0078911

SAF-RC-029
Remaining Sites Confirmation Sampling - Soil
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Kathy Wendt (2) H4-21

COMMENTS:

SDG K1317 **SAF-RC-029**

Waste Subsite: 100-H-28:1

RECEIVED
OCT 20 2008
EDMC

Date: 13 October 2008
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Remaining Sites Confirmation Sampling – Soil - Waste Subsite 128-H-28:1
Subject: Polyaromatic Hydrocarbons - Data Package No. K1317-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K1317 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J17FX6	8/28/08	Soil	C	See note 1
J17FX7	8/28/08	Soil	C	See note 1

1 – Polyaromatic hydrocarbons by 8310.

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

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

DATA QUALITY OBJECTIVES

Holding Times

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

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

All holding times were met.

- **Method Blanks**

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

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.

All accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit

are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

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

All duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J17FX6/J17FX7) were submitted for analysis. Field Duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K1317 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

None found.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

POLYAROMATIC HYDROCARBON DATA QUALIFICATION SUMMARY*

SDG: K1317	REVIEWER: ELR	Project: 100-H-28:1	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			

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

Appendix 3

Annotated Laboratory Reports

PAH'S by HPLC / Method 8310 Report Date: 09/19/08 12:42

RFW Batch Number: **0809L022** Client: **WC-HANFORD RC-029 K1317** Work Order: 60049001001 Page: 1

	Cust ID:	J17FX6	J17FX6	J17FX6	J17FX7	BLK	BLK BS
Sample Information	RFW#:	002	002 MS	002 MSD	003	08LE0432-MB1	08LE0432-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Triphenylene		99 %	91 %	101 %	99 %	101 %	109 %
		fl	fl	fl	fl	fl	fl
Naphthalene		22 J	112 %	100 %	23 J	33.3 U	100 %
Acenaphthylene		34.0 U	71 %	70 %	34.0 U	33.3 U	93 %
Acenaphthene		34.0 U	93 %	113 %	22 J	33.3 U	79 %
Fluorene		6.9	81 %	91 %	6.4	3.33 U	90 %
Phenathrene		15	89 %	90 %	4.4	3.33 U	93 %
Anthracene		3.40 U	90 %	105 %	3.40 U	3.33 U	108 %
Fluoranthrene		7.2	89 %	99 %	1.8 J	3.33 U	92 %
Indeno (1,2,3-cd) pyrene		34	89 %	93 %	24	3.33 U	98 %
Pyrene		8.3	71 %	80 %	2.8 J	3.33 U	90 %
Benzo (a) anthracene		3.7	69 %	79 %	3.6	3.33 U	85 %
Chrysene		4.3	74 %	85 %	3.40 U	3.33 U	93 %
Benzo (b) fluoranthrene		19	110 %	127 %	58	3.33 U	97 %
Benzo (k) fluoranthrene		2.0 J	81 %	93 %	2.4 J	3.33 U	98 %
Benzo (a) pyrene		4.2	71 %	80 %	3.2 J	3.33 U	95 %
Dibenzo (a,h) anthracene		1.7 J	77 %	86 %	2.2 J	3.33 U	96 %
Benzo (ghi) perylene		10	67 %	75 %	12	3.33 U	92 %

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 10/11/08

000000004

000010

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LvLI
LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-014
LVL #: 0809L022
SDG/SAF # K1317 /RC-029

W.O. #: 11343-606-001-9999-00
Date Received: 09-04-2008

POLYAROMATIC HYDROCARBONS

Two (2) soil samples were collected on 08-28-2008.

The samples and associated QC samples were extracted on 09-11-2008 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 09-18-2008. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8310.

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

1. The sample shipment met the sample acceptance policy for Lionville Laboratory.
2. The samples were extracted and analyzed within hold 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. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. LvLI is NELAP accredited by the State of Pennsylvania. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

Iain Daniels
Laboratory Manager
Lionville Laboratory

9/23/08
Date

r:\group\data\2008\8310\tnu\0809-022oj2.8310.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 8 pages.

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

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-029-052

Collector: WELCH-KOELLING	Company Contact: Matt Perrott	Telephone No.: 372-9088	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: Remaining Sites Confirmation Sampling - Soil	Sampling Location: 100-H-28:1		SAF No.: RC-029
Ice Chest No.: AFS-06-004	Field Logbook No.: EL-1601-2	COA: C00H28A000	Method of Shipment: FedEx
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A080 344		Bill of Lading/Air Bill No.: SEE BELOW

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000013

Preservation	None	Cool 4C										
Type of Container	G/P	aG										
No. of Container(s)	1	1										
Volume	250mL	250mL										
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PAHs - 8310										

Sample No.	Matrix *	Sample Date	Sample Time										
117FX5	SOIL	8/28/08	1040	X									
117FX6	SOIL	8/28/08	1045	X	X								
117FX7	SOIL	8/28/08	1050	X	X								
~~117FX8~~	~~SOIL~~												
~~117FX9~~	~~SOIL~~	BW 8/28/08											

CHAIN OF POSSESSION

Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
WELCH KOELLING	8/28/08 1056 9/3/08	BHUDSON BHudson	8/28/08 1056 9/3/08
BHUDSON BHudson	8/28/07 1630	1060 3C	8/28/08 1630
1060 3C	9/3/08 0900	MStankovich	9/3/08 0900
MStankovich	9/3/08 0900	Fed Ex	
Fed Ex	9.4.08 0955	DJMuller	9.4.08 0955

SPECIAL INSTRUCTIONS

ICP Metals - 6010TR (Client List [Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7471 - (CV)

First time times changed per B. Hudson
MS 9/3/08

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

BW

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

VCH-EE-011

000000007

Appendix 5

Data Validation Supporting Documentation

GENERAL ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-H-281			DATA PACKAGE: K1317		
VALIDATOR: ELR		LAB: LLI		DATE: 10/10/08	
			SDG: K1317		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	8310
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX:					
J17FX6 J17FX7					
					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)

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:

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

no FB

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

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

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

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

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

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

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

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

MS/MSD standards 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 ORGANIC DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

6. HOLDING TIMES (all levels)

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

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

Comments:

GENERAL ORGANIC DATA VALIDATION CHECKLIST

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

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

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

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

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

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

Comments: 3 over

9. SAMPLE CLEANUP (Levels D and E)

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

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

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

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

Check 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: 13 October 2008
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Remaining Sites Confirmation Sampling – Soil - Waste Subsite 100-H-28:1
Subject: Inorganics - Data Package No. K1317-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K1317 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J17FX5	8/28/08	Soil	C	See note 1
J17FX6	8/28/08	Soil	C	See note 1
J17FX7	8/28/08	Soil	C	See note 1

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

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

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

DATA QUALITY PARAMETERS

Holding Times

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

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

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

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

Due to method blank contamination, the calcium, magnesium and sodium results in sample J17FX5 were qualified as undetected and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

One field blank (J17FX5) was submitted for analysis. Aluminum, barium, copper, iron, potassium, manganese, silicon, vanadium and zinc were detected in the equipment blank. Under the WCH statement of work, no qualification is required.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits, all antimony (32.7%) results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (20%), all silicon results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J17FX6/J17FX7) were submitted for analysis. Field Duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K1317 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, the calcium, magnesium and sodium results in sample J17FX5 were qualified as undetected and flagged "UJ".
- Due to a matrix spike recovery outside QC limits, all antimony (32.7%) results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits (20%), all silicon results were qualified as estimates and flagged "J".

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

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

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

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K1317	REVIEWER: ELR	Project: 100-H-28:1	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Calcium Magnesium Sodium	UJ	J17FX5	Method blank contamination
Antimony	J	All	MS recovery
Silicon	J	All	LCS recovery

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

Appendix 3

Annotated Laboratory Reports

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 09/22/08

CLIENT: WC-HANFORD RC-029 K1317 LVL LOT #: 0809L022

WORK ORDER: 60049-001-001-0001-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J17FX5	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Aluminum, Total	66.3	MG/KG	3.1	1.0
		Arsenic, Total	0.39 u	MG/KG	0.39	1.0
		Boron, Total	0.39 u	MG/KG	0.39	1.0
		Barium, Total	1.2	MG/KG	0.08	1.0
		Beryllium, Total	0.04 u	MG/KG	0.04	1.0
		Calcium, Total	24.2 UJ	MG/KG	3.1	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Cobalt, Total	0.16 u	MG/KG	0.16	1.0
		Chromium, Total	0.16 u	MG/KG	0.16	1.0
		Copper, Total	0.27	MG/KG	0.16	1.0
		Iron, Total	128	MG/KG	3.5	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Potassium, Total	67.4	MG/KG	38.2	1.0
		Magnesium, Total	12.3 UJ	MG/KG	1.9	1.0
		Manganese, Total	4.9	MG/KG	0.03	1.0
		Molybdenum, Total	0.23 u	MG/KG	0.23	1.0
		Sodium, Total	60.5 UJ	MG/KG	1.6	1.0
		Nickel, Total	0.16 u	MG/KG	0.16	1.0
		Lead, Total	0.23 u	MG/KG	0.23	1.0
		Antimony, Total	0.23 uJ	MG/KG	0.23	1.0
		Selenium, Total	0.46 u	MG/KG	0.46	1.0
		Silicon, Total	44.8 J	MG/KG	3.1	1.0
		Vanadium, Total	0.14	MG/KG	0.11	1.0
		Zinc, Total	0.77	MG/KG	0.46	1.0

10/11/08

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 09/22/08

CLIENT: WC-HANFORD RC-029 K1317 LVL LOT #: 0809L022

WORK ORDER: 60049-001-001-0001-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	J17FX6	Silver, Total	0.24 u	MG/KG	0.24	3.0
		Aluminum, Total	12100	MG/KG	9.6	3.0
		Arsenic, Total	3.3	MG/KG	1.2	3.0
		Boron, Total	66.4	MG/KG	1.2	3.0
		Barium, Total	540	MG/KG	0.24	3.0
		Beryllium, Total	0.53	MG/KG	0.12	3.0
		Calcium, Total	15400	MG/KG	9.6	3.0
		Cadmium, Total	0.12 u	MG/KG	0.12	3.0
		Cobalt, Total	8.0	MG/KG	0.48	3.0
		Chromium, Total	15.0	MG/KG	0.48	3.0
		Copper, Total	22.7	MG/KG	0.48	3.0
		Iron, Total	21800	MG/KG	10.8	3.0
		Mercury, Total	0.03	MG/KG	0.01	1.0
		Potassium, Total	1300	MG/KG	119	3.0
		Magnesium, Total	6450	MG/KG	6.0	3.0
		Manganese, Total	340	MG/KG	0.1	3.0
		Molybdenum, Total	1.1	MG/KG	0.72	3.0
		Sodium, Total	774	MG/KG	4.8	3.0
		Nickel, Total	17.2	MG/KG	0.48	3.0
		Lead, Total	5.7	MG/KG	0.72	3.0
		Antimony, Total	0.72 u J	MG/KG	0.72	3.0
		Selenium, Total	1.4 u	MG/KG	1.4	3.0
		Silicon, Total	415 J	MG/KG	9.6	3.0
		Vanadium, Total	52.7	MG/KG	0.34	3.0
		Zinc, Total	44.5	MG/KG	1.4	3.0

10/11/08

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 09/22/08

CLIENT: WC-HANFORD RC-029 K1317 LVL LOT #: 0809L022

WORK ORDER: 60049-001-001-0001-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	J17FX7	Silver, Total	0.25 u	MG/KG	0.25	3.0
		Aluminum, Total	11200	MG/KG	9.9	3.0
		Arsenic, Total	2.6	MG/KG	1.2	3.0
		Boron, Total	56.2	MG/KG	1.2	3.0
		Barium, Total	500	MG/KG	0.25	3.0
		Beryllium, Total	0.47	MG/KG	0.12	3.0
		Calcium, Total	14200	MG/KG	9.9	3.0
		Cadmium, Total	0.12 u	MG/KG	0.12	3.0
		Cobalt, Total	8.0	MG/KG	0.50	3.0
		Chromium, Total	13.9	MG/KG	0.50	3.0
		Copper, Total	21.3	MG/KG	0.50	3.0
		Iron, Total	21500	MG/KG	11.2	3.0
		Mercury, Total	0.02	MG/KG	0.009	1.0
		Potassium, Total	1220	MG/KG	123	3.0
		Magnesium, Total	6050	MG/KG	6.2	3.0
		Manganese, Total	306	MG/KG	0.1	3.0
		Molybdenum, Total	0.99	MG/KG	0.75	3.0
		Sodium, Total	663	MG/KG	5.0	3.0
		Nickel, Total	16.2	MG/KG	0.50	3.0
		Lead, Total	5.4	MG/KG	0.75	3.0
		Antimony, Total	0.75 u J	MG/KG	0.75	3.0
		Selenium, Total	1.5 u	MG/KG	1.5	3.0
		Silicon, Total	470 J	MG/KG	9.9	3.0
		Vanadium, Total	51.5	MG/KG	0.35	3.0
		Zinc, Total	45.2	MG/KG	1.5	3.0

10/11/08

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: WC-HANFORD RC-029
LVL#: 0809L022
SDG/SAF#: K1317/RC-029

W.O.#: 60049-001-001-0001-00
Date Received: 09-04-08

METALS CASE NARRATIVE

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

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

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

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

   The samples, with the exception of J17FX5, were run with 3-fold dilutions for ICP metals due to sample matrix.

   All samples for Aluminum were run on a different instrument due to sample matrix.

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

4. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury) with the exception of Potassium and Sodium in file TA0918C. All samples were run and reported for Potassium and Sodium from file PS0918B along with Aluminum.

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

6. The preparation/method blanks for 2 analytes were outside method criteria. {less than the Limit of Quantitation (3-10X the LOD), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

   a). The MB results for Manganese and Sodium were greater than the Limit of Quantitation (LOQ) {3-10x the (LOD) Limit of Detection} and sample J17FX5 for Sodium and Manganese read less than 20 times the MB concentration. However, no corrective action criteria for MBs were provided in SW846 method 6010B. The sample result was reported herein "uncorrected" for the

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 22 pages.

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

levels found in the MB.

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

8. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon (20%). Sample results for Silicon may be biased low. Refer to the Inorganics Laboratory Control Standards Report.

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

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

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J17FX6	Aluminum	126,000	94.9
	Iron	60,000	94.5
	Antimony	300	101.1
	Manganese	3,000	105.7
	Calcium	60,000	92.6

11. The duplicate analyses for 3 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

9/22/08
Date

alm/m09-022

LVLI
LIONVILLE LABORATORY INC.

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-029-032

llector WELCH-KOELLING	Company Contact Matt Perrott	Telephone No. 372-9088	Project Coordinator KESSNER, JH
Price Code 8C	Data Turnaround 15 Days		
oject Designation Remaining Sites Confirmation Sampling - Soil	Sampling Location 100-H-28:1		SAF No. RC-029
Chest No. AFS-06-004	Field Logbook No. EL-1601-2	COA C00H28A000	Method of Shipment FedEx
ipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A080344		Bill of Lading/Air Bill No. See GPC

OSSIBLE SAMPLE HAZARDS/REMARKS

pecial Handling and/or Storage

Preservation	None	Cool 4C										
Type of Container	G/P	aG										
No. of Container(s)	1	1										
Volume	250mL	250mL										
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PAHs - 8310										

Sample No.	Matrix *	Sample Date	Sample Time										
7FX5	SOIL	8/28/08	1040	X									
7FX6	SOIL	8/28/08	1045	X	X								
7FX7	SOIL	8/28/08	1050	X	X								
~~7FX8~~	~~SOIL~~												
7FX9	SOIL	RSH 8/28/08											

CHAIN OF POSSESSION	Sign/Print Names	
linquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
WELCH KOELLING	8/28/08 1046 9/3/08 1056	BHUDSON BHudson	8/28/08 1046 9/3/08 1056
linquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
BHUDSON BHudson	8/28/07 1630	1060 #3C	8/28/08 1630
linquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
260 3C	9/3/08 0900	MStankovich	9/3/08 0900
linquished By/Removed From WCH	Date/Time	Received By/Stored In	Date/Time
MStankovich	9/3/08 0900	FedEx	
linquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FedEx	9.4.08 0955	DJ Jones	9.4.08 0955
linquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

ICP Metals - 6010TR (Client List (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7471 - (CV)

First time times changed per B. Hudson
MS 9/8/08

Sampler unavailable to remove samples from controlled storage. Shipper removed samples from storage location taking custody of samples for shipment to lab.

BW

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
Ve=Vegetation
X=Other

ABORATORY SECTION	Received By	Title	Date/Time
INAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

CH-EE-011

000016

00000021

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-H-28:1			DATA PACKAGE: K1317		
VALIDATOR: ELR		LAB: LLI		DATE: 10/10/08	
			SDG: K1317		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J17FX5	J17FX6	J17FX7			
					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 ..... Yes No N/A

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

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

Comments: XS - calcium, magnesium, sodium - UJ

FB - aluminum, barium, copper, iron, potassium, manganese, silicon, vanadium, zinc

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 32.7% - J no pts
LCS - silicon - 209% - J

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 09/22/08

CLIENT: WC-HANFORD RC-029 K1317 LVL LOT #: 0809L022

WORK ORDER: 60049-001-001-0001-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	08L0338-MB1	Silver, Total	0.16	MG/KG	0.10	1.0
		Aluminum, Total	4.0 u	MG/KG	4.0	1.0
		Arsenic, Total	0.50 u	MG/KG	0.50	1.0
		Boron, Total	0.50 u	MG/KG	0.50	1.0
		Barium, Total	0.13	MG/KG	0.10	1.0
		Beryllium, Total	0.05 u	MG/KG	0.05	1.0
		Calcium, Total	6.6	MG/KG	4.0	1.0
		Cadmium, Total	0.06	MG/KG	0.05	1.0
		Cobalt, Total	0.20 u	MG/KG	0.20	1.0
		Chromium, Total	0.25	MG/KG	0.20	1.0
		Copper, Total	0.20 u	MG/KG	0.20	1.0
		Iron, Total	5.5	MG/KG	4.5	1.0
		Potassium, Total	49.3 u	MG/KG	49.3	1.0
		Magnesium, Total	3.1	MG/KG	2.5	1.0
		Manganese, Total	0.45	MG/KG	0.04	1.0
		Molybdenum, Total	0.30 u	MG/KG	0.30	1.0
		Sodium, Total	22.1	MG/KG	2.0	1.0
		Nickel, Total	0.20 u	MG/KG	0.20	1.0
		Lead, Total	0.30 u	MG/KG	0.30	1.0
		Antimony, Total	0.30 u	MG/KG	0.30	1.0
		Selenium, Total	0.60 u	MG/KG	0.60	1.0
		Silicon, Total	4.0 u	MG/KG	4.0	1.0
		Vanadium, Total	0.14 u	MG/KG	0.14	1.0
		Zinc, Total	0.60 u	MG/KG	0.60	1.0
BLANK1	08C0157-MB1	Mercury, Total	0.01 u	MG/KG	0.01	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 09/22/08

CLIENT: WC-HANFORD RC-029 K1317 LVL LOT #: 0809L022

WORK ORDER: 60049-001-001-0001-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	J17FX6	Silver, Total	3.7	0.24u	3.9	94.9	3.0
		Aluminum, Total	12600	12100	158	360.3*	3.0
		Arsenic, Total	149	3.3	158	92.3	3.0
		Boron, Total	138	66.4	79.0	90.8	3.0
		Barium, Total	674	540	158	84.3	3.0
		Beryllium, Total	4.3	0.53	3.9	96.8	3.0
		Calcium, Total	16900	15400	1980	72.1*	3.0
		Cadmium, Total	3.8	0.12u	3.9	97.4	3.0
		Cobalt, Total	45.6	8.0	39.5	95.2	3.0
		Chromium, Total	29.5	15.0	15.8	91.8	3.0
		Copper, Total	41.0	22.7	19.8	92.4	3.0
		Iron, Total	22600	21800	79.0	908.1*	3.0
		Mercury, Total	0.21	0.03	0.16	110.7	1.0
		Potassium, Total	3070	1300	1980	89.5	3.0
		Magnesium, Total	8480	6450	1980	102.7	3.0
		Manganese, Total	342	340	39.5	5.8*	3.0
		Molybdenum, Total	73.2	1.1	79.0	91.3	3.0
		Sodium, Total	2810	774	1980	103.1	3.0
		Nickel, Total	55.0	17.2	39.5	95.7	3.0
		Lead, Total	42.0	5.7	39.5	91.9	3.0
		Antimony, Total	12.9	0.72u	39.5	32.7	3.0
		Selenium, Total	128	1.4 u	158	80.9	3.0
		Silicon, Total	504	415	79.0	112.7*	3.0
		Vanadium, Total	91.1	52.7	39.5	97.2	3.0
		Zinc, Total	81.2	44.5	39.5	92.9	3.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 09/22/08

CLIENT: WC-HANFORD RC-029 K1317 LVL LOT #: 0809L022

WORK ORDER: 60049-001-001-0001-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-002REP	J17FX6	Silver, Total	0.24u	0.22u	NC	3.0
		Aluminum, Total	12100	12000	0.28	3.0
		Arsenic, Total	3.3	2.6	23.7	3.0
		Boron, Total	66.4	72.8	9.2	3.0
		Barium, Total	540	571	5.5	3.0
		Beryllium, Total	0.53	0.53	1.1	3.0
		Calcium, Total	15400	15600	1.3	3.0
		Cadmium, Total	0.12u	0.11u	NC	3.0
		Cobalt, Total	8.0	7.6	5.1	3.0
		Chromium, Total	15.0	14.4	4.1	3.0
		Copper, Total	22.7	26.9	16.9	3.0
		Iron, Total	21800	20200	7.6	3.0
		Mercury, Total	0.03	0.02	22.2	1.0
		Potassium, Total	1300	1260	3.1	3.0
		Magnesium, Total	6450	6290	2.4	3.0
		Manganese, Total	340	295	14.1	3.0
		Molybdenum, Total	1.1	1.3	16.7	3.0
		Sodium, Total	774	1040	29.5	3.0
		Nickel, Total	17.2	16.1	6.6	3.0
		Lead, Total	5.7	5.5	3.6	3.0
		Antimony, Total	0.72u	0.67u	NC	3.0
		Selenium, Total	1.4 u	1.3 u	NC	3.0
		Silicon, Total	415	475	13.4	3.0
		Vanadium, Total	52.7	54.1	2.6	3.0
		Zinc, Total	44.5	43.2	3.0	3.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 09/22/08

CLIENT: WC-HANFORD RC-029 K1317 LVL LOT #: 0809L022

WORK ORDER: 60049-001-001-0001-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	08L0338-LC1	Silver, LCS	48.3	50.0	MG/KG	96.6
		Aluminum, LCS	456	500	MG/KG	91.3
		Arsenic, LCS	935	1000	MG/KG	93.5
		Boron, LCS	454	500	MG/KG	90.7
		Barium, LCS	474	500	MG/KG	94.8
		Beryllium, LCS	24.3	25.0	MG/KG	97.2
		Calcium, LCS	2450	2500	MG/KG	98.2
		Cadmium, LCS	23.8	25.0	MG/KG	95.2
		Cobalt, LCS	240	250	MG/KG	96.0
		Chromium, LCS	48.8	50.0	MG/KG	97.6
		Copper, LCS	121	125	MG/KG	96.9
		Iron, LCS	516	500	MG/KG	103.2
		Potassium, LCS	2200	2500	MG/KG	88.1
		Magnesium, LCS	2370	2500	MG/KG	94.9
		Manganese, LCS	73.7	75.0	MG/KG	98.3
		Molybdenum, LCS	482	500	MG/KG	96.4
		Sodium, LCS	2250	2500	MG/KG	90.1
		Nickel, LCS	194	200	MG/KG	96.8
		Lead, LCS	242	250	MG/KG	96.8
		Antimony, LCS	281	300	MG/KG	93.5
		Selenium, LCS	891	1000	MG/KG	89.1
		Silicon, LCS	100	500	MG/KG	20.0
		Vanadium, LCS	240	250	MG/KG	96.2
		Zinc, LCS	96.5	100	MG/KG	96.5
LCS1	08C0157-LC1	Mercury, LCS	4.7	4.7	MG/KG	99.3