	94.9	3.0
		Magnesium, Total	6190	3270	2590	113.1	3.0
		Manganese, Total	330	269	51.8	117.6*	3.0
		Molybdenum, Total	92.1	0.40u	104	89.0	3.0
		Sodium, Total	2480	110	2590	91.8	3.0
		Nickel, Total	56.9	8.4	51.8	93.6	3.0
		Lead, Total	55.4	10.7	51.8	86.3	3.0
		Antimony, Total	24.4	1.2 u	51.8	47.1	3.0
		Selenium, Total	176	1.1 u	207	85.1	3.0
		Silicon, Total	688	628	104	57.1*	3.0
		Vanadium, Total	83.9	30.2	51.8	103.7	3.0
		Zinc, Total	93.1	46.1	51.8	90.7	3.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J112W5	Silver, Total	0.43u	0.43u	NC	3.0
		Aluminum, Total	4810	5210	8.0	3.0
		Arsenic, Total	2.3	1.9	19.0	3.0
		Boron, Total	1.6	2.7	51.2	3.0
		Barium, Total	65.4	82.7	23.4	3.0
		Beryllium, Total	0.25	0.27	8.5	3.0
		Calcium, Total	3910	4000	2.3	3.0
		Cadmium, Total	0.22u	0.22u	NC	3.0
		Cobalt, Total	5.5	5.4	1.8	3.0
		Chromium, Total	7.0	7.3	4.2	3.0
		Copper, Total	11.7	12.0	2.5	3.0
		Iron, Total	13700	13800	0.20	3.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Potassium, Total	1040	1120	7.3	3.0
		Magnesium, Total	3270	3410	4.3	3.0
		Manganese, Total	269	268	0.19	3.0
		Molybdenum, Total	0.40u	0.40u	NC	3.0
		Sodium, Total	110	136	21.3	3.0
		Nickel, Total	8.4	9.0	6.9	3.0
		Lead, Total	10.7	7.9	30.1	3.0
		Antimony, Total	1.2 u	1.2 u	NC	3.0
		Selenium, Total	1.1 u	1.1 u	NC	3.0
		Silicon, Total	628	628	0.032	3.0
		Vanadium, Total	30.2	31.1	2.9	3.0
		Zinc, Total	46.1	46.0	0.22	3.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 02/10/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	06L0079-LC1	Silver, LCS	47.2	50.0	MG/KG	94.4
		Aluminum, LCS	474	500	MG/KG	94.9
		Arsenic, LCS	904	1000	MG/KG	90.4
		Boron, LCS	457	500	MG/KG	91.4
		Barium, LCS	468	500	MG/KG	93.6
		Beryllium, LCS	24.0	25.0	MG/KG	96.0
		Calcium, LCS	2440	2500	MG/KG	97.4
		Cadmium, LCS	23.8	25.0	MG/KG	95.2
		Cobalt, LCS	241	250	MG/KG	96.3
		Chromium, LCS	49.1	50.0	MG/KG	98.2
		Copper, LCS	120	125	MG/KG	96.1
		Iron, LCS	491	500	MG/KG	98.3
		Potassium, LCS	2240	2500	MG/KG	89.5
		Magnesium, LCS	2330	2500	MG/KG	93.3
		Manganese, LCS	74.0	75.0	MG/KG	98.7
		Molybdenum, LCS	485	500	MG/KG	97.1
		Sodium, LCS	2240	2500	MG/KG	89.5
		Nickel, LCS	191	200	MG/KG	95.7
		Lead, LCS	239	250	MG/KG	95.5
		Antimony, LCS	277	300	MG/KG	92.3
		Selenium, LCS	840	1000	MG/KG	84.0
		Silicon, LCS	269	500	MG/KG	53.7
		Vanadium, LCS	243	250	MG/KG	97.2
		Zinc, LCS	94.2	100	MG/KG	94.2
LCS1	06C0022-LC1	Mercury, LCS	6.3	6.2	MG/KG	101.7

Date: 17 March 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 141-C
Subject: Radiochemistry - Data Package No. K0201-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0201 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
J112W0	1/30/06	Soil	C	See note 1
J112W1	1/30/06	Soil	C	See note 1
J112W2	1/30/06	Soil	C	See note 1
J112W3	1/30/06	Soil	C	See note 1
J112W4	1/30/06	Soil	C	See note 1
J112W5	1/30/06	Soil	C	See note 1
J112W6	1/30/06	Soil	C	See note 1
J112W7	1/30/06	Soil	C	See note 1
J112W8	1/30/06	Soil	C	See note 1
J112W9	1/30/06	Soil	C	See note 1
J112X0	1/30/06	Soil	C	See note 1
J112X2	1/30/06	Soil	C	See note 1

1 – Tritium, total strontium and gamma spectroscopy.

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

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

DATA QUALITY PARAMETERS

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Laboratory Duplicates**

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

All duplicate results were acceptable.

Field Duplicates

One set of field duplicates (J112W6/J112X0) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPDs for thorium-228 (32%) and radium-228 (53%) were outside QC limits. Under the WCH statement of work, no qualification is required. All other field duplicates were acceptable.

- **Detection Levels**

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

- **Completeness**

Data package No. K0201 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

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

Thirty-three 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: K0201	REVIEWER: TLI	Project: 141-C	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Tritium	J	All	No MS analysis

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD																					
Laboratory: EB																					
Case	SDG: K0201																				
Sample Number		J112W0		J112W1		J112W2		J112W3		J112W4		J112W5		J112W6		J112W7		J112W8		J112W9	
Remarks																					
Sample Date		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	10	0.259	UJ	0.480	UJ	-1.55	UJ	-0.456	UJ	-1.28	UJ	-0.996	UJ	0.131	UJ	-1.38	UJ	-0.385	UJ	-0.237	UJ
Total Strontium	1	-0.063	U	0.092	U	-0.069	U	1.70		0.122	U	0.189	U	-0.105	U	0.096	U	0.080	U	0.049	
Potassium-40		6.91		26.3		13.8		13.9		14.1		14.3		8.07		26.1		15.2		13.3	
Cobalt 60	0.05	U	U	U	U	U	U	U	U*	U	U	U	U	U	U*	U	U	U	U	U	U*
Cesium 137	0.05	U	U	0.059		U	U	U	U*	U	U	U	U	U	U*	U	U	U	U	U	U*
Radium-226		0.272		0.988		0.498		0.529		0.459		0.566		0.408		0.916		0.345		0.661	
Radium-228		0.471		1.35		0.775		0.933		0.635		0.756		U	U	1.40		0.466		0.747	
Europium 152	0.1	U	U*	U	U*	U	U	U	U*	U	U	U	U	U	U*	U	U*	U	U	U	U*
Europium 154	0.1	U	U*	U	U*	U	U	U	U*	U	U*	U	U*	U	U*	U	U*	U	U	U	U*
Europium 155	0.1	U	U*	U	U*	U	U	U	U*	U	U*	U	U*	U	U*	U	U*	U	U	U	U*
Thorium-228		0.702		1.30		0.660		0.684		0.569		0.676		0.940		1.20		0.444		0.746	
Thorium-232		0.471		1.35		0.775		0.933		0.635		0.756		U	U	1.40		0.466		0.747	
Uranium-235(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Uranium-238(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Americium-241(gea)		U	U	U	U	U	U	U	U	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	U	U	U	U	U	U	U	U

010000

* - 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.

Project: WASHINGTON CLOSURE HANFORD									
Laboratory: EB									
Case	SDG: K0201								
Sample Number		J112X0		J112X2					
Remarks									
Sample Date		1/30/06		1/30/06					
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	10	0.416	UJ	0.289	UJ				
Total Strontium	1	0.002	U	0.134	U				
Potassium-40		11.5		12.9					
Cobalt 60	0.05	U	U*	U	U				
Cesium 137	0.05	U	U*	0.041					
Radium-226		0.699		0.540					
Radium-228		0.680		0.770					
Europium 152	0.1	U	U*	U	U				
Europium 154	0.1	U	U*	U	U				
Europium 155	0.1	U	U*	U	U				
Thorium-228		0.599		0.641					
Thorium-232		0.680		0.770					
Uranium-235(gea)		U	U	U	U				
Uranium-238(gea)		U	U	U	U				
Americium-241(gea)		U	U	U	U				
Silver-108m		U	U	U	U				

* - 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 K0201

7718-001 J112W0

DATA SHEET

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-01	Client sample id	J112W0		
Dept sample id	7718-001	Location/Matrix	141-C Excavation	SOLID	
Received	02/01/06	Collected/Weight	01/30/06 08:30	1026 g	
% solids	91.6	Custody/SAF No	RC-032-009	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.259	1.8	3.0	400	U J	H
Total Strontium	SR-RAD	-0.063	0.15	0.31	1.0	U	SR
Potassium 40	13966-00-2	6.91	0.62	0.39			GAM
Cobalt 60	10198-40-0	U		0.042	0.050	U	GAM
Cesium 137	10045-97-3	U		0.046	0.10	U	GAM
Radium 226	13982-63-3	0.272	0.076	0.078	0.10		GAM
Radium 228	15262-20-1	0.471	0.17	0.18	0.20		GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.15	0.10	U	GAM
Europium 155	14391-16-3	U		0.17	0.10	U	GAM
Thorium 228	14274-82-9	0.702	0.088	0.081			GAM
Thorium 232	TH-232	0.471	0.17	0.18			GAM
Uranium 235	15117-96-1	U		0.23		U	GAM
Uranium 238	U-238	U		5.3		U	GAM
Americium 241	14596-10-2	U		0.25		U	GAM
Silver 108m	14391-65-2	U		0.034		U	GAM

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R
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Protocol	Hanford
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Form	DVD-DS
Version	3.06
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-002 J112W1

DATA SHEET

SDG	7718	Client/Case no	Hanford SDG K0201
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R602006-02	Client sample id	J112W1
Dept sample id	7718-002	Location/Matrix	141-C Excavation SOLID
Received	02/01/06	Collected/Weight	01/30/06 08:40 1342 g
% solids	92.9	Custody/SAF No	RC-032-009 RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.480	1.8	3.1	400	U J	H
Total Strontium	SR-RAD	0.092	0.16	0.30	1.0	U	SR
Potassium 40	13966-00-2	26.3	1.4	0.44			GAM
Cobalt 60	10198-40-0	U		0.049	0.050	U	GAM
Cesium 137	10045-97-3	0.059	0.039	0.051	0.10		GAM
Radium 226	13982-63-3	0.988	0.11	0.097	0.10		GAM
Radium 228	15262-20-1	1.35	0.22	0.21	0.20		GAM
Europium 152	14683-23-9	U		0.13	0.10	U	GAM
Europium 154	15585-10-1	U		0.15	0.10	U	GAM
Europium 155	14391-16-3	U		0.18	0.10	U	GAM
Thorium 228	14274-82-9	1.30	0.075	0.065			GAM
Thorium 232	TH-232	1.35	0.22	0.21			GAM
Uranium 235	15117-96-1	U		0.25		U	GAM
Uranium 238	U-238	U		6.2		U	GAM
Americium 241	14596-10-2	U		0.54		U	GAM
Silver 108m	14391-65-2	U		0.035		U	GAM

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

SAMPLE DELIVERY GROUP K0201

7718-003 J112W2

DATA SHEET

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-03	Client sample id	J112W2		
Dept sample id	7718-003	Location/Matrix	141-C Excavation	SOLID	
Received	02/01/06	Collected/Weight	01/30/06 08:50	1399 g	
% solids	90.6	Custody/SAF No	RC-032-009	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.55	1.8	3.2	400	U J	H
Total Strontium	SR-RAD	-0.069	0.12	0.28	1.0	U	SR
Potassium 40	13966-00-2	13.8	1.4	0.23			GAM
Cobalt 60	10198-40-0	U		0.025	0.050	U	GAM
Cesium 137	10045-97-3	U		0.024	0.10	U	GAM
Radium 226	13982-63-3	0.498	0.079	0.043	0.10		GAM
Radium 228	15262-20-1	0.775	0.14	0.12	0.20		GAM
Europium 152	14683-23-9	U		0.061	0.10	U	GAM
Europium 154	15585-10-1	U		0.078	0.10	U	GAM
Europium 155	14391-16-3	U		0.088	0.10	U	GAM
Thorium 228	14274-82-9	0.660	0.045	0.030			GAM
Thorium 232	TH-232	0.775	0.14	0.12			GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		3.0		U	GAM
Americium 241	14596-10-2	U		0.15		U	GAM
Silver 108m	14391-65-2	U		0.019		U	GAM

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3/12/06

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

SAMPLE DELIVERY GROUP K0201

7718-004 J112W3

DATA SHEET

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-04	Client sample id	J112W3		
Dept sample id	7718-004	Location/Matrix	141-C Excavation	SOLID	
Received	02/01/06	Collected/Weight	01/30/06 09:00	1141 g	
% solids	93.2	Custody/SAF No	RC-032-009	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.456	1.9	3.3	400	U J	H
Total Strontium	SR-RAD	1.70	0.29	0.30	1.0		SR
Potassium 40	13966-00-2	13.9	1.1	0.54			GAM
Cobalt 60	10198-40-0	U		0.058	0.050	U	GAM
Cesium 137	10045-97-3	U		0.052	0.10	U	GAM
Radium 226	13982-63-3	0.529	0.10	0.11	0.10		GAM
Radium 228	15262-20-1	0.933	0.23	0.24	0.20		GAM
Europium 152	14683-23-9	U		0.12	0.10	U	GAM
Europium 154	15585-10-1	U		0.17	0.10	U	GAM
Europium 155	14391-16-3	U		0.13	0.10	U	GAM
Thorium 228	14274-82-9	0.684	0.054	0.054			GAM
Thorium 232	TH-232	0.933	0.23	0.24			GAM
Uranium 235	15117-96-1	U		0.18		U	GAM
Uranium 238	U-238	U		6.2		U	GAM
Americium 241	14596-10-2	U		0.18		U	GAM
Silver 108m	14391-65-2	U		0.034		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-005 J112W4

DATA SHEET

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-05	Client sample id	J112W4		
Dept sample id	7718-005	Location/Matrix	141-C Excavation	SOLID	
Received	02/01/06	Collected/Weight	01/30/06 09:10	1219 g	
% solids	94.3	Custody/SAF No	RC-032-009	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.28	1.9	3.3	400	U J	H
Total Strontium	SR-RAD	0.122	0.20	0.35	1.0	U	SR
Potassium 40	13966-00-2	14.1	0.84	0.29			GAM
Cobalt 60	10198-40-0	U		0.045	0.050	U	GAM
Cesium 137	10045-97-3	U		0.045	0.10	U	GAM
Radium 226	13982-63-3	0.459	0.078	0.078	0.10		GAM
Radium 228	15262-20-1	0.635	0.15	0.16	0.20		GAM
Europium 152	14683-23-9	U		0.088	0.10	U	GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.13	0.10	U	GAM
Thorium 228	14274-82-9	0.569	0.043	0.041			GAM
Thorium 232	TH-232	0.635	0.15	0.16			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		5.0		U	GAM
Americium 241	14596-10-2	U		0.31		U	GAM
Silver 108m	14391-65-2	U		0.025		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-006 J112W5

DATA SHEET

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-06	Client sample id	J112W5		
Dept sample id	7718-006	Location/Matrix	141-C Excavation	SOLID	
Received	02/01/06	Collected/Weight	01/30/06 09:20	1357 g	
% solids	95.3	Custody/SAF No	RC-032-009	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.996	1.9	3.2	400	UJ	H
Total Strontium	SR-RAD	0.189	0.13	0.22	1.0	U	SR
Potassium 40	13966-00-2	14.3	0.90	0.36			GAM
Cobalt 60	10198-40-0	U		0.042	0.050	U	GAM
Cesium 137	10045-97-3	U		0.038	0.10	U	GAM
Radium 226	13982-63-3	0.566	0.072	0.068	0.10		GAM
Radium 228	15262-20-1	0.756	0.17	0.17	0.20		GAM
Europium 152	14683-23-9	U		0.10	0.10	U	GAM
Europium 154	15585-10-1	U		0.14	0.10	U	GAM
Europium 155	14391-16-3	U		0.13	0.10	U	GAM
Thorium 228	14274-82-9	0.676	0.050	0.052			GAM
Thorium 232	TH-232	0.756	0.17	0.17			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		4.9		U	GAM
Americium 241	14596-10-2	U		0.33		U	GAM
Silver 108m	14391-65-2	U		0.028		U	GAM

100F Remain.SitesBurialGrnds-SoilFP

3/17/06

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

SAMPLE DELIVERY GROUP K0201

7718-007 J112W6

DATA SHEET

SDG	7718	Client/Case no	Hanford SDG K0201
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R602006-07	Client sample id	J112W6
Dept sample id	7718-007	Location/Matrix	141-C Excavation SOLID
Received	02/01/06	Collected/Weight	01/30/06 09:30 812 g
% solids	84.8	Custody/SAF No	RC-032-009 RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.131	1.8	3.0	400	U J	H
Total Strontium	SR-RAD	-0.105	0.12	0.27	1.0	U	SR
Potassium 40	13966-00-2	8.07	1.7	1.7			GAM
Cobalt 60	10198-40-0	U		0.17	0.050	U	GAM
Cesium 137	10045-97-3	U		0.13	0.10	U	GAM
Radium 226	13982-63-3	0.408	0.21	0.25	0.10		GAM
Radium 228	15262-20-1	U		0.71	0.20	U	GAM
Europium 152	14683-23-9	U		0.42	0.10	U	GAM
Europium 154	15585-10-1	U		0.54	0.10	U	GAM
Europium 155	14391-16-3	U		0.30	0.10	U	GAM
Thorium 228	14274-82-9	0.940	0.22	0.20			GAM
Thorium 232	TH-232	U		0.71		U	GAM
Uranium 235	15117-96-1	U		0.44		U	GAM
Uranium 238	U-238	U		17		U	GAM
Americium 241	14596-10-2	U		0.29		U	GAM
Silver 108m	14391-65-2	U		0.099		U	GAM

100F Remain.SitesBurialGrnds-SoilFP

R
3/17/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-008 J112W7

DATA SHEET

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-08	Client sample id	J112W7		
Dept sample id	7718-008	Location/Matrix	141-C Excavation	SOLID	
Received	02/01/06	Collected/Weight	01/30/06 09:45	1185 g	
% solids	91.2	Custody/SAF No	RC-032-009	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.38	1.8	3.1	400	U J	H
Total Strontium	SR-RAD	0.096	0.16	0.31	1.0	U	SR
Potassium 40	13966-00-2	26.1	1.2	0.39			GAM
Cobalt 60	10198-40-0	U		0.043	0.050	U	GAM
Cesium 137	10045-97-3	U		0.044	0.10	U	GAM
Radium 226	13982-63-3	0.916	0.099	0.091	0.10		GAM
Radium 228	15262-20-1	1.40	0.20	0.18	0.20		GAM
Europium 152	14683-23-9	U		0.11	0.10	U	GAM
Europium 154	15585-10-1	U		0.16	0.10	U	GAM
Europium 155	14391-16-3	U		0.17	0.10	U	GAM
Thorium 228	14274-82-9	1.20	0.066	0.061			GAM
Thorium 232	TH-232	1.40	0.20	0.18			GAM
Uranium 235	15117-96-1	U		0.19		U	GAM
Uranium 238	U-238	U		5.6		U	GAM
Americium 241	14596-10-2	U		0.43		U	GAM
Silver 108m	14391-65-2	U		0.032		U	GAM

100F Remain.SitesBurialGrnds-SoilFP

3/17/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-009 J112W8

DATA SHEET

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-09	Client sample id	J112W8		
Dept sample id	7718-009	Location/Matrix	141-C Excavation	SOLID	
Received	02/01/06	Collected/Weight	01/30/06 09:55	1133 g	
% solids	95.4	Custody/SAF No	RC-032-009	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.385	1.7	2.9	400	UJ	H
Total Strontium	SR-RAD	0.080	0.16	0.30	1.0	U	SR
Potassium 40	13966-00-2	15.2	1.6	0.24			GAM
Cobalt 60	10198-40-0	U		0.026	0.050	U	GAM
Cesium 137	10045-97-3	U		0.025	0.10	U	GAM
Radium 226	13982-63-3	0.345	0.088	0.053	0.10		GAM
Radium 228	15262-20-1	0.466	0.13	0.11	0.20		GAM
Europium 152	14683-23-9	U		0.062	0.10	U	GAM
Europium 154	15585-10-1	U		0.085	0.10	U	GAM
Europium 155	14391-16-3	U		0.081	0.10	U	GAM
Thorium 228	14274-82-9	0.444	0.045	0.030			GAM
Thorium 232	TH-232	0.466	0.13	0.11			GAM
Uranium 235	15117-96-1	U		0.096		U	GAM
Uranium 238	U-238	U		3.2		U	GAM
Americium 241	14596-10-2	U		0.14		U	GAM
Silver 108m	14391-65-2	U		0.018		U	GAM

100F Remain.SitesBurialGrnds-SoilFP

3/17/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-010 J112W9

DATA SHEET

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-10	Client sample id	J112W9		
Dept sample id	7718-010	Location/Matrix	141-C Excavation	SOLID	
Received	02/01/06	Collected/Weight	01/30/06 10:05	1292 g	
% solids	88.5	Custody/SAF No	RC-032-009	RC-032	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-0.237	1.8	3.0	400	U J	H
Total Strontium	SR-RAD	0.049	0.16	0.32	1.0	U	SR
Potassium 40	13966-00-2	13.3	1.2	0.63			GAM
Cobalt 60	10198-40-0	U		0.065	0.050	U	GAM
Cesium 137	10045-97-3	U		0.056	0.10	U	GAM
Radium 226	13982-63-3	0.661	0.12	0.11	0.10		GAM
Radium 228	15262-20-1	0.747	0.35	0.34	0.20		GAM
Europium 152	14683-23-9	U		0.15	0.10	U	GAM
Europium 154	15585-10-1	U		0.20	0.10	U	GAM
Europium 155	14391-16-3	U		0.15	0.10	U	GAM
Thorium 228	14274-82-9	0.746	0.069	0.073			GAM
Thorium 232	TH-232	0.747	0.35	0.34			GAM
Uranium 235	15117-96-1	U		0.21		U	GAM
Uranium 238	U-238	U		7.9		U	GAM
Americium 241	14596-10-2	U		0.21		U	GAM
Silver 108m	14391-65-2	U		0.038		U	GAM

100F Remain.SitesBurialGrnds-SoilFP

3/17/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-011 J112X0

DATA SHEET

SDG	7718	Client/Case no	Hanford SDG K0201
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R602006-11	Client sample id	J112X0
Dept sample id	7718-011	Location/Matrix	141-C Excavation SOLID
Received	02/01/06	Collected/Weight	01/30/06 09:30 822 g
% solids	85.2	Custody/SAF No	RC-032-009 RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.416	1.9	3.2	400	U J	H
Total Strontium	SR-RAD	0.002	0.14	0.30	1.0	U	SR
Potassium 40	13966-00-2	11.5	3.1	0.97			GAM
Cobalt 60	10198-40-0	U		0.11	0.050	U	GAM
Cesium 137	10045-97-3	U		0.083	0.10	U	GAM
Radium 226	13982-63-3	0.699	0.20	0.18	0.10		GAM
Radium 228	15262-20-1	0.680	0.37	0.37	0.20		GAM
Europium 152	14683-23-9	U		0.22	0.10	U	GAM
Europium 154	15585-10-1	U		0.29	0.10	U	GAM
Europium 155	14391-16-3	U		0.26	0.10	U	GAM
Thorium 228	14274-82-9	0.599	0.12	0.12			GAM
Thorium 232	TH-232	0.680	0.37	0.37			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		0.35		U	GAM
Silver 108m	14391-65-2	U		0.065		U	GAM

100F Remain.SitesBurialGrnds-SoilFP

3/17/06

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

SAMPLE DELIVERY GROUP K0201

7718-012 J112X2

DATA SHEET

SDG	7718	Client/Case no	Hanford SDG K0201
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R602006-12	Client sample id	J112X2
Dept sample id	7718-012	Location/Matrix	141-C Staging Area SOLID
Received	02/01/06	Collected/Weight	01/30/06 10:15 1305 g
% solids	92.4	Custody/SAF No	RC-032-010 RC-032

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.289	1.8	3.0	400	U J	H
Total Strontium	SR-RAD	0.134	0.17	0.31	1.0	U	SR
Potassium 40	13966-00-2	12.9	1.8	0.32			GAM
Cobalt 60	10198-40-0	U		0.030	0.050	U	GAM
Cesium 137	10045-97-3	0.041	0.028	0.032	0.10		GAM
Radium 226	13982-63-3	0.540	0.10	0.058	0.10		GAM
Radium 228	15262-20-1	0.770	0.17	0.14	0.20		GAM
Europium 152	14683-23-9	U		0.079	0.10	U	GAM
Europium 154	15585-10-1	U		0.095	0.10	U	GAM
Europium 155	14391-16-3	U		0.097	0.10	U	GAM
Thorium 228	14274-82-9	0.641	0.054	0.037			GAM
Thorium 232	TH-232	0.770	0.17	0.14			GAM
Uranium 235	15117-96-1	U		0.12		U	GAM
Uranium 238	U-238	U		3.7		U	GAM
Americium 241	14596-10-2	U		0.17		U	GAM
Silver 108m	14391-65-2	U		0.021		U	GAM

100F Remain.SitesBurialGrnds-SoilFP

3/17/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/16/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0201 was composed of twelve 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 February 16, 2006.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

No problems were encountered during the course of the analyses.

2.2 Total Strontium 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."

Mel Mannion

Melissa C. Mannion
Senior Program Manager

2/20/6

Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-032-009	Page 1 of 3
Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8C; Data Turnaround:
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation K0201 (7718)		SAF No.: RC-032	Air Quality: 15 day
Ice Chest No.: ERC-02-001	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060240		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

~~Cool 4 degrees C~~ None

~~RS~~ 1-31-06

Preservation	None	Cool 4C	Cool 4C	None	None	None				
Type of Container	G/P	G/P	aG	G/P	G/P	G/P				
No. of Container(s)	1	1	1	1	1	1				
Volume	250g	~~60mL~~ 1-30-06	250g	~~300mL~~ 1000 MS 1/30/06	60mL	60mL				
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	~~Carbon-14~~; Tritium - H3 MS	~~Nickel-63~~; Strontium-89,90 -- Total Sr 1/30/06				

Sample No.	Matrix *	Sample Date	Sample Time										
J112W0	SOIL	1-30-06	0830				X	X	X				
J112W1	SOIL	1-30-06	0840				X	X	X				
J112W2	SOIL	1-30-06	0850				X	X	X				
J112W3	SOIL	1-30-06	0900				X	X	X				
J112W4	SOIL	1-30-06	0910				X	X	X				

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: [signature] MSTANKOVICH	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/IC	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/IC	Date/Time: 1-31-06 1045	Received By/Stored In: RZ Steffler R.J. Steffler	Date/Time: 1045 1-31-06
Relinquished By/Removed From: RZ Steffler R.J. Steffler	Date/Time: 1500 WCH 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: FED EX	Date/Time:	Received By/Stored In: [signature]	Date/Time: 2/1/06 10:00
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) 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 # IC on 1/31/06

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

3HI-EE-011 (08/29/2005)

000026

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-032-009	Page 2 of 3
Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8c; Data Turnaround: 15 day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation K0201 (7718)		SAF No.: RC-032	Air Quality
Ice Chest No.: ERC-02-001	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060240		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

~~Cool 4 degrees C~~ None

RZS 1-31-06

Preservation	None	Cool 4C	Cool 4C	None	None	None				
Type of Container	G/P	G/P	aG	G/P	G/P	G/P				
No. of Container(s)	1	1	1	1	1	1				
Volume	250g	60mL	250g	~~500~~mL 1000 MA 1/30/06	60mL	60mL				
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196 MA 1-30-06	PAHs - 8310	See item (2) in Special Instructions.	~~Carbon-14~~ Tritium - H3 MA 1-30-06	~~Nickel-63~~ Strontium-89,90 -- Total Sr				

Sample No.	Matrix *	Sample Date	Sample Time										
J112W5	SOIL	1-30-06	0920				X	X	X				
J112W6	SOIL	1-30-06	0930				X	X	X				
J112W7	SOIL	1-30-06	0945				X	X	X				
J112W8	SOIL	1-30-06	0955				X	X	X				
J112W9	SOIL	1-30-06	1005				X	X	X				

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: [signature] M Stankovich	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/IC	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/IC	Date/Time: 1-31-06 / 1045	Received By/Stored In: RZ Steffler R.J. Steffler	Date/Time: 1045 1-31-06
Relinquished By/Removed From: RZ Steffler R.J. Steffler	Date/Time: WCH 1500 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: FED EX	Date/Time:	Received By/Stored In: [signature]	Date/Time: 2/1/06 10:00
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) 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 # IC on 1/31/06

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)

000027

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-009	Page 3 of 3

Collector: Coffman/Stankovich	Company Contact: R.T. Coffman — Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8C — Data Turnaround: 15 day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation K0201 (7718)	SAF No.: RC-032	Air Quality
Ice Chest No.: ERC-02-001	Field Logbook No.: EFL-1174 — COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060240	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

~~cool 4 degrees C~~ None

RZS 1-31-06

SAMPLE ANALYSIS												
Preservation	None	Cool 4C	Cool 4C	None	None	None						
Type of Container	G/P	G/P	aG	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1	1						
Volume	250g	~~600mL~~ 1-30-06	250g	~~500mL~~ 1000 NW 1/30/06	60mL	60mL						
	See item (1) in Special Instructions	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	~~Carbon-14~~; Tritium - H3 NW 1-30-06	~~Nickel-63~~; Strontium-89,90 -- Total Sr						
Sample No.	Matrix *	Sample Date	Sample Time									
J112X0	SOIL	1-30-06	~~0900~~				X	X	X			
~~J112X1~~ NW 1-30-06	~~SOIL~~		NW 1-30-06									

820028

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: MSTankoach	1430 1/30/06	3728/IC	1/30/06 1430
Relinquished By/Removed From: 3728/IC	1-31-06 1045	RZ Steffler RZ Steffler	1045 1-31-06
Relinquished By/Removed From: RZ Steffler RZ Steffler	1500 WITH 1-31-06	Received By/Stored In: Fed Ex	
Relinquished By/Removed From: FED EX		Received By/Stored In: Alice Kennedy	2/1/06 10:00
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 - 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 # IC on 1/31/06

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-032-010	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:
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Staging Area K0201 (7718)	SAF No.: RC-032	Air Quality: 15 days
Ice Chest No.: ERC-02-001	Field Logbook No.: EFL-1174; COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060240	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

~~not 4 degrees C~~ None

RZS 1-31-06

Preservation	None	Cool 4C	Cool 4C	None	None	None				
Type of Container	G/P	G/P	aG	G/P	G/P	G/P				
No. of Container(s)	1	1	1	1	1	1				
Volume	250g	60mL	250g	~~500mL~~ 1000 MD 1/30/06	60mL	60mL				
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex 7196 1-30-06	PAHs - 8310	See item (2) in Special Instructions	~~Carbon-14,~~ Tritium - H3 MD 1-30-06	~~Nickel-63,~~ Strontium-89,90 -- Total Sr				

Sample No.	Matrix *	Sample Date	Sample Time										
J112X2	SOIL	1-30-06	1015				X	X	X				

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: MJC MStankovich	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/IC	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/IC	Date/Time: 1-31-06 1045	Received By/Stored In: RZ Steffler R.Z. Steffler	Date/Time: 1045 1-31-06
Relinquished By/Removed From: RZ Steffler R.Z. Steffler WCH	Date/Time: 1500 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: FED EX	Date/Time:	Received By/Stored In: Alex Kelleeton	Date/Time: 2/1/06 10:00
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) 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 # IC on 1/31/06

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: 100F 141-S			DATA PACKAGE: K0201		
VALIDATOR: TLI		LAB: EB		DATE: 3/14/06	
			SDG: K0201		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			
SAMPLES/MATRIX					
J112W0	J112W1	J112W2	J112W3	J112W4	J112W5
J112W6	J112W7	J112W8	J112W9	J112X0	J112X2
					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: no MS - Jall 3H

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: Ra 226 - 53%
Th 228 - 32%

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: 33 over

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-014 **Method Blank**

METHOD BLANK

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-14	Client sample id	Method Blank		
Dept sample id	7718-014	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
Tritium	10028-17-8	-0.617	2.2	3.7	400	U	H
Total Strontium	SR-RAD	-0.084	0.14	0.31	1.0	U	SR

100F Remain.SitesBurialGrnds-SoilFP

QC-BLANK #55906

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-017 **Method Blank**

METHOD BLANK

SDG	7718	Client/Case no	Hanford	SDG K0201	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R602006-17	Client sample id	Method Blank		
Dept sample id	7718-017	Material/Matrix		SOLID	
		SAF No	RC-032		

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Potassium 40	13966-00-2	U		1.3		U	GAM
Cobalt 60	10198-40-0	U		0.055	0.050	U	GAM
Cesium 137	10045-97-3	U		0.074	0.10	U	GAM
Radium 226	13982-63-3	U		0.13	0.10	U	GAM
Radium 228	15262-20-1	U		0.31	0.20	U	GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.21	0.10	U	GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Thorium 228	14274-82-9	U		0.094		U	GAM
Thorium 232	TH-232	U		0.31		U	GAM
Uranium 235	15117-96-1	U		0.24		U	GAM
Uranium 238	U-238	U		8.6		U	GAM
Americium 241	14596-10-2	U		0.52		U	GAM
Silver 108m	14391-65-2	U		0.055		U	GAM

100F Remain.SitesBurialGrnds-SoilFP

QC-BLANK #56004

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-013

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7718
Contact Melissa C. Mannion

Client/Case no Hanford SDG K0201
Contract No. 630

Lab sample id R602006-13
Dept sample id 7718-013

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
Tritium	860	19	7.0	400		H	930	37	92	85-115	80-120
Total Strontium	10.7	0.67	0.30	1.0		SR	9.85	0.39	109	80-120	80-120

100F Remain.SitesBurialGrnds-SoilFP

QC-LCS #55905

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-016

Lab Control Sample

LAB CONTROL SAMPLE

SDG	7718	Client/Case no	Hanford SDG K0201
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R602006-16	Client sample id	Lab Control Sample
Dept sample id	7718-016	Material/Matrix	SOLID
		SAF No	RC-032

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Cobalt 60	3.09	0.33	0.15	0.050		GAM	2.71	0.11	114	68-132	80-120
Cesium 137	3.00	0.27	0.18	0.10		GAM	2.74	0.11	110	71-129	80-120

100F Remain.SitesBurialGrnds-SoilFP

QC-LCS #56003

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-LCS
Version	3.06
Report date	02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-015 J112W5

DUPLICATE

SDG	7718			Client/Case no	Hanford SDG K0201
Contact	Melissa C. Mannion			Contract	No. 630
	DUPLICATE		ORIGINAL		
Lab sample id	R602006-15	Lab sample id	R602006-06	Client sample id	J112W5
Dept sample id	7718-015	Dept sample id	7718-006	Location/Matrix	141-C Excavation SOLID
		Received	02/01/06	Collected/Weight	01/30/06 09:20 1357 g
% solids	95.3	% solids	95.3	Custody/SAF No	RC-032-009 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
Tritium	0.928	1.9	3.2	400	U	H	-0.996	1.9	3.2	U	-		1.4
Total Strontium	0.222	0.12	0.20	1.0		SR	0.189	0.13	0.22	U	16	131	0.4

100F Remain.SitesBurialGrnds-SoilFP

QC-DUP#6 55907

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	02/16/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0201

7718-018 J112W5

DUPLICATE

SDG	7718			Client/Case no	Hanford SDG K0201
Contact	Melissa C. Mannion			Contract	No. 630
	DUPLICATE		ORIGINAL		
Lab sample id	R602006-18	Lab sample id	R602006-06	Client sample id	J112W5
Dept sample id	7718-018	Dept sample id	7718-006	Location/Matrix	141-C Excavation SOLID
		Received	02/01/06	Collected/Weight	01/30/06 09:20 1357 g
% solids	95.3	% solids	95.3	Custody/SAF No	RC-032-009 RC-032

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	DER σ
Potassium 40	13.7	0.76	0.34			GAM	14.3	0.90	0.36		4	34	0.4
Cobalt 60	U		0.035	0.050	U	GAM	U		0.042	U	-		0.3
Cesium 137	U		0.035	0.10	U	GAM	U		0.038	U	-		0.1
Radium 226	0.520	0.070	0.070	0.10		GAM	0.566	0.072	0.068		8	42	0.6
Radium 228	0.850	0.15	0.14	0.20		GAM	0.756	0.17	0.17		12	53	0.7
Europium 152	U		0.084	0.10	U	GAM	U		0.10	U	-		0.2
Europium 154	U		0.12	0.10	U	GAM	U		0.14	U	-		0.2
Europium 155	U		0.11	0.10	U	GAM	U		0.13	U	-		0.2
Thorium 228	0.652	0.039	0.038			GAM	0.676	0.050	0.052		4	35	0.3
Thorium 232	0.850	0.15	0.14			GAM	0.756	0.17	0.17		12	53	0.7
Uranium 235	U		0.13		U	GAM	U		0.16	U	-		0.3
Uranium 238	U		4.3		U	GAM	U		4.9	U	-		0.2
Americium 241	U		0.27		U	GAM	U		0.33	U	-		0.3
Silver 108m	U		0.022		U	GAM	U		0.028	U	-		0.3

100F Remain.SitesBurialGrnds-SoilFP

QC-DUP#6 56005

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	02/16/06

Date: 17 March 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 141-C
Subject: PAH - Data Package No. K0201-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0201 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
J112W0	1/30/06	Soil	C	See note 1
J112W1	1/30/06	Soil	C	See note 1
J112W2	1/30/06	Soil	C	See note 1
J112W3	1/30/06	Soil	C	See note 1
J112W4	1/30/06	Soil	C	See note 1
J112W5	1/30/06	Soil	C	See note 1
J112W6	1/30/06	Soil	C	See note 1
J112W7	1/30/06	Soil	C	See note 1
J112W8	1/30/06	Soil	C	See note 1
J112W9	1/30/06	Soil	C	See note 1
J112X0	1/30/06	Soil	C	See note 1
J112X2	1/30/06	Soil	C	See note 1

1 – Polyaromatic hydrocarbons by 8310.

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

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: 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, 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 met.

- **Method Blanks**

Method blank analyses are conducted 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. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to interference in the matrix spike analysis, all acenaphthene results were qualified as estimates and flagged "J".

Due to a matrix spike duplicate recovery outside QC limits (49%), all ideno(1,2,3-cd)pyrene results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to interference in the surrogate analysis, all PAH results in sample J112W0 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. 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.

Due to an RPD outside QC limits (57%), all ideno(1,2,3-cd)pyrene results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J112W6/J112X0) 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 (RQL's) to ensure that laboratory detection levels meet the required criteria. Thirty-five analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0201-LLI 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 interference in the matrix spike analysis, all acenaphthene results were qualified as estimates and flagged "J".
- Due to a matrix spike duplicate recovery outside QC limits (49%), all ideno(1,2,3-cd)pyrene results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (57%), all ideno(1,2,3-cd)pyrene results were qualified as estimates and flagged "J".
- Due to interference in the surrogate analysis, all PAH results in sample J112W0 were qualified as estimates and flagged "J".

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

Thirty-five analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI 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 same 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 usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

POLYAROMATIC HYDROCARBON DATA QUALIFICATION SUMMARY*

SDG: K0201	REVIEWER: TLI	Project: 141-C	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Acenaphthene	J	All	MS interference
Ideno(1,2,3-cd)pyrene	J	All	MS recovery and RPD
All PAH analytes	J	J112W0	Surrogate interference

* - 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

PAH ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD																	
Laboratory: LLI	SDG: K0201																
Sample Number		J112W0		J112W1		J112W2		J112W3		J112W4		J112W5		J112W6		J112W7	
Remarks																	
Sample Date		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06	
Extraction Date		2/2/06		2/2/06		2/2/06		2/2/06		2/2/06		2/2/06		2/2/06		2/2/06	
Analysis Date		2/6/06		2/6/06		2/6/06		2/6/06		2/6/06		2/6/06		2/6/06		2/6/06	
PAH	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Naphthalene	15	36.5	UJ	36.6	U	37.2	U	35.9	U	35.3	U	36.3	U	38.8	U	36.4	U
Acenaphthylene	15	36.5	UJ	36.6	U	37.2	U	35.9	U	35.3	U	36.3	U	38.8	U	36.4	U
Acenaphthene	15	36.5	UJ	36.6	UJ	37.2	UJ	35.9	UJ	35.3	UJ	36.3	UJ	38.8	UJ	36.4	UJ
Fluorene	15	11	J	30		3.72	U	3.59	U	4.6		3.63	U	3.88	U	3.64	U
Phenanthrene	15	140	J	280		11		3.59	U	7.6		6.1		3.88	U	3.64	U
Anthracene	15	26	J	65		3.72	U	3.59	U	3.53	U	3.63	U	3.88	U	3.64	U
Fluoranthene	15	280	J	400		23		7.18	U	28		9.4		7.77	U	7.27	U
Pyrene	15	200	J	440		18		7.18	U	12		7.25	U	7.77	U	7.27	U
Benzo(a)anthracene	15	69	J	150		6.3		4.9		9.4		5.5		3.88	U	3.64	U
Chrysene	15	81	J	200		8.3		4.1		9.2		3.63	U	3.88	U	3.64	U
Benzo(b)fluoranthene	15	53	J	110		6.4		5.0		10		4.0		3.88	U	3.64	U
Benzo(k)fluoranthene	15	35	J	76		0.00		3.59	U	4.2		3.63	U	3.88	U	3.64	U
Benzo(a)pyrene	15	70	J	160		8.8		4.5		11		3.63	U	3.88	U	3.64	U
Dibenz(a,h)anthracene	15	10	J	24		3.72	U	3.59	U	3.53	U	3.63	U	3.88	U	3.64	U
Benzo(g,h,i)perylene	15	45	J	99		16		8.8		14		14		3.88	U	3.64	U
Indeno(1,2,3-cd)pyrene	15	52	J	110	J	3.4	J	8.8	J	13	J	13	J	3.88	UJ	3.64	UJ

000011

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.

* - RQL exceeded

PAH ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD																	
Laboratory: LLI	SDG: K0201																
Sample Number		J112W8		J112W9		J112X0		J112X2									
Remarks						Duplicate											
Sample Date		1/30/06		1/30/06		1/30/06		1/30/06									
Extraction Date		2/2/06		2/2/06		2/2/06		2/2/06									
Analysis Date		2/6/06		2/6/06		2/7/06		2/7/06									
PAH	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Naphthalene	15	34.6	U	37.5	U	38.8	U	36.3	U								
Acenaphthylene	15	34.6	U	37.5	U	38.8	U	36.3	U								
Acenaphthene	15	34.6	UJ	37.5	UJ	38.8	UJ	100	J								
Fluorene	15	3.46	U	3.75	U	3.88	U	3.63	U								
Phenanthrene	15	3.46	U	3.75	U	3.88	U	70									
Anthracene	15	3.46	U	3.75	U	3.88	U	7.6									
Fluoranthene	15	6.92	U	7.50	U	7.77	U	88									
Pyrene	15	6.92	U	9.5		7.77	U	82									
Benzo(a)anthracene	15	3.46	U	5.7		3.88	U	76									
Chrysene	15	3.46	U	3.6		3.88	U	200									
Benzo(b)fluoranthene	15	3.46	U	3.75	U	3.88	U	48									
Benzo(k)fluoranthene	15	3.46	U	3.75	U	3.88	U	17									
Benzo(a)pyrene	15	3.46	U	3.75	U	3.88	U	46									
Dibenz(a,h)anthracene	15	3.46	U	3.75	U	3.88	U	3.63									
Benzo(g,h,i)perylene	15	3.46	U	7.5		3.88	U	34									
Indeno(1,2,3-cd)pyrene	15	3.46	UJ	3.75	UJ	3.88	UJ	58	J								

000012

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.

* - RQL exceeded

Lionville Laboratory, Inc.

PAH'S by HPLC / Method 8310 Report Date: 02/16/06 10:46

RFW Batch Number: 0602L192 Client: TNUHANFORD RC-032 K0201 Work Order: 11343606001 Page: 1

	Cust ID:	J112W5		J112W5		J112W5		J112W6		J112W7		J112W8	
Sample Information	RFW#:	001		001 MS		001 MSD		002		003		004	
	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	
	Triphenylene	107	%	86	%	98	%	102	%	112	%	109	%
			fl		fl		fl		fl		fl		fl
Naphthalene		36.3	U	96	%	117	%	38.8	U	36.4	U	34.6	U
Acenaphthylene		36.3	U	48	%	59	%	38.8	U	36.4	U	34.6	U
Acenaphthene		36.3	UJ	I	%	78	%	38.8	UJ	36.4	UJ	34.6	UJ
Fluorene		3.63	U	91	%	93	%	3.88	U	3.64	U	3.46	U
Phenanthrene		6.1		100	%	92	%	3.88	U	3.64	U	3.46	U
Anthracene		3.63	U	87	%	99	%	3.88	U	3.64	U	3.46	U
Fluoranthene		9.4		77	%	78	%	7.77	U	7.27	U	6.92	U
Pyrene		7.25	U	107	%	96	%	7.77	U	7.27	U	6.92	U
Benzo(a)anthracene		5.5		64	%	75	%	3.88	U	3.64	U	3.46	U
Chrysene		3.63	U	68	%	71	%	3.88	U	3.64	U	3.46	U
Benzo(b)fluoranthrene		4.0		77	%	93	%	3.88	U	3.64	U	3.46	U
Benzo(k)fluoranthrene		3.63	U	88	%	102	%	3.88	U	3.64	U	3.46	U
Benzo(a)pyrene		3.63	U	78	%	91	%	3.88	U	3.64	U	3.46	U
Dibenzo(a,h)anthracene		3.63	U	90	%	106	%	3.88	U	3.64	U	3.46	U
Benzo(ghi)perylene		14		67	%	80	%	3.88	U	3.64	U	3.46	U
Indeno(1,2,3-cd)pyrene		13	J	88	%	49 *	%	3.88	UJ	3.64	UJ	3.46	UJ

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

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3/17/06

PAH'S by HPLC / Method 8310 Report Date: 02/16/06 10:46

RFW Batch Number: 0602L192 Client: TNUHANFORD RC-032 K0201 Work Order: 11343606001 Page: 2

	Cust ID:	J112W9	J112W0	J112W1	J112W2	J112W3	J112W4
Sample Information	RFW#:	005	006	007	008	009	010
	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
	Triphenylene	95 %	.I %	122 %	110 %	95 %	99 %
		fl	fl	fl	fl	fl	fl
Naphthalene		37.5 U	36.5 U J	36.6 U	37.2 U	35.9 U	35.3 U
Acenaphthylene		37.5 U	36.5 U J	36.6 U	37.2 U	35.9 U	35.3 U
Acenaphthene		37.5 U J	36.5 U J	36.6 U J	37.2 U J	35.9 U J	35.3 U J
Fluorene		3.75 U	11	30	3.72 U	3.59 U	4.6
Phenanthrene		3.75 U	140	280	11	3.59 U	7.6
Anthracene		3.75 U	26	65	3.72 U	3.59 U	3.53 U
Fluoranthene		7.50 U	280	400	23	7.18 U	28
Pyrene		9.5	200	440	18	7.18 U	12
Benzo(a)anthracene		5.7	69	150	6.3	4.9	9.4
Chrysene		3.6 J	81	200	8.3	4.1	9.2
Benzo(b)fluoranthrene		3.75 U	53	110	6.4	5.0	10
Benzo(k)fluoranthrene		3.75 U	35	76	0.00	3.59 U	4.2
Benzo(a)pyrene		3.75 U	70	160	8.8	4.5	11
Dibenzo(a,h)anthracene		3.75 U	10	24	3.72 U	3.59 U	3.53 U
Benzo(ghi)perylene		7.5	45	99	16	8.8	14
Indeno(1,2,3-cd)pyrene		3.75 U J	52 J	110 J	3.4 J	8.8 J	13 J

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

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RC 3/17/06

Lionville Laboratory, Inc.

PAH'S by HPLC / Method 8310

Report Date: 02/16/06 10:46

RFW Batch Number: 0602L192 Client: TNUHANFORD RC-032 K0201 Work Order: 11343606001 Page: 3

	Cust ID:	J112X0	J112X2	BLK	BLK BS
Sample Information	RFW#:	011	013	06LE0082-MB1	06LE0082-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Triphenylene		102 %	100 %	93 %	104 %
Naphthalene		38.8 U	36.3 U	33.3 U	93 %
Acenaphthylene		38.8 U	36.3 U	33.3 U	78 %
Acenaphthene		38.8 U J	100 J	33.3 U	54 %
Fluorene		3.88 U	3.63 U	3.33 U	109 %
Phenanthrene		3.88 U	70	3.33 U	112 %
Anthracene		3.88 U	7.6	3.33 U	105 %
Fluoranthene		7.77 U	88	6.67 U	107 %
Pyrene		7.77 U	82	6.67 U	114 %
Benzo(a)anthracene		3.88 U	76	3.33 U	97 %
Chrysene		3.88 U	200	3.33 U	110 %
Benzo(b)fluoranthrene		3.88 U	48	3.33 U	109 %
Benzo(k)fluoranthrene		3.88 U	17	3.33 U	115 %
Benzo(a)pyrene		3.88 U	46	3.33 U	96 %
Dibenzo(a,h)anthracene		3.88 U	3.63 U	3.33 U	116 %
Benzo(ghi)perylene		3.88 U	34	3.33 U	108 %
Indeno(1,2,3-cd)pyrene		3.88 U J	58 J	3.33 U	111 %

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

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3/17/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0602L192
SDG/SAF # K0201/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 02-01-2006

PAH

Twelve (12) soil samples were collected on 01-30-2006.

The samples and their associated QC samples were extracted on 02-02-2006 and analyzed according to criteria set for the in Lionville Laboratory SOPs based on SW846, 3rd Edition for Polyaromatic Hydrocarbons on 02-06,07-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8310.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. The method blank was below the reporting limits for all target compounds.
4. All obtainable surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. One (1) of thirty-one (31) obtainable matrix spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
7. The initial calibrations associated with this data set were within acceptance criteria.
8. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. 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.
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 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

2/12/06
Date

som\r:\group\data\pah\tnu hanford\0602-192.doc

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 1 4 pages.

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 066C 040

Initiator: John Lach
Date: 2/16/06
Client: TMV

Batch: 06021132
Samples: MSD
Method: SW846/MCAWW/CLP/

Parameter: PAH
Matrix: SO.1
Prep Batch: 06LE0082

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other _____

b. General Discrepancy

__ Missing Sample/Extract* __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample* __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. Problem (Include all relevant specific results; attach data if necessary)

Indeno (1,2,3-cd) pyrene decreased @ 49% in MSD (Limit 63%)

2. Known or Probable Causes(s)

matrix effects.

3. Discussion and Proposed Action

__ Re-log
__ Entire Batch
__ Following Samples: _____
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to _____
__ Place On/Take Off Hold (circle)

Other Description:

Narr. as BS & MS are in control.

4. Project Manager Instructions...signature/date: 2/16/06

✓ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: 2/16/06

Other Explanation:

__ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
__	X Initiator	__	__ Metals: Beegle
__	X Lab General Manager: M. Taylor	__	__ Inorganic: Perrone
__	X Project Mgr: Stone/Johnson	__	__ GC/LC: Kiger
__	__ Data Management: Stilwell	__	__ MS: Rychlak/Daley
__	__ Sample Prep: Beegle/Kiger	__	__ Log-in: Perry
		__	__ Admin: _____
		__	__ Other: _____

QA-105-A-0805

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-009	Page 2 of 3

Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 days	Air Quality: ☐	
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation	SAF No.: RC-032	
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx
Shipped To: EBERLINE SERVICES/ LIONVILLE	Offsite Property No.: A060276	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	Cool 4C	None	None	None					
Type of Container	G/P A	G/P B	aG C	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	250g	500mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Carbon-14; Tritium-3H	Nickel-63; Strontium-90 – Total Sr					

610019

	Sample No.	Matrix *	Sample Date	Sample Time										
1	J112W5	SOIL	1-30-06	0920	X	X	X							
2	J112W6	SOIL	1-30-06	0950	X	X	X							
3	J112W7	SOIL	1-30-06	0945	X	X	X							
4	J112W8	SOIL	1-30-06	0955	X	X	X							
5	J112W9	SOIL	1-30-06	1005	X	X	X							

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: [illegible] Stankovich	Date/Time: 1430 1/30/06	Received By/Stored In: 3728 / 1C	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728 / 1C 1-31-06	Date/Time: 1240	Received By/Stored In: RZ Stoffler RJ Stoffler	Date/Time: 1240 1-31-06
Relinquished By/Removed From: RZ Stoffler RJ Stoffler	Date/Time: 1500 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: [illegible]	Date/Time: 2-1-06 0910	Received By/Stored In: [illegible] Kennedy	Date/Time: 2-1-06 0910
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 - 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 # 1C on 1/31/06

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-032-009	Page 1 of 3
Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8C; Data Turnaround: 15day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation		SAF No.: RC-032	Air Quality: ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060276		Bill of Lading/Air Bill No.: See OSPC	

000000011

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	None	None	None					
Type of Container	G/P	G/P	aG	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	250g	500mL	1,200	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Carbon-14, Tritium-3,	Nickel-63, Strontium-89,90 -- Total Sr					

000020

	Sample No.	Matrix *	Sample Date	Sample Time										
6	J112W0	SOIL	1-30-06	0830	X	X	X							
7	J112W1	SOIL	1-30-06	0840	X	X	X							
8	J112W2	SOIL	1-30-06	0850	X	X	X							
9	J112W3	SOIL	1-30-06	0900	X	X	X							
10	J112W4	SOIL	1-30-06	0910	X	X	X							

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: MSTankovich	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/1C	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/1C	Date/Time: 1-31-06 1240	Received By/Stored In: RZ Steffler RZ Steffler	Date/Time: 1240 1-31-06
Relinquished By/Removed From: RZ Steffler RZ Steffler	Date/Time: 1500 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 2-1-06 0910	Received By/Stored In: V. Hernandez	Date/Time: 2-1-06 0910
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 - 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 # 1C on 1/31/06

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-032-009	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: 15 day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174 — COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060276	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	Cool 4C	None	None	None					
Type of Container	G/P	G/P	aG	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	250g	500mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Calcium-14; Tritium-[illegible]	Nickel-63; Strontium-89,90 -- Total Sr					

000021

	Sample No.	Matrix *	Sample Date	Sample Time										
11	J112X0	SOIL	1-30-06	0830	X	X	X							
12	J112X1	SOIL	1-30-06	0745	X									

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: [signature] mstankovich	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/1C	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/1C	Date/Time: 1-31-06 1240	Received By/Stored In: RZ Steffler [signature]	Date/Time: 1240 1-31-06
Relinquished By/Removed From: RZ Steffler [signature]	Date/Time: 1500 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: FedEx	Date/Time: 2/1/06 0910	Received By/Stored In: [signature]	Date/Time: 2-1-06 0910
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 - 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 # 1C on 1/31/06

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

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

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

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-032-010	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: 15 Day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Staging Area		SAF No.: RC-032	Air Quality: ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060276		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	Cool 4C	None	None	None						
Type of Container	G/P	G/P	aG	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1	1	1						
Volume	250g	60mL	250g	500mL	60mL	60mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Carbon-14; Tritium-H3	Nickel-63; Strontium-89,90 – Total Sr						
Sample No.	Matrix *	Sample Date	Sample Time									
13 J112X2	SOIL	1-30-06	1015	X	X	X						

000022

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: [signature] Stankovich	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/IC	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/IC 1-31-06	Date/Time: 1240	Received By/Stored In: [signature] 1-31-06	Date/Time: 1240 1-31-06
Relinquished By/Removed From: RZ Steffler [signature]	Date/Time: 1500 WCH 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 2/1/06 0910	Received By/Stored In: Victor Hernandez	Date/Time: 2-1-06 0910
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 - 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 # IC on 1/31/06

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

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

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

Appendix 5

Data Validation Supporting Documentation

GENERAL ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 141-C			DATA PACKAGE: K0201		
VALIDATOR: TLI		LAB: LLT		DATE: 3/15/06	
			SDG: K0201		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	8310
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX:					
J112W0	J112W1	J112W2	J112W3	J112W4	J112W5
J112W6	J112W7	J112W8	J112W9	J112X0	J112X2
					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

2. INSTRUMENT TUNING AND CALIBRATION (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)

Comments:

GENERAL ORGANIC 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 MB

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

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A

Surrogate/system monitoring compound 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: Surrogate - WO Interference - J all
MS - acenaphthene - Interference - J all no PAs
MSD - Ideno(123-cd)pyrene - J all

GENERAL ORGANIC 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: Ideno (123-cd)pyrene - RPD 572 - J all

6. HOLDING TIMES (all levels)

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

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

Comments:

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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

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

Rresults 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: 35 over

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

Comments:

Date: 17 March 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 141-C
Subject: Wet Chemistry - Data Package No. K0201-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0201 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
J112W0	1/30/06	Soil	C	See note 1
J112W1	1/30/06	Soil	C	See note 1
J112W2	1/30/06	Soil	C	See note 1
J112W3	1/30/06	Soil	C	See note 1
J112W4	1/30/06	Soil	C	See note 1
J112W5	1/30/06	Soil	C	See note 1
J112W6	1/30/06	Soil	C	See note 1
J112W7	1/30/06	Soil	C	See note 1
J112W8	1/30/06	Soil	C	See note 1
J112W9	1/30/06	Soil	C	See note 1
J112X0	1/30/06	Soil	C	See note 1
J112X2	1/30/06	Soil	C	See note 1

1 – Chromium VI by 7196A.

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

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

DATA QUALITY PARAMETERS

- **Holding Times**

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

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

All holding times were acceptable.

- **Method Blanks**

Method Blanks

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

All method blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J".

Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J112W6/J112X0) 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 K0201 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: K0201	REVIEWER: TLI	PROJECT: 141-C	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: K0201																				
Sample Number		J112W0		J112W1		J112W2		J112W3		J112W4		J112W5		J112W6		J112W7		J112W8		J112W9	
Remarks																					
Sample Date		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06		1/30/06	
Wet Chemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	0.22	U	0.26		0.22	U	0.22	U	0.39		1.5		0.31		0.34		0.29		0.29	
Sample Number		J112X0		J112X2																	
Remarks		Duplicate																			
Sample Date		1/30/06		1/30/06																	
Wet Chemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	0.45		0.22	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 02/15/06

LIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192
ORK ORDER: 12343-606-001-9999-00

AMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
001	J112W5	% Solids	92.0	%	0.01	1.0
		Chromium VI	1.5	MG/KG	0.22	1.0
002	J112W6	% Solids	85.8	%	0.01	1.0
		Chromium VI	0.31	MG/KG	0.23	1.0
003	J112W7	% Solids	91.7	%	0.01	1.0
		Chromium VI	0.34	MG/KG	0.22	1.0
004	J112W8	% Solids	96.3	%	0.01	1.0
		Chromium VI	0.29	MG/KG	0.21	1.0
005	J112W9	% Solids	88.9	%	0.01	1.0
		Chromium VI	0.29	MG/KG	0.22	1.0
006	J112W0	% Solids	91.4	%	0.01	1.0
		Chromium VI	0.22 u	MG/KG	0.22	1.0
007	J112W1	% Solids	91.0	%	0.01	1.0
		Chromium VI	0.26	MG/KG	0.22	1.0
008	J112W2	% Solids	89.7	%	0.01	1.0
		Chromium VI	0.22 u	MG/KG	0.22	1.0
009	J112W3	% Solids	92.8	%	0.01	1.0
		Chromium VI	0.22 u	MG/KG	0.22	1.0
010	J112W4	% Solids	94.5	%	0.01	1.0
		Chromium VI	0.39	MG/KG	0.21	1.0

3/17/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/15/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-011	J112X0	% Solids	85.8	%	0.01	1.0
		Chromium VI	0.45	MG/KG	0.23	1.0
-012	J112X1	% Solids	99.9	%	0.01	1.0
-013	J112X2	% Solids	91.9	%	0.01	1.0
		Chromium VI	0.22 u	MG/KG	0.22	1.0

KR 3/17/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032 K0201
LVL#: 0602L192

W.O.#: 11343-606-001-9999-00
Date Received: 02-01-06

INORGANIC NARRATIVE

1. This narrative covers the analyses of 13 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 analyses for Percent Solids and Chromium VI were within the 20% Relative Percent Difference (RPD) control limit.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

2/21/06
Date

njp\i02-192

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 17 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-032-009 Page 2 of 2

Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 day		
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx
Shipped To: EBERLINE SERVICES/ LIONVILLE	Offsite Property No.: A060276	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	Cool 4C	None	None	None					
Type of Container	G/P A	G/P B	sG C	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	250g	500mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Carbon-14; Tritium-3; Iodine-129	Nickel-63; Strontium-89,90 -- Total Sr					
Sample No.	Matrix *	Sample Date	Sample Time								
J112W5	SOIL	1-30-06	0920	X	X	X					
J112W6	SOIL	1-30-06	0950	X	X	X					
J112W7	SOIL	1-30-06	0945	X	X	X					
J112W8	SOIL	1-30-06	0955	X	X	X					
J112W9	SOIL	1-30-06	1005	X	X	X					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 1430	Received By/Stored In	Date/Time
[signature] Stankovich	1/30/06	3728/1C	1/30/06 1430
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
3728/1C	1-31-06 / 1240	RZ Stoffler [signature]	1-31-06 1240
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RZ Stoffler [signature]	1-31-06 1500	Fed Ex	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature]	2-1-06 0910	[signature]	2-1-06 0910
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 - 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 # 1C on 1/31/06

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

0001015

Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-032-009

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: 141-C Excavation		SAF No.: RC-032
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060276		Bill of Lading/Air Bill No.: See OSPC

Price Code: 8C | Data Turnaround: 15 days | Air Quality: ☐

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	None	None	None					
Type of Container	G/P	G/P	aG	G/P	G/P	G/P					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	250g	500mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Cesium-14; Tritium-133	Nickel-63; Strontium-89,90 -- Total Sr					

	Sample No.	Matrix *	Sample Date	Sample Time										
	J112W0	SOIL	1-30-06	0830	X	X	X							
1	J112W1	SOIL	1-30-06	0840	X	X	X							
8	J112W2	SOIL	1-30-06	0850	X	X	X							
9	J112W3	SOIL	1-30-06	0900	X	X	X							
10	J112W4	SOIL	1-30-06	0910	X	X	X							

000016

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: [signature] M Stankovich	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/1C	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/1C	Date/Time: 1-31-06 1240	Received By/Stored In: RZ Steffler R.J. Steffler	Date/Time: 1240 1-31-06
Relinquished By/Removed From: RZ Steffler R.J. Steffler	Date/Time: 1500 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 2-1-06 0910	Received By/Stored In: V. Hernandez	Date/Time: 2-1-06 0910
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 - 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 # 1C on 1/31/06

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

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

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

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector: Coffman/Stankovich	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 day		
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Excavation	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx
Shipped To: EBERLINE SERVICES/ LIONVILLE	Offsite Property No.: A060276	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	Cool 4C	None	None	None				
Type of Container	G/P	G/P	aG	G/P	G/P	G/P				
No. of Container(s)	1	1	1	1	1	1				
Volume	250g	60mL	250g	500mL	60mL	60mL				
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Cobalt-14; Tritium-3H	Nickel-63; Strontium-89/90 – Total Sr				

000012

	Sample No.	Matrix *	Sample Date	Sample Time									
11	J112X0	SOIL	1-30-06	0830	X	X	X						
12	J112X1	SOIL	1-30-06	0745	X								

CHAIN OF POSSESSION

Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
MSTANKOVICH	1/30/06 1430	3728/IC	1/30/06 1430
3728/IC	1-31-06 1240	RR Stiffler	1-31-06 1240
RR Stiffler	1-31-06 1500	FedEx	
FedEx	2/1/06 0910	N. Hernandez	2-1-06 0910

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 # IC on 1/31/06

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Soli
DL=Drum Liq
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-032-010	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: 15 Day
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 141-C Staging Area		SAF No.: RC-032	Air Quality: ☐
Ice Chest No.: ERC-02-006	Field Logbook No.: EFL-1174	COA: R1410C2000	Method of Shipment: FedEx	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060276		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA < DOT Limits

Special Handling and/or Storage

Cool 4 degrees C

000018

Preservation	None	Cool 4C	Cool 4C	None	None	None				
Type of Container	G/P	G/P	aG	G/P	G/P	G/P				
No. of Container(s)	1	1	1	1	1	1				
Volume	250g	60mL	250g	500mL	60mL	60mL				
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PAHs - 8310	See item (2) in Special Instructions.	Carbon-14; Tritium-H3	Nickel-63; Strontium-89,90 -- Total Sr				

Sample No.	Matrix *	Sample Date	Sample Time										
13 J112X2	SOIL	1-30-06	1015	X	X	X							

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: [signature]	Date/Time: 1430 1/30/06	Received By/Stored In: 3728/1C	Date/Time: 1/30/06 1430
Relinquished By/Removed From: 3728/1C 1-31-06	Date/Time: 1240	Received By/Stored In: [signature] 1-31-06	Date/Time: 1240 1-31-06
Relinquished By/Removed From: RZ Steffler R.J. Steffler	Date/Time: 1500 1-31-06	Received By/Stored In: Fed Ex	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 2/1/06 0910	Received By/Stored In: Victor Hernandez	Date/Time: 2-1-06 0910
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 - 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 # 1C on 1/31/06

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Sol
DL=Drum Li
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: 141-C			DATA PACKAGE: K0201		
VALIDATOR: TLI		LAB: LLI		DATE: 3/14/06	
			SDG: K0201		
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					
J112W0	J112W2	J112W1	J112W3	J112W4	J112W5
J112W6	J112W7	J112W8	J112W9	J112X0	J112X2
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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

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

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

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

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

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

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

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

Comments: _____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FB

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

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

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

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

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

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

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

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

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

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

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

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

Comments: NO PA

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

6. HOLDING TIMES (all levels)

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

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

Comments:

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/15/06

:LIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

:AMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
:LANK10	06LVI006-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 02/15/06

LIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

AMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
003	J112W7	Soluble Chromium VI	4.2	0.34	4.4	89.3	1.0
		Insoluble Chromium VI	1430	0.34	1250	114.5	100
LANK10	06LVI006-MB1	Soluble Chromium VI	3.9	0.20u	4.0	98.2	1.0
		Insoluble Chromium VI	1230	0.20u	1120	109.8	100

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 02/15/06

CLIENT: TNUHANFORD RC-032 K0201 LVL LOT #: 0602L192

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-002REP	J112W6	% Solids	85.8	85.8	0.058	1.0
-003REP	J112W7	Chromium VI	0.34	0.38	10.0	1.0