0093620

SAF-RC-176
ARRA Remaining Sites Confirmation Sampling – Other
FINAL VALIDATION PACKAGE

COMPLETE COPY OF FINAL VALIDATION PACKAGE TO:

Kathy Wendt (2)

COMMENTS:

SDG J00921 SAF-RC-176

Sample Location: 100-K-90

RECEIVED
JAN 17 2011
EDMC

Date: 20 December 2010
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: ARRA Remaining Sites Confirmation Sampling – Soil Full Protocol - Waste Site 100-K-90
Subject: Metals - Data Package No. J00921-TAL

INTRODUCTION

This memo presents the results of data validation on Data Package No. J00921 prepared by TestAmerica Laboratory Inc. (TAL). 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
J1C521	11/10/10	Soil	C	See note 1
J1B522	11/21010	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, Rev. 4, February 2005). Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY PARAMETERS

- **Holding Times**

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

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 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 matrix spike recoveries outside QC limits, all antimony (66%) and silicon (28%) results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (11%), 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 (J1B521/J1B522) was 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. J00921 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 matrix spike recoveries outside QC limits, all antimony (66%) and silicon (28%) results were qualified as estimates and flagged "J".

- Due to an LCS recovery outside QC limits (11%), 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: J00921	REVIEWER: ELR	Project: 100-K-90	PAGE_1_OF_1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony Silicon	J	All	Matrix spike 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

Analytical Data

Client: Washington Closure Hanford

Job Number: 280-9726-1
Sdg Number: J00921

12/18/10

Client Sample ID: J1B522

Lab Sample ID: 280-9726-2
Client Matrix: Solid
% Moisture: 21.6

Date Sampled: 11/10/2010 1020
Date Received: 11/12/2010 0900

6010B Metals (ICP)

Method:	6010B	Analysis Batch: 280-42187		Instrument ID:	MT_026
Preparation:	3050B	Prep Batch: 280-41028		Lab File ID:	26a111910.asc
Dilution:	1.0			Initial Weight/Volume:	1.00 g
Date Analyzed:	11/19/2010 1949			Final Weight/Volume:	100 mL
Date Prepared:	11/19/2010 0800				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		1650	J	2.0	6.4
Antimony		0.48	U J	0.48	0.77
Arsenic		0.84	U	0.84	1.3
Barium		15.2	J	0.097	0.64
Beryllium		0.048	B	0.042	0.26
Boron		1.2	U	1.2	2.6
Cadmium		0.052	U	0.052	0.26
Calcium		1030	J	18.0	63.8
Chromium		1.2		0.074	0.26
Cobalt		1.2	B	0.13	1.3
Copper		3.0		0.28	1.3
Iron		3320		4.8	6.4
Lead		2.7		0.34	0.64
Magnesium		618	J	4.7	25.5
Manganese		47.1		0.13	1.3
Molybdenum		0.33	U	0.33	2.6
Nickel		1.7	B	0.16	5.1
Potassium		291	B	52.3	383
Selenium		1.1	U	1.1	1.3
Silicon		276	J	2.7	12.8
Silver		0.20	U	0.20	0.26
Sodium		118	B M	75.2	153
Vanadium		8.1		0.12	2.6
Zinc		12.0	J	0.51	1.3

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 280-41892		Instrument ID:	MT_033
Preparation:	7471A	Prep Batch: 280-40980		Lab File ID:	101118AA.txt
Dilution:	1.0			Initial Weight/Volume:	0.63 g
Date Analyzed:	11/18/2010 1355			Final Weight/Volume:	50 mL
Date Prepared:	11/18/2010 0900				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.017	B	0.0067	0.021

000010

Client: Washington Closure Hanford

Job Number: 280-9726-1
Sdg Number: J00921

12/18/10

Client Sample ID: J1B521

Lab Sample ID: 280-9726-1
Client Matrix: Solid
% Moisture: 21.3

Date Sampled: 11/10/2010 1020
Date Received: 11/12/2010 0900

6010B Metals (ICP)

Method:	6010B	Analysis Batch: 280-42187		Instrument ID:	MT_026
Preparation:	3050B	Prep Batch: 280-41028		Lab File ID:	26a111910.asc
Dilution:	1.0			Initial Weight/Volume:	1.05 g
Date Analyzed:	11/19/2010 1947			Final Weight/Volume:	100 mL
Date Prepared:	11/19/2010 0800				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		1540	J	1.9	6.0
Antimony		0.46	U J	0.46	0.73
Arsenic		0.80	U	0.80	1.2
Barium		17.0	J	0.092	0.60
Beryllium		0.058	B	0.040	0.24
Boron		1.2	U	1.2	2.4
Cadmium		0.050	U	0.050	0.24
Calcium		1060	J	17.1	60.5
Chromium		1.4		0.070	0.24
Cobalt		1.6		0.12	1.2
Copper		3.6		0.26	1.2
Iron		4250		4.6	6.0
Lead		2.5		0.33	0.60
Magnesium		886	J	4.5	24.2
Manganese		61.7		0.12	1.2
Molybdenum		0.35	B	0.31	2.4
Nickel		1.9	B	0.15	4.8
Potassium		327	B	49.6	363
Selenium		1.0	U	1.0	1.2
Silicon		301	J	2.5	12.1
Silver		0.19	U	0.19	0.24
Sodium		99.7	B	71.4	145
Vanadium		11.0		0.11	2.4
Zinc		14.1	J	0.48	1.2

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 280-41892		Instrument ID:	MT_033
Preparation:	7471A	Prep Batch: 280-40980		Lab File ID:	101118AA.txt
Dilution:	1.0			Initial Weight/Volume:	0.63 g
Date Analyzed:	11/18/2010 1343			Final Weight/Volume:	50 mL
Date Prepared:	11/18/2010 0900				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0083	B M	0.0067	0.021

000011

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

CASE NARRATIVE

Client: Washington Closure Hanford

Project: WASHINGTON CLOSURE HANFORD

Report Number: 280-9726-1

SDG #: J00921
SAF#: RC-176

Date SDG Closed: November 12, 2010
Data Deliverable: 15 Day / Summary

CLIENT ID	LAB ID	ANALYSES REQUESTED	ANALYSES PERFORMED
J1B521	280-9726-1	6010/7471	6010B/7471A
J1B522	280-9726-2	6010/7471	6010B/7471A

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this Case Narrative. 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 signature on the Report Cover.

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted. Calculations are performed before rounding to avoid round-off errors in calculated results.

This report includes reporting limits (RLs) less than TestAmerica Denver's practical quantitation limits. These reporting limits are being used specifically at the client's request to meet the needs of this project. Please note that data are not normally reported to these levels without qualification, since they are inherently less reliable and potentially less defensible than required by the current NELAC standards.

The results, RLs and MDLs included in this report have been adjusted for dry weight, as appropriate.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 11/12/2010: the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 1.6 C, 1.8 C and 2.0 C.

TOTAL METALS - SW846 6010B/7471A
Low levels of Aluminum, Barium, Calcium, Magnesium and Zinc are present in the method blank associated with batch 280-41028. Because the concentrations in the method blank are not present at levels greater than the reporting limits, corrective action is deemed unnecessary. Associated sample results present above the MDL and/or RL have been flagged with a "J".

It can be noted that the sample amount was greater than four times the spike amount for Aluminum and Iron in the Matrix Spike performed on sample J1B522; therefore, control limits are not applicable.

The SW846 6010B duplicate analysis of sample J1B522 exhibited RPD data outside the control limits for Sodium, and the associated sample result has been flagged "M". There is no indication that the analytical system was operating out of control, and method accuracy has been verified by the acceptable LCS analysis data; therefore, corrective action is deemed unnecessary.

The Mercury duplicate analysis of sample J1B521 exhibited RPD data outside the control limits, and the associated sample result has been flagged "M". There is no indication that the analytical system was operating out of control, and method accuracy has been verified by the acceptable LCS analysis data; therefore, corrective action is deemed unnecessary.

No other anomalies were encountered.

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-176-013	Page 1 of 1

Collector: WT Sexsmith	Company Contact: Joan Kessner — Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 9GC TRD 11/10/10 — Data Turnaround: 15 Days
Project Designation: ARRA Remaining Sites Confirmation Sampling - Other	Sampling Location: 100-K-90 Other Solid Surface Sample	SAF No.: RC-176	
Ice Chest No.: NA	Field Logbook No.: EL-1649 — COA: S10K90A000	Method of Shipment: Hand Deliver	
Shipped To: TestAmerica Incorporated, Richland	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA	

POSSIBLE SAMPLE HAZARDS/REMARKS

None TRD 11/10/10

Special Handling and/or Storage

Cool 4C TRD 11/10/10

Preservation	None	Cool 4C	Cool 4C	None								
Type of Container	aG	aG	aG	G/P								
No. of Container(s)	1	1	1	1								
Volume	60mL	60mL	60mL	500mL								
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196	VOA - 8260A (TCL)	See item (2) in Special Instructions.								

000014

Sample No.	Matrix *	Sample Date	Sample Time										
J1B521	OTHER	11/10/10	1020	✓	✓								SS
J1B522	OTHER	11/10/10	1020	✓	✓								D

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Whitney Sexsmith — Date/Time: 1040 11/10/10	Received By/Stored In: JR DeBuique — Date/Time: 1040 11/10/10		
Relinquished By/Removed From: JR DeBuique — Date/Time: 1100 11/10/10	Received By/Stored In: [illegible] — Date/Time: 1100 11/10/10		
Relinquished By/Removed From: WCH — Date/Time: 1210 11/10/10	Received By/Stored In: TA IR — Date/Time: 1210 11.10.10		
Relinquished By/Removed From: TA IR — Date/Time: 1400 11.10.10	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

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7471 - (CV)
(2) Gamma Spec (Client List) {Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gross Alpha & Gross Beta

JDG#
J0C921

REVIEWED BY JEB DATE 11-10-10

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: [signature]	Title	Date/Time: 11/12/10	0900
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time	

WCH-EE-011

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-K-90			DATA PACKAGE: J00921		
VALIDATOR: ELR		LAB: TAL		DATE: 12/18/00	
			SDG: J00921		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J1B521 J1B522					
					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: LCS - silicon (119%) - J all
MS - antimony (66%) silicon (28%) - J all

no PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: _____

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

Client: Washington Closure Hanford

Job Number: 280-9726-1
Sdg Number: J00921

Method Blank - Batch: 280-41028

Method: 6010B
Preparation: 3050B

Lab Sample ID: MB 280-41028/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/19/2010 1942
Date Prepared: 11/19/2010 0800

Analysis Batch: 280-42187
Prep Batch: 280-41028
Units: mg/Kg

Instrument ID: MT_026
Lab File ID: 26a111910.asc
Initial Weight/Volume: 1.00 g
Final Weight/Volume: 100 mL

Analyte	Result	Qual	MDL	RL
Aluminum	1.86	B	1.6	5.0
Antimony	0.38	U	0.38	0.60
Arsenic	0.66	U	0.66	1.0
Barium	0.125	B	0.076	0.50
Beryllium	0.033	U	0.033	0.20
Boron	0.98	U	0.98	2.0
Cadmium	0.041	U	0.041	0.20
Calcium	15.71	B	14.1	50.0
Chromium	0.058	U	0.058	0.20
Cobalt	0.10	U	0.10	1.0
Copper	0.22	U	0.22	1.0
Iron	3.8	U	3.8	5.0
Lead	0.27	U	0.27	0.50
Magnesium	4.42	B	3.7	20.0
Manganese	0.10	U	0.10	1.0
Molybdenum	0.26	U	0.26	2.0
Nickel	0.12	U	0.12	4.0
Potassium	41.0	U	41.0	300
Selenium	0.86	U	0.86	1.0
Silicon	2.1	U	2.1	10.0
Silver	0.16	U	0.16	0.20
Sodium	59.0	U	59.0	120
Vanadium	0.094	U	0.094	2.0
Zinc	0.414	B	0.40	1.0

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-9726-1
Sdg Number: J00921

Lab Control Sample - Batch: 280-41028

Method: 6010B
Preparation: 3050B

Lab Sample ID: LCS 280-41028/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/19/2010 1945
Date Prepared: 11/19/2010 0800

Analysis Batch: 280-42187
Prep Batch: 280-41028
Units: mg/Kg

Instrument ID: MT_026
Lab File ID: 26a111910.asc
Initial Weight/Volume: 1.00 g
Final Weight/Volume: 100 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	200	189.4	95	82 - 116	
Antimony	50.0	47.48	95	82 - 110	
Arsenic	100	96.89	97	85 - 110	
Barium	200	188.2	94	87 - 112	
Beryllium	5.00	4.51	90	84 - 114	
Boron	100	95.19	95	81 - 110	
Cadmium	10.0	9.83	98	87 - 110	
Calcium	5000	4654	93	82 - 114	
Chromium	20.0	19.45	97	84 - 114	
Cobalt	50.0	48.22	96	87 - 110	
Copper	25.0	23.57	94	88 - 110	
Iron	100	98.02	98	87 - 120	
Lead	50.0	47.87	96	86 - 110	
Magnesium	5000	4673	93	90 - 110	
Manganese	50.0	47.24	94	88 - 110	
Molybdenum	100	95.90	96	86 - 110	
Nickel	50.0	46.17	92	87 - 110	
Potassium	5000	4820	96	89 - 110	
Selenium	200	196.9	98	83 - 110	
Silicon	1000	111.4	11	10 - 70	
Silver	5.00	5.12	102	87 - 114	
Sodium	5000	4869	97	90 - 112	
Vanadium	50.0	46.85	94	88 - 110	
Zinc	50.0	49.87	100	76 - 114	

Client: Washington Closure Hanford

Job Number: 280-9726-1
Sdg Number: J00921

Matrix Spike - Batch: 280-41028

Method: 6010B
Preparation: 3050B

Lab Sample ID: 280-9726-2
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/19/2010 1956
Date Prepared: 11/19/2010 0800

Analysis Batch: 280-42187
Prep Batch: 280-41028
Units: mg/Kg

Instrument ID: MT_026
Lab File ID: 26a111910.asc
Initial Weight/Volume: 1.16 g
Final Weight/Volume: 100 mL

Analyte	Sample Result/Qual		Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	1650		220	2343	314	50 - 200	4
Antimony	0.48	U	55.0	36.05	66	20 - 200	
Arsenic	0.84	U	110	109.0	99	76 - 111	
Barium	15.2		220	226.9	96	52 - 159	
Beryllium	0.048	B	5.50	5.09	92	72 - 105	
Boron	1.2	U	110	103.6	94	75 - 107	
Cadmium	0.052	U	11.0	11.00	100	40 - 130	
Calcium	1030		5500	6320	96	43 - 165	
Chromium	1.2		22.0	23.68	102	70 - 200	
Cobalt	1.2	B	55.0	54.67	97	72 - 106	
Copper	3.0		27.5	30.92	102	37 - 187	
Iron	3320		110	3679	324	70 - 200	4
Lead	2.7		55.0	55.95	97	70 - 200	
Magnesium	618		5500	5971	97	64 - 145	
Manganese	47.1		55.0	114.9	123	40 - 200	
Molybdenum	0.33	U	110	103.9	95	75 - 103	
Nickel	1.7	B	55.0	53.71	95	61 - 126	
Potassium	291	B	5500	5740	99	56 - 172	
Selenium	1.1	U	220	218.5	99	76 - 104	
Silicon	276		1100	589.3	28	20 - 200	
Silver	0.20	U	5.50	5.73	104	75 - 141	
Sodium	118	B	5500	5545	99	78 - 111	
Vanadium	8.1		55.0	61.00	96	50 - 169	
Zinc	12.0		55.0	67.00	100	70 - 200	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-9726-1
Sdg Number: J00921

Duplicate - Batch: 280-41028

Method: 6010B
Preparation: 3050B

Lab Sample ID: 280-9726-2
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/19/2010 1954
Date Prepared: 11/19/2010 0800

Analysis Batch: 280-42187
Prep Batch: 280-41028
Units: mg/Kg

Instrument ID: MT_026
Lab File ID: 26a111910.asc
Initial Weight/Volume: 1.15 g
Final Weight/Volume: 100 mL

Analyte	Sample Result/Qual		Result	RPD	Limit	Qual
Aluminum	1650		1493	10	40	
Antimony	0.48	U	0.42	NC	40	U
Arsenic	0.84	U	0.73	NC	30	U
Barium	15.2		14.88	2	30	
Beryllium	0.048	B	0.0588	19	30	B
Boron	1.2	U	1.1	NC	30	U
Cadmium	0.052	U	0.0588	NC	30	B
Calcium	1030		871.8	16	30	
Chromium	1.2		1.25	4	40	
Cobalt	1.2	B	1.15	3	30	
Copper	3.0		3.29	11	30	
Iron	3320		3166	5	40	
Lead	2.7		2.70	1	40	
Magnesium	618		643.8	4	30	
Manganese	47.1		60.67	25	40	
Molybdenum	0.33	U	0.29	NC	30	U
Nickel	1.7	B	1.72	2	30	B
Potassium	291	B	298.1	2	40	B
Selenium	1.1	U	0.95	NC	30	U
Silicon	276		266.3	4	40	
Silver	0.20	U	0.18	NC	30	U
Sodium	118	B	69.30	52	30	B M
Vanadium	8.1		8.16	0.9	30	
Zinc	12.0		11.38	5	40	

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Client: Washington Closure Hanford

Job Number: 280-9726-1
Sdg Number: J00921

Method Blank - Batch: 280-40980

Method: 7471A
Preparation: 7471A

Lab Sample ID: MB 280-40980/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/18/2010 1339
Date Prepared: 11/18/2010 0900

Analysis Batch: 280-41892
Prep Batch: 280-40980
Units: mg/Kg

Instrument ID: MT_033
Lab File ID: 101118AA.txt
Initial Weight/Volume: 0.60 g
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Mercury	0.0055	U	0.0055	0.017

Lab Control Sample - Batch: 280-40980

Method: 7471A
Preparation: 7471A

Lab Sample ID: LCS 280-40980/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/18/2010 1341
Date Prepared: 11/18/2010 0900

Analysis Batch: 280-41892
Prep Batch: 280-40980
Units: mg/Kg

Instrument ID: MT_033
Lab File ID: 101118AA.txt
Initial Weight/Volume: 0.60 g
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Mercury	0.417	0.420	101	87 - 111	

Matrix Spike - Batch: 280-40980

Method: 7471A
Preparation: 7471A

Lab Sample ID: 280-9726-1
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/18/2010 1348
Date Prepared: 11/18/2010 0900

Analysis Batch: 280-41892
Prep Batch: 280-40980
Units: mg/Kg

Instrument ID: MT_033
Lab File ID: 101118AA.txt
Initial Weight/Volume: 0.63 g
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual		Spike Amount	Result	% Rec.	Limit	Qual
Mercury	0.0083	B	0.504	0.495	97	87 - 111	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-9726-1
Sdg Number: J00921

Duplicate - Batch: 280-40980

Method: 7471A
Preparation: 7471A

Lab Sample ID:	280-9726-1	Analysis Batch:	280-41892	Instrument ID:	MT_033
Client Matrix:	Solid	Prep Batch:	280-40980	Lab File ID:	101118AA.txt
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.64 g
Date Analyzed:	11/18/2010 1346			Final Weight/Volume:	50 mL
Date Prepared:	11/18/2010 0900				

Analyte	Sample Result/Qual		Result	RPD	Limit	Qual
Mercury	0.0083	B	0.0132	46	20	B M

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