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SAF-RC-051
100 & 300 Area Component of the RCBRA - Incremental Soil Sampling
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2) H9-02 DE 07/26/06
INITIAL/DATE

SDG K0274 **SAF-RC-051**

Sample Location/Waste Site: 100-H Riparian #8

RECEIVED
AUG 08 2006
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Date: 14 July 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Semivolatile - Data Package No. K0274-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0274 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
J11JJ6	3/28/06	Soil	C	See note 1
J11JJ7	3/28/06	Soil	C	See note 1
J11JJ8	3/28/06	Soil	C	See note 1
J11JJ9	3/28/06	Soil	C	See note 1
J11JK0	3/28/06	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 and 300 Area Component of the RCBRA Sampling and Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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 Preservation**

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 for semivolatile analytes.

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".

The nature of the incremental sampling process precludes sample preservation by cooling. Per WCH instruction, this validation does not include examining the sample preservation cooling parameters of the WCH validation procedures.

All holding times were acceptable.

- **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 bis(2-ethylhexyl)phthalate result in all samples were qualified as undetected, raised to the RQL 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 an LCS recovery outside QC limits (16%), all 2,4-dinitrophenol 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 +/-20%. 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 (31%), all 2,4-dinitrophenol results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **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 analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data package No. K0274 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 4%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, the bis(2-ethylhexyl)phthalate result in all samples were qualified as undetected, raised to the RQL and flagged "U".
- Due to an LCS recovery outside QC limits (16%), all 2,4-dinitrophenol results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (31%), all 2,4-dinitrophenol 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.

Forty 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-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

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

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the 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: K0274	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Bis(2-ethylhexyl)phthalate	U at RQL	All	Blank contamination
2,4-Dinitrophenol	J	All	LCS & 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: K0274										
Sample Number		J11JJ6		J11JJ7		J11JJ8		J11JJ9		J11JK0	
Remarks											
Sample Date		3/28/06		3/28/06		3/28/06		3/28/06		3/28/06	
Extraction Date		3/21/06		3/21/06		3/21/06		3/21/06		3/21/06	
Analysis Date		4/12/06		4/13/06		4/12/06		4/13/06		4/12/06	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol		330	U	330	U	19		330	U	330	U
bis(2-Chloroethyl)ether		330	U	330	U	330	U	330	U	330	U
2-Chlorophenol		330	U	330	U	330	U	330	U	330	U
1,3-Dichlorobenzene		330	U	330	U	330	U	330	U	330	U
1,4-Dichlorobenzene		330	U	330	U	330	U	330	U	330	U
1,2-Dichlorobenzene	330	330	U	330	U	330	U	330	U	330	U
2-Methylphenol		330	U	330	U	330	U	330	U	330	U
2,2'-oxybis(1-chloropropane)		330	U	330	U	330	U	330	U	330	U
3 and/or 4-Methylphenol		330	U	330	U	330	U	330	U	330	U
N-Nitroso-di-n-propylamine		330	U	330	U	330	U	330	U	330	U
Hexachloroethane		330	U	330	U	330	U	330	U	330	U
Nitrobenzene		330	U	330	U	330	U	330	U	330	U
Isophorone		330	U	330	U	330	U	330	U	330	U
2-Nitrophenol		330	U	330	U	330	U	330	U	330	U
2,4-Dimethylphenol		330	U	330	U	330	U	330	U	330	U
bis(2-Chloroethoxy)methane		330	U	330	U	330	U	330	U	330	U
2,4-Dichlorophenol		330	U	330	U	330	U	330	U	330	U
1,2,4-Trichlorobenzene	330	330	U	330	U	330	U	330	U	330	U
Naphthalene		330	U	330	U	330	U	330	U	330	U
4-Chloroaniline		330	U	330	U	330	U	330	U	330	U
Hexachlorobutadiene		330	U	330	U	330	U	330	U	330	U
4-Chloro-3-methylphenol		330	U	330	U	330	U	330	U	330	U
2-Methylnaphthalene		330	U	330	U	330	U	330	U	330	U
Hexachlorocyclopentadiene		330	U	330	U	330	U	330	U	330	U
2,4,6-Trichlorophenol	330	330	U	330	U	330	U	330	U	330	U
2,4,5-Trichlorophenol	330	830	U	830	U	830	U	830	U	830	U
2-Chloronaphthalene		330	U	330	U	330	U	330	U	330	U
2-Nitroaniline		830	U	830	U	830	U	830	U	830	U
Dimethylphthalate		330	U	330	U	330	U	330	U	330	U
Acenaphthylene		330	U	330	U	330	U	330	U	330	U
2,6-Dinitrotoluene		330	U	330	U	330	U	330	U	330	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: K0274										
Sample Number		J11JJ6		J11JJ7		J11JJ8		J11JJ9		J11JK0	
Remarks											
Sample Date		3/28/06		3/28/06		3/28/06		3/28/06		3/28/06	
Extraction Date		3/21/06		3/21/06		3/21/06		3/21/06		3/21/06	
Analysis Date		4/12/06		4/13/06		4/12/06		4/13/06		4/12/06	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline		830	U	830	U	830	U	830	U	830	U
Acenaphthene		330	U	330	U	330	U	330	U	330	U
2,4-Dinitrophenol		830	UJ	830	UJ	830	UJ	830	UJ	830	UJ
4-Nitrophenol		830	U	830	U	830	U	830	U	830	U
Dibenzofuran	330	330	U	330	U	330	U	330	U	330	U
2,4-Dinitrotoluene		330	U	330	U	330	U	330	U	330	U
Diethylphthalate		330	U	330	U	330	U	330	U	330	U
4-Chlorophenyl-phenyl ether		330	U	330	U	330	U	330	U	330	U
Fluorene		330	U	330	U	330	U	330	U	330	U
4-Nitroaniline		830	U	830	U	830	U	830	U	830	U
4,6-Dinitro-2-methylphenol		830	U	830	U	830	U	830	U	830	U
N-Nitrosodiphenylamine		330	U	330	U	330	U	330	U	330	U
4-Bromophenyl-phenyl ether		330	U	330	U	330	U	330	U	330	U
Hexachlorobenzene		330	U	330	U	330	U	330	U	330	U
Pentachlorophenol	330	830	U	830	U	830	U	830	U	830	U
Phenanthrene		330	U	330	U	330	U	330	U	330	U
Anthracene		330	U	330	U	330	U	330	U	330	U
Carbazole		330	U	330	U	330	U	330	U	330	U
Di-n-butylphthalate		36		50		61		330	U	28	
Fluoranthene		330	U	330	U	330	U	330	U	330	U
Pyrene		330	U	330	U	330	U	330	U	330	U
Butylbenzylphthalate		330	U	330	U	330	U	330	U	330	U
3,3'-Dichlorobenzidine		330	U	330	U	330	U	330	U	330	U
Benzo(a)anthracene		330	U	330	U	330	U	330	U	330	U
Chrysene		330	U	330	U	330	U	330	U	330	U
bis(2-Ethylhexyl)phthalate		330	U	330	U	330	U	330	U	330	U
Di-n-octylphthalate		330	U	330	U	330	U	330	U	330	U
Benzo(b)fluoranthene		330	U	330	U	330	U	330	U	330	U
Benzo(k)fluoranthene		330	U	330	U	330	U	330	U	330	U
Benzo(a)pyrene		330	U	330	U	330	U	330	U	330	U
Indeno(1,2,3-cd)pyrene		330	U	330	U	330	U	330	U	330	U
Dibenz(a,h)anthracene		330	U	330	U	330	U	330	U	330	U
Benzo(g,h,i)perylene		330	U	330	U	330	U	330	U	330	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

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

RFW Batch Number: 0603L638 Client: TNUHANFORD RC-051 K0274 Work Order: 11343606001 Report Date: 04/17/06 12:36 Page: 1a

	Cust ID:	J11JJ6	J11JJ7	J11JJ7	J11JJ7	J11JJ8	J11JJ9
Sample Information	RFW#:	001	002	002 MS	002 MSD	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	69 %	61 %	72 %	63 %	50 %	56 %
	2-Fluorobiphenyl	71 %	63 %	77 %	66 %	53 %	57 %
	Terphenyl-d14	83 %	79 %	83 %	74 %	69 %	74 %
	Phenol-d5	64 %	61 %	75 %	66 %	43 %	55 %
	2-Fluorophenol	56 %	54 %	62 %	55 %	37 %	50 %
	2,4,6-Tribromophenol	79 %	75 %	87 %	78 %	57 %	67 %
		fl	fl	fl	fl	fl	fl
Phenol		330 U	330 U	77 %	73 %	19 J	330 U
bis(2-Chloroethyl)ether		330 U	330 U	73 %	69 %	330 U	330 U
2-Chlorophenol		330 U	330 U	75 %	70 %	330 U	330 U
1,3-Dichlorobenzene		330 U	330 U	67 %	64 %	330 U	330 U
1,4-Dichlorobenzene		330 U	330 U	67 %	64 %	330 U	330 U
1,2-Dichlorobenzene		330 U	330 U	72 %	67 %	330 U	330 U
2-Methylphenol		330 U	330 U	77 %	71 %	330 U	330 U
2,2'-oxybis(1-Chloropropane)		330 U	330 U	81 %	76 %	330 U	330 U
4-Methylphenol		330 U	330 U	82 %	77 %	330 U	330 U
N-Nitroso-di-n-propylamine		330 U	330 U	81 %	76 %	330 U	330 U
Hexachloroethane		330 U	330 U	63 %	57 %	330 U	330 U
Nitrobenzene		330 U	330 U	72 %	68 %	330 U	330 U
Isophorone		330 U	330 U	86 %	80 %	330 U	330 U
2-Nitrophenol		330 U	330 U	76 %	72 %	330 U	330 U
2,4-Dimethylphenol		330 U	330 U	74 %	69 %	330 U	330 U
bis(2-Chloroethoxy)methane		330 U	330 U	78 %	73 %	330 U	330 U
2,4-Dichlorophenol		330 U	330 U	79 %	74 %	330 U	330 U
1,2,4-Trichlorobenzene		330 U	330 U	72 %	68 %	330 U	330 U
Naphthalene		330 U	330 U	77 %	71 %	330 U	330 U
4-Chloroaniline		330 U	330 U	66 %	63 %	330 U	330 U
Hexachlorobutadiene		330 U	330 U	79 %	72 %	330 U	330 U
4-Chloro-3-methylphenol		330 U	330 U	84 %	81 %	330 U	330 U
2-Methylnaphthalene		330 U	330 U	83 %	77 %	330 U	330 U
Hexachlorocyclopentadiene		330 U	330 U	54 %	42 %	330 U	330 U
2,4,6-Trichlorophenol		330 U	330 U	83 %	79 %	330 U	330 U
2,4,5-Trichlorophenol		830 U	830 U	83 %	78 %	830 U	830 U

*= Outside of EPA CLP QC limits.

7/13/06

000013

000000008

RFW Batch Number: 0603L638 Client: TNUHANFORD RC-051 K0274 Work Order: 11343606001 Page: 1b

Cust ID:	J11JJ6		J11JJ7		J11JJ7		J11JJ7		J11JJ8		J11JJ9	
RFW#:	001		002		002 MS		002 MSD		003		004	
2-Chloronaphthalene	330	U	330	U	80	%	76	%	330	U	330	U
2-Nitroaniline	830	U	830	U	83	%	80	%	830	U	830	U
Dimethylphthalate	330	U	330	U	80	%	76	%	330	U	330	U
Acenaphthylene	330	U	330	U	82	%	78	%	330	U	330	U
2,6-Dinitrotoluene	330	U	330	U	80	%	77	%	330	U	330	U
3-Nitroaniline	830	U	830	U	94	%	91	%	830	U	830	U
Acenaphthene	330	U	330	U	82	%	78	%	330	U	330	U
2,4-Dinitrophenol	830	U J	830	U J	33	%	45	%	830	U J	830	U J
4-Nitrophenol	830	U	830	U	82	%	83	%	830	U	830	U
Dibenzofuran	330	U	330	U	84	%	79	%	330	U	330	U
2,4-Dinitrotoluene	330	U	330	U	87	%	83	%	330	U	330	U
Diethylphthalate	330	U	330	U	83	%	79	%	330	U	330	U
4-Chlorophenyl-phenylether	330	U	330	U	80	%	77	%	330	U	330	U
Fluorene	330	U	330	U	81	%	76	%	330	U	330	U
4-Nitroaniline	830	U	830	U	97	%	80	%	830	U	830	U
4,6-Dinitro-2-methylphenol	830	U	830	U	75	%	77	%	830	U	830	U
N-Nitrosodiphenylamine (1)	330	U	330	U	67	%	64	%	330	U	330	U
4-Bromophenyl-phenylether	330	U	330	U	70	%	67	%	330	U	330	U
Hexachlorobenzene	330	U	330	U	88	%	85	%	330	U	330	U
Pentachlorophenol	830	U	830	U	80	%	88	%	830	U	830	U
Phenanthrene	330	U	330	U	84	%	81	%	330	U	330	U
Anthracene	330	U	330	U	86	%	82	%	330	U	330	U
Carbazole	330	U	330	U	87	%	84	%	330	U	330	U
Di-n-butylphthalate	36	J	50	J	82	%	79	%	61	J	330	U
Fluoranthene	330	U	330	U	87	%	83	%	330	U	330	U
Pyrene	330	U	330	U	88	%	84	%	330	U	330	U
Butylbenzylphthalate	330	U	330	U	89	%	86	%	330	U	330	U
3,3'-Dichlorobenzidine	330	U	330	U	64	%	62	%	330	U	330	U
Benzo(a)anthracene	330	U	330	U	84	%	81	%	330	U	330	U
Chrysene	330	U	330	U	83	%	78	%	330	U	330	U
bis(2-Ethylhexyl)phthalate	330	~~180~~ 97/12 JB U	330	~~180~~ 97/12 JB U	84	%	81	%	330	~~100~~ 97/12 JB U	330	~~67~~ 97/12 JB U
Di-n-octyl phthalate	330	U	330	U	87	%	85	%	330	U	330	U
Benzo(b)fluoranthene	330	U	330	U	92	%	90	%	330	U	330	U
Benzo(k)fluoranthene	330	U	330	U	78	%	75	%	330	U	330	U
Benzo(a)pyrene	330	U	330	U	81	%	77	%	330	U	330	U
Indeno(1,2,3-cd)pyrene	330	U	330	U	75	%	71	%	330	U	330	U
Dibenz(a,h)anthracene	330	U	330	U	75	%	71	%	330	U	330	U
Benzo(g,h,i)perylene	330	U	330	U	68	%	64	%	330	U	330	U

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

7/13/06

0000014

000000009

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

RFW Batch Number: 0603L638 Client: TNUHANFORD RC-051 K0274 Work Order: 11343606001 Report Date: 04/17/06 12:36 Page: 2a

	Cust ID:	J11JK0	SBLKVV	SBLKVV BS
Sample Information	RFW#:	005	06LE0265-MB1	06LE0265-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	54 %	63 %	65 %
	2-Fluorobiphenyl	56 %	63 %	66 %
	Terphenyl-d14	77 %	78 %	71 %
	Phenol-d5	57 %	61 %	67 %
	2-Fluorophenol	53 %	57 %	62 %
	2,4,6-Tribromophenol	58 %	59 %	72 %
Phenol		330 U	330 U	70 %
bis(2-Chloroethyl)ether		330 U	330 U	69 %
2-Chlorophenol		330 U	330 U	70 %
1,3-Dichlorobenzene		330 U	330 U	69 %
1,4-Dichlorobenzene		330 U	330 U	69 %
1,2-Dichlorobenzene		330 U	330 U	73 %
2-Methylphenol		330 U	330 U	71 %
2,2'-oxybis(1-Chloropropane)		330 U	330 U	70 %
4-Methylphenol		330 U	330 U	72 %
N-Nitroso-di-n-propylamine		330 U	330 U	73 %
Hexachloroethane		330 U	330 U	67 %
Nitrobenzene		330 U	330 U	68 %
Isophorone		330 U	330 U	77 %
2-Nitrophenol		330 U	330 U	70 %
2,4-Dimethylphenol		330 U	330 U	60 %
bis(2-Chloroethoxy)methane		330 U	330 U	69 %
2,4-Dichlorophenol		330 U	330 U	71 %
1,2,4-Trichlorobenzene		330 U	330 U	70 %
Naphthalene		330 U	330 U	71 %
4-Chloroaniline		330 U	330 U	80 %
Hexachlorobutadiene		330 U	330 U	77 %
4-Chloro-3-methylphenol		330 U	330 U	74 %
2-Methylnaphthalene		330 U	330 U	75 %
Hexachlorocyclopentadiene		330 U	330 U	69 %
2,4,6-Trichlorophenol		330 U	330 U	73 %
2,4,5-Trichlorophenol		830 U	830 U	69 %

*= Outside of EPA CLP QC limits.

7/13/06

000015

000000010

Cust. ID:	J11JK0		SBLKVV		SBLKVV BS	
RFW#:	005		06LE0265-MB1		06LE0265-MB1	
2-Chloronaphthalene	330	U	330	U	70	%
2-Nitroaniline	830	U	830	U	73	%
Dimethylphthalate	330	U	330	U	72	%
Acenaphthylene	330	U	330	U	72	%
2,6-Dinitrotoluene	330	U	330	U	71	%
3-Nitroaniline	830	U	830	U	95	%
Acenaphthene	330	U	330	U	72	%
2,4-Dinitrophenol	830	U J	830	U	16 *	%
4-Nitrophenol	830	U	830	U	74	%
Dibenzofuran	330	U	330	U	74	%
2,4-Dinitrotoluene	330	U	330	U	79	%
Diethylphthalate	330	U	330	U	73	%
4-Chlorophenyl-phenylether	330	U	330	U	71	%
Fluorene	330	U	330	U	71	%
4-Nitroaniline	830	U	830	U	83	%
4,6-Dinitro-2-methylphenol	830	U	830	U	58	%
N-Nitrosodiphenylamine (1)	330	U	330	U	59	%
4-Bromophenyl-phenylether	330	U	330	U	62	%
Hexachlorobenzene	330	U	330	U	79	%
Pentachlorophenol	830	U	830	U	64	%
Phenanthrene	330	U	330	U	74	%
Anthracene	330	U	330	U	77	%
Carbazole	330	U	330	U	77	%
Di-n-butylphthalate	28	J	330	U	76	%
Fluoranthene	330	U	330	U	81	%
Pyrene	330	U	330	U	75	%
Butylbenzylphthalate	330	U	330	U	76	%
3,3'-Dichlorobenzidine	330	U	330	U	101	%
Benzo(a)anthracene	330	U	330	U	75	%
Chrysene	330	U	330	U	75	%
bis(2-Ethylhexyl)phthalate	330 ~~51~~ JB	U	33	J	73	%
Di-n-octyl phthalate	330	U	330	U	73	%
Benzo(b)fluoranthene	330	U	330	U	76	%
Benzo(k)fluoranthene	330	U	330	U	73	%
Benzo(a)pyrene	330	U	330	U	72	%
Indeno(1,2,3-cd)pyrene	330	U	330	U	73	%
Dibenz(a,h)anthracene	330	U	330	U	73	%
Benzo(g,h,i)perylene	330	U	330	U	68	%

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

7/13/06

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0603L638
SDG/SAF # K0274/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 03-30-2006

SEMIVOLATILE

Five (5) soil samples were collected on 03-28-2006.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 04-07-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 04-11,12-2006.

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. All matrix spike recoveries were within acceptance criteria.

5. One (1) of sixty-four (64) blank spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

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. 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 0 pages.

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

LvLI
LIONVILLE LABORATORY INC.

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

4/21/05
Date

som\gorup\data\bna\mu-hanford\0603-638.doc

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 060523

Initiator: Robert Carden
Date: 4/17/06
Client: TNU Hanford RC051

Batch: 06034638
Samples: 85
Method: SW846/MCAWW/CLP/

Parameter: 02SH
Matrix: Soil
Prep Batch: 06LE0265

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)

2,4 dinitrophenol spike recovery outside of limits -16% (20-120) MS/MSD ok. All other spikes + surrogates ok.

2. Known or Probable Causes(s) phenolic acid cmpds are subject to erratic chromatographic behavior especially if the GC system is contaminated with high boiling material.

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: 4/18/06

✓ 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: 4/21/06 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
1	X Project Mgr: Stone/Johnson	__	__ GC/LC: Kiger
__	__ Data Management: Stilwell	2	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-051-107	Page 2 of 1

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Price Code 8L	Data Turnaround 45 Days	Air Quality ☐	
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 100-H RIPARIAN #8	SAF No. RC-051	
Ice Chest No.	Field Logbook No. EL-1596-1.	COA BESRAS6520	Method of Shipment FED EX
Shipped To EBERLINE SERVICES LIONVILLE	Offsite Property No. A060151	Bill of Lading/Air Bill No. SEE OSPC	

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POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

00021

Preservation	None	None	None	None	None	None	None	None	None	None
Type of Container	G/P	G/P	aG	aG	aG	aG	G/P	G/P	^	^
No. of Container(s)	9	9	7	1	7	7	7	7	0	0
Volume	30g	30g	30g	30g	30g	30g	30g	30g	1^	1^

SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082	IC Anions - 300.0 [Nitrate]	NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]	~	--
Sample No. / Matrix * / Sample Date / Sample Time										
J11JJ6 / SOIL / 3-28-06 / 14:00	3	1	1		1	1	1	1		
J11JJ7 / | / | / 16:19	1	3	3		1	1	1	1		
J11JJ8 / | / | / 15:20	1	1	1		3	3	1	1		
J11JJ9 / | / | / 15:00	1	1	1		1	1	3	3		
J11JK0 / | / | / 13:00	3	3	1		1	1	1	1		

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Elizabeth M Tepper		CH2M Hill →	
Relinquished By/Removed From CH2m	Elizabeth M Tepper	3-29-06 11:30	Received By/Stored In Fed Ex	3-29-06 11:30
Relinquished By/Removed From Fed Ex		3-30-06 0900	Received By/Stored In	3-30-06 0900
Relinquished By/Removed From Fed Ex		3-30-06 0900	Received By/Stored In	3-30-06 0900
Relinquished By/Removed From			Received By/Stored In	
Relinquished By/Removed From			Received By/Stored In	

SPECIAL INSTRUCTIONS

' These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^~ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]

Matrix *

Soil
SlSediment
SO=Solid
SlSludge
W=Water
O=Oil
Air=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
Ve=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: RCBRA - Soil			DATA PACKAGE: K0274		
VALIDATOR: TLR		LAB: LLI		DATE: 7/10/00	
			SDG: K0274		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J11JJ6	J11JJ7	J11JJ8	J11JJ9	J11JK0	
					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

MB – ~~di-n-butylphthalate~~ + bis(2-ethylhexyl) phthalate – U all at RQL

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: 2,4-dinitrophenol – LCS – 167% – 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: 2,4-dinitrophenol - 317o - 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:

- cooling not assessed per WCH

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: 40 over

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: 14 July 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Inorganic - Data Package No. K0274-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0274 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
J11JJ6	3/28/06	Soil	C	See note 1
J11JJ7	3/28/06	Soil	C	See note 1
J11JJ8	3/28/06	Soil	C	See note 1
J11JJ9	3/28/06	Soil	C	See note 1
J11JK0	3/28/06	Soil	C	See note 1

1 – ICP metals by 6010B.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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 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 80% to 120%. 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 79% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 120% or less than 80% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 120% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (35.9%), all antimony results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (64.5%), 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

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 and 300 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data package No. K0274 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 (35.9%), all antimony results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits (64.5%), all silicon results were qualified as estimates and flagged "J".

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

REFERENCES

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

DOE/RL-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K0274	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Silicon	J	All	LCS recovery
Antimony	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											
Laboratory: LLI	SDG: K0274										
Sample Number		J11JJ6		J11JJ7		J11JJ8		J11JJ9		J11JK0	
Remarks											
Sample Date		3/28/06		3/28/06		3/28/06		3/28/06		3/28/06	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	1	0.12		0.11	U	0.10	U	0.10	U	0.11	U
Aluminum		7600		7350		8030		7430		7690	
Arsenic	10	5.7		5.5		5.9		5.7		5.6	
Boron		2.5		0.88		0.60		0.54		0.36	U
Barium	2	71.1		71.0		75.2		68.1		71.5	
Beryllium		0.45		0.42		0.46		0.43		0.45	
Bismuth		0.77	U	0.77	U	0.76	U	0.76	U	0.77	U
Calcium		3850		3970		4270		4090		4040	
Cadmium	0.5	1.1		1.1		1.2		1.0		1.1	
Cobalt		5.8		5.8		6.3		6.1		6.0	
Chromium	1	21.1		19.7		22.6		22.4		22.2	
Copper	1	26.5		27.1		27.8		29.4		25.2	
Iron		18400		17300		19800		19300		19700	
Potassium	400	828		793		861		816		824	
Lithium	5	9.8		9.4		9.9		9.4		9.8	
Magnesium		4270		4220		4420		4240		4360	
Manganese		286		305		338		295		308	
Molybdenum		0.76		0.73		0.72		0.72		0.66	
Sodium		222		224		239		234		219	
Nickel		16.4		16.1		16.9		16.4		16.7	
Phosphorous	5	663		652		682		657		666	
Lead	5	31.5		35.0		35.6		36.7		33.2	
Antimony	6	0.66	UJ	0.66	UJ	0.66	UJ	0.66	UJ	0.66	UJ
Selenium		0.71	U	0.71	U	0.70	U	0.70	U	0.71	U
Silicon		391	J	323	J	367	J	383	J	376	J
Tin		1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
Strontium		24.0		23.5		25.6		24.1		24.3	
Thallium		1.1	U	1.1	U	1.0	U	1.0	U	1.1	U
Uranium	30	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Vanadium		42.7		38.0		46.0		44.9		46.1	
Zinc	1	202		218		236		225		208	

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

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/17/06

CLIENT: TNUHANFORD RC-051 K0274 LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J11JJ6	Silver, Total	0.12	MG/KG	0.11	3.0
		Aluminum, Total	7600	MG/KG	4.3	3.0
		Arsenic, Total	5.7	MG/KG	0.92	3.0
		Boron, Total	2.5	MG/KG	0.36	3.0
		Barium, Total	71.1	MG/KG	0.03	3.0
		Beryllium, Total	0.45	MG/KG	0.03	3.0
		Bismuth, Total	0.77 u	MG/KG	0.77	3.0
		Calcium, Total	3850	MG/KG	2.5	3.0
		Cadmium, Total	1.1	MG/KG	0.11	3.0
		Cobalt, Total	5.8	MG/KG	0.21	3.0
		Chromium, Total	21.1	MG/KG	0.20	3.0
		Copper, Total	26.5	MG/KG	0.18	3.0
		Iron, Total	18400	MG/KG	5.2	3.0
		Potassium, Total	828	MG/KG	3.4	3.0
		Lithium, Total	9.8	MG/KG	0.05	3.0
		Magnesium, Total	4270	MG/KG	1.5	3.0
		Manganese, Total	286	MG/KG	0.05	3.0
		Molybdenum, Total	0.76	MG/KG	0.44	3.0
		Sodium, Total	222	MG/KG	1.1	3.0
		Nickel, Total	16.4	MG/KG	0.36	3.0
		Phosphorus, Total	663	MG/KG	1.4	3.0
		Lead, Total	31.5	MG/KG	0.47	3.0
		Antimony, Total	0.66 u J	MG/KG	0.66	3.0
		Selenium, Total	0.71 u	MG/KG	0.71	3.0
		Silicon, Total	391 J	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	24.0	MG/KG	0.02	3.0
		Thallium, Total	1.1 u	MG/KG	1.1	3.0
		Uranium, Total	1.3 u	MG/KG	1.3	3.0
		Vanadium, Total	42.7	MG/KG	0.14	3.0
		Zinc, Total	202	MG/KG	0.24	3.0

7/13/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/17/06

CLIENT: TNUHANFORD RC-051 K0274 LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	J11JJ7	Silver, Total	0.11 u	MG/KG	0.11	3.0
		Aluminum, Total	7350	MG/KG	4.3	3.0
		Arsenic, Total	5.5	MG/KG	0.92	3.0
		Boron, Total	0.88	MG/KG	0.36	3.0
		Barium, Total	71.0	MG/KG	0.03	3.0
		Beryllium, Total	0.42	MG/KG	0.03	3.0
		Bismuth, Total	0.77 u	MG/KG	0.77	3.0
		Calcium, Total	3970	MG/KG	2.5	3.0
		Cadmium, Total	1.1	MG/KG	0.11	3.0
		Cobalt, Total	5.8	MG/KG	0.21	3.0
		Chromium, Total	19.7	MG/KG	0.20	3.0
		Copper, Total	27.1	MG/KG	0.18	3.0
		Iron, Total	17300	MG/KG	5.3	3.0
		Potassium, Total	793	MG/KG	3.4	3.0
		Lithium, Total	9.4	MG/KG	0.05	3.0
		Magnesium, Total	4220	MG/KG	1.5	3.0
		Manganese, Total	305	MG/KG	0.05	3.0
		Molybdenum, Total	0.73	MG/KG	0.44	3.0
		Sodium, Total	224	MG/KG	1.1	3.0
		Nickel, Total	16.1	MG/KG	0.36	3.0
		Phosphorus, Total	652	MG/KG	1.4	3.0
		Lead, Total	35.0	MG/KG	0.47	3.0
		Antimony, Total	0.66 u J	MG/KG	0.66	3.0
		Selenium, Total	0.71 u	MG/KG	0.71	3.0
		Silicon, Total	323 J	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	23.5	MG/KG	0.02	3.0
		Thallium, Total	1.1 u	MG/KG	1.1	3.0
		Uranium, Total	1.3 u	MG/KG	1.3	3.0
		Vanadium, Total	38.0	MG/KG	0.14	3.0
		Zinc, Total	218	MG/KG	0.24	3.0

7/13/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/17/06

CLIENT: TNUHANFORD RC-051 K0274 LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	J11JJ8	Silver, Total	0.10 u	MG/KG	0.10	3.0
		Aluminum, Total	8030	MG/KG	4.3	3.0
		Arsenic, Total	5.9	MG/KG	0.91	3.0
		Boron, Total	0.60	MG/KG	0.36	3.0
		Barium, Total	75.2	MG/KG	0.03	3.0
		Beryllium, Total	0.46	MG/KG	0.03	3.0
		Bismuth, Total	0.76 u	MG/KG	0.76	3.0
		Calcium, Total	4270	MG/KG	2.5	3.0
		Cadmium, Total	1.2	MG/KG	0.10	3.0
		Cobalt, Total	6.3	MG/KG	0.21	3.0
		Chromium, Total	22.6	MG/KG	0.19	3.0
		Copper, Total	27.8	MG/KG	0.18	3.0
		Iron, Total	19800	MG/KG	5.2	3.0
		Potassium, Total	861	MG/KG	3.4	3.0
		Lithium, Total	9.9	MG/KG	0.04	3.0
		Magnesium, Total	4420	MG/KG	1.4	3.0
		Manganese, Total	338	MG/KG	0.04	3.0
		Molybdenum, Total	0.72	MG/KG	0.43	3.0
		Sodium, Total	239	MG/KG	1.1	3.0
		Nickel, Total	16.9	MG/KG	0.36	3.0
		Phosphorus, Total	682	MG/KG	1.3	3.0
		Lead, Total	35.6	MG/KG	0.46	3.0
		Antimony, Total	0.66 uJ	MG/KG	0.66	3.0
		Selenium, Total	0.70 u	MG/KG	0.70	3.0
		Silicon, Total	367 J	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	25.6	MG/KG	0.01	3.0
		Thallium, Total	1.0 u	MG/KG	1.0	3.0
		Uranium, Total	1.3 u	MG/KG	1.3	3.0
		Vanadium, Total	46.0	MG/KG	0.13	3.0
		Zinc, Total	236	MG/KG	0.24	3.0

7/13/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/17/06

CLIENT: TNUHANFORD RC-051 K0274 LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-004	J11JJ9	Silver, Total	0.10 u	MG/KG	0.10	3.0
		Aluminum, Total	7430	MG/KG	4.3	3.0
		Arsenic, Total	5.7	MG/KG	0.92	3.0
		Boron, Total	0.54	MG/KG	0.36	3.0
		Barium, Total	68.1	MG/KG	0.03	3.0
		Beryllium, Total	0.43	MG/KG	0.03	3.0
		Bismuth, Total	0.76 u	MG/KG	0.76	3.0
		Calcium, Total	4090	MG/KG	2.5	3.0
		Cadmium, Total	1.0	MG/KG	0.10	3.0
		Cobalt, Total	6.1	MG/KG	0.21	3.0
		Chromium, Total	22.4	MG/KG	0.20	3.0
		Copper, Total	29.4	MG/KG	0.18	3.0
		Iron, Total	19300	MG/KG	5.2	3.0
		Potassium, Total	816	MG/KG	3.4	3.0
		Lithium, Total	9.4	MG/KG	0.04	3.0
		Magnesium, Total	4240	MG/KG	1.5	3.0
		Manganese, Total	295	MG/KG	0.04	3.0
		Molybdenum, Total	0.72	MG/KG	0.44	3.0
		Sodium, Total	234	MG/KG	1.1	3.0
		Nickel, Total	16.4	MG/KG	0.36	3.0
		Phosphorus, Total	657	MG/KG	1.4	3.0
		Lead, Total	26.7	MG/KG	0.46	3.0
		Antimony, Total	0.66 u J	MG/KG	0.66	3.0
		Selenium, Total	0.70 u	MG/KG	0.70	3.0
		Silicon, Total	383 J	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	24.1	MG/KG	0.02	3.0
		Thallium, Total	1.0 u	MG/KG	1.0	3.0
		Uranium, Total	1.3 u	MG/KG	1.3	3.0
		Vanadium, Total	44.9	MG/KG	0.14	3.0
		Zinc, Total	225	MG/KG	0.24	3.0

2/13/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/17/06

CLIENT: TNUHANFORD RC-051 K0274

LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	J11JK0	Silver, Total	0.11 u	MG/KG	0.11	3.0
		Aluminum, Total	7690	MG/KG	4.3	3.0
		Arsenic, Total	5.6	MG/KG	0.92	3.0
		Boron, Total	0.36 u	MG/KG	0.36	3.0
		Barium, Total	71.5	MG/KG	0.03	3.0
		Beryllium, Total	0.45	MG/KG	0.03	3.0
		Bismuth, Total	0.77 u	MG/KG	0.77	3.0
		Calcium, Total	4040	MG/KG	2.5	3.0
		Cadmium, Total	1.1	MG/KG	0.11	3.0
		Cobalt, Total	6.0	MG/KG	0.21	3.0
		Chromium, Total	22.2	MG/KG	0.20	3.0
		Copper, Total	25.2	MG/KG	0.18	3.0
		Iron, Total	19700	MG/KG	5.3	3.0
		Potassium, Total	824	MG/KG	3.4	3.0
		Lithium, Total	9.8	MG/KG	0.05	3.0
		Magnesium, Total	4360	MG/KG	1.5	3.0
		Manganese, Total	308	MG/KG	0.05	3.0
		Molybdenum, Total	0.66	MG/KG	0.44	3.0
		Sodium, Total	219	MG/KG	1.1	3.0
		Nickel, Total	16.7	MG/KG	0.36	3.0
		Phosphorus, Total	666	MG/KG	1.4	3.0
		Lead, Total	33.2	MG/KG	0.47	3.0
		Antimony, Total	0.66 u J	MG/KG	0.66	3.0
		Selenium, Total	0.71 u	MG/KG	0.71	3.0
		Silicon, Total	376 J	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	24.3	MG/KG	0.02	3.0
		Thallium, Total	1.1 u	MG/KG	1.1	3.0
		Uranium, Total	1.3 u	MG/KG	1.3	3.0
		Vanadium, Total	46.1	MG/KG	0.14	3.0
		Zinc, Total	208	MG/KG	0.24	3.0

7/13/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-051
LVL#: 0603L638
SDG/SAF#: K0274/RC-051

W.O.#: 11343-606-001-9999-00
Date Received: 03-30-06

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 5 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary. The samples were digested in 2 gram increments in multiple beakers until all of the metals sample aliquot was digested. The resulting digestates were composited to represent each sample for analysis, and a portion of the final digestate volume was filtered for analysis. All samples were reported with 3-fold dilutions due to high concentrations and sample matrix. The sample results are reported on a wet weight, 'as received' basis.

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

4. Please refer to the Sample Receipt Check List for sample discrepancies in LvLI's sample acceptance policy.

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

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

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

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

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 29 pages.

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

9. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 64.5%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

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

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J11JJ6	Aluminum	66,000	93.4
	Iron	66,000	108.2
	Antimony	300	97.3
	Silicon	6,300	98.9

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/17/06
Date

jjw/m03-638

LVLI
LIONVILLE LABORATORY INC.

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-107	Page 2 of 3

Collector STANKOVICH, M.	Company Contact JOAN KESSNER Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 100-H RIPARIAN #8	SAF No. RC-051	Air Quality ☐
Ice Chest No.	Field Logbook No. EL-1596-1 COA BESRAS6520	Method of Shipment FED EX	
Shipped To EBERLINE SERVICES (LIONVILLE)	Offsite Property No. A060151	Bill of Lading/Air Bill No. SEE OSPC	

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POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

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Preservation	None	None	None	None	None	None	None	None	None	None
Type of Container	G/P	G/P	aG	aG	aG	aG	G/P	G/P	^	^
No. of Container(s)	9	9	7	1	7	7	7	7	0	0
Volume	30g	30g	30g	30g	30g	30g	30g	30g	1^	1^

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082	IC Anions - 300.0 (Nitrate)	NO2/NO3 - 353.2 (Nitrogen in Nitrite and Nitrate)	-	--
J11JJ6	SOIL	3-28-06	14:00	3	1	1		1	1	1	1		
J11JJ7			16:19	1	3	3		1	1	1	1		
J11JJ8			15:20	1	1	1		3	3	1	1		
J11JJ9			15:00	1	1	1		1	1	3	3		
J11JK0			13:00	3	3	1		1	1	1	1		

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CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth M Tepper		CH2M Hill →	
CH2M Elizabeth M Tepper	11:30 3-29-06	Fed Ex	11:30 3-29-06
Fed Ex	3-30-06 0920	[signature]	3-30-06 0920
Fed Ex	3-30-06 0920	[signature]	3-30-06 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^-- These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]

Matrix *

Se=Soil
Sl=Sediment
SO=Solid
Sh=Shalge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
Ve=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: RCBRA			DATA PACKAGE: K0274		
VALIDATOR: TLP		LAB: LLI		DATE: 7/7/06	
			SDG: K0274		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J11JJ6 J11JJ7 J11JJ8 J11JJ9 J11JK0					
					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 3[illegible]% - J all no PES
LCS - silicon 64% - 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 05/17/06

CLIENT: TNUHANFORD RC-051 K0274 LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	06L0222-MB1	Silver, Total	0.04	u	MG/KG	0.04	1.0
		Aluminum, Total	1.4	u	MG/KG	1.4	1.0
		Arsenic, Total	0.30	u	MG/KG	0.30	1.0
		Boron, Total	0.12	u	MG/KG	0.12	1.0
		Barium, Total	0.02		MG/KG	0.01	1.0
		Beryllium, Total	0.01	u	MG/KG	0.01	1.0
		Bismuth, Total	0.26	u	MG/KG	0.26	1.0
		Calcium, Total	0.82	u	MG/KG	0.82	1.0
		Cadmium, Total	0.04	u	MG/KG	0.04	1.0
		Cobalt, Total	0.07	u	MG/KG	0.07	1.0
		Chromium, Total	0.06	u	MG/KG	0.06	1.0
		Copper, Total	0.06	u	MG/KG	0.06	1.0
		Iron, Total	1.7	u	MG/KG	1.7	1.0
		Potassium, Total	1.1	u	MG/KG	1.1	1.0
		Lithium, Total	0.03		MG/KG	0.02	1.0
		Magnesium, Total	0.48	u	MG/KG	0.48	1.0
		Manganese, Total	0.02	u	MG/KG	0.02	1.0
		Molybdenum, Total	0.14	u	MG/KG	0.14	1.0
		Sodium, Total	0.38	u	MG/KG	0.38	1.0
		Nickel, Total	0.12	u	MG/KG	0.12	1.0
		Phosphorus, Total	0.45	u	MG/KG	0.45	1.0
		Lead, Total	0.16	u	MG/KG	0.16	1.0
		Antimony, Total	0.22	u	MG/KG	0.22	1.0
		Selenium, Total	0.24	u	MG/KG	0.24	1.0
		Silicon, Total	1.1	u	MG/KG	1.1	1.0
		Tin, Total	0.54	u	MG/KG	0.54	1.0
		Strontium, Total	0.009		MG/KG	0.005	1.0
		Thallium, Total	0.35	u	MG/KG	0.35	1.0
		Uranium, Total	0.44	u	MG/KG	0.44	1.0
		Vanadium, Total	0.04	u	MG/KG	0.04	1.0
		Zinc, Total	0.08	u	MG/KG	0.08	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/17/06

CLIENT: TNUHANFORD RC-051 K0274

LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J11JJ6	Silver, Total	2.4	0.12	2.5	91.2	3.0
		Aluminum, Total	8150	7600	101	548.4*	3.0
		Arsenic, Total	99.7	5.7	101	93.4	3.0
		Boron, Total	46.1	2.5	50.3	86.7	3.0
		Barium, Total	165	71.1	101	93.6	3.0
		Beryllium, Total	2.9	0.45	2.5	97.8	3.0
		Bismuth, Total	47.4	0.77u	50.3	94.3	3.0
		Calcium, Total	5200	3850	1260	107.4	3.0
		Cadmium, Total	3.4	1.1	2.5	92.0	3.0
		Cobalt, Total	29.4	5.8	25.1	94.0	3.0
		Chromium, Total	30.8	21.1	10.1	96.0	3.0
		Copper, Total	37.7	26.5	12.6	88.9	3.0
		Iron, Total	18200	18400	50.3	-420. *	3.0
		Potassium, Total	2020	828	1260	95.2	3.0
		Lithium, Total	61.7	9.8	50.3	103.2	3.0
		Magnesium, Total	5510	4270	1260	99.1	3.0
		Manganese, Total	308	286	25.1	87.6*	3.0
		Molybdenum, Total	47.3	0.76	50.3	92.5	3.0
		Sodium, Total	1450	222	1260	97.4	3.0
		Nickel, Total	39.9	16.4	25.1	93.6	3.0
		Phosphorus, Total	894	663	252	91.7	3.0
		Lead, Total	55.3	31.5	25.1	94.8	3.0
		Antimony, Total	9.0	0.66u	25.1	35.9	3.0
		Selenium, Total	92.2	0.71u	101	91.7	3.0
		Silicon, Total	694	391	50.3	602.2*	3.0
		Tin, Total	47.1	1.6 u	50.3	93.6	3.0
		Strontium, Total	72.5	24.0	50.3	96.4	3.0
		Thallium, Total	95.3	1.1 u	101	94.7	3.0
		Uranium, Total	45.2	1.3 u	50.3	90.0	3.0
		Vanadium, Total	65.3	42.7	25.1	90.0	3.0
		Zinc, Total	227	202	25.1	98.0*	3.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/17/06

CLIENT: TNUHANFORD RC-051 K0274 LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-001REP	J11JJ6	Silver, Total	0.12	0.10u	~~NC~~ 200	3.0
		Aluminum, Total	7600	7330	3.6	3.0
		Arsenic, Total	5.7	5.8	1.7	3.0
		Boron, Total	2.5	0.75	107.4	3.0
		Barium, Total	71.1	68.9	3.1	3.0
		Beryllium, Total	0.45	0.43	5.6	3.0
		Bismuth, Total	0.77u	0.76u	NC	3.0
		Calcium, Total	3850	3780	1.7	3.0
		Cadmium, Total	1.1	1.0	9.5	3.0
		Cobalt, Total	5.8	5.8	0.00	3.0
		Chromium, Total	21.1	20.8	1.4	3.0
		Copper, Total	26.5	26.0	1.9	3.0
		Iron, Total	18400	18100	1.3	3.0
		Potassium, Total	828	809	2.2	3.0
		Lithium, Total	9.8	9.5	3.1	3.0
		Magnesium, Total	4270	4170	2.3	3.0
		Manganese, Total	286	282	1.3	3.0
		Molybdenum, Total	0.76	0.77	1.8	3.0
		Sodium, Total	222	209	5.8	3.0
		Nickel, Total	16.4	15.8	3.7	3.0
		Phosphorus, Total	663	648	2.2	3.0
		Lead, Total	31.5	31.5	0.00	3.0
		Antimony, Total	0.66u	0.66u	NC	3.0
		Selenium, Total	0.71u	0.70u	NC	3.0
		Silicon, Total	391	384	1.9	3.0
		Tin, Total	1.6 u	1.6 u	NC	3.0
		Strontium, Total	24.0	23.3	3.0	3.0
		Thallium, Total	1.1 u	1.0 u	NC	3.0
		Uranium, Total	1.3 u	1.3 u	NC	3.0
		Vanadium, Total	42.7	42.0	1.7	3.0
		Zinc, Total	202	203	0.35	3.0

corrected entry 5/17/06

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 05/17/06

CLIENT: TNUHANFORD RC-051 K0274 LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	06L0222-LC1	Silver, LCS	23.2	25.0	MG/KG	92.8
		Aluminum, LCS	235	250	MG/KG	94.1
		Arsenic, LCS	443	500	MG/KG	88.6
		Boron, LCS	227	250	MG/KG	90.9
		Barium, LCS	236	250	MG/KG	94.2
		Beryllium, LCS	11.7	12.5	MG/KG	93.6
		Bismuth, LCS	46.6	50.0	MG/KG	93.2
		Calcium, LCS	1160	1250	MG/KG	93.2
		Cadmium, LCS	11.6	12.5	MG/KG	92.8
		Cobalt, LCS	116	125	MG/KG	92.4
		Chromium, LCS	23.4	25.0	MG/KG	93.6
		Copper, LCS	59.7	62.5	MG/KG	95.5
		Iron, LCS	236	250	MG/KG	94.4
		Potassium, LCS	1150	1250	MG/KG	92.1
		Lithium, LCS	248	250	MG/KG	99.0
		Magnesium, LCS	1140	1250	MG/KG	90.8
		Manganese, LCS	35.8	37.5	MG/KG	95.5
		Molybdenum, LCS	236	250	MG/KG	94.6
		Sodium, LCS	1140	1250	MG/KG	91.1
		Nickel, LCS	93.5	100	MG/KG	93.5
		Phosphorus, LCS	224	250	MG/KG	89.6
		Lead, LCS	116	125	MG/KG	92.7
		Antimony, LCS	137	150	MG/KG	91.5
		Selenium, LCS	427	500	MG/KG	85.3
		Silicon, LCS	161	250	MG/KG	64.5
		Tin, LCS	235	250	MG/KG	94.1
		Strontium, LCS	235	250	MG/KG	94.1
		Thallium, LCS	464	500	MG/KG	92.9
		Uranium, LCS	47.9	50.0	MG/KG	95.9
		Vanadium, LCS	116	125	MG/KG	93.2
		Zinc, LCS	45.9	50.0	MG/KG	91.8

Date: 14 July 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Pesticide/PCB - Data Package No. K0274-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0274 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
J11JJ6	3/28/06	Soil	C	See note 1
J11JJ7	3/28/06	Soil	C	See note 1
J11JJ8	3/28/06	Soil	C	See note 1
J11JJ9	3/28/06	Soil	C	See note 1
J11JK0	3/28/06	Soil	C	See note 1

1– Pesticides by 8081A and PCBs by 8082.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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 Preservation**

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".

The nature of the incremental sampling process precludes sample preservation by cooling. Per WCH instruction, this validation does not include examining the sample preservation cooling parameters of the WCH validation procedures.

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 80% to 120%. 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 and 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 (125% & 137%), the 4,4'-DDE result in sample J11JJ6 was qualified as an estimate 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 20%. 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 and matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the project specific 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. K0274 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 the lack of a matrix spike, matrix spike duplicate and LCS analysis, all toxaphene results were qualified as estimates and flagged "J".
- Due to surrogate recoveries outside QC limits (125% & 137%), the 4,4'-DDE result in sample J11JJ6 was qualified as an 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.

All toxaphene results exceeded the RQL. Under the WCH validation statement of work, no qualification is required.

REFERENCES

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

DOE/RL-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan*.

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

PESTICIDE/PCB DATA QUALIFICATION SUMMARY*

SDG: K0274	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Toxaphene	J	All	No MS/MSD/LCS
4,4'-DDE	J	J11JJ6	Surrogate 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

PESTICIDE/PCB ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD															
Laboratory: LLI	SDG: K0274														
Sample Number		J11JJ6		J11JJ7		J11JJ8		J11JJ9		J11JK0					
Remarks															
Sample Date		3/28/06		3/28/06		3/28/06		3/28/06		3/28/06					
Extraction Date		4/10/06		4/10/06		4/10/06		4/10/06		4/10/06					
Analysis Date		4/20/06		4/20/06		4/20/06		4/20/06		4/20/06					
PCB	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016		13	U	13	U	13	U	13	U	13	U				
Aroclor-1221		13	U	13	U	13	U	13	U	13	U				
Aroclor-1232	16.5	13	U	13	U	13	U	13	U	13	U				
Aroclor-1242	16.5	13	U	13	U	13	U	13	U	13	U				
Aroclor-1248		13	U	13	U	13	U	13	U	13	U				
Aroclor-1254	16.5	13	U	13	U	13	U	13	U	13	U				
Aroclor-1260	16.5	13	U	13	U	13	U	13	U	13	U				
Sample Number		J11JJ6		J11JJ7		J11JJ8		J11JJ9		J11JK0					
Remarks															
Sample Date		3/28/06		3/28/06		3/28/06		3/28/06		3/28/06					
Extraction Date		4/7/06		4/7/06		4/7/06		4/7/06		4/7/06					
Analysis Date		4/12/06		4/12/06		4/12/06		4/12/06		4/12/06					
Pesticide	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Alpha-BHC	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Gamma-BHC (Lindane)	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Beta-BHC	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Heptachlor	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Delta-BHC	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Aldrin	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Heptachlor Epoxide	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Endosulfan I	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Dieldrin	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
4,4'-DDE	5	0.40	J	1.3	U	1.3	U	1.3	U	1.3	U				
Endrin	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Endosulfan II	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
4,4'-DDD	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Endosulfan Sulfate	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
4,4'-DDT	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Methoxychlor	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Endrin Ketone	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Endrin Aldehyde	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
alpha-Chlordane	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
gamma-Chlordane	5	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U				
Toxaphene	5	13	UJ	13	UJ	13	UJ	13	UJ	13	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.

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 05/01/06 14:49

RFW Batch Number: 0603L638 Client: TNUHANFORD RC-051 K0274 Work Order: 11343606001 Page: 1

	Cust ID:	J11JJ6	J11JJ7	J11JJ8	J11JJ8	J11JJ8	J11JJ9
Sample Information	RFW#:	001	002	003	003 MS	003 MSD	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	105 %	111 %	111 %	117 %	110 %	101 %
	Decachlorobiphenyl	110 %	112 %	108 %	115 %	107 %	105 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		13 U	13 U	13 U	120 %	105 %	13 U
Aroclor-1221		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1232		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1242		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1248		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1254		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1260		13 U	13 U	13 U	111 %	101 %	13 U

	Cust ID:	J11JK0	PBLKFF	PBLKFF BS
Sample Information	RFW#:	005	06LE0269-MB1	06LE0269-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	108 %	111 %	108 %
	Decachlorobiphenyl	108 %	107 %	105 %
		fl	fl	fl
Aroclor-1016		13 U	13 U	111 %
Aroclor-1221		13 U	13 U	13 U
Aroclor-1232		13 U	13 U	13 U
Aroclor-1242		13 U	13 U	13 U
Aroclor-1248		13 U	13 U	13 U
Aroclor-1254		13 U	13 U	13 U
Aroclor-1260		13 U	13 U	101 %

7/13/06

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

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Pesticide/PCBs by GC, CLP List

Report Date: 04/24/06 10:50

RFW Batch Number: 0603L638 Client: TNUHANFORD RC-051 K0274 Work Order: 11343606001 Page: 1

000000006

	Cust ID:	J11JJ6	J11JJ7	J11JJ8	J11JJ8	J11JJ8	J11JJ9
Sample Information	RFW#:	001	002	003	003 MS	003 MSD	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	125 * %	89 %	106 %	96 %	103 %	103 %
	Decachlorobiphenyl	137 * %	104 %	119 %	120 %	120 %	114 %
		fl	fl	fl	fl	fl	fl
Alpha-BHC		1.3 U	1.3 U	1.3 U	83 %	82 %	1.3 U
gamma-BHC (Lindane)		1.3 U	1.3 U	1.3 U	90 %	88 %	1.3 U
Beta-BHC		1.3 U	1.3 U	1.3 U	99 %	94 %	1.3 U
Heptachlor		1.3 U	1.3 U	1.3 U	90 %	88 %	1.3 U
Delta-BHC		1.3 U	1.3 U	1.3 U	75 %	74 %	1.3 U
Aldrin		1.3 U	1.3 U	1.3 U	84 %	83 %	1.3 U
Heptachlor epoxide		1.3 U	1.3 U	1.3 U	90 %	89 %	1.3 U
gamma-Chlordane		1.3 U	1.3 U	1.3 U	88 %	88 %	1.3 U
Endosulfan I		1.3 U	1.3 U	1.3 U	87 %	87 %	1.3 U
alpha-Chlordane		1.3 U	1.3 U	1.3 U	91 %	90 %	1.3 U
4,4'-DDE		0.40 ~~B~~ J	1.3 U	1.3 U	88 %	89 %	1.3 U
Dieldrin		1.3 U	1.3 U	1.3 U	84 %	85 %	1.3 U
Endrin		1.3 U	1.3 U	1.3 U	91 %	90 %	1.3 U
4,4'-DDD		1.3 U	1.3 U	1.3 U	94 %	94 %	1.3 U
Endosulfan II		1.3 U	1.3 U	1.3 U	87 %	87 %	1.3 U
4,4'-DDT		1.3 U	1.3 U	1.3 U	88 %	87 %	1.3 U
Endrin aldehyde		1.3 U	1.3 U	1.3 U	91 %	92 %	1.3 U
Endosulfan sulfate		1.3 U	1.3 U	1.3 U	89 %	89 %	1.3 U
Methoxychlor		1.3 U	1.3 U	1.3 U	110 %	107 %	1.3 U
Endrin ketone		1.3 U	1.3 U	1.3 U	97 %	97 %	1.3 U
Toxaphene		13 UJ	13 UJ	13 UJ	13 U	13 U	13 UJ

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

7/13/06

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	Cust ID:	J11JK0	PBLKFD	PBLKFD BS
Sample Information	RFW#:	005	06LE0266-MB1	06LE0266-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	4.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG

Surrogate:	Tetrachloro-m-xylene	105	%		104	%		88	%				
	Decachlorobiphenyl	121	%		108	%		89	%				
			fl			fl			fl		fl		fl
Alpha-BHC		1.3	U		0.33	U		90	%				
gamma-BHC (Lindane)		1.3	U		0.33	U		89	%				
Beta-BHC		1.3	U		0.33	U		90	%				
Heptachlor		1.3	U		0.33	U		83	%				
Delta-BHC		1.3	U		0.33	U		83	%				
Aldrin		1.3	U		0.33	U		85	%				
Heptachlor epoxide		1.3	U		0.33	U		85	%				
gamma-Chlordane		1.3	U		0.33	U		84	%				
Endosulfan I		1.3	U		0.33	U		84	%				
alpha-Chlordane		1.3	U		0.33	U		84	%				
4,4'-DDE		1.3	U		0.33	U		88	%				
Dieldrin		1.3	U		0.33	U		87	%				
Endrin		1.3	U		0.33	U		90	%				
4,4'-DDD		1.3	U		0.33	U		93	%				
Endosulfan II		1.3	U		0.33	U		85	%				
4,4'-DDT		1.3	U		0.33	U		90	%				
Endrin aldehyde		1.3	U		0.33	U		79	%				
Endosulfan sulfate		1.3	U		0.33	U		86	%				
Methoxychlor		1.3	U		0.33	U		95	%				
Endrin ketone		1.3	U		0.33	U		88	%				
Toxaphene		13	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

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7/13/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0603L638
SDG/SAF # K0274/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 03-30-2006

PCB

Five (5) soil samples were collected on 03-28-2006.

The samples and their associated QC samples were extracted on 04-10-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 04-20-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

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

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy with the exception of a discrepancy, which was documented on the Sample Receipt Checklist.

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

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

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

5. All surrogate recoveries were within acceptance criteria.

6. The blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

8. The results for soil samples were reported on a wet-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 3 pages.

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

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

5/4/06
Date

som\r:\group\data\pest\tnu hanford\0603-638.pcbs

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

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0603L638
SDG/SAF # K0274/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 03-30-2006

CHLORINATED PESTICIDES

Five (5) soil samples were collected on 03-28-2006.

The samples and their associated QC samples were extracted on 04-07-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 04-12-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081A.

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

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy with the exception of a discrepancy, which was documented on the Sample Receipt Checklist.

2. All required holding times for analysis have been met.

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

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

5. Two (2) of eighteen (18) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

6. All blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

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

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 5 pages.

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LIONVILLE LABORATORY INC.

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

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.

for Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/4/06
Date

som\r:\group\data\pest\tnu hanford\0603-638s.pst

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06GC129

Initiator: KBW
Date: 4/24/06
Client: TN

Batch: 0603L638
Samples: 001
Method: SW846/MCAWW/CLP/

Parameter: PEST
Matrix: SOIL
Prep Batch: 06LK0266

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)

Surrogate recoveries high in sample 001.

2. Known or Probable Causes(s)

3. Discussion and Proposed Action

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

Other Description:

Correct. no hit in sample above reporting limit
4/25/06.

4. Project Manager Instructions...signature/date: 5/4/06

V 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: _____

Other Explanation:

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

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

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

QA-105-A-0805

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-107	Page 2 of 1

Collector: STANKOVICH, M.	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location: 100-H RIPARIAN #8		SAF No.: RC-051
Ice Chest No.:	Field Logbook No.: EL-1596-1	COA: BESRAS6520	Method of Shipment: FED EX
Shipped To: EBERLINE SERVICES (LIONVILLE)	Offsite Property No.: A060151		Bill of Lading/Air Bill No.: SEE OSPC

Price Code: 8L

Air Quality: ☐

Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None	None	None	None	None	None	None	None	None
Type of Container	G/P	G/P	aG	aG	aG	aG	G/P	G/P	A	A
No. of Container(s)	9	9	7	1	7	7	7	7	0	0
Volume	30g	30g	30g	30g	30g	30g	30g	30g	1^	1^
SAMPLE ANALYSIS	See item (1) in Special Instructions	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082	IC Anions - 300.0 (Nitrate)	NO2/NO3 - 353.2 (Nitrogen in Nitrite and Nitrate)	-	—

Sample No.	Matrix *	Sample Date	Sample Time										
J11JJ6	SOIL	3-28-06	14:00	3	1	1		1	1	1	1		
J11JJ7			16:19	1	3	3		1	1	1	1		
J11JJ8			15:20	1	1	1		3	3	1	1		
J11JJ9			15:00	1	1	1		1	1	3	3		
J11JK0			13:00	3	3	1		1	1	1	1		

3706

000021

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Elizabeth M Tepper	Date/Time	Received By/Stored In: CH2M Hill	Date/Time
Relinquished By/Removed From: CH2M Elizabeth M Tepper	Date/Time: 3-29-06 11:30	Received By/Stored In: Fed Ex	Date/Time: 3-29-06 11:30
Relinquished By/Removed From: Fed Ex	Date/Time: 3-30-06 0900	Received By/Stored In: [signature]	Date/Time: 3-30-06 0900
Relinquished By/Removed From: Fed Ex	Date/Time: 3-30-06 0900	Received By/Stored In: [signature]	Date/Time: 3-30-06 0900
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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^-- These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]

Matrix *

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

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

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

Appendix 5

Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0274		
VALIDATOR: TLP		LAB: LLI		DATE: 7/7/06	
			SDG: K0274		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J11JJ6 J11JJ7 J11JJ8 J11JJ9 J11JK0					
					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: Surrogate – J11JJ6 – 4,4'-DDE – J no PAS

toxaphene – no MS 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:

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:

Sample cooling not assessed per WCH

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: all toxaphene 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: 14 July 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Radiochemistry - Data Package No. K0274-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0274 prepared by Eberline Services (EB). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J11JJ6	3/28/06	Soil	C	See note 1
J11JJ7	3/28/06	Soil	C	See note 1
J11JJ8	3/28/06	Soil	C	See note 1
J11JJ9	3/28/06	Soil	C	See note 1
J11JK0	3/28/06	Soil	C	See note 1

1 – Total strontium, isotopic thorium, isotopic uranium, gamma spectroscopy.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 2005). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY PARAMETERS

- **Holding Times**

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

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

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

All blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 80-120%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

Due to the lack of an LCS analysis, all thorium-228 and thorium-232 results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate

analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 20%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicates

No field duplicates were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the 100 & 300 Area RQLs to ensure that laboratory detection levels meet the required criteria. Fifteen analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0274 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of an LCS analysis, all thorium-228 and thorium-232 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.

Fifteen 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-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0274	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Thorium-228 Thorium-232	J	All	No LCS

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: EB											
Case	SDG: K0274										
Sample Number		J11JJ6		J11JJ7		J11JJ8		J11JJ9		J11JK0	
Remarks											
Sample Date		3/28/06		3/28/06		3/28/06		3/28/06		3/28/06	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Total Strontium	1	0.018	U	0.010	U	0.027	U	0.018	U	-0.061	U
Thorium-228	1	0.662	UJ	0.981	J	0.445	UJ	0.390	UJ	0.347	J
Thorium-230		0.377	U	0	U	0.266	U	0.389	U	0.173	U
Thorium-232	1	0.189	UJ	0.293	UJ	0.266	UJ	0.681	UJ	0.389	J
Uranium-233/234	1	0.682		0.524		0.825		0.449		0.511	
Uranium-235	1	0.188	U	0.058	U	0.032	U	0.029	U	0.052	U
Uranium-238	1	0.488		0.334		0.772		0.544		0.553	
Potassium-40		10.6		8.69		11.4		14.2		13.7	
Cobalt 60	0.05	U	U*	U	U*	U	U*	U	U*	U	U*
Cesium 137	0.1	0.220		0.232		0.354		0.250		0.262	
Radium-226	0.1	0.662		0.547		0.598		0.772		0.594	
Radium-228	0.2	1.38		0.911		1.07		1.03		1.18	
Europium 152	0.1	U	U*	U	U*	U	U*	U	U*	U	U*
Europium 154	0.1	U	U*	U	U*	U	U*	U	U*	U	U*
Europium 155		U	U	U	U	U	U	U	U	U	U
Thorium-228		1.06		0.654		0.943		0.784		0.816	
Thorium-232		1.38		0.911		1.07		1.03		1.18	
Uranium-235(gea)		U	U	U	U	U	U	U	U	U	U
Uranium-238(gea)		U	U	U	U	U	U	U	U	U	U
Americium-241		U	U	U	U	U	U	U	U	U	U
Ruthenium-106		U	U	U	U	U	U	U	U	U	U
Antimony-125		U	U	U	U	U	U	U	U	U	U
Cesium-134		U	U	U	U	U	U	U	U	U	U

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

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0274

R603166-01 J11JJ6

DATA SHEET

SDG	7408	Client/Case no	Hanford SDG K0274
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R603166-01	Client sample id	J11JJ6
Dept sample id	7408-001	Location/Matrix	100-H RIPARIAN #8 SOLID
Received	03/30/06	Collected/Weight	03/28/06 14:00 490 g
% solids	100.0	Custody/SAF No	RC-051-107 RC-051

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.018	0.10	0.20	1.0	U	SR
Thorium 228	14274-82-9	0.662	0.57	0.72	1.0	U J	TH
Thorium 230	14269-63-7	0.377	0.38	0.72	1.0	U	TH
Thorium 232	TH-232	0.189	0.19	0.72	1.0	U J	TH
Uranium 233/234	U-233/234	0.682	0.25	0.19	1.0		U
Uranium 235	15117-96-1	0.118	0.12	0.23	1.0	U	U
Uranium 238	U-238	0.488	0.25	0.19	1.0		U
Potassium 40	13966-00-2	10.6	1.5	1.1			GAM
Cobalt 60	10198-40-0	U		0.088	0.050	U	GAM
Cesium 137	10045-97-3	0.220	0.10	0.11	0.10		GAM
Radium 226	13982-63-3	0.662	0.16	0.16	0.10		GAM
Radium 228	15262-20-1	1.38	0.35	0.32	0.20		GAM
Europium 152	14683-23-9	U		0.26	0.10	U	GAM
Europium 154	15585-10-1	U		0.26	0.10	U	GAM
Europium 155	14391-16-3	U		0.22	0.10	U	GAM
Thorium 228	14274-82-9	1.06	0.12	0.11			GAM
Thorium 232	TH-232	1.38	0.35	0.32			GAM
Uranium 235	15117-96-1	U		0.35		U	GAM
Uranium 238	U-238	U		10		U	GAM
Americium 241	14596-10-2	U		0.35		U	GAM
Antimony 125	14234-35-6	U		0.19		U	GAM
Cesium 134	13967-70-9	U		0.10		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0274

R603166-02 J11JJ7

DATA SHEET

SDG	7408	Client/Case no	Hanford SDG K0274
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R603166-02	Client sample id	J11JJ7
Dept sample id	7408-002	Location/Matrix	100-H RIPARIAN #8 SOLID
Received	03/30/06	Collected/Weight	03/28/06 16:19 432 g
% solids	100.0	Custody/SAF No	RC-051-107 RC-051

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.010	0.11	0.22	1.0	U	SR
Thorium 228	14274-82-9	0.981	0.60	0.75	1.0	J	TH
Thorium 230	14269-63-7	0	0.20	0.75	1.0	U	TH
Thorium 232	TH-232	0.293	0.39	0.75	1.0	U J	TH
Uranium 233/234	U-233/234	0.524	0.24	0.18	1.0		U
Uranium 235	15117-96-1	0.058	0.058	0.22	1.0	U	U
Uranium 238	U-238	0.334	0.19	0.18	1.0		U
Potassium 40	13966-00-2	8.69	3.5	1.1			GAM
Cobalt 60	10198-40-0	U		0.11	0.050	U	GAM
Cesium 137	10045-97-3	0.232	0.10	0.11	0.10		GAM
Radium 226	13982-63-3	0.547	0.21	0.19	0.10		GAM
Radium 228	15262-20-1	0.911	0.44	0.44	0.20		GAM
Europium 152	14683-23-9	U		0.27	0.10	U	GAM
Europium 154	15585-10-1	U		0.29	0.10	U	GAM
Europium 155	14391-16-3	U		0.28	0.10	U	GAM
Thorium 228	14274-82-9	0.654	0.12	0.12			GAM
Thorium 232	TH-232	0.911	0.44	0.44			GAM
Uranium 235	15117-96-1	U		0.35		U	GAM
Uranium 238	U-238	U		24		U	GAM
Americium 241	14596-10-2	U		0.37		U	GAM
Antimony 125	14234-35-6	U		0.22		U	GAM
Cesium 134	13967-70-9	U		0.12		U	GAM

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SAMPLE DELIVERY GROUP K0274

R603166-03 J11JJ8

DATA SHEET

SDG	7408	Client/Case no	Hanford	SDG K0274
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R603166-03	Client sample id	J11JJ8	
Dept sample id	7408-003	Location/Matrix	100-H RIPARIAN #8	SOLID
Received	03/30/06	Collected/Weight	03/28/06 15:20	430 g
% solids	100.0	Custody/SAF No	RC-051-107	RC-051

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.027	0.12	0.23	1.0	U	SR
Thorium 228	14274-82-9	0.445	0.54	0.68	1.0	U J	TH
Thorium 230	14269-63-7	0.266	0.36	0.68	1.0	U	TH
Thorium 232	TH-232	0.266	0.36	0.68	1.0	U J	TH
Uranium 233/234	U-233/234	0.825	0.33	0.20	1.0		U
Uranium 235	15117-96-1	0.032	0.064	0.25	1.0	U	U
Uranium 238	U-238	0.772	0.27	0.20	1.0		U
Potassium 40	13966-00-2	11.4	1.4	0.63			GAM
Cobalt 60	10198-40-0	U		0.10	0.050	U	GAM
Cesium 137	10045-97-3	0.354	0.11	0.098	0.10		GAM
Radium 226	13982-63-3	0.598	0.14	0.14	0.10		GAM
Radium 228	15262-20-1	1.07	0.35	0.35	0.20		GAM
Europium 152	14683-23-9	U		0.28	0.10	U	GAM
Europium 154	15585-10-1	U		0.26	0.10	U	GAM
Europium 155	14391-16-3	U		0.16	0.10	U	GAM
Thorium 228	14274-82-9	0.943	0.16	0.17			GAM
Thorium 232	TH-232	1.07	0.35	0.35			GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.090		U	GAM
Antimony 125	14234-35-6	U		0.19		U	GAM
Cesium 134	13967-70-9	U		0.11		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0274

R603166-04 J11JJ9

DATA SHEET

SDG	7408	Client/Case no	Hanford	SDG K0274
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R603166-04	Client sample id	J11JJ9	
Dept sample id	7408-004	Location/Matrix	100-H RIPARIAN #8	SOLID
Received	03/30/06	Collected/Weight	03/28/06 15:00	432 g
% solids	100.0	Custody/SAF No	RC-051-107	RC-051

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.018	0.11	0.21	1.0	U	SR
Thorium 228	14274-82-9	0.390	0.39	0.75	1.0	UJ	TH
Thorium 230	14269-63-7	0.389	0.39	0.74	1.0	U	TH
Thorium 232	TH-232	0.681	0.59	0.74	1.0	UJ	TH
Uranium 233/234	U-233/234	0.449	0.19	0.18	1.0		U
Uranium 235	15117-96-1	0.029	0.057	0.22	1.0	U	U
Uranium 238	U-238	0.544	0.24	0.18	1.0		U
Potassium 40	13966-00-2	14.2	2.5	1.0			GAM
Cobalt 60	10198-40-0	U		0.13	0.050	U	GAM
Cesium 137	10045-97-3	0.250	0.11	0.12	0.10		GAM
Radium 226	13982-63-3	0.772	0.18	0.17	0.10		GAM
Radium 228	15262-20-1	1.03	0.46	0.45	0.20		GAM
Europium 152	14683-23-9	U		0.27	0.10	U	GAM
Europium 154	15585-10-1	U		0.33	0.10	U	GAM
Europium 155	14391-16-3	U		0.29	0.10	U	GAM
Thorium 228	14274-82-9	0.784	0.11	0.12			GAM
Thorium 232	TH-232	1.03	0.46	0.45			GAM
Uranium 235	15117-96-1	U		0.35		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.35		U	GAM
Antimony 125	14234-35-6	U		0.21		U	GAM
Cesium 134	13967-70-9	U		0.13		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0274

R603166-05 J11JK0

DATA SHEET

SDG	7408	Client/Case no	Hanford	SDG K0274	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R603166-05	Client sample id	J11JK0		
Dept sample id	7408-005	Location/Matrix	100-H RIPARIAN #8	SOLID	
Received	03/30/06	Collected/Weight	03/28/06 13:00	433 g	
% solids	100.0	Custody/SAF No	RC-051-107	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.061	0.095	0.22	1.0	U	SR
Thorium 228	14274-82-9	0.347	0.26	0.33	1.0	J	TH
Thorium 230	14269-63-7	0.173	0.26	0.33	1.0	U	TH
Thorium 232	TH-232	0.389	0.26	0.33	1.0	J	TH
Uranium 233/234	U-233/234	0.511	0.22	0.16	1.0		U
Uranium 235	15117-96-1	0.052	0.052	0.20	1.0	U	U
Uranium 238	U-238	0.553	0.22	0.16	1.0		U
Potassium 40	13966-00-2	13.7	2.3	0.88			GAM
Cobalt 60	10198-40-0	U		0.10	0.050	U	GAM
Cesium 137	10045-97-3	0.262	0.098	0.10	0.10		GAM
Radium 226	13982-63-3	0.594	0.17	0.16	0.10		GAM
Radium 228	15262-20-1	1.18	0.39	0.37	0.20		GAM
Europium 152	14683-23-9	U		0.22	0.10	U	GAM
Europium 154	15585-10-1	U		0.24	0.10	U	GAM
Europium 155	14391-16-3	U		0.23	0.10	U	GAM
Thorium 228	14274-82-9	0.816	0.099	0.098			GAM
Thorium 232	TH-232	1.18	0.39	0.37			GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		9.5		U	GAM
Americium 241	14596-10-2	U		0.29		U	GAM
Antimony 125	14234-35-6	U		0.17		U	GAM
Cesium 134	13967-70-9	U		0.18		U	GAM

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0274 was composed of five solid (soil) samples designated under SAF No. RC-051 with a Project Designation of: 100 & 300 Area Component of the RCBRA-Incremental So.

The strontium, thorium, and uranium aliquots were taken from 30-gram leachates of the respective samples and not from full dissolutions. The gamma aliquots were taken from the samples as received.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. All results were transmitted to WCH via e-mail on May 22, 2006.

2.0 ANALYSIS NOTES

2.1 Total Strontium Analysis

No problems were encountered during the course of the analyses.

2.2 Isotopic Thorium Analysis

No problems were encountered during the course of the analyses.

2.3 Isotopic Uranium Analysis

No problems were encountered during the course of the analyses.

2.4 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

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

Melissa Mannion

Melissa C. Mannion
Senior Program Manager

5/23/6

Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-107	Page 1 of 3

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L	Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 100-H RIPARIAN #8 K0274 (7408)		SAF No. RC-051	Air Quality ☐	
Ice Chest No.	Field Logbook No. EL-1596-1	COA BESRAS6520	Method of Shipment FED EX		
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None	None	None	None	None	None	None	None	None
Type of Container	G/P	G/P	^	^	^	^	^	^	^	^
No. of Container(s)	5	7	0	0	0	0	0	0	0	0
Volume	400g	30g	1^	1^	1^	1^	1^	1^	1^	1^

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SAMPLE ANALYSIS				See item (1) in Special Instructions.	Strontium-89,90 -- Total Sr	Isotopic Thorium (Thorium-232)	Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238)	Isotopic Plutonium (Plutonium-238, Plutonium-239/240)	^	^^	^^^	^^^^	^^^^^
Sample No.	Matrix *	Sample Date	Sample Time										
J11JJ6	SOIL	3-28-06	14:00	1	3								
J11JJ7			16:19	1	1								
J11JJ8			15:20	1	1								
J11JJ9			15:00	1	1								
J11JK0			13:00	1	1								

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Elizabeth M Tepper		CH2M Hill	
Relinquished By/Removed From: Elizabeth M Tepper	3-29-06 11:30	Received By/Stored In: Fed Ex	3-29-06 11:30
Relinquished By/Removed From: FED EX		Received By/Stored In: MFM	3/30/06 9:30
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^-- These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) Gamma Spec - (Full List) (Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium 226, Radium-228)

Matrix *

Sy=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
GL=Drum Liquids
Ti=Tissue
Wi=Wipe
Li=Liquid
Ve=Vegetation
X=Other

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

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

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	RCBRA - soil		DATA PACKAGE:	K0274	
VALIDATOR:	TLI	LAB: EB		DATE: 7/10/06	
			SDG:	K0274	
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			
SAMPLES/MATRIX					
J1JJ6	J1JJ7	J1JJ8	J1JJ9	J1JK0	
					soil

1. Completeness ..... ☐ N/A

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

Comments: _____

2. Initial Calibration (Levels D, E) ..... ☐ N/A

Instruments/detectors calibrated? ..... Yes No N/A

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

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

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

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

Comments: _____

3. Continuing Calibration (Levels D, E) ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

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

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

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

Comments: _____

_____

_____

_____

_____

4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

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

Comments: _____

_____

_____

_____

_____

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... Yes No N/A

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

Analytes detected in method blank? ..... Yes No N/A

Field blank(s) analyzed? ..... Yes No N/A

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

Analytes detected in field blank(s)? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A

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

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

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

LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: no th 228 or 232 — J all

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☐ N/A

Chemical carrier added? ..... Yes No N/A

Chemical recovery acceptable? ..... Yes No N/A

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

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

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

Comments: _____

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

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

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

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

Comments: _____

9. Matrix Spikes (Levels C, D, E) ..... ☒ N/A

Matrix spike analyzed? ..... Yes No N/A

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

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

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

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

10. Duplicates (Levels C, D, E) ..... ☐ N/A

Duplicates Analyzed at required frequency? ..... Yes No N/A

RPD Values Acceptable? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

11. Field QC Samples (Levels C, D E) ..... ☐ N/A

Field duplicate sample(s) analyzed? ..... Yes No N/A

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

Field split sample(s) analyzed? ..... Yes No N/A

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

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

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

Comments: no Field QC

12. Holding Times (All levels)

Are sample holding times acceptable? ..... Yes No N/A

Comments: _____

13. Results and Detection Limits (All Levels) ..... ☐ N/A

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

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

Results Acceptable? (Levels D, E) ..... Yes No N/A

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

MDA's meet required detection limits? ..... Yes No N/A

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

Comments: 15 over

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0274

R603166-07 Method Blank

METHOD BLANK

SDG	7408	Client/Case no	Hanford	SDG K0274	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R603166-07	Client sample id	Method Blank		
Dept sample id	7408-007	Material/Matrix		SOLID	
		SAF No	RC-051		

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.097	0.096	0.22	1.0	U	SR
Thorium 228	14274-82-9	0.114	0.23	0.43	1.0	U	TH
Thorium 230	14269-63-7	0.113	0.23	0.43	1.0	U	TH
Thorium 232	TH-232	0	0.11	0.43	1.0	U	TH
Uranium 233/234	U-233/234	0	0.050	0.19	1.0	U	U
Uranium 235	15117-96-1	0	0.060	0.23	1.0	U	U
Uranium 238	U-238	0	0.050	0.19	1.0	U	U
Potassium 40	13966-00-2	U		0.41		U	GAM
Cobalt 60	10198-40-0	U		0.048	0.050	U	GAM
Cesium 137	10045-97-3	U		0.041	0.10	U	GAM
Radium 226	13982-63-3	U		0.080	0.10	U	GAM
Radium 228	15262-20-1	U		0.16	0.20	U	GAM
Europium 152	14683-23-9	U		0.10	0.10	U	GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.067	0.10	U	GAM
Thorium 228	14274-82-9	U		0.056		U	GAM
Thorium 232	TH-232	U		0.16		U	GAM
Uranium 235	15117-96-1	U		0.13		U	GAM
Uranium 238	U-238	U		4.8		U	GAM
Americium 241	14596-10-2	U		0.034		U	GAM
Antimony 125	14234-35-6	U		0.095		U	GAM
Cesium 134	13967-70-9	U		0.050		U	GAM

100&300Area Compnt RCBRA-Incrmntl So

QC-BLANK #56675

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/22/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0274

R603166-06

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7408

Contact Melissa C. Mannion

Client/Case no Hanford SDG K0274

Contract No. 630

Lab sample id R603166-06

Dept sample id 7408-006

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No RC-051

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Total Strontium	11.0	0.51	0.20	1.0		SR	10.8	0.43	102	82-118	80-120
Thorium 230	38.6	4.1	0.38	1.0		TH	40.4	1.6	96	82-118	80-120
Uranium 233/234	18.5	1.8	0.77	1.0		U	18.6	0.74	99	83-117	80-120
Uranium 235	13.9	1.5	0.17	1.0		U	15.1	0.60	92	83-117	80-120
Uranium 238	18.5	1.8	0.74	1.0		U	20.2	0.81	92	84-116	80-120
Cobalt 60	2.85	0.25	0.066	0.050		GAM	2.81	0.11	101	73-127	80-120
Cesium 137	3.18	0.23	0.16	0.10		GAM	2.92	0.12	109	72-128	80-120

100&300Area Compnt RCBRA-Incrmntl So

QC-LCS #56674

Lab id EBRLNE

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 05/22/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0274

R603166-08 J11JJ6

DUPLICATE

SDG	7408			Client/Case no	Hanford SDG K0274
Contact	Melissa C. Mannion			Contract	No. 630
DUPLICATE		ORIGINAL			
Lab sample id	R603166-08	Lab sample id	R603166-01	Client sample id	J11JJ6
Dept sample id	7408-008	Dept sample id	7408-001	Location/Matrix	100-H RIPARIAN #8 SOLID
		Received	03/30/06	Collected/Weight	03/28/06 14:00 490 g
% solids	100.0	% solids	100.0	Custody/SAF No	RC-051-107 RC-051

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	DER σ
Total Strontium	0.007	0.097	0.20	1.0	U	SR	0.018	0.10	0.20	U	-		0.2
Thorium 228	0.513	0.30	0.35	1.0		TH	0.662	0.57	0.72	U	25	165	0.5
Thorium 230	0.255	0.29	0.28	1.0	U	TH	0.377	0.38	0.72	U	-		0.5
Thorium 232	0.583	0.30	0.28	1.0		TH	0.189	0.19	0.72	U	102	138	2.2
Uranium 233/234	0.632	0.22	0.14	1.0		U	0.682	0.25	0.19		8	77	0.3
Uranium 235	0	0.044	0.17	1.0	U	U	0.118	0.12	0.23	U	-		1.8
Uranium 238	0.578	0.22	0.14	1.0		U	0.488	0.25	0.19		17	94	0.5
Potassium 40	12.1	1.4	0.77			GAM	10.6	1.5	1.1		13	42	0.9
Cobalt 60	U		0.092	0.050	U	GAM	U		0.088	U	-		0.1
Cesium 137	0.336	0.094	0.091	0.10		GAM	0.220	0.10	0.11		42	81	1.5
Radium 226	0.727	0.17	0.17	0.10		GAM	0.662	0.16	0.16		9	60	0.5
Radium 228	1.24	0.33	0.33	0.20		GAM	1.38	0.35	0.32		11	64	0.5
Europium 152	U		0.30	0.10	U	GAM	U		0.26	U	-		0.2
Europium 154	U		0.26	0.10	U	GAM	U		0.26	U	-		0
Europium 155	U		0.22	0.10	U	GAM	U		0.22	U	-		0
Thorium 228	1.09	0.11	0.11			GAM	1.06	0.12	0.11		3	39	0.2
Thorium 232	1.24	0.33	0.33			GAM	1.38	0.35	0.32		11	64	0.5
Uranium 235	U		0.32		U	GAM	U		0.35	U	-		0.1
Uranium 238	U		8.0		U	GAM	U		10	U	-		0.3
Americium 241	U		0.34		U	GAM	U		0.35	U	-		0
Antimony 125	U		0.18		U	GAM	U		0.19	U	-		0.1
Cesium 134	U		0.099		U	GAM	U		0.10	U	-		0

100&300Area Compnt RCBRA-Incrmntl So

QC-DUP#1 56676

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	05/22/06

Date: 14 July 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Wet Chemistry - Data Package No. K0274-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0274 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
J11JJ6	3/28/06	Soil	C	See note 1
J11JJ7	3/28/06	Soil	C	See note 1
J11JJ8	3/28/06	Soil	C	See note 1
J11JJ9	3/28/06	Soil	C	See note 1
J11JK0	3/28/06	Soil	C	See note 1

1– IC anions by 300.0 (nitrate), chromium VI by 7196A and nitrate/nitrite by 353.2.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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; 28 days for nitrate/nitrite; and 48 hours for nitrate.

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".

The nature of the incremental sampling process precludes sample preservation by cooling. Per WCH instruction, this validation does not include examining the sample preservation cooling parameters of the WCH validation procedures.

Due to the holding time being exceeded by greater than twice the limit, all nitrate results were qualified as estimates and flagged "J".

All other 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 80% to 120%. 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 79% 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 120% and a sample result less than the IDL, no qualification is required.

Due to a soluble chromium VI matrix spike recovery outside QC limits (47%), 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 20%, 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

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K0274 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 the holding time being exceeded by greater than twice the limit, all nitrate results were qualified as estimates and flagged "J".
- Due to a soluble chromium VI matrix spike recovery outside QC limits (47%), 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-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0274	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nitrate	J	All	Hold time
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

GENERAL CHEMISTRY ANALYSIS, SOIL MATRIX, (MG/KG)

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: Lionville Laboratory Inc. SDG: K0274											
Sample Number		J11JJ6		J11JJ7		J11JJ8		J11JJ9		J11JK0	
Remarks											
Sample Date		3/28/06		3/28/06		3/28/06		3/28/06		3/28/06	
General Chemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Nitrate	2.5	15.2	J	17.0	J	17.8	J	14.2	J	13.4	J
Chromium VI	0.5	0.20	UJ	0.20	UJ	0.20	UJ	0.20	UJ	0.20	UJ
Nitrate/Nitrite		3.4		3.7		4.0		3.4		3.3	

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 05/05/06

CLIENT: TNUHANFORD RC-051 K0274 LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J11JJ6	Nitrate by IC	15.2 J	MG/KG	2.50	1.0
		Chromium VI	0.20 u J	MG/KG	0.20	1.0
		Nitrate Nitrite	3.4	MG/KG	0.20	1.0
-002	J11JJ7	Nitrate by IC	17.0 J	MG/KG	2.50	1.0
		Chromium VI	0.20 u J	MG/KG	0.20	1.0
		Nitrate Nitrite	3.7	MG/KG	0.20	1.0
-003	J11JJ8	Nitrate by IC	17.8 J	MG/KG	2.49	1.0
		Chromium VI	0.20 u J	MG/KG	0.20	1.0
		Nitrate Nitrite	4.0	MG/KG	0.20	1.0
-004	J11JJ9	Nitrate by IC	14.2 J	MG/KG	2.44	1.0
		Chromium VI	0.20 u J	MG/KG	0.20	1.0
		Nitrate Nitrite	3.4	MG/KG	0.20	1.0
-005	J11JK0	Nitrate by IC	13.4 J	MG/KG	2.48	1.0
		Chromium VI	0.20 u J	MG/KG	0.20	1.0
		Nitrate Nitrite	3.3	MG/KG	0.20	1.0

7/13/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-051 K0274
LVL#: 0603L638

W.O.#: 11343-606-001-9999-00
Date Received: 03-30-06

INORGANIC NARRATIVE

1. This narrative covers the analyses of 5 soil samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary with the exception of the sample digestate compilation modification requested by the client for Chromium VI. The total sample mass submitted for each sample number was determined and then portioned for the digestion preparation step and the subsequent digestates were composited prior to the colorimetric analysis. For Nitrate Nitrite and IC analyses, the sample extraction ratios were 1:10 using the total sample masses submitted. The Nitrate Nitrite extracts were preserved with sulfuric acid prior to analysis. The sample weights were as follows:

LvLI Sample	Site ID	Cr6+ sample wt,g	Nitrate-Nitrite IC Nitrate sample wt,g
0603L638-001	J11JJ6	30.041	29.984
0603L638-002	J11JJ7	30.456	NA
0603L638-002 dup	J11JJ7	30.213	NA
0603L638-002 spk	J11JJ7	30.064	29.990
0603L638-003	J11JJ8	30.319	30.082
0603L638-004	J11JJ9	30.136	30.735
0603L638-004 dup	J11JJ9	NA	30.483
0603L638-004 spk	J11JJ9	NA	29.981
0603L638-005	J11JK0	30.123	30.227

Elevated reporting limits for Chromium VI are the result of the necessity to dilute the samples to diminish background color of the digestates.

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 18 pages.

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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 did not meet LvLI's sample acceptance policy as noted on the Sample Receipt Checklist.

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits.

7. The matrix spike recoveries for Nitrate and Nitrate Nitrite were within the 75-125% control limits however replicate recovery for Soluble Chromium VI was below the control limits.

8. The replicate analyses for Chromium VI and Nitrate were within the 20% Relative Percent Difference (RPD) control limit however replicate analysis for Nitrate Nitrite was outside the control limits at 21.2%.

9. Results for solid samples were reported on an "as-received" 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

5/8/06
Date

njp\03-638

LvLI
LIONVILLE LABORATORY INC.

RECEIVED
MAY 2006

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0274

DATE RECEIVED: 03/30/06 LVL LOT # :0603L638

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
J11JJ6						
NITRATE BY IC	001	S	06LICC39	03/28/06	04/06/06	04/07/06
CHROMIUM VI	001	S	06LVI019	03/28/06	04/03/06	04/03/06
NITRATE NITRITE	001	S	06LN3022	03/28/06	04/06/06	04/10/06
J11JJ7						
NITRATE BY IC	002	S	06LICC39	03/28/06	04/06/06	04/07/06
CHROMIUM VI	002	S	06LVI019	03/28/06	04/03/06	04/03/06
CHROMIUM VI	002 REP	S	06LVI019	03/28/06	04/03/06	04/03/06
CHROMIUM VI	002 MS	S	06LVI019	03/28/06	04/03/06	04/03/06
NITRATE NITRITE	002	S	06LN3022	03/28/06	04/06/06	04/10/06
J11JJ8						
NITRATE BY IC	003	S	06LICC39	03/28/06	04/06/06	04/07/06
CHROMIUM VI	003	S	06LVI019	03/28/06	04/03/06	04/03/06
NITRATE NITRITE	003	S	06LN3022	03/28/06	04/06/06	04/10/06
J11JJ9						
NITRATE BY IC	004	S	06LICC39	03/28/06	04/06/06	04/07/06
NITRATE BY IC	004 REP	S	06LICC39	03/28/06	04/06/06	04/07/06
NITRATE BY IC	004 MS	S	06LICC39	03/28/06	04/06/06	04/07/06
CHROMIUM VI	004	S	06LVI019	03/28/06	04/03/06	04/03/06
NITRATE NITRITE	004	S	06LN3022	03/28/06	04/06/06	04/10/06
NITRATE NITRITE	004 REP	S	06LN3022	03/28/06	04/06/06	04/10/06
NITRATE NITRITE	004 MS	S	06LN3022	03/28/06	04/06/06	04/10/06
J11JK0						
NITRATE BY IC	005	S	06LICC39	03/28/06	04/06/06	04/07/06
CHROMIUM VI	005	S	06LVI019	03/28/06	04/03/06	04/03/06
NITRATE NITRITE	005	S	06LN3022	03/28/06	04/06/06	04/10/06

LAB QC:

NITRATE BY IC	MB1	S	06LICC39	N/A	04/06/06	04/06/06

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0274

DATE RECEIVED: 03/30/06 LVL LOT # :0603L638

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NITRATE BY IC	MB1 BS	S	06LICC39	N/A	04/06/06	04/06/06
CHROMIUM VI	MB1	S	06LVI019	N/A	04/03/06	04/03/06
CHROMIUM VI	MB1 BS	S	06LVI019	N/A	04/03/06	04/03/06
CHROMIUM VI	MB1 BSD	S	06LVI019	N/A	04/03/06	04/03/06
NITRATE NITRITE	MB1	S	06LN3022	N/A	04/04/06	04/10/06
NITRATE NITRITE	MB1 BS	S	06LN3022	N/A	04/04/06	04/10/06

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-107	Page 2 of 3

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 100-H RIPARIAN #8		SAF No. RC-051	Air Quality ☐
Ice Chest No.	Field Logbook No. EL-1596-1	COA BESRAS6520	Method of Shipment FED EX	
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.

Preservation	None	None	None	None	None	None	None	None	None	None
Type of Container	G/P	G/P	aG	aG	aG	aG	G/P	G/P	^	^
No. of Container(s)	9	9	7	1	7	7	7	7	0	0
Volume	30g	30g	30g	30g	30g	30g	30g	30g	1^	1^
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082	IC Anions - 300.0 (Nitrate)	NO2/NO3 - 353.2 (Nitrogen in Nitrite and Nitrate)	~	--

Sample No.	Matrix *	Sample Date	Sample Time										
J11JJ6	SOIL	3-28-06	14:00	3	1	1		1	1	1	1		
J11JJ7			16:19	1	3	3		1	1	1	1		
J11JJ8			15:20	1	1	1		3	3	1	1		
J11JJ9			15:00	1	1	1		1	1	3	3		
J11JK0			13:00	3	3	1		1	1	1	1		

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth M Tepper		CH2M Hill →	
Elizabeth M Tepper CH2M	3-29-06 11:30	Fed Ex	3-29-06 11:30
Fed Ex	3-30-06 0900	[illegible]	3-30-06 0900
Fed Ex	3-30-06 0900	[illegible]	3-30-06 0900
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

These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^~ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc)

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)

000017

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0274		
VALIDATOR: TLI		LAB: LLI		DATE: 7/6/06	
			SDG: K0274		

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
J11JJ6 J11JJ7 J11JJ8 J11JJ9 J11JK0
Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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

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

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

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

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

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

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

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

Comments: _____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FB

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

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

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

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

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

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

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

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

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

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

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

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

Comments: chr VI - MS - 479.0 - J all no PDS

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: nitrate >2x — J all

Sample temp not assessed per WCH

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/05/06

CLIENT: TNUHANFORD RC-051 K0274

LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	06LICC39-MB1	Nitrate by IC	2.50 u	MG/KG	2.50	1.0
BLANK10	06LVI019-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0
BLANK10	06LN3022-MB1	Nitrate Nitrite	0.20 u	MG/KG	0.20	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/05/06

CLIENT: TNUHANFORD RC-051 K0274

LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	J11JJ7	Soluble Chromium VI	1.7	0.20u	4.0	47.1	1.0
-004	J11JJ9	Nitrate by IC	63.7	14.2	50.0	98.9	1.0
		Nitrate Nitrite	7.5	3.4	5.0	81.5	1.0
BLANK10	06LICC39-MB1	Nitrate by IC	49.3	2.50u	50.0	98.6	1.0
BLANK10	06LVI019-MB1	Soluble Chromium VI	4.0	0.20u	4.0	99.9	1.0
		Insoluble Chromium VI	1120	0.20u	1070	105.2	100
BLANK10	06LN3022-MB1	Nitrate Nitrite	5.0	0.20u	5.0	99.8	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/05/06

CLIENT: TNUHANFORD RC-051 K0274

LVL LOT #: 0603L638

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-002REP	J11JJ7	Chromium VI	0.20u	0.20u	NC	1.0
-004REP	J11JJ9	Nitrate by IC	14.2	12.1	16.6	1.0
		Nitrate Nitrite	3.4	2.7	21.2	1.0