0070875

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

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2) H9-02 JE 08/28/06
INITIAL/DATE

SDG K0328 SAF-RC-051

Sample Location/Waste Site: 600-204

RECEIVED
SEP 25 2006
EDMC

Date: 23 August 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Radiochemistry - Data Package No. K0328-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0328 prepared by Eberline Services (EB). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J11K41	4/24/06	Soil	C	See note 1
J11K42	4/24/06	Soil	C	See note 1
J11K43	4/24/06	Soil	C	See note 1
J11K44	4/24/06	Soil	C	See note 1
J11K45	4/24/06	Soil	C	See note 1

1– Total strontium, alpha spectroscopy and gamma spectroscopy.

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

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

DATA QUALITY PARAMETERS

- **Holding Times**

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

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

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

All blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

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

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

All other accuracy results were acceptable.

- **Laboratory Duplicates**

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

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

Due to an RPD outside QC limits (45%), all radium-226 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicates

No field duplicates were submitted for analysis.

- **Detection Levels**

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

- **Completeness**

Data package No. K0328 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

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

- Due to an RPD outside QC limits (45%), all radium-226 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.

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

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0328	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Radium-226	J	All	RPD
Thorium-228 Thorium-232	J	All	No LCS

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: EB											
Case	SDG: K0328										
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Total strontium	1	-0.010	U	0.041	U	0.135	U	0.016	U	0.030	U
Thorium-228	1	0.307	UJ	0.410	UJ	0.330	UJ	0.461	UJ	0.357	UJ
Thorium-230		0.305	U	0.326	U	0.164	U	0.393	U	0.178	U
Thorium-232	1	0.697	J	0.163	UJ	0.328	UJ	0.327	UJ	0.355	J
Uranium-233/234	1	0.226	U	0.105	U	0.200	U	0.080	U	0.135	U
Uranium-235	1	0	U	0	U	0	U	0	U	0	U
Uranium-238	1	0.226	U	0.245	U	0.228		0.320		0.270	
Plutonium-238	1	0.051	U	0.038	U	0	U	0	U	-0.056	U
Plutonium-239/234		0	U	0.038	U	0	U	0.061	U	0.019	U
Potassium-40		11.3		8.80		11.8		9.92		10.2	
Cobalt 60	0.05	U	U*	U	U*	U	U*	U	U*	U	U*
Cesium 137	0.1	0.156		0.127		0.113		U	U*	0.111	
Radium-226	0.1	0.607	J	0.323	J	0.564	J	0.359	J	0.474	J
Radium-228	0.2	0.706		0.761		0.801		0.581		0.610	
Europium 152	0.1	U	U*	U	U*	U	U*	U	U*	U	U*
Europium 154	0.1	U	U*	U	U*	U	U*	U	U*	U	U*
Europium 155		U	U*	U	U*	U	U*	U	U*	U	U*
Thorium-228(gea)		0.537		0.458		0.712		0.544		0.766	
Thorium-232(gea)		0.706		0.761		0.801		0.581		0.610	
Uranium-235(gea)		U	U	U	U	U	U	U	U	U	U
Uranium-238(gea)		U	U	U	U	U	U	U	U	U	U
Americium-241(gea)		U	U	U	U	U	U	U	U	U	U
Cesium-134		U	U	U	U	U	U	U	U	U	U

* - RQL exceeded

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

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0328

R604193-01 J11K41

DATA SHEET

SDG	7427	Client/Case no	Hanford	SDG K0328	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R604193-01	Client sample id	J11K41		
Dept sample id	7427-001	Location/Matrix	600--204	SOLID	
Received	04/26/06	Collected/Weight	04/24/06 10:00	401 g	
% solids	100.0	Custody/SAF No	RC-051-229	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.010	0.091	0.18	1.0	U	SR
Thorium 228	14274-82-9	0.307	0.26	0.42	1.0	U J	TH
Thorium 230	14269-63-7	0.305	0.26	0.33	1.0	U	TH
Thorium 232	TH-232	0.697	0.35	0.33	1.0	J	TH
Uranium 233/234	U-233/234	0.226	0.19	0.25	1.0	U	U
Uranium 235	15117-96-1	0	0.078	0.30	1.0	U	U
Uranium 238	U-238	0.226	0.19	0.25	1.0	U	U
Plutonium 238	13981-16-3	0.051	0.10	0.20	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.051	0.20	1.0	U	PU
Potassium 40	13966-00-2	11.3	1.3	0.65			GAM
Cobalt 60	10198-40-0	U		0.077	0.050	U	GAM
Cesium 137	10045-97-3	0.156	0.074	0.084	0.10		GAM
Radium 226	13982-63-3	0.607	0.14	0.13	0.10	J	GAM
Radium 228	15262-20-1	0.706	0.33	0.33	0.20		GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.26	0.10	U	GAM
Europium 155	14391-16-3	U		0.18	0.10	U	GAM
Thorium 228	14274-82-9	0.537	0.075	0.080			GAM
Thorium 232	TH-232	0.706	0.33	0.33			GAM
Uranium 235	15117-96-1	U		0.28		U	GAM
Uranium 238	U-238	U		9.3		U	GAM
Americium 241	14596-10-2	U		0.31		U	GAM
Cesium 134	13967-70-9	U		0.084		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0328

R604193-02 J11K42

DATA SHEET

SDG	7427	Client/Case no	Hanford	SDG K0328	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R604193-02	Client sample id	J11K42		
Dept sample id	7427-002	Location/Matrix	600--204	SOLID	
Received	04/26/06	Collected/Weight	04/24/06 14:15	401 g	
% solids	100.0	Custody/SAF No	RC-051-229	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.041	0.12	0.23	1.0	U	SR
Thorium 228	14274-82-9	0.410	0.50	0.63	1.0	U J	TH
Thorium 230	14269-63-7	0.326	0.33	0.62	1.0	U	TH
Thorium 232	TH-232	0.163	0.16	0.62	1.0	U J	TH
Uranium 233/234	U-233/234	0.105	0.14	0.27	1.0	U	U
Uranium 235	15117-96-1	0	0.085	0.32	1.0	U	U
Uranium 238	U-238	0.245	0.21	0.27	1.0	U	U
Plutonium 238	13981-16-3	0.038	0.15	0.37	1.0	U	PU
Plutonium 239/240	PU-239/240	0.038	0.076	0.29	1.0	U	PU
Potassium 40	13966-00-2	8.80	2.6	0.70			GAM
Cobalt 60	10198-40-0	U		0.083	0.050	U	GAM
Cesium 137	10045-97-3	0.127	0.064	0.075	0.10		GAM
Radium 226	13982-63-3	0.323	0.18	0.16	0.10	J	GAM
Radium 228	15262-20-1	0.761	0.34	0.32	0.20		GAM
Europium 152	14683-23-9	U		0.18	0.10	U	GAM
Europium 154	15585-10-1	U		0.28	0.10	U	GAM
Europium 155	14391-16-3	U		0.21	0.10	U	GAM
Thorium 228	14274-82-9	0.458	0.092	0.098			GAM
Thorium 232	TH-232	0.761	0.34	0.32			GAM
Uranium 235	15117-96-1	U		0.26		U	GAM
Uranium 238	U-238	U		9.3		U	GAM
Americium 241	14596-10-2	U		0.27		U	GAM
Cesium 134	13967-70-9	U		0.097		U	GAM

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SAMPLE DELIVERY GROUP K0328

R604193-03 J11K43

DATA SHEET

SDG	7427	Client/Case no	Hanford	SDG K0328	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R604193-03	Client sample id	J11K43		
Dept sample id	7427-003	Location/Matrix	600--204	SOLID	
Received	04/26/06	Collected/Weight	04/24/06 10:00	400 g	
% solids	100.0	Custody/SAF No	RC-051-229	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.135	0.12	0.22	1.0	U	SR
Thorium 228	14274-82-9	0.330	0.33	0.42	1.0	U J	TH
Thorium 230	14269-63-7	0.164	0.33	0.42	1.0	U	TH
Thorium 232	TH-232	0.328	0.22	0.42	1.0	U J	TH
Uranium 233/234	U-233/234	0.200	0.17	0.22	1.0	U	U
Uranium 235	15117-96-1	0	0.069	0.26	1.0	U	U
Uranium 238	U-238	0.228	0.17	0.22	1.0		U
Plutonium 238	13981-16-3	0	0.056	0.21	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.056	0.21	1.0	U	PU
Potassium 40	13966-00-2	11.8	1.8	1.4			GAM
Cobalt 60	10198-40-0	U		0.10	0.050	U	GAM
Cesium 137	10045-97-3	0.113	0.084	0.11	0.10		GAM
Radium 226	13982-63-3	0.564	0.15	0.14	0.10	J	GAM
Radium 228	15262-20-1	0.801	0.35	0.36	0.20		GAM
Europium 152	14683-23-9	U		0.19	0.10	U	GAM
Europium 154	15585-10-1	U		0.30	0.10	U	GAM
Europium 155	14391-16-3	U		0.22	0.10	U	GAM
Thorium 228	14274-82-9	0.712	0.14	0.15			GAM
Thorium 232	TH-232	0.801	0.35	0.36			GAM
Uranium 235	15117-96-1	U		0.31		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.22		U	GAM
Cesium 134	13967-70-9	U		0.12		U	GAM

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SAMPLE DELIVERY GROUP K0328

R604193-04 J11K44

DATA SHEET

SDG	7427	Client/Case no	Hanford	SDG K0328	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R604193-04	Client sample id	J11K44		
Dept sample id	7427-004	Location/Matrix	600--204	SOLID	
Received	04/26/06	Collected/Weight	04/24/06 15:30	401 g	
% solids	100.0	Custody/SAF No	RC-051-229	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.016	0.12	0.25	1.0	U	SR
Thorium 228	14274-82-9	0.461	0.40	0.50	1.0	U J	TH
Thorium 230	14269-63-7	0.393	0.40	0.50	1.0	U	TH
Thorium 232	TH-232	0.327	0.26	0.50	1.0	U J	TH
Uranium 233/234	U-233/234	0.080	0.080	0.31	1.0	U	U
Uranium 235	15117-96-1	0	0.097	0.37	1.0	U	U
Uranium 238	U-238	0.320	0.24	0.31	1.0		U
Plutonium 238	13981-16-3	0	0.061	0.23	1.0	U	PU
Plutonium 239/240	PU-239/240	0.061	0.061	0.23	1.0	U	PU
Potassium 40	13966-00-2	9.92	2.7	0.85			GAM
Cobalt 60	10198-40-0	U		0.086	0.050	U	GAM
Cesium 137	10045-97-3	U		0.12	0.10	U	GAM
Radium 226	13982-63-3	0.359	0.15	0.14	0.10	J	GAM
Radium 228	15262-20-1	0.581	0.33	0.33	0.20		GAM
Europium 152	14683-23-9	U		0.18	0.10	U	GAM
Europium 154	15585-10-1	U		0.28	0.10	U	GAM
Europium 155	14391-16-3	U		0.21	0.10	U	GAM
Thorium 228	14274-82-9	0.544	0.13	0.13			GAM
Thorium 232	TH-232	0.581	0.33	0.33			GAM
Uranium 235	15117-96-1	U		0.26		U	GAM
Uranium 238	U-238	U		9.8		U	GAM
Americium 241	14596-10-2	U		0.26		U	GAM
Cesium 134	13967-70-9	U		0.092		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0328

R604193-05 J11K45

DATA SHEET

SDG	7427	Client/Case no	Hanford	SDG K0328	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R604193-05	Client sample id	J11K45		
Dept sample id	7427-005	Location/Matrix	600--204	SOLID	
Received	04/26/06	Collected/Weight	04/24/06 16:30	400 g	
% solids	100.0	Custody/SAF No	RC-051-229	RC-051	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.030	0.12	0.24	1.0	U	SR
Thorium 228	14274-82-9	0.357	0.36	0.68	1.0	U J	TH
Thorium 230	14269-63-7	0.178	0.36	0.68	1.0	U	TH
Thorium 232	TH-232	0.355	0.36	0.68	1.0	U J	TH
Uranium 233/234	U-233/234	0.135	0.14	0.26	1.0	U	U
Uranium 235	15117-96-1	0	0.082	0.31	1.0	U	U
Uranium 238	U-238	0.270	0.20	0.26	1.0		U
Plutonium 238	13981-16-3	-0.056	0.075	0.21	1.0	U	PU
Plutonium 239/240	PU-239/240	0.019	0.037	0.14	1.0	U	PU
Potassium 40	13966-00-2	10.2	1.5	0.90			GAM
Cobalt 60	10198-40-0	U		0.10	0.050	U	GAM
Cesium 137	10045-97-3	0.111	0.076	0.089	0.10		GAM
Radium 226	13982-63-3	0.474	0.18	0.19	0.10	J	GAM
Radium 228	15262-20-1	0.610	0.36	0.39	0.20		GAM
Europium 152	14683-23-9	U		0.21	0.10	U	GAM
Europium 154	15585-10-1	U		0.30	0.10	U	GAM
Europium 155	14391-16-3	U		0.20	0.10	U	GAM
Thorium 228	14274-82-9	0.766	0.15	0.16			GAM
Thorium 232	TH-232	0.610	0.36	0.39			GAM
Uranium 235	15117-96-1	U		0.31		U	GAM
Uranium 238	U-238	U		9.9		U	GAM
Americium 241	14596-10-2	U		0.22		U	GAM
Cesium 134	13967-70-9	U		0.10		U	GAM

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0328 was composed of five solid (soil) samples designated under SAF No. RC-051 with a Project Designation of: 100 & 300 Area Component of the RCBRA-Incremental So.

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

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. All results were transmitted to WCH via e-mail on June 8, 2006.

2.0 ANALYSIS NOTES

2.1 Total Strontium Analysis

No problems were encountered during the course of the analyses.

2.2 Isotopic Thorium Analysis

No problems were encountered during the course of the analyses.

2.3 Isotopic Uranium Analysis

No problems were encountered during the course of the analyses.

2.4 Isotopic Plutonium Analysis

No problems were encountered during the course of the analyses

2.5 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

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

Mel Mann
Melissa C. Mannion
Senior Program Manager

6/13/6
Date

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-229	Page 1 of 2

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L	Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 600--204 K0328 (7427)		SAF No. RC-051	Air Quality	
Ice Chest No.	Field Logbook No. EL-1596-1	COA BESRAS6520	Method of Shipment FED EX		
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

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

Preservation	None	None	None	None	None	None	None	None	None	None
Type of Container	G/P	G/P	'	'	'	^	^	^	^	^
No. of Container(s)	5	7	0	0	0	0	0	0	0	0
Volume	400g	30g	1'	1'	1'	1^	1^	1^	1^	1^
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Strontium-89,90 -- Total Sr	Isotopic Thorium (Thorium-228, Thorium-232)	Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238)	Isotopic Plutonium (Plutonium-238, Plutonium-239/240)	^	^^	^^^	^^^^	^^^^^

000018

Sample No.	Matrix *	Sample Date	Sample Time									
J11K41	SOIL	4-24-06	1000	1	3							
J11K42			1415	1	1							
J11K43			~~1450~~ 1000	1	1							
J11K44			~~1450~~ 1530	1	1							
J11K45			1630	1	1							

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth Tepper		CH2M Hill →	
Relinquished By/Removed From	Date/Time 11:30	Received By/Stored In	Date/Time 11:30
Elizabeth M Tepper	4-25-06	Fed Ex	4-25-06
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FED EX		MM	04/26/06 9:30
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

Matrix *

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

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

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

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	RCBRA		DATA PACKAGE:	K0328	
VALIDATOR:	TLF	LAB:	EB	DATE:	8/20/06
			SDG:	K0328	

ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			

SAMPLES/MATRIX					
J11K41	J11K42	J11K43	J11K44	J11K45	
					Soil

1. Completeness ..... ☐ N/A

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

_____

_____

_____

_____

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

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

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

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

Comments: _____

_____

_____

_____

_____

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

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

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

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

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

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

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

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

Comments: no FB

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

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

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

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

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

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

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

Comments: no th 228 or 232 LCS - J all

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

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

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

Comments: RA-224 - 4590 - J all

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

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

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

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

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

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

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

Comments: no field QC

12. Holding Times (All levels)

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

Comments:

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

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

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

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

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

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

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

Comments: 21 over

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0328

R604193-07 Method Blank

METHOD BLANK

SDG	7427	Client/Case no	Hanford	SDG K0328	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R604193-07	Client sample id	Method Blank		
Dept sample id	7427-007	Material/Matrix		SOLID	
		SAF No	RC-051		

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.028	0.11	0.22	1.0	U	SR
Thorium 228	14274-82-9	-0.152	0.15	0.73	1.0	U	TH
Thorium 230	14269-63-7	0	0.15	0.58	1.0	U	TH
Thorium 232	TH-232	0	0.15	0.58	1.0	U	TH
Uranium 233/234	U-233/234	0.036	0.071	0.27	1.0	U	U
Uranium 235	15117-96-1	0	0.086	0.33	1.0	U	U
Uranium 238	U-238	0	0.071	0.27	1.0	U	U
Plutonium 238	13981-16-3	0.149	0.18	0.23	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.059	0.23	1.0	U	PU
Potassium 40	13966-00-2	U		2.0		U	GAM
Cobalt 60	10198-40-0	U		0.087	0.050	U	GAM
Cesium 137	10045-97-3	U		0.13	0.10	U	GAM
Radium 226	13982-63-3	U		0.14	0.10	U	GAM
Radium 228	15262-20-1	U		0.30	0.20	U	GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.15	0.10	U	GAM
Thorium 228	14274-82-9	U		0.16		U	GAM
Thorium 232	TH-232	U		0.30		U	GAM
Uranium 235	15117-96-1	U		0.21		U	GAM
Uranium 238	U-238	U		7.8		U	GAM
Americium 241	14596-10-2	U		0.19		U	GAM
Cesium 134	13967-70-9	U		0.076		U	GAM

100&300Area Compnt RCBRA-Incrmntl So

QC-BLANK 56942

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/13/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0328

R604193-06

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7427

Contact Melissa C. Mannion

Client/Case no Hanford SDG K0328

Contract No. 630

Lab sample id R604193-06

Dept sample id 7427-006

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No RC-051

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Total Strontium	11.8	0.60	0.24	1.0		SR	10.8	0.43	109	81-119	80-120
Thorium 230	41.9	5.9	0.55	1.0		TH	40.4	1.6	104	76-124	80-120
Uranium 233/234	17.8	2.1	0.98	1.0		U	18.6	0.74	96	81-119	80-120
Uranium 235	15.4	1.9	0.25	1.0		U	15.1	0.60	102	79-121	80-120
Uranium 238	18.7	2.1	0.95	1.0		U	20.2	0.81	93	82-118	80-120
Plutonium 238	22.6	3.0	0.54	1.0		PU	23.8	0.95	95	79-121	80-120
Plutonium 239/240	23.6	3.0	0.34	1.0		PU	26.4	1.1	89	81-119	80-120
Cobalt 60	2.33	0.23	0.099	0.050		GAM	2.28	0.091	102	72-128	80-120
Cesium 137	2.48	0.21	0.14	0.10		GAM	2.38	0.095	104	72-128	80-120

100&300Area Compnt RCBRA-Incrmntl So

QC-LCS 56941

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 06/13/06

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0328

R604193-08 J11K41

DUPLICATE

SDG	7427			Client/Case no	Hanford SDG K0328
Contact	Melissa C. Mannion			Contract	No. 630
	DUPLICATE		ORIGINAL		
Lab sample id	R604193-08	Lab sample id	R604193-01	Client sample id	J11K41
Dept sample id	7427-008	Dept sample id	7427-001	Location/Matrix	600--204 SOLID
		Received	04/26/06	Collected/Weight	04/24/06 10:00 401 g
% solids	100.0	% solids	100.0	Custody/SAF No	RC-051-229 RC-051

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	DER σ
Total Strontium	0.092	0.11	0.20	1.0	U	SR	-0.010	0.091	0.18	U	-		1.4
Thorium 228	0.166	0.33	0.63	1.0	U	TH	0.307	0.26	0.42	U	-		0.7
Thorium 230	0.411	0.50	0.63	1.0	U	TH	0.305	0.26	0.33	U	-		0.4
Thorium 232	0.576	0.50	0.63	1.0	U	TH	0.697	0.35	0.33		19	144	0.4
Uranium 233/234	0.176	0.18	0.34	1.0	U	U	0.226	0.19	0.25	U	-		0.4
Uranium 235	0	0.11	0.41	1.0	U	U	0	0.078	0.30	U	-		0
Uranium 238	0.088	0.088	0.34	1.0	U	U	0.226	0.19	0.25	U	-		1.3
Plutonium 238	0.117	0.23	0.37	1.0	U	PU	0.051	0.10	0.20	U	-		0.5
Plutonium 239/240	-0.039	0.078	0.30	1.0	U	PU	0	0.051	0.20	U	-		0.8
Potassium 40	9.65	1.3	0.95			GAM	11.3	1.3	0.65		16	41	1.1
Cobalt 60	U		0.076	0.050	U	GAM	U		0.077	U	-		0
Cesium 137	0.178	0.083	0.090	0.10		GAM	0.156	0.074	0.084		13	105	0.4
Radium 226	0.384	0.16	0.17	0.10		GAM	0.607	0.14	0.13		45	72	1.9
Radium 228	0.728	0.28	0.30	0.20		GAM	0.706	0.33	0.33		3	96	0.1
Europium 152	U		0.18	0.10	U	GAM	U		0.16	U	-		0.2
Europium 154	U		0.26	0.10	U	GAM	U		0.26	U	-		0
Europium 155	U		0.18	0.10	U	GAM	U		0.18	U	-		0
Thorium 228	0.520	0.087	0.095			GAM	0.537	0.075	0.080		3	46	0.2
Thorium 232	0.728	0.28	0.30			GAM	0.706	0.33	0.33		3	96	0.1
Uranium 235	U		0.30		U	GAM	U		0.28	U	-		0.1
Uranium 238	U		9.9		U	GAM	U		9.3	U	-		0.1
Americium 241	U		0.39		U	GAM	U		0.31	U	-		0.3
Cesium 134	U		0.10		U	GAM	U		0.084	U	-		0.2

100&300Area Compnt RCBRA-Incrmntl So

QC-DUP#1 56943

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	06/13/06

Date: 23 August 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Semivolatile - Data Package No. K0328-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0328 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J11K41	4/24/06	Soil	C	See note 1
J11K42	4/24/06	Soil	C	See note 1
J11K43	4/24/06	Soil	C	See note 1
J11K44	4/24/06	Soil	C	See note 1
J11K45	4/24/06	Soil	C	See note 1

1 – Semivolatiles by 8270C and PAHs by 8310.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan (DOE/RL-2005-42, Rev. 0, October 2005). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times & Sample Preservation**

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

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

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

All holding times were acceptable.

- **Method Blanks**

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

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

All other method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to

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

Due to matrix spike recoveries outside QC limits, all 2-methylphenol (56%), 4-methylphenol (55%), 4-nitroanaline (43%), carbazole(58%), indeno(1,2,3-cd)pyrene (50%) and benzo(g,h,i)perylene (43%) were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (31% & 46%), all 2,4-dimethylphenol results were qualified as estimates and flagged "J".

Due to LCS recoveries outside QC limits, all 2,4-dimethylphenol (44%) and 2,4-dinitrophenol (15%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

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

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes.

Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-20%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to an RPD outside QC limits (39%), all 2,4-dimethylphenol results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (31%), all pyrene results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (31%), all butylbenzylphthalate results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (32%), all di-n-octylphthalate results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (30.3%), all phenanthrene results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (31%), all bis(2-ethylhexyl)phthalate results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K0328 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, all detected phenanthrene, bis(2-ethylhexyl)phthalate and di-n-butylphthalate results were qualified as undetected, raised to the RQL and flagged "U".

- Due to matrix spike recoveries outside QC limits, all 2-methylphenol (56%), 4-methylphenol (55%), 4-nitroanaline (43%), carbazole(58%), indeno(1,2,3-cd)pyrene (50%) and benzo(g,h,i)perylene (43%) were qualified as estimates and flagged "J".

- Due to matrix spike and matrix spike duplicate recoveries outside QC limits (31% & 46%), all 2,4-dimethylphenol results were qualified as estimates and flagged "J".

- Due to LCS recoveries outside QC limits, all 2,4-dimethylphenol (44%) and 2,4-dinitrophenol (15%) results were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits (39%), all 2,4-dimethylphenol results were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits (31%), all pyrene results were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits (31%), all butylbenzylphthalate results were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits (32%), all di-n-octylphthalate results were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits (30.3%), all phenanthrene results were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits (31%), all bis(2-ethylhexyl)phthalate results were qualified as estimates and flagged "J".

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

Forty analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

SEMVOLATILE DATA QUALIFICATION SUMMARY*

SDG: K0328	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Phenanthrene Bis(2-ethylhexyl)phthalate Di-n-butylphthalate	U at RQL	All detected analytes	Method blank contaminantion
2-Methylphenol 4-Methylphenol 4-Nitroanaline Carbazole Indeno(1,2,3-cd)pyrene Benzo(g,h,i)perylene	J	All	MS recovery
2,4-Dimethylphenol	J	All	MS & MSD recovery
2,4-Dimethylphenol 2,4-Dinitrophenol	J	All	LCS recovery
2,4-Dimethylphenol Pyrene Butylbenzylphthalate Di-n-octylphthalate Phenanthrene Bis(2-ethylhexyl)phthalate	J	All	RPD

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI	SDG: K0328										
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Extraction Date		5/4/06		5/4/06		5/4/06		5/4/06		5/4/06	
Analysis Date		5/9/06		5/9/06		5/9/06		5/11/06		5/11/06	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol		330	U	330	U	330	U	330	U	330	U
bis(2-Chloroethyl)ether		330	U	330	U	330	U	330	U	330	U
2-Chlorophenol		330	U	330	U	330	U	330	U	330	U
1,3-Dichlorobenzene		330	U	330	U	330	U	330	U	330	U
1,4-Dichlorobenzene		330	U	330	U	330	U	330	U	330	U
1,2-Dichlorobenzene	330	330	U	330	U	330	U	330	U	330	U
2-Methylphenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
2,2'-oxybis(1-chloropropane)		330	U	330	U	330	U	330	U	330	U
3 and/or 4-Methylphenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
N-Nitroso-di-n-propylamine		330	U	330	U	330	U	330	U	330	U
Hexachloroethane		330	U	330	U	330	U	330	U	330	U
Nitrobenzene		330	U	330	U	330	U	330	U	330	U
Isophorone		330	U	330	U	330	U	330	U	330	U
2-Nitrophenol		330	U	330	U	330	U	330	U	330	U
2,4-Dimethylphenol		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
bis(2-Chloroethoxy)methane		330	U	330	U	330	U	330	U	330	U
2,4-Dichlorophenol		330	U	330	U	330	U	330	U	330	U
1,2,4-Trichlorobenzene	330	330	U	330	U	330	U	330	U	330	U
Naphthalene		330	U	330	U	330	U	330	U	330	U
4-Chloroaniline		330	U	330	U	330	U	330	U	330	U
Hexachlorobutadiene		330	U	330	U	330	U	330	U	330	U
4-Chloro-3-methylphenol		330	U	330	U	330	U	330	U	330	U
2-Methylnaphthalene		330	U	330	U	330	U	330	U	330	U
Hexachlorocyclopentadiene		330	U	330	U	330	U	330	U	330	U
2,4,6-Trichlorophenol	330	330	U	330	U	330	U	330	U	330	U
2,4,5-Trichlorophenol	330	830	U	830	U	830	U	830	U	830	U
2-Chloronaphthalene		330	U	330	U	330	U	330	U	330	U
2-Nitroaniline		830	U	830	U	830	U	830	U	830	U
Dimethylphthalate		330	U	330	U	330	U	330	U	330	U
Acenaphthylene		330	U	330	U	330	U	330	U	330	U
2,6-Dinitrotoluene		330	U	330	U	330	U	330	U	330	U

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

All other qualifiers shown were applied during validation.

* - RQL exceeded

000012

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

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI	SDG: K0328										
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Extraction Date		5/4/06		5/4/06		5/4/06		5/4/06		5/4/06	
Analysis Date		5/9/06		5/9/06		5/9/06		5/11/06		5/11/06	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline		830	U	830	U	830	U	830	U	830	U
Acenaphthene		330	U	330	U	330	U	330	U	330	U
2,4-Dinitrophenol		830	UJ	830	UJ	830	UJ	830	UJ	830	UJ
4-Nitrophenol		830	U	830	U	830	U	830	U	830	U
Dibenzofuran	330	330	U	330	U	330	U	330	U	330	U
2,4-Dinitrotoluene		330	U	330	U	330	U	330	U	330	U
Diethylphthalate		330	U	330	U	330	U	330	U	330	U
4-Chlorophenyl-phenyl ether		330	U	330	U	330	U	330	U	330	U
Fluorene		330	U	330	U	330	U	330	U	330	U
4-Nitroaniline		830	UJ	830	UJ	830	UJ	830	UJ	830	UJ
4,6-Dinitro-2-methylphenol		830	U	830	U	830	U	830	U	830	U
N-Nitrosodiphenylamine		330	U	330	U	330	U	330	U	330	U
4-Bromophenyl-phenyl ether		330	U	330	U	330	U	330	U	330	U
Hexachlorobenzene		330	U	330	U	330	U	330	U	330	U
Pentachlorophenol	330	830	U	830	U	830	U	830	U	830	U
Phenanthrene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Anthracene		330	U	330	U	330	U	330	U	330	U
Carbazole		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Di-n-butylphthalate		330	U	330	U	330	U	330	U	330	U
Fluoranthene		330	U	330	U	330	U	330	U	330	U
Pyrene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Butylbenzylphthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
3,3'-Dichlorobenzidine		330	U	330	U	330	U	330	U	330	U
Benzo(a)anthracene		330	U	330	U	330	U	330	U	330	U
Chrysene		330	U	330	U	330	U	330	U	330	U
bis(2-Ethylhexyl)phthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Di-n-octylphthalate		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Benzo(b)fluoranthene		330	U	330	U	330	U	330	U	330	U
Benzo(k)fluoranthene		330	U	330	U	330	U	330	U	330	U
Benzo(a)pyrene		330	U	330	U	330	U	330	U	330	U
Indeno(1,2,3-cd)pyrene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ
Dibenz(a,h)anthracene		330	U	330	U	330	U	330	U	330	U
Benzo(g,h,i)perylene		330	UJ	330	UJ	330	UJ	330	UJ	330	UJ

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

All other qualifiers shown were applied during validation.

* - RQL exceeded

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

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI	SDG: K0328										
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Extraction Date		5/4/06		5/4/06		5/4/06		5/4/06		5/4/06	
Analysis Date		5/9/06		5/9/06		5/9/06		5/11/06		5/11/06	
PAH by 8310	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Naphthalene	100	33.3	U	33.3	U	33.3	U	33.3	U	33.3	U
Acenaphthylene	100	33.3	U	33.3	U	33.3	U	33.3	U	33.3	U
Acenaphthene	100	33.3	U	33.3	U	33.3	U	33.3	U	33.3	U
Fluorene	30	3.33	U	3.33	U	3.33	U	3.33	U	3.33	U
Phenanthrene	50	3.33	U	3.33	U	50	U	50	U	50	U
Anthracene	50	3.33	U	3.33	U	3.33	U	3.33	U	3.33	U
Fluoranthene	50	6.67	U	6.67	U	6.67	U	6.67	U	6.67	U
Pyrene	50	6.67	U	6.67	U	1.4		1.0		6.67	U
Benzo(a)anthracene		3.33	U	3.33	U	3.33	U	3.33	U	3.33	U
Chrysene	100	1.0		2.5		1.2		1.2		1.0	
Benzo(b)fluoranthene		1.4		0.88		3.33	U	3.33	U	3.33	U
Benzo(k)fluoranthene	15	3.33	U	3.33	U	3.33	U	3.33	U	3.33	U
Benzo(a)pyrene	15	3.33	U	3.33	U	3.33	U	3.33	U	3.33	U
Dibenzo(a,h)anthracene	30	3.33	U	3.33	U	3.33	U	3.33	U	3.33	U
Benzo(ghi)perylene	30	3.33	U	3.33	U	3.33	U	3.33	U	3.33	U
Indeno(1,2,3-cd)pyrene	30	3.33	U	3.33	U	3.33	U	3.33	U	3.33	U

000014

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

All other qualifiers shown were applied during validation.

* - RQL exceeded

Semivolatiles by GC/MS, HSL List — Report Date: 05/16/06 14:37

RFW Batch Number: 0604L865 — Client: TNUHANFORD RC-051 K0328 — Work Order: 11343606001 — Page: 1a

	Cust ID:	J11K41		J11K42		J11K42		J11K42		J11K43		J11K44	
Sample Information	RFW#:	001		002		002 MS		002 MSD		003		004	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Surrogate Recovery	Nitrobenzene-d5	68	%	59	%	61	%	75	%	50	%	60	%
	2-Fluorobiphenyl	69	%	62	%	59	%	77	%	47	%	58	%
	Terphenyl-d14	77	%	77	%	64	%	83	%	71	%	73	%
	Phenol-d5	59	%	56	%	50	%	62	%	38	%	52	%
	2-Fluorophenol	57	%	51	%	43	%	51	%	35	%	53	%
	2,4,6-Tribromophenol	52	%	55	%	60	%	76	%	42	%	66	%
			fl		fl		fl		fl		fl		fl
Phenol		330	U	330	U	57	%	71	%	330	U	330	U
bis(2-Chloroethyl)ether		330	U	330	U	62	%	71	%	330	U	330	U
2-Chlorophenol		330	U	330	U	60	%	70	%	330	U	330	U
1,3-Dichlorobenzene		330	U	330	U	60	%	67	%	330	U	330	U
1,4-Dichlorobenzene		330	U	330	U	60	%	67	%	330	U	330	U
1,2-Dichlorobenzene		330	U	330	U	63	%	72	%	330	U	330	U
2-Methylphenol		330	U J	330	U J	56 *	%	70	%	330	U J	330	U J
2,2'-oxybis(1-Chloropropane)		330	U	330	U	54	%	64	%	330	U	330	U
4-Methylphenol		330	U J	330	U J	55 *	%	72	%	330	U J	330	U J
N-Nitroso-di-n-propylamine		330	U	330	U	73	%	90	%	330	U	330	U
Hexachloroethane		330	U	330	U	65	%	68	%	330	U	330	U
Nitrobenzene		330	U	330	U	68	%	81	%	330	U	330	U
Isophorone		330	U	330	U	73	%	90	%	330	U	330	U
2-Nitrophenol		330	U	330	U	60	%	75	%	330	U	330	U
2,4-Dimethylphenol		330	U J	330	U J	31 *	%	46 *	%	330	U J	330	U J
bis(2-Chloroethoxy)methane		330	U	330	U	63	%	78	%	330	U	330	U
2,4-Dichlorophenol		330	U	330	U	64	%	83	%	330	U	330	U
1,2,4-Trichlorobenzene		330	U	330	U	69	%	82	%	330	U	330	U
Naphthalene		330	U	330	U	64	%	78	%	330	U	330	U
4-Chloroaniline		330	U	330	U	54	%	61	%	330	U	330	U
Hexachlorobutadiene		330	U	330	U	86	%	99	%	330	U	330	U
4-Chloro-3-methylphenol		330	U	330	U	66	%	86	%	330	U	330	U
2-Methylnaphthalene		330	U	330	U	71	%	91	%	330	U	330	U
Hexachlorocyclopentadiene		330	U	330	U	30	%	38	%	330	U	330	U
2,4,6-Trichlorophenol		330	U	330	U	68	%	90	%	330	U	330	U
2,4,5-Trichlorophenol		830	U	830	U	65	%	85	%	830	U	830	U

*= Outside of EPA CLP QC limits.

R 8/23/06

000000008

000015

Cust ID:	J11K41	J11K42	J11K42	J11K42	J11K43	J11K44
RFW#:	001	002	002 MS	002 MSD	003	004
2-Chloronaphthalene	330 U	330 U	66 %	86 %	330 U	330 U
2-Nitroaniline	830 U	830 U	71 %	91 %	830 U	830 U
Dimethylphthalate	330 U	330 U	67 %	88 %	330 U	330 U
Acenaphthylene	330 U	330 U	64 %	84 %	330 U	330 U
2,6-Dinitrotoluene	330 U	330 U	62 %	80 %	330 U	330 U
3-Nitroaniline	830 U	830 U	60 %	78 %	830 U	830 U
Acenaphthene	330 U	330 U	65 %	87 %	330 U	330 U
2,4-Dinitrophenol	830 UJ	830 UJ	47 %	46 %	830 UJ	830 UJ
4-Nitrophenol	830 U	830 U	68 %	90 %	830 U	830 U
Dibenzofuran	330 U	330 U	68 %	91 %	330 U	330 U
2,4-Dinitrotoluene	330 U	330 U	66 %	86 %	330 U	330 U
Diethylphthalate	330 U	330 U	70 %	92 %	330 U	330 U
4-Chlorophenyl-phenylether	330 U	330 U	70 %	93 %	330 U	330 U
Fluorene	330 U	330 U	66 %	87 %	330 U	330 U
4-Nitroaniline	830 UJ	830 UJ	43 * %	56 %	830 UJ	830 UJ
4,6-Dinitro-2-methylphenol	830 U	830 U	76 %	87 %	830 U	830 U
N-Nitrosodiphenylamine (1)	330 U	330 U	55 %	73 %	330 U	330 U
4-Bromophenyl-phenylether	330 U	330 U	65 %	86 %	330 U	330 U
Hexachlorobenzene	330 U	330 U	71 %	95 %	330 U	330 U
Pentachlorophenol	830 U	830 U	81 %	96 %	830 U	830 U
Phenanthrene	330 UJ	330 UJ	67 %	91 %	330 UJ	330 UJ
Anthracene	330 U	330 U	70 %	93 %	330 U	330 U
Carbazole	330 UJ	330 UJ	58 * %	78 %	330 UJ	330 UJ
Di-n-butylphthalate	330 U	330 ~~34 JB~~ U	69 %	92 %	330 U	330 U
Fluoranthene	330 U	330 U	69 %	91 %	330 U	330 U
Pyrene	330 UJ	330 UJ	75 %	103 %	330 UJ	330 UJ
Butylbenzylphthalate	330 UJ	330 UJ	69 %	94 %	330 UJ	330 UJ
3,3'-Dichlorobenzidine	330 U	330 U	41 %	54 %	330 U	330 U
Benzo(a)anthracene	330 U	330 U	65 %	85 %	330 U	330 U
Chrysene	330 U	330 U	64 %	84 %	330 U	330 U
bis(2-Ethylhexyl)phthalate	330 UJ	330 ~~20 JB~~ UJ	66 %	90 %	330 UJ	330 ~~130 JB~~ UJ
Di-n-octyl phthalate	330 UJ	330 UJ	80 %	110 %	330 UJ	330 UJ
Benzo(b)fluoranthene	330 U	330 U	73 %	94 %	330 U	330 U
Benzo(k)fluoranthene	330 U	330 U	75 %	94 %	330 U	330 U
Benzo(a)pyrene	330 U	330 U	65 %	82 %	330 U	330 U
Indeno(1,2,3-cd)pyrene	330 UJ	330 UJ	50 * %	61 %	330 UJ	330 UJ
Dibenz(a,h)anthracene	330 U	330 U	52 %	62 %	330 U	330 U
Benzo(g,h,i)perylene	330 UJ	330 UJ	43 * %	53 %	330 UJ	330 UJ

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

8/23/00

000016

000000009

000000010

	Cust ID:	J11K45	SBLKXH	SBLKXH BS
Sample Information	RFW#:	005	06LE0357-MB1	06LE0357-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	68 %	66 %	70 %
	2-Fluorobiphenyl	65 %	68 %	73 %
	Terphenyl-d14	73 %	91 %	77 %
	Phenol-d5	58 %	66 %	70 %
	2-Fluorophenol	52 %	60 %	69 %
	2,4,6-Tribromophenol	58 %	54 %	72 %
Phenol		330 U	330 U	74 %
bis(2-Chloroethyl)ether		330 U	330 U	74 %
2-Chlorophenol		330 U	330 U	74 %
1,3-Dichlorobenzene		330 U	330 U	69 %
1,4-Dichlorobenzene		330 U	330 U	68 %
1,2-Dichlorobenzene		330 U	330 U	72 %
2-Methylphenol		330 UJ	330 U	69 %
2,2'-oxybis(1-Chloropropane)		330 U	330 U	70 %
4-Methylphenol		330 UJ	330 U	70 %
N-Nitroso-di-n-propylamine		330 U	330 U	71 %
Hexachloroethane		330 U	330 U	67 %
Nitrobenzene		330 U	330 U	71 %
Isophorone		330 U	330 U	77 %
2-Nitrophenol		330 U	330 U	74 %
2,4-Dimethylphenol		330 UJ	330 U	44 * %
bis(2-Chloroethoxy)methane		330 U	330 U	73 %
2,4-Dichlorophenol		330 U	330 U	72 %
1,2,4-Trichlorobenzene		330 U	330 U	70 %
Naphthalene		330 U	330 U	69 %
4-Chloroaniline		330 U	330 U	83 %
Hexachlorobutadiene		330 U	330 U	77 %
4-Chloro-3-methylphenol		330 U	330 U	71 %
2-Methylnaphthalene		330 U	330 U	71 %
Hexachlorocyclopentadiene		330 U	330 U	57 %
2,4,6-Trichlorophenol		330 U	330 U	75 %
2,4,5-Trichlorophenol		830 U	830 U	76 %

*= Outside of EPA CLP QC limits.

000017

8/23/06

Cust ID:	J11K45		SBLKXH		SBLKXH BS	
RFW#:	005		06LE0357-MB1		06LE0357-MB1	
2-Chloronaphthalene	330	U	330	U	74	%
2-Nitroaniline	830	U	830	U	77	%
Dimethylphthalate	330	U	330	U	76	%
Acenaphthylene	330	U	330	U	74	%
2,6-Dinitrotoluene	330	U	330	U	75	%
3-Nitroaniline	830	U	830	U	92	%
Acenaphthene	330	U	330	U	73	%
2,4-Dinitrophenol	830	U J	830	U	15 *	%
4-Nitrophenol	830	U	830	U	73	%
Dibenzofuran	330	U	330	U	74	%
2,4-Dinitrotoluene	330	U	330	U	78	%
Diethylphthalate	330	U	330	U	77	%
4-Chlorophenyl-phenylether	330	U	330	U	74	%
Fluorene	330	U	330	U	72	%
4-Nitroaniline	830	U J	830	U	76	%
4,6-Dinitro-2-methylphenol	830	U	830	U	61	%
N-Nitrosodiphenylamine (1)	330	U	330	U	64	%
4-Bromophenyl-phenylether	330	U	330	U	69	%
Hexachlorobenzene	330	U	330	U	81	%
Pentachlorophenol	830	U	830	U	68	%
Phenanthrene	330	U J	330	U	75	%
Anthracene	330	U	330	U	76	%
Carbazole	330	U J	330	U	75	%
Di-n-butylphthalate	330 ~~29~~ ~~JB~~	U	20	J	79	%
Fluoranthene	330	U	330	U	80	%
Pyrene	330	U J	330	U	76	%
Butylbenzylphthalate	330	U J	330	U	84	%
3,3'-Dichlorobenzidine	330	U	330	U	84	%
Benzo(a)anthracene	330	U	330	U	77	%
Chrysene	330	U	330	U	76	%
bis(2-Ethylhexyl)phthalate	330	U J	18	J	86	%
Di-n-octyl phthalate	330	U J	330	U	90	%
Benzo(b)fluoranthene	330	U	330	U	78	%
Benzo(k)fluoranthene	330	U	330	U	78	%
Benzo(a)pyrene	330	U	330	U	77	%
Indeno(1,2,3-cd)pyrene	330	U J	330	U	88	%
Dibenz(a,h)anthracene	330	U	330	U	91	%
Benzo(g,h,i)perylene	330	U J	330	U	85	%

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

8/23/02

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PAH'S by HPLC / Method 8310 Report Date: 05/25/06 13:44

RFW Batch Number: 0604L865 Client: TNUHANFORD RC-051 K0328 Work Order: 11343606001 Page: 1

	Cust ID:	J11K41	J11K42	J11K42	J11K42	J11K43	J11K44
Sample Information	RFW#:	001	002	002 MS	002 MSD	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Triphenylene		96 %	105 %	101 %	97 %	89 %	94 %
		fl	fl	fl	fl	fl	fl
Naphthalene		33.3 U	33.3 U	119 %	109 %	33.3 U	33.3 U
Acenaphthylene		33.3 U	33.3 U	91 %	87 %	33.3 U	33.3 U
Acenaphthene		33.3 U	33.3 U	108 %	90 %	33.3 U	33.3 U
Fluorene		3.33 U	3.33 U	105 %	100 %	3.33 U	3.33 U
Phenanthrene		3.33 U	3.33 U	111 %	103 %	50 ~~1.5 J~~ U	50 ~~2.3 J~~ U
Anthracene		3.33 U	3.33 U	149 %	160 %	3.33 U	3.33 U
Fluoranthene		6.67 U	6.67 U	112 %	105 %	6.67 U	6.67 U
Pyrene		6.67 U	6.67 U	107 %	103 %	1.4 J	1.0 J
Benzo(a)anthracene		3.33 U	3.33 U	101 %	97 %	3.33 U	3.33 U
Chrysene		1.0 J	2.5 J	119 %	108 %	1.2 J	1.2 J
Benzo(b)fluoranthrene		1.4 J	0.88 J	110 %	104 %	3.33 U	3.33 U
Benzo(k)fluoranthrene		3.33 U	3.33 U	117 %	110 %	3.33 U	3.33 U
Benzo(a)pyrene		3.33 U	3.33 U	133 %	129 %	3.33 U	3.33 U
Dibenzo(a,h)anthracene		3.33 U	3.33 U	112 %	106 %	3.33 U	3.33 U
Benzo(ghi)perylene		3.33 U	3.33 U	113 %	104 %	3.33 U	3.33 U
Indeno(1,2,3-cd)pyrene		3.33 U	3.33 U	112 %	105 %	3.33 U	3.33 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

8/23/06

5/30/06

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PAH'S by HPLC / Method 8310 Report Date: 05/25/06 13:44

RFW Batch Number: 0604L865 Client: TNUHANFORD RC-051 K0328 Work Order: 11343606001 Page: 2

	Cust ID:	J11K45	BLK	BLK BS
Sample Information	RFW#:	005	06LE0355-MB1	06LE0355-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg
Triphenylene		96 %	90 %	97 %
Naphthalene		33.3 U	33.3 U	103 %
Acenaphthylene		33.3 U	33.3 U	103 %
Acenaphthene		33.3 U	33.3 U	104 %
Fluorene		3.33 U	3.33 U	103 %
Phenanthrene		50 ~~2.5~~ J U	1.4 J	106 %
Anthracene		3.33 U	3.33 U	109 %
Fluoranthene		6.67 U	6.67 U	115 %
Pyrene		6.67 U	6.67 U	98 %
Benzo(a)anthracene		3.33 U	3.33 U	96 %
Chrysene		1.0 J	3.33 U	113 %
Benzo(b)fluoranthrene		3.33 U	3.33 U	103 %
Benzo(k)fluoranthrene		3.33 U	3.33 U	110 %
Benzo(a)pyrene		3.33 U	3.33 U	120 %
Dibenzo(a,h)anthracene		3.33 U	3.33 U	106 %
Benzo(ghi)perylene		3.33 U	3.33 U	103 %
Indeno(1,2,3-cd)pyrene		3.33 U	3.33 U	107 %

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

8/23/06

8/23/06

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0604L865
SDG/SAF # K0328/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 04-26-2006

SEMIVOLATILE

Five (5) soil samples were collected on 04-24-2006.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 05-04-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 05-09,11-2006.

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

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

2. All soil sample results were reported on a wet-weight basis.

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

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

5. All surrogate recoveries were within acceptance criteria.

6. Eight (8) of one hundred twenty-eight (128) matrix spike recoveries were outside acceptance criteria.

   Two (2) of sixty-four (64) blank spike recoveries were outside acceptance criteria.

   A copy of the Sample Discrepancy Report (SDR) has been enclosed.

7. The method blank contained the common laboratory contaminants Bis (2-Ethylhexyl) phthalate and Di-n-butylphthalate at levels less than the CRQL.

8. 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 25 pages.

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

LIONVILLE LABORATORY INC.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/19/06
Date

som\gorup\data\bna\tnu-hanford\0604-865.doc

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06MS16

Initiator: Robert Carter
Date: 5/18/06
Client: TNU Hanford

Batch: 06W1965
Samples: 06W1965/06W1965MS/MSD/BS
Method: SW8480MCAWW/CLP/

Parameter: 06PCH
Matrix: Soil
Prep Batch: 06LE0359

1. Reason for SDR

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

b. General Discrepancy

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

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

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

Several spike compounds outside QC criteria in MS/MSD/BS

2. Known or Probable Causes(s) The phenolic acids compounds and/or aniline compounds are subject to erratic chromatographic behavior, especially if the GC system is contaminated with high boiling material. Other compounds specific

3. Discussion and Proposed Action Other Description: Narrate

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

4. Project Manager Instructions...signature/date: 5/18/06

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

5. Final Action...signature/date: _____ Other Explanation:

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

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

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
__	X Initiator	__	__ Metals: Beegle
__	X Lab General Manager: M. Taylor	__	__ Inorganic: Perrone
1	X Project Mgr: Stone/Johnson	__	__ GC/LC: Kiger
__	__ Data Management: Stilwell	1	X MS: Rychlak/Daley
__	__ Sample Prep: Beegle/Kiger	__	__ Log-in: Perry
		__	__ Admin: _____
		__	__ Other: _____

QA-105-A-0805

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LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0604L865
SDG/SAF # K0328/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 04-26-2006

POLYAROMATIC HYDROCARBONS

Five (5) soil samples were collected on 04-24-2006.

The samples and their associated QC samples were extracted on 05-04-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 05-20-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8310.

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

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy with the exception of some discrepancies, which were documented on the Sample Receipt Checklist.
2. The samples were extracted and analyzed within required holding time.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria..
5. All 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.
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.
11. All samples results were reported on a wet-weight basis.

Judy Strom

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

6/2/06
Date

\kim\r:\group\data\pest\tnu hanford\0604-865

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 3 pages 000025

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-229	Page 2 of 3

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 600--204		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596-1	COA BESRAS6520	Method of Shipment FED EX
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC

Price Code 8L

Data Turnaround 45 Days

Air Quality

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

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

Preservation	None	None	None	None	None	None	None	None	None	None
Type of Container	G/P	G/P	aG	aG	aG	aG	aG	G/P	G/P	^
No. of Container(s)	9	9	7	7	7	7	7	7	7	0
Volume	30g	30g	30g	30g	30g	30g	30g	30g	30g	1^
SAMPLE ANALYSIS	See item (1) in Special Instructions	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	IC Anions - 300.0 (Nitrate)	NO2/NO3 - 353.2 (Nitrogen in Nitrite and Nitrate)	—

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Sample No.	Matrix *	Sample Date	Sample Time									
J11K41	SOIL	4-24-06	1000	3	3	1	1	1	1	1	1	1	
J11K42			1415	1	1	3	3	3	1	1	1	1	
J11K43			1000	1	1	1	1	1	3	3	1	1	
J11K44			1530	1	1	1	1	1	1	1	3	3	
J11K45			1630	3	3	1	1	1	1	1	1	1	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth M Tepper		CH2M Hill	
Relinquished By/Removed From	Date/Time 11:30	Received By/Stored In	Date/Time 11:30
Elizabeth M Tepper 4-25-06		Fed Ex 4-25-06	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex 4/26/06 0950		[illegible] 4/26/06 0950	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

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

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

(2) Chloro-Herbicides - EPA8151+ (2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop, Picloram)

Matrix *

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

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

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

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCRA			DATA PACKAGE: K0328		
VALIDATOR: TLI		LAB: LLI		DATE: 8/20/00	
			SDG: K0328		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270	8310	SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J11K41	J11K42	J11K43	J11K44	J11K45	
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

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

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

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

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

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

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

Comments:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A
Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: bis(2-ethylhexyl)phthalate - U at RQL - all undetects
di-n-butylphthalate - U at RQL - all undetects
phenanthrene - U all undetects at RQL
no FB

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

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A
Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A
Surrogates traceable? (Levels D, E) ..... Yes No N/A
Surrogates expired? (Levels D, E) ..... Yes No N/A
MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD results acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards? (Levels D, E) ..... Yes No N/A
LCS/BSS samples analyzed? ..... Yes No N/A
LCS/BSS results acceptable? ..... Yes No N/A
Standards traceable? (Levels D, E) ..... Yes No N/A
Standards expired? (Levels D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Performance audit sample(s) analyzed? ..... Yes No N/A
Performance audit sample results acceptable? ..... Yes No N/A

Comments: 7 MS over 1 MSD over - J all no PAS
LCS - 2,4-dimethylphenol - J
2,4-dinitrophenol - 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: 2,4-dimethylphenol - 39% pherothane - 30.3%
di-n-octylphthalate - 31%
bis(2-ethylhexyl) phthalate - 31%
pyrene - 31%
butylbenzylphthalate - 31%

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: 40 SV over

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

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

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

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

Comments:

Date: 21 August 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Inorganic - Data Package No. K0328-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0328 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J11K41	4/24/06	Soil	C	See note 1
J11K42	4/24/06	Soil	C	See note 1
J11K43	4/24/06	Soil	C	See note 1
J11K44	4/24/06	Soil	C	See note 1
J11K45	4/24/06	Soil	C	See note 1

1 – ICP metals by 6010B.

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

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

DATA QUALITY PARAMETERS

- **Holding Times**

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

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data . The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 80% to 120%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 79% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 120% or less than 80% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 120% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (45.6%), all antimony results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K0328 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 a matrix spike recovery outside QC limits (45.6%), all antimony results were qualified as estimates and flagged "J".

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

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K0328	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	All	MS recovery

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI	SDG: K0328										
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	1	0.10	U	0.10	U	0.11	U	0.10	U	0.10	U
Aluminum		7440		7300		7130		7280		7090	
Arsenic	10	2.8		2.7		2.7		2.5		2.9	
Boron		1.5		1.6		1.3		1.4		1.5	
Barium	2	82.9		82.0		80.4		83.8		81.4	
Beryllium		0.42		0.42		0.41		0.43		0.44	
Bismuth		0.75	U	0.76	U	0.77	U	0.76	U	0.76	U
Calcium		3510		3560		3470		3490		3510	
Cadmium	0.5	0.34		0.35		0.31		0.38		0.32	
Cobalt		8.6		8.9		8.7		8.9		8.9	
Chromium	1	9.1		9.0		8.7		9.0		8.9	
Copper	1	13.6		13.3		13.0		13.1		12.9	
Iron		24700		25100		24300		24900		24600	
Potassium	400	1520		1500		1450		1560		1500	
Lithium	5	7.3		7.2		7.1		7.2		7.0	
Magnesium		4500		4550		4470		4530		4480	
Manganese		407		413		406		419		414	
Molybdenum		0.43	U	0.43	U	0.44	U	0.43	U	0.43	U
Sodium		150		140		136		137		133	
Nickel		10.1		10.1		9.9		9.9		9.9	
Phosphorous	5	997		1000		988		992		975	
Lead	5	5.2		5.6		5.5		5.5		6.1	
Antimony	6	0.65	UJ	0.65	UJ	0.66	UJ	0.66	UJ	0.65	UJ
Selenium		0.69	U	0.70	U	0.71	U	0.70	U	0.70	U
Silicon		278		289		286		288		322	
Tin		1.6	U	1.6	U	1.6	U	1.6	U	1.6	U
Strontium		18.7		18.1		17.8		18.5		18.2	
Thallium		1.0	U	1.0	U	1.1	U	1.0	U	1.0	U
Uranium	30	2.2		2.8		1.3	U	1.3	U	1.4	
Vanadium		63.4		63.1		61.0		62.2		61.8	
Zinc	1	49.8		50.3		49.1		50.7		50.2	

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

000010

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/08/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J11K41	Silver, Total	0.10 u	MG/KG	0.10	3.0
		Aluminum, Total	7440	MG/KG	4.3	3.0
		Arsenic, Total	2.8	MG/KG	0.90	3.0
		Boron, Total	1.5	MG/KG	0.35	3.0
		Barium, Total	82.9	MG/KG	0.03	3.0
		Beryllium, Total	0.42	MG/KG	0.03	3.0
		Bismuth, Total	0.75 u	MG/KG	0.75	3.0
		Calcium, Total	3510	MG/KG	2.4	3.0
		Cadmium, Total	0.34	MG/KG	0.10	3.0
		Cobalt, Total	8.6	MG/KG	0.21	3.0
		Chromium, Total	9.1	MG/KG	0.19	3.0
		Copper, Total	13.6	MG/KG	0.18	3.0
		Iron, Total	24700	MG/KG	5.2	3.0
		Potassium, Total	1520	MG/KG	3.4	3.0
		Lithium, Total	7.3	MG/KG	0.04	3.0
		Magnesium, Total	4500	MG/KG	1.4	3.0
		Manganese, Total	407	MG/KG	0.04	3.0
		Molybdenum, Total	0.43 u	MG/KG	0.43	3.0
		Sodium, Total	150	MG/KG	1.1	3.0
		Nickel, Total	10.1	MG/KG	0.35	3.0
		Phosphorus, Total	997	MG/KG	1.3	3.0
		Lead, Total	5.2	MG/KG	0.46	3.0
		Antimony, Total	0.65 uJ	MG/KG	0.65	3.0
		Selenium, Total	0.69 u	MG/KG	0.69	3.0
		Silicon, Total	278	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	18.7	MG/KG	0.01	3.0
		Thallium, Total	1.0 u	MG/KG	1.0	3.0
		Uranium, Total	2.2	MG/KG	1.3	3.0
		Vanadium, Total	63.4	MG/KG	0.13	3.0
		Zinc, Total	49.8	MG/KG	0.24	3.0

6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/08/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	J11K42	Silver, Total	0.10 u	MG/KG	0.10	3.0
		Aluminum, Total	7300	MG/KG	4.3	3.0
		Arsenic, Total	2.7	MG/KG	0.91	3.0
		Boron, Total	1.6	MG/KG	0.36	3.0
		Barium, Total	82.0	MG/KG	0.03	3.0
		Beryllium, Total	0.42	MG/KG	0.03	3.0
		Bismuth, Total	0.76 u	MG/KG	0.76	3.0
		Calcium, Total	3560	MG/KG	2.4	3.0
		Cadmium, Total	0.35	MG/KG	0.10	3.0
		Cobalt, Total	8.9	MG/KG	0.21	3.0
		Chromium, Total	9.0	MG/KG	0.19	3.0
		Copper, Total	13.3	MG/KG	0.18	3.0
		Iron, Total	25100	MG/KG	5.2	3.0
		Potassium, Total	1500	MG/KG	3.4	3.0
		Lithium, Total	7.2	MG/KG	0.04	3.0
		Magnesium, Total	4550	MG/KG	1.4	3.0
		Manganese, Total	413	MG/KG	0.04	3.0
		Molybdenum, Total	0.43 u	MG/KG	0.43	3.0
		Sodium, Total	140	MG/KG	1.1	3.0
		Nickel, Total	10.1	MG/KG	0.36	3.0
		Phosphorus, Total	1000	MG/KG	1.3	3.0
		Lead, Total	5.6	MG/KG	0.46	3.0
		Antimony, Total	0.65 u J	MG/KG	0.65	3.0
		Selenium, Total	0.70 u	MG/KG	0.70	3.0
		Silicon, Total	289	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	18.1	MG/KG	0.01	3.0
		Thallium, Total	1.0 u	MG/KG	1.0	3.0
		Uranium, Total	2.8	MG/KG	1.3	3.0
		Vanadium, Total	63.1	MG/KG	0.13	3.0
		Zinc, Total	50.3	MG/KG	0.24	3.0

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/08/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	J11K43	Silver, Total	0.11 u	MG/KG	0.11	3.0
		Aluminum, Total	7130	MG/KG	4.3	3.0
		Arsenic, Total	2.7	MG/KG	0.92	3.0
		Boron, Total	1.3	MG/KG	0.36	3.0
		Barium, Total	80.4	MG/KG	0.03	3.0
		Beryllium, Total	0.41	MG/KG	0.03	3.0
		Bismuth, Total	0.77 u	MG/KG	0.77	3.0
		Calcium, Total	3470	MG/KG	2.5	3.0
		Cadmium, Total	0.31	MG/KG	0.11	3.0
		Cobalt, Total	8.7	MG/KG	0.21	3.0
		Chromium, Total	8.7	MG/KG	0.20	3.0
		Copper, Total	13.0	MG/KG	0.18	3.0
		Iron, Total	24300	MG/KG	5.3	3.0
		Potassium, Total	1450	MG/KG	3.4	3.0
		Lithium, Total	7.1	MG/KG	0.05	3.0
		Magnesium, Total	4470	MG/KG	1.5	3.0
		Manganese, Total	406	MG/KG	0.05	3.0
		Molybdenum, Total	0.44 u	MG/KG	0.44	3.0
		Sodium, Total	136	MG/KG	1.1	3.0
		Nickel, Total	9.9	MG/KG	0.36	3.0
		Phosphorus, Total	988	MG/KG	1.4	3.0
		Lead, Total	5.5	MG/KG	0.47	3.0
		Antimony, Total	0.66 uJ	MG/KG	0.66	3.0
		Selenium, Total	0.71 u	MG/KG	0.71	3.0
		Silicon, Total	286	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	17.8	MG/KG	0.02	3.0
		Thallium, Total	1.1 u	MG/KG	1.1	3.0
		Uranium, Total	1.3 u	MG/KG	1.3	3.0
		Vanadium, Total	61.0	MG/KG	0.14	3.0
		Zinc, Total	49.1	MG/KG	0.24	3.0

8/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/08/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-004	J11K44	Silver, Total	0.10 u	MG/KG	0.10	3.0
		Aluminum, Total	7280	MG/KG	4.3	3.0
		Arsenic, Total	2.5	MG/KG	0.91	3.0
		Boron, Total	1.4	MG/KG	0.36	3.0
		Barium, Total	83.8	MG/KG	0.03	3.0
		Beryllium, Total	0.43	MG/KG	0.03	3.0
		Bismuth, Total	0.76 u	MG/KG	0.76	3.0
		Calcium, Total	3490	MG/KG	2.5	3.0
		Cadmium, Total	0.38	MG/KG	0.10	3.0
		Cobalt, Total	8.9	MG/KG	0.21	3.0
		Chromium, Total	9.0	MG/KG	0.19	3.0
		Copper, Total	13.1	MG/KG	0.18	3.0
		Iron, Total	24900	MG/KG	5.2	3.0
		Potassium, Total	1560	MG/KG	3.4	3.0
		Lithium, Total	7.2	MG/KG	0.04	3.0
		Magnesium, Total	4530	MG/KG	1.4	3.0
		Manganese, Total	419	MG/KG	0.04	3.0
		Molybdenum, Total	0.43 u	MG/KG	0.43	3.0
		Sodium, Total	137	MG/KG	1.1	3.0
		Nickel, Total	9.9	MG/KG	0.36	3.0
		Phosphorus, Total	992	MG/KG	1.3	3.0
		Lead, Total	5.5	MG/KG	0.46	3.0
		Antimony, Total	0.66 u J	MG/KG	0.66	3.0
		Selenium, Total	0.70 u	MG/KG	0.70	3.0
		Silicon, Total	288	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	18.5	MG/KG	0.01	3.0
		Thallium, Total	1.0 u	MG/KG	1.0	3.0
		Uranium, Total	1.3 u	MG/KG	1.3	3.0
		Vanadium, Total	62.2	MG/KG	0.13	3.0
		Zinc, Total	50.7	MG/KG	0.24	3.0

8/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/08/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	J11K45	Silver, Total	0.10 u	MG/KG	0.10	3.0
		Aluminum, Total	7090	MG/KG	4.3	3.0
		Arsenic, Total	2.9	MG/KG	0.91	3.0
		Boron, Total	1.5	MG/KG	0.36	3.0
		Barium, Total	81.4	MG/KG	0.03	3.0
		Beryllium, Total	0.44	MG/KG	0.03	3.0
		Bismuth, Total	0.76 u	MG/KG	0.76	3.0
		Calcium, Total	3510	MG/KG	2.4	3.0
		Cadmium, Total	0.32	MG/KG	0.10	3.0
		Cobalt, Total	8.9	MG/KG	0.21	3.0
		Chromium, Total	8.9	MG/KG	0.19	3.0
		Copper, Total	12.9	MG/KG	0.18	3.0
		Iron, Total	24600	MG/KG	5.2	3.0
		Potassium, Total	1500	MG/KG	3.4	3.0
		Lithium, Total	7.0	MG/KG	0.04	3.0
		Magnesium, Total	4480	MG/KG	1.4	3.0
		Manganese, Total	414	MG/KG	0.04	3.0
		Molybdenum, Total	0.43 u	MG/KG	0.43	3.0
		Sodium, Total	133	MG/KG	1.1	3.0
		Nickel, Total	9.9	MG/KG	0.36	3.0
		Phosphorus, Total	975	MG/KG	1.3	3.0
		Lead, Total	6.1	MG/KG	0.46	3.0
		Antimony, Total	0.65 u J	MG/KG	0.65	3.0
		Selenium, Total	0.70 u	MG/KG	0.70	3.0
		Silicon, Total	322	MG/KG	3.4	3.0
		Tin, Total	1.6 u	MG/KG	1.6	3.0
		Strontium, Total	18.2	MG/KG	0.01	3.0
		Thallium, Total	1.0 u	MG/KG	1.0	3.0
		Uranium, Total	1.4	MG/KG	1.3	3.0
		Vanadium, Total	61.8	MG/KG	0.13	3.0
		Zinc, Total	50.2	MG/KG	0.24	3.0

8/23/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-051
LVL#: 0604L865
SDG/SAF#: K0328/RC-051

W.O.#: 11343-606-001-9999-00
Date Received: 04-26-06

METALS CASE NARRATIVE

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

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

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

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

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

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

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

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

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

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

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 29 pages.

9. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 73.1%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

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

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J11K41	Aluminum	66,000	100.0
	Calcium	66,000	96.2
	Iron	66,000	115.5
	Antimony	300	100.0
	Silicon	6,300	100.8

12. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

6/8/06
Date

jjw/m04-865

LvLI
LIONVILLE LABORATORY INC.

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-229	Page 2 of 3

Collector: STANKOVICH, M.	Company Contact: JOAN KESSNER	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8L	Data Turnaround: 45 Days	Air Quality: 1	
Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location: 600--204	SAF No.: RC-051	
Ice Chest No.	Field Logbook No.: EL-1596-1	COA: BESRAS6520	Method of Shipment: FED EX
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060151		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

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

Preservation	None	None	None	None	None	None	None	None	None	None	
Type of Container	G/P	G/P	aG	aG	aG	aG	aG	G/P	G/P	^	
No. of Container(s)	9	9	7	7	7	7	7	7	7	0	
Volume	30g	30g	30g	30g	30g	30g	30g	30g	30g	1^	
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	IC Anions - 300.0 (Nitrate)	NO2/NO3 - 353.2 (Nitrogen in Nitrite and Nitrate)	—	
Sample No.	Matrix *	Sample Date	Sample Time								
J11K41	SOIL	4-24-06	1000	3	3	1	1	1	1	1	1	1	
J11K42			1415	1	1	3	3	3	1	1	1	1	
J11K43			1000	1	1	1	1	1	3	3	1	1	
J11K44			1530	1	1	1	1	1	1	1	3	3	
J11K45			1630	3	3	1	1	1	1	1	1	1	

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Elizabeth M Teppe		CH2M Hill	
Relinquished By/Removed From	Elizabeth M Teppe	4-25-06 11:30	Received By/Stored In: Fed Ex	4-25-06 11:30
Relinquished By/Removed From	Fed Ex	4/26/06 0950	Received By/Stored In	4/26/06 0950
Relinquished By/Removed From			Received By/Stored In	
Relinquished By/Removed From			Received By/Stored In	
Relinquished By/Removed From			Received By/Stored In	

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop, Picloram]

Matrix *

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

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

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

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0328		
VALIDATOR: TLT		LAB: LLI		DATE: 8/20/06	
			SDG: K0328		

ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		

SAMPLES/MATRIX				
J11K41	J11K42	J11K43	J11K44	J11K45
				soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

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

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no FB

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

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

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

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

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

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

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

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

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

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

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

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

Comments: MS - Antimony 45.6% - J all no RPD

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: _____

6. ICP QUALITY CONTROL (Levels D and E)

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

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

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

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

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

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

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

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

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

Comments:

8. HOLDING TIMES (all levels)

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

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

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

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

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

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/08/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	06L0290-MB1	Silver, Total	0.04 u	MG/KG	0.04	1.0
		Aluminum, Total	1.4 u	MG/KG	1.4	1.0
		Arsenic, Total	0.30 u	MG/KG	0.30	1.0
		Boron, Total	0.12 u	MG/KG	0.12	1.0
		Barium, Total	0.01	MG/KG	0.01	1.0
		Beryllium, Total	0.01 u	MG/KG	0.01	1.0
		Bismuth, Total	0.26 u	MG/KG	0.26	1.0
		Calcium, Total	0.82 u	MG/KG	0.82	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Cobalt, Total	0.07 u	MG/KG	0.07	1.0
		Chromium, Total	0.06 u	MG/KG	0.06	1.0
		Copper, Total	0.06 u	MG/KG	0.06	1.0
		Iron, Total	1.7 u	MG/KG	1.7	1.0
		Potassium, Total	1.1 u	MG/KG	1.1	1.0
		Lithium, Total	0.02	MG/KG	0.02	1.0
		Magnesium, Total	0.48 u	MG/KG	0.48	1.0
		Manganese, Total	0.02 u	MG/KG	0.02	1.0
		Molybdenum, Total	0.14 u	MG/KG	0.14	1.0
		Sodium, Total	0.38 u	MG/KG	0.38	1.0
		Nickel, Total	0.12 u	MG/KG	0.12	1.0
		Phosphorus, Total	0.45 u	MG/KG	0.45	1.0
		Lead, Total	0.16 u	MG/KG	0.16	1.0
		Antimony, Total	0.22 u	MG/KG	0.22	1.0
		Selenium, Total	0.24 u	MG/KG	0.24	1.0
		Silicon, Total	1.1 u	MG/KG	1.1	1.0
		Tin, Total	0.57	MG/KG	0.54	1.0
		Strontium, Total	0.005u	MG/KG	0.005	1.0
		Thallium, Total	0.35 u	MG/KG	0.35	1.0
		Uranium, Total	0.44 u	MG/KG	0.44	1.0
		Vanadium, Total	0.04 u	MG/KG	0.04	1.0
		Zinc, Total	0.08 u	MG/KG	0.08	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/08/06

CLIENT: TNUHANFORD RC-051 K0328

LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J11K41	Silver, Total	2.4	0.10u	2.5	96.0	3.0
		Aluminum, Total	8180	7440	99.0	754.2*	3.0
		Arsenic, Total	101	2.8	99.0	99.3	3.0
		Boron, Total	49.4	1.5	49.5	96.8	3.0
		Barium, Total	180	82.9	99.0	98.1	3.0
		Beryllium, Total	3.0	0.42	2.5	103.4	3.0
		Bismuth, Total	49.6	0.75u	49.5 ~~440~~	~~80.0~~ 100.2	3.0
		Calcium, Total	5060	3510	* 1240	125.5	3.0
		Cadmium, Total	2.8	0.34	2.5	98.5	3.0
		Cobalt, Total	33.7	8.6	24.8	101.2	3.0
		Chromium, Total	19.3	9.1	9.9	103.0	3.0
		Copper, Total	25.9	13.6	12.4	99.2	3.0
		Iron, Total	25200	24700	49.5	1079 *	3.0
		Potassium, Total	2760	1520	1240	100.4	3.0
		Lithium, Total	60.7	7.3	49.5	107.9	3.0
		Magnesium, Total	5920	4500	1240	115.3	3.0
		Manganese, Total	438	407	24.8	125.0*	3.0
		Molybdenum, Total	48.9	0.43u	49.5	98.8	3.0
		Sodium, Total	1430	150	1240	103.8	3.0
		Nickel, Total	35.2	10.1	24.8	101.2	3.0
		Phosphorus, Total	1220	997	248	88.8*	3.0
		Lead, Total	30.0	5.2	24.8	100	3.0
		Antimony, Total	11.3	0.65u	24.8	45.6	3.0
		Selenium, Total	98.1	0.69u	99.0	99.1	3.0
		Silicon, Total	435	278	49.5	318.6*	3.0
		Tin, Total	48.8	1.6 u	49.5	98.6	3.0
		Strontium, Total	69.3	18.7	49.5	102.2	3.0
		Thallium, Total	98.6	1.0 u	99.0	99.6	3.0
		Uranium, Total	49.5	2.2	49.5 ~~248~~	~~19.2~~ 95.6	3.0
		Vanadium, Total	88.1	63.4	* 24.8	99.6	3.0
		Zinc, Total	75.7	49.8	24.8	104.4	3.0

* corrected entries
pw 6/8/06

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/08/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J11K41	Silver, Total	0.10u	0.10u	NC	3.0
		Aluminum, Total	7440	7590	2.0	3.0
		Arsenic, Total	2.8	3.0	6.9	3.0
		Boron, Total	1.5	1.5	0.00	3.0
		Barium, Total	82.9	81.7	1.5	3.0
		Beryllium, Total	0.42	0.44	6.7	3.0
		Bismuth, Total	0.75u	0.76u	NC	3.0
		Calcium, Total	3510	3660	4.3	3.0
		Cadmium, Total	0.34	0.32	4.1	3.0
		Cobalt, Total	8.6	8.9	3.4	3.0
		Chromium, Total	9.1	9.5	4.3	3.0
		Copper, Total	13.6	13.3	2.2	3.0
		Iron, Total	24700	25400	2.8	3.0
		Potassium, Total	1520	1510	0.58	3.0
		Lithium, Total	7.3	7.5	2.7	3.0
		Magnesium, Total	4500	4640	3.2	3.0
		Manganese, Total	407	412	1.4	3.0
		Molybdenum, Total	0.43u	0.43u	NC	3.0
		Sodium, Total	150	154	3.2	3.0
		Nickel, Total	10.1	10.4	2.9	3.0
		Phosphorus, Total	997	986	1.2	3.0
		Lead, Total	5.2	5.6	7.4	3.0
		Antimony, Total	0.65u	0.65u	NC	3.0
		Selenium, Total	0.69u	0.70u	NC	3.0
		Silicon, Total	278	231	18.4	3.0
		Tin, Total	1.6 u	1.6 u	NC	3.0
		Strontium, Total	18.7	18.8	0.53	3.0
		Thallium, Total	1.0 u	1.0 u	NC	3.0
		Uranium, Total	2.2	1.3 u	~~NC~~ zero	3.0
		Vanadium, Total	63.4	64.9	2.3	3.0
		Zinc, Total	49.8	51.0	2.4	3.0

corrected entry MW 6/8/06

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 06/08/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV	
LCS1	06L0290-LC1	Silver, LCS	23.9	25.0	MG/KG	95.6	
		Aluminum, LCS	243	250	MG/KG	97.0	
		Arsenic, LCS	472	500	MG/KG	94.4	
		Boron, LCS	240	250	MG/KG	96.1	
		Barium, LCS	242	250	MG/KG	96.7	
		Beryllium, LCS	12.2	12.5	MG/KG	97.6	
		Bismuth, LCS	48.1	50 ~~250~~ *	MG/KG	* ~~19.2~~	96.2
		Calcium, LCS	1220	1250	MG/KG	98.0	
		Cadmium, LCS	12.2	12.5	MG/KG	97.6	
		Cobalt, LCS	121	125	MG/KG	97.0	
		Chromium, LCS	24.6	25.0	MG/KG	98.4	
		Copper, LCS	60.7	62.5	MG/KG	97.1	
		Iron, LCS	245	250	MG/KG	98.0	
		Potassium, LCS	1130	1250	MG/KG	90.5	
		Lithium, LCS	250	250	MG/KG	100.1	
		Magnesium, LCS	1190	1250	MG/KG	95.0	
		Manganese, LCS	37.1	37.5	MG/KG	98.9	
		Molybdenum, LCS	246	250	MG/KG	98.5	
		Sodium, LCS	1130	1250	MG/KG	90.6	
		Nickel, LCS	98.0	100	MG/KG	98.0	
		Phosphorus, LCS	223	250	MG/KG	89.2	
		Lead, LCS	121	125	MG/KG	96.9	
		Antimony, LCS	144	150	MG/KG	95.9	
		Selenium, LCS	458	500	MG/KG	91.7	
		Silicon, LCS	183	250	MG/KG	73.1	
		Tin, LCS	246	250	MG/KG	98.5	
		Strontium, LCS	244	250	MG/KG	97.6	
		Thallium, LCS	484	500	MG/KG	96.8	
		Uranium, LCS	49.3	~~250~~ *	MG/KG	* ~~19.7~~	98.5
		Vanadium, LCS	121	125	MG/KG	96.8	
		Zinc, LCS	47.7	50.0	MG/KG	95.4	

* corrected entries
MV 6/8/06

Date: 23 August 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Wet Chemistry - Data Package No. K0328-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0328 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J11K41	4/24/06	Soil	C	See note 1
J11K42	4/24/06	Soil	C	See note 1
J11K43	4/24/06	Soil	C	See note 1
J11K44	4/24/06	Soil	C	See note 1
J11K45	4/24/06	Soil	C	See note 1

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

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

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

DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within: 30 days for chromium VI; 28 days for nitrate/nitrite; and 48 hours for nitrate.

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

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

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

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

Due to the holding time being exceeded by greater than twice the limit, all undetected nitrate results were rejected and flagged "UR".

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

All other holding times were acceptable.

- **Method Blanks**

Method Blanks

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

All method blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 80% to 120%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 79% and a sample result less than the IDL are

qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J".

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

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 20%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K0328 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 86%.

MAJOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all undetected nitrate results were rejected and flagged "UR". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

The following minor deficiency was noted:

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

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

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0328	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nitrate	UR	J11K42, J11K43 J11K44	Holding time
Nitrate	J	J11K41, J11K45	Holding time
Nitrate/nitrite	J	All	Holding 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

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD											
Lab: LLI	SDG: K0328										
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Wet Chemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Nitrate	2.5	3.91	J	2.45	UR	2.49	UR	2.48	UR	2.77	J
Chromium VI	0.5	0.34		0.20		0.32		0.20	U	0.20	U
Nitrate/nitrite		0.19	UJ	0.20	UJ	0.47	J	0.20	UJ	0.33	J

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

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/15/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J11K41	Nitrate by IC	3.91 J	MG/KG	2.43	1.0
		Chromium VI	0.34	MG/KG	0.20	1.0
		Nitrate Nitrite	0.19 u J	MG/KG	0.19	1.0
-002	J11K42	Nitrate by IC	2.45 u R	MG/KG	2.45	1.0
		Chromium VI	0.20	MG/KG	0.20	1.0
		Nitrate Nitrite	0.20 u J	MG/KG	0.20	1.0
-003	J11K43	Nitrate by IC	2.49 u R	MG/KG	2.49	1.0
		Chromium VI	0.32	MG/KG	0.20	1.0
		Nitrate Nitrite	0.47 J	MG/KG	0.20	1.0
-004	J11K44	Nitrate by IC	2.48 u R	MG/KG	2.48	1.0
		Chromium VI	0.20 u	MG/KG	0.20	1.0
		Nitrate Nitrite	0.20 u J	MG/KG	0.20	1.0
-005	J11K45	Nitrate by IC	2.77 J	MG/KG	2.48	1.0
		Chromium VI	0.20 u	MG/KG	0.20	1.0
		Nitrate Nitrite	0.33 J	MG/KG	0.20	1.0

8/23/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-051 K0328
LVL#: 0604L865

W.O.#: 11343-606-001-9999-00
Date Received: 04-26-06

INORGANIC NARRATIVE

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

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

LvLI Sample	Site ID	Cr6+ sample wt,g	Nitrate-Nitrite IC Nitrate sample wt,g
0604L865-001	J11K41	30.306	30.891
0604L865-001 dup	J11K41	30.944	NA
0604L865-001 spk	J11K41	30.572	NA
0604L865-002	J11K42	30.069	30.584
0604L865-003	J11K43	30.317	30.084
0604L865-004	J11K44	30.563	30.287
0604L865-004 dup	J11K44	NA	30.172
0604L865-004 spk	J11K44	NA	30.203
0604L865-005	J11K45	30.039	30.256

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 18 pages.

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

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

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

4. The results presented in this report are derived from samples that did not meet LvLI's sample acceptance policy as noted on the Sample Receipt Checklist.

5. The method blanks were within the method criteria.

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

7. The matrix spike recoveries for Soluble Chromium VI, Nitrate and Nitrate Nitrite were within the 75-125% control limits.

8. The replicate analyses for Nitrate and Nitrate Nitrite were within the 20% Relative Percent Difference (RPD) control limit however replicate analysis for Chromium VI was outside the control limit at 23.9% that may be attributed to sample inhomogeneity.

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

6/15/06
Date

njp\04-865

LvLI
LIONVILLE LABORATORY INC.

RECEIVED
JUL 2006

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0328

DATE RECEIVED: 04/26/06 LVL LOT # :0604L865

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
J11K41						
NITRATE BY IC	001	S	06LICA56	04/24/06	06/06/06	06/07/06
CHROMIUM VI	001	S	06LVI034	04/24/06	05/02/06	05/02/06
CHROMIUM VI	001 REP	S	06LVI034	04/24/06	05/02/06	05/02/06
CHROMIUM VI	001 MS	S	06LVI034	04/24/06	05/02/06	05/02/06
NITRATE NITRITE	001	S	06LN3047	04/24/06	06/08/06	06/08/06
J11K42						
NITRATE BY IC	002	S	06LICA56	04/24/06	06/06/06	06/07/06
CHROMIUM VI	002	S	06LVI034	04/24/06	05/02/06	05/02/06
NITRATE NITRITE	002	S	06LN3047	04/24/06	06/08/06	06/08/06
J11K43						
NITRATE BY IC	003	S	06LICA56	04/24/06	06/06/06	06/07/06
CHROMIUM VI	003	S	06LVI034	04/24/06	05/02/06	05/02/06
NITRATE NITRITE	003	S	06LN3047	04/24/06	06/08/06	06/08/06
J11K44						
NITRATE BY IC	004	S	06LICA56	04/24/06	06/06/06	06/07/06
NITRATE BY IC	004 REP	S	06LICA56	04/24/06	06/06/06	06/07/06
NITRATE BY IC	004 MS	S	06LICA56	04/24/06	06/06/06	06/07/06
CHROMIUM VI	004	S	06LVI034	04/24/06	05/02/06	05/02/06
NITRATE NITRITE	004	S	06LN3047	04/24/06	06/08/06	06/08/06
NITRATE NITRITE	004 REP	S	06LN3047	04/24/06	06/08/06	06/08/06
NITRATE NITRITE	004 MS	S	06LN3047	04/24/06	06/08/06	06/08/06
J11K45						
NITRATE BY IC	005	S	06LICA56	04/24/06	06/06/06	06/07/06
CHROMIUM VI	005	S	06LVI034	04/24/06	05/02/06	05/02/06
NITRATE NITRITE	005	S	06LN3047	04/24/06	06/08/06	06/08/06

LAB QC:

NITRATE BY IC	MB1	S	06LICA56	N/A	06/06/06	06/07/06

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-051 K0328

DATE RECEIVED: 04/26/06 LVL LOT # :0604L865

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NITRATE BY IC	MB1 BS	S	06LICA56	N/A	06/06/06	06/07/06
CHROMIUM VI	MB1	S	06LVI034	N/A	05/02/06	05/02/06
CHROMIUM VI	MB1 BS	S	06LVI034	N/A	05/02/06	05/02/06
CHROMIUM VI	MB1 BSD	S	06LVI034	N/A	05/02/06	05/02/06
NITRATE NITRITE	MB1	~~W~~ S	06LN3047	N/A	06/08/06	06/08/06
NITRATE NITRITE	MB1 BS	~~W~~ S	06LN3047	N/A	06/08/06	06/08/06

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-229	Page 2 of 2

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 600--204		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596-1	COA BESRAS6520	Method of Shipment FED EX
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC

Price Code 8L

Air Quality 1

Data Turnaround 45 Days*

000000012

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

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

Preservation	None	None	None	None	None	None	None	None	None	None
Type of Container	G/P	G/P	aG	aG	aG	aG	aG	G/P	G/P	^
No. of Container(s)	9	9	7	7	7	7	7	7	7	0
Volume	30g	30g	30g	30g	30g	30g	30g	30g	30g	1^
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	IC Anions - 300.0 (Nitrate)	NO2/NO3 - 353.2 (Nitrogen in Nitrite and Nitrate)	—

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Sample No.	Matrix *	Sample Date	Sample Time									
J11K41	SOIL	4-24-06	1000	3	3	1	1	1	1	1	1	1
J11K42			1415	1	1	3	3	3	1	1	1	1
J11K43			1000	1	1	1	1	1	3	3	1	1
J11K44			1530	1	1	1	1	1	1	1	3	3
J11K45			1630	3	3	1	1	1	1	1	1	1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth M Tepp	4-25-06	CH2M Hill	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Dalotty M Tepp	11:30 4-25-06	Fed EX	11:30 4-25-06
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	4/26/06 0950	[illegible]	4/26/06 0950
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

(2) Chloro-Herbicides - EPA8151+ (2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop, Picloram)

Matrix *

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

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

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

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0328		
VALIDATOR: TLI		LAB: LLJ		DATE: 8/20/00	
			SDG: K0528		
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					
J11K41	J11K42	J11K43	J11K44	J11K45	
					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: nitrate - >2x UR/J

nitrate/nitrite - <2x - 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:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/15/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	06LICA56-MB1	Nitrate by IC	2.50 u	MG/KG	2.50	1.0
BLANK10	06LVI034-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0
BLANK10	06LN3047-MB1	Nitrate Nitrite	0.20 u	MG/KG	0.20	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/15/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J11K41	Soluble Chromium VI	5.0	0.34	3.9	119.2	1.0
-004	J11K44	Nitrate by IC	50.6	2.48u	50.0	101.3	1.0
		Nitrate Nitrite	4.4	0.20u	5.0	88.6	1.0
BLANK10	06LICA56-MB1	Nitrate by IC	49.1	2.50u	50.0	98.3	1.0
BLANK10	06LVI034-MB1	Soluble Chromium VI	3.9	0.20u	4.0	98.2	1.0
		Insoluble Chromium VI	1110	0.20u	1040	107.1	100
BLANK10	06LN3047-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.2	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/15/06

CLIENT: TNUHANFORD RC-051 K0328 LVL LOT #: 0604L865
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J11K41	Chromium VI	0.34	0.43	23.9	1.0
-004REP	J11K44	Nitrate by IC	2.48u	2.49u	NC	1.0
		Nitrate Nitrite	0.20u	0.20u	NC	1.0

Date: 23 August 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Incremental Soil Sampling
Subject: Pesticide/PCB/Herbicide - Data Package No. K0328-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0328 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J11K41	4/24/06	Soil	C	See note 1
J11K42	4/24/06	Soil	C	See note 1
J11K43	4/24/06	Soil	C	See note 1
J11K44	4/24/06	Soil	C	See note 1
J11K45	4/24/06	Soil	C	See note 1

1 – Pesticides by 8081A, PCBs by 8082 and chlorinated herbicides by 8151A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 2005). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times & Sample Preservation**

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

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

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

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

All holding times were acceptable.

- **Method Blank**

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

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 80% to 120%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

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

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

Due to the matrix spike and matrix spike duplicate results being lost due to interference, all dichloroprop results were qualified as estimates and flagged "J".

Due to matrix spike and matrix spike duplicate results outside QC limits (163% & 179%), all detected dinoseb results (J11K41 & J11K44) were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (10%), all dicamba results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

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

Due to a surrogate recovery outside QC limits (38%), all chlorinated herbicide results in sample J11K44 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results

must be within RPD limits of plus/minus 20%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

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

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

Due to an RPD outside QC limits (137%), all dicamba results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (57%), all 2,4-D results were qualified as estimates and flagged "J".

Due to an RPD outside QC limits (42%), all 2,4,5-T results were qualified as estimates and flagged "J".

Due to the matrix spike and matrix spike duplicate results being lost due to interference, all dichloroprop results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

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

- **Completeness**

Data Package No. K0328 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the lack of a matrix spike, matrix spike duplicate and LCS analysis, all toxaphene and picloram results were qualified as estimates and flagged "J".
- Due to the lack of a matrix spike analysis, all pesticide results were qualified as estimates and flagged "J".
- Due to the matrix spike and matrix spike duplicate results being lost due to interference, all dichloroprop results were qualified as estimates and flagged "J".
- Due to matrix spike and matrix spike duplicate results outside QC limits (163% & 179%), all detected dinoseb results (J11K41 & J11K44) were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (10%), all dicamba results were qualified as estimates and flagged "J".
- Due to a surrogate recovery outside QC limits (38%), all chlorinated herbicide results in sample J11K44 were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (137%), all dicamba results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (57%), all 2,4-D results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (42%), all 2,4,5-T results were qualified as estimates and flagged "J".

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

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

REFERENCES

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

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

PESTICIDE/PCB/HERBICIDE DATA QUALIFICATION SUMMARY*

SDG: K0328	REVIEWER: TLI	Project: RCBRA	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Toxaphene Picloram	J	All	No MS, MSD or LCS
All pesticides	J	All	No MS analysis
Dicloroprop	J	All	MS interference
Dinoseb	J	J11K41, J11K44	MS/MSD recovery
Dicamba	J	All	MS recovery
All herbicides	J	J11K44	Surrogate recovery
Dicamba 2,4-D 2,4,5-T	J	All	RPD

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

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: LLI	SDG: K0328										
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Extraction Date		5/3/06		5/3/06		5/3/06		5/3/06		5/3/06	
Analysis Date		5/6/06		5/6/06		5/6/06		5/6/06		5/6/06	
PCB	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016		13	U	13	U	13	U	13	U	13	U
Aroclor-1221		13	U	13	U	13	U	13	U	13	U
Aroclor-1232	16.5	13	U	13	U	13	U	13	U	13	U
Aroclor-1242	16.5	13	U	13	U	13	U	13	U	13	U
Aroclor-1248		13	U	13	U	13	U	13	U	13	U
Aroclor-1254	16.5	13	U	13	U	13	U	13	U	13	U
Aroclor-1260	16.5	13	U	13	U	13	U	13	U	13	U
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Extraction Date		5/3/06		5/3/06		5/3/06		5/3/06		5/3/06	
Analysis Date		5/6/06		5/6/06		5/6/06		5/6/06		5/6/06	
Pesticide	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Alpha-BHC	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Gamma-BHC (Lindane)	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Beta-BHC	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Heptachlor	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Delta-BHC	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Aldrin	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Heptachlor Epoxide	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endosulfan I	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Dieldrin	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
4,4'-DDE	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endrin	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endosulfan II	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
4,4'-DDD	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endosulfan Sulfate	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
4,4'-DDT	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Methoxychlor	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endrin Ketone	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Endrin Aldehyde	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
alpha-Chlordane	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
gamma-Chlordane	5	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Toxaphene	5	13	UJ	13	UJ	13	UJ	13	UJ	13	UJ

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

000012

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

Project: WASHINGTON CLOSURE HANFORD											
Laboratory: Lionville Laboratory Inc.											
Case:	SDG: K0328										
Sample Number		J11K41		J11K42		J11K43		J11K44		J11K45	
Remarks											
Sample Date		4/24/06		4/24/06		4/24/06		4/24/06		4/24/06	
Extraction Date		5/3/06		5/3/06		5/3/06		5/3/06		5/3/06	
Analysis Date		5/6/06		5/6/06		5/6/06		5/6/06		5/6/06	
Chlorinated Herbicides	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Dalapon	100	33	U	33	U	11		33	UJ	33	U
Dicamba	100	8.7	J	33	UJ	33	UJ	33	UJ	33	UJ
Dichloroprop	100	44	J	33	UJ	440	J	340	J	110	J
2,4-D	100	33	J	33	UJ	33	UJ	66	J	33	UJ
2,4,5-TP (Silvex)	100	17	U	17	U	17	U	17	UJ	17	U
2,4,5-T	100	17	UJ	17	UJ	17	UJ	17	UJ	17	UJ
Dinoseb	100	16	J	17	U	17	U	11	J	17	U
2,4-DB	100	210		220		17	U	17	UJ	17	U
Pentachlorophenol	100	17	U	17	U	17	U	17	UJ	17	U
Picloram	100	17	UJ	17	UJ	17	UJ	17	UJ	17	UJ

000013

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

PCBs by GC

Report Date: 05/11/06 12:09

RFW Batch Number: 0604L865 Client: TNU-HANFORD RC-051 Work Order: 11343606001 Page: 1

000000005

	Cust ID:	J11K41	J11K42	J11K43	J11K43	J11K43	J11K44
Sample Information	RFW#:	001	002	003	003 MS	003 MSD	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene		102 %	106 %	98 %	104 %	110 %	99 %
Decachlorobiphenyl		102 %	103 %	95 %	103 %	107 %	98 %
Aroclor-1016		13 U	13 U	13 U	96 %	95 %	13 U
Aroclor-1221		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1232		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1242		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1248		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1254		13 U	13 U	13 U	13 U	13 U	13 U
Aroclor-1260		13 U	13 U	13 U	95 %	91 %	13 U

	Cust ID:	J11K45	PBLKGT	PBLKGT BS
Sample Information	RFW#:	005	06LE0354-MB1	06LE0354-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene		101 %	91 %	107 %
Decachlorobiphenyl		98 %	87 %	104 %
Aroclor-1016		13 U	13 U	104 %
Aroclor-1221		13 U	13 U	13 U
Aroclor-1232		13 U	13 U	13 U
Aroclor-1242		13 U	13 U	13 U
Aroclor-1248		13 U	13 U	13 U
Aroclor-1254		13 U	13 U	13 U
Aroclor-1260		13 U	13 U	97 %

8/23/06

5/10/06

000014

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

Pesticide/PCBs by GC, CLP List

Report Date: 05/17/06 14:35

RFW Batch Number: 0604L865 Client: TNUHANFORD RC-051 K0328 Work Order: 11343606001 Page: 1

	Cust ID:	J11K41	J11K42	J11K42	J11K43	J11K44	J11K45
Sample Information	RFW#:	001	002	002 MSD	003	004	005
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	4.00	4.00	4.00	4.00	4.00	4.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	124 * %	131 * %	137 * %	127 * %	126 * %	117 %
	Decachlorobiphenyl	123 * %	137 * %	133 * %	124 * %	126 * %	118 %
		fl	fl	fl	fl	fl	fl
Alpha-BHC		1.3 U J	1.3 U J	115 %	1.3 U J	1.3 U J	1.3 U J
gamma-BHC (Lindane)		1.3 U	1.3 U	116 %	1.3 U	1.3 U	1.3 U
Beta-BHC		1.3 U	1.3 U	117 %	1.3 U	1.3 U	1.3 U
Heptachlor		1.3 U	1.3 U	114 %	1.3 U	1.3 U	1.3 U
Delta-BHC		1.3 U	1.3 U	93 %	1.3 U	1.3 U	1.3 U
Aldrin		1.3 U	1.3 U	109 %	1.3 U	1.3 U	1.3 U
Heptachlor epoxide		1.3 U	1.3 U	113 %	1.3 U	1.3 U	1.3 U
gamma-Chlordane		1.3 U	1.3 U	111 %	1.3 U	1.3 U	1.3 U
Endosulfan I		1.3 U	1.3 U	111 %	1.3 U	1.3 U	1.3 U
alpha-Chlordane		1.3 U	1.3 U	113 %	1.3 U	1.3 U	1.3 U
4,4'-DDE		1.3 U	1.3 U	110 %	1.3 U	1.3 U	1.3 U
Dieldrin		1.3 U	1.3 U	109 %	1.3 U	1.3 U	1.3 U
Endrin		1.3 U	1.3 U	111 %	1.3 U	1.3 U	1.3 U
4,4'-DDD		1.3 U	1.3 U	117 %	1.3 U	1.3 U	1.3 U
Endosulfan II		1.3 U	1.3 U	110 %	1.3 U	1.3 U	1.3 U
4,4'-DDT		1.3 U	1.3 U	88 %	1.3 U	1.3 U	1.3 U
Endrin aldehyde		1.3 U	1.3 U	112 %	1.3 U	1.3 U	1.3 U
Endosulfan sulfate		1.3 U	1.3 U	106 %	1.3 U	1.3 U	1.3 U
Methoxychlor		1.3 U	1.3 U	108 %	1.3 U	1.3 U	1.3 U
Endrin ketone		1.3 U	1.3 U	116 %	1.3 U	1.3 U	1.3 U
Toxaphene		13 U	13 U	13 U	13 U	13 U	13 U

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

R 8/23/06

000000006

000015

000000007

	Cust ID:	PBLKGQ		PBLKGQ BS		
Sample Information	RFW#:	06LE0353-MB1		06LE0353-MB1		
	Matrix:	SOIL		SOIL		
	D.F.:	1.00		1.00		
	Units:	UG/KG		UG/KG		
Surrogate: Tetrachloro-m-xylene		118	%	110	%	
Decachlorobiphenyl		104	%	94	%	
Alpha-BHC		0.33	U	115	%	
gamma-BHC (Lindane)		0.33	U	111	%	
Beta-BHC		0.33	U	117	%	
Heptachlor		0.33	U	106	%	
Delta-BHC		0.33	U	91	%	
Aldrin		0.33	U	108	%	
Heptachlor epoxide		0.33	U	105	%	
gamma-Chlordane		0.33	U	102	%	
Endosulfan I		0.33	U	105	%	
alpha-Chlordane		0.33	U	102	%	
4,4'-DDE		0.33	U	103	%	
Dieldrin		0.33	U	109	%	
Endrin		0.33	U	110	%	
4,4'-DDD		0.33	U	102	%	
Endosulfan II		0.33	U	104	%	
4,4'-DDT		0.33	U	101	%	
Endrin aldehyde		0.33	U	96	%	
Endosulfan sulfate		0.33	U	97	%	
Methoxychlor		0.33	U	101	%	
Endrin ketone		0.33	U	101	%	
Toxaphene		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

000016

8/23/06

8/18/06

Herbicides, Special List

Report Date: 06/28/06 15:51

RFW Batch Number: 0604L865 Client: TNUHANFORD RC-051 K0328 Work Order: 11343606001 Page: 1

000000005

	Cust ID:	J11K41	J11K42	J11K43	J11K43	J11K43	J11K44
Sample Information	RFW#:	001	002	003	003 MS	003 MSD	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	DCAA	62 %	53 %	58 %	50 %	49 %	38 * %
		fl	fl	fl	fl	fl	fl
Dalapon		33 U	33 U	11 J	84 %	68 %	33 UJ
Dicamba		8.7 UJ	33 UJ	33 UJ	54 %	10 * %	33 UJ
Dichloroprop		44 J	33 UJ	440 J	.I %	.I %	340 J
2,4-D		33 UJ	33 UJ	33 UJ	116 %	64 %	66 J
2,4,5-TP (Silvex)		17 U	17 U	17 U	89 %	73 %	17 UJ
2,4,5-T		17 UJ	17 UJ	17 UJ	93 %	61 %	17 UJ
Dinoseb		16 UJ	17 U	17 U	163 * %	179 * %	11 UJ
2,4-DB		210	220	17 U	70 %	59 %	17 UJ
Pentachlorophenol		17 U	17 U	17 U	121 %	143 %	17 UJ
Picloram		17 UJ	17 UJ	17 UJ	NS %	NS %	17 UJ

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

0000017

8/23/06

	Cust ID:	J11K45	PBLKHV	PBLKHV BS
Sample Information	RFW#:	005	06LE0365-MB1	06LE0365-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG

Surrogate:	DCAA	47 %	62 %	49 %
		fl	fl	fl

Dalapon	33	U		33	U		94	%					
Dicamba	33	U	J	33	U		97	%					
Dichloroprop	110		J	33	U		103	%					
2,4-D	33	U	J	33	U		108	%					
2,4,5-TP (Silvex)	17	U		17	U		100	%					
2,4,5-T	17	U	J	17	U		93	%					
Dinoseb	17	U		17	U		147	%					
2,4-DB	17	U		17	U		85	%					
Pentachlorophenol	17	U		17	U		105	%					
Picloram	17	U	J	17	U		NS	%					

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

000018

000000006

8/23/06

8/28/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0604L865
SDG/SAF # K0328 / RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 04-26-2006

PCB

Five (5) soil samples were collected on 04-24-2006.

The samples and their associated QC samples were extracted on 05-03-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 05-05,06-2006. 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 base 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. Discrepancies from the Sample acceptance policy have been recorded on the Sample Receipt Checklist.

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

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

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

5. All surrogate recoveries were within acceptance criteria.

6. The blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

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

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

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 4 pages.

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

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/12/06
Date

kim\r:\group\data\pest\tnu hanford\0604-865.pcbs

LvLI
LIONVILLE LABORATORY INC.

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0604L865
SDG/SAF # K0328/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 04-26-2006

CHLORINATED PESTICIDES

Five (5) soil samples were collected on 04-24-2006.

The samples and their associated QC samples were extracted on 05-03-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 05-08,11-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081. All soil samples are reported on a dry weight base 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. Discrepancies from the Sample acceptance policy have been recorded on the Sample Receipt Checklist.

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

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

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

5. Ten (10) of sixteen (16) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 06GC159) has been enclosed.

6. All blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

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

9. All samples required a 4-fold instrument dilutions due to matrix. Reporting limits have been adjusted to reflect the necessary dilutions.

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

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

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

12. 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.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/19/06
Date

kim\r:\group\data\pest\tnu hanford\0604-865.pst

LVLI
LIONVILLE LABORATORY INC.

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06GC157

Initiator: KBG
Date: 5/17/96
Client: IN

Batch: 0604L865
Samples: 001, 002, 002MSD, 003, 004, 005
Method: SW846/MCAWW/CLP/ KBG 5/17/96

Parameter: PEST
Matrix: SOIL
Prep Batch: 06LE0363

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)

(1) Surrogate recoveries high ~~in most samples~~ 5/18/96

(2) Matrix Spike lost during extraction

2. Known or Probable Causes(s)

(2) MSD and LCS recoveries all within acceptance criteria. Nonate 5/18/96

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:

(1) Surrogate recoveries exceed acceptance criteria by +10-20%. No target compounds detected at greater than LOD. Minimal impact on sample data. Nonate 5/18/96

4. Project Manager Instructions...signature/date: _____

__ 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: _____ 5/18/96

Other Explanation:

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

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

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

QA-105-A-0805

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-051
LVL #: 0604L865
SDG/SAF # K0328/RC-051

W.O. #: 11343-606-001-9999-00
Date Received: 04-26-2006

HERBICIDE

Five (5) soil samples were collected on 4-24-2006.

The samples and their associated QC samples were extracted on 05-08-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 05-30,31-2006. The extraction and analysis procedures were based on method 8151A.

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. Discrepancies from the Sample acceptance policy have been recorded on the Sample Receipt checklist.
2. All required holding times for extraction and analysis have been met.
3. All samples results are reported on a wet-weight basis.
4. The method blank was below the reporting limits for all target compounds.
5. One (1) of nine (9) surrogate recoveries were outside acceptance criteria.
6. All blank spike recoveries were within acceptance criteria.
7. Three (3) of sixteen (16) matrix spike recoveries were outside acceptance criteria.
8. The initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. LvLI is NELAP accredited by the State of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
11. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

6/29/06
Date

ojr:\group\data\herb\tnu\0604-865 doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

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

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06GC.228

Initiator: Fran Kiger
Date: 6/28/6
Client: TNLE

Batch: 06041865
Samples: 001
Method: SW846/MCAWW/CLP/ 8151

Parameter: Herb
Matrix: Soil
Prep Batch: 0365

1. Reason for SDR

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

b. General Discrepancy

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

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

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

Surrogate recovery < lower control limit (38%; LCL= 40%)

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:

Sample Re-derivatized and reanalyzed to confirm recovery. Insufficient sample volume remains for re-extraction. Marginal exceedance (~2%), some low bias may be introduced to data quantitation

Nanette – 6/28/6

4. Project Manager Instructions...signature/date: _____

__ 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: _____ 6/28/6

Other Explanation:

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

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

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

QA-105-A-0805

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-229	Page 2 of 3

Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 600--204		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596-1	COA BESRAS6520	Method of Shipment FED EX
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC

Price Code 8L

Air Quality

Data Turnaround 45 Days

0000000009

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

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

Preservation	None	None	None	None	None	None	None	None	None	None	
Type of Container	G/P	G/P	aG	aG	aG	aG	aG	G/P	G/P	^	
No. of Container(s)	9	9	7	7	7	7	7	7	7	0	
Volume	30g	30g	30g	30g	30g	30g	30g	30g	30g	1^	
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	Semi-VOA - 8270A (TCL)	PAHs - 8310	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	IC Anions - 300.0 (Nitrate)	NO2/NO3 - 353.2 (Nitrogen in Nitrite and Nitrate)	—	
Sample No. / Matrix * / Sample Date / Sample Time											
J11K41 / SOIL / 4-24-06 / 1000	3	3	1	1	1	1	1	1	1		
J11K42 /	1	1	3	3	3	1	1	1	1		
J11K43 /	1	1	1	1	1	3	3	1	1		
J11K44 /	1	1	1	1	1	1	1	3	3		
J11K45 / 1630	3	3	1	1	1	1	1	1	1		

00027

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Elizabeth M Tepp		Received By/Stored In: CH2M Hill	
Relinquished By/Removed From: Dalotty M Teffer	Date/Time 11:30 4-25-06	Received By/Stored In: Fed EX	Date/Time 11:30 4-25-06
Relinquished By/Removed From: Fed Ex	Date/Time 4/26/06 0950	Received By/Stored In: [illegible]	Date/Time 4/26/06 0950
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

(2) Chloro-Herbicides - EPA8151+ (2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop, Picloram)

Matrix *

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

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

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

Appendix 5

Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA			DATA PACKAGE: K0328		
VALIDATOR: TLI		LAB: LLI		DATE: 8/20/00	
			SDG: K0328		

ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)	8151A	

SAMPLES/MATRIX				
J11K41	J11K42	J11K43	J11K44	J11K45
				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:

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: CH-44 - low surr - J all Pest - No MS - J all
MS - dicamba - J all - 10% No tox MSD/LCS - J all
MS - dichloroprop - J all - Interfere
MS - dinoseb - J all detects
MS/LCS - picloram - J all no MS/LCS no PTS

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: CA - dicamba - 137%
dichloroprop - interfere
2,4-D - 57%
2,4,5-T - 41%
picloram - ns
} J all

no Pest MS - J all
~~no dicloroprop - J all~~
8/20/6

6. SYSTEM PERFORMANCE (Levels D and E)

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

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

Comments:

7. HOLDING TIMES (all levels)

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

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

Comments:

PCB DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: toxaphene - all over

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

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

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

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

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

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

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

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

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

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

Comments: