0076349

SAF-RC-020
100-BC Burial Grounds –
Soil Full Protocol
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Kathy Wendt (2) H4-21

RECEIVED
FEB 26 2008
EDMC

COMMENTS:

SDG K0875 SAF-RC-020

Waste Site: 100-B-23 treated wood sites

Date: 4 February 2008
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-BC Burial Grounds – Soil Full Protocol - Waste Site 100-B-23
Subject: Semivolatile - Data Package No. K0875-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0875 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	Analyte
J156N9	7/16/07	Soil	C	See note 1
J156P0	7/16/07	Soil	C	See note 1
J156P1	7/16/07	Soil	C	See note 1

1 – Semivolatiles by 8270C.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

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

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

times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, the di-n-butylphthalate and bis(2-ethylhexyl) phthalate result in all samples were raised to the RQL, qualified as undetected and flagged "U".

Due to method blank contamination, the benzo(g,h,i)perylene result in samples J156N9 and J156P0 were raised to the RQL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

Field Blanks

One field (equipment) blank (J156P1) was submitted for analysis. No analytes were detected in the field blank

- **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 recoveries outside QC limits, all 1,3-dichlorobenzene (47%), 1,4-dichlorobenzene (47%), hexachloroethane (42%), 1,2,4-trichlorobenzene (55%) and hexachlorocyclopentadiene (17%) results were qualified as estimates and flagged "J".

Due to a matrix spike or a matrix spike duplicate recovery outside QC limits, the phenanthrene (142%) and carbazole (122%) results in samples J156N9 and J156P0 were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits, all 2,4,6-trichlorophenol (46%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

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

Due to a surrogate recovery outside QC limits (14%), the 2,4-dichlorophenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, pentachlorophenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chlorophenyl phenyl ether, 4-bromophenyl phenyl ether results in sample J156P1 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to RPDs outside QC limits, thirty-four semi-volatile analytes (in all samples) were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J156N9/J156P0) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPDs for phenanthrene (82%) and anthracene (158%) were outside QC limits. Under the WCH statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Twenty-four semivolatile analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other undetected analytes met the RQL.

- **Completeness**

Data package No. K0875 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 di-n-butylphthalate and bis(2-ethylhexyl) phthalate result in all samples were raised to the RQL, qualified as undetected and flagged "U".

- Due to method blank contamination, the benzo(g,h,i)perylene result in samples J156N9 and J156P0 were raised to the RQL, qualified as undetected and flagged "U".

- Due to matrix spike recoveries outside QC limits, all 1,3-dichlorobenzene (47%), 1,4-dichlorobenzene (47%), hexachloroethane (42%), 1,2,4-trichlorobenzene (55%) and hexachlorocyclopentadiene (17%) results were qualified as estimates and flagged "J".

- Due to a matrix spike or a matrix spike duplicate recovery outside QC limits, the phenanthrene (142%) and carbazole (122%) results in samples J156N9 and J156P0 were qualified as estimates and flagged "J".

- Due to an LCS recovery outside QC limits, all 2,4,6-trichlorophenol (46%) results were qualified as estimates and flagged "J".

- Due to a surrogate recovery outside QC limits (14%), the 2,4-dichlorophenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, pentachlorophenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chlorophenyl phenyl ether, 4-bromophenyl phenyl ether results in sample J156P1 were qualified as estimates and flagged "J".

- Due to RPDs outside QC limits, thirty-four semi-volatile analytes (in all samples) 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.

Twenty-four semivolatile analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

SDG: K0875	REVIEWER: ELR	Project: 100-B-23	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Bis(2-ethylhexyl)phthalate Di-n-butylphthalate	U at RQL	All	Method blank contamination
Benzo(g,h,i)perylene	U at RQL	J156N9, J156P0	Method blank contamination
1,3-dichlorobenzene 1,4-dichlorobenzene Hexachloroethane 1,2,4-trichlorobenzene Hexachlorocyclopentadiene	J	All	MS and/or MSD recovery
Phenanthrene Carbazole	J	J156N9, J156P0	MS and/or MSD recovery
2,4,6-trichlorophenol	J	All	LCS recovery
2,4-dichlorophenol 2,4,6-trichlorophenol 2,4,5-trichlorophenol Pentachlorophenol bis(2-chloroethyl)ether bis(2-chloroethoxy)methane 4-chlorophenyl phenyl ether 4-bromophenyl phenyl ether	J	J156P1	Surrogate recovery
Phenol bis(2-chloroethyl)ether 2-chlorophenol 1,3-dichlorobenzene 1,4-dichlorobenzene 1,2-dichlorobenzene 2-methylphenol 2,2-oxybis(1-chloropropane) n-nitroso-di-d-propylamine Hexachloroethane Nitrobenzene Isopherone 2-nitrophenol bis(2-chloroethoxy)methane 1,2,4-trichlorobenzene Naphthalene 4-chloroanaline	J	All	RPD

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

Hexachlorobutadiene			
Hexachlorocyclopentadiene			
2-chloronaphthalene			
Dimethylphthalate			
Acenaphthylene			
2,6-dinitrotoluene			
3-nitroanaline			
4-nitrophenol			
Dibenzofuran			
Diethylphthalate			
Fluorene			
4-nitroanaline			
3,3-dichlorobenzidine			
benzo(b)fluoranthene			
ideno(1,2,3-cd)pyrene			
Dibenz(a,h)anthracene			
benzo(g,h,i)perylene			

* - 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

Annotated Laboratory Reports

	Cust ID:	J156N9	J156N9	J156N9	J156P0	J156P1	SBLKMP
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	07LE0395-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	60 %	53 %	77 %	52 %	62 %	50 %
	2-Fluorobiphenyl	68 %	71 %	101 %	67 %	67 %	60 %
	Terphenyl-d14	76 %	91 %	111 %	81 %	78 %	91 %
	Phenol-d5	63 %	62 %	82 %	60 %	60 %	52 %
	2-Fluorophenol	58 %	53 %	77 %	56 %	57 %	42 %
	2,4,6-Tribromophenol	72 %	94 %	101 %	84 %	14 * %	20 %
		fl	fl	fl	fl	fl	fl
Phenol		330 UJ	58 %	79 %	330 UJ	330 UJ	330 U
bis(2-Chloroethyl)ether		330 UJ	51 %	77 %	330 UJ	330 UJ	330 U
2-Chlorophenol		330 UJ	55 %	80 %	330 UJ	330 UJ	330 U
1,3-Dichlorobenzene		330 UJ	47 * %	74 %	330 UJ	330 UJ	330 U
1,4-Dichlorobenzene		330 UJ	47 * %	74 %	330 UJ	330 UJ	330 U
1,2-Dichlorobenzene		330 UJ	52 %	81 %	330 UJ	330 UJ	330 U
2-Methylphenol		330 UJ	64 %	91 %	330 UJ	330 UJ	330 U
2,2'-oxybis(1-Chloropropane)		330 UJ	51 %	78 %	330 UJ	330 UJ	330 U
3/4 Methylphenol		330 U	65 %	84 %	330 U	330 U	330 U
N-Nitroso-di-n-propylamine		330 UJ	61 %	86 %	330 UJ	330 UJ	330 U
Hexachloroethane		330 UJ	42 * %	67 %	330 UJ	330 UJ	330 U
Nitrobenzene		330 UJ	54 %	80 %	330 UJ	330 UJ	330 U
Isophorone		330 UJ	62 %	86 %	330 UJ	330 UJ	330 U
2-Nitrophenol		330 UJ	58 %	83 %	330 UJ	330 UJ	330 U
2,4-Dimethylphenol		330 U	69 %	91 %	330 U	330 U	330 U
bis(2-Chloroethoxy)methane		330 UJ	62 %	89 %	330 UJ	330 UJ	330 U
2,4-Dichlorophenol		330 U	72 %	96 %	330 U	330 UJ	330 U
1,2,4-Trichlorobenzene		330 UJ	55 * %	80 %	330 UJ	330 UJ	330 U
Naphthalene		330 UJ	57 %	82 %	330 UJ	330 UJ	330 U
4-Chloroaniline		330 UJ	40 %	60 %	330 UJ	330 UJ	330 U
Hexachlorobutadiene		330 UJ	57 %	85 %	330 UJ	330 UJ	330 U
4-Chloro-3-methylphenol		330 U	76 %	92 %	330 U	330 U	330 U
2-Methylnaphthalene		330 U	92 %	124 * %	330 U	330 U	330 U
Hexachlorocyclopentadiene		330 UJ	17 * %	29 %	330 UJ	330 UJ	330 U
2,4,6-Trichlorophenol		330 UJ	60 %	63 %	330 UJ	330 UJ	330 U
2,4,5-Trichlorophenol		840 U	97 %	115 %	840 U	840 UJ	840 U

*= Outside of EPA CLP QC limits.

R 2/1/08

000000008

000013

RFW#:	001		001 MS		001 MSD		002		003		07LE0395-MB1	
2-Chloronaphthalene	330	UJ	68	%	101	%	330	UJ	330	UJ	330	U
2-Nitroaniline	840	U	74	%	95	%	840	U	840	U	840	U
Dimethylphthalate	330	UJ	66	%	96	%	330	UJ	330	UJ	330	U
Acenaphthylene	330	UJ	64	%	93	%	330	UJ	330	UJ	330	U
2,6-Dinitrotoluene	330	UJ	62	%	93	%	330	UJ	330	UJ	330	U
3-Nitroaniline	840	UJ	67	%	94	%	840	UJ	840	UJ	840	U
Acenaphthene	170	J	74	%	90	%	200	J	330	U	330	U
2,4-Dinitrophenol	840	U	43	%	52	%	840	U	840	U	840	U
4-Nitrophenol	840	UJ	71	%	113	%	840	UJ	840	UJ	840	U
Dibenzofuran	150	J	66	%	94	%	220	J	330	UJ	330	U
2,4-Dinitrotoluene	330	U	77	%	103	%	330	U	330	U	330	U
Diethylphthalate	330	UJ	67	%	96	%	330	UJ	330	UJ	330	U
4-Chlorophenyl-phenylether	330	U	76	%	100	%	330	U	330	UJ	330	U
Fluorene	230	J	67	%	93	%	390	J	330	UJ	330	U
4-Nitroaniline	840	UJ	63	%	99	%	840	UJ	840	UJ	840	U
4,6-Dinitro-2-methylphenol	840	U	72	%	77	%	840	U	840	U	840	U
N-Nitrosodiphenylamine (1)	330	U	81	%	87	%	330	U	330	U	330	U
4-Bromophenyl-phenylether	330	U	78	%	87	%	330	U	330	UJ	330	U
Hexachlorobenzene	330	U	86	%	98	%	330	U	330	U	330	U
Pentachlorophenol	840	U	96	%	90	%	840	U	840	UJ	840	U
Phenanthrene	1000	J	142	* %	105	%	2400	J	330	U	330	U
Anthracene	220	J	89	%	100	%	1900		330	U	330	U
Carbazole	85	J	107	%	122	* %	370	J	330	U	330	U
Di-n-butylphthalate	LLO 22	JB UJ	86	%	107	%	LLO 27	JB UJ	LLO 25	JB UJ	39	J
Fluoranthene	770		121	%	105	%	1600		330	U	330	U
Pyrene	620		108	%	96	%	1200		330	U	330	U
Butylbenzylphthalate	330	U	81	%	105	%	20	J	330	U	330	U
3,3'-Dichlorobenzidine	330	UJ	33	%	59	%	330	UJ	330	UJ	330	U
Benzo(a)anthracene	260	J	92	%	98	%	490		330	U	330	U
Chrysene	570		67	%	75	%	1400		330	U	330	U
bis(2-Ethylhexyl)phthalate	LLO 67	JB UJ	81	%	104	%	LLO 170	JB UJ	LLO 73	JB UJ	110	J
Di-n-octyl phthalate	330	U	93	%	117	%	330	U	330	U	330	U
Benzo(b)fluoranthene	150	J	84	%	115	%	270	J	330	UJ	330	U
Benzo(k)fluoranthene	200	J	94	%	95	%	290	J	330	U	330	U
Benzo(a)pyrene	120	J	85	%	101	%	220	J	330	U	330	U
Indeno(1,2,3-cd)pyrene	43	J	64	%	88	%	83	J	330	UJ	330	U
Dibenz(a,h)anthracene	23	J	63	%	89	%	45	J	330	UJ	330	U
Benzo(g,h,i)perylene	LLO 37	JB UJ	60	%	85	%	LLO 77	JB UJ	330	UJ	22	J

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

2/1/08

Cust ID: SBLKMP BS

Sample Information		
RFW#:	07LE0395-MB1	
Matrix:	SOIL	
D.F.:	1.00	
Units:	ug/Kg	

Surrogate Recovery			
	Nitrobenzene-d5	78	%
	2-Fluorobiphenyl	85	%
	Terphenyl-d14	101	%
	Phenol-d5	86	%
	2-Fluorophenol	84	%
	2,4,6-Tribromophenol	43	%

Phenol	85	%
bis(2-Chloroethyl)ether	85	%
2-Chlorophenol	80	%
1,3-Dichlorobenzene	79	%
1,4-Dichlorobenzene	79	%
1,2-Dichlorobenzene	82	%
2-Methylphenol	87	%
2,2'-oxybis(1-Chloropropane)	81	%
3/4 Methylphenol	84	%
N-Nitroso-di-n-propylamine	83	%
Hexachloroethane	68	%
Nitrobenzene	76	%
Isophorone	85	%
2-Nitrophenol	77	%
2,4-Dimethylphenol	67	%
bis(2-Chloroethoxy)methane	84	%
2,4-Dichlorophenol	88	%
1,2,4-Trichlorobenzene	83	%
Naphthalene	78	%
4-Chloroaniline	70	%
Hexachlorobutadiene	89	%
4-Chloro-3-methylphenol	84	%
2-Methylnaphthalene	85	%
Hexachlorocyclopentadiene	80	%
2,4,6-Trichlorophenol	46	%
2,4,5-Trichlorophenol	72	%

*= Outside of EPA CLP QC limits.

2/1/08

000000015

000000010

2-Chloronaphthalene	83	%
2-Nitroaniline	87	%
Dimethylphthalate	93	%
Acenaphthylene	84	%
2,6-Dinitrotoluene	81	%
3-Nitroaniline	121	%
Acenaphthene	84	%
2,4-Dinitrophenol	81	%
4-Nitrophenol	77	%
Dibenzofuran	84	%
2,4-Dinitrotoluene	85	%
Diethylphthalate	90	%
4-Chlorophenyl-phenylether	89	%
Fluorene	86	%
4-Nitroaniline	102	%
4,6-Dinitro-2-methylphenol	102	%
N-Nitrosodiphenylamine (1)	81	%
4-Bromophenyl-phenylether	89	%
Hexachlorobenzene	100	%
Pentachlorophenol	74	%
Phenanthrene	100	%
Anthracene	94	%
Carbazole	114	%
Di-n-butylphthalate	97	%
Fluoranthene	107	%
Pyrene	90	%
Butylbenzylphthalate	94	%
3,3'-Dichlorobenzidine	105	%
Benzo(a)anthracene	104	%
Chrysene	92	%
bis(2-Ethylhexyl)phthalate	93	%
Di-n-octyl phthalate	79	%
Benzo(b)fluoranthene	92	%
Benzo(k)fluoranthene	82	%
Benzo(a)pyrene	90	%
Indeno(1,2,3-cd)pyrene	100	%
Dibenz(a,h)anthracene	101	%
Benzo(g,h,i)perylene	98	%

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

2/1/08

000016

000000011

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-020
LVL #: 0707L603
SDG/SAF # K0875/RC-020

W.O. #: 11343-606-001-9999-00
Date Received: 07-18-2007

SEMIVOLATILE

Three (3) soil samples were collected on 07-16-2007.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 07-20-2007 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for client specified Semivolatile target compounds on 07-25-2007 and 08-03-2007.

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise. The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

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

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

3. One (1) of forty-two (42) surrogate recoveries was outside acceptance criteria. However, the surrogate recovery criteria were met (i.e., no more than one outlier per fraction (acid and base neutral} and no recoveries less than 10%).

4. Eight (8) of one hundred twenty-eight (128) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

5. All blank spike recoveries were within acceptance criteria.

6. The method blank contained the common laboratory contaminants Di-n-butylphthalate and Bis (2-Ethylhexyl) phthalate at levels less than the CRQL. The method blank also contained the target compound Benzo (g, h, i) perylene at a level less than the CRQL.

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

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 8 pages.

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

LIONVILLE LABORATORY INC.

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

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

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

for Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

8/9/07
Date

som\gorup\data\bna\tnu-hanford\0707-603.doc

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 07MS164

itiator: Sharon Saylor
ate: 8-6-07
lient: TRU RC020

Batch: 07071603
Samples: 001ms, 001msd
Method: SW846/MCAWW/CLP/

Parameter: 8270
Matrix: Solid
Prep Batch: 07160395

Reason for SDR

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

). 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: _____

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

low recovery of several analytes in the ms but the msd + BS are ok
(13 dichlorobenzene, 14 dichlorobenzene, hexachloroethane, 124 Trichlorobenzene, hexachlorocyclopentadiene)

. Known or Probable Causes(s) Hexachlorocyclopentadiene is subject to thermal decomposition in the inlet of the gas chromatograph, chemical reactions in acetone solutions and photochemical decomposition. Others possible

. Discussion and Proposed Action Other Description: none

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

. Project Manager Instructions...signature/date: 8/7/07

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

. Final Action...signature/date: 8/09/07 Other Explanation:

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

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

oute	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	__ MS: Rychlak/Daley
__	__ Sample Prep: Beegle/Kiger	__	__ Log-in: Perry
		__	__ Admin: _____
		__	__ Other: _____

A-105-A-0805

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround
C. Martinez	C. Martinez	509-539-2816	KESSNER, JH	21 days	8D

Project Designation	Sampling Location	SAF No.
100-BC Burial Grounds - Soil Full Protocol	100-B-23 treated wood sites	RC-020

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
ERC-02-609	EFL1173-13	R10B232000	FED EX

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
EBERLINE SERVICES LIONVILLE	A070381	see OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

cool 4 degrees

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C						
Type of Container	G/P	aG	aG	aG	aG						
No. of Container(s)	1	1	1	1	1						
Volume	250mL	120mL	120mL	250mL	250mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	Pesticides - 8081	TPH (Total) - 418.1						

Sample No.	Matrix *	Sample Date	Sample Time										
J156N9	SOIL	07/16/07	1345	✓	✓	✓	✓	✓					
J156P0	SOIL	07/16/07	1350	✓	✓	✓	✓	✓					
J156P1	SOIL	07/16/07	1253	✓	n/a	✓	n/a	n/a					

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Martinez / C. Martinez	07/16/07 1700	3728 3B	07/16/07 1700
3728 3B	7-17-07 0900	KM Singleton	7-17-07 0900
KM Singleton	7-17-07 1500	FED EX	
Fed Ex	7-18-07 0935	Peter Hernandez	7-18-07 0935

SPECIAL INSTRUCTIONS

None

(1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7470 - (CV)

Sampler unavailable to relinquish samples from 3728 Ref # 3B. 3728 Custodian removed samples for shipping on 7/17/07.

Matrix *

S=Soil
SS=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

120021

00000017

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-B-23			DATA PACKAGE: K0875		
VALIDATOR: ERR		LAB: LLI		DATE: 1/25/08	
			SDG: K0875		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J15GN9	J15GP0	J15GP1			
					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: di-n-butylphthalate & bis(2-ethylhexyl)phthalate – U at RQL NQ+PO; benzo(g,h,i)perylene – U at RQL NQ+PO; RQL – all

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Comments: Surr – 31 – J all tribromophenol assoc no Pots

MS/MSD – 1,3 + 1,4 dichlorobenzene, hexachloroethane, 1,2,4 trichlorobenzene, hexachlorocyclopentadiene – J all

MS/MSD – carbazole – J NQ+PO; phenanthrene J NQ+PO

LCS – 2,4,6 – trichlorophenol – J

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: 34 w/RPDs out — J

FP Phenanthrene (82%) anthracene (158%)

6. SYSTEM PERFORMANCE (Levels D and E)

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

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

Internal standard retention times acceptable? ..... Yes No N/A

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

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

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

Comments:

7. HOLDING TIMES (all levels)

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

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

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

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

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

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

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

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

Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A

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

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

Comments: 24 over

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

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

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

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

Comments:

RPD SV

79	58	30.65693
77	51	40.625
80	55	37.03704
74	47	44.6281
74	47	44.6281
81	52	43.60902
91	64	34.83871
78	51	41.86047
84	65	25.50336
86	61	34.01361
67	42	45.87156
80	54	38.80597
86	62	32.43243
83	58	35.46099
91	69	27.5
89	62	35.76159
96	72	28.57143
80	55	37.03704
82	57	35.97122
60	40	40
85	57	39.43662
92	76	19.04762
124	92	29.62963
29	17	52.17391
63	60	4.878049
115	97	16.98113

101	68	39.05325
95	74	24.85207
96	66	37.03704
93	64	36.94268
93	62	40
94	67	33.54037
90	74	19.5122
52	43	18.94737
113	71	45.65217
94	66	35
103	77	28.88889
96	67	35.58282
100	76	27.27273
93	67	32.5
99	63	44.44444
77	72	6.711409
87	81	7.142857
87	78	10.90909
98	86	13.04348
90	96	-6.451613
105	142	-29.95951
100	89	11.64021
122	107	13.10044
107	86	21.76166
105	121	-14.15929
96	108	-11.76471
105	81	25.80645
59	33	56.52174
98	92	6.315789
75	67	11.26761
104	81	24.86486
117	93	22.85714
115	84	31.15578
95	94	1.058201
101	85	17.2043
88	64	31.57895
89	63	34.21053
85	60	34.48276

RPD SV

Date: 4 February 2008
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-BC Burial Grounds – Soil Full Protocol – Waste Site 100-B-23
Subject: Pesticide/PCB - Data Package No. K0875-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0875 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	Analyte
J156N9	7/16/07	Soil	C	See note 1
J156P0	7/16/07	Soil	C	See note 1

1– PCBs by 8082 and pesticides by 8081A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

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

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

All holding times were acceptable.

- **Method Blank**

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

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & Laboratory Control Sample

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

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

All accuracy results were acceptable.

Surrogate Recovery

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

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

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to an RPD outside QC limits (35%), all PCB results (except aroclor1016) were qualified as estimates and flagged "J".

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

Due to an RPD outside QC limits (37%), all 4,4'-DDE results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J156N9/J156N0) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

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

- **Completeness**

Data Package No. K0875 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to the lack of a matrix spike, matrix spike duplicate or LCS analysis, all toxaphene results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (35%), all PCB results (except aroclor1016) were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (37%), all 4,4'-DDE results were qualified as estimates and flagged "J".

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

REFERENCES

Fluor Hanford Data Validation Contract #29776 (June 2006), *Validation Statement of Work*, through Washington Closure Hanford Work Order #WB6081.

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

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

PESTICIDE/PCB DATA QUALIFICATION SUMMARY*

SDG: K0875	REVIEWER: ELR	Project: 100-B-23	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All PCBs (except aroclor 1016)	J	All	RPD
4,4-DDE	J	All	RPD
Toxaphene	J	All	No MS/MSD or 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

Annotated Laboratory Reports

RFW Batch Number: 0707L603 Client: TNUHANFORD RC-020 K0875 Work Order: 11343606001 Page: 1

	Cust ID:	J156N9	J156P0	J156P0	J156P0	PBLKDO	PBLKDO BS
Sample Information	RFW#:	001	002	002 MS	002 MSD	07LE0394-MB1	07LE0394-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	77 %	87 %	104 %	82 %	88 %	98 %
	Decachlorobiphenyl	53 %	62 %	80 %	64 %	87 %	97 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		13 U	13 U	119 %	99 %	13 U	106 %
Aroclor-1221		13 U J	13 U J	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	21	87 %	61 %	13 U	105 %

000011

2/1/08

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

000000005

Pesticide/PCBs by GC, CLP List

Report Date: 08/13/07 10:29

RFW Batch Number: 0707L603 Client: TNUHANFORD RC-020 K0875 Work Order: 11343606001 Page: 1

	Cust ID:	J156N9	J156N9	J156N9	J156P0	PBLKDO	PBLKDO BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	07LE0394-MB1	07LE0394-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	4.00	4.00	4.00	4.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	97 %	108 %	225 * %	102 %	91 %	97 %
	Decachlorobiphenyl	100 %	112 %	216 * %	104 %	97 %	94 %
		fl	fl	fl	fl	fl	fl
Alpha-BHC		1.3 U	110 %	110 %	1.3 U	0.33 U	118 %
gamma-BHC (Lindane)		1.3 U	117 %	116 %	1.3 U	0.33 U	116 %
Beta-BHC		1.3 U	131 * %	124 %	1.3 U	0.33 U	106 %
Heptachlor		1.3 U	125 %	125 %	1.3 U	0.33 U	110 %
Delta-BHC		1.3 U	115 %	115 %	1.3 U	0.33 U	124 * %
Aldrin		1.3 U	117 %	112 %	1.3 U	0.33 U	113 %
Heptachlor epoxide		1.3 U	124 %	120 %	1.3 U	0.33 U	112 %
gamma-Chlordane		1.3 U	118 %	113 %	1.3 U	0.33 U	111 %
Endosulfan I		1.3 U	128 * %	117 %	1.3 U	0.33 U	116 %
alpha-Chlordane		1.3 U	123 %	114 %	1.3 U	0.33 U	109 %
4,4'-DDE		1.3 U J	138 * %	194 * %	1.3 U J	0.33 U	116 %
Dieldrin		1.3 U	119 %	111 %	1.3 U	0.33 U	116 %
Endrin		1.3 U	127 %	129 %	1.3 U	0.33 U	116 %
4,4'-DDD		1.3 U	118 %	111 %	~~2.7~~ 1.3 U	0.33 U	119 %
Endosulfan II		1.3 U	125 * %	122 * %	1.3 U	0.33 U	113 %
4,4'-DDT		1.3 U	113 %	130 %	1.3 U	0.33 U	112 %
Endrin aldehyde		1.3 U	131 * %	130 %	1.3 U	0.33 U	100 %
Endosulfan sulfate		1.3 U	126 * %	126 * %	1.3 U	0.33 U	109 %
Methoxychlor		1.3 U	148 %	143 %	1.3 U	0.33 U	110 %
Endrin ketone		1.3 U	131 %	151 * %	1.3 U	0.33 U	114 %
Toxaphene		13 U J	13 U	13 U	13 U J	3.3 U	3.3 U

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

2/1/08

ID 8/13/07

000012

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-020
LVL #: 0707L603
SDG/SAF # K0875/RC-020

W.O. #: 11343-606-001-9999-00
Date Received: 07-18-2007

PCB

Two (2) soil samples were collected on 07-16-2007.

The samples and their associated QC samples were extracted on 07-20-2007 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedure on 07-27-2007. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise. The following is a summary of the QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

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

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

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

4. All surrogate recoveries were within acceptance criteria.

5. The blank spike recoveries were within acceptance criteria.

6. All matrix spike recoveries were within acceptance criteria.

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

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

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

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

LIONVILLE LABORATORY INC.

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

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

for Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

8/9/07
Date

som\r:\group\data\pest\tmu hanford\0707so603s.pcb

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

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-020
LVL #: 0707L603
SDG/SAF # K0875/RC-020

W.O. #: 11343-606-001-9999-00
Date Received: 07-18-2007

CHLORINATED PESTICIDES

Two (2) soil samples were collected on 07-16-2007.

The samples and their associated QC samples were extracted on 07-20-2007 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedure on 08-07-2007. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081A.

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise. The following is a summary of the QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

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

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

3. Two (2) of twelve (12) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

4. One (1) of twenty (20) blank spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

5. Ten (10) of forty (40) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

6. The sample and its associated matrix spike samples required a 4-fold instrument dilution due to the sample matrix. The reporting limits were adjusted to reflect the necessary dilution.

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

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

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.

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

LvLI
LIONVILLE LABORATORY INC.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

8/14/07
Date

som\r:\group\data\pest\tcc hanford\0707s603s.pst

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 07GC201

Initiator: CAC
Date: 8-10-07
Client: TNU

Batch: 07071603
Samples: 001MS+MSD, BS
Method: SW846/MCAWW/CLP/

Parameter: 0608H
Matrix: SOIL
Prep Batch: 07LE0394

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)

both surrogates out high in MSD ← Appears double spiked.
several spikes out high in MS+MSD
delta BHC spike out high in BS

2. Known or Probable Causes(s)

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

Other Description:
No Impact on data.
High recoveries with both samples as non detects.
JD 8/12/07

4. Project Manager Instructions...signature/date: 8/13/07
__ 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: 8/14/07
✓ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

Other Explanation:

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

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround
C. Martinez	C. Martinez	509-539-2816	KESSNER, JH	21 days	8D

Project Designation	Sampling Location	SAF No.
100-BC Burial Grounds - Soil Full Protocol	100-B-23 treated wood sites	RC-020

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
ERC-02-009	EFL1173-13	R10B232000	FED EX

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
EBERLINE SERVICES/ LIONVILLE	A070381	see OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

cool 4 degrees

610019

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C						
Type of Container	G/P	aG	aG	aG	aG						
No. of Container(s)	1	1	1	1	1						
Volume	250mL	120mL	120mL	250mL	250mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	Pesticides - 8081	TPH (Total) - 418.1						

Sample No.	Matrix *	Sample Date	Sample Time											
J156N9	SOIL	07/16/07	1345	✓	✓	✓	✓	✓						
J156P0	SOIL	07/16/07	1350	✓	✓	✓	✓	✓						
J156P1	SOIL	07/16/07	1253	✓	n/a	✓	n/a	n/a						

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Martinez / C. Martinez	1700 07/16/07	3728 3B	1700 07/16/07
3728 3B	7-17-07 0900	KM Singleton	7-17-07 0900
KM Singleton	7-17-07 1500	FED EX	
Fed Ex	7-18-07 0935	Carla Hernandez	7-18-07 0935

SPECIAL INSTRUCTIONS

None

(1) ICP Metals - 6010TR (Client List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7470 - (CV)

Sampler unavailable to relinquish samples from 3728 Ref# 3B. 3728 Custodian removed samples for shipping on 7/17/07.

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

WCH-EE-01

Appendix 5

Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-B-23			DATA PACKAGE: K0875		
VALIDATOR: ELR		LAB: LLI		DATE: 1/25/08	
			SDG: K0875		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J15L09	J15L90	J15L9P 1/24/07			
					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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

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

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

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

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

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

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

Comments: _____

PCB DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FB

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Comments: no PAS

no toxaphene MS/MSD or 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: 4,4-DDE 34% - J all
aroclor 1016 - 35% - J all (except 1260)

6. SYSTEM PERFORMANCE (Levels D and E)

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

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

Comments:

7. HOLDING TIMES (all levels)

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

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

Comments:

PCB DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

tox - all ave

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

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

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

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

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

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

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

Comments:

Date: 4 February 2008
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-BC Burial Grounds – Soil Full Protocol – Waste Site 100-B-23
Subject: Inorganics - Data Package No. K0875-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0875 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	Analyte
J156N9	7/16/07	Soil	C	See note 1
J156P0	7/16/07	Soil	C	See note 1
J156P1	7/16/07	Soil	C	See note 1

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

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

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

DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "UJ". 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 calcium, chromium, copper, sodium, and zinc result in sample J156P1 were qualified as undetected and flagged "UJ".

Due to method blank contamination, all molybdenum results were qualified as undetected and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

One field blank (J156P1) was submitted for analysis. Aluminum, barium, iron, potassium, magnesium, manganese, and silicon were detected in the equipment blank. Under the WCH statement of work, no qualification is required.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the

effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (58.4%), all antimony results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (131%), the calcium result in samples J156N9 and J156P0 were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

Due to RPDs outside QC limits, all chromium (35%), copper (34.2%), and vanadium (35.2%) results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J156N9/J156P0) were submitted for analysis. Laboratory duplicates are compared using the same criteria as for laboratory duplicates. The RPDs for chromium (57%) and vanadium (43%) were outside QC limits. Under the WCH statement of work, no qualification is required.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K0875 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to method blank contamination, the calcium, chromium, copper, sodium, and zinc result in sample J156P1 were qualified as undetected and flagged "UJ".
- Due to method blank contamination, all molybdenum results were qualified as undetected and flagged "UJ".
- Due to a matrix spike recovery outside QC limits (58.4%), all antimony results were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (131%), the calcium result in samples J156N9 and J156P0 were qualified as estimates and flagged "J".
- Due to RPDs outside QC limits, all chromium (35%), copper (34.2%), and vanadium (35.2%) results were qualified as estimates and flagged "J".

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

REFERENCES

Fluor Hanford Data Validation Contract #29776 (June 2006), *Validation Statement of Work*, through Washington Closure Hanford Work Order #WB6081.

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K1006	REVIEWER: ELR	Project: 116-C-3	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Calcium Chromium Copper Sodium Zinc	UJ	J156P1	Method blank contamination
Molybdenum	UJ	All	Method blank contamination
Antimony	J	All	MS recovery
Calcium	J	J156N9, J156P0	MS recovery
Chromium Copper Vanadium	J	All	RPD

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

Appendix 3

Annotated Laboratory Reports

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 08/01/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

PLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
01	J156N9	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Aluminum, Total	4430	MG/KG	1.7	1.0
		Arsenic, Total	4.4	MG/KG	0.39	1.0
		Boron, Total	3.2	MG/KG	0.34	1.0
		Barium, Total	71.8	MG/KG	0.02	1.0
		Beryllium, Total	0.15	MG/KG	0.01	1.0
		Calcium, Total	5100 J	MG/KG	0.68	1.0
		Cadmium, Total	0.10	MG/KG	0.05	1.0
		Cobalt, Total	6.6	MG/KG	0.08	1.0
		Chromium, Total	7.3 J	MG/KG	0.1	1.0
		Copper, Total	15.5 J	MG/KG	0.09	1.0
		Iron, Total	14300	MG/KG	0.32	1.0
		Mercury, Total	1.4	MG/KG	0.01	1.0
		Potassium, Total	901	MG/KG	3.0	1.0
		Magnesium, Total	3310	MG/KG	0.77	1.0
		Manganese, Total	261	MG/KG	0.07	1.0
		Molybdenum, Total	0.49 UJ	MG/KG	0.15	1.0
		Sodium, Total	156	MG/KG	0.67	1.0
		Nickel, Total	8.3	MG/KG	0.26	1.0
		Lead, Total	6.7	MG/KG	0.31	1.0
		Antimony, Total	0.21 uJ	MG/KG	0.21	1.0
		Selenium, Total	0.57	MG/KG	0.41	1.0
		Silicon, Total	1230	MG/KG	0.82	1.0
		Vanadium, Total	27.9 J	MG/KG	0.08	1.0
		Zinc, Total	34.3	MG/KG	0.04	1.0

MG/KG added entry MJ 8/1/07

2/1/08

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 08/01/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

FLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
2	J156P0	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Aluminum, Total	5870	MG/KG	1.7	1.0
		Arsenic, Total	3.2	MG/KG	0.39	1.0
		Boron, Total	2.6	MG/KG	0.35	1.0
		Barium, Total	71.5	MG/KG	0.02	1.0
		Beryllium, Total	0.09	MG/KG	0.01	1.0
		Calcium, Total	5550 J	MG/KG	0.68	1.0
		Cadmium, Total	0.11	MG/KG	0.05	1.0
		Cobalt, Total	7.7	MG/KG	0.08	1.0
		Chromium, Total	13.1 J	MG/KG	0.1	1.0
		Copper, Total	16.3 J	MG/KG	0.09	1.0
		Iron, Total	18100	MG/KG	0.33	1.0
		Mercury, Total	1.3	MG/KG	0.02	1.0
		Potassium, Total	1080	MG/KG	3.1	1.0
		Magnesium, Total	4070	MG/KG	0.78	1.0
		Manganese, Total	282	MG/KG	0.07	1.0
		Molybdenum, Total	0.73 UJ	MG/KG	0.15	1.0
		Sodium, Total	218	MG/KG	0.67	1.0
		Nickel, Total	11.7	MG/KG	0.26	1.0
		Lead, Total	6.9	MG/KG	0.32	1.0
		Antimony, Total	0.27 J	MG/KG	0.21	1.0
		Selenium, Total	0.55	MG/KG	0.41	1.0
		Silicon, Total	924	MG/KG	0.83	1.0
		Vanadium, Total	42.9 J	MG/KG	0.08	1.0
		Zinc, Total	42.2	MG/KG	0.04	1.0

2/1/08

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 08/01/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

PLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
3	J156P1	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Aluminum, Total	46.8	MG/KG	1.7	1.0
		Arsenic, Total	0.40 u	MG/KG	0.40	1.0
		Boron, Total	0.35 u	MG/KG	0.35	1.0
		Barium, Total	1.2	MG/KG	0.02	1.0
		Beryllium, Total	0.01 u	MG/KG	0.01	1.0
		Calcium, Total	21.8 UJ	MG/KG	0.69	1.0
		Cadmium, Total	0.05 u	MG/KG	0.05	1.0
		Cobalt, Total	0.08 u	MG/KG	0.08	1.0
		Chromium, Total	0.19 UJ	MG/KG	0.1	1.0
		Copper, Total	0.29 UJ	MG/KG	0.09	1.0
		Iron, Total	106	MG/KG	0.33	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	24.2	MG/KG	3.1	1.0
		Magnesium, Total	7.0	MG/KG	0.79	1.0
		Manganese, Total	5.0	MG/KG	0.07	1.0
		Molybdenum, Total	0.25 UJ	MG/KG	0.16	1.0
		Sodium, Total	11.4 UJ	MG/KG	0.68	1.0
		Nickel, Total	0.26 u	MG/KG	0.26	1.0
		Lead, Total	0.32 u	MG/KG	0.32	1.0
		Antimony, Total	0.21 uJ	MG/KG	0.21	1.0
		Selenium, Total	0.42 u	MG/KG	0.42	1.0
		Silicon, Total	66.0	MG/KG	0.84	1.0
		Vanadium, Total	0.08 uJ	MG/KG	0.08	1.0
		Zinc, Total	2.4 UJ	MG/KG	0.04	1.0

2/1/08

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-020
LVL#: 0707L603
SDG/SAF#: K0875/RC-020

W.O.#: 11343-606-001-9999-00
Date Received: 07-18-07

METALS CASE NARRATIVE

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

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

1. This narrative covers the analyses of 3 soil samples.

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

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

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

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

6. The preparation/method blanks for 3 analytes were 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 results for Calcium, Sodium, and Zinc were greater than the Practical Quantitation Limit (PQL) {3 x the (IDL) Instrument Detection Level} and sample J156N9 for Sodium, and sample J156P1 for Calcium, Sodium, and Zinc, 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.

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

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 19 pages.

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

8. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

9. The matrix spike (MS) recoveries for 7 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J156N9	Aluminum	22,000	98.0
	Calcium	22,000	92.2
	Iron	22,000	118.8
	Manganese	2,000	96.0
	Antimony	100	96.2
	Silicon	2,100	91.3

11. The duplicate analyses for 14 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

8/9/07
Date

jjw/m07-603

LVLI
LIONVILLE LABORATORY INC.

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Date Turnaround
C. Martinez	C. Martinez	509-539-2816	KESSNER, JH	21 days	8D

Project Designation	Sampling Location	SAF No.
100-BC Burial Grounds - Soil Full Protocol	100-B-23 treated wood sites	RC-020

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
ERC-02-609	EFL1173-13	R10B232000	FED EX

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
EBERLINE SERVICES/ LIONVILLE	A070381	see OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

cool 4 degrees

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	G/P	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1					
Volume	250mL	120mL	120mL	250mL	250mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	Pesticides - 8081	TPH (Total) - 418.1					

Sample No.	Matrix *	Sample Date	Sample Time									
J156N9	SOIL	07/16/07	1345	✓	✓	✓	✓	✓				
J156P0	SOIL	07/16/07	1350	✓	✓	✓	✓	✓				
J156P1	SOIL	07/16/07	1253	✓	n/a	✓	n/a	n/a				

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Martinez / C. Martinez	07/16/07 1700	3728 3B	07/16/07 1700
3728 3B	7-17-07 0900	[illegible]	7-17-07 0900
[illegible] / [illegible]	7-17-07 1500	FED EX	
Fed Ex	7-18-07 0935	[illegible]	7-18-07 0935

SPECIAL INSTRUCTIONS

None

(1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7470 - (CV)

Sampler unavailable to relinquish samples from 3728 Ref # 3B. 3728 Custodian removed samples for shipping on 7/17/07.

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

WCH-EF-011

00000018

00000042

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-B-23			DATA PACKAGE: K0875		
VALIDATOR: BLR		LAB: LLI		DATE: 1/25/08	
			SDG: K0875		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J156N9 J156P0 J156P1					
					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: Calcium, chromium, copper, sodium, zinc molybdenum - all UJ

FD - 7 analytes

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

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

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

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

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

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

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

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

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

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

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

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

Comments: MS - antimony - J all no PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: Chromium (35%), copper (34.2%) vanadium (33.2%) - Jal

FD - Chromium (57%) vanadium (43%)

6. ICP QUALITY CONTROL (Levels D and E)

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

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

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

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

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

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

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

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

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

Comments: _____

8. HOLDING TIMES (all levels)

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

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments: _____

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 08/01/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

PLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
MK1	07L0329-MB1	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Aluminum, Total	1.8 u	MG/KG	1.8	1.0
		Arsenic, Total	0.40 u	MG/KG	0.40	1.0
		Boron, Total	0.35 u	MG/KG	0.35	1.0
		Barium, Total	0.02 u	MG/KG	0.02	1.0
		Beryllium, Total	0.01 u	MG/KG	0.01	1.0
		Calcium, Total	7.0	MG/KG	0.70	1.0
		Cadmium, Total	0.05 u	MG/KG	0.05	1.0
		Cobalt, Total	0.08 u	MG/KG	0.08	1.0
		Chromium, Total	0.15	MG/KG	0.1	1.0
		Copper, Total	0.21	MG/KG	0.09	1.0
		Iron, Total	2.0	MG/KG	0.33	1.0
		Potassium, Total	3.1 u	MG/KG	3.1	1.0
		Magnesium, Total	0.95	MG/KG	0.79	1.0
		Manganese, Total	0.07 u	MG/KG	0.07	1.0
		Molybdenum, Total	0.19	MG/KG	0.16	1.0
		Sodium, Total	10.2	MG/KG	0.69	1.0
		Nickel, Total	0.26 u	MG/KG	0.26	1.0
		Lead, Total	0.32 u	MG/KG	0.32	1.0
		Antimony, Total	0.22 u	MG/KG	0.22	1.0
		Selenium, Total	0.42 u	MG/KG	0.42	1.0
		Silicon, Total	0.93	MG/KG	0.84	1.0
		Vanadium, Total	0.08 u	MG/KG	0.08	1.0
		Zinc, Total	1.0	MG/KG	0.04	1.0
MK1	07C0125-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 08/01/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

PLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
1	J156N9	Silver, Total	4.4	0.09u	4.8	91.7	1.0
		Aluminum, Total	6350	4430	190	1009 *	1.0
		Arsenic, Total	166	4.4	190	84.9	1.0
		Boron, Total	85.8	3.2	95.2	86.8	1.0
		Barium, Total	252	71.8	190	94.4	1.0
		Beryllium, Total	4.4	0.15	4.8	88.6	1.0
		Calcium, Total	8230	5100	2380	131.5	1.0
		Cadmium, Total	4.4	0.10	4.8	89.5	1.0
		Cobalt, Total	52.2	6.6	47.6	95.8	1.0
		Chromium, Total	27.5	7.3	19.0	106.3	1.0
		Copper, Total	38.3	15.5	23.8	95.8	1.0
		Iron, Total	17900	14300	95.2	3767 *	1.0
		Mercury, Total	1.3	1.4	0.14	-56. *	1.0
		Potassium, Total	3230	901	2380	97.7	1.0
		Magnesium, Total	6110	3310	2380	117.6	1.0
		Manganese, Total	365	261	47.6	218.5*	1.0
		Molybdenum, Total	88.4	0.49	95.2	92.3	1.0
		Sodium, Total	2390	156	2380	93.7	1.0
		Nickel, Total	52.8	8.3	47.6	93.5	1.0
		Lead, Total	50.0	6.7	47.6	91.0	1.0
		Antimony, Total	27.8	0.21u	47.6	58.4	1.0
		Selenium, Total	163	0.57	190	85.4	1.0
		Silicon, Total	1280	1230	95.2	54.1*	1.0
		Vanadium, Total	84.5	27.9	47.6	118.9	1.0
		Zinc, Total	85.9	34.3	47.6	108.4	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 08/01/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

PLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
1REP	J156N9	Silver, Total	0.09u	0.09u	NC	1.0
		Aluminum, Total	4430	5400	19.8	1.0
		Arsenic, Total	4.4	2.9	41.1	1.0
		Boron, Total	3.2	2.3	32.7	1.0
		Barium, Total	71.8	73.7	2.6	1.0
		Beryllium, Total	0.15	0.11	25.5	1.0
		Calcium, Total	5100	6590	25.5	1.0
		Cadmium, Total	0.10	0.16	45.7	1.0
		Cobalt, Total	6.6	7.1	7.3	1.0
		Chromium, Total	7.3	10.4	35.0	1.0
		Copper, Total	15.5	21.9	34.2	1.0
		Iron, Total	14300	16400	13.4	1.0
		Mercury, Total	1.4	1.4	2.4	1.0
		Potassium, Total	901	986	9.0	1.0
		Magnesium, Total	3310	2870	15.5	1.0
		Manganese, Total	261	260	0.23	1.0
		Molybdenum, Total	0.49	0.92	61.9	1.0
		Sodium, Total	156	192	20.5	1.0
		Nickel, Total	8.3	10.5	23.4	1.0
		Lead, Total	6.7	6.8	1.5	1.0
		Antimony, Total	0.21u	0.24	see 2nd corrected value	1.0
		Selenium, Total	0.57	0.91	46.0	1.0
		Silicon, Total	1230	1060	15.4	1.0
		Vanadium, Total	27.9	39.8	35.2	1.0
		Zinc, Total	34.3	42.5	21.4	1.0

PMS 8/8/07

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 08/01/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

PLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
1	07L0329-LC1	Silver, LCS	46.2	49.0	MG/KG	94.3
		Aluminum, LCS	441	490	MG/KG	90.0
		Arsenic, LCS	867	980	MG/KG	88.5
		Boron, LCS	448	490	MG/KG	91.4
		Barium, LCS	458	490	MG/KG	93.4
		Beryllium, LCS	22.9	24.5	MG/KG	93.5
		Calcium, LCS	2330	2450	MG/KG	94.9
		Cadmium, LCS	22.8	24.5	MG/KG	93.1
		Cobalt, LCS	234	245	MG/KG	95.6
		Chromium, LCS	46.4	49.0	MG/KG	94.7
		Copper, LCS	114	122	MG/KG	92.8
		Iron, LCS	452	490	MG/KG	92.2
		Potassium, LCS	2170	2450	MG/KG	88.6
		Magnesium, LCS	2270	2450	MG/KG	92.6
		Manganese, LCS	70.4	73.5	MG/KG	95.8
		Molybdenum, LCS	461	490	MG/KG	94.0
		Sodium, LCS	2170	2450	MG/KG	88.7
		Nickel, LCS	183	196	MG/KG	93.5
		Lead, LCS	229	245	MG/KG	93.4
		Antimony, LCS	269	294	MG/KG	91.6
		Selenium, LCS	856	980	MG/KG	87.4
		Silicon, LCS	435	490	MG/KG	88.9
		Vanadium, LCS	235	245	MG/KG	95.9
		Zinc, LCS	91.3	98.0	MG/KG	93.2
1	07C0125-LC1	Mercury, LCS	2.9	2.8	MG/KG	102.6

Date: 4 February 2008
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-BC Burial Grounds – Soil Full Protocol – Waste Site 100-B-23
Subject: Wet Chemistry - Data Package No. K0875-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0875 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	Analyte
J156N9	7/16/07	Soil	C	See note 1
J156P0	7/16/07	Soil	C	See note 1

1 – Petroleum hydrocarbons by 9071/418.1.

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

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. 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 within14 days for petroleum hydrocarbons.

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 holding time being exceeded by less than twice the limit, all petroleum hydrocarbon results 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 130% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J156N9/J156P0) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All petroleum hydrocarbon results exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package K0875 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to the holding time being exceeded by less than twice the limit, all petroleum hydrocarbon results were qualified as estimates and flagged "J".

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

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

REFERENCES

Fluor Hanford Data Validation Contract #29776 (June 2006), *Validation Statement of Work*, through Washington Closure Hanford Work Order #WB6081.

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0875	REVIEWER: ELR	Project: 100-B-23	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	All	Hold time

* - 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

Annotated Laboratory Reports

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 08/06/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603
K ORDER: 11343-606-001-9999-00

PLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
1	J156N9	% Solids	100	%	0.01	1.0
		Petroleum Hydrocarbons	133	u J MG/KG	133	1.0
2	J156P0	% Solids	100	%	0.01	1.0
		Petroleum Hydrocarbons	133	u J MG/KG	133	1.0
3	J156P1	% Solids	100	%	0.01	1.0

K 2/1/08

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-020 K0875
LVL#: 0707L603

W.O.#: 11343-606-001-9999-00
Date Received: 07-18-07

INORGANIC NARRATIVE

1. This narrative covers the analyses of 3 soil samples.

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

   LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvLI certifies that all test results meet the requirements of NELAC with any exception noted in the following statements.

3. Sample holding times as required by the method and/or contract were met.

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

5. The method blank for Petroleum Hydrocarbons (PHC) was within the method criteria.

6. The Laboratory Control Sample (LCS) for PHC was within the laboratory control limits.

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

8. The replicate analyses for Percent Solids and PHC were within the 20% Relative Percent Difference (RPD) control limit.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

8/6/07
Date

njp\i07-603

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 11 pages.

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

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround
C. Martinez	C. Martinez	509-539-2816	KESSNER, JH	21 days	8D

Project Designation	Sampling Location	SAF No.
100-BC Burial Grounds - Soil Full Protocol	100-B-23 treated wood sites	RC-020

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
ERC-02-009	EFL1173-13	R10B232000	FED EX

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
EBERLINE SERVICES LIONVILLE	A070381	see OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

cool 4 degrees

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C						
Type of Container	G/P	aG	aG	aG	aG						
No. of Container(s)	1	1	1	1	1						
Volume	250mL	120mL	120mL	250mL	250mL						
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	Pesticides - 8081	TPH (Total) - 418.1						
Sample No. / Matrix * / Sample Date / Sample Time											
J156N9 / SOIL / 07/16/07 / 1345	✓	✓	✓	✓	✓						
J156P0 / SOIL / 07/16/07 / 1350	✓	✓	✓	✓	✓						
J156P1 / SOIL / 07/16/07 / 1253	✓	n/a	✓	n/a	n/a						

000013

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Martinez / C. Martinez	07/16/07 1700	3728 3B	07/16/07 1700
3728 3B	7-17-07 0900	K.M. Singleton	7-17-07 0900
K.M. Singleton	7-17-07 1500	FED EX	
Fed Ex	7-18-07 0935	Peter Kennedy	7-18-07 0935

SPECIAL INSTRUCTIONS

None

(1) ICP Metals - 6010TR (Client List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7470 - (CV)

Sampler unavailable to relinquish samples from 3728 Ref # 3B. 3728 Custodian removed samples for shipping on 7/17/07.

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

WCH-EE-01

000000000

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-020 K0875

RECEIVED
AUG 2007

TE RECEIVED: 07/18/07 LVL LOT # :07[illegible]603

IENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
56N9						
SOLIDS	001	S	07L%S083	07/16/07	07/24/07	07/25/07
TROLEUM HYDROCARBO	001	S	07LHC029	07/16/07	08/01/07	08/02/07
56P0						
SOLIDS	002	S	07L%S083	07/16/07	07/24/07	07/25/07
TROLEUM HYDROCARBO	002	S	07LHC029	07/16/07	08/01/07	08/02/07
TROLEUM HYDROCARBO	002 REP	S	07LHC029	07/16/07	08/01/07	08/02/07
TROLEUM HYDROCARBO	002 MS	S	07LHC029	07/16/07	08/01/07	08/02/07
56P1						
SOLIDS	003	S	07L%S083	07/16/07	07/24/07	07/25/07
SOLIDS	003 REP	S	07L%S083	07/16/07	07/24/07	07/25/07
QC:						
TROLEUM HYDROCARBO	MB1	S	07LHC029	N/A	08/01/07	08/02/07
TROLEUM HYDROCARBO	MB1 BS	S	07LHC029	N/A	08/01/07	08/02/07

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-B-23		DATA PACKAGE:	K0875	
VALIDATOR:	BLR	LAB: LLI		DATE: 1/23/07	
			SDG:	K0875	

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
J15GN9 J15GP0
Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

Comments:

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FB

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

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

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

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

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

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

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

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

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

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

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

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

Comments: no PAS

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

6. HOLDING TIMES (all levels)

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

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

Comments:

all - <2x Hold time - J all

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments: all over

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 08/06/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

PLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
NK10	07LHC029-MB1	Petroleum Hydrocarbons	133	u	MG/KG	133	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 08/06/07

:ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603

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

:PLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
:2	J156P0	Petroleum Hydrocarbons	545	54.8	555	88.5	1.0
:NK10	07LHC029-MB1	Petroleum Hydrocarbons	561	133 u	555	101.1	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 08/06/07

ENT: TNUHANFORD RC-020 K0875 LVL LOT #: 0707L603
K ORDER: 11343-606-001-9999-00

PLE	SITE ID	ANALYTE	INITIAL RESULT		REPLICATE		RPD	DILUTION FACTOR (REP)
2REP	J156P0	Petroleum Hydrocarbons	133	u	132	u	NC	1.0
3REP	J156P1	% Solids	100		100		0.00	1.0