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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 MJP 02/21/06
INITIAL/DATE

SDG K0102 **SAF-RC-051**

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Date: 8 February 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/PAH - Data Package No. K0102-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0102 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
J10DN0	11/8/05	Soil	C	See note 1
J10DN1	11/8/05	Soil	C	See note 1
J10DN2	11/8/05	Soil	C	See note 1
J10DN3	11/8/05	Soil	C	See note 1
J10DN4	11/8/05	Soil	C	See note 1

1 – Semivolatiles by 8270C & polyaromatic hydrocarbons by 8310.

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 Water Sampling Plan (DOE/RL-2005, 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 and analyzed within 14 days for PAH.

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".

Due to the samples not being properly preserved (cooler temperature 8-9°C) but analyzed within the holding time, all analytes were qualified as estimates and flagged "J".

- **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 matrix spike and matrix spike duplicate recoveries outside QC limits (43% and 45%), all nitrobenzene results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (53% and 52%), all isophorone results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (49%), all 2-nitrophenol results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (42% and 43%), all 2,4-dimethylphenol results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (44% and 46%), all 1,2,4-trichlorobenzene results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (56% and 56%), all 2-methylnaphthalene results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (54% and 52%), all carbazole 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.

All 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. Two semivolatile analytes (pentachlorophenol & 2,4,5-trichlorophenol) exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data package No. K0102 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 samples not being properly preserved (cooler temperature 8-9°C) but analyzed within the holding time, all analytes were qualified as estimates and flagged "J".

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 matrix spike and matrix spike duplicate recoveries outside QC limits (43% and 45%), all nitrobenzene results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (53% and 52%), all isophorone results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (49%), all 2-nitrophenol results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (42% and 43%), all 2,4-dimethylphenol results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (44% and 46%), all 1,2,4-trichlorobenzene results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (56% and 56%), all 2-methylnaphthalene results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (54% and 52%), all carbazole results were qualified as estimates and flagged "J".

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

REFERENCES

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

DOE/RL-2005, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Water Sampling 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/PAH DATA QUALIFICATION SUMMARY*

SDG: K0102	REVIEWER: Project RCBRA TLL		PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	All	Sample preservation
Bis(2-ethylhexyl)phthalate	U at RQL	All	Blank contamination
Nitrobenzene Isophorone 2-nitrophenol 2,4-dimethylphenol 1,2,4-trichlorobenzene 2-methylnaphthalene Carbazole	J	All	MS, MSD 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

SEMIVOLATILE/PAH ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI	SDG: K0102										
Sample Number		J10DN0		J10DN1		J10DN2		J10DN3		J10DN4	
Remarks											
Sample Date		11/8/05		11/8/05		11/8/05		11/8/05		11/8/05	
Extraction Date		11/15/05		11/15/05		11/15/05		11/15/05		11/15/05	
Analysis Date		11/16/05		11/22/05		11/18/05		11/22/05		11/22/05	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
bis(2-Chloroethyl)ether		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2-Chlorophenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
1,3-Dichlorobenzene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
1,4-Dichlorobenzene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
1,2-Dichlorobenzene	650	330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2-Methylphenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,2'-oxybis(1-chloropropane)		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
3 and/or 4-Methylphenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
N-Nitroso-di-n-propylamine		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Hexachloroethane		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Nitrobenzene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Isophorone		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2-Nitrophenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,4-Dimethylphenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
bis(2-Chloroethoxy)methane		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,4-Dichlorophenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
1,2,4-Trichlorobenzene	650	330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Naphthalene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
4-Chloroaniline		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Hexachlorobutadiene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
4-Chloro-3-methylphenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2-Methylnaphthalene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Hexachlorocyclopentadiene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,4,6-Trichlorophenol	330	330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,4,5-Trichlorophenol	330	840	UJ	830	UJ	830	UJ	830	UJ	830	UJ
2-Chloronaphthalene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2-Nitroaniline		840	UJ	830	UJ	830	UJ	830	UJ	830	UJ
Dimethylphthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Acenaphthylene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,6-Dinitrotoluene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results.

All other qualifiers shown were applied during validation.

* - RQL exceeded

SEMIVOLATILE/PAH ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI	SDG: K0102										
Sample Number		J10DN0		J10DN1		J10DN2		J10DN3		J10DN4	
Remarks											
Sample Date		11/8/05		11/8/05		11/8/05		11/8/05		11/8/05	
Extraction Date		11/15/05		11/15/05		11/15/05		11/15/05		11/15/05	
Analysis Date		11/16/05		11/22/05		11/18/05		11/22/05		11/22/05	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline		840	UJ	830	UJ	830	UJ	830	UJ	830	UJ
Acenaphthene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,4-Dinitrophenol		840	UJ	830	UJ	830	UJ	830	UJ	830	UJ
4-Nitrophenol		840	UJ	830	UJ	830	UJ	830	UJ	830	UJ
Dibenzofuran	330	330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,4-Dinitrotoluene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Diethylphthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
4-Chlorophenyl-phenyl ether		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Fluorene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
4-Nitroaniline		840	UJ	830	UJ	830	UJ	830	UJ	830	UJ
4,6-Dinitro-2-methylphenol		840	UJ	830	UJ	830	UJ	830	UJ	830	UJ
N-Nitrosodiphenylamine		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
4-Bromophenyl-phenyl ether		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Hexachlorobenzene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Pentachlorophenol	330	840	UJ	830	UJ	830	UJ	830	UJ	830	UJ
Phenanthrene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Anthracene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Carbazole		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Di-n-butylphthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Fluoranthene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Pyrene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Butylbenzylphthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
3,3'-Dichlorobenzidine		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Benzo(a)anthracene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Chrysene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
bis(2-Ethylhexyl)phthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Di-n-octylphthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Benzo(b)fluoranthene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Benzo(k)fluoranthene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Benzo(a)pyrene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Indeno(1,2,3-cd)pyrene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Dibenz(a,h)anthracene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Benzo(g,h,i)perylene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results.

All other qualifiers shown were applied during validation.

* - RQL exceeded

SEMIVOLATILE/PAH ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI	SDG: K0102*										
Sample Number		J10DN0		J10DN1		J10DN2		J10DN3		J10DN4	
Remarks											
Sample Date		11/8/05		11/8/05		11/8/05		11/8/05		11/8/05	
Extraction Date		11/15/05		11/15/05		11/15/05		11/15/05		11/15/05	
Analysis Date		11/16/05		11/22/05		11/18/05		11/22/05		11/22/05	
PAH by 8310	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Naphthalene	100	32.7	UJ	33.1	UJ	33.3	UJ	33.4	UJ	16	J
Acenaphthylene	100	32.7	UJ	33.1	UJ	33.3	UJ	33.4	UJ	33.4	UJ
Acenaphthene	100	32.7	UJ	33.1	UJ	33.3	UJ	33.4	UJ	33.4	UJ
Fluorene	30	3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Phenanthrene	50	3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Anthracene	50	3.6	J	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Fluoranthene	50	6.53	UJ	6.62	UJ	6.66	UJ	6.68	UJ	6.68	UJ
Pyrene	50	6.53	UJ	6.62	UJ	6.66	UJ	6.68	UJ	6.68	UJ
Benzo(a)anthracene		3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Chrysene	100	3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Benzo(b)fluoranthene		3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Benzo(k)fluoranthene	15	3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Benzo(a)pyrene	15	3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Dibenzo(a,h)anthracene	30	3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Benzo(ghi)perylene	30	3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ
Indeno(1,2,3-cd)pyrene	30	3.27	UJ	3.31	UJ	3.33	UJ	3.34	UJ	3.34	UJ

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results.

All other qualifiers shown were applied during validation.

* - RQL exceeded

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, HSL List

Report Date: 11/28/05 12:16

RFW Batch Number: 0511L690 Client: TNUHANFORD RC-051 K0102 Work Order: 11343606001 Page: 1a

	Cust ID:	J10DN0	J10DN1	J10DN2	J10DN2	J10DN2	J10DN3
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 Recovery	Nitrobenzene-d5	53 %	63 %	58 %	43 %	46 %	55 %
	2-Fluorobiphenyl	53 %	63 %	58 %	80 %	78 %	62 %
	Terphenyl-d14	68 %	81 %	82 %	74 %	73 %	88 %
	Phenol-d5	69 %	74 %	66 %	73 %	68 %	58 %
	2-Fluorophenol	60 %	67 %	53 %	60 %	64 %	52 %
	2,4,6-Tribromophenol	45 %	74 %	70 %	83 %	77 %	66 %
		fl	fl	fl	fl	fl	fl
Phenol		330 U J	330 U J	330 U J	75 %	70 %	330 U J
bis(2-Chloroethyl)ether		330 U	330 U	330 U	68 %	71 %	330 U
2-Chlorophenol		330 U	330 U	330 U	72 %	77 %	330 U
1,3-Dichlorobenzene		330 U	330 U	330 U	66 %	71 %	330 U
1,4-Dichlorobenzene		330 U	330 U	330 U	65 %	69 %	330 U
1,2-Dichlorobenzene		330 U	330 U	330 U	68 %	72 %	330 U
2-Methylphenol		330 U	330 U	330 U	76 %	79 %	330 U
2,2'-oxybis(1-Chloropropane)		330 U	330 U	330 U	66 %	69 %	330 U
4-Methylphenol		330 U	330 U	330 U	76 %	78 %	330 U
N-Nitroso-di-n-propylamine		330 U	330 U	330 U	79 %	75 %	330 U
Hexachloroethane		330 U	330 U	330 U	63 %	65 %	330 U
Nitrobenzene		330 U	330 U	330 U	43 * %	45 * %	330 U
Isophorone		330 U	330 U	330 U	53 * %	52 * %	330 U
2-Nitrophenol		330 U	330 U	330 U	49 * %	52 %	330 U
2,4-Dimethylphenol		330 U	330 U	330 U	42 * %	43 * %	330 U
bis(2-Chloroethoxy)methane		330 U	330 U	330 U	49 %	49 %	330 U
2,4-Dichlorophenol		330 U	330 U	330 U	51 %	54 %	330 U
1,2,4-Trichlorobenzene		330 U	330 U	330 U	44 * %	46 * %	330 U
Naphthalene		330 U	330 U	330 U	48 %	50 %	330 U
4-Chloroaniline		330 U	330 U	330 U	70 %	71 %	330 U
Hexachlorobutadiene		330 U	330 U	330 U	44 %	46 %	330 U
4-Chloro-3-methylphenol		330 U	330 U	330 U	63 %	64 %	330 U
2-Methylnaphthalene		330 U	330 U	330 U	56 * %	56 * %	330 U
Hexachlorocyclopentadiene		330 U	330 U	330 U	40 %	41 %	330 U
2,4,6-Trichlorophenol		330 U	330 U	330 U	77 %	76 %	330 U
2,4,5-Trichlorophenol		840 U	830 U	830 U	86 %	84 %	830 U

*= Outside of EPA CLP QC limits.

R 2/8/06

000015

RFW Batch Number: 0511L690 Client: TNUHANFORD RC-051 K0102 Work Order: 11343606001 Page: 1b

Cust ID:	J10DN0		J10DN1		J10DN2		J10DN2		J10DN2		J10DN3	
RFW#:	001		002		003		003 MS		003 MSD		004	
2-Chloronaphthalene	330	U J	330	U J	330	U J	84	%	80	%	330	U J
2-Nitroaniline	840	U	830	U	830	U	89	%	84	%	830	U
Dimethylphthalate	330	U	330	U	330	U	94	%	79	%	330	U
Acenaphthylene	330	U	330	U	330	U	77	%	73	%	330	U
2,6-Dinitrotoluene	330	U	330	U	330	U	86	%	80	%	330	U
3-Nitroaniline	840	U	830	U	830	U	106	%	103	%	830	U
Acenaphthene	330	U	330	U	330	U	75	%	72	%	330	U
2,4-Dinitrophenol	840	U	830	U	830	U	28	%	37	%	830	U
4-Nitrophenol	840	U	830	U	830	U	93	%	88	%	830	U
Dibenzofuran	330	U	330	U	330	U	77	%	83	%	330	U
2,4-Dinitrotoluene	330	U	330	U	330	U	87	%	95	%	330	U
Diethylphthalate	330	U	330	U	330	U	87	%	79	%	330	U
4-Chlorophenyl-phenylether	330	U	330	U	330	U	81	%	72	%	330	U
Fluorene	330	U	330	U	330	U	88	%	73	%	330	U
4-Nitroaniline	840	U	830	U	830	U	71	%	66	%	830	U
4,6-Dinitro-2-methylphenol	840	U	830	U	830	U	81	%	74	%	830	U
N-Nitrosodiphenylamine (1)	330	U	330	U	330	U	60	%	58	%	330	U
4-Bromophenyl-phenylether	330	U	330	U	330	U	67	%	65	%	330	U
Hexachlorobenzene	330	U	330	U	330	U	78	%	76	%	330	U
Pentachlorophenol	840	U	830	U	830	U	90	%	89	%	830	U
Phenanthrene	330	U	330	U	330	U	75	%	74	%	330	U
Anthracene	330	U	330	U	330	U	74	%	74	%	330	U
Carbazole	330	U	330	U	330	U	54 *	%	52 *	%	330	U
Di-n-butylphthalate	330	U	330	U	330	U	71	%	71	%	20	J
Fluoranthene	330	U	330	U	330	U	72	%	64	%	330	U
Pyrene	330	U	330	U	330	U	69	%	71	%	330	U
Butylbenzylphthalate	330	U	330	U	330	U	69	%	68	%	330	U
3,3'-Dichlorobenzidine	330	U	330	U	330	U	68	%	73	%	330	U
Benzo(a)anthracene	330	U	330	U	330	U	81	%	79	%	330	U
Chrysene	330	U	330	U	330	U	81	%	81	%	330	U
bis(2-Ethylhexyl)phthalate	330	~~110~~ 170 JB U	330	~~230~~ 170 JB U	330	~~110~~ 170 JB U	82	%	76	%	330	~~170~~ 170 JB U
Di-n-octyl phthalate	330	U	330	U	330	U	88	%	75	%	330	U
Benzo(b)fluoranthene	330	U	330	U	330	U	84	%	67	%	330	U
Benzo(k)fluoranthene	330	U	330	U	330	U	79	%	67	%	330	U
Benzo(a)pyrene	330	U	330	U	330	U	81	%	77	%	330	U
Indeno(1,2,3-cd)pyrene	330	U	330	U	330	U	95	%	100	%	330	U
Dibenz(a,h)anthracene	330	U	330	U	330	U	118	%	115	%	330	U
Benzo(g,h,i)perylene	330	U	330	U	330	U	84	%	88	%	330	U

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

2/8/01

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Lionville Laboratory, Inc.
Semivolatiles by GC/MS, HSL List
Report Date: 11/28/05 12:16

RFW Batch Number: 0511L690 Client: TNUHANFORD RC-051 K0102 Work Order: 11343606001 Page: 2a

	Cust ID:	J10DN4		SBLKQL		SBLKQL BS	
Sample Information	RFW#:	005		05LE0902-MB1		05LE0902-MB1	
	Matrix:	SOIL		SOIL		SOIL	
	D.F.:	1.00		1.00		1.00	
	Units:	ug/Kg		ug/Kg		ug/Kg	
Surrogate Recovery	Nitrobenzene-d5	59	%	64	%	73	%
	2-Fluorobiphenyl	67	%	61	%	71	%
	Terphenyl-d14	87	%	89	%	77	%
	Phenol-d5	64	%	77	%	73	%
	2-Fluorophenol	56	%	69	%	68	%
	2,4,6-Tribromophenol	74	%	58	%	80	%
Phenol		330	U J	330	U	81	%
bis(2-Chloroethyl)ether		330	U	330	U	83	%
2-Chlorophenol		330	U	330	U	79	%
1,3-Dichlorobenzene		330	U	330	U	71	%
1,4-Dichlorobenzene		330	U	330	U	70	%
1,2-Dichlorobenzene		330	U	330	U	74	%
2-Methylphenol		330	U	330	U	80	%
2,2'-oxybis(1-Chloropropane)		330	U	330	U	80	%
4-Methylphenol		330	U	330	U	83	%
N-Nitroso-di-n-propylamine		330	U	330	U	86	%
Hexachloroethane		330	U	330	U	67	%
Nitrobenzene		330	U	330	U	77	%
Isophorone		330	U	330	U	89	%
2-Nitrophenol		330	U	330	U	78	%
2,4-Dimethylphenol		330	U	330	U	66	%
bis(2-Chloroethoxy)methane		330	U	330	U	82	%
2,4-Dichlorophenol		330	U	330	U	80	%
1,2,4-Trichlorobenzene		330	U	330	U	72	%
Naphthalene		330	U	330	U	72	%
4-Chloroaniline		330	U	330	U	89	%
Hexachlorobutadiene		330	U	330	U	77	%
4-Chloro-3-methylphenol		330	U	330	U	79	%
2-Methylnaphthalene		330	U	330	U	77	%
Hexachlorocyclopentadiene		330	U	330	U	48	%
2,4,6-Trichlorophenol		330	U	330	U	80	%
2,4,5-Trichlorophenol		840	U	830	U	82	%

*= Outside of EPA CLP QC limits.

R 2/8/06

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Cust ID:	J10DN4		SBLKQL		SBLKQL BS	
RFW#:	005		05LE0902-MB1		05LE0902-MB1	
2-Chloronaphthalene	330	U	330	U	76	%
2-Nitroaniline	840	U	830	U	84	%
Dimethylphthalate	330	U	330	U	82	%
Acenaphthylene	330	U	330	U	77	%
2,6-Dinitrotoluene	330	U	330	U	82	%
3-Nitroaniline	840	U	830	U	94	%
Acenaphthene	330	U	330	U	76	%
2,4-Dinitrophenol	840	U	830	U	30	%
4-Nitrophenol	840	U	830	U	81	%
Dibenzofuran	330	U	330	U	77	%
2,4-Dinitrotoluene	330	U	330	U	84	%
Diethylphthalate	330	U	330	U	81	%
4-Chlorophenyl-phenylether	330	U	330	U	77	%
Fluorene	330	U	330	U	78	%
4-Nitroaniline	840	U	830	U	86	%
4,6-Dinitro-2-methylphenol	840	U	830	U	64	%
N-Nitrosodiphenylamine (1)	330	U	330	U	70	%
4-Bromophenyl-phenylether	330	U	330	U	74	%
Hexachlorobenzene	330	U	330	U	77	%
Pentachlorophenol	840	U	830	U	87	%
Phenanthrene	330	U	330	U	79	%
Anthracene	330	U	330	U	81	%
Carbazole	330	U	330	U	86	%
Di-n-butylphthalate	22	J	330	U	90	%
Fluoranthene	330	U	330	U	90	%
Pyrene	330	U	330	U	76	%
Butylbenzylphthalate	330	U	330	U	87	%
3,3'-Dichlorobenzidine	330	U	330	U	103	%
Benzo(a)anthracene	330	U	330	U	84	%
Chrysene	330	U	330	U	78	%
bis(2-Ethylhexyl)phthalate	330 ~~160~~ 2/5u JB U		44	J	100	%
Di-n-octyl phthalate	330	U	330	U	130	%
Benzo(b)fluoranthene	330	U	330	U	84	%
Benzo(k)fluoranthene	330	U	330	U	86	%
Benzo(a)pyrene	330	U	330	U	76	%
Indeno(1,2,3-cd)pyrene	330	U	330	U	61	%
Dibenz(a,h)anthracene	330	U	330	U	59	%
Benzo(g,h,i)perylene	330	U	330	U	57	%

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

J

2/8/02

000018

PAH'S by HPLC / Method 8310

Report Date: 12/21/05 13:20

RFW Batch Number: 0511L690 Client: TNUHANFORD RC-051 K0102 Work Order: 11343606001 Page: 1

	Cust ID:	J10DN0	J10DN1	J10DN2	J10DN2	J10DN2	J10DN3
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
Triphenylene		106 %	97 %	109 %	103 %	107 %	100 %
		fl	fl	fl	fl	fl	fl
Naphthalene		32.7 U J	33.1 U J	33.3 U J	115 %	110 %	33.4 U J
Acenaphthylene		32.7 U	33.1 U	33.3 U	88 %	86 %	33.4 U
Acenaphthene		32.7 U	33.1 U	33.3 U	123 %	123 %	33.4 U
Fluorene		3.27 U	3.31 U	3.33 U	97 %	100 %	3.34 U
Phenanthrene		3.27 U	3.31 U	3.33 U	102 %	103 %	3.34 U
Anthracene		3.6	3.31 U	3.33 U	111 %	121 %	3.34 U
Fluoranthene		6.53 U	6.62 U	6.66 U	107 %	102 %	6.68 U
Pyrene		6.53 U	6.62 U	6.66 U	110 %	111 %	6.68 U
Benzo(a)anthracene		3.27 U	3.31 U	3.33 U	105 %	107 %	3.34 U
Chrysene		3.27 U	3.31 U	3.33 U	102 %	105 %	3.34 U
Benzo(b)fluoranthrene		3.27 U	3.31 U	3.33 U	101 %	103 %	3.34 U
Benzo(k)fluoranthrene		3.27 U	3.31 U	3.33 U	105 %	108 %	3.34 U
Benzo(a)pyrene		3.27 U	3.31 U	3.33 U	102 %	104 %	3.34 U
Dibenzo(a,h)anthracene		3.27 U	3.31 U	3.33 U	100 %	103 %	3.34 U
Benzo(ghi)perylene		3.27 U	3.31 U	3.33 U	100 %	103 %	3.34 U
Indeno(1,2,3-cd)pyrene		3.27 U	3.31 U	3.33 U	103 %	107 %	3.34 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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K 2/8/06

Lionville Laboratory, Inc.
PAH'S by HPLC / Method 8310

Report Date: 12/21/05 13:20

RFW Batch Number: 0511L690 Client: TNUHANFORD RC-051 K0102 Work Order: 11343606001 Page: 2

000000005

	Cust ID:	J10DN4	BLK	BLK BS
Sample Information	RFW#:	005	05LE0899-MB1	05LE0899-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg

Triphenylene	105	%	fl	106	%	fl	104	%	fl			fl			fl			fl	
Naphthalene	16		J	33.3	U		113	%											
Acenaphthylene	33.4	U		33.3	U		75	%											
Acenaphthene	33.4	U		33.3	U		105	%											
Fluorene	3.34	U		3.33	U		100	%											
Phenanthrene	3.34	U		3.33	U		102	%											
Anthracene	3.34	U		3.33	U		105	%											
Fluoranthene	6.68	U		6.67	U		100	%											
Pyrene	6.68	U		6.67	U		103	%											
Benzo(a)anthracene	3.34	U		3.33	U		104	%											
Chrysene	3.34	U		3.33	U		107	%											
Benzo(b)fluoranthrene	3.34	U		3.33	U		100	%											
Benzo(k)fluoranthrene	3.34	U		3.33	U		104	%											
Benzo(a)pyrene	3.34	U		3.33	U		99	%											
Dibenzo(a,h)anthracene	3.34	U		3.33	U		99	%											
Benzo(ghi)perylene	3.34	U		3.33	U		99	%											
Indeno(1,2,3-cd)pyrene	3.34	U		3.33	U		99	%											

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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2/8/06

2/12/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0511L690
SDG/SAF # K0102/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 11-10-2005

PAH

Five (5) soil samples were collected on 11-08-2005.

The samples and their associated QC samples were extracted on 11-14-2005 and analyzed according to criteria set for the in Lionville Laboratory SOPs based on SW846, 3rd Edition for Polyaromatic Hydrocarbons on 11-17-2005. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8310.

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

1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.
2. The samples were extracted and analyzed within required holding time.
3. The method blank was below the reporting limits for all target compounds.
4. All obtainable surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. The initial calibrations associated with this data set were within acceptance criteria.
7. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
8. 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.
9. 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.

Carol Schenkel
for Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

12/22/05
Date

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kim\r:\group\data\pah\tnu hanford\0511-690.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 15 pages.

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 #: 0511L690
SDG/SAF # K0102/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 11-10-2005

SEMIVOLATILE

Five (5) soil samples were collected on 11-08-2005.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 11-15-2005 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 11-16,18,22-2005.

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

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. Non-target compounds were detected in the samples.
4. All surrogate recoveries were within acceptance criteria.
5. Thirteen (13) of one hundred twenty-eight (128) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were outside acceptance criteria.
7. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than the CRQL.
8. Internal standard area criteria were not met for J10DN2 MS and J10DN2 MSD. The initial sample analysis fulfills the reanalysis requirement of samples J10DN2 MS and J10DN2 MSD. The GC/MS instrument was also inspected for possible malfunction and was judged to be functioning properly.
9. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
10. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
11. I certify, that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data, contained in this hard-copy data package, has been authorized, by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

11/21/05
Date

soin\gorup\data\bna\tnu-hanford\0511-690.doc
The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 0 pages.

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 05M5378

Initiator: Jim Daley
Date: 25 Nov 2005
Client: TNU

Batch: 05M2690
Samples: MS & MSD
Method: SW846/MCAWW/CLP/

Parameter: BNA
Matrix: Soil
Prep Batch: 05LE902

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)

Several spike Recoveries slightly low

2. Known or Probable Causes(s)

Blank spike Recoveries ok

3. Discussion and Proposed Action Other Description:

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

NARRATE

4. Project Manager Instructions...signature/date: 11/25/05

__ 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: 11/29/05 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-051-5	Page 1 of 1

Collector: L. COLLOM	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: PIT 23		SAF No.: RC-051
Ice Chest No.: 5 gal Bucket	Field Logbook No.: EL-1596	COA: BESRAS6520	Method of Shipment: ~~FED EX~~ Oak Harbor Freight / Giant
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060151		Bill of Lading/Air Bill No.: See DSRC

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

SAMPLE ANALYSIS											
Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	500g	30g	30g	30g	30g	30g	30g	30g		
	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

Sample No.	Matrix *	Sample Date	Sample Time									
J10DN0	SOIL	11-2-05	1005									
J10DN1	SOIL		1105									
J10DN2	SOIL		1220									
J10DN3	SOIL		1330									
J10DN4	SOIL		1440									

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From	Lorion Collom	11-2-05 1540
Received By/Stored In	3725 BLDG. SIGALE Nolle	11 2 05 1540
Relinquished By/Removed From	3725 Bldg Johnson	11/3/05 0700
Received By/Stored In	Dave Stringer	11/3/05 0900
Relinquished By/Removed From	Dave Stringer	11/3/05 0900
Received By/Stored In	Oak Harbor Freight	
Relinquished By/Removed From		
Received By/Stored In	Gerald Terpe	11/4/05 14:45
Relinquished By/Removed From		11/10/05 0900
Received By/Stored In		11-10-05 0900
Relinquished By/Removed From		
Received By/Stored In		

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(1) Gamma Spec - (Full List) (Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228)
(2) Strontium-89,90 -- Total Sr; Isotopic Thorium (Thorium-232); Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238); Isotopic Plutonium
(3) 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

RHI-FE-011 (08/29/2005)

000000025

00000014

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-5	Page 1 of 1

Collector L. COLLOM	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 PIT 23		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment FED EX
Shipped To LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No.

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	NA	NA	7	7	7	7	7	7		
Volume	500g	30g	30g I-L	30g M-O	30g A-C	30g P-R	30g D-F	30g G-I		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

000026

Sample No.	Matrix *	Sample Date	Sample Time										
J10DN0	SOIL	11-8-05	9:45			3	1	1	1	1	1		
J10DN1	SOIL	11-8-05	12:00			1	3	1	1	1	3		
J10DN2	SOIL	11-8-05	8:05			1	1	3	3	1	1		
J10DN3	SOIL	11-8-05	9:15			1	1	1	1	3	1		
J10DN4	SOIL	11-8-05	14:00			1	1	1	1	1	1		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 12:00	Received By/Stored In	Date/Time
Elizabeth M Tolme 11-9-05			
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Ed Ec 11/10/05 0900		11/10/05 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
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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(1) Gamma Spec - (Full List) {Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228}
(2) Strontium-89,90 -- Total Sr; Isotopic Thorium (Thorium-232); Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238); Isotopic Plutonium
(3) 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}

See attached sample weights & ID's
ET 11/9/05

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

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

Lionville Laboratory Incorporated

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: TNU HANFORD

Date: 11/10/05

Purchase Order / Project# / SAF# / SOW# / Release #: RC-051

LvLI Batch # : 05IIL690

Sample Custodian:

NOTE: EXPLAIN ALL DISCREPANCIES

1.	Samples Hand Delivered or Shipped	Carrier FED EX		Airbill# 6595 0628 8725
2.	Custody seals on coolers or shipping container intact, signed and dated?	☑ Yes	☐ No	☐ No Seals Comments
3.	Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	
4.	All expected paperwork received (coc and other client specific information) sealed in plastic bag and easily accessible?	☑ Yes	☐ No	
5.	Samples received cooled or ambient?	Temp 8-9 °C		Cooler # N/A
6.	Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☑ No Seals
7.	coc signed and dated?	☑ Yes	☐ No	
8.	Sample containers are intact?	☑ Yes	☐ No	
9.	All samples on coc received? All samples received on coc?	☑ Yes	☐ No	
10.	All sample label information matches coc?	☑ Yes	☐ No	
11.	Samples properly preserved?	☑ Yes	☐ No	
12.	Samples received within hold times? Short holds taken to wet lab?	☑ Yes	☐ No	
13.	VOA, TOC, TOX free of headspace?	☐ Yes	☐ No	☑ N/A
14.	QC stickers placed on bottles designated by client?	☑ Yes	☐ No	☐ N/A
15.	Shipment meets LvLI Sample Acceptance Policy? (Identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	
16.	Project Manager contacted concerning discrepancies? name/date (or samples outside criteria)	☑ Yes	☐ No	☐ No Discrepancies

SR-002-B

LVLI LIONVILLE LABORATORY INC.

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0102		
VALIDATOR: TLI		LAB: LLI		DATE: 2/3/00	
			SDG: K0102		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270	8310	SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J10DN0	J10DN1	J10DN2	J10DN3	J10DN4	
					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: bis(2ethylhexyl) phthalate U at RQL no FB

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

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

Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A

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

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

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

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

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

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

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

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

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

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

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

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

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

Comments: 7 MS and or MSD out - 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:

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: Cooler temp 8-9° C – J all

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: ~~[illegible]~~ 2 SU ovm

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: 8 February 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. K0102-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0102 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	Matrix	Validation Level	Date
J10DN0	11/8/05	Soil	C	See note 1
J10DN1	11/8/05	Soil	C	See note 1
J10DN2	11/8/05	Soil	C	See note 1
J10DN3	11/8/05	Soil	C	See note 1
J10DN4	11/8/05	Soil	C	See note 1

1 - ICP metals (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 Water Sampling Plan (DOE/RL-2005, 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.

Due to method blank contamination, the tin results in all samples were qualified as an estimate and flagged "UJ".

Due to method blank contamination, the molybdedum result in samples J10DN0, J10DN1 and J10DN2 were qualified as estimates and flagged "UJ".

All other 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 the lack of a matrix spike analysis, all results in samples J10DN1, J10DN2, J10DN3 and J10DN4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (39%), the antimony result in sample J10DN0 was qualified as an estimate 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.

Due to the lack of a duplicate analysis, all results in samples J10DN1, J10DN2, J10DN3 and J10DN4 were qualified as estimates and flagged "J".

All other 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. K0102 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

Due to method blank contamination, the tin result in all samples were qualified as an estimate and flagged "UJ".

Due to method blank contamination, the molybdedum result in samples J10DN0, J10DN1 and J10DN2 were qualified as estimates and flagged "UJ".

Due to the lack of a matrix spike analysis, all results in samples J10DN1, J10DN2, J10DN3 and J10DN4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (39%), the antimony result in sample J10DN0 was qualified as an estimate and flagged "J".

Due to the lack of a duplicate analysis, all results in samples J10DN1, J10DN2, J10DN3 and J10DN4 were qualified as estimates and flagged "J".

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

REFERENCES

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

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

INORGANIC DATA QUALIFICATION SUMMARY*

SDG: K0102	REVIEWER: TLK	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Tin	UJ	All	Blank contamination
Molybdenum	UJ	J10DN0, J10DN1, J10DN2	Blank contamination
All	J	J10DN1, J10DN2, J10DN3, J10DN4	No MS or duplicate analysis
Antimony	J	J10DN0	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: K0102

Sample Number		J10DN0		J10DN1		J10DN2		J10DN3		J10DN4	
Remarks											
Sample Date		11/8/05		11/8/05		11/8/05		11/8/05		11/8/05	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	1	0.07	U	0.07	UJ	0.07	UJ	0.07	UJ	0.07	UJ
Aluminum		4450		4010	J	3960	J	4900	J	4730	J
Arsenic	10	2.3		2.3	J	2.1	J	2.2	J	2.1	J
Boron		1.4		1.1	J	1.0	J	1.3	J	1.1	J
Barium	2	51.6		50.1	J	48.6	J	55.5	J	51.5	J
Beryllium		0.35		0.005	UJ	0.005	UJ	0.77	J	0.68	J
Bismuth		0.39		0.32	UJ	0.62	J	0.32	UJ	0.29	UJ
Calcium		5720		5010	J	5350	J	5020	J	4900	J
Cadmium	0.5	0.04	U	0.06	J	0.04	UJ	0.05	J	0.03	UJ
Cobalt		8.4		7.5	J	8.2	J	9.0	J	8.4	J
Chromium		5.6		4.5	J	4.6	J	5.3	J	5.3	J
Copper	1	16.7		15.1	J	15.2	J	17.0	J	16.0	J
Iron		20900		18900	J	20700	J	24500	J	23300	J
Potassium		855		848	J	779	J	852	J	868	J
Lithium	5	4.5		4.1	J	4.1	J	4.7	J	4.6	J
Magnesium		3850		3500	J	3660	J	4100	J	4010	J
Manganese		305		288	J	305	J	333	J	321	J
Molybdenum		0.32	UJ	0.10	UJ	0.19	UJ	0.19	J	0.31	J
Sodium		153		116	J	121	J	188	J	178	J
Nickel		8.6		7.4	J	7.7	J	8.3	J	7.9	J
Phosphorous	5	1290		1110	J	1170	J	1210	J	1150	J
Lead	5	4.3		4.0	J	4.1	J	5.2	J	4.2	J
Antimony		0.21	UJ	0.21	UJ	0.20	UJ	0.26	J	0.30	J
Selenium		0.19	U	0.19	UJ	0.18	UJ	0.19	UJ	0.17	UJ
Silicon		314		284	J	268	J	272	J	255	J
Tin		0.79	UJ	0.84	UJ	0.89	UJ	0.80	UJ	0.84	UJ
Strontium		20.5		18.2	J	18.2	J	20.0	J	19.6	J
Thallium		0.34	U	0.34	UJ	0.33	UJ	0.34	UJ	0.30	UJ
Uranium	30	1.1	U	1.1	UJ	1.1	UJ	1.1	UJ	0.97	UJ
Vanadium		46.1		39.8	J	46.5	J	63.5	J	58.4	J
Zinc	1	39.9		36.1	J	38.5	J	46.3	J	43.4	J

000010

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

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102

LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J10DN0	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	4450	MG/KG	0.97	1.0
		Arsenic, Total	2.3	MG/KG	0.18	1.0
		Boron, Total	1.4	MG/KG	0.14	1.0
		Barium, Total	51.6	MG/KG	0.01	1.0
		Beryllium, Total	0.35	MG/KG	0.005	1.0
		Bismuth, Total	0.39	MG/KG	0.32	1.0
		Calcium, Total	5720	MG/KG	0.63	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Cobalt, Total	8.4	MG/KG	0.06	1.0
		Chromium, Total	5.6	MG/KG	0.08	1.0
		Copper, Total	16.7	MG/KG	0.06	1.0
		Iron, Total	20900	MG/KG	1.7	1.0
		Potassium, Total	855	MG/KG	2.9	1.0
		Lithium, Total	4.5	MG/KG	0.02	1.0
		Magnesium, Total	3850	MG/KG	0.71	1.0
		Manganese, Total	305	MG/KG	0.01	1.0
		Molybdenum, Total	0.32 UJ	MG/KG	0.07	1.0
		Sodium, Total	153	MG/KG	0.09	1.0
		Nickel, Total	8.6	MG/KG	0.07	1.0
		Phosphorus, Total	1290	MG/KG	2.6	6.0
		Lead, Total	4.3	MG/KG	0.16	1.0
		Antimony, Total	0.21 u J	MG/KG	0.21	1.0
		Selenium, Total	0.19 u	MG/KG	0.19	1.0
		Silicon, Total	214	MG/KG	0.43	1.0
		Tin, Total	0.79 UJ	MG/KG	0.28	1.0
		Strontium, Total	20.5	MG/KG	0.005	1.0
		Thallium, Total	0.34 u	MG/KG	0.34	1.0
		Uranium, Total	1.1 u	MG/KG	1.1	1.0
		Vanadium, Total	46.1	MG/KG	0.05	1.0
		Zinc, Total	39.9	MG/KG	0.03	1.0

PL
2/8/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	J10DN1	Silver, Total	0.07 u J	MG/KG	0.07	1.0
		Aluminum, Total	4010	MG/KG	0.97	1.0
		Arsenic, Total	2.3	MG/KG	0.18	1.0
		Boron, Total	1.1	MG/KG	0.14	1.0
		Barium, Total	50.1	MG/KG	0.01	1.0
		Beryllium, Total	0.005u	MG/KG	0.005	1.0
		Bismuth, Total	0.32 u	MG/KG	0.32	1.0
		Calcium, Total	5010	MG/KG	0.63	1.0
		Cadmium, Total	0.06	MG/KG	0.04	1.0
		Cobalt, Total	7.5	MG/KG	0.06	1.0
		Chromium, Total	4.5	MG/KG	0.08	1.0
		Copper, Total	15.1	MG/KG	0.06	1.0
		Iron, Total	18900	MG/KG	1.7	1.0
		Potassium, Total	848	MG/KG	2.9	1.0
		Lithium, Total	4.1	MG/KG	0.02	1.0
		Magnesium, Total	3500	MG/KG	0.71	1.0
		Manganese, Total	288	MG/KG	0.01	1.0
		Molybdenum, Total	0.10	MG/KG	0.07	1.0
		Sodium, Total	116	MG/KG	0.09	1.0
		Nickel, Total	7.4	MG/KG	0.07	1.0
		Phosphorus, Total	1110	MG/KG	0.44	1.0
		Lead, Total	4.0	MG/KG	0.16	1.0
		Antimony, Total	0.21 u	MG/KG	0.21	1.0
		Selenium, Total	0.19 u	MG/KG	0.19	1.0
		Silicon, Total	284	MG/KG	0.43	1.0
		Tin, Total	0.84	MG/KG	0.28	1.0
		Strontium, Total	18.2	MG/KG	0.005	1.0
		Thallium, Total	0.34 u	MG/KG	0.34	1.0
		Uranium, Total	1.1 u	MG/KG	1.1	1.0
		Vanadium, Total	39.8	MG/KG	0.05	1.0
		Zinc, Total	26.1	MG/KG	0.03	1.0

2/6/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	J10DN2	Silver, Total	0.07 u J	MG/KG	0.07	1.0
		Aluminum, Total	3960	MG/KG	0.94	1.0
		Arsenic, Total	2.1	MG/KG	0.17	1.0
		Boron, Total	1.0	MG/KG	0.14	1.0
		Barium, Total	48.6	MG/KG	0.01	1.0
		Beryllium, Total	0.005u	MG/KG	0.005	1.0
		Bismuth, Total	0.62	MG/KG	0.31	1.0
		Calcium, Total	5350	MG/KG	0.61	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Cobalt, Total	8.2	MG/KG	0.06	1.0
		Chromium, Total	4.6	MG/KG	0.08	1.0
		Copper, Total	15.2	MG/KG	0.06	1.0
		Iron, Total	20700	MG/KG	1.6	1.0
		Potassium, Total	779	MG/KG	2.8	1.0
		Lithium, Total	4.1	MG/KG	0.02	1.0
		Magnesium, Total	3660	MG/KG	0.69	1.0
		Manganese, Total	305	MG/KG	0.01	1.0
		Molybdenum, Total	0.19	MG/KG	0.07	1.0
		Sodium, Total	121	MG/KG	0.09	1.0
		Nickel, Total	7.7	MG/KG	0.07	1.0
		Phosphorus, Total	1170	MG/KG	0.42	1.0
		Lead, Total	4.1	MG/KG	0.16	1.0
		Antimony, Total	0.20 u	MG/KG	0.20	1.0
		Selenium, Total	0.18 u	MG/KG	0.18	1.0
		Silicon, Total	268	MG/KG	0.42	1.0
		Tin, Total	0.89	MG/KG	0.27	1.0
		Strontium, Total	18.2	MG/KG	0.005	1.0
		Thallium, Total	0.33 u	MG/KG	0.33	1.0
		Uranium, Total	1.1 u	MG/KG	1.1	1.0
		Vanadium, Total	46.5	MG/KG	0.05	1.0
		Zinc, Total	38.5	MG/KG	0.03	1.0

2/8/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-004	J10DN3	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	4900	MG/KG	0.97	1.0
		Arsenic, Total	2.2	MG/KG	0.18	1.0
		Boron, Total	1.3	MG/KG	0.14	1.0
		Barium, Total	55.5	MG/KG	0.01	1.0
		Beryllium, Total	0.77	MG/KG	0.005	1.0
		Bismuth, Total	0.32 u	MG/KG	0.32	1.0
		Calcium, Total	5020	MG/KG	1.0	1.0
		Cadmium, Total	0.05	MG/KG	0.04	1.0
		Cobalt, Total	9.0	MG/KG	0.06	1.0
		Chromium, Total	5.3	MG/KG	0.08	1.0
		Copper, Total	17.0	MG/KG	0.06	1.0
		Iron, Total	24500	MG/KG	1.7	1.0
		Potassium, Total	852	MG/KG	28.6	1.0
		Lithium, Total	4.7	MG/KG	0.02	1.0
		Magnesium, Total	4100	MG/KG	0.72	1.0
		Manganese, Total	333	MG/KG	0.01	1.0
		Molybdenum, Total	0.19	MG/KG	0.07	1.0
		Sodium, Total	188	MG/KG	0.09	1.0
		Nickel, Total	8.3	MG/KG	0.07	1.0
		Phosphorus, Total	1210	MG/KG	0.44	1.0
		Lead, Total	5.2	MG/KG	0.16	1.0
		Antimony, Total	0.26	MG/KG	0.21	1.0
		Selenium, Total	0.19 u	MG/KG	0.19	1.0
		Silicon, Total	272	MG/KG	0.43	1.0
		Tin, Total	0.80	MG/KG	0.28	1.0
		Strontium, Total	20.0	MG/KG	0.005	1.0
		Thallium, Total	0.34 u	MG/KG	0.34	1.0
		Uranium, Total	1.1 u	MG/KG	1.1	1.0
		Vanadium, Total	63.5	MG/KG	0.05	1.0
		Zinc, Total	46.3	MG/KG	0.03	1.0

2/8/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	J10DN4	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	4730	MG/KG	0.87	1.0
		Arsenic, Total	2.1	MG/KG	0.16	1.0
		Boron, Total	1.2	MG/KG	0.13	1.0
		Barium, Total	51.5	MG/KG	0.009	1.0
		Beryllium, Total	0.68	MG/KG	0.005	1.0
		Bismuth, Total	0.29 u	MG/KG	0.29	1.0
		Calcium, Total	4900	MG/KG	0.92	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Cobalt, Total	8.4	MG/KG	0.06	1.0
		Chromium, Total	5.3	MG/KG	0.08	1.0
		Copper, Total	16.0	MG/KG	0.06	1.0
		Iron, Total	22300	MG/KG	1.5	1.0
		Potassium, Total	866	MG/KG	25.5	1.0
		Lithium, Total	4.6	MG/KG	0.01	1.0
		Magnesium, Total	4010	MG/KG	0.64	1.0
		Manganese, Total	321	MG/KG	0.009	1.0
		Molybdenum, Total	0.31	MG/KG	0.06	1.0
		Sodium, Total	178	MG/KG	0.08	1.0
		Nickel, Total	7.9	MG/KG	0.06	1.0
		Phosphorus, Total	1150	MG/KG	0.39	1.0
		Lead, Total	4.2	MG/KG	0.15	1.0
		Antimony, Total	0.30	MG/KG	0.19	1.0
		Selenium, Total	0.17 u	MG/KG	0.17	1.0
		Silicon, Total	255	MG/KG	0.39	1.0
		Tin, Total	0.84	MG/KG	0.25	1.0
		Strontium, Total	19.6	MG/KG	0.005	1.0
		Thallium, Total	0.30 u	MG/KG	0.30	1.0
		Uranium, Total	0.97 u	MG/KG	0.97	1.0
		Vanadium, Total	58.4	MG/KG	0.04	1.0
		Zinc, Total	43.4	MG/KG	0.02	1.0

2/8/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-051
LVL#: 0511L690
SDG/SAF#: K0102/RC-051

W.O.#: 11343-606-001-9999-00
Date Received: 11-10-05

METALS CASE NARRATIVE

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. Aliquots of the resulting digestates were composited to represent each sample for analysis.

   Approximately 24 grams of each sample in this batch was used for the digestions. The balance was inadvertantly used for solids determination. Calculations for the final result were adjusted accordingly.

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

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

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits with the exception of CCV2 for Calcium (115.6), Cadmium (111.2%), Potassium (89.0%), and Tin (111.2%). Since the CCV's were high for Cadmium and Tin, and the samples were below the Client Requested Detection Limit (CRDL), these analytes were reported from this file. Calcium and Potassium were rerun in file PS1222B.

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

7. The preparation/method blank for 1 analyte was outside 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.

   a). The MB (05L0747) result for Tin was greater than the Practical Quantitation Limit (PQL) {3 x the (IDL) Instrument Detection Level} and samples J10DN3 and J10DN4 read less than 20 times the MB concentration. However, no corrective action criteria for MBs were provided in SW846 method 6010B. The sample results were reported herein "uncorrected" for the levels found in the MB.

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 35 pages.

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

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

9. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of 05L0747-LC1 for Silicon at 74.6%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

10. The matrix spike (MS) recoveries for 6 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
J10DN0	Aluminum	20,000	84.7
	Iron	20,000	76.2
	Manganese	2,000	87.3
	Antimony	100	95.5
	Silicon	2,000	91.1
	Vanadium	1,000	92.9

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

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

12/29/08
Date

jjw/m11-690

LVLI LIONVILLE LABORATORY INC.

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 05 MR016A

Initiator: Svetlana Zak
Date: 12/15/05
Client: TNU

Batch: 05 11L690
Samples: 001 J, K, L
Method: SW846/MCAWW/CLP/

Parameter:
Matrix: soils
Prep Batch: 05L0738

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)

05 11L690-001 J only 24.56 available
05 11L690-001 K only 27.22 available
05 11L690-001 L only 24.30 available

2. Known or Probable Causes(s)

3. Discussion and Proposed Action Other Description:

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

Narrative

4. Project Manager Instructions...signature/date: 01/9/06

✓ 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: 12/28/06 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	2	__ Metals: Beegle
__	X Lab General Manager: M. Taylor	__	__ Inorganic: Perrone
1	X Project Mgr: Stone/Johnson	__	__ GC/LC: Kiger
__	__ Data Management: Stilwell	__	__ MS: Rychlak/Daley
__	__ Sample Prep: Beegle/Kiger	__	__ Log-in: Perry
		__	__ Admin:
		__	__ Other:

QA-105-A-0805

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 05MR015A

Initiator: Svetlana Zak
Date: 12/13/2005
Client: TNU

Batch: 0511L690
Samples: 002,003
Method: SW846/MCAWW/CLP/

Parameter:
Matrix: soils
Prep Batch: 0510732

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)

0511L690-002 - only 24.096 g ~~received~~ available
0511L690-003 - only 25.39 g ~~received~~ available
CZ

2. Known or Probable Causes(s)

balance was inadvertently used for % solids

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: 12/14/05

✓ 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	2	__ Metals: Beegle
__	X Lab General Manager: M. Taylor	__	__ Inorganic: Perrone
1	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-051-5	Page 1 of 1

Collector L. COLLOM	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 PIT 23		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment FED EX
Shipped To LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No.

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

00000033

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

000021

Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	NA	NA	7	7	7	7	7	7		
Volume	500g	30g	30g I-L	30g M-O	30g A-C	30g P-R	30g D-F	30g G-I		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

Sample No.	Matrix *	Sample Date	Sample Time										
J10DN0	SOIL	11-8-05	9:45			3	1	1	1	1	1		
J10DN1	SOIL	11-8-05	12:00			1	3	1	1	1	3		
J10DN2	SOIL	11-8-05	8:05			1	1	3	3	1	1		
J10DN3	SOIL	11-8-05	9:15			1	1	1	1	3	1		
J10DN4	SOIL	11-8-05	14:00			1	1	1	1	1	1		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 12:00	Received By/Stored In	Date/Time
Elizabeth M Tepe 11-9-05			
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Ed Ego	11/10/05 0900	[signature]	11/10/05 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
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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(1) Gamma Spec - (Full List) {Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228}
(2) Strontium-89,90 – Total Sr; Isotopic Thorium {Thorium-232}; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; Isotopic Plutonium
(3) 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}

See attached sample weights & ID's
ET 11/9/05

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

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

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

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-5	Page 1 of 1

Collector: L. COLLOM	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: PIT 23	SAF No.: RC-051	
Ice Chest No.: 5 gal Bucket	Field Logbook No.: EL-1596	COA: BESRAS6520	Method of Shipment: ~~FED EX~~ Oak Harbor Freight/ground
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

NONE

Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	500g	30g	30g	30g	30g	30g	30g	30g		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

Sample No.	Matrix *	Sample Date	Sample Time									
J10DN0	SOIL	11-2-05	1005									
J10DN1	SOIL		1105									
J10DN2	SOIL		1220									
J10DN3	SOIL		1330									
J10DN4	SOIL		1440									

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Landon Collom	11-2-05 1540	3228 BLDG. SIGBLEN	11 2 05 1540
[illegible]	11/3/05 0900	[illegible]	11/3/05 0900
[illegible]	11/3/05 0900	Oak Harbor Freight	
		[illegible]	11/4/05 14:40
[illegible]	11/10/05 0900	[illegible]	11-10-05 0900

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting. [illegible]

(1) Gamma Spec - (Full List) {Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228}
(2) Strontium-89,90 – Total Sr; Isotopic Thorium {Thorium-232}; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; Isotopic Plutonium
(3) 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)

000022

000000034

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0102		
VALIDATOR: TLI		LAB: LLI		DATE: 2/2/06	
			SDG: K0102		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J10DN0	J10DN1	J10DN2	J10DN3	J10DN4	
					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: moly N0 N1 + N2 - UJ
Tin - all UJ

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: no MS for N1, N2, N3 or N4 - J all
Antimony - J NO MS recovery

no PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no duplicate for n1, n2, n3 + n4 – JAB

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	05L0738-MB1	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	0.92 u	MG/KG	0.92	1.0
		Arsenic, Total	0.17 u	MG/KG	0.17	1.0
		Boron, Total	0.16	MG/KG	0.14	1.0
		Barium, Total	0.01 u	MG/KG	0.01	1.0
		Beryllium, Total	0.005u	MG/KG	0.005	1.0
		Bismuth, Total	0.30 u	MG/KG	0.30	1.0
		Calcium, Total	1.2	MG/KG	0.60	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Cobalt, Total	0.06 u	MG/KG	0.06	1.0
		Chromium, Total	0.08 u	MG/KG	0.08	1.0
		Copper, Total	0.06 u	MG/KG	0.06	1.0
		Iron, Total	1.6 u	MG/KG	1.6	1.0
		Potassium, Total	8.6	MG/KG	2.8	1.0
		Lithium, Total	0.03	MG/KG	0.02	1.0
		Magnesium, Total	0.68 u	MG/KG	0.68	1.0
		Manganese, Total	0.03	MG/KG	0.01	1.0
		Molybdenum, Total	0.1	MG/KG	0.06	1.0
		Sodium, Total	0.84	MG/KG	0.08	1.0
		Nickel, Total	0.06 u	MG/KG	0.06	1.0
		Phosphorus, Total	0.57	MG/KG	0.42	1.0
		Lead, Total	0.16 u	MG/KG	0.16	1.0
		Antimony, Total	0.20 u	MG/KG	0.20	1.0
		Selenium, Total	0.18 u	MG/KG	0.18	1.0
		Silicon, Total	0.64	MG/KG	0.41	1.0
		Tin, Total	0.67	MG/KG	0.26	1.0
		Strontium, Total	0.007	MG/KG	0.005	1.0
		Thallium, Total	0.32 u	MG/KG	0.32	1.0
		Uranium, Total	1.0 u	MG/KG	1.0	1.0
		Vanadium, Total	0.04 u	MG/KG	0.04	1.0
		Zinc, Total	0.02 u	MG/KG	0.02	1.0
BLANK1	05L0732-MB1	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	0.92 u	MG/KG	0.92	1.0
		Arsenic, Total	0.17 u	MG/KG	0.17	1.0
		Boron, Total	0.16	MG/KG	0.14	1.0
		Barium, Total	0.01 u	MG/KG	0.01	1.0
		Beryllium, Total	0.005u	MG/KG	0.005	1.0
		Bismuth, Total	0.30 u	MG/KG	0.30	1.0
		Calcium, Total	1.2	MG/KG	0.60	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	05L0732-MB1	Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Cobalt, Total	0.06 u	MG/KG	0.06	1.0
		Chromium, Total	0.08 u	MG/KG	0.08	1.0
		Copper, Total	0.06 u	MG/KG	0.06	1.0
		Iron, Total	1.6 u	MG/KG	1.6	1.0
		Potassium, Total	8.2	MG/KG	2.8	1.0
		Lithium, Total	0.03	MG/KG	0.02	1.0
		Magnesium, Total	0.68 u	MG/KG	0.68	1.0
		Manganese, Total	0.04	MG/KG	0.01	1.0
		Molybdenum, Total	0.08	MG/KG	0.06	1.0
		Sodium, Total	0.84	MG/KG	0.08	1.0
		Nickel, Total	0.06 u	MG/KG	0.06	1.0
		Phosphorus, Total	0.53	MG/KG	0.42	1.0
		Lead, Total	0.16 u	MG/KG	0.16	1.0
		Antimony, Total	0.20 u	MG/KG	0.20	1.0
		Selenium, Total	0.18 u	MG/KG	0.18	1.0
		Silicon, Total	0.41 u	MG/KG	0.41	1.0
		Tin, Total	0.71	MG/KG	0.26	1.0
		Strontium, Total	0.005u	MG/KG	0.005	1.0
		Thallium, Total	0.32 u	MG/KG	0.32	1.0
		Uranium, Total	1.0 u	MG/KG	1.0	1.0
		Vanadium, Total	0.04 u	MG/KG	0.04	1.0
		Zinc, Total	0.02 u	MG/KG	0.02	1.0
BLANK1	05L0747-MB1	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	0.92 u	MG/KG	0.92	1.0
		Arsenic, Total	0.17 u	MG/KG	0.17	1.0
		Boron, Total	0.14	MG/KG	0.14	1.0
		Barium, Total	0.02	MG/KG	0.01	1.0
		Beryllium, Total	0.005u	MG/KG	0.005	1.0
		Bismuth, Total	0.30 u	MG/KG	0.30	1.0
		Calcium, Total	1.4	MG/KG	0.98	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Cobalt, Total	0.06 u	MG/KG	0.06	1.0
		Chromium, Total	0.11	MG/KG	0.08	1.0
		Copper, Total	0.06 u	MG/KG	0.06	1.0
		Iron, Total	1.6 u	MG/KG	1.6	1.0
		Potassium, Total	27.0 u	MG/KG	27.0	1.0
		Lithium, Total	0.04	MG/KG	0.02	1.0
		Magnesium, Total	0.68 u	MG/KG	0.68	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	05L0747-MB1	Manganese, Total	0.05	MG/KG	0.01	1.0
		Molybdenum, Total	0.06 u	MG/KG	0.06	1.0
		Sodium, Total	2.0	MG/KG	0.08	1.0
		Nickel, Total	0.06 u	MG/KG	0.06	1.0
		Phosphorus, Total	0.88	MG/KG	0.42	1.0
		Lead, Total	0.16 u	MG/KG	0.16	1.0
		Antimony, Total	0.20 u	MG/KG	0.20	1.0
		Selenium, Total	0.18 u	MG/KG	0.18	1.0
		Silicon, Total	0.41 u	MG/KG	0.41	1.0
		Tin, Total	0.86	MG/KG	0.26	1.0
		Strontium, Total	0.01	MG/KG	0.005	1.0
		Thallium, Total	0.32 u	MG/KG	0.32	1.0
		Uranium, Total	1.0 u	MG/KG	1.0	1.0
		Vanadium, Total	0.04 u	MG/KG	0.04	1.0
		Zinc, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J10DN0	Silver, Total	2.5	0.07u	2.7	92.6	1.0
		Aluminum, Total	5600	4450	107	1071 *	1.0
		Arsenic, Total	99.5	2.3	107	90.8	1.0
		Boron, Total	48.2	1.4	53.5	87.5	1.0
		Barium, Total	153	51.6	107	94.5	1.0
		Beryllium, Total	2.9	0.35	2.7	94.5	1.0
		Bismuth, Total	50.1	0.39	53.5	93.0	1.0
		Calcium, Total	7000	5720	1340	95.9*	1.0
		Cadmium, Total	2.6	0.04u	2.7	96.3	1.0
		Cobalt, Total	33.7	8.4	26.8	94.4	1.0
		Chromium, Total	15.7	5.6	10.7	94.4	1.0
		Copper, Total	29.5	16.7	13.4	95.5	1.0
		Iron, Total	23500	20900	53.5	4934 *	1.0
		Potassium, Total	2150	855	1340	96.5	1.0
		Lithium, Total	62.3	4.5	53.5	108.0	1.0
		Magnesium, Total	5400	3850	1340	115.6	1.0
		Manganese, Total	351	305	26.8	172.4*	1.0
		Molybdenum, Total	48.4	0.32	53.5	89.9	1.0
		Sodium, Total	1440	153	1340	96.4	1.0
		Nickel, Total	33.4	8.6	26.8	92.5	1.0
		Phosphorus, Total	1550	1290	268	96.5*	6.0
		Lead, Total	28.8	4.3	26.8	91.4	1.0
		Antimony, Total	10.6	0.21u	26.8	39.6	1.0
		Selenium, Total	94.0	0.19u	107	87.9	1.0
		Silicon, Total	428	314	53.5	213.1*	1.0
		Tin, Total	49.1	0.79	53.5	90.3	1.0
		Strontium, Total	70.9	20.5	53.5	94.2	1.0
		Thallium, Total	98.0	0.34u	107	91.6	1.0
		Uranium, Total	46.9	1.1 u	53.5	87.7	1.0
		Vanadium, Total	80.0	46.1	26.8	126.5	1.0
		Zinc, Total	68.5	39.9	26.8	106.7	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J10DN0	Silver, Total	0.07u	0.07u	NC	1.0
		Aluminum, Total	4450	4140	7.1	1.0
		Arsenic, Total	2.3	2.1	9.1	1.0
		Boron, Total	1.4	1.2	15.4	1.0
		Barium, Total	51.6	50.0	3.1	1.0
		Beryllium, Total	0.35	0.32	7.5	1.0
		Bismuth, Total	0.39	0.31u	~~NC~~ 200 MW 12/23/05	1.0
		Calcium, Total	5720	5390	5.9	1.0
		Cadmium, Total	0.04u	0.04u	NC	1.0
		Cobalt, Total	8.4	7.9	6.1	1.0
		Chromium, Total	5.6	4.4	24.0	1.0
		Copper, Total	16.7	15.7	6.2	1.0
		Iron, Total	20900	19600	6.4	1.0
		Potassium, Total	855	800	6.7	1.0
		Lithium, Total	4.5	4.1	9.3	1.0
		Magnesium, Total	3850	3660	5.1	1.0
		Manganese, Total	305	296	3.1	1.0
		Molybdenum, Total	0.32	0.15	76.2	1.0
		Sodium, Total	153	138	10.0	1.0
		Nickel, Total	8.6	7.8	9.8	1.0
		Phosphorus, Total	1290	1270	1.9	6.0
		Lead, Total	4.3	4.0	7.2	1.0
		Antimony, Total	0.21u	0.21u	NC	1.0
		Selenium, Total	0.19u	0.19u	NC	1.0
		Silicon, Total	314	290	7.8	1.0
		Tin, Total	0.79	0.59	28.1	1.0
		Strontium, Total	20.5	19.6	4.5	1.0
		Thallium, Total	0.34u	0.33u	NC	1.0
		Uranium, Total	1.1 u	1.1 u	NC	1.0
		Vanadium, Total	46.1	41.7	10.0	1.0
		Zinc, Total	39.9	37.1	7.3	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	05L0738-LC1	Silver, LCS	24.4	25.0	MG/KG	97.6
		Aluminum, LCS	238	250	MG/KG	95.2
		Arsenic, LCS	463	500	MG/KG	92.6
		Boron, LCS	237	250	MG/KG	94.6
		Barium, LCS	243	250	MG/KG	97.1
		Beryllium, LCS	12.4	12.5	MG/KG	99.2
		Bismuth, LCS	48.2	50.0	MG/KG	96.3
		Calcium, LCS	1190	1250	MG/KG	95.5
		Cadmium, LCS	12.3	12.5	MG/KG	98.4
		Cobalt, LCS	124	125	MG/KG	98.8
		Chromium, LCS	25.0	25.0	MG/KG	100
		Copper, LCS	62.0	62.5	MG/KG	99.2
		Iron, LCS	248	250	MG/KG	99.3
		Potassium, LCS	1100	1250	MG/KG	88.3
		Lithium, LCS	255	250	MG/KG	102.0
		Magnesium, LCS	1160	1250	MG/KG	93.0
		Manganese, LCS	37.2	37.5	MG/KG	99.2
		Molybdenum, LCS	249	250	MG/KG	99.6
		Sodium, LCS	1130	1250	MG/KG	90.1
		Nickel, LCS	97.7	100	MG/KG	97.7
		Phosphorus, LCS	218	250	MG/KG	87.3
		Lead, LCS	120	125	MG/KG	96.2
		Antimony, LCS	143	150	MG/KG	95.1
		Selenium, LCS	442	500	MG/KG	88.5
		Silicon, LCS	200	250	MG/KG	79.9
		Tin, LCS	247	250	MG/KG	98.8
		Strontium, LCS	244	250	MG/KG	97.8
		Thallium, LCS	480	500	MG/KG	96.0
		Uranium, LCS	49.0	50.0	MG/KG	98.0
		Vanadium, LCS	121	125	MG/KG	96.6
		Zinc, LCS	48.1	50.0	MG/KG	96.2
LCS1	05L0732-LC1	Silver, LCS	24.7	25.0	MG/KG	98.8
		Aluminum, LCS	248	250	MG/KG	99.3
		Arsenic, LCS	487	500	MG/KG	97.4
		Boron, LCS	246	250	MG/KG	98.2
		Barium, LCS	252	250	MG/KG	100.9
		Beryllium, LCS	12.9	12.5	MG/KG	103.2
		Bismuth, LCS	47.5	50.0	MG/KG	95.0
		Calcium, LCS	1280	1250	MG/KG	102.2

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	05L0722-LC1	Cadmium, LCS	12.8	12.5	MG/KG	102.4
		Cobalt, LCS	129	125	MG/KG	103.3
		Chromium, LCS	26.1	25.0	MG/KG	104.4
		Copper, LCS	64.8	62.5	MG/KG	103.7
		Iron, LCS	259	250	MG/KG	103.5
		Potassium, LCS	1200	1250	MG/KG	96.2
		Lithium, LCS	267	250	MG/KG	107.0
		Magnesium, LCS	1230	1250	MG/KG	98.5
		Manganese, LCS	39.6	37.5	MG/KG	105.6
		Molybdenum, LCS	251	250	MG/KG	100.4
		Sodium, LCS	1200	1250	MG/KG	96.1
		Nickel, LCS	102	100	MG/KG	102.1
		Phosphorus, LCS	217	250	MG/KG	86.7
		Lead, LCS	125	125	MG/KG	99.9
		Antimony, LCS	142	150	MG/KG	95.0
		Selenium, LCS	454	500	MG/KG	90.9
		Silicon, LCS	200	250	MG/KG	80.2
		Tin, LCS	250	250	MG/KG	100
		Strontium, LCS	255	250	MG/KG	101.8
		Thallium, LCS	502	500	MG/KG	100.4
		Uranium, LCS	48.5	50.0	MG/KG	96.9
		Vanadium, LCS	129	125	MG/KG	102.9
		Zinc, LCS	50.4	50.0	MG/KG	100.8
LCS1	05L0747-LC1	Silver, LCS	24.9	25.0	MG/KG	99.6
		Aluminum, LCS	246	250	MG/KG	98.2
		Arsenic, LCS	471	500	MG/KG	94.1
		Boron, LCS	242	250	MG/KG	96.8
		Barium, LCS	248	250	MG/KG	99.3
		Beryllium, LCS	12.3	12.5	MG/KG	98.4
		Bismuth, LCS	48.6	50.0	MG/KG	97.2
		Calcium, LCS	1090	1250	MG/KG	87.0
		Cadmium, LCS	12.2	12.5	MG/KG	97.6
		Cobalt, LCS	123	125	MG/KG	98.5
		Chromium, LCS	25.3	25.0	MG/KG	101.2
		Copper, LCS	63.8	62.5	MG/KG	102.1
		Iron, LCS	251	250	MG/KG	100.3
		Potassium, LCS	1100	1250	MG/KG	87.7
		Lithium, LCS	261	250	MG/KG	104.5
		Magnesium, LCS	1210	1250	MG/KG	96.5

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 12/23/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	05L0747-LC1	Manganese, LCS	38.2	37.5	MG/KG	101.9
		Molybdenum, LCS	248	250	MG/KG	99.3
		Sodium, LCS	1190	1250	MG/KG	95.4
		Nickel, LCS	97.3	100	MG/KG	97.3
		Phosphorus, LCS	221	250	MG/KG	88.4
		Lead, LCS	120	125	MG/KG	96.2
		Antimony, LCS	144	150	MG/KG	95.9
		Selenium, LCS	450	500	MG/KG	90.0
		Silicon, LCS	186	250	MG/KG	74.6
		Tin, LCS	244	250	MG/KG	97.6
		Strontium, LCS	249	250	MG/KG	99.7
		Thallium, LCS	486	500	MG/KG	97.2
		Uranium, LCS	50.1	50.0	MG/KG	100.3
		Vanadium, LCS	124	125	MG/KG	99.3
		Zinc, LCS	48.6	50.0	MG/KG	97.2

RECEIVED
JAN 2006

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0102

DATE RECEIVED: 11/10/05 LVL LOT # :0511L690

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
J10DN0						
SILVER, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
SILVER, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
SILVER, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
ALUMINUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
ALUMINUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
ALUMINUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
ARSENIC, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
ARSENIC, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
ARSENIC, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
BORON, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
BORON, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
BORON, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
BARIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
BARIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
BARIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
BERYLLIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
BERYLLIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
BERYLLIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
BISMUTH, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
BISMUTH, TOTAL REP	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
BISMUTH, TOTAL SPIKE	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
CALCIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
CALCIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
CALCIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
CADMIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
CADMIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
CADMIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
COBALT, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
COBALT, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
COBALT, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
CHROMIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
CHROMIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
CHROMIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
COPPER, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
COPPER, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0102

DATE RECEIVED: 11/10/05 LVL LOT # :0511L690

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
COPPER, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
IRON, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
IRON, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
IRON, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
POTASSIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
POTASSIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
POTASSIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
LITHIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
LITHIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
LITHIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
MAGNESIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
MAGNESIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
MAGNESIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
MANGANESE, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
MANGANESE, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
MANGANESE, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
MOLYBDENUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
MOLYBDENUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
MOLYBDENUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
SODIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
SODIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
SODIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
NICKEL, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
NICKEL, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
NICKEL, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
PHOSPHORUS, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/19/05
PHOSPHORUS, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/19/05
PHOSPHORUS, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/19/05
LEAD, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
LEAD, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
LEAD, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
ANTIMONY, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
ANTIMONY, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
ANTIMONY, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
SELENIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
SELENIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
SELENIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
SILICON, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0102

DATE RECEIVED: 11/10/05 LVL LOT # :0511L690

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SILICON, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
SILICON, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
TIN, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
TIN, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
TIN, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
STRONTIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
STRONTIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
STRONTIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
THALLIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
THALLIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
THALLIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
URANIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
URANIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
URANIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
VANADIUM, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
VANADIUM, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
VANADIUM, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
ZINC, TOTAL	001	S	05L0738	11/08/05	12/15/05	12/15/05
ZINC, TOTAL	001 REP	S	05L0738	11/08/05	12/15/05	12/15/05
ZINC, TOTAL	001 MS	S	05L0738	11/08/05	12/15/05	12/15/05
J10DN1						
SILVER, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
ALUMINUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
ARSENIC, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
BORON, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
BARIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
BERYLLIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
BISMUTH, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
CALCIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
CADMIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
COBALT, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
CHROMIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
COPPER, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
IRON, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
POTASSIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
LITHIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0102

DATE RECEIVED: 11/10/05 LVL LOT # :0511L690

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MAGNESIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
MANGANESE, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
MOLYBDENUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
SODIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
NICKEL, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
PHOSPHORUS, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
LEAD, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
ANTIMONY, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
SELENIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
SILICON, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
TIN, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
STRONTIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
THALLIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
URANIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
VANADIUM, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
ZINC, TOTAL	002	S	05L0732	11/08/05	12/13/05	12/13/05
J10DN2						
SILVER, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
ALUMINUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
ARSENIC, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
BORON, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
BARIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
BERYLLIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
BISMUTH, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
CALCIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
CADMIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
COBALT, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
CHROMIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
COPPER, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
IRON, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
POTASSIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
LITHIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
MAGNESIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
MANGANESE, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
MOLYBDENUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
SODIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0102

DATE RECEIVED: 11/10/05 LVL LOT # :0511L690

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NICKEL, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
PHOSPHORUS, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
LEAD, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
ANTIMONY, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
SELENIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
SILICON, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
TIN, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
STRONTIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
THALLIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
URANIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
VANADIUM, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
ZINC, TOTAL	003	S	05L0732	11/08/05	12/13/05	12/13/05
J10DN3						
SILVER, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
ALUMINUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
ARSENIC, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
BORON, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
BARIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
BERYLLIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
BISMUTH, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
CALCIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/22/05
CADMIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
COBALT, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
CHROMIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
COPPER, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
IRON, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
POTASSIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/22/05
LITHIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
MAGNESIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
MANGANESE, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
MOLYBDENUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
SODIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
NICKEL, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
PHOSPHORUS, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/22/05
LEAD, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
ANTIMONY, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0102

DATE RECEIVED: 11/10/05 LVL LOT # :0511L690

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SELENIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
SILICON, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
TIN, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
STRONTIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
THALLIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
URANIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
VANADIUM, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
ZINC, TOTAL	004	S	05L0747	11/08/05	12/21/05	12/21/05
J10DN4						
SILVER, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
ALUMINUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
ARSENIC, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
BORON, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
BARIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
BERYLLIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
BISMUTH, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
CALCIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/22/05
CADMIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
COBALT, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
CHROMIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
COPPER, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
IRON, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
POTASSIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/22/05
LITHIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
MAGNESIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
MANGANESE, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
MOLYBDENUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
SODIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
NICKEL, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
PHOSPHORUS, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/22/05
LEAD, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
ANTIMONY, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
SELENIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
SILICON, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
TIN, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
STRONTIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05

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CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
THALLIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
URANIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
VANADIUM, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05
ZINC, TOTAL	005	S	05L0747	11/08/05	12/21/05	12/21/05

LAB QC:

SILVER LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
SILVER, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
ALUMINUM LABORTORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
ALUMINUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
ARSENIC LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
ARSENIC, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
BORON LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
BORON, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
BARIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
BARIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
BERYLLIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
BERYLLIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
BISMUTH, LCS	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
BISMUTH, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
CALCIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
CALCIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
CADMIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
CADMIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
COBALT LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
COBALT, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
CHROMIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
CHROMIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
COPPER LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
COPPER, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
IRON LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
IRON, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
POTASSIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
POTASSIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
LITHIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
LITHIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
MAGNESIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05

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MAGNESIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
MANGANESE LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
MANGANESE, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
MOLYBDENUM LABORATOR	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
MOLYBDENUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
SODIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
SODIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
NICKEL LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
NICKEL, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
PHOSPHORUS LCS	LC1 BS	S	05L0738	N/A	12/15/05	12/19/05
PHOSPHORUS, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/19/05
LEAD LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
LEAD, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
ANTIMONY LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
ANTIMONY, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
SELENIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
SELENIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
SILICON LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
SILICON, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
TIN LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
TIN, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
STRONTIUM LCS STANDA	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
STRONTIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
THALLIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
THALLIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
URANIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
URANIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
VANADIUM LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
VANADIUM, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
ZINC LABORATORY	LC1 BS	S	05L0738	N/A	12/15/05	12/15/05
ZINC, TOTAL	MB1	S	05L0738	N/A	12/15/05	12/15/05
SILVER LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
SILVER, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
ALUMINUM LABORTORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
ALUMINUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
ARSENIC LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
ARSENIC, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
BORON LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05

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BORON, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
BARIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
BARIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
BERYLLIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
BERYLLIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
BISMUTH, LCS	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
BISMUTH, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
CALCIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
CALCIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
CADMIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
CADMIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
COBALT LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
COBALT, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
CHROMIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
CHROMIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
COPPER LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
COPPER, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
IRON LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
IRON, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
POTASSIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
POTASSIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
LITHIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
LITHIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
MAGNESIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
MAGNESIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
MANGANESE LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
MANGANESE, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
MOLYBDENUM LABORATOR	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
MOLYBDENUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
SODIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
SODIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
NICKEL LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
NICKEL, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
PHOSPHORUS LCS	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
PHOSPHORUS, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
LEAD LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
LEAD, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
ANTIMONY LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05

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ANTIMONY, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
SELENIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
SELENIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
SILICON LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
SILICON, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
TIN LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
TIN, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
STRONTIUM LCS STANDA	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
STRONTIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
THALLIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
THALLIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
URANIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
URANIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
VANADIUM LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
VANADIUM, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
ZINC LABORATORY	LC1 BS	S	05L0732	N/A	12/13/05	12/13/05
ZINC, TOTAL	MB1	S	05L0732	N/A	12/13/05	12/13/05
SILVER LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
SILVER, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
ALUMINUM LABORTORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
ALUMINUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
ARSENIC LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
ARSENIC, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
BORON LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
BORON, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
BARIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
BARIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
BERYLLIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
BERYLLIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
BISMUTH, LCS	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
BISMUTH, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
CALCIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/22/05
CALCIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/22/05
CADMIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
CADMIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
COBALT LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
COBALT, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
CHROMIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05

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CHROMIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
COPPER LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
COPPER, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
IRON LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
IRON, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
POTASSIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/22/05
POTASSIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/22/05
LITHIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
LITHIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
MAGNESIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
MAGNESIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
MANGANESE LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
MANGANESE, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
MOLYBDENUM LABORATOR	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
MOLYBDENUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
SODIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
SODIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
NICKEL LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
NICKEL, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
PHOSPHORUS LCS	LC1 BS	S	05L0747	N/A	12/21/05	12/22/05
PHOSPHORUS, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/22/05
LEAD LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
LEAD, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
ANTIMONY LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
ANTIMONY, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
SELENIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
SELENIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
SILICON LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
SILICON, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
TIN LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
TIN, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
STRONTIUM LCS STANDA	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
STRONTIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
THALLIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
THALLIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
URANIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
URANIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
VANADIUM LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05

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VANADIUM, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05
ZINC LABORATORY	LC1 BS	S	05L0747	N/A	12/21/05	12/21/05
ZINC, TOTAL	MB1	S	05L0747	N/A	12/21/05	12/21/05

Date: 8 February 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. K0102-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0102 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
J10DN0	11/8/05	Soil	C	See note 1
J10DN1	11/8/05	Soil	C	See note 1
J10DN2	11/8/05	Soil	C	See note 1
J10DN3	11/8/05	Soil	C	See note 1
J10DN4	11/8/05	Soil	C	See note 1

1 – Total strontium, alpha spectroscopy and 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 Water Sampling Plan (DOE/RL-2005, 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 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

Due to the lack of 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 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicates

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. K0102 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, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Water Sampling Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0102	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Thorium-228 Thorium-232	J	All	No LCS analysis

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, WATER MATRIX, (PCi/L)

Project: WASHINGTO CLOSURE HANFORD											
Laboratory: EB											
Case	SDG: K0102										
Sample Number		J10DN0		J10DN1		J10DN2		J10DN3		J10DN4	
Remarks											
Sample Date		11/8/05		11/8/05		11/8/05		11/8/05		11/8/05	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Total Strontium	1	0.082	U	-0.015	U	0.033	U	0.012	U	-0.066	U
Thorium-228	1	0.395	UJ	0.313	UJ	0.302	J	0.271	UJ	0.363	J
Thorium-230		0.158	U	0.261	U	0.150	U	0.315	U	0.281	U
Thorium-232	1	0.079	UJ	0.469	J	0.263	UJ	0.315	UJ	0.160	UJ
Uranium-233/234	1	0.120	U	0.134	U	0.105	U	0.297	U	0.119	U
Uranium-235	1	0	U	0.041	U	0	U	0.051	U	0	U
Uranium-238	1	0.120	U	0.369		0.105	U	0.085	U	0.159	U
Plutonium-238	1	0	U	-0.026	U	0	U	0	U	0.017	U
Plutonium-239/240		0.027	U	0	U	0.043	U	0	U	0.165	
Potassium-40		8.52		7.83		8.07		8.46		8.20	
Cobalt 60	0.05	U	U*	U	U*	U	U*	U	U*	U	U*
Cesium 137	0.1	0.052		0.103		U	U	0.067		0.061	
Radium-226	0.1	0.328		0.309		0.450		0.239		0.312	
Radium-228	0.2	0.480		0.604		0.690		0.498		0.567	
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		0.378		0.557		0.516		0.378		0.451	
Thorium-232		0.480		0.604		0.690		0.498		0.567	
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(gea)		U	U	U	U	U	U	U	U	U	U
Cesium-134		U	U	U	U	U	U	U	U	U	U

000010

* - RQL exceeded

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

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0102

7330-001 J10DN0

DATA SHEET

SDG	7330	Client/Case no	Hanford	SDG K0102	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R511118-01	Client sample id	J10DN0		
Dept sample id	7330-001	Location/Matrix	PIT 23	SOLID	
Received	11/10/05	Collected/Weight	11/08/05 09:45	505 g	
% solids	100.0	Custody/SAF No	RC-051-5	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.082	0.13	0.25	1.0	U	SR
Thorium 228	14274-82-9	0.395	0.48	0.60	1.0	U J	TH
Thorium 230	14269-63-7	0.158	0.32	0.60	1.0	U	TH
Thorium 232	TH-232	0.079	0.16	0.60	1.0	U J	TH
Uranium 233/234	U-233/234	0.120	0.16	0.31	1.0	U	U
Uranium 235	15117-96-1	0	0.097	0.37	1.0	U	U
Uranium 238	U-238	0.120	0.16	0.31	1.0	U	U
Plutonium 238	13981-16-3	0	0.055	0.21	1.0	U	PU
Plutonium 239/240	PU-239/240	0.027	0.055	0.21	1.0	U	PU
Potassium 40	13966-00-2	8.52	2.5	0.48			GAM
Cobalt 60	10198-40-0	U		0.12	0.050	U	GAM
Cesium 137	10045-97-3	0.052	0.041	0.051	0.10		GAM
Radium 226	13982-63-3	0.328	0.11	0.098	0.10		GAM
Radium 228	15262-20-1	0.480	0.22	0.22	0.20		GAM
Europium 152	14683-23-9	U		0.12	0.10	U	GAM
Europium 154	15585-10-1	U		0.17	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	0.378	0.048	0.047			GAM
Thorium 232	TH-232	0.480	0.22	0.22			GAM
Uranium 235	15117-96-1	U		0.19		U	GAM
Uranium 238	U-238	U		6.0		U	GAM
Americium 241	14596-10-2	U		0.17		U	GAM
Cesium 134	13967-70-9	U		0.062		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0102

7330-002 J10DN1

DATA SHEET

SDG	7330	Client/Case no	Hanford SDG K0102
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R511118-02	Client sample id	J10DN1
Dept sample id	7330-002	Location/Matrix	PIT 23 SOLID
Received	11/10/05	Collected/Weight	11/08/05 12:00 500 g
% solids	100.0	Custody/SAF No	RC-051-5 RC-051

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.015	0.098	0.20	1.0	U	SR
Thorium 228	14274-82-9	0.313	0.31	0.40	1.0	U J	TH
Thorium 230	14269-63-7	0.261	0.31	0.40	1.0	U	TH
Thorium 232	TH-232	0.469	0.32	0.40	1.0	J	TH
Uranium 233/234	U-233/234	0.134	0.13	0.26	1.0	U	U
Uranium 235	15117-96-1	0.041	0.081	0.31	1.0	U	U
Uranium 238	U-238	0.369	0.20	0.26	1.0		U
Plutonium 238	13981-16-3	-0.026	0.053	0.20	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.053	0.20	1.0	U	PU
Potassium 40	13966-00-2	7.83	1.2	0.83			GAM
Cobalt 60	10198-40-0	U		0.069	0.050	U	GAM
Cesium 137	10045-97-3	0.103	0.062	0.076	0.10		GAM
Radium 226	13982-63-3	0.309	0.12	0.13	0.10		GAM
Radium 228	15262-20-1	0.604	0.29	0.31	0.20		GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.19	0.10	U	GAM
Europium 155	14391-16-3	U		0.16	0.10	U	GAM
Thorium 228	14274-82-9	0.557	0.10	0.11			GAM
Thorium 232	TH-232	0.604	0.29	0.31			GAM
Uranium 235	15117-96-1	U		0.24		U	GAM
Uranium 238	U-238	U		7.6		U	GAM
Americium 241	14596-10-2	U		0.14		U	GAM
Cesium 134	13967-70-9	U		0.081		U	GAM

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EBERLINE SERVICES/RICHMOND
SAMPLE DELIVERY GROUP K0102

7330-003 J10DN2

DATA SHEET

SDG	7330	Client/Case no	Hanford	SDG K0102	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R511118-03	Client sample id	J10DN2		
Dept sample id	7330-003	Location/Matrix	PIT 23	SOLID	
Received	11/10/05	Collected/Weight	11/08/05 08:05	500 g	
% solids	100.0	Custody/SAF No	RC-051-5	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.033	0.13	0.27	1.0	U	SR
Thorium 228	14274-82-9	0.302	0.23	0.29	1.0	J	TH
Thorium 230	14269-63-7	0.150	0.23	0.29	1.0	U	TH
Thorium 232	TH-232	0.263	0.23	0.29	1.0	U J	TH
Uranium 233/234	U-233/234	0.105	0.14	0.27	1.0	U	U
Uranium 235	15117-96-1	0	0.085	0.32	1.0	U	U
Uranium 238	U-238	0.105	0.14	0.27	1.0	U	U
Plutonium 238	13981-16-3	0	0.087	0.33	1.0	U	PU
Plutonium 239/240	PU-239/240	0.043	0.087	0.33	1.0	U	PU
Potassium 40	13966-00-2	8.07	1.2	0.42			GAM
Cobalt 60	10198-40-0	U		0.077	0.050	U	GAM
Cesium 137	10045-97-3	U		0.086	0.10	U	GAM
Radium 226	13982-63-3	0.450	0.13	0.13	0.10		GAM
Radium 228	15262-20-1	0.690	0.27	0.23	0.20		GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.24	0.10	U	GAM
Europium 155	14391-16-3	U		0.17	0.10	U	GAM
Thorium 228	14274-82-9	0.516	0.11	0.12			GAM
Thorium 232	TH-232	0.690	0.27	0.23			GAM
Uranium 235	15117-96-1	U		0.25		U	GAM
Uranium 238	U-238	U		9.0		U	GAM
Americium 241	14596-10-2	U		0.17		U	GAM
Cesium 134	13967-70-9	U		0.094		U	GAM

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Summary Data Section
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SAMPLE DELIVERY GROUP K0102

7330-004 J10DN3

DATA SHEET

SDG	7330	Client/Case no	Hanford	SDG K0102	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R511118-04	Client sample id	J10DN3		
Dept sample id	7330-004	Location/Matrix	PIT 23	SOLID	
Received	11/10/05	Collected/Weight	11/08/05 09:15	499 g	
% solids	100.0	Custody/SAF No	RC-051-5	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.012	0.12	0.25	1.0	U	SR
Thorium 228	14274-82-9	0.271	0.18	0.35	1.0	U J	TH
Thorium 230	14269-63-7	0.315	0.27	0.34	1.0	U	TH
Thorium 232	TH-232	0.315	0.27	0.34	1.0	U J	TH
Uranium 233/234	U-233/234	0.297	0.26	0.32	1.0	U	U
Uranium 235	15117-96-1	0.051	0.10	0.39	1.0	U	U
Uranium 238	U-238	0.085	0.085	0.32	1.0	U	U
Plutonium 238	13981-16-3	0	0.031	0.12	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.031	0.12	1.0	U	PU
Potassium 40	13966-00-2	8.46	2.6	0.55			GAM
Cobalt 60	10198-40-0	U		0.059	0.050	U	GAM
Cesium 137	10045-97-3	0.067	0.045	0.051	0.10		GAM
Radium 226	13982-63-3	0.239	0.099	0.090	0.10		GAM
Radium 228	15262-20-1	0.498	0.22	0.22	0.20		GAM
Europium 152	14683-23-9	U		0.11	0.10	U	GAM
Europium 154	15585-10-1	U		0.17	0.10	U	GAM
Europium 155	14391-16-3	U		0.13	0.10	U	GAM
Thorium 228	14274-82-9	0.378	0.056	0.056			GAM
Thorium 232	TH-232	0.498	0.22	0.22			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		5.5		U	GAM
Americium 241	14596-10-2	U		0.16		U	GAM
Cesium 134	13967-70-9	U		0.089		U	GAM

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SAMPLE DELIVERY GROUP K0102

7330-005 J10DN4

DATA SHEET

SDG	7330	Client/Case no	Hanford	SDG K0102	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R511118-05	Client sample id	J10DN4		
Dept sample id	7330-005	Location/Matrix	PIT 23	SOLID	
Received	11/10/05	Collected/Weight	11/08/05 14:00	502 g	
% solids	100.0	Custody/SAF No	RC-051-5	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.066	0.13	0.27	1.0	U	SR
Thorium 228	14274-82-9	0.363	0.24	0.31	1.0	J	TH
Thorium 230	14269-63-7	0.281	0.24	0.31	1.0	U	TH
Thorium 232	TH-232	0.160	0.16	0.31	1.0	U J	TH
Uranium 233/234	U-233/234	0.119	0.16	0.30	1.0	U	U
Uranium 235	15117-96-1	0	0.096	0.37	1.0	U	U
Uranium 238	U-238	0.159	0.16	0.30	1.0	U	U
Plutonium 238	13981-16-3	0.017	0.033	0.13	1.0	U	PU
Plutonium 239/240	PU-239/240	0.165	0.099	0.13	1.0		PU
Potassium 40	13966-00-2	8.20	1.1	0.55			GAM
Cobalt 60	10198-40-0	U		0.061	0.050	U	GAM
Cesium 137	10045-97-3	0.061	0.043	0.057	0.10		GAM
Radium 226	13982-63-3	0.312	0.089	0.098	0.10		GAM
Radium 228	15262-20-1	0.567	0.22	0.24	0.20		GAM
Europium 152	14683-23-9	U		0.14	0.10	U	GAM
Europium 154	15585-10-1	U		0.17	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	0.451	0.058	0.063			GAM
Thorium 232	TH-232	0.567	0.22	0.24			GAM
Uranium 235	15117-96-1	U		0.22		U	GAM
Uranium 238	U-238	U		5.8		U	GAM
Americium 241	14596-10-2	U		0.29		U	GAM
Cesium 134	13967-70-9	U		0.064		U	GAM

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Report date	01/04/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0102 was composed of five solid sample designated under SAF No. RC-051 with a Project Designation of: 100 & 300 Area Component of the RCBRA – Incremental So.

The total strontium, thorium, uranium and plutonium aliquots were taken from a 30-gram leachate of sample and not a full dissolution. The gamma spectroscopy analysis was performed from received sample.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to WCH via e-mail on January 4, 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 Isotopic Plutonium Analysis

No problems were encountered during the course of the analyses.

2.5 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

1/9/6

Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-5	Page 1 of 1

Collector L. COLLOM	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 PIT 23 K0102 (7330)	SAF No. RC-051	
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment FED EX
Shipped To EBERLINE SERVICES	Offsite Property No. A060151		Bill of Lading/Air Bill No.

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	5	7								
Volume	500g	30g	30g	30g	30g	30g	30g	30g		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

Sample No.	Matrix *	Sample Date	Sample Time										
J10DN0	SOIL	11-8-05	9:45	1	3								
J10DN1	SOIL	11-8-05	12:00	1	1								
J10DN2	SOIL	11-8-05	8:05	1	1								
J10DN3	SOIL	11-8-05	9:15	1	1								
J10DN4	SOIL	11-8-05	14:00	1	1								

000018

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From Elizabeth M Tiggs	12:00 11/9/05	Received By/Stored In	
Relinquished By/Removed From FED EX	11/10/05	Received By/Stored In MFW	11/10/05 9:15
Relinquished By/Removed From		Received By/Stored In	
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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(1) Gamma Spec - (Full List) {Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228}
(2) Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-232}; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; Isotopic Plutonium
(3) 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}

See Attached Wts & Id's

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

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

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

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCRA			DATA PACKAGE: K0102		
VALIDATOR: TLT		LAB:		DATE: 2/3/00	
			SDG: K0102		
ANALYSES PERFORMED					
Gross Alpha/Beta Total Uranium	Strontium-90 Radium-22	Technetium-99 Tritium	Alpha Spectroscopy	Gamma Spectroscopy	
SAMPLES/MATRIX					
J10DU0	J10DU1	J10DU2	J10DU3	J10DU4	
					Soil

1. Completeness ..... ☐ N/A

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

Comments: _____

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

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

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

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

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

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

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

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

Comments: no FB

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

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

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

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

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

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

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

Comments: th 228 + 232 - no LCS Jack

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: ~~20 ug~~

15 ug

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0102

7330-007 Method Blank

METHOD BLANK

SDG	7330	Client/Case no	Hanford SDG K0102
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R511118-07	Client sample id	Method Blank
Dept sample id	7330-007	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	-0.052	0.11	0.24	1.0	U	SR
Thorium 228	14274-82-9	0	0.11	0.41	1.0	U	TH
Thorium 230	14269-63-7	0.107	0.22	0.41	1.0	U	TH
Thorium 232	TH-232	0	0.11	0.41	1.0	U	TH
Uranium 233/234	U-233/234	0	0.073	0.28	1.0	U	U
Uranium 235	15117-96-1	0	0.089	0.34	1.0	U	U
Uranium 238	U-238	0	0.073	0.28	1.0	U	U
Plutonium 238	13981-16-3	0.028	0.056	0.21	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.056	0.21	1.0	U	PU
Potassium 40	13966-00-2	U		0.42		U	GAM
Cobalt 60	10198-40-0	U		0.053	0.050	U	GAM
Cesium 137	10045-97-3	U		0.038	0.10	U	GAM
Radium 226	13982-63-3	U		0.077	0.10	U	GAM
Radium 228	15262-20-1	U		0.18	0.20	U	GAM
Europium 152	14683-23-9	U		0.096	0.10	U	GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.064	0.10	U	GAM
Thorium 228	14274-82-9	U		0.048		U	GAM
Thorium 232	TH-232	U		0.18		U	GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		5.0		U	GAM
Americium 241	14596-10-2	U		0.034		U	GAM
Cesium 134	13967-70-9	U		0.051		U	GAM

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QC-BLANK #55159

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/04/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0102

R511118-06 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7330 Client/Case no Hanford SDG K0102
Contact Melissa C. Mannion Contract No. 630

Lab sample id R511118-06 Client sample id Lab Control Sample
Dept sample id 7330-006 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	9.63	0.48	0.20	1.0		SR	9.89	0.40	97	83-117	80-120
Thorium 230	42.8	4.9	0.35	1.0		TH	42.0	1.7	102	80-120	80-120
Uranium 233/234	19.2	2.0	0.92	1.0		U	18.6	0.74	103	81-119	80-120
Uranium 235	15.5	1.7	0.22	1.0		U	15.1	0.60	103	81-119	80-120
Uranium 238	18.6	1.9	0.88	1.0		U	20.2	0.81	92	83-117	80-120
Plutonium 238	21.9	2.1	0.19	1.0		PU	23.8	0.95	92	84-116	80-120
Plutonium 239/240	25.0	2.3	0.19	1.0		PU	26.4	1.1	95	84-116	80-120
Cobalt 60	1.71	0.12	0.048	0.050		GAM	1.74	0.070	98	75-125	80-120
Cesium 137	1.77	0.10	0.065	0.10		GAM	1.74	0.070	102	75-125	80-120

100&300AreaComponentRCBRA-Incrmnt So

QC-LCS #55158

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 01/04/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0102

7330-008 J10DN0

DUPLICATE

SDG	7330			Client/Case no	Hanford SDG K0102
Contact	Melissa C. Mannion			Contract	No. 630
DUPLICATE		ORIGINAL			
Lab sample id	R511118-08	Lab sample id	R511118-01	Client sample id	J10DN0
Dept sample id	7330-008	Dept sample id	7330-001	Location/Matrix	PIT 23 SOLID
		Received	11/10/05	Collected/Weight	11/08/05 09:45 505 g
% solids	100.0	% solids	100.0	Custody/SAF No	RC-051-5 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	0.054	0.12	0.22	1.0	U	SR	0.082	0.13	0.25	U	-		0.3
Thorium 228	0.188	0.25	0.48	1.0	U	TH	0.395	0.48	0.60	U	-		0.8
Thorium 230	0.313	0.38	0.48	1.0	U	TH	0.158	0.32	0.60	U	-		0.6
Thorium 232	0	0.13	0.48	1.0	U	TH	0.079	0.16	0.60	U	-		0.8
Uranium 233/234	0.263	0.23	0.29	1.0	U	U	0.120	0.16	0.31	U	-		1.0
Uranium 235	0.045	0.091	0.35	1.0	U	U	0	0.097	0.37	U	-		0.7
Uranium 238	0.263	0.23	0.29	1.0	U	U	0.120	0.16	0.31	U	-		1.0
Plutonium 238	0.029	0.058	0.22	1.0	U	PU	0	0.055	0.21	U	-		0.7
Plutonium 239/240	0	0.058	0.22	1.0	U	PU	0.027	0.055	0.21	U	-		0.7
Potassium 40	7.99	1.2	0.56			GAM	8.52	2.5	0.48		6	60	0.3
Cobalt 60	U		0.056	0.050	U	GAM	U		0.12	U	-		1.0
Cesium 137	U		0.12	0.10	U	GAM	0.052	0.041	0.051		79	224	1.1
Radium 226	0.351	0.12	0.13	0.10		GAM	0.328	0.11	0.098		7	79	0.3
Radium 228	0.578	0.31	0.30	0.20		GAM	0.480	0.22	0.22		19	112	0.5
Europium 152	U		0.16	0.10	U	GAM	U		0.12	U	-		0.4
Europium 154	U		0.20	0.10	U	GAM	U		0.17	U	-		0.2
Europium 155	U		0.15	0.10	U	GAM	U		0.14	U	-		0.1
Thorium 228	0.420	0.11	0.13			GAM	0.378	0.048	0.047		11	55	0.6
Thorium 232	0.578	0.31	0.30			GAM	0.480	0.22	0.22		19	112	0.5
Uranium 235	U		0.25		U	GAM	U		0.19	U	-		0.4
Uranium 238	U		7.2		U	GAM	U		6.0	U	-		0.3
Americium 241	U		0.33		U	GAM	U		0.17	U	-		0.9
Cesium 134	U		0.069		U	GAM	U		0.062	U	-		0.1

100&300AreaComponentRCBRA-Incrmnt So

QC-DUP#1 55160

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	01/04/06

Date: 8 February 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. K0102-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0102 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
J10DN0	11/8/05	Soil	C	See note 1
J10DN1	11/8/05	Soil	C	See note 1
J10DN2	11/8/05	Soil	C	See note 1
J10DN3	11/8/05	Soil	C	See note 1
J10DN4	11/8/05	Soil	C	See note 1

1 – Chromium VI by 7196A.

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

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

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

"J" and all non-detects are rejected and flagged "UR".

Due to the samples not being properly preserved (cooler temperature 8-9°C) but analyzed within the holding time, all analytes were qualified as estimates and flagged "J".

- **Method Blanks**

Method Blanks

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

All method blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

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

Finally, for samples with a recovery greater than 120% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

Field Duplicate

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. K0102 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 samples not being properly preserved (cooler temperature 8-9°C) but analyzed within the holding time, all analytes were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for

decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0102	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	All	Sample preservation

* - 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.											
Case	SDG: K0102										
Sample Number		J10DN0		J10DN1		J10DN2		J10DN3		J10DN4	
Remarks											
Sample Date		11/8/05		11/8/05		11/8/05		11/8/05		11/8/05	
General Chemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	0.26	J	0.20	UJ	0.21	J	0.26	J	0.18	UJ

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

000010

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/29/05

CLIENT: TNUHANFORD RC-051 K0102
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0511L690

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J10DN0	Chromium VI	0.26 J	MG/KG	0.20	1.0
-002	J10DN1	Chromium VI	0.20 uJ	MG/KG	0.20	1.0
-003	J10DN2	Chromium VI	0.21 J	MG/KG	0.20	1.0
-004	J10DN3	Chromium VI	0.26 J	MG/KG	0.20	1.0
-005	J10DN4	Chromium VI	0.18 uJ	MG/KG	0.18	1.0

R 2/8/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-051 K0102
LVL#: 0511L690

W.O.#: 11343-606-001-9999-00
Date Received: 11-10-05

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. The total sample volume 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. The sample weight were as follows:

LvLI Sample	Site ID	Total sample weight, g
0511L690-001	J10DN0	30.281
0511L690-002	J10DN1	30.024
0511L690-002 duplicate	J10DN1	30.017
0511L690-002 spike	J10DN1	30.025
0511L690-003	J10DN2	30.089
0511L690-004	J10DN3	30.006
0511L690-005	JMDN4	30.340

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.

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 20 pages.

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7. The matrix spike recovery for Soluble Chromium VI was within the 75-125% control limits.

8. The replicate analyses for Chromium VI was outside the 20% Relative Percent Difference (RPD) control limit at 29.8% may be attributed to sample inhomogeneity.

9. 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

12/29/05
Date

njp\11-690

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-5	Page 1 of 1

Collector L. COLLOM	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 PIT 23		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment FED EX
Shipped To LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No.

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	NA	NA	7	7	7	7	7	7		
Volume	500g	30g	30g I-L	30g M-O	30g A-C	30g P-R	30g D-F	30g G-I		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

000015

Sample No.	Matrix *	Sample Date	Sample Time										
J10DN0	SOIL	11-8-05	9:45			3	1	1	1	1	1		
J10DN1	SOIL	11-8-05	12:00			1	3	1	1	1	3		
J10DN2	SOIL	11-8-05	8:05			1	1	3	3	1	1		
J10DN3	SOIL	11-8-05	9:15			1	1	1	1	3	1		
J10DN4	SOIL	11-8-05	14:00			1	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 Tyree 11-9-05	12:00		
Ed Eo	11/10/05 0900	[signature]	11/10/05 0900

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(1) Gamma Spec - (Full List) (Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228)
(2) Strontium-89,90 – Total Sr; Isotopic Thorium (Thorium-232); Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238); Isotopic Plutonium
(3) 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)

See attached Sample weights & ID's
ET 11/9/05

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

RHI-EF-011 (08/29/2005)

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-5	Page 1 of 1

Collector: L. COLLOM	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: PIT 23		SAF No.: RC-051
Ice Chest No.: 5 gal Bucket	Field Logbook No.: EL-1596	COA: BESRAS6520	Method of Shipment: ~~FED EX~~ Oak Harbor Freight / Giovan
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060151		Bill of Lading/Air Bill No.: See DSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	500g	30g	30g	30g	30g	30g	30g	30g		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

000016

Sample No.	Matrix *	Sample Date	Sample Time
J10DN0	SOIL	11-2-05	1005
J10DN1	SOIL		1105
J10DN2	SOIL		1220
J10DN3	SOIL		1330
J10DN4	SOIL		1440

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Lorrie Collom	11-2-05 1540	3728 Bldg. Sigle Mark	11 2 05 1540
Relinquished By/Removed From	3728 Bldg Sigle Mark	11/3/05 0700	Received By/Stored In	11/3/05 0900
Relinquished By/Removed From		11/3/05 0900	Received By/Stored In: Oak Harbor Freight	
Relinquished By/Removed From			Received By/Stored In: Donald Tagg	11/4/05 14:45
Relinquished By/Removed From		11/10/05 0900	Received By/Stored In	11-10-05 0900
Relinquished By/Removed From			Received By/Stored In	

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill, Corvallis laboratory for incremental preparation and aliquoting.

(1) Gamma Spec - (Full List) (Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228)
(2) Strontium-89,90 -- Total Sr; Isotopic Thorium (Thorium-232); Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238); Isotopic Plutonium
(3) 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

00000008

Lionville Laboratory Incorporated

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: TRU HANFORD **Date:** 11/10/05

Purchase Order / Project# / SAF# / SOW# / Release #: RC-051

LvLI Batch # : 0511L690 **Sample Custodian:** [signature]

NOTE: EXPLAIN ALL DISCREPANCIES

1.	Samples Hand Delivered or Shipped	Carrier FED EX	Airbill# 6595 0628 8725	
2.	Custody seals on coolers or shipping container intact, signed and dated?	☑ Yes	☐ No	☐ No Seals Comments
3.	Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	
4.	All expected paperwork received (coc and other client specific information) sealed in plastic bag and easily accessible?	☑ Yes	☐ No	
5.	Samples received cooled or ambient?	Temp 8-9 °C		Cooler # N/A
6.	Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☑ No Seals
7.	coc signed and dated?	☑ Yes	☐ No	
8.	Sample containers are intact?	☑ Yes	☐ No	
9.	All samples on coc received? All samples received on coc?	☑ Yes	☐ No	
10.	All sample label information matches coc?	☑ Yes	☐ No	
11.	Samples properly preserved?	☑ Yes	☐ No	
12.	Samples received within hold times? Short holds taken to wet lab?	☑ Yes	☐ No	
13.	VOA, TOC, TOX free of headspace?	☐ Yes	☐ No	☑ N/A
14.	QC stickers placed on bottles designated by client?	☑ Yes	☐ No	☐ N/A
15.	Shipment meets LvLI Sample Acceptance Policy? (Identify all bottles not within policy. See reverse side for policy)	☑ Yes AP 12-11-05	☑ No	All #5 (temp > 6°C)
16.	Project Manager contacted concerning discrepancies? name/date (or samples outside criteria)	☑ Yes	☐ No	☐ No Discrepancies

SR-002-B

LVLI LIONVILLE LABORATORY INC.

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0102		
VALIDATOR: TCI		LAB: LLI		DATE: 2/3/06	
			SDG: K0162		

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				
J10DN0	J10DN1	J10DN2	J10DN3	J10DN4
				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:

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: Cooler temp 8-9° C - J cell

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 12/29/05

CLIENT: TNUHANFORD RC-051 K0102
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0511L690

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	05LVI080-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0
BLANK10	05LVI081-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 12/29/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	J10DN1	Soluble Chromium VI	4.5	0.0	4.0	112.3	1.0
BLANK10	05LVI080-MB1	Soluble Chromium VI	4.0	0.20u	4.0	99.2	1.0
		Insoluble Chromium VI	1110	0.20u	1100	101.0	100
BLANK10	05LVI081-MB1	Soluble Chromium VI	4.1	0.20u	4.0	101.4	1.0
		Insoluble Chromium VI	1260	0.20u	1200	105.4	100

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 12/29/05

CLIENT: TNUHANPORD RC-051 K0102 LVL LOT #: 0511L690
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	05LVI080-MB1	Chromium VI	99.2	101.0	1.7
BLANK10	05LVI081-MB1	Chromium VI	101.4	105.4	3.9

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 12/29/05

CLIENT: TNUHANFORD RC-051 K0102 LVL LOT #: 0511L690
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-002REP	J10DN1	Chromium VI	0.20u	0.27	29.8	1.0

Date: 8 February 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: PCB/Pesticide - Data Package No. K0102-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0102 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	Matrix	Validation	Date
J10DN0	11/8/05	Soil	C	See note 1
J10DN1	11/8/05	Soil	C	See note 1
J10DN2	11/8/05	Soil	C	See note 1
J10DN3	11/8/05	Soil	C	See note 1
J10DN4	11/8/05	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 Water Sampling Plan (DOE/RL-2005, 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".

Due to the samples not being properly preserved (cooler temperature 8-9°C) but analyzed within the holding time, all analytes were qualified as estimates and flagged "J".

- **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 the surrogates being diluted out, all pesticide results in sample J10DN0, J10DN3 and J10DN4 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 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. The toxaphene result in all samples exceeded the RQL. Under the WCH validation statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data Package No. K0102 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 samples not being properly preserved (cooler temperature 8-9°C) but analyzed within the holding time, all analytes were qualified as estimates and flagged "J". 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 the surrogates being diluted out, all pesticide results in sample J10DN0, J10DN3 and J10DN4 were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The toxaphene result in all samples 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, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Water Sampling 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 NUMBER	REVIEWER	PAGE	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Toxaphene	J	All	No MS, MSD or LCS
Pesticides	J	J10DN0, J10DN3 J10DN4	Surrogate recovery
All	J	All	Sample preservation

* - 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: K0102

Sample Number		J10DN0		J10DN1		J10DN2		J10DN3		J10DN4	
Remarks											
Sample Date		11/8/05		11/8/05		11/8/05		11/8/05		11/8/05	
Extraction Date		11/16/05		11/16/05		11/16/05		11/16/05		11/16/05	
Analysis Date		11/18/05		11/18/05		11/18/05		11/18/05		11/18/05	
PCB	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016		13	UJ	13	UJ	13	UJ	13	UJ	13	UJ
Aroclor-1221		13	UJ	13	UJ	13	UJ	13	UJ	13	UJ
Aroclor-1232	16.5	13	UJ	13	UJ	13	UJ	13	UJ	13	UJ
Aroclor-1242	16.5	13	UJ	13	UJ	13	UJ	13	UJ	13	UJ
Aroclor-1248		13	UJ	13	UJ	13	UJ	13	UJ	13	UJ
Aroclor-1254	16.5	13	UJ	13	UJ	13	UJ	13	UJ	13	UJ
Aroclor-1260	16.5	13	UJ	13	UJ	13	UJ	13	UJ	13	UJ

Sample Number		J10DN0		J10DN1		J10DN2		J10DN3		J10DN4	
Remarks											
Sample Date		11/8/05		11/8/05		11/8/05		11/8/05		11/8/05	
Extraction Date		11/13/05		11/13/05		11/13/05		11/13/05		11/13/05	
Analysis Date		11/16/05		11/16/05		11/16/05		11/16/05		11/16/05	
Pesticide	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Alpha-BHC	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Gamma-BHC (Lindane)	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Beta-BHC	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Heptachlor	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Delta-BHC	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Aldrin	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Heptachlor Epoxide	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endosulfan I	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Dieldrin	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
4,4'-DDE	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endrin	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endosulfan II	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
4,4'-DDD	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endosulfan Sulfate	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
4,4'-DDT	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Methoxychlor	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endrin Ketone	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endrin Aldehyde	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
alpha-Chlordane	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
gamma-Chlordane	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
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: 11/25/05 11:13

RFW Batch Number: 0511L690 Client: TNUHANFORD RC-051 K0102 Work Order: 11343606001 Page: 1

	Cust ID:	J10DN0	J10DN1	J10DN1	J10DN1	J10DN2	J10DN3
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:	Tetrachloro-m-xylene	100 %	87 %	95 %	91 %	79 %	86 %
	Decachlorobiphenyl	96 %	88 %	93 %	96 %	82 %	83 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		13 U J	13 U J	101 %	101 %	13 U J	13 U J
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	103 %	109 %	13 U	13 U

	Cust ID:	J10DN4	PBLKWL	PBLKWL BS
Sample Information	RFW#:	005	05LK0907-MB1	05LK0907-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	80 %	94 %	85 %
	Decachlorobiphenyl	80 %	96 %	89 %
		fl	fl	fl
Aroclor-1016		13 U J	13 U	90 %
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	94 %

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

2/8/06

11/28/06

000011

Mitchville Laboratory, Inc.
Pesticide/PCBs by GC, CLP List

Report Date: 11/28/05 12:38

RFW Batch Number: 0511L690 Client: TNDHANFORD RC-051 K0102 Work Order: 11343606001 Page: 1

	Cust ID:	J10DN0	J10DN1	J10DN2	J10DN3	J10DN3	J10DN3
Sample Information	RFW#:	001	002	003	004	004 MS	004 MSD
	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		D %	88 %	84 %	D %	74 %	70 %
Decachlorobiphenyl		D %	97 %	96 %	D %	84 %	85 %
		fl	fl	fl	fl	fl	fl
Alpha-BHC		1.3 U J	1.3 U J	1.3 U J	1.3 U J	77 %	73 %
gamma-BHC (Lindane)		1.3 U	1.3 U	1.3 U	1.3 U	83 %	78 %
Beta-BHC		1.3 U	1.3 U	1.3 U	1.3 U	82 %	76 %
Heptachlor		1.3 U	1.3 U	1.3 U	1.3 U	96 %	91 %
Delta-BHC		1.3 U	1.3 U	1.3 U	1.3 U	80 %	76 %
Aldrin		1.3 U	1.3 U	1.3 U	1.3 U	84 %	82 %
Heptachlor epoxide		1.3 U	1.3 U	1.3 U	1.3 U	91 %	85 %
gamma-Chlordane		1.3 U	1.3 U	1.3 U	1.3 U	88 %	82 %
Endosulfan I		1.3 U	1.3 U	1.3 U	1.3 U	98 %	88 %
alpha-Chlordane		1.3 U	1.3 U	1.3 U	1.3 U	90 %	84 %
4,4'-DDE		1.3 U	1.3 U	1.3 U	1.3 U	85 %	81 %
Dieldrin		1.3 U	1.3 U	1.3 U	1.3 U	92 %	86 %
Endrin		1.3 U	1.3 U	1.3 U	1.3 U	95 %	91 %
4,4'-DDD		1.3 U	1.3 U	1.3 U	1.3 U	105 %	102 %
Endosulfan II		1.3 U	1.3 U	1.3 U	1.3 U	112 %	107 %
4,4'-DDT		1.3 U	1.3 U	1.3 U	1.3 U	84 %	81 %
Endrin aldehyde		1.3 U	1.3 U	1.3 U	1.3 U	65 %	73 %
Endosulfan sulfate		1.3 U	1.3 U	1.3 U	1.3 U	88 %	82 %
Methoxychlor		1.3 U	1.3 U	1.3 U	1.3 U	91 %	86 %
Endrin ketone		1.3 U	1.3 U	1.3 U	1.3 U	90 %	83 %
Toxaphene		13 U	13 U	13 U	13 U	13 U	13 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

2/8/06

11/28/05

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Lionville Laboratory, Inc.
Pesticide/PCBs by GC, CLP List

Report Date: 11/28/05 12:38

RFW Batch Number: 0511L690 Client: TNUHANFORD RC-051 K0102 Work Order: 11343606001 Page: 2

	Cust ID:	J10DN4	PBLKWG	PBLKWG BS
Sample Information	RFW#:	005	05LE0897-MB1	05LE0897-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	4.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene		D %	70 %	43 %
Decachlorobiphenyl		D %	74 %	45 %
Alpha-BHC		1.3 U	0.33 U	62 %
gamma-BHC (Lindane)		1.3 U	0.33 U	60 %
Beta-BHC		1.3 U	0.33 U	58 %
Heptachlor		1.3 U	0.33 U	65 %
Delta-BHC		1.3 U	0.33 U	61 %
Aldrin		1.3 U	0.33 U	72 %
Heptachlor epoxide		1.3 U	0.33 U	74 %
gamma-Chlordane		1.3 U	0.33 U	73 %
Endosulfan I		1.3 U	0.33 U	64 %
alpha-Chlordane		1.3 U	0.33 U	58 %
4,4'-DDE		1.3 U	0.33 U	62 %
Dieldrin		1.3 U	0.33 U	62 %
Endrin		1.3 U	0.33 U	62 %
4,4'-DDD		1.3 U	0.33 U	84 %
Endosulfan II		1.3 U	0.33 U	76 %
4,4'-DDT		1.3 U	0.33 U	58 %
Endrin aldehyde		1.3 U	0.33 U	59 %
Endosulfan sulfate		1.3 U	0.33 U	74 %
Methoxychlor		1.3 U	0.33 U	59 %
Endrin ketone		1.3 U	0.33 U	76 %
Toxaphene		13 U	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

R 2/4/06

R 1/12/06

000000005

000013

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0511L690
SDG/SAF # K0102/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 11-10-2005

CHLORINATED PESTICIDES

Five (5) soil samples were collected on 11-08-2005.

The samples and their associated QC samples were extracted on 11-13-2005 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 11-16-2005. 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 and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. The required holding time for extraction and analysis was 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. All obtainable surrogate recoveries were within acceptance criteria.
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 dilution due to the nature of the sample matrix. The reporting limits were adjusted to reflect the necessary dilution.
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.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

11/29/05
Date

som\r:\group\data\pest\tnu hanford\0511-690.pst
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 9 pages.

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 #: 0511L690
SDG/SAF # K0102/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 11-10-2005

PCB

Five (5) soil samples were collected on 11-08-2005.

The samples and their associated QC samples were extracted on 11-16-2005 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 11-18-2005. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

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

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. The 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 initial calibrations associated with this data set were within acceptance criteria; however, the initial calibration of Aroclor-1660 performed on 11-14-2005 was inadvertently analyzed using the curve, which was expired on 11-11-2005. There is no significant impact on the data. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
9. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
11. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

11/28/05
Date

som\r:\group\data\pest\tnu hanford\0511-690.pcbs
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 9 pages.

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 056C530

Initiator: DS
Date: 11/21/05
Client: QA

Batch: ICAL
Samples:
Method: SW846/MCAWW/CLP/

Parameter: OPCB
Matrix:
Prep Batch:

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) PCB 1660 ICAL ANALYZED 11/14/05 WAS inadvertently DONE USING a CURVE that EXPIRED ON 11/14/05 HOWEVER the ICV USED to check CALIBRATIONS met criteria VALIDATING EXPIRED CURVE. PCB STDS ARE GENERALLY STABLE. NO DATA Impacted SIGNIFICANTLY COPY OF SDR will be KEPT with STDS.

2. Known or Probable Causes(s)

3. Discussion and Proposed Action Other Description:

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

Narrative

4. Project Manager Instructions...signature/date: 11/28/05

✓ 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: 11/2005 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-051-5	Page 1 of 1

Collector L. COLLOM	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 PIT 23		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment FED EX
Shipped To LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No.

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	NA	NA	7	7	7	7	7	7		
Volume	500g	30g	30g I-L	30g M-O	30g A-C	30g P-R	30g D-F	30g G-I		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

000018

Sample No.	Matrix *	Sample Date	Sample Time										
J10DN0	SOIL	11-8-05	9:45			3	1	1	1	1	1		
J10DN1	SOIL	11-8-05	12:00			1	3	1	1	1	3		
J10DN2	SOIL	11-8-05	8:05			1	1	3	3	1	1		
J10DN3	SOIL	11-8-05	9:15			1	1	1	1	3	1		
J10DN4	SOIL	11-8-05	14:00			1	1	1	1	1	1		

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From Elizabeth M Tyree	12:00 11-9-05	Received By/Stored In	
Relinquished By/Removed From Fed Ex	11/10/05 0900	Received By/Stored In	11/10/05 0900
Relinquished By/Removed From		Received By/Stored In	
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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(1) Gamma Spec - (Full List) {Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228}
(2) Strontium-89,90 -- Total Sr; Isotopic Thorium {Thorium-232}; Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}; Isotopic Plutonium
(3) 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}

See attached sample weights & ID's
ET 11/9/05

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

RHLEF.011 (08/29/2005)

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-5	Page 1 of 1

Collector L. COLLOM	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 PIT 23		SAF No. RC-051
Ice Chest No. 5 gal Bucket	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment ~~FED EX~~ Oak Harbor Freight / Ground
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No. See DSPC

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None	None	None	None	None	None	None		
Type of Container	G/P	G/P	G/P	G/P	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	500g	30g	30g	30g	30g	30g	30g	30g		
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082		

Sample No.	Matrix *	Sample Date	Sample Time										
J10DN0	SOIL	11-7-05	1005										
J10DN1	SOIL		1105										
J10DN2	SOIL		1220										
J10DN3	SOIL		1330										
J10DN4	SOIL		1440										

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From	Lawson Collom	11-2-05 1540
Received By/Stored In	3728 BLDG	11 2 05 1540
Relinquished By/Removed From	3728 Bldg Storage	11/3/05 0900
Received By/Stored In		11/3/05 0900
Relinquished By/Removed From		11/3/05 0900
Received By/Stored In	Oak Harbor Freight	
Relinquished By/Removed From		
Received By/Stored In	Elizabeth Tripp	11/4/05 14:45
Relinquished By/Removed From	FedEx	11/10/05 0900
Received By/Stored In		11-10-05 0900
Relinquished By/Removed From		
Received By/Stored In		

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(1) Gamma Spec - (Full List) (Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228)
(2) Strontium-89,90 -- Total Sr; Isotopic Thorium (Thorium-232); Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238); Isotopic Plutonium
(3) 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

0000019

0000008

Laboratory Incorporated

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: TRU HANFORD

Date: 11/10/05

Purchase Order / Project# / SAF# / SOW# / Release #: RC-051

LvLI Batch #: 0511L690

Sample Custodian:

NOTE: EXPLAIN ALL DISCREPANCIES

1.	Samples Hand Delivered or Shipped	Carrier Fed Ex		Airbill# 6595 0628 8725
2.	Custody seals on coolers or shipping container intact, signed and dated?	☑ Yes	☐ No	☐ No Seals Comments
3.	Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	
4.	All expected paperwork received (coc and other client specific information) sealed in plastic bag and easily accessible?	☑ Yes	☐ No	
5.	Samples received cooled or ambient?	Temp 8-9 °C		Cooler # N/A
6.	Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☑ No Seals
7.	coc signed and dated?	☑ Yes	☐ No	
8.	Sample containers are intact?	☑ Yes	☐ No	
9.	All samples on coc received? All samples received on coc?	☑ Yes	☐ No	
10.	All sample label information matches coc?	☑ Yes	☐ No	
11.	Samples properly preserved?	☑ Yes	☐ No	
12.	Samples received within hold times? Short holds taken to wet lab?	☑ Yes	☐ No	
13.	VOA, TOC, TOX free of headspace?	☐ Yes	☐ No	☑ N/A
14.	QC stickers placed on bottles designated by client?	☑ Yes	☐ No	☐ N/A
15.	Shipment meets LvLI Sample Acceptance Policy? (Identify all bottles not within policy. See reverse side for policy)	☑ Yes	☐ No	
16.	Project Manager contacted concerning discrepancies? name/date (or samples outside criteria)	☑ Yes	☐ No	☐ No Discrepancies

SR-002-B

LvLI

Appendix 5

Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0102		
VALIDATOR: TLI		LAB: LLI		DATE: 2/2/06	
			SDG: K0102		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J10DN0	J10DN1	J10DN2	J10DN3	J10DNY	
					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: N0 + N3 + N4 surr diluted out – J all (post)

no toxaphene MS/MSD/LCS – J all

PCB DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no toxaphene MS/MSD – J all

6. SYSTEM PERFORMANCE (Levels D and E)

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

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

Comments:

7. HOLDING TIMES (all levels)

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

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

Comments: Cooler temp 8-9° C – J all

PCB DATA VALIDATION CHECKLIST

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

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

Comments: toxaphene only

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: