0070026

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 JE 06/13/06
INITIAL/DATE

RECEIVED
JUN 22 2006
EDMC

COMMENTS:

SDG K0297 SAF-RC-032

Waste Site: 1607-F-7

Date: 2 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Sites 1607-F-7
Subject: PCB/Pesticide - Data Package No. K0297-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 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
J11VJ3	4/4/06	Soil	C	See note 1
J11VJ4	4/4/06	Soil	C	See note 1
J11VJ5	4/4/06	Soil	C	See note 1
J11VJ6	4/4/06	Soil	C	See note 1
J11VJ7	4/4/06	Soil	C	See note 1
J11VJ8	4/4/06	Soil	C	See note 1

1 – PCBs by 8082 & pesticides by 8081.

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**

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

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-

detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blank**

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

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data . The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

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

All other accuracy results were acceptable.

Surrogate Recovery

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

Due to surrogate recoveries outside QC limits, all detected pesticide results in samples J11VJ3, J11VJ7 and J11VJ8 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 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 the lack of a matrix spike or matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

One set of field duplicate samples (J11VJ3/J11VJ4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All toxaphene results exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data Package No. K0297 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 deficiency was noted:

- Due to surrogate recoveries outside QC limits, all detected pesticide results in samples J11VJ3, J11VJ7 and J11VJ8 were qualified as estimates and flagged "J".

- Due to the lack of a matrix spike, matrix spike duplicate or LCS analysis, all toxaphene results were qualified as estimates and flagged "J".

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

All toxaphene 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 the procedures herein are as follows:

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

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

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

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

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

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

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

Appendix 2

Summary of Data Qualification

PCB DATA QUALIFICATION SUMMARY*

SDG: K0297	REVIEWER: TLI	Project: 1607-F-7	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All detected pesticide analytes	J	J11VJ3, J11VJ7 J11VJ8	Surrogate recovery
Toxaphene	J	All	No MS/MSD/LCS 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

PCB ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD													
Laboratory: LLI	SDG: K0297												
Sample Number		J11VJ3		J111VJ4		J11VJ5		J11VJ6		J11VJ7		J11VJ8	
Remarks				Duplicate									
Sample Date		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06	
Extraction Date		4/17/06		4/17/06		4/17/06		4/17/06		4/17/06		4/17/06	
Analysis Date		4/20/06		4/21/06		4/21/06		4/21/06		4/21/06		4/21/06	
PCB	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	100	15	U	15	U	15	U	15	U	15	U	15	U
Aroclor-1221	100	15	U	15	U	15	U	15	U	15	U	15	U
Aroclor-1232	100	15	U	15	U	15	U	15	U	15	U	15	U
Aroclor-1242	100	15	U	15	U	15	U	15	U	15	U	15	U
Aroclor-1248	100	15	U	15	U	15	U	15	U	15	U	15	U
Aroclor-1254	100	15	U	15	U	15	U	15	U	15	U	15	U
Aroclor-1260	100	2.0		2.2		15	U	4.2		7.0		10	
Sample Number		J11VJ3		J111VJ4		J11VJ5		J11VJ6		J11VJ7		J11VJ8	
Remarks				Duplicate									
Sample Date		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06	
Extraction Date		4/17/06		4/17/06		4/17/06		4/17/06		4/17/06		4/17/06	
Analysis Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Pesticide	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Alpha-BHC	5	1.5	U	1.5	U	1.5	U	0.53		0.62	J	1.1	J
Gamma-BHC (Lindane)	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	0.92	J
Beta-BHC	5	2.3	J	3.1		1.5	U	3.9		1.5	U	8.5	J
Heptachlor	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Delta-BHC	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Aldrin	5	1.5	U	0.42		1.5	U	1.5	U	1.5	U	1.5	U
Heptachlor Epoxide	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
gamma-Chlordane	5	0.92	J	1.1		1.5	U	1.5	U	1.5	U	1.5	U
Endosulfan I	5	1.5	U	0.46		1.5	U	0.46		0.54	J	1.5	U
alpha-Chlordane	5	1.2	J	1.7		1.5	U	1.5	U	1.5	U	1.5	U
4,4'-DDE	5	1.5	U	1.5		1.5	U	1.4		2.1	J	1.5	U
Dieldrin	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Endrin	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
4,4'-DDD	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Endosulfan II	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
4,4'-DDT	5	3.5	J	5.2		1.5	U	4.5		6.5	J	10	J
Endrin Aldehyde	5	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Endosulfan sulfate	5	1.0	J	1.5	U	1.5	U	0.76		1.1	J	1.5	U
Methoxyclor	5	1.5	U	1.4		1.5	U	1.5	U	1.5	U	1.5	U
Endrin Ketone	5	1.5	U	1.5	U	1.5	U	1.5	U	0.89	J	1.5	U
Toxaphene	5	15	UJ	15	UJ	15	UJ	15	UJ	15	UJ	15	UJ

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.

000011

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 04/26/06 12:49

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 1

0000000005

	Cust ID:	J11VJ3	J11VJ3	J11VJ3	J11VJ4	J11VJ5	J11VJ6
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
Surrogate:	Tetrachloro-m-xylene	104 %	112 %	113 %	107 %	125 * %	112 %
	Decachlorobiphenyl	104 %	108 %	114 %	102 %	114 %	107 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		15 U	113 %	107 %	15 U	15 U	15 U
Aroclor-1221		15 U	15 U	15 U	15 U	15 U	15 U
Aroclor-1232		15 U	15 U	15 U	15 U	15 U	15 U
Aroclor-1242		15 U	15 U	15 U	15 U	15 U	15 U
Aroclor-1248		15 U	15 U	15 U	15 U	15 U	15 U
Aroclor-1254		15 U	15 U	15 U	15 U	15 U	15 U
Aroclor-1260		2.0 J	103 %	101 %	2.2 J	15 U	4.2 J

0000012

	Cust ID:	J11VJ7	J11VJ8	PBLKFO	PBLKFO BS
Sample Information	RFW#:	005	006	06LE0295-MB1	06LE0295-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
Surrogate:	Tetrachloro-m-xylene	110 %	114 %	121 * %	122 * %
	Decachlorobiphenyl	103 %	107 %	112 %	115 %
		fl	fl	fl	fl
Aroclor-1016		15 U	15 U	13 U	119 %
Aroclor-1221		15 U	15 U	13 U	13 U
Aroclor-1232		15 U	15 U	13 U	13 U
Aroclor-1242		15 U	15 U	13 U	13 U
Aroclor-1248		15 U	15 U	13 U	13 U
Aroclor-1254		15 U	15 U	13 U	13 U
Aroclor-1260		7.0 J	10 J	13 U	105 %

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

R 5/29/06

Pesticide/PCBs by GC, CLP List

Report Date: 04/25/06 16:13

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 1

	Cust ID:	J11VJ3	J11VJ3	J11VJ3	J11VJ4	J11VJ5	J11VJ6
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	4.00	4.00	4.00	4.00	4.00	4.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	104 %	108 %	110 %	108 %	110 %	116 %
	Decachlorobiphenyl	123 * %	111 %	123 * %	118 %	130 * %	121 %
		fl	fl	fl	fl	fl	fl
Alpha-BHC		1.5 U	98 %	86 %	1.5 U	1.5 U	0.53 J
gamma-BHC (Lindane)		1.5 U	106 %	97 %	1.5 U	1.5 U	1.5 U
Beta-BHC		2.3 J	109 %	99 %	3.1	1.5 U	3.9
Heptachlor		1.5 U	105 %	102 %	1.5 U	1.5 U	1.5 U
Delta-BHC		1.5 U	87 %	80 %	1.5 U	1.5 U	1.5 U
Aldrin		1.5 U	98 %	94 %	0.42 J	1.5 U	1.5 U
Heptachlor epoxide		1.5 U	100 %	97 %	1.5 U	1.5 U	1.5 U
gamma-Chlordane		0.92 ~~J~~ J	99 %	96 %	1.1 J	1.5 U	1.5 U
Endosulfan I		1.5 U	101 %	98 %	0.46 J	1.5 U	0.46 J
alpha-Chlordane		1.2 ~~J~~ J	105 %	101 %	1.7 J	1.5 U	1.5 U
4,4'-DDE		1.5 U	107 %	108 %	1.5 J	1.5 U	1.4 J
Dieldrin		1.5 U	107 %	103 %	1.5 U	1.5 U	1.5 U
Endrin		1.5 U	108 %	106 %	1.5 U	1.5 U	1.5 U
4,4'-DDD		1.5 U	127 * %	124 * %	1.5 U	1.5 U	1.5 U
Endosulfan II		1.5 U	106 %	103 %	1.5 U	1.5 U	1.5 U
4,4'-DDT		3.5 J	109 %	112 %	5.2	1.5 U	4.5
Endrin aldehyde		1.5 U	103 %	99 %	1.5 U	1.5 U	1.5 U
Endosulfan sulfate		1.0 ~~J~~ J	102 %	100 %	1.5 U	1.5 U	0.76 J
Methoxychlor		1.5 U	131 %	133 %	1.4 J	1.5 U	1.5 U
Endrin ketone		1.5 U	112 %	108 %	1.5 U	1.5 U	1.5 U
Toxaphene		15 U J	15 U	15 U	15 U J	15 U J	15 U 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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00000013

5/29/06

5/29/06

Pesticide/PCBs by GC, CLP List

Report Date: 04/25/06 16:13

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 2

	Cust ID:	J11VJ7	J11VJ8	PBLKFO	PBLKFO BS
Sample Information	RFW#:	005	006	06LE0295-MB1	06LE0295-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	4.00	4.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	126 * %	152 * %	102 %	94 %
	Decachlorobiphenyl	116 %	120 %	103 %	99 %
Alpha-BHC		0.62 ~~U~~ J	1.1 ~~U~~ J	0.33 U	100 %
gamma-BHC (Lindane)		1.5 U	0.92 ~~U~~ J	0.33 U	99 %
Beta-BHC		1.5 U	8.5 J	0.33 U	97 %
Heptachlor		1.5 U	1.5 U	0.33 U	101 %
Delta-BHC		1.5 U	1.5 U	0.33 U	87 %
Aldrin		1.5 U	1.5 U	0.33 U	99 %
Heptachlor epoxide		1.5 U	1.5 U	0.33 U	100 %
gamma-Chlordane		1.5 U	1.5 U	0.33 U	98 %
Endosulfan I		0.54 ~~U~~ J	1.5 U	0.33 U	99 %
alpha-Chlordane		1.5 U	1.5 U	0.33 U	97 %
4,4'-DDE		2.1 J	1.5 U	0.33 U	92 %
Dieldrin		1.5 U	1.5 U	0.33 U	103 %
Endrin		1.5 U	1.5 U	0.33 U	107 %
4,4'-DDD		1.5 U	1.5 U	0.33 U	92 %
Endosulfan II		1.5 U	1.5 U	0.33 U	105 %
4,4'-DDT		6.5 J	10 J	0.33 U	96 %
Endrin aldehyde		1.5 U	1.5 U	0.33 U	91 %
Endosulfan sulfate		1.1 ~~U~~ J	1.5 U	0.33 U	98 %
Methoxychlor		1.5 U	1.5 U	0.33 U	94 %
Endrin ketone		0.89 ~~U~~ J	1.5 U	0.33 U	101 %
Toxaphene		15 U J	15 U J	3.3 U	3.3 U

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

K 5/22/06

4/21/06

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0604L712
SDG/SAF # K0297/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 04-07-2006

CHLORINATED PESTICIDES

Six (6) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were extracted on 04-17-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 04-20,24-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081A.

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

1. Samples were extracted and analyzed within required holding time.

2. The samples and their associated QC samples received a Copper-Sulfur cleanup according to Lionville Laboratory SOPs based on SW846 method 3660A.

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

4. Five (5) of twenty (20) surrogate recoveries were outside acceptance criteria. However, the surrogate recovery criteria were met (i.e., no more than one outlier per sample).

5. All blank spike recoveries were within acceptance criteria.

6. Two (2) of forty (40) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

7. All samples required a 4-fold dilution due to the nature of the sample matrix. The reporting limits were adjusted to reflect the necessary dilution.

8. The results for soil samples were reported on a dry weight basis.

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

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 1 pages.

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LIONVILLE LABORATORY INC.

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

11. 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.

12. 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

4/27/06
Date

som\r:\group\data\pest\tnu hanford\0604-712s.pst

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Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 066C/33

Initiator: KJW
Date: 4/25/06
Client: TNI

Batch: 0604L 712
Samples:
Method: SW846/MCAWW/CLP/

Parameter: PEST
Matrix: SOIL
Prep Batch: 06LE-0296

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)

SPIKE RECOVERIES HIGH FOR 4,4'-DDD IN MS + MSD.

2. Known or Probable Causes(s)

3. Discussion and Proposed Action Other Description:

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

Report + Narrate

4. Project Manager Instructions...signature/date: 4/25/06

✓ 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: 4/25/06 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

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-040
LVL #: 0604L697
SDG/SAF # K0293/RC-040

W.O. #: 11343-606-001-9999-00
Date Received: 04-06-2006

PCB

Two (2) solid samples were collected on 04-03-2006.

The samples and their associated QC samples were extracted on 04-16-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 04-24-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

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

1. Samples were extracted and analyzed within required holding time.

2. The samples and their associated QC samples received Silica Gel, Copper-Sulfur and Sulfuric Acid cleanups according to Lionville Laboratory SOPs based on SW846 methods 3630C, 3660A and 3665A respectively.

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

4. All surrogate recoveries were within acceptance criteria.

5. The blank spike recoveries were within acceptance criteria.

6. All matrix spike recoveries were within acceptance criteria.

7. The results for solid samples were reported on a dry weight basis.

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

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

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.

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

LIONVILLE LABORATORY INC.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/27/06
Date

som\r:\group\data\pest\tnu hanford\0604-697.pcbs

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-030	Page 2 of 2

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8K	Data Turnaround: 15 DAY		
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-96-030	Field Logbook No.: EFL-1174-1	COA: R607F72000	Method of Shipment: Fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: ~~A060350~~ TRE 4-6-06 A060352		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	aG	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	60mL	120mL	120mL	125mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081					
Sample No. / Matrix * / Sample Date / Sample Time											
J11VJ3 / SOIL / 4/4/06 / 0835	X	X	X	X	X	X					F7-6
J11VJ4 / SOIL / / 0835	X	X	X	X	X	X					F7-6D
J11VJ5 / SOIL / / 0845	X	X	X	X	X	X					F7-7
J11VJ6 / SOIL / / 0855	X	X	X	X	X	X					F7-8
J11VJ7 / SOIL / 4/4/06 / 0905	X	X	X	X	X	X					F7-9

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RT COFFMAN / RT Coffman	4/4/06 1500	REFER # 2C, 3728	4/4/00 1500
3728 #2C	4-6-06 1030	TR Edmundson	4-6-06 1030
TR Edmundson / TR Edmundson	4-6-06 / 1500	FED EX	
FED EX	4.7.06 / 0920	W. Smith	4-7-06 / 0920

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)

Personnel not available to Relinquish samples from 3728 Ref # 2C on 4/6/06

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)

000021

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-030	Page 1 of 1

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8K	Data Turnaround: 15 DAY		
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-96-030	Field Logbook No.: EFL-1174-1	COA: R607F72000	Method of Shipment: Fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060352	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	aG	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	60mL	120mL	120mL	125mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081					
Sample No.	Matrix *	Sample Date	Sample Time								
J11VJ8	SOIL	4/4/06	0915	X	X	X	X	X	X		F7-1C

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RTCOFFMAN / RT Coffman	1500 4/4/06	REFER # 2C, 3728	1500 4/4/06
3728 #2C	4-6-06 1030	R.K. Edmundson / R.K. Edmundson	4-6-06 1030
R.K. Edmundson / R.K. Edmundson	4-6-06 / 1500	FEDEX	
D. Smith	4-7-06 / 0920	D. Smith	4-7-06 / 0920

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)

Personnel not available to relinquish samples from 3728 Ref # 2C on 4/16/06

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

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

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

220022

Appendix 5

Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 1607-F-7		DATA PACKAGE: K0297	
VALIDATOR: TLI	LAB: LLI	DATE: 5/21/00	
		SDG: K0297	

ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		

SAMPLES/MATRIX
J11VJ3 J11VJ4 J11VJ5 J11VJ6 J11VJ7
J11VJ8
Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

Comments:

PCB DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FB

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

Surrogates analyzed? ..... Yes No N/A

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Comments: pest J detects in J3 J7 + J8

no toxaphene MS/MSD or LCS

PCB DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

no toxaphene ms/msd - J all

6. SYSTEM PERFORMANCE (Levels D and E)

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

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

Comments:

7. HOLDING TIMES (all levels)

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

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

Comments:

PCB DATA VALIDATION CHECKLIST

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

Compound identification acceptable? (Levels D, E) ..... Yes No N/A
Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A
Results reported for all requested analyses? ..... Yes No N/A
Results supported in the raw data? (Levels D, E) ..... Yes No N/A
Samples properly prepared? (Levels D, E) ..... Yes No N/A
Detection limits meet RDL? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: toxaphene - all over

9. SAMPLE CLEANUP (Levels D and E)

Fluoricil ® (or other absorbent) cleanup performed? ..... Yes No N/A
Lot check performed? ..... Yes No N/A
Check recoveries acceptable? ..... Yes No N/A
GPC cleanup performed? ..... Yes No N/A
GPC check performed? ..... Yes No N/A
GPC check recoveries acceptable? ..... Yes No N/A
GPC calibration performed? ..... Yes No N/A
GPC calibration check performed? ..... Yes No N/A
GPC calibration check retention times acceptable? ..... Yes No N/A
Check/calibration materials traceable? ..... Yes No N/A
Check/calibration materials Expired? ..... Yes No N/A
Analytical batch QC given similar cleanup? ..... Yes No N/A
Transcription/Calculation Errors? ..... Yes No N/A

Comments:

Date: 2 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Sites 1607-F-7
Subject: Inorganics - Data Package No. K0297-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 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
J11VJ3	4/4/06	Soil	C	See note 1
J11VJ4	4/4/06	Soil	C	See note 1
J11VJ5	4/4/06	Soil	C	See note 1
J11VJ6	4/4/06	Soil	C	See note 1
J11VJ7	4/4/06	Soil	C	See note 1
J11VJ8	4/4/06	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

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.

Due to a matrix spike recovery outside QC limits (45.1%), all antimony results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (54.8%), 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 (J11VJ3/J11VJ4) 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 results met the RQL.

- **Completeness**

Data package No. K0297 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 (45.1%), all antimony results were qualified as estimates and flagged "J".

- Due to an LCS recovery outside QC limits (54.8%), 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.

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: K0297	REVIEWER: TLI	Project: 1607-F-7	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: K0297												
Sample Number		J11VJ3		J11VJ4		J11VJ5		J11VJ6		J11VJ7		J11VJ8	
Remarks				Duplicate									
Sample Date		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	0.2	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U	0.08	U
Aluminum		4830		5210		6470		3680		4970		5640	
Arsenic	10	2.3		2.5		2.4		1.9		2.5		3.7	
Boron		1.5		2.3		3.4		2.5		3.6		4.7	
Barium	2	85.6		85.1		100		68.5		105		135	
Beryllium		0.32		0.36		0.44		0.27		0.36		0.41	
Calcium		3440		3710		3380		3490		4520		5360	
Cadmium	0.2	0.16		0.18		0.16		0.14		0.22		0.32	
Cobalt		5.1		5.5		6.5		3.8		4.9		5.5	
Chromium	1	7.9		8.6		9.5		7.2		8.3		18.7	
Copper		12.5		14.3		11.4		10.4		13.3		15.3	
Iron		11800		13300		16000		9200		11900		12500	
Mercury	0.2	0.02		0.02	U	0.02	U	0.02	U	0.02		0.02	
Potassium		949		1010		1480		719		1050		1200	
Magnesium		3080		3290		3780		2670		3260		3420	
Manganese		253		269		321		183		233		276	
Molybdenum		0.51		0.52		0.48		0.45		0.52		0.50	
Sodium		89.5		95.5		150		89.5		116		126	
Nickel		9.1		9.9		10.0		8.3		9.1		9.5	
Lead	5	6.2		6.0		4.7		46.3		7.8		28.2	
Antimony		0.49	UJ	0.48	UJ	0.53	J	0.48	UJ	0.48	UJ	0.48	UJ
Selenium	1	0.52	U	0.52	U	0.52	U	0.51	U	0.51	U	0.52	U
Silicon		456	J	518	J	606	J	475	J	490	J	450	J
Vanadium		25.5		30.1		36.8		21.1		27.4		27.2	
Zinc	1	36.0		38.5		38.9		35.9		46.8		84.0	

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 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J11VJ3	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Aluminum, Total	4830	MG/KG	3.2	1.0
		Arsenic, Total	2.3	MG/KG	0.68	1.0
		Boron, Total	1.5	MG/KG	0.27	1.0
		Barium, Total	85.6	MG/KG	0.02	1.0
		Beryllium, Total	0.32	MG/KG	0.02	1.0
		Calcium, Total	3440	MG/KG	1.8	1.0
		Cadmium, Total	0.16	MG/KG	0.08	1.0
		Cobalt, Total	5.1	MG/KG	0.16	1.0
		Chromium, Total	7.9	MG/KG	0.14	1.0
		Copper, Total	12.5	MG/KG	0.13	1.0
		Iron, Total	11800	MG/KG	3.9	1.0
		Mercury, Total	0.02	MG/KG	0.02	1.0
		Potassium, Total	949	MG/KG	2.5	1.0
		Magnesium, Total	3080	MG/KG	1.1	1.0
		Manganese, Total	253	MG/KG	0.03	1.0
		Molybdenum, Total	0.51	MG/KG	0.32	1.0
		Sodium, Total	89.5	MG/KG	0.84	1.0
		Nickel, Total	9.1	MG/KG	0.27	1.0
		Lead, Total	6.2	MG/KG	0.34	1.0
		Antimony, Total	0.49 u J	MG/KG	0.49	1.0
		Selenium, Total	0.52 u	MG/KG	0.52	1.0
		Silicon, Total	456 J	MG/KG	2.5	1.0
		Vanadium, Total	25.5	MG/KG	0.1	1.0
		Zinc, Total	36.0	MG/KG	0.18	1.0

5/29/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	J11VJ4	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Aluminum, Total	5210	MG/KG	3.2	1.0
		Arsenic, Total	2.5	MG/KG	0.67	1.0
		Boron, Total	2.3	MG/KG	0.26	1.0
		Barium, Total	85.1	MG/KG	0.02	1.0
		Beryllium, Total	0.36	MG/KG	0.02	1.0
		Calcium, Total	3710	MG/KG	1.8	1.0
		Cadmium, Total	0.18	MG/KG	0.08	1.0
		Cobalt, Total	5.5	MG/KG	0.15	1.0
		Chromium, Total	8.6	MG/KG	0.14	1.0
		Copper, Total	14.3	MG/KG	0.13	1.0
		Iron, Total	13300	MG/KG	3.8	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1010	MG/KG	2.5	1.0
		Magnesium, Total	3290	MG/KG	1.1	1.0
		Manganese, Total	269	MG/KG	0.03	1.0
		Molybdenum, Total	0.52	MG/KG	0.32	1.0
		Sodium, Total	95.5	MG/KG	0.83	1.0
		Nickel, Total	9.9	MG/KG	0.26	1.0
		Lead, Total	6.0	MG/KG	0.34	1.0
		Antimony, Total	0.48 u J	MG/KG	0.48	1.0
		Selenium, Total	0.52 u	MG/KG	0.52	1.0
		Silicon, Total	518 J	MG/KG	2.5	1.0
		Vanadium, Total	30.1	MG/KG	0.1	1.0
		Zinc, Total	38.5	MG/KG	0.18	1.0

RC 5/29/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	J11VJ5	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Aluminum, Total	6470	MG/KG	3.2	1.0
		Arsenic, Total	2.4	MG/KG	0.67	1.0
		Boron, Total	3.4	MG/KG	0.26	1.0
		Barium, Total	100	MG/KG	0.02	1.0
		Beryllium, Total	0.44	MG/KG	0.02	1.0
		Calcium, Total	3380	MG/KG	1.8	1.0
		Cadmium, Total	0.16	MG/KG	0.08	1.0
		Cobalt, Total	6.5	MG/KG	0.15	1.0
		Chromium, Total	9.5	MG/KG	0.14	1.0
		Copper, Total	11.4	MG/KG	0.13	1.0
		Iron, Total	16000	MG/KG	3.9	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1480	MG/KG	2.5	1.0
		Magnesium, Total	3780	MG/KG	1.1	1.0
		Manganese, Total	321	MG/KG	0.03	1.0
		Molybdenum, Total	0.48	MG/KG	0.32	1.0
		Sodium, Total	150	MG/KG	0.84	1.0
		Nickel, Total	10.0	MG/KG	0.26	1.0
		Lead, Total	4.7	MG/KG	0.34	1.0
		Antimony, Total	0.53 J	MG/KG	0.49	1.0
		Selenium, Total	0.52 u	MG/KG	0.52	1.0
		Silicon, Total	606 J	MG/KG	2.5	1.0
		Vanadium, Total	36.8	MG/KG	0.1	1.0
		Zinc, Total	38.9	MG/KG	0.18	1.0

K
5/29/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-004	J11VJ6	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Aluminum, Total	3680	MG/KG	3.1	1.0
		Arsenic, Total	1.9	MG/KG	0.67	1.0
		Boron, Total	2.5	MG/KG	0.26	1.0
		Barium, Total	68.5	MG/KG	0.02	1.0
		Beryllium, Total	0.27	MG/KG	0.02	1.0
		Calcium, Total	3490	MG/KG	1.8	1.0
		Cadmium, Total	0.14	MG/KG	0.08	1.0
		Cobalt, Total	3.8	MG/KG	0.15	1.0
		Chromium, Total	7.2	MG/KG	0.14	1.0
		Copper, Total	10.4	MG/KG	0.13	1.0
		Iron, Total	9200	MG/KG	3.8	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	719	MG/KG	2.5	1.0
		Magnesium, Total	2670	MG/KG	1.1	1.0
		Manganese, Total	183	MG/KG	0.03	1.0
		Molybdenum, Total	0.45	MG/KG	0.32	1.0
		Sodium, Total	89.5	MG/KG	0.83	1.0
		Nickel, Total	8.3	MG/KG	0.26	1.0
		Lead, Total	46.3	MG/KG	0.34	1.0
		Antimony, Total	0.48 u J	MG/KG	0.48	1.0
		Selenium, Total	0.51 u	MG/KG	0.51	1.0
		Silicon, Total	475 J	MG/KG	2.5	1.0
		Vanadium, Total	21.1	MG/KG	0.1	1.0
		Zinc, Total	35.9	MG/KG	0.17	1.0

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	J11VJ7	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Aluminum, Total	4970	MG/KG	3.1	1.0
		Arsenic, Total	2.5	MG/KG	0.66	1.0
		Boron, Total	3.6	MG/KG	0.26	1.0
		Barium, Total	105	MG/KG	0.02	1.0
		Beryllium, Total	0.36	MG/KG	0.02	1.0
		Calcium, Total	4520	MG/KG	1.8	1.0
		Cadmium, Total	0.22	MG/KG	0.08	1.0
		Cobalt, Total	4.9	MG/KG	0.15	1.0
		Chromium, Total	8.3	MG/KG	0.14	1.0
		Copper, Total	13.3	MG/KG	0.13	1.0
		Iron, Total	11900	MG/KG	3.8	1.0
		Mercury, Total	0.02	MG/KG	0.02	1.0
		Potassium, Total	1050	MG/KG	2.5	1.0
		Magnesium, Total	3260	MG/KG	1.1	1.0
		Manganese, Total	233	MG/KG	0.03	1.0
		Molybdenum, Total	0.52	MG/KG	0.32	1.0
		Sodium, Total	116	MG/KG	0.83	1.0
		Nickel, Total	9.1	MG/KG	0.26	1.0
		Lead, Total	7.8	MG/KG	0.34	1.0
		Antimony, Total	0.48 u J	MG/KG	0.48	1.0
		Selenium, Total	0.51 u	MG/KG	0.51	1.0
		Silicon, Total	490 J	MG/KG	2.5	1.0
		Vanadium, Total	27.4	MG/KG	0.1	1.0
		Zinc, Total	46.8	MG/KG	0.17	1.0

JL 5/27/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-006	J11VJ8	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Aluminum, Total	5640	MG/KG	3.2	1.0
		Arsenic, Total	3.7	MG/KG	0.67	1.0
		Boron, Total	4.7	MG/KG	0.26	1.0
		Barium, Total	135	MG/KG	0.02	1.0
		Beryllium, Total	0.41	MG/KG	0.02	1.0
		Calcium, Total	5360	MG/KG	1.8	1.0
		Cadmium, Total	0.32	MG/KG	0.08	1.0
		Cobalt, Total	5.5	MG/KG	0.15	1.0
		Chromium, Total	18.7	MG/KG	0.14	1.0
		Copper, Total	15.3	MG/KG	0.13	1.0
		Iron, Total	12500	MG/KG	3.8	1.0
		Mercury, Total	0.02	MG/KG	0.02	1.0
		Potassium, Total	1200	MG/KG	2.5	1.0
		Magnesium, Total	3420	MG/KG	1.1	1.0
		Manganese, Total	276	MG/KG	0.03	1.0
		Molybdenum, Total	0.50	MG/KG	0.32	1.0
		Sodium, Total	126	MG/KG	0.84	1.0
		Nickel, Total	9.5	MG/KG	0.26	1.0
		Lead, Total	28.2	MG/KG	0.34	1.0
		Antimony, Total	0.48 u J	MG/KG	0.48	1.0
		Selenium, Total	0.52 u	MG/KG	0.52	1.0
		Silicon, Total	450 J	MG/KG	2.5	1.0
		Vanadium, Total	27.2	MG/KG	0.1	1.0
		Zinc, Total	84.0	MG/KG	0.18	1.0

5/24/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032
LVL#: 0604L712
SDG/SAF#: K0297/RC-032

W.O.#: 11343-606-001-9999-00
Date Received: 04-07-06

METALS CASE NARRATIVE

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

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

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

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

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

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

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

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

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

8. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 54.8%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

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

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 26 pages.

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

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J11VJ3	Aluminum	22,000	86.5
	Iron	22,000	58.2
	Manganese	2,000	93.0
	Antimony	100	101.1
	Silicon	2,100	89.5

11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

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

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

Judy Stone

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/26/06
Date

jjw/m04-712

LvLI
LIONVILLE LABORATORY INC.

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-030	Page 2 of 3

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 81C	Data Turnaround: 15 DAY
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification		SAF No.: RC-032	Air Quality ☐	
Ice Chest No.: ERC-96-030	Field Logbook No.: EFL-1174-1	COA: R607F72000	Method of Shipment: Fed Ex		
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: ~~A060352~~ TRB 4-6-06 A060352		Bill of Lading/Air Bill No.: SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

000020

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	aG	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	60mL	120mL	120mL	125mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081					
Sample No.	Matrix *	Sample Date	Sample Time								
J11VJ3	SOIL	4/4/06	0835	X	X	X	X	X	X		F7-6
J11VJ4	SOIL		0835	X	X	X	X	X	X		F7-6D
J11VJ5	SOIL		0845	X	X	X	X	X	X		F7-7
J11VJ6	SOIL		0855	X	X	X	X	X	X		F7-8
J11VJ7	SOIL	4/4/06	0905	X	X	X	X	X	X		F7-9

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From: RT COFFMAN / RT Coffman	Received By/Stored In: REFER #2C, 3728	4/4/06 1500
Relinquished By/Removed From: 3728 #2C	Received By/Stored In: TR Simmons / TR Simmons	4-6-06 1030
Relinquished By/Removed From: TR Simmons / TR Simmons	Received By/Stored In: FED EX	4-6-06 1500
Relinquished By/Removed From: FED EX	Received By/Stored In: D. Smith	4-7-06 0920
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)

Personnel not available to Relinquish samples from 3728 Ref # 2C on 4/6/06

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)

000000024

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-030	Page 3 of 3

Collector Coffman	Company Contact R.T. Coffman	Telephone No. 528-6409	Project Coordinator KESSNER, JH	Price Code 8K	Data Turnaround 15 DAY
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location 1607-F7 Verification		SAF No. RC-032	Air Quality ☐	
Ice Chest No. ERC-96-030	Field Logbook No. EFL-1174-1	COA R607F72000	Method of Shipment Fed Ex		
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060352		Bill of Lading/Air Bill No. SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

000021

			Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C				
			Type of Container	aG	aG	aG	aG	aG	aG				
			No. of Container(s)	1	1	1	1	1	1				
			Volume	250g	60mL	60mL	120mL	120mL	125mL				
SAMPLE ANALYSIS				See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081				
Sample No.	Matrix *	Sample Date	Sample Time										
J11VJ8	SOIL	4/4/06	0915	X	X	X	X	X	X				F7-10

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RTCOFFMAN / RT Coffman	1500 4/4/06	REFER # 2C, 3728	1500 4/4/06
3728 #2C	4-6-06 1030	T.R. Edmundson / Jr Edmundson	4-6-06 1030
T.R. Edmundson / Jr Edmundson WCH	4-6-06 / 1500	FEDEX	
FedEx	4-7-06 / 0920	D. Smith	4-7-06 / 0920

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)

Personnel not available to relinquish samples from 3728 Ref # 2C on 4/16/06

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)

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1607-F-7			DATA PACKAGE: K0297		
VALIDATOR: TLI		LAB: LCI		DATE: 4/21/06	
			SDG: K0297		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J11VJ3	J11VJ4	J11VJ5	J11VJ6	J11VJ7	J11VJ8
					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FB

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 45% - J all no PAS

LCS silica - 55% - J all

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: _____

6. ICP QUALITY CONTROL (Levels D and E)

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

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

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

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

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

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

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

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

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

Comments: _____

8. HOLDING TIMES (all levels)

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

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	06L0225-MB1	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	2.9 u	MG/KG	2.9	1.0
		Arsenic, Total	0.61 u	MG/KG	0.61	1.0
		Boron, Total	0.24 u	MG/KG	0.24	1.0
		Barium, Total	0.02	MG/KG	0.02	1.0
		Beryllium, Total	0.02 u	MG/KG	0.02	1.0
		Calcium, Total	2.0	MG/KG	1.6	1.0
		Cadmium, Total	0.07 u	MG/KG	0.07	1.0
		Cobalt, Total	0.14 u	MG/KG	0.14	1.0
		Chromium, Total	0.13 u	MG/KG	0.13	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		Iron, Total	3.5 u	MG/KG	3.5	1.0
		Potassium, Total	2.3 u	MG/KG	2.3	1.0
		Magnesium, Total	0.97 u	MG/KG	0.97	1.0
		Manganese, Total	0.03 u	MG/KG	0.03	1.0
		Molybdenum, Total	0.29 u	MG/KG	0.29	1.0
		Sodium, Total	0.96	MG/KG	0.76	1.0
		Nickel, Total	0.24 u	MG/KG	0.24	1.0
		Lead, Total	0.31 u	MG/KG	0.31	1.0
		Antimony, Total	0.44 u	MG/KG	0.44	1.0
		Selenium, Total	0.47 u	MG/KG	0.47	1.0
		Silicon, Total	2.3 u	MG/KG	2.3	1.0
		Vanadium, Total	0.09 u	MG/KG	0.09	1.0
		Zinc, Total	0.16 u	MG/KG	0.16	1.0
BLANK1	06C0070-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J11VJ3	Silver, Total	4.9	0.08u	5.5	89.1	1.0
		Aluminum, Total	7060	4830	222	1006 *	1.0
		Arsenic, Total	207	2.3	222	92.4	1.0
		Boron, Total	101	1.5	111	90.0	1.0
		Barium, Total	299	85.6	222	96.2	1.0
		Beryllium, Total	5.6	0.32	5.5	96.0	1.0
		Calcium, Total	6470	3440	2770	109.3	1.0
		Cadmium, Total	5.3	0.16	5.5	93.4	1.0
		Cobalt, Total	55.9	5.1	55.4	91.7	1.0
		Chromium, Total	30.4	7.9	22.2	101.4	1.0
		Copper, Total	39.7	12.5	27.7	98.2	1.0
		Iron, Total	14700	11800	111	2605 *	1.0
		Mercury, Total	0.24	0.02	0.19	117.2	1.0
		Potassium, Total	3620	949	2770	96.3	1.0
		Magnesium, Total	6300	3080	2770	116.2	1.0
		Manganese, Total	328	253	55.4	136.1*	1.0
		Molybdenum, Total	100	0.51	111	90.2	1.0
		Sodium, Total	2600	89.5	2770	90.6	1.0
		Nickel, Total	62.4	9.1	55.4	96.2	1.0
		Lead, Total	57.9	6.2	55.4	93.3	1.0
		Antimony, Total	25.0	0.49u	55.4	45.1	1.0
		Selenium, Total	201	0.52u	222	90.8	1.0
		Silicon, Total	648	456	111	173.0*	1.0
		Vanadium, Total	82.1	25.5	55.4	102.2	1.0
		Zinc, Total	94.0	36.0	55.4	104.7	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J11VJ3	Silver, Total	0.08u	0.08u	NC	1.0
		Aluminum, Total	4830	5250	8.2	1.0
		Arsenic, Total	2.3	2.4	4.3	1.0
		Boron, Total	1.5	1.4	6.9	1.0
		Barium, Total	85.6	89.8	4.8	1.0
		Beryllium, Total	0.32	0.35	9.0	1.0
		Calcium, Total	3440	3740	8.2	1.0
		Cadmium, Total	0.16	0.19	14.0	1.0
		Cobalt, Total	5.1	5.7	11.1	1.0
		Chromium, Total	7.9	8.6	8.5	1.0
		Copper, Total	12.5	13.7	9.2	1.0
		Iron, Total	11800	12900	8.7	1.0
		Mercury, Total	0.02	0.02	19.0	1.0
		Potassium, Total	949	1040	9.5	1.0
		Magnesium, Total	3080	3360	8.5	1.0
		Manganese, Total	253	271	6.8	1.0
		Molybdenum, Total	0.51	0.61	18.2	1.0
		Sodium, Total	89.5	94.8	5.8	1.0
		Nickel, Total	9.1	10.5	14.3	1.0
		Lead, Total	6.2	6.3	1.6	1.0
		Antimony, Total	0.49u	0.49u	NC	1.0
		Selenium, Total	0.52u	0.52u	NC	1.0
		Silicon, Total	456	537	16.3	1.0
		Vanadium, Total	25.5	28.8	12.2	1.0
		Zinc, Total	36.0	40.3	11.3	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	06L0225-LC1	Silver, LCS	46.8	50.0	MG/KG	93.6
		Aluminum, LCS	464	500	MG/KG	92.8
		Arsenic, LCS	911	1000	MG/KG	91.1
		Boron, LCS	461	500	MG/KG	92.1
		Barium, LCS	470	500	MG/KG	94.0
		Beryllium, LCS	23.9	25.0	MG/KG	95.6
		Calcium, LCS	2400	2500	MG/KG	96.1
		Cadmium, LCS	23.6	25.0	MG/KG	94.4
		Cobalt, LCS	235	250	MG/KG	94.0
		Chromium, LCS	47.7	50.0	MG/KG	95.4
		Copper, LCS	118	125	MG/KG	94.1
		Iron, LCS	474	500	MG/KG	94.7
		Potassium, LCS	2200	2500	MG/KG	88.1
		Magnesium, LCS	2360	2500	MG/KG	94.5
		Manganese, LCS	72.7	75.0	MG/KG	96.9
		Molybdenum, LCS	478	500	MG/KG	95.5
		Sodium, LCS	2230	2500	MG/KG	89.1
		Nickel, LCS	189	200	MG/KG	94.5
		Lead, LCS	236	250	MG/KG	94.5
		Antimony, LCS	277	300	MG/KG	92.4
		Selenium, LCS	889	1000	MG/KG	88.9
		Silicon, LCS	274	500	MG/KG	54.8
		Vanadium, LCS	237	250	MG/KG	95.0
		Zinc, LCS	92.5	100	MG/KG	92.5
LCS1	06C0070-LC1	Mercury, LCS	6.6	6.2	MG/KG	106.1

Date: 2 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Sites 1607-F-7
Subject: Volatile Organics - Data Package No. K0297-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 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
J11VJ3*	4/4/06	Soil	C	VOAs by 8260B
J11VJ4*	4/4/06	Soil	C	VOAs by 8260B
J11VJ5	4/4/06	Soil	C	VOAs by 8260B
J11VJ6*	4/4/06	Soil	C	VOAs by 8260B
J11VJ7	4/4/06	Soil	C	VOAs by 8260B
J11VJ8	4/4/06	Soil	C	VOAs by 8260B

* - Reprepared and reanalyzed.

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 analyzed within 14 days of the date of sample collection. 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".

Due to method blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U".

Due to method blank contamination, the chloroform results in all samples were raised to the RQL, qualified as undetected and flagged "U".

Due to method blank contamination, all detected 2-hexone results (J11VJ3, J11VJ4, J11VJ6, J11VJ8) were raised to the RQL, qualified as undetected and flagged "U".

All other 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 the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples J11VJ3, J11VJ4 and J11VJ6 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 a surrogate recovery outside QC limits (149%), the ethylbenzene, xylene and styrene results in sample J11VJ3 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, the bromoform results in all samples (except J111VJ3, J11VJ4 & J111VJ6) were qualified as estimate and flagged "J".

Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples J11VJ3, J11VJ4 and J11VJ6 were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J11VJ3/J11VJ4) 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. Fifty-seven analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data package No. K0297 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 method blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U".

- Due to method blank contamination, the chloroform results in all samples were raised to the RQL, qualified as undetected and flagged "U".

- Due to method blank contamination, all detected 2-hexone results (J11VJ3, J11VJ4, J11VJ6, J11VJ8) were raised to the RQL, qualified as undetected and flagged "U".

- Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples J11VJ3, J11VJ4 and J11VJ6 were qualified as estimates and flagged "J".

- Due to a surrogate recovery outside QC limits (149%), the ethylbenzene, xylene and styrene results in sample J11VJ3 were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits, the bromoform results in all samples (except J111VJ3, J11VJ4 & J111VJ6) were qualified as estimate and flagged "J".

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

Fifty-seven 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

VOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: K0297	REVIEWER: TLI	Project: 1607-F-7	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Methylene chloride	U	All	Blank contamination
Chloroform	U at RQL	All	Blank contamination
2-Hexanone	U at RQL	J11VJ3, J11VJ4 J11VJ6, J11VJ8	Blank contamination
All	J	J11VJ3, J11VJ4 J11VJ6	No MS/MSD
Ethylbenzene Styrene Xylene	J	J11VJ3	Surrogate recovery
Bromoform	J	All (except J11VJ3, J11VJ4 J11VJ6)	RPD

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

VOLATILE ORGANIC ANALYSIS, SOIL MATRIX (UG/KG)

Project: WASHINGTON CLOSURE HANFORD																			
Laboratory: LLI																			
Case:	SDG: K0297																		
Sample Number		J11VJ3		J11VJ3R		J11VJ4		J11VJ4R		J11VJ5		J11VJ6		J11VJ6R		J11VJ7		J11VJ8	
Remarks																			
Sample Date		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06	
Analysis Date		4/14/06		4/17/06		4/14/06		4/17/06		4/17/06		4/14/06		4/17/06		4/17/06		4/17/06	
VOA	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	10	12	UJ	11	U	12	UJ	11	U	12	U	12	UJ	11	U	11	U	11	U
Bromomethane	10	12	UJ	11	U	12	UJ	11	U	12	U	12	UJ	11	U	11	U	11	U
Vinyl Chloride	10	12	UJ	11	U	12	UJ	11	U	12	U	12	UJ	11	U	11	U	11	U
Chloroethane	10	12	UJ	11	U	12	UJ	11	U	12	U	12	UJ	11	U	11	U	11	U
Methylene Chloride	10	13	UJ	18	U	12	UJ	15	U	13	U	12	UJ	17	U	17	U	14	U
Acetone	10	12	UJ	15		8	J	14		29		8	J	22		11		10	
Carbon Disulfide	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
1,1-Dichloroethene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
1,1-Dichloroethane	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
1,2-Dichloroethene (total)	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Chloroform	10	10	UJ	10	U	10	UJ	10	U	10	U	10	UJ	10	U	10	U	10	U
1,2-Dichloroethane	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
2-Butanone	10	7	J	11	U	12	UJ	11	U	12	U	12	UJ	11	U	11	U	11	U
1,1,1-Trichloroethane	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Carbon Tetrachloride	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Bromodichloromethane	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
1,2-Dichloropropane	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
cis-1,3-Dichloropropene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Trichloroethene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Dibromochloromethane	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
1,1,2-Trichloroethane	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Benzene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
trans-1,3-Dichloropropene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Bromoform	10	6	UJ	6	UJ	6	UJ	6	UJ	6	UJ	6	UJ	6	UJ	6	UJ	6	UJ
4-Methyl-2-pentanone	10	7	J	11	U	3	J	11	U	12	U	12	UJ	11	U	11	U	11	U
2-Hexanone	10	10	UJ	11	U	10	UJ	11	U	12	U	10	UJ	11	U	11	U	10	U
Tetrachloroethene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
1,1,2,2-Tetrachloroethane	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Toluene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Chlorobenzene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Ethylbenzene	10	2	J	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Styrene	10	3	J	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
Xylene	10	5	J	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
cis-1,2-Dichloroethene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U
trans-1,2-Dichloroethene	10	6	UJ	6	U	6	UJ	6	U	6	U	6	UJ	6	U	6	U	6	U

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

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Lionville Laboratory, Inc.
Volatiles by GC/MS, HSL List

Report Date: 04/21/06 13:55

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343506001 Page: 1a

	Cust ID:	J11VJ3	J11VJ3	J11VJ4	J11VJ4	J11VJ5	J11VJ6
Sample Information	RFW#:	001	001	002	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.02	0.980	1.04	0.980	1.00	1.04
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
			REPREP		REPREP		
Surrogate Recovery	Toluene-d8	149 * %	126 %	138 %	122 %	110 %	134 %
	Bromofluorobenzene	164 * %	122 %	151 * %	135 * %	99 %	159 * %
	1,2-Dichloroethane-d4	150 %	141 %	143 %	133 %	120 %	144 %
		fl	fl	fl	fl	fl	fl
Chloromethane		12 U J	11 U	12 U J	11 U	12 U	12 U J
Bromomethane		12 U	11 U	12 U	11 U	12 U	12 U
Vinyl Chloride		12 U	11 U	12 U	11 U	12 U	12 U
Chloroethane		12 U	11 U	12 U	11 U	12 U	12 U
Methylene Chloride		13 ~~B~~ U	18 ~~B~~ U	12 ~~B~~ U	15 ~~B~~ U	13 ~~B~~ U	12 ~~B~~ U
Acetone		12 U	15	8 J	14	29	8 J
Carbon Disulfide		6 U	6 U	6 U	6 U	6 U	6 U
1,1-Dichloroethene		6 U	6 U	6 U	6 U	6 U	6 U
1,1-Dichloroethane		6 U	6 U	6 U	6 U	6 U	6 U
1,2-Dichloroethene (total)		6 U	6 U	6 U	6 U	6 U	6 U
Chloroform		10 ~~4 JB~~ U	10 ~~4 JB~~ U	10 ~~3 JB~~ U	10 ~~3 JB~~ U	10 ~~3 JB~~ U	10 ~~3 JB~~ U
1,2-Dichloroethane		6 U	6 U	6 U	6 U	6 U	6 U
2-Butanone		7	11 U	12 U	11 U	12 U	12 U
1,1,1-Trichloroethane		6 U	6 U	6 U	6 U	6 U	6 U
Carbon Tetrachloride		6 U	6 U	6 U	6 U	6 U	6 U
Bromodichloromethane		6 U	6 U	6 U	6 U	6 U	6 U
1,2-Dichloropropane		6 U	6 U	6 U	6 U	6 U	6 U
cis-1,3-Dichloropropene		6 U	6 U	6 U	6 U	6 U	6 U
Trichloroethene		6 U	6 U	6 U	6 U	6 U	6 U
Dibromochloromethane		6 U	6 U	6 U	6 U	6 U	6 U
1,1,2-Trichloroethane		6 U	6 U	6 U	6 U	6 U	6 U
Benzene		6 U	6 U	6 U	6 U	6 U	6 U
Trans-1,3-Dichloropropene		6 U	6 U	6 U	6 U	6 U	6 U
Bromoform		6 U	6 U J	6 U	6 U J	6 U J	6 U
4-Methyl-2-pentanone		7	11 U	3 J	11 U	12 U	12 U
2-Hexanone		10 ~~8 JB~~ U	11 U	10 ~~3 JB~~ U	11 U	12 U	10 ~~2 JB~~ U
Tetrachloroethene		6 U	6 U	6 U	6 U	6 U	6 U
1,1,2,2-Tetrachloroethane		6 U	6 U	6 U	6 U	6 U	6 U
Toluene		6 U	6 U	6 U	6 U	6 U	6 U

*= Outside of EPA CLP QC limits.

5/29/06

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RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 1b

Cust ID:	J11VJ3	J11VJ3	J11VJ4	J11VJ4	J11VJ5	J11VJ6
RFW#:	001	001 REPREP	002	002 REPREP	003	004
Chlorobenzene	6 U J	6 U	6 U	6 U	6 U	6 U J
Ethylbenzene	2 J	6 U	6 U	6 U	6 U	6 U
Styrene	3 J	6 U	6 U	6 U	6 U	6 U
Xylene (total)	5 J	6 U	6 U	6 U	6 U	6 U
cis-1,2-dichloroethene	6 U	6 U	6 U	6 U	6 U	6 U
trans-1,2-dichloroethene	6 U	6 U	6 U	6 U	6 U	6 U

*= Outside of EPA CLP QC limits.

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5/29/04

Lionville Laboratory, Inc.
Volatiles by GC/MS, HSL List

Report Date: 04/21/06 13:55

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 2a

	Cust ID:	J11VJ6	J11VJ7	J11VJ7	J11VJ7	J11VJ8	VBLKWS
Sample Information	RFW#:	004	005	005 MS	005 MSD	006	06LVK055-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	0.980	0.962	1.00	1.00	0.980	1.00
	Units:	ug/Kg REPREP	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Toluene-d8	122 %	120 %	123 %	126 %	118 %	115 %
	Bromofluorobenzene	125 * %	141 * %	138 * %	144 * %	116 %	122 %
	1,2-Dichloroethane-d4	129 %	124 %	145 %	143 %	131 %	131 %
		fl	fl	fl	fl	fl	fl
Chloromethane		11 U	11 U	71 %	66 %	11 U	10 U
Bromomethane		11 U	11 U	76 %	70 %	11 U	10 U
Vinyl Chloride		11 U	11 U	77 %	75 %	11 U	10 U
Chloroethane		11 U	11 U	97 %	91 %	11 U	10 U
Methylene Chloride		17 ~~B~~ U	17 ~~B~~ U	73 %	68 %	14 ~~B~~ U	7
Acetone		22 ~~22 B~~ U	11 ~~B~~ U	188 %	153 %	10 ~~B~~ U	10 U
Carbon Disulfide		6 U	6 U	85 %	79 %	6 U	5 U
1,1-Dichloroethene		6 U	6 U	98 %	91 %	6 U	5 U
1,1-Dichloroethane		6 U	6 U	109 %	103 %	6 U	5 U
1,2-Dichloroethene (total)		6 U	6 U	92 %	85 %	6 U	5 U
Chloroform		10 ~~4 B~~ U	10 ~~4 B~~ U	102 %	94 %	10 ~~3 B~~ U	2 J
1,2-Dichloroethane		6 U	6 U	131 %	118 %	6 U	5 U
2-Butanone		11 U	11 U	131 %	118 %	11 U	10 U
1,1,1-Trichloroethane		6 U	6 U	125 %	118 %	6 U	5 U
Carbon Tetrachloride		6 U	6 U	119 %	113 %	6 U	5 U
Bromodichloromethane		6 U	6 U	113 %	105 %	6 U	5 U
1,2-Dichloropropane		6 U	6 U	106 %	98 %	6 U	5 U
cis-1,3-Dichloropropene		6 U	6 U	103 %	94 %	6 U	5 U
Trichloroethene		6 U	6 U	107 %	100 %	6 U	5 U
Dibromochloromethane		6 U	6 U	127 %	116 %	6 U	5 U
1,1,2-Trichloroethane		6 U	6 U	117 %	107 %	6 U	5 U
Benzene		6 U	6 U	100 %	93 %	6 U	5 U
Trans-1,3-Dichloropropene		6 U	6 U	100 %	90 %	6 U	5 U
Bromoform		6 U J	6 U J	71 %	101 %	6 U J	5 U
4-Methyl-2-pentanone		11 U	11 U	110 %	99 %	11 U	10 U
2-Hexanone		11 ~~10 B~~ U	11 U	82 %	76 %	10 ~~2 B~~ U	1 J
Tetrachloroethene		6 U	6 U	109 %	102 %	6 U	5 U
1,1,2,2-Tetrachloroethane		6 U	6 U	132 * %	126 %	6 U	5 U
Toluene		6 U	6 U	106 %	98 %	6 U	5 U

*= Outside of EPA CLP QC limits.

R 5/25/06

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RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 2b

Cust ID:	J11VJ6	J11VJ7	J11VJ7	J11VJ7	J11VJ8	VBLKWS
RFW#:	004 REPREP	005	005 MS	005 MSD	006	06LVK055-MB1
Chlorobenzene	6 U	6 U	93 %	87 %	6 U	5 U
Ethylbenzene	6 U	6 U	97 %	91 %	6 U	5 U
Styrene	6 U	6 U	76 %	74 %	6 U	5 U
Xylene (total)	6 U	6 U	92 %	89 %	6 U	5 U
cis-1,2-dichloroethene	6 U	6 U	93 %	86 %	6 U	5 U
trans-1,2-dichloroethene	6 U	6 U	90 %	85 %	6 U	5 U

*= Outside of EPA CLP QC limits.

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5/29/06

Lionville Laboratory, Inc.
Volatiles by GC/MS, HSL List

Report Date: 04/21/06 13:55

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 3a

	Cust ID:	VBLKWS BS		VBLKWT		VBLKWT BS	
Sample Information	RFW#:	06LVK055-MB1		06LVK056-MB1		06LVK056-MB1	
	Matrix:	SOIL		SOIL		SOIL	
	D.F.:	1.00		1.00		1.00	
	Units:	ug/Kg		ug/Kg		ug/Kg	
Surrogate Recovery	Toluene-d8	114	%	108	%	112	%
	Bromofluorobenzene	119	%	116	%	119	%
	1,2-Dichloroethane-d4	141	%	121	%	133	%
Chloromethane		86	%	10	U	75	%
Bromomethane		96	%	10	U	74	%
Vinyl Chloride		82	%	10	U	81	%
Chloroethane		97	%	10	U	94	%
Methylene Chloride		70	%	8		69	%
Acetone		180	%	10	U	204	%
Carbon Disulfide		100	%	5	U	98	%
1,1-Dichloroethene		103	%	5	U	102	%
1,1-Dichloroethane		109	%	5	U	107	%
1,2-Dichloroethene (total)		97	%	5	U	96	%
Chloroform		103	%	2	J	100	%
1,2-Dichloroethane		138	%	5	U	126	%
2-Butanone		133	%	10	U	158	%
1,1,1-Trichloroethane		134	%	5	U	131	%
Carbon Tetrachloride		133	%	5	U	133	%
Bromodichloromethane		117	%	5	U	115	%
1,2-Dichloropropane		106	%	5	U	104	%
cis-1,3-Dichloropropene		97	%	5	U	101	%
Trichloroethene		132	%	5	U	121	%
Dibromochloromethane		120	%	5	U	115	%
1,1,2-Trichloroethane		100	%	5	U	99	%
Benzene		103	%	5	U	103	%
Trans-1,3-Dichloropropene		90	%	5	U	97	%
Bromoform		115	%	5	U	114	%
4-Methyl-2-pentanone		101	%	4	J	102	%
2-Hexanone		111	%	3	J	122	%
Tetrachloroethene		117	%	5	U	115	%
1,1,2,2-Tetrachloroethane		76	%	5	U	95	%
Toluene		103	%	5	U	100	%

*= Outside of EPA CLP QC limits.

5/29/06

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Cust ID:	VBLKWS BS	VBLKWT	VBLKWT BS
RFW#:	06LVK055-MB1	06LVK056-MB1	06LVK056-MB1
Chlorobenzene	95 %	5 U	99 %
Ethylbenzene	87 %	5 U	100 %
Styrene	96 %	1 J	88 %
Xylene (total)	95 %	1 J	96 %
cis-1,2-dichloroethene	97 %	5 U	97 %
trans-1,2-dichloroethene	97 %	5 U	96 %

*= Outside of EPA CLP QC limits.

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5/24/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0604L712
SDG/SAF # K0297/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 04-07-2006

GC/MS VOLATILE

Six (6) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8260B for TCL volatile target compounds on 04-14,17-2006.

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

1. Samples were analyzed within required holding time.

2. Non-target compounds were detected in the samples.

3. Nine (9) of forty-five (45) surrogate recoveries were outside acceptance criteria. The analysis of associated matrix spike samples fulfills the reanalysis requirement of sample J11VJ7. All other out of criteria samples were reanalyzed on 04-17-2006 and reported.

4. One (1) of seventy (70) matrix spike recoveries was outside acceptance criteria.

5. All blank spike recoveries were within acceptance criteria.

6. The method blank 06LVK055-MB1 contained the common laboratory contaminant Methylene Chloride at a level less than 2x the CRQL and the target compounds Chloroform and 2-Hexanone at levels less than the CRQL. The method blank 06LVK056-MB1 contained the common laboratory contaminant Methylene Chloride at a level less than 2x the CRQL and the target compounds Chloroform, 4-Methyl-2-pentanone, 2-Hexanone, Xylenes (total) and Styrene at levels less than the CRQL.

7. Internal standard area criteria were not met for several samples. The analysis of associated matrix spike duplicate fulfills the reanalysis requirement of sample J11VJ7 MS. All other out of criteria samples were reanalyzed on 04-17-2006 and reported.

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 2 7 pages.

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LIONVILLE LABORATORY INC.

8. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

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

4/26/06
Date

som\group\data\voa\tnu-hanford\0604-712.doc

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-030	Page 2 of 3

Collector: Coffman	Company Contact: R.T. Coffman — Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8K — Data Turnaround: 15 DAY
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-96-030	Field Logbook No.: EFL-1174-1 — COA: R607F72000	Method of Shipment: Fed Ex	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: ~~A060350~~ TCE 4-6-06 A060352	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

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Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	aG	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	60mL	120mL	120mL	125mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081					
Sample No.	Matrix *	Sample Date	Sample Time								
J11VJ3	SOIL	4/4/06	0835	X	X	X	X	X	X		F7-6
J11VJ4	SOIL		0835	X	X	X	X	X	X		F7-6D
J11VJ5	SOIL		0845	X	X	X	X	X	X		F7-7
J11VJ6	SOIL		0855	X	X	X	X	X	X		F7-8
J11VJ7	SOIL	4/4/06	0905	X	X	X	X	X	X		F7-9

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From: RT COFFMAN / RT Coffman	Received By/Stored In: REFER #2C, 3728	4/4/06 1500
Relinquished By/Removed From: 3728 #2C	Received By/Stored In: JR Edmondson	4-6-06 1030
Relinquished By/Removed From: JR Edmondson / JR Edmondson	Received By/Stored In: FED EX	4-6-06 1500
Relinquished By/Removed From: FED EX	Received By/Stored In: W. Smith	4-7-06 0920
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)

Personnel not available to Relinquish samples from 3728 Ref # 2C on 4/6/06

Matrix *
S=Soil
SP=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-032-030	Page 3 of 3

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8K	Data Turnaround: 15 DAY
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification		SAF No.: RC-032	Air Quality ☐	
Ice Chest No.: ERC-96-030	Field Logbook No.: EFL-1174-1	COA: R607F72000	Method of Shipment: Fed Ex		
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060352		Bill of Lading/Air Bill No.: SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	aG	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	60mL	120mL	120mL	125mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081					
Sample No. / Matrix * / Sample Date / Sample Time											
J11VJ8 / SOIL / 4/4/06 / 0915	X	X	X	X	X	X					F7-10

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RTCOFFMAN / RT Coffman	1500 4/4/06	REFER # 2C, 3728	1500 4/4/06
3728 #2C	4-6-06 1030	T.R. Edmundson / TR Edmundson	4-6-06 1030
T.R. Edmundson / TR Edmundson	4-6-06 / 1500	FEDEX	
FedEx	4-7-06 / 0920	D. Smith	4-7-06 / 0920

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)

Personnel not available to relinquish samples from 3728 Ref # 2C on 4/16/06

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

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

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

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1607-F-7			DATA PACKAGE: K0297		
VALIDATOR: TLI		LAB: LLP		DATE: 5/21/00	
			SDG: K0297		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J11VJ3	J11VJ4	J11VJ5	J11VJ6	J11VJ7	J11VJ8
					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)

GC/MS tuning/performance check acceptable? ..... Yes No N/A

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:

GC/MS 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: MC – U in all samples no FS

chloroform – U in all – at RQL

2-hexane – U at RQL – ~~in 3, 4, 7, 8~~ 5/6 5/12 – all detect

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? (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: Surr – J3 ~~Benzene, toluene~~, ethylbenzene, styrene + xylene – J 5/6

J3, J4 + J6 – No MS or MSD – J all

no PAS

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

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

MS/MSD RPD values 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:

J3, J4 + J6 – no MS/MSD – J all

Brownfield 7470 – J (all but J3, J4 + J6)

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A

Iinternal standard areas acceptable? ..... Yes No N/A

Internal standard retention times 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:

7. HOLDING TIMES (all levels)

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

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

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

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

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

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

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

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

Laboratory properly identified and coded all TIC? (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: 57 ppm

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

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

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

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

Comments:

Date: 2 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 1607-F-7
Subject: Semivolatile - Data Package No. K0297-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 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
J11VJ3	4/4/06	Soil	C	See note 1
J11VJ4	4/4/06	Soil	C	See note 1
J11VJ5	4/4/06	Soil	C	See note 1
J11VJ6	4/4/06	Soil	C	See note 1
J11VJ7	4/4/06	Soil	C	See note 1
J11VJ8	4/4/06	Soil	C	See note 1

1 – Semivolatiles by 8270C.

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 equipment 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 a matrix spike duplicate result outside QC limits, all hexacloroethane (47%) and 1,2,4-trichlorobenzene (53%) results were qualified as estimates and flagged "J".

Due to a matrix spike result outside QC limits (10%), the 3,3'-dichlorobenzidine results in all samples were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (118%), all detected 2-methylnaphthalene 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".

All 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, all semivolatile results (except 4-chloroanaline, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,6-dinitrotoluene, 3-nitroanaline, 4-nitrophenol, 4-nitroanaline and benzo(k)fluoranthene) were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J11VJ3/J11VJ4) 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. Forty-eight analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0297 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 duplicate result outside QC limits, all hexacloroethane (47%) and 1,2,4-trichlorobenzene (53%) results were qualified as estimates and flagged "J".

- Due to a matrix spike result outside QC limits (10%), the 3,3'-dichlorobenzidine results in all samples were qualified as estimates and flagged "J".

- Due to a matrix spike recovery outside QC limits (118%), all detected 2-methylnaphthalene results were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits, all semivolatile results (except 4-chloroanaline, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,6-dinitrotoluene, 3-nitroanaline, 4-nitrophenol, 4-nitroanaline and benzo(k)fluoranthene) 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

Forty-eight 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

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

SDG: K0297	REVIEWER: TLI	Project: 1607-F-7	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Hexachloroethane 1,2,4-Trichlorobenzene	J	All	MSD recovery
2-Methyonaphthalene	J	All detected analytes	MS recovery
3,3-Dichlorobenzidine	J	All	MS recovery
All analytes except the following: 4-Chloroanaline 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,6-Dinitrotoluene 3-Nitroanaline 4-Nitrophenol 4-Nitroanaline Benzo(k)fluoranthene	J	All	RPD

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD													
Laboratory: LLI	SDG: K0297												
Sample Number		J11VJ3		J111VJ4		J11VJ5		J11VJ6		J11VJ7		J11VJ8	
Remarks				Duplicate									
Sample Date		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06	
Extraction Date		4/17/06		4/17/06		4/17/06		4/17/06		4/17/06		4/17/06	
Analysis Date		4/19/06		4/19/06		4/19/06		4/20/06		4/20/06		4/19/06	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
bis(2-Chloroethyl)ether	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2-Chlorophenol	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
1,3-Dichlorobenzene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
1,4-Dichlorobenzene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
1,2-Dichlorobenzene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2-Methylphenol	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2,2'-oxybis(1-chloropropane)	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
3 and/or 4-Methylphenol	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
N-Nitroso-di-n-propylamine	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Hexachloroethane	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Nitrobenzene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Isophorone	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2-Nitrophenol	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2,4-Dimethylphenol	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
bis(2-Chloroethoxy)methane	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2,4-Dichlorophenol	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
1,2,4-Trichlorobenzene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Naphthalene	660	46	J	47	J	390	UJ	68	J	97	J	87	J
4-Chloroaniline		380	U	380	U	390	U	380	U	770	U	380	U
Hexachlorobutadiene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
4-Chloro-3-methylphenol		380	U	380	U	390	U	380	U	770	U	380	U
2-Methylnaphthalene	660	83	J	83	J	390	UJ	88	J	150	J	120	J
Hexachlorocyclopentadiene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2,4,6-Trichlorophenol		380	U	380	U	390	U	380	U	770	U	380	U
2,4,5-Trichlorophenol*	660	960	UJ	960	UJ	970	UJ	950	UJ	1900	UJ	960	UJ
2-Chloronaphthalene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2-Nitroaniline*	660	960	UJ	960	UJ	970	UJ	950	UJ	1900	UJ	960	UJ
Dimethylphthalate	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Acenaphthylene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2,6-Dinitrotoluene		380	U	380	U	390	U	380	U	770	U	380	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.

* - RQL exceeded

000011

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD													
Laboratory: LLI	SDG: K0297												
Sample Number		J11VJ3		J111VJ4		J11VJ5		J11VJ6		J11VJ7		J11VJ8	
Remarks				Duplicate									
Sample Date		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06	
Extraction Date		4/17/06		4/17/06		4/17/06		4/17/06		4/17/06		4/17/06	
Analysis Date		4/20/06		4/21/06		4/21/06		4/21/06		4/21/06		4/21/06	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline*		960	U	960	U	970	U	950	U	1900	U	960	U
Acenaphthene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
2,4-Dinitrophenol*	660	960	U	960	UJ	970	UJ	950	UJ	1900	UJ	960	UJ
4-Nitrophenol*		960	U	960	U	970	U	950	U	1900	U	960	U
Dibenzofuran	660	380	UJ	380	UJ	390	UJ	23	UJ	770	UJ	26	J
2,4-Dinitrotoluene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Diethylphthalate	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
4-Chlorophenyl-phenyl ether	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Fluorene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
4-Nitroaniline*		960	U	960	U	970	U	950	U	1900	U	960	U
4,6-Dinitro-2-methylphenol*	660	960	UJ	960	UJ	970	UJ	950	UJ	1900	UJ	960	UJ
N-Nitrosodiphenylamine	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
4-Bromophenyl-phenyl ether	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Hexachlorobenzene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Pentachlorophenol*	660	960	UJ	960	UJ	970	UJ	950	UJ	1900	UJ	960	UJ
Phenanthrene	660	27	J	27	J	390	UJ	73	J	100	J	63	J
Anthracene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Carbazole	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Di-n-butylphthalate	660	380	UJ	24	J	390	UJ	47	J	770	UJ	30	J
Fluoranthene	660	380	UJ	380	UJ	390	UJ	62	J	72	J	47	J
Pyrene	660	30	J	380	UJ	390	UJ	54	J	71	J	64	J
Butylbenzylphthalate	660	380	UJ	380	UJ	390	UJ	24	J	770	UJ	380	UJ
3,3'-Dichlorobenzidine	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Benzo(a)anthracene	660	380	UJ	380	UJ	390	UJ	26	J	770	UJ	21	J
Chrysene	660	380	UJ	380	UJ	390	UJ	47	J	76	J	39	J
bis(2-Ethylhexyl)phthalate	660	21	J	22	J	19	J	66	J	63	J	29	J
Di-n-octylphthalate	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Benzo(b)fluoranthene	660	380	UJ	380	UJ	390	UJ	28	J	48	J	380	UJ
Benzo(k)fluoranthene		380	U	380	U	390	U	28		46		380	U
Benzo(a)pyrene	660	380	UJ	380	U	390	UJ	23	J	770	UJ	380	UJ
Indeno(1,2,3-cd)pyrene	660	380	UJ	380	UJ	390	UJ	21	J	58	J	380	UJ
Dibenz(a,h)anthracene	660	380	UJ	380	UJ	390	UJ	380	UJ	770	UJ	380	UJ
Benzo(g,h,i)perylene	660	380	UJ	380	UJ	390	UJ	20	J	58	J	380	UJ

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

000012

Semivolatiles by GC/MS, HSL List

Report Date: 04/21/06 17:03

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 1a

	Cust ID:	J11VJ3	J11VJ3	J11VJ3	J11VJ4	J11VJ5	J11VJ6
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
Surrogate Recovery	Nitrobenzene-d5	63 %	68 %	47 %	64 %	67 %	89 %
	2-Fluorobiphenyl	67 %	82 %	56 %	66 %	69 %	91 %
	Terphenyl-d14	85 %	97 %	70 %	81 %	90 %	99 %
	Phenol-d5	68 %	84 %	59 %	67 %	71 %	92 %
	2-Fluorophenol	66 %	75 %	53 %	66 %	74 %	84 %
	2,4,6-Tribromophenol	87 %	105 %	76 %	83 %	92 %	83 %
		fl	fl	fl	fl	fl	fl
Phenol		380 U J	103 %	72 %	380 U J	390 U J	380 U J
bis(2-Chloroethyl)ether		380 U	83 %	55 %	380 U	390 U	380 U
2-Chlorophenol		380 U	95 %	64 %	380 U	390 U	380 U
1,3-Dichlorobenzene		380 U	77 %	50 %	380 U	390 U	380 U
1,4-Dichlorobenzene		380 U	75 %	50 %	380 U	390 U	380 U
1,2-Dichlorobenzene		380 U	83 %	53 %	380 U	390 U	380 U
2-Methylphenol		380 U	100 %	67 %	380 U	390 U	380 U
2,2'-oxybis(1-Chloropropane)		380 U	93 %	61 %	380 U	390 U	380 U
4-Methylphenol		380 U	104 %	75 %	380 U	390 U	380 U
N-Nitroso-di-n-propylamine		380 U	98 %	65 %	380 U	390 U	380 U
Hexachloroethane		380 U	74 %	47 * %	380 U	390 U	380 U
Nitrobenzene		380 U	78 %	53 %	380 U	390 U	380 U
Isophorone		380 U	90 %	65 %	380 U	390 U	380 U
2-Nitrophenol		380 U	85 %	58 %	380 U	390 U	380 U
2,4-Dimethylphenol		380 U	87 %	61 %	380 U	390 U	380 U
bis(2-Chloroethoxy)methane		380 U	85 %	58 %	380 U	390 U	380 U
2,4-Dichlorophenol		380 U	91 %	65 %	380 U	390 U	380 U
1,2,4-Trichlorobenzene		380 U	78 %	53 * %	380 U	390 U	380 U
Naphthalene		46 ~~U~~ J	108 %	55 %	47 J	390 U	68 J
4-Chloroaniline		380 U	66 %	53 %	380 U	390 U	380 U
Hexachlorobutadiene		380 U J	85 %	55 %	380 U J	390 U J	380 U J
4-Chloro-3-methylphenol		380 U	95 %	71 %	380 U	390 U	380 U
2-Methylnaphthalene		83 ~~U~~ J	118 * %	62 %	83 ~~U~~ J	390 U J	88 ~~U~~ J
Hexachlorocyclopentadiene		380 U J	72 %	42 %	380 U J	390 U J	380 U J
2,4,6-Trichlorophenol		380 U	101 %	76 %	380 U	390 U	380 U
2,4,5-Trichlorophenol		960 U J	108 %	77 %	960 U J	970 U J	950 U J

*= Outside of EPA CLP QC limits.

pr 5/29/06

0000013

0000000008

Cust ID:	J11VJ3	J11VJ3	J11VJ3	J11VJ4	J11VJ5	J11VJ6
RFW#:	001	001 MS	001 MSD	002	003	004
2-Chloronaphthalene	380 U J	94 %	65 %	380 U J	390 U J	380 U J
2-Nitroaniline	960 U J	100 %	72 %	960 U	970 U	950 U
Dimethylphthalate	380 U J	97 %	71 %	380 U	390 U	380 U
Acenaphthylene	380 U J	99 %	69 %	380 U	390 U	380 U
2,6-Dinitrotoluene	380 U	96 %	71 %	380 U	390 U	380 U
3-Nitroaniline	960 U	103 %	82 %	960 U	970 U	950 U
Acenaphthene	380 U J	96 %	67 %	380 U J	390 U J	380 U J
2,4-Dinitrophenol	960 U J	92 %	58 %	960 U J	970 U J	950 U J
4-Nitrophenol	960 U	90 %	70 %	960 U	970 U	950 U
Dibenzofuran	380 U J	103 %	69 %	380 U J	390 U J	23 J
2,4-Dinitrotoluene	380 U	99 %	71 %	380 U	390 U	380 U
Diethylphthalate	380 U	97 %	70 %	380 U	390 U	380 U
4-Chlorophenyl-phenylether	380 U	94 %	66 %	380 U	390 U	380 U
Fluorene	380 U	92 %	65 %	380 U	390 U	380 U
4-Nitroaniline	960 U	67 %	62 %	960 U	970 U	950 U
4,6-Dinitro-2-methylphenol	960 U J	106 %	73 %	960 U J	970 U J	950 U J
N-Nitrosodiphenylamine (1)	380 U	84 %	60 %	380 U	390 U	380 U
4-Bromophenyl-phenylether	380 U	88 %	61 %	380 U	390 U	380 U
Hexachlorobenzene	380 U	107 %	72 %	380 U	390 U	380 U
Pentachlorophenol	960 U	146 * %	101 %	960 U	970 U	950 U
Phenanthrene	27 J	102 %	68 %	27 J	390 U	73
Anthracene	380 U	95 %	69 %	380 U	390 U	380 U
Carbazole	380 U	90 %	66 %	380 U	390 U	380 U
Di-n-butylphthalate	380 U	93 %	67 %	24 J	390 U	47 U
Fluoranthene	380 U	85 %	62 %	380 U	390 U	62 U
Pyrene	30	112 %	77 %	380 U	390 U	54 U
Butylbenzylphthalate	380 U	113 %	80 %	380 U	390 U	24 U
3,3'-Dichlorobenzidine	380 U	10 * %	31 %	380 U	390 U	380 U
Benzo(a)anthracene	380 U	93 %	68 %	380 U	390 U	26 U
Chrysene	380 U	90 %	65 %	380 U	390 U	47 U
bis(2-Ethylhexyl)phthalate	21 J	102 %	75 %	22 J	19 J	66 J
Di-n-octyl phthalate	380 U	118 %	83 %	380 U	390 U	380 U
Benzo(b)fluoranthene	380 U	109 %	75 %	380 U	390 U	28 U
Benzo(k)fluoranthene	380 U	89 %	66 %	380 U	390 U	28 U
Benzo(a)pyrene	380 U J	91 %	63 %	380 U J	390 U J	23 J
Indeno(1,2,3-cd)pyrene	380 U J	85 %	60 %	380 U J	390 U J	21 J
Dibenz(a,h)anthracene	380 U J	87 %	61 %	380 U J	390 U J	380 U J
Benzo(g,h,i)perylene	380 U J	79 %	55 %	380 U J	390 U J	20 J

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

5/29/a

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	Cust ID:	J11VJ7	J11VJ8	SBLKWG	SBLKWG BS
Sample Information	RFW#:	005	006	06LE0294-MB1	06LE0294-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	2.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	85 %	66 %	70 %	58 %
	2-Fluorobiphenyl	92 %	69 %	68 %	64 %
	Terphenyl-d14	88 %	84 %	97 %	74 %
	Phenol-d5	79 %	69 %	70 %	68 %
	2-Fluorophenol	69 %	65 %	72 %	66 %
	2,4,6-Tribromophenol	79 %	86 %	64 %	79 %
		fl	fl	fl	fl
Phenol		770 U J	380 U J	330 U	80 %
bis(2-Chloroethyl)ether		770 U	380 U	330 U	71 %
2-Chlorophenol		770 U	380 U	330 U	76 %
1,3-Dichlorobenzene		770 U	380 U	330 U	69 %
1,4-Dichlorobenzene		770 U	380 U	330 U	68 %
1,2-Dichlorobenzene		770 U	380 U	330 U	74 %
2-Methylphenol		770 U	380 U	330 U	73 %
2,2'-oxybis(1-Chloropropane)		770 U	380 U	330 U	70 %
4-Methylphenol		770 U	380 U	330 U	79 %
N-Nitroso-di-n-propylamine		770 U	380 U	330 U	78 %
Hexachloroethane		770 U	380 U	330 U	67 %
Nitrobenzene		770 U	380 U	330 U	63 %
Isophorone		770 U	380 U	330 U	70 %
2-Nitrophenol		770 U	380 U	330 U	65 %
2,4-Dimethylphenol		770 U	380 U	330 U	53 %
bis(2-Chloroethoxy)methane		770 U	380 U	330 U	64 %
2,4-Dichlorophenol		770 U	380 U	330 U	66 %
1,2,4-Trichlorobenzene		770 U	380 U	330 U	64 %
Naphthalene		97 J	87 J	330 U	65 %
4-Chloroaniline		770 U	380 U	330 U	77 %
Hexachlorobutadiene		770 U J	380 U J	330 U	71 %
4-Chloro-3-methylphenol		770 U	380 U	330 U	71 %
2-Methylnaphthalene		150 J	120 J	330 U	69 %
Hexachlorocyclopentadiene		770 U J	380 U J	330 U	62 %
2,4,6-Trichlorophenol		770 U	380 U	330 U	78 %
2,4,5-Trichlorophenol		1900 U J	960 U J	830 U	71 %

*= Outside of EPA CLP QC limits.

5/24/06

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Cust ID:	J11VJ7		J11VJ8		SBLKWG		SBLKWG BS	
RFW#:	005		006		06LE0294-MB1		06LE0294-MB1	
2-Chloronaphthalene	770	U J	380	U J	330	U	70	%
2-Nitroaniline	1900	U J	960	U J	830	U	76	%
Dimethylphthalate	770	U J	380	U J	330	U	76	%
Acenaphthylene	770	U J	380	U J	330	U	72	%
2,6-Dinitrotoluene	770	U	380	U	330	U	74	%
3-Nitroaniline	1900	U	960	U	830	U	100	%
Acenaphthene	770	U J	380	U J	330	U	72	%
2,4-Dinitrophenol	1900	U J	960	U J	830	U	33	%
4-Nitrophenol	1900	U	960	U	830	U	75	%
Dibenzofuran	770	U J	26	J	330	U	75	%
2,4-Dinitrotoluene	770	U	380	U	330	U	80	%
Diethylphthalate	770	U	380	U	330	U	77	%
4-Chlorophenyl-phenylether	770	U	380	U	330	U	76	%
Fluorene	770	U	380	U	330	U	72	%
4-Nitroaniline	1900	U	960	U	830	U	78	%
4,6-Dinitro-2-methylphenol	1900	U J	960	U J	830	U	65	%
N-Nitrosodiphenylamine (1)	770	U	380	U	330	U	61	%
4-Bromophenyl-phenylether	770	U	380	U	330	U	66	%
Hexachlorobenzene	770	U	380	U	330	U	78	%
Pentachlorophenol	1900	U	960	U	830	U	84	%
Phenanthrene	100	J	63	J	330	U	76	%
Anthracene	770	U	380	U	330	U	78	%
Carbazole	770	U	380	U	330	U	75	%
Di-n-butylphthalate	770	U	30	J	330	U	81	%
Fluoranthene	72	J	47	J	330	U	81	%
Pyrene	71	J	64	J	330	U	79	%
Butylbenzylphthalate	770	U	380	U	330	U	81	%
3,3'-Dichlorobenzidine	770	U	380	U	330	U	104	%
Benzo(a)anthracene	770	U	21	J	330	U	76	%
Chrysene	76	J	39	J	330	U	74	%
bis(2-Ethylhexyl)phthalate	63	J	29	J	330	U	82	%
Di-n-octyl phthalate	770	U	380	U	330	U	85	%
Benzo(b)fluoranthene	48	J	380	U	330	U	83	%
Benzo(k)fluoranthene	46	J	380	U	330	U	74	%
Benzo(a)pyrene	770	U J	380	U J	330	U	75	%
Indeno(1,2,3-cd)pyrene	58	J	380	U J	330	U	70	%
Dibenz(a,h)anthracene	770	U J	380	U J	330	U	70	%
Benzo(g,h,i)perylene	58	J	380	U J	330	U	66	%

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

R 5/29/06

R 5/29/06

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0604L712
SDG/SAF # K0297/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 04-07-2006

SEMIVOLATILE

Six (6) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 04-17-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 04-19,20-2006.

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

1. Samples were extracted and analyzed within required holding time.

2. Non-target compounds were detected in the samples.

3. All surrogate recoveries were within acceptance criteria.

4. Five (5) of two hundred twenty-eight (128) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

5. All blank spike recoveries were within acceptance criteria.

6. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than the CRQL.

7. Internal standard area and retention time criteria were met.

8. Sample J11VJ7 was analyzed using 2mL final volume due to the nature of the sample extract resulting in higher sample results. A copy of the Sample Extraction Record has been enclosed for more information.

9. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

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 2 pages.

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

LIONVILLE LABORATORY INC.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/25/04
Date

som\gorup\data\bna\tnu-hanford\0604-712.doc

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: dem5136

Initiator: Robert Carden
Date: 4/24/06
Client: TMV Hanford RL032

Batch: dw4L712
Samples: MS/MSD
Method: SW846/MCAWW/CLP/

Parameter: dw25H
Matrix: Soil
Prep Batch: dLE0294

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)

MSD hexachloroethane spike recovery outside QC limits 47% (50-120%) OK in MS/BS
MSD-1,2,4 Trichlorobenzene 53% (60-120%) OK in MS/BS
MS-3,3' Dichlorobenzidine 10% (20-140%) OK in MSD/BS
2 spiked base/neutrals in MS

2. Known or Probable Causes(s) 3,3' Dichlorobenzidine can be subject to oxidative losses during solvent concentration. Since all other spikes/surrogates are all good not an extraction problem. Sporadic.

3. Discussion and Proposed Action Other Description: Narrate

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

4. Project Manager Instructions...signature/date: 4/24/06

__ 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: 4/25/06 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	✓	X 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-032-030	Page 2 of 2

Collector: Coffman	Company Contact: R.T. Coffman — Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8K — Data Turnaround: 15 DAY
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-96-030	Field Logbook No.: EFL-1174-1 — COA: R607F72000	Method of Shipment: Fed Ex	
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: ~~A060350~~ TCE 4-6-06 A060352	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

000021

SAMPLE ANALYSIS												
			Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C				
			Type of Container	aG	aG	aG	aG	aG	aG				
			No. of Container(s)	1	1	1	1	1	1				
			Volume	250g	60mL	60mL	120mL	120mL	125mL				
				See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081				
Sample No.	Matrix *	Sample Date	Sample Time										
J11VJ3	SOIL	4/4/06	0835	X	X	X	X	X	X				F7-6
J11VJ4	SOIL		0835	X	X	X	X	X	X				F7-6D
J11VJ5	SOIL		0845	X	X	X	X	X	X				F7-7
J11VJ6	SOIL		0855	X	X	X	X	X	X				F7-8
J11VJ7	SOIL	4/4/06	0905	X	X	X	X	X	X				F7-9

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From: RT COFFMAN / RT Coffman	Received By/Stored In: REFER #2C, 3728	4/4/06 1500
Relinquished By/Removed From: 3728 #2C	Received By/Stored In: JR Edmundson	4-6-06 1030
Relinquished By/Removed From: JR Edmundson	Received By/Stored In: FED EX	4-6-06 1500
Relinquished By/Removed From: FED EX	Received By/Stored In: W. Smith	4-7-06 0920
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)

Personnel not available to Relinquish samples from 3728 Ref #2C on 4/6/06

Matrix *
S=Soil
SP=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-032-030	Page 3 of 3

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8K	Data Turnaround: 15 DAY	Air Quality ☐	
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification	SAF No.: RC-032	
Ice Chest No.: ERC-96-030	Field Logbook No.: EFL-1174-1	COA: R607F72000	Method of Shipment: Fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060352	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	aG	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	60mL	120mL	120mL	125mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081					
Sample No.	Matrix *	Sample Date	Sample Time								
J11VJ8	SOIL	4/4/06	0915	X	X	X	X	X	X		F7-10

000022

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: RTCoffman / RT Coffman	Date/Time: 4/4/06 1500	Received By/Stored In: REFER # 2C, 3728	Date/Time: 4/4/06 1500
Relinquished By/Removed From: 3728 #2C	Date/Time: 4-6-06 1030	Received By/Stored In: J.R. Edmundson / JR Edmundson	Date/Time: 4-6-06 1030
Relinquished By/Removed From: J.R. Edmundson / JR Edmundson	Date/Time: 4-6-06 / 1500	Received By/Stored In: FEDEX	Date/Time:
Relinquished By/Removed From: FedEx	Date/Time: 4-7-06 / 0920	Received By/Stored In: D. Smith	Date/Time: 4-7-06 / 0920
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(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)

Personnel not available to relinquish samples from 3728 Ref # 2C on 4/16/06

Matrix *

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

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

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

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1607-F-7			DATA PACKAGE: K0297		
VALIDATOR: TLI		LAB: LLI		DATE: 5/21/06	
			SDG: K0297		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J11VJ3 J11VJ4 J11VJ5 J11VJ6 J11VJ7					
J11VJ8					
					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)

GC/MS tuning/performance check acceptable? ..... Yes No N/A

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:

GC/MS 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 FB

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? (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: hexachlorobutadiene - MSD - J all no PAS
124 trichlorobenzene - MSD - J all
2 methylene - MS - detects only
3,3-dichlorobenzidine - MS - J all

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

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

MS/MSD RPD values 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~~ 12/21/02

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

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

Comments: 56 RPD's outside QC limits - J all

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A

Iinternal standard areas acceptable? ..... Yes No N/A

Internal standard retention times 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:

7. HOLDING TIMES (all levels)

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

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

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

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

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

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

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

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

Laboratory properly identified and coded all TIC? (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: 48 am

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

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

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

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

Comments:

Date: 2 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Sites 1607-F-7
Subject: Wet Chemistry - Data Package No. K0297-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 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
J11VJ3	4/4/06	Soil	C	See note 1
J11VJ4	4/4/06	Soil	C	See note 1
J11VJ5	4/4/06	Soil	C	See note 1
J11VJ6	4/4/06	Soil	C	See note 1
J11VJ7	4/4/06	Soil	C	See note 1
J11VJ8	4/4/06	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.

Due to a matrix spike recovery outside QC limits (33.7%), all chromium VI 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 (J11VJ3/J11VJ4) were submitted for analysis. Field duplicates are analyzed 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 exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package K0297 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 (33.7%), all chromium VI results were qualified as estimates and flagged "J".

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

REFERENCES

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

DOE/RL-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: K0297	REVIEWER: TLI	Project: 1607-F-7	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chromium VI	J	All	MS 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: K0297												
Sample Number		J11VJ3		J11VJ4		J11VJ5		J11VJ6		J11VJ7		J11VJ8	
Remarks				Duplicate									
Sample Date		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06		4/4/06	
Wet Chemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	2.3	UJ	2.3	UJ	2.3	UJ	2.3	UJ	2.3	UJ	2.3	UJ

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

000010

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/25/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J11VJ3	% Solids	86.8	%	0.01	1.0
		Chromium VI	2.3 u J	MG/KG	2.3	10.0
-002	J11VJ4	% Solids	86.9	%	0.01	1.0
		Chromium VI	2.3 u J	MG/KG	2.3	10.0
-003	J11VJ5	% Solids	86.3	%	0.01	1.0
		Chromium VI	2.3 u J	MG/KG	2.3	10.0
-004	J11VJ6	% Solids	88.0	%	0.01	1.0
		Chromium VI	2.3 u J	MG/KG	2.3	10.0
-005	J11VJ7	% Solids	86.6	%	0.01	1.0
		Chromium VI	2.3 u J	MG/KG	2.3	10.0
-006	J11VJ8	% Solids	86.6	%	0.01	1.0
		Chromium VI	2.3 u J	MG/KG	2.3	10.0

R 5/29/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032 K0297
LVL#: 0604L712

W.O.#: 11343-606-001-9999-00
Date Received: 04-07-06

INORGANIC NARRATIVE

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

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary. Elevated reporting limits for Chromium VI are the result of the necessity to dilute the samples to diminish the background color of the sample digestates.

   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 (MS) recovery for Insoluble Chromium VI was within the 75-125% control limits however MS recovery for Soluble Chromium VI was below the control limit that may be attributed to the high background color of the digestate.

8. The replicate analysis for Chromium VI was within the 20% Relative Percent Difference (RPD) control limit.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/26/06
Date

njp\i04-712

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 13 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-032-030	Page 2 of 3

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8K	Data Turnaround: 15 DAY		
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification	SAF No.: RC-032	Air Quality ☐
Ice Chest No. ERC-96-030	Field Logbook No.: EFL-1174-1	COA: R607F72000	Method of Shipment: Fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No. ~~A060352~~ TCR 4-6-06 A060352	Bill of Lading/Air Bill No. SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

000014

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	aG	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	60mL	120mL	120mL	125mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081					
Sample No.	Matrix *	Sample Date	Sample Time								
J11VJ3	SOIL	4/4/06	0835	X	X	X	X	X	X		E7-6
J11VJ4	SOIL		0835	X	X	X	X	X	X		F7-6D
J11VJ5	SOIL		0845	X	X	X	X	X	X		F7-7
J11VJ6	SOIL		0855	X	X	X	X	X	X		F7-8
J11VJ7	SOIL	4/4/06	0905	X	X	X	X	X	X		F7-9

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From: RT COFFMAN / RT Coffman	Received By/Stored In: REFER # 2C, 3728	4/4/06 1500
Relinquished By/Removed From: 3728 #2C	Received By/Stored In: TR Edmundson / TR Edmundson	4-6-06 1030
Relinquished By/Removed From: TR Edmundson / TR Edmundson	Received By/Stored In: FED EX	4-6-06 1500
Relinquished By/Removed From: FED EX	Received By/Stored In: W. Smith	4-7-06 0920
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)

Personnel not available to Relinquish samples from 3728 Ref # 2C on 4/6/06

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-032-030	Page 1 of 1

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH
Price Code: 8K	Data Turnaround: 15 DAY	Air Quality ☐	
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F7 Verification	SAF No.: RC-032	
Ice Chest No.: ERC-96-030	Field Logbook No.: EFL-1174-1	COA: R607F72000	Method of Shipment: Fed Ex
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060352	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4 degrees C

000015

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	aG	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250g	60mL	60mL	120mL	120mL	125mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081					
Sample No. / Matrix * / Sample Date / Sample Time											
J11VJ8 / SOIL / 4/4/06 / 0915	X	X	X	X	X	X					F7-10

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RTCoffman / RT Coffman	4/4/06 1500	REFER # 2C, 3728	4/4/06 1500
3728 #2C	4-6-06 1030	T.R. Edmundson / T.R. Edmundson	4-6-06 1030
T.R. Edmundson / T.R. Edmundson (WCH)	4-6-06 1500	FEDEX	
FedEx	4-7-06 0920	D. Smith	4-7-06 0920

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)

Personnel not available to relinquish samples from 3728 Ref # 2C on 4/6/06

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

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

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

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1607-F-7			DATA PACKAGE: K0297		
VALIDATOR: TLI		LAB: LLI		DATE: 5/21/00	
			SDG: K0297		
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					
J11VJ3	J11VJ4	J11VJ5	J11VJ6	J11VJ7	J11VJ8
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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

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

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

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

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

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

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

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

Comments: _____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

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

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

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

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

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

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

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

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

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

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

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

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

Comments: Sol CRUI 33.7% J all no PAS

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

6. HOLDING TIMES (all levels)

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

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

Comments:

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments: all over

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/25/06

CLIENT: TNUHANPORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	06LVI024-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/25/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-003	J11VJ5	Soluble Chromium VI	1.6 u	2.3 u	4.6	33.7	10.0
		Insoluble Chromium VI	1260	2.3 u	1260	100	100
BLANK10	06LVI024-MB1	Soluble Chromium VI	4.0	0.20u	4.0	101.2	1.0
		Insoluble Chromium VI	1230	0.20u	1040	117.7	100

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/25/06

CLIENT: TNUHANFORD RC-032 K0297 LVL LOT #: 0604L712
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-003REP	J11VJ5	Chromium VI	2.3 u	2.3 u	NC	10.0