SAF-RC-238
Characterization of Surface Soils
At 100-K-64 & 100-K-111
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Kathy Wendt	H4-21	KW 9/26/13 INITIAL/DATE

COMMENTS:

SDG J01905 SAF-RC-238

Sample Location: 100-K-111

Date: 23 September 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Characterization of Surface Soils at 100-K-64 & 100-K-111 - Waste Site 100-K-111
Subject: Inorganics - Data Package No. J01905-TAL

INTRODUCTION

This memo presents the results of data validation on Data Package No. J01905 prepared by TestAmerica Laboratories (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
J1RR49	8/6/13	Soil	C	See note 1
J1RR50	8/6/13	Soil	C	See note 1
J1RR53	8/7/13	Soil	C	See note 1
J1RR54	8/7/13	Soil	C	See note 1
J1RR55	8/7/13	Soil	C	See note 1
J1RR56	8/7/13	Soil	C	See note 1
J1RR57	8/7/13	Soil	C	See note 1
J1RR58	8/7/13	Soil	C	See note 1
J1RR59	8/7/13	Soil	C	See note 1

1 – ICP metals by 6010B & mercury by 7471A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the Sampling and Analysis Instruction for Characterization of Surface Soils in the 100-K-64 and 100-K-111 Waste Site Areas (WHC-570, Rev. 1, May 2013). 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 6 months for ICP metals and 28 days for mercury.

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 75% to 125%. 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 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 74% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to matrix spike recoveries outside QC limits, all antimony (60%) and silicon (15%) results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits, all silicon (13%) 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 (J1RR55/J1RR56) 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. J01905 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 (60%) and silicon (15%) results were qualified as estimates and flagged "J".

- Due to an LCS recovery outside QC limits, all silicon (13%) 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.

WCH-570, Rev. 1, Sampling and Analysis Instruction for Characterization of Surface Soils in the 100-K-64 and 100-K-111 Waste Site Areas, May 2013.

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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

INORGANICS DATA QUALIFICATION SUMMARY*

SDG: J01905	REVIEWER: ELR	Project: 100-K-111	PAGE_1_OF_1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony Silicon	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

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR58

Lab Sample ID: 280-45398-1
Client Matrix: Solid
% Moisture: 1.5

Date Sampled: 08/07/2013 1355
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.03 g
Analysis Date:	08/16/2013 1740			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

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Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		7050		1.5	4.9
Antimony		0.37	U J	0.37	0.59
Arsenic		4.7		0.65	0.99
Barium		58.0		0.075	0.49
Beryllium		0.20		0.033	0.20
Boron		0.97	U	0.97	2.0
Cadmium		0.087	B	0.040	0.20
Calcium		10300		13.9	49.3
Chromium		16.4		0.057	0.20
Cobalt		5.5		0.099	0.99
Copper		9.6		0.21	0.99
Iron		14600		3.7	4.9
Lead		4.1		0.27	0.49
Magnesium		4850		3.6	19.7
Manganese		206		0.099	0.99
Molybdenum		0.26	U	0.26	2.0
Nickel		15.2		0.12	3.9
Potassium		729		40.4	296
Selenium		0.85	U	0.85	0.99
Silicon		282	N J	5.6	9.9
Silver		0.16	U	0.16	0.20
Sodium		159		58.2	118
Vanadium		30.8		0.093	2.0
Zinc		32.4		0.39	0.99

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.60 g
Analysis Date:	08/14/2013 1636			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0056	U	0.0056	0.017

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR59

Lab Sample ID: 280-45398-2
Client Matrix: Solid
% Moisture: 7.0

Date Sampled: 08/07/2013 1402
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.04 g
Analysis Date:	08/16/2013 1749			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

9/20/13

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		6690		1.6	5.2
Antimony		0.39	U J	0.39	0.62
Arsenic		3.9		0.68	1.0
Barium		51.4		0.079	0.52
Beryllium		0.20	B	0.034	0.21
Boron		1.0	U	1.0	2.1
Cadmium		0.12	B	0.042	0.21
Calcium		4020		14.6	51.7
Chromium		16.0		0.060	0.21
Cobalt		5.0		0.10	1.0
Copper		8.4		0.22	1.0
Iron		14800		3.9	5.2
Lead		5.6		0.28	0.52
Magnesium		4240		3.8	20.7
Manganese		190		0.10	1.0
Molybdenum		0.27	U	0.27	2.1
Nickel		14.1		0.13	4.1
Potassium		1020		42.4	310
Selenium		0.89	U J	0.89	1.0
Silicon		438		5.9	10.3
Silver		0.17	U	0.17	0.21
Sodium		123	B	61.0	124
Vanadium		31.6		0.097	2.1
Zinc		38.3		0.41	1.0

7471A Mercury (CVAA)

Analysis Method:	*7471A*	*Analysis Batch:*	*280-187309*	*Instrument ID:*	*MT_034*
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.62 g
Analysis Date:	08/14/2013 1643			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0058	U	0.0058	0.018

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR49

Lab Sample ID: 280-45398-3
Client Matrix: Solid
% Moisture: 2.4

Date Sampled: 08/06/2013 0742
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.05 g
Analysis Date:	08/16/2013 1801			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

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Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		10200		1.5	4.9
Antimony		0.37	U J	0.37	0.59
Arsenic		4.4		0.64	0.98
Barium		81.2		0.074	0.49
Beryllium		0.33		0.032	0.20
Boron		1.1	B	0.96	2.0
Cadmium		0.089	B	0.040	0.20
Calcium		3780		13.8	48.8
Chromium		18.7		0.057	0.20
Cobalt		7.6		0.098	0.98
Copper		16.9		0.21	0.98
Iron		19600		3.7	4.9
Lead		5.5		0.26	0.49
Magnesium		5110		3.6	19.5
Manganese		281		0.098	0.98
Molybdenum		0.25	U	0.25	2.0
Nickel		17.5		0.12	3.9
Potassium		1410		40.0	293
Selenium		0.84	U J	0.84	0.98
Silicon		293		5.5	9.8
Silver		0.16	U	0.16	0.20
Sodium		140		57.6	117
Vanadium		40.3		0.092	2.0
Zinc		42.1		0.39	0.98

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.68 g
Analysis Date:	08/14/2013 1650			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0067	B	0.0050	0.015

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR50

Lab Sample ID: 280-45398-4
Client Matrix: Solid
% Moisture: 2.3

Date Sampled: 08/06/2013 0759
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.06 g
Analysis Date:	08/16/2013 1803			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

9/20/13

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		7990		1.5	4.8
Antimony		0.37	U J	0.37	0.58
Arsenic		4.1		0.64	0.97
Barium		72.1		0.073	0.48
Beryllium		0.26		0.032	0.19
Boron		0.97	B	0.95	1.9
Cadmium		0.19		0.040	0.19
Calcium		3470		13.6	48.3
Chromium		15.7		0.056	0.19
Cobalt		6.2		0.097	0.97
Copper		11.9		0.21	0.97
Iron		17100		3.7	4.8
Lead		9.3		0.26	0.48
Magnesium		4120		3.6	19.3
Manganese		256		0.097	0.97
Molybdenum		0.25	U	0.25	1.9
Nickel		13.8		0.12	3.9
Potassium		1650		39.6	290
Selenium		0.83	U J	0.83	0.97
Silicon		353		5.5	9.7
Silver		0.15	U	0.15	0.19
Sodium		126		57.0	116
Vanadium		36.9		0.091	1.9
Zinc		56.0		0.38	0.97

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.64 g
Analysis Date:	08/14/2013 1652			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0078	B	0.0053	0.016

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR53

Lab Sample ID: 280-45398-5
Client Matrix: Solid
% Moisture: 1.4

Date Sampled: 08/07/2013 0716
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.09 g
Analysis Date:	08/16/2013 1806			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

9/20/13

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		7650		1.4	4.7
Antimony		0.35	U J	0.35	0.56
Arsenic		7.3		0.61	0.93
Barium		78.7		0.071	0.47
Beryllium		0.25		0.031	0.19
Boron		0.91	U	0.91	1.9
Cadmium		0.48		0.038	0.19
Calcium		3510		13.1	46.5
Chromium		45.9		0.054	0.19
Cobalt		6.4		0.093	0.93
Copper		17.4		0.20	0.93
Iron		18000		3.5	4.7
Lead		28.2		0.25	0.47
Magnesium		4260		3.4	18.6
Manganese		256		0.093	0.93
Molybdenum		0.24	U	0.24	1.9
Nickel		16.2		0.11	3.7
Potassium		870		38.1	279
Selenium		0.80	U	0.80	0.93
Silicon		223	J	5.3	9.3
Silver		0.15	U	0.15	0.19
Sodium		135		54.9	112
Vanadium		38.2		0.087	1.9
Zinc		142		0.37	0.93

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.56 g
Analysis Date:	08/14/2013 1654			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.010	B	0.0060	0.018

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR54

Lab Sample ID: 280-45398-6
Client Matrix: Solid
% Moisture: 3.6

Date Sampled: 08/07/2013 0722
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.06 g
Analysis Date:	08/16/2013 1808			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

9/20/13

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		9370		1.5	4.9
Antimony		0.37	U J	0.37	0.59
Arsenic		6.3		0.65	0.98
Barium		85.0		0.074	0.49
Beryllium		0.28		0.032	0.20
Boron		0.96	U	0.96	2.0
Cadmium		1.0		0.040	0.20
Calcium		4190		13.8	48.9
Chromium		69.9		0.057	0.20
Cobalt		7.3		0.098	0.98
Copper		26.0		0.21	0.98
Iron		18400		3.7	4.9
Lead		40.5		0.26	0.49
Magnesium		4890		3.6	19.6
Manganese		240		0.098	0.98
Molybdenum		0.25	U	0.25	2.0
Nickel		16.8		0.12	3.9
Potassium		1340		40.1	294
Selenium		0.84	U	0.84	0.98
Silicon		273	J	5.5	9.8
Silver		0.16	U	0.16	0.20
Sodium		192		57.8	117
Vanadium		38.0		0.092	2.0
Zinc		229		0.39	0.98

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.54 g
Analysis Date:	08/14/2013 1657			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.019	B	0.0064	0.020

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR57

Lab Sample ID: 280-45398-7
Client Matrix: Solid
% Moisture: 0.9

Date Sampled: 08/07/2013 1145
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.18 g
Analysis Date:	08/16/2013 1810			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

9/20/17

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		6480		1.3	4.3
Antimony		0.32	U J	0.32	0.51
Arsenic		2.8		0.56	0.86
Barium		48.8		0.065	0.43
Beryllium		0.18		0.028	0.17
Boron		0.84	U	0.84	1.7
Cadmium		0.11	B	0.035	0.17
Calcium		2990		12.1	42.8
Chromium		15.6		0.050	0.17
Cobalt		4.7		0.086	0.86
Copper		7.4		0.19	0.86
Iron		14100		3.2	4.3
Lead		5.5		0.23	0.43
Magnesium		3930		3.2	17.1
Manganese		175		0.086	0.86
Molybdenum		0.22	U	0.22	1.7
Nickel		13.4		0.11	3.4
Potassium		1150		35.1	257
Selenium		0.74	U J	0.74	0.86
Silicon		268		4.8	8.6
Silver		0.14	U	0.14	0.17
Sodium		102	B	50.5	103
Vanadium		28.9		0.080	1.7
Zinc		36.0		0.34	0.86

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.68 g
Analysis Date:	08/14/2013 1659			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0049	U	0.0049	0.015

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR56

Lab Sample ID: 280-45398-8
Client Matrix: Solid

% Moisture: 1.5

Date Sampled: 08/07/2013 1148
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.08 g
Analysis Date:	08/16/2013 1813			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

9/20/13

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		6180		1.5	4.7
Antimony		0.36	U J	0.36	0.56
Arsenic		2.9		0.62	0.94
Barium		48.8		0.071	0.47
Beryllium		0.17	B	0.031	0.19
Boron		0.92	U	0.92	1.9
Cadmium		0.081	B	0.039	0.19
Calcium		2830		13.3	47.0
Chromium		14.2		0.055	0.19
Cobalt		4.6		0.094	0.94
Copper		7.3		0.20	0.94
Iron		13200		3.6	4.7
Lead		4.3		0.25	0.47
Magnesium		3590		3.5	18.8
Manganese		170		0.094	0.94
Molybdenum		0.24	U	0.24	1.9
Nickel		12.7		0.12	3.8
Potassium		1090		38.6	282
Selenium		0.81	U J	0.81	0.94
Silicon		185		5.3	9.4
Silver		0.15	U	0.15	0.19
Sodium		92.7	B	55.5	113
Vanadium		26.6		0.088	1.9
Zinc		32.2		0.37	0.94

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.68 g
Analysis Date:	08/14/2013 1701			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0050	U	0.0050	0.015

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Client Sample ID: J1RR55

Lab Sample ID: 280-45398-9
Client Matrix: Solid
% Moisture: 1.5

Date Sampled: 08/07/2013 1200
Date Received: 08/13/2013 0900

6010B Metals (ICP)

Analysis Method:	6010B	Analysis Batch:	280-187745	Instrument ID:	MT_026
Prep Method:	3050B	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0			Initial Weight/Volume:	1.17 g
Analysis Date:	08/16/2013 1815			Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				

9/20/13

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Aluminum		6800		1.3	4.3
Antimony		0.33	U J	0.33	0.52
Arsenic		2.9		0.57	0.87
Barium		53.4		0.066	0.43
Beryllium		0.20		0.029	0.17
Boron		0.85	U	0.85	1.7
Cadmium		0.087	B	0.036	0.17
Calcium		3080		12.2	43.4
Chromium		15.2		0.050	0.17
Cobalt		4.9		0.087	0.87
Copper		7.6		0.19	0.87
Iron		14600		3.3	4.3
Lead		4.6		0.23	0.43
Magnesium		3890		3.2	17.4
Manganese		186		0.087	0.87
Molybdenum		0.23	U	0.23	1.7
Nickel		13.6		0.11	3.5
Potassium		1210		35.6	260
Selenium		0.75	U	0.75	0.87
Silicon		243	J	4.9	8.7
Silver		0.14	U	0.14	0.17
Sodium		102	B	51.2	104
Vanadium		30.2		0.082	1.7
Zinc		34.6		0.35	0.87

7471A Mercury (CVAA)

Analysis Method:	7471A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Prep Method:	7471A	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0			Initial Weight/Volume:	0.72 g
Analysis Date:	08/14/2013 1704			Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0047	U	0.0047	0.014

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

CASE NARRATIVE

Client: Washington Closure Hanford

Project: WASHINGTON CLOSURE HANFORD

Report Number: 280-45398-1

SDG #: J01905
SAF#: RC-238

Date SDG Closed: August 13, 2013
Data Deliverable: 15 Day / Summary

CLIENT ID	LAB ID	ANALYSES REQUESTED	ANALYSES PERFORMED
J1RR58	280-45398-1	6010/7471	6010B/7471A
J1RR59	280-45398-2	6010/7471	6010B/7471A
J1RR49	280-45398-3	6010/7471	6010B/7471A
J1RR50	280-45398-4	6010/7471	6010B/7471A
J1RR53	280-45398-5	6010/7471	6010B/7471A
J1RR54	280-45398-6	6010/7471	6010B/7471A
J1RR57	280-45398-7	6010/7471	6010B/7471A
J1RR56	280-45398-8	6010/7471	6010B/7471A
J1RR55	280-45398-9	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 8/13/2013 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.6° C.

TOTAL METALS - SW846 6010B/7471A
It can be noted that the sample amount was greater than four times the spike amount for Aluminum, Iron and Manganese in the Matrix Spike performed on sample J1RR58; therefore, control limits are not applicable.

Silicon was recovered outside the control limits in the Matrix Spike performed on sample J1RR58, and the associated sample result has been flagged "N". 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-238-005	Page 1 of 1

Collector JH 8.7.13 ~~WHITE, ED~~ B. Moeller	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 8C	Data Turnaround: 15 Days
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238		
Ice Chest No.: WCH-11-014 ~~WCH-12-031~~ 8-12-13 CMB	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Commercial Carrier Fed Ex		
Shipped To: TestAmerica - Denver	Offsite Property No.: ~~A120943~~ A120965 8-12-13 CMB		Bill of Lading/Air Bill No.: See OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

C0014C
8-12-13 CMB

Preservation	Cool 4C											
Type of Container	G/P											
No. of Container(s)	1											
Volume	250mL											
SAMPLE ANALYSIS	See Item (1) in Special Instructions				RCF							
Sample No.	Matrix	Sample Date	Sample Time			JH 8-7-13						
J1RR58	SOIL	8-7-13	1355	X	35964	ECAL						
J1RR59	SOIL	8-7-13	1402	X	35965	ECAL						
	SOIL					8-7-13						
	SOIL											
	SOIL											

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CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Doug Bowers / Bowers	8-7-13/1435	Doug Bowers / Bowers	8-7-13/1435
Doug Bowers / Bowers	8-7-13/1600	Joe A. Freier / A. Freier	8-7-13 1600
A. Freier / A. Freier	8-7-13 1605	Bakkac 1060 # 1B	8-7-13 1605
Fridge 1B 1060 Battelle	8/8/13 0810	DWSHEA / DWSHEA	8/8/13 0810 *
~~DWSHEA / DWSHEA~~	~~8/8/13 0840~~	~~Fed Ex~~ DWS	8/8/13 ~~0810~~
DWSHEA / DWSHEA	8/8/13 1000	Fridge 1 1060 Battelle	8/8/13 1000
Fridge 1 1060 Battelle	8/12/13 1345	DWSHEA / DWSHEA	8/12/13 1345

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — 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) (Mercury)

SDG J01905

2.6 IR 8/13/13 AB

* Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

DWSHEA 8/8/13

Relinquished by/removed from	Received by/stored in
DWSHEA / DWSHEA 8/12/13 1352	Fed Ex

REVIEWED BY CMB DATE 8-12-13

8/13/13 0900

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005

Page 1 of 1

Collector: WHITE, EC	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: ~~N/A~~ 8-12-13 CMB WCH-11-014	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Commercial Carrier - fed EX
Shipped To: TestAmerica - Denver	Offsite Property No.: ~~NA~~ 8-12-13 CMB A120965		Bill of Lading/Air Bill No.: See OSPC ~~NA~~ 8-12-13 CMB

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4C
8-12-13 CMB

Preservation	Cool 4C											
Type of Container	G/P											
No. of Container(s)	1											
Volume	250mL											
SAMPLE ANALYSIS	See item (1) in Special Instructions					RCF						
Sample No.	Matrix	Sample Date	Sample Time									
J1RR49	SOIL	8-6-13	0742	X	E-111		35957					
J1RR50	SOIL	8-6-13	0759	X	E-114		35958					
	SOIL											
	SOIL											
	SOIL											

CHAIN OF POSSESSION 8-8-13 Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
E. White	8-6-13 0845	Doug Bowers	8-6-13/0845
Doug Bowers	8-6-13/1620 *	1060 Battelle Blvd R.F 24	8-6-13/1620
1060 Battelle Blvd, Ref 24	8-12-13 1340	Cynthia Bingham	8-12-13 1340
Cynthia Bingham	8-12-13 1345	fed EX	
		Alex Brand	8/13/13 900

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | 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) (Mercury)

SDG
J01905

REVIEWED BY
DATE 8/12/13

* Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005

Collector: ~~WHITE, EC~~ B. Moeller 8-7-13

Company Contact: Joan Kessner

Telephone No.: 375-4688

Project Coordinator: KESSNER, JH

Price Code: 8C

Data Turnaround: 15 Days

Project Designation: 100K Shoreline Characterization

Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)

SAF No.: RC-238

Ice Chest No.: WCH-11-014 ~~WCH-12-031~~ 8-12-13 CMB

Field Logbook No.: EL-1668

COA: 0ESKSH6520

Method of Shipment: Commercial Carrier - Fed EX

Shipped To: TestAmerica - Denver

Offsite Property No.: ~~A120942~~ 8-12-13 CMB A120965

Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4C

8-12-13 CMB

Preservation	Cool 4C											
Type of Container	G/P											
No. of Container(s)	1											
Volume	250mL											

SAMPLE ANALYSIS

Sample No.	Matrix	Sample Date	Sample Time	See Item (1) in Special Instructions			RCF					
9IRR53	SOIL	8-7-13	0716	X	E-8L		35959					
9IRR54	SOIL	8-7-13	0722	X	E-84		35960					
	SOIL											
	SOIL											
	SOIL											

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CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Brooks Moeller	8-7-13/0815	Doug Bowers	8-7-13/0815
Doug Bowers	8-7-13/1600	A. Freier	8-7-13 1600
A. Freier	8-7-13 1605	1060 Battelle #1B	8-7-13 1605
Fridge 1B 1060 Battelle	8/8/13 0810	DWShea	8/8/13 0810
DWShea	8/8/13 0840	Fed EX	DWShea 8/8/13
DWShea	8/8/13 1000	Fridge 1 1060 Battelle	8/8/13 1000
Fridge 1 1060 Battelle	8/12/13 1345	DWShea	8/12/13 1345

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — 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) (Mercury)

SDG J01905

* Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Relinquished by/Removed from	Received by/Stored in
DWShea 8/12/13 1352	Fed EX
	Alex Bramla 8/13/13 900

REVIEWED BY CMB DATE 8-12-13

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

Washington Closure Hanford — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005 | Page 1 of 1

Collector: JA 8-7-13 ~~WHITE, EG~~ B. Moeller	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: ~~WCH-12-031~~ WCH-11-014 8-12-13 cmB	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Commercial Carrier - Fed EX
Shipped To: TestAmerica - Denver	Offsite Property No.: ~~A120942~~ 8-12-13 cmB A120965		Bill of Lading/Air Bill No.: See OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4C 8-12-13 cmB

Preservation	Cool 4C											
Type of Container	G/P											
No. of Container(s)	1											
Volume	250mL											
SAMPLE ANALYSIS	See item (1) in Special Instructions			RCF								
Sample No.	Matrix	Sample Date	Sample Time									
31RR57	SOIL	8-7-13	1145	X		35961		E7A L				
31RR56	SOIL	8-7-13	1148	X		35962		E7A U				
31RR55	SOIL	8-7-13	1200	X		35963		E7A-1 U				
	SOIL											
	SOIL											

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CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Brooks Moeller	8-7-13/1240	Doug Bowers	8-7-13/1240
Doug Bowers	8-7-13/1600	A. Freier	8-7-13 1600
A. Freier	8-7-13 1605	1060 Battelle #1B	8-7-13 1605 *
Fridge 1B 1060 Battelle	8/8/13 0810	DWShea	8/8/13 0810
~~DWShea~~	~~8/8/13 0840~~	~~Fed Ex~~	DWShea 8/8/13
DWShea	8/8/13 1000	Fridge 1 1060 Battelle	8/8/13 1000
Fridge 1 1060 Battelle	8/12/13 1345	DWShea	8/12/13 1345

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — 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) (Mercury)

506 / J01905

* Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to lab.

Relinquished by/removed from	Received by/stored in
DWShea 8/12/13 1352	Fed Ex
	Alex Brauula 8/13/13 900

REVIEWED BY CMB DATE 8-12-13

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-K-111			DATA PACKAGE: J01905		
VALIDATOR: ECR		LAB: TAL		DATE: 9/18/13	
			SDG: J01905		

ANALYSES PERFORMED

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

SAMPLES/MATRIX

J1RRS8	J1RRS9	J1RR49	J1RRS0	J1RRS3
J1RRS4	J1RRS7	J1RRS6	J1RRS5	
				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 (13%) - J all
MS - antmy (CO2) silicon (15%) - J all

no PDS

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:

54/55 –

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: 280-45398-1
Sdg Number: J01905

Method Blank - Batch: 280-187372

Method: 6010B
Preparation: 3050B

Lab Sample ID:	MB 280-187372/1-A	Analysis Batch:	280-187745	Instrument ID:	MT_026
Client Matrix:	Solid	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1 g
Analysis Date:	08/16/2013 1735	Units:	mg/Kg	Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Aluminum	1.6	U	1.6	5.0
Antimony	0.38	U	0.38	0.60
Arsenic	0.66	U	0.66	1.0
Barium	0.076	U	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	14.1	U	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	3.7	U	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	5.7	U	5.7	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	0.40	U	0.40	1.0

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Lab Control Sample - Batch: 280-187372

Method: 6010B
Preparation: 3050B

Lab Sample ID:	LCS 280-187372/2-A	Analysis Batch:	280-187745	Instrument ID:	MT_026
Client Matrix:	Solid	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1 g
Analysis Date:	08/16/2013 1737	Units:	mg/Kg	Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	200	205.4	103	82 - 116	
Antimony	50.0	50.50	101	82 - 110	
Arsenic	100	105.0	105	85 - 110	
Barium	200	201.3	101	87 - 112	
Beryllium	5.00	4.88	98	84 - 114	
Boron	100	100.1	100	80 - 120	
Cadmium	10.0	10.91	109	87 - 110	
Calcium	5000	4870	97	82 - 114	
Chromium	20.0	20.86	104	84 - 114	
Cobalt	50.0	51.82	104	87 - 110	
Copper	25.0	25.73	103	88 - 110	
Iron	100	101.0	101	87 - 120	
Lead	50.0	51.17	102	86 - 110	
Magnesium	5000	4937	99	90 - 110	
Manganese	50.0	50.01	100	88 - 110	
Molybdenum	100	104.9	105	86 - 110	
Nickel	50.0	51.47	103	87 - 110	
Potassium	5000	5015	100	89 - 110	
Selenium	200	201.2	101	83 - 110	
Silicon	1000	129.2	13	10 - 70	
Silver	5.00	5.29	106	87 - 114	
Sodium	5000	5259	105	90 - 112	
Vanadium	50.0	51.56	103	88 - 110	
Zinc	50.0	49.87	100	76 - 114	

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Matrix Spike - Batch: 280-187372

Method: 6010B
Preparation: 3050B

Lab Sample ID:	280-45398-1	Analysis Batch:	280-187745	Instrument ID:	MT_026
Client Matrix:	Solid	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.13 g
Analysis Date:	08/16/2013 1747	Units:	mg/Kg	Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				
Leach Date:	N/A				

Analyte	Sample Result/Qual		Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	7050		180	8847	999	50 - 200	4
Antimony	0.37	U	44.9	27.01	60	20 - 200	
Arsenic	4.7		89.8	91.42	97	76 - 111	
Barium	58.0		180	232.4	97	52 - 159	
Beryllium	0.20		4.49	4.27	91	72 - 105	
Boron	0.97	U	89.8	80.47	90	80 - 120	
Cadmium	0.087	B	8.98	9.18	101	40 - 130	
Calcium	10300		4490	14540	95	43 - 165	
Chromium	16.4		18.0	35.02	103	70 - 200	
Cobalt	5.5		44.9	47.47	93	72 - 106	
Copper	9.6		22.5	30.98	95	37 - 187	
Iron	14600		89.8	14860	344	70 - 200	4
Lead	4.1		44.9	45.02	91	70 - 200	
Magnesium	4850		4490	9197	97	64 - 145	
Manganese	206		44.9	258.1	116	40 - 200	4
Molybdenum	0.26	U	89.8	84.55	94	75 - 103	
Nickel	15.2		44.9	57.05	93	61 - 126	
Potassium	729		4490	5178	99	56 - 172	
Selenium	0.85	U	180	164.4	91	76 - 104	
Silicon	282		898	420.0	15	20 - 200	N
Silver	0.16	U	4.49	4.48	100	75 - 141	
Sodium	159		4490	4583	98	78 - 111	
Vanadium	30.8		44.9	77.37	104	50 - 169	
Zinc	32.4		44.9	74.06	93	70 - 200	

Quality Control Results

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Duplicate - Batch: 280-187372

Method: 6010B
Preparation: 3050B

Lab Sample ID:	280-45398-1	Analysis Batch:	280-187745	Instrument ID:	MT_026
Client Matrix:	Solid	Prep Batch:	280-187372	Lab File ID:	26A1081613.asc
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	1.11 g
Analysis Date:	08/16/2013 1744	Units:	mg/Kg	Final Weight/Volume:	100 mL
Prep Date:	08/15/2013 1202				
Leach Date:	N/A				

Analyte	Sample Result/Qual		Result	RPD	Limit	Qual
Aluminum	7050		7106	0.8	40	
Antimony	0.37	U	0.35	NC	40	U
Arsenic	4.7		4.80	3	30	
Barium	58.0		57.43	1	30	
Beryllium	0.20		0.207	4	30	
Boron	0.97	U	0.90	NC	30	U
Cadmium	0.087	B	0.0695	22	30	B
Calcium	10300		10050	2	30	
Chromium	16.4		16.93	3	40	
Cobalt	5.5		5.55	0.6	30	
Copper	9.6		9.40	2	30	
Iron	14600		14870	2	40	
Lead	4.1		3.99	2	40	
Magnesium	4850		4912	1	30	
Manganese	206		209.2	2	40	
Molybdenum	0.26	U	0.24	NC	30	U
Nickel	15.2		15.36	0.8	30	
Potassium	729		742.5	2	40	
Selenium	0.85	U	0.79	NC	30	U
Silicon	282		238.0	17	40	
Silver	0.16	U	0.15	NC	30	U
Sodium	159		160.0	0.9	30	
Vanadium	30.8		31.60	2	30	
Zinc	32.4		32.91	2	40	

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Method Blank - Batch: 280-187095

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 280-187095/1-A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Client Matrix:	Solid	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.60 g
Analysis Date:	08/14/2013 1630	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Mercury	0.0055	U	0.0055	0.017

Lab Control Sample - Batch: 280-187095

Method: 7471A
Preparation: 7471A

Lab Sample ID:	LCS 280-187095/2-A	Analysis Batch:	280-187309	Instrument ID:	MT_034
Client Matrix:	Solid	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.60 g
Analysis Date:	08/14/2013 1633	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Mercury	0.417	0.422	101	87 - 111	

Matrix Spike - Batch: 280-187095

Method: 7471A
Preparation: 7471A

Lab Sample ID:	280-45398-1	Analysis Batch:	280-187309	Instrument ID:	MT_034
Client Matrix:	Solid	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.63 g
Analysis Date:	08/14/2013 1641	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				
Leach Date:	N/A				

Analyte	Sample Result/Qual		Spike Amount	Result	% Rec.	Limit	Qual
Mercury	0.0056	U	0.403	0.402	100	87 - 111	

Client: Washington Closure Hanford

Job Number: 280-45398-1
Sdg Number: J01905

Duplicate - Batch: 280-187095

Method: 7471A
Preparation: 7471A

Lab Sample ID:	280-45398-1	Analysis Batch:	280-187309	Instrument ID:	MT_034
Client Matrix:	Solid	Prep Batch:	280-187095	Lab File ID:	130814taa.txt
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.61 g
Analysis Date:	08/14/2013 1638	Units:	mg/Kg	Final Weight/Volume:	50 mL
Prep Date:	08/14/2013 1115				
Leach Date:	N/A				

Analyte	Sample Result/Qual		Result	RPD	Limit	Qual
Mercury	0.0056	U	0.0473	NC	20	

Date: 23 September 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Characterization of Surface Soils at 100-K-64 & 100-K-111 - Waste Site 100-K-111
Subject: Radiochemistry - Data Package No. J01905-TAL

INTRODUCTION

This memo presents the results of data validation on Data Package No. J01905 prepared by TestAmerica Laboratories (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
J1RR49	8/6/13	Soil	C	See note 1
J1RR50	8/6/13	Soil	C	See note 1
J1RR53	8/7/13	Soil	C	See note 1
J1RR54	8/7/13	Soil	C	See note 1
J1RR55	8/7/13	Soil	C	See note 1
J1RR56	8/7/13	Soil	C	See note 1
J1RR57	8/7/13	Soil	C	See note 1
J1RR58	8/7/13	Soil	C	See note 1
J1RR59	8/7/13	Soil	C	See note 1

1 – Gamma spectroscopy, carbon-14, alpha spectroscopy, total strontium, tritium, & nickel-63.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the Sampling and Analysis Instruction for Characterization of Surface Soils in the 100-K-64 and 100-K-111 Waste Site Areas (WHC-570, Rev. 1, May 2013). 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 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 laboratory blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

Due to the lack of an LCS analysis, all plutonium-238 results were qualified as estimates and flagged "J".

Due to the lack of a matrix spike analysis, all tritium and carbon-14 results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Laboratory Duplicates**

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

performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicates

One set of field duplicates (J1RR55/J1RR56) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Detection Levels

Reported analytical detection levels for undetected analytes are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. Five analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

Completeness

Data package No. J01905 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 plutonium-238 results were qualified as estimates and flagged "J".
- Due to the lack of a matrix spike analysis, all tritium and carbon-14 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.

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

REFERENCES

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

WCH-570, Rev. 1, Sampling and Analysis Instruction for Characterization of Surface Soils in the 100-K-64 and 100-K-111 Waste Site Areas, May 2013.

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: J01905	REVIEWER: ELR	Project: 100-K-111	PAGE 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Plutonium-238	J	All	No LCS analysis
Tritium Carbon-14	J	All	No MS analysis

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

Appendix 3

Annotated Laboratory Reports

Date: 28-Aug-13

Sample Results Summary

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 56712 K - 9/20/13 SDG No: J01905

Batch	Client Id / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
3224077 C14_LSC									
	J1RR49								
	M1LRR1AH	C-14	-4.97E-02 +- 2.1E-01	U J	pCi/g	100%	4.52E-01	5.00E+01	
	J1RR50								
	M1LRT1AH	C-14	-1.23E-01 +- 2.1E-01	U J	pCi/g	100%	4.52E-01	5.00E+01	
	J1RR53								
	M1LRV1AH	C-14	1.22E-01 +- 2.2E-01	U J	pCi/g	100%	4.47E-01	5.00E+01	
	J1RR54								
	M1LRW1AH	C-14	6.49E-02 +- 2.2E-01	U J	pCi/g	100%	4.47E-01	5.00E+01	
	J1RR55								
	M1LR21AH	C-14	-1.20E-01 +- 2.1E-01	U J	pCi/g	100%	4.50E-01	5.00E+01	
	J1RR56								
	M1LR11AH	C-14	-1.66E-01 +- 2.0E-01	U J	pCi/g	100%	4.48E-01	5.00E+01	
	J1RR57								
	M1LR01AH	C-14	9.78E-02 +- 2.2E-01	U J	pCi/g	100%	4.54E-01	5.00E+01	
	J1RR57 DUP								
	M1LR01AJ	C-14	-1.38E-01 +- 2.1E-01	U	pCi/g	100%	4.51E-01	5.00E+01	-1179.1
	J1RR58								
	M1LR31AH	C-14	-1.14E-01 +- 2.1E-01	U J	pCi/g	100%	4.49E-01	5.00E+01	
	J1RR59								
	M1LR41AH	C-14	-1.89E-01 +- 2.0E-01	U J	pCi/g	100%	4.49E-01	5.00E+01	
3224080 PUISO_PLATE_AEA									
	J1RR49								
	M1LRR1AE	Pu-238	-1.15E-03 +- 2.9E-02	U J	pCi/g	100%	5.78E-02	1.00E+00	
		PU239/40	-1.15E-03 +- 2.9E-02	U	pCi/g	100%	5.77E-02	1.00E+00	
	J1RR49 DUP								
	M1LRR1AK	Pu-238	0.00E+00 +- 2.9E-02	U	pCi/g	100%	5.25E-02	1.00E+00	-200.0
		PU239/40	-1.15E-03 +- 2.9E-02	U	pCi/g	100%	5.80E-02	1.00E+00	-0.5
	J1RR50								
	M1LRT1AE	Pu-238	-2.29E-03 +- 2.9E-02	U J	pCi/g	100%	6.54E-02	1.00E+00	
		PU239/40	2.69E-02 +- 4.1E-02	U	pCi/g	100%	6.18E-02	1.00E+00	
	J1RR53								
	M1LRV2AE	Pu-238	-2.22E-03 +- 2.8E-02	U J	pCi/g	96%	6.32E-02	1.00E+00	
		PU239/40	-1.11E-03 +- 2.8E-02	U	pCi/g	96%	5.57E-02	1.00E+00	
	J1RR54								
	M1LRW1AE	Pu-238	-1.30E-03 +- 3.2E-02	U J	pCi/g	87%	6.52E-02	1.00E+00	
		PU239/40	-3.24E-03 +- 3.3E-02	U	pCi/g	87%	7.75E-02	1.00E+00	
	J1RR55								
	M1LR21AE	Pu-238	-6.28E-04 +- 3.1E-02	U J	pCi/g	90%	5.71E-02	1.00E+00	

TestAmerica Inc

rptSTLRchSaSum mary2 V5.2.23 A2002

RPD - Relative Percent Difference.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Sample Results Summary

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Date: 28-Aug-13

Report No. : 56712

9/20/13

SDG No: J01905

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
3224080 PUISO_PLATE_AEA									
J1RR55									
	M1LR21AE	PU239/40	1.44E-02 +- 3.2E-02	U	pCi/g	90%	6.32E-02	1.00E+00	
J1RR56									
	M1LR11AE	Pu-238	-1.19E-03 +- 3.0E-02	U J	pCi/g	97%	5.98E-02	1.00E+00	
		PU239/40	-1.78E-03 +- 3.0E-02	U	pCi/g	97%	6.41E-02	1.00E+00	
J1RR57									
	M1LR01AE	Pu-238	-5.50E-03 +- 3.1E-02	U J	pCi/g	92%	8.40E-02	1.00E+00	
		PU239/40	-6.11E-04 +- 3.1E-02	U	pCi/g	92%	5.56E-02	1.00E+00	
J1RR58									
	M1LR31AE	Pu-238	-1.77E-03 +- 3.0E-02	U J	pCi/g	100%	6.38E-02	1.00E+00	
		PU239/40	0.00E+00 +- 3.0E-02	U	pCi/g	100%	5.37E-02	1.00E+00	
J1RR59									
	M1LR41AE	Pu-238	-1.19E-03 +- 3.0E-02	U J	pCi/g	100%	5.98E-02	1.00E+00	
		PU239/40	-1.19E-03 +- 3.0E-02	U	pCi/g	100%	5.97E-02	1.00E+00	
3224075 GAMMA_GS									
J1RR49									
	M1LRR1AG	CO-60	6.77E-03 +- 1.8E-02	U	pCi/g		3.25E-02	5.00E-02	
		CS-137	-2.38E-03 +- 1.6E-02	U	pCi/g		2.74E-02	1.00E-01	
		EU-152	2.14E-03 +- 3.5E-02	U	pCi/g		5.67E-02	1.00E-01	
		EU-154	-3.88E-02 +- 5.9E-02	U	pCi/g		9.83E-02	1.00E-01	
		EU-155	5.51E-02 +- 3.2E-02	U	pCi/g		5.54E-02	1.00E-01	
		K-40	1.84E+01 +- 2.2E+00		pCi/g		3.01E-01		
J1RR50									
	M1LRT1AG	CO-60	-1.39E-02 +- 1.8E-02	U	pCi/g		2.90E-02	5.00E-02	
		CS-137	9.75E-02 +- 3.1E-02		pCi/g		2.58E-02	1.00E-01	
		EU-152	-8.04E-03 +- 3.2E-02	U	pCi/g		5.54E-02	1.00E-01	
		EU-154	1.25E-02 +- 5.3E-02	U	pCi/g		9.39E-02	1.00E-01	
		EU-155	3.63E-02 +- 2.9E-02	U	pCi/g		5.18E-02	1.00E-01	
		K-40	1.89E+01 +- 2.2E+00		pCi/g		2.06E-01		
J1RR53									
	M1LRV1AG	CO-60	4.84E-03 +- 1.9E-02	U	pCi/g		3.42E-02	5.00E-02	
		CS-137	-4.47E-03 +- 2.0E-02	U	pCi/g		3.41E-02	1.00E-01	
		EU-152	-3.57E-02 +- 4.1E-02	U	pCi/g		6.80E-02	1.00E-01	
		EU-154	2.33E-02 +- 6.2E-02	U	pCi/g		1.12E-01	1.00E-01	
		EU-155	7.84E-02 +- 4.2E-02	U	pCi/g		7.16E-02	1.00E-01	
		K-40	1.91E+01 +- 2.3E+00		pCi/g		2.60E-01		
J1RR54									
	M1LRW1AG	CO-60	-9.23E-03 +- 1.9E-02	U	pCi/g		3.13E-02	5.00E-02	

TestAmerica Inc

rptSTLRchSaSummary2 V5.2.23 A2002

RPD - Relative Percent Difference.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Date: 28-Aug-13

Sample Results Summary

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 56712 9/20/13 SDG No: J01905

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
3224075 GAMMA_GS									
J1RR54									
	M1LRW1AG	CS-137	1.19E-01 +- 2.9E-02		pCi/g		2.97E-02	1.00E-01	
		EU-152	2.61E-02 +- 3.6E-02	U	pCi/g		6.39E-02	1.00E-01	
		EU-154	9.69E-03 +- 5.9E-02	U	pCi/g		1.05E-01	1.00E-01	
		EU-155	6.34E-02 +- 3.2E-02	U	pCi/g		5.74E-02	1.00E-01	
		K-40	1.83E+01 +- 2.2E+00		pCi/g		2.01E-01		
J1RR54 DUP									
	M1LRW1AJ	CO-60	1.35E-02 +- 1.8E-02	U	pCi/g		3.39E-02	5.00E-02	1073.6
		CS-137	1.01E-01 +- 4.0E-02		pCi/g		3.12E-02	1.00E-01	16.4
		EU-152	1.35E-02 +- 3.9E-02	U	pCi/g		6.77E-02	1.00E-01	63.8
		EU-154	5.68E-02 +- 5.8E-02	U	pCi/g		1.10E-01	1.00E-01	141.7
		EU-155	5.50E-02 +- 3.7E-02	U	pCi/g		6.39E-02	1.00E-01	14.3
		K-40	1.78E+01 +- 2.1E+00		pCi/g		2.58E-01		2.8
J1RR55									
	M1LR21AG	CO-60	-1.15E-02 +- 2.0E-02	U	pCi/g		3.36E-02	5.00E-02	
		CS-137	5.46E-03 +- 1.7E-02	U	pCi/g		3.03E-02	1.00E-01	
		EU-152	2.65E-02 +- 3.6E-02	U	pCi/g		6.38E-02	1.00E-01	
		EU-154	2.69E-02 +- 5.9E-02	U	pCi/g		1.06E-01	1.00E-01	
		EU-155	8.49E-02 +- 3.2E-02	U	pCi/g		5.73E-02	1.00E-01	
		K-40	1.86E+01 +- 2.2E+00		pCi/g		2.08E-01		
J1RR56									
	M1LR11AG	CO-60	-4.51E-03 +- 2.0E-02	U	pCi/g		3.38E-02	5.00E-02	
		CS-137	-1.42E-03 +- 1.9E-02	U	pCi/g		3.24E-02	1.00E-01	
		EU-152	-5.27E-03 +- 4.6E-02	U	pCi/g		7.70E-02	1.00E-01	
		EU-154	3.54E-02 +- 6.1E-02	U	pCi/g		1.10E-01	1.00E-01	
		EU-155	3.02E-03 +- 5.2E-02	U	pCi/g		8.71E-02	1.00E-01	
		K-40	1.99E+01 +- 2.5E+00		pCi/g		2.74E-01		
J1RR57									
	M1LR01AG	CO-60	-3.60E-03 +- 1.8E-02	U	pCi/g		3.11E-02	5.00E-02	
		CS-137	1.36E-02 +- 1.8E-02	U	pCi/g		3.32E-02	1.00E-01	
		EU-152	1.91E-03 +- 3.8E-02	U	pCi/g		6.49E-02	1.00E-01	
		EU-154	6.20E-03 +- 5.6E-02	U	pCi/g		9.92E-02	1.00E-01	
		EU-155	6.17E-02 +- 3.7E-02	U	pCi/g		6.27E-02	1.00E-01	
		K-40	1.87E+01 +- 2.2E+00		pCi/g		2.44E-01		
J1RR58									
	M1LR31AG	CO-60	1.23E-02 +- 2.0E-02	U	pCi/g		3.58E-02	5.00E-02	
		CS-137	4.79E-05 +- 1.9E-02	U	pCi/g		3.15E-02	1.00E-01	
		EU-152	-2.71E-02 +- 4.8E-02	U	pCi/g		7.79E-02	1.00E-01	

TestAmerica Inc

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RPD - Relative Percent Difference.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Date: 28-Aug-13

Sample Results Summary

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 56712 9/20/13 SDG No: J01905

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
3224075 GAMMA_GS									
J1RR58									
	M1LR31AG	EU-154	3.68E-02 +- 6.3E-02	U	pCi/g		1.13E-01	1.00E-01	
		EU-155	6.28E-02 +- 5.5E-02	U	pCi/g		9.46E-02	1.00E-01	
		K-40	1.84E+01 +- 2.3E+00		pCi/g		2.77E-01		
J1RR59									
	M1LR41AG	CO-60	2.52E-02 +- 1.9E-02	U	pCi/g		3.61E-02	5.00E-02	
		CS-137	1.70E-02 +- 1.8E-02	U	pCi/g		3.17E-02	1.00E-01	
		EU-152	-2.15E-02 +- 3.6E-02	U	pCi/g		5.95E-02	1.00E-01	
		EU-154	-3.33E-02 +- 5.7E-02	U	pCi/g		9.59E-02	1.00E-01	
		EU-155	4.32E-02 +- 3.1E-02	U	pCi/g		5.44E-02	1.00E-01	
		K-40	1.86E+01 +- 2.2E+00		pCi/g		2.63E-01		
3224076 SRTOT_SEP_PRECIP_GPC									
J1RR49									
	M1LRR1AC	STRONTIUM	1.68E-02 +- 8.3E-02	U	pCi/g	89%	1.94E-01		
J1RR50									
	M1LRT1AC	STRONTIUM	9.84E-02 +- 9.7E-02	U	pCi/g	88%	1.96E-01		
J1RR53									
	M1LRV1AC	STRONTIUM	5.19E-02 +- 9.7E-02	U	pCi/g	85%	2.14E-01		
J1RR54									
	M1LRW1AC	STRONTIUM	1.83E-02 +- 9.4E-02	U	pCi/g	81%	2.20E-01		
J1RR55									
	M1LR21AC	STRONTIUM	7.74E-02 +- 8.9E-02	U	pCi/g	87%	1.87E-01		
J1RR56									
	M1LR11AC	STRONTIUM	-7.44E-02 +- 8.9E-02	U	pCi/g	85%	2.30E-01		
J1RR56 DUP									
	M1LR11AJ	STRONTIUM	1.07E-01 +- 1.0E-01	U	pCi/g	83%	2.08E-01		1121.4
J1RR57									
	M1LR01AC	STRONTIUM	8.01E-02 +- 1.0E-01	U	pCi/g	79%	2.19E-01		
J1RR58									
	M1LR31AC	STRONTIUM	6.05E-02 +- 8.8E-02	U	pCi/g	86%	1.90E-01		
J1RR59									
	M1LR41AC	STRONTIUM	2.92E-01 +- 1.4E-01		pCi/g	83%	2.07E-01		
3224078 906.0_H3_LSC									
J1RR49									
	M1LRR1AF	H-3	2.68E-02 +- 3.0E-02	U J	pCi/g	100%	6.61E-02	4.00E+02	
J1RR49 DUP									
	M1LRR1AJ	H-3	2.54E-02 +- 3.2E-02	U	pCi/g	100%	7.17E-02	4.00E+02	5.3
J1RR50									

TestAmerica Inc

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Date: 28-Aug-13

Sample Results Summary

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 56712 SDG No: J01905

Batch	Client Id / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
3224078 906.0_H3_LSC									
	J1RR50 M1LRT1AF	H-3	-3.35E-03 +- 3.4E-02	U J	pCi/g	100%	8.09E-02	4.00E+02	
	J1RR53 M1LRV1AF	H-3	-2.37E-03 +- 2.5E-02	U J	pCi/g	100%	5.82E-02	4.00E+02	
	J1RR54 M1LRW1AF	H-3	2.87E-02 +- 5.5E-02	U J	pCi/g	100%	1.27E-01	4.00E+02	
	J1RR55 M1LR21AF	H-3	-9.38E-03 +- 2.5E-02	U J	pCi/g	100%	6.01E-02	4.00E+02	
	J1RR56 M1LR11AF	H-3	-1.23E-02 +- 4.9E-02	U J	pCi/g	100%	1.17E-01	4.00E+02	
	J1RR57 M1LR01AF	H-3	1.79E-02 +- 2.1E-02	U J	pCi/g	100%	4.87E-02	4.00E+02	
	J1RR58 M1LR31AF	H-3	1.45E-02 +- 2.4E-02	U J	pCi/g	100%	5.51E-02	4.00E+02	
	J1RR59 M1LR41AF	H-3	1.92E-02 +- 4.3E-02	U J	pCi/g	100%	9.78E-02	4.00E+02	
3224079 NI63_LSC									
	J1RR49 M1LRR1AD	Ni-63	8.15E-01 +- 3.3E+00	U	pCi/g	86%	6.46E+00	3.00E+01	
	J1RR50 M1LRT1AD	Ni-63	4.07E+00 +- 3.7E+00	U	pCi/g	91%	6.29E+00	3.00E+01	
	J1RR50 DUP M1LRT1AJ	Ni-63	8.88E-01 +- 3.3E+00	U	pCi/g	96%	5.97E+00	3.00E+01	128.4
	J1RR53 M1LRV1AD	Ni-63	3.93E+00 +- 3.7E+00	U	pCi/g	96%	6.13E+00	3.00E+01	
	J1RR54 M1LRW1AD	Ni-63	2.48E+00 +- 3.4E+00	U	pCi/g	96%	5.88E+00	3.00E+01	
	J1RR55 M1LR21AD	Ni-63	-1.02E+00 +- 3.2E+00	U	pCi/g	96%	6.15E+00	3.00E+01	
	J1RR56 M1LR11AD	Ni-63	1.56E+00 +- 3.4E+00	U	pCi/g	99%	5.91E+00	3.00E+01	
	J1RR57 M1LR01AD	Ni-63	8.78E-01 +- 3.2E+00	U	pCi/g	97%	5.75E+00	3.00E+01	
	J1RR58 M1LR31AD	Ni-63	6.11E-01 +- 3.1E+00	U	pCi/g	100%	5.53E+00	3.00E+01	
	J1RR59 M1LR41AD	Ni-63	1.15E+00 +- 3.3E+00	U	pCi/g	99%	5.75E+00	3.00E+01	
3225035 7196_CR6									
	J1RR49								

TestAmerica Inc

rptSTLRchSaSummary2 V5.2.23 A2002

RPD - Relative Percent Difference.

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Certificate of Analysis

Washington Hanford Closure
2620 Fermi Avenue
Richland, WA 99354

August 28, 2013

Attention: Joan Kessner

SAF Number	:	RC-238
Date SDG Closed	:	August 12, 2013
Number of Samples	:	Nine (9)
Sample Type	:	Soil
SDG Number	:	J01905
Data Deliverable	:	15– Day / Summary

CASE NARRATIVE

I. Introduction

On August 12, 2013, nine soil samples were received at TestAmerica for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Washington Closure Hanford (WCH) specific ID:

WCH ID#	TARL ID#	MATRIX	DATE OF RECEIPT
J1RR49	M1LRR	SOIL	08/12/13
J1RR50	M1LRT	SOIL	08/12/13
J1RR53	M1LRV	SOIL	08/12/13
J1RR54	M1LRW	SOIL	08/12/13
J1RR55	M1LR2	SOIL	08/12/13
J1RR56	M1LR1	SOIL	08/12/13
J1RR57	M1LR0	SOIL	08/12/13
J1RR58	M1LR3	SOIL	08/12/13
J1RR59	M1LR4	SOIL	08/12/13

II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Alpha Spectroscopy
Plutonium-238, -239/240 by method RL-ALP-002
Gas Proportional Counting
Strontium-90 by method RL-GPC-010
Gamma Spectroscopy
Gamma Spec by method RL-GAM-001
Liquid Scintillation Counting
Tritium by method RL-LSC-005
Carbon-14 by method RL-LSC-008
Nickel-63 by method RL-LCS-017
Chemical Analysis
Hexavalent Chromium by EPA method 7196A

IV. Quality Control

The analytical results for each analysis performed includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

V. Comments

Alpha Spectroscopy
Plutonium-238, -239/240 by method RL-ALP-002:
Sample J1RR53 tracer recovery was outside the acceptance limits on the original count. The sample was recounted for an acceptable tracer recovery. Except as noted; the LCS, batch blank, samples and sample duplicate (J1RR49) results are within contractual requirements.

Gas Proportional Counting
Strontium-90 by method RL-GPC-010:
The LCS, batch blank, samples and sample duplicate (J1RR56) results are within contractual requirements.

Gamma Spectroscopy
Gamma Spec by method RL-GAM-001:
The CRDL was not met for some of the analytes. Except as noted, the LCS, batch blank, samples and sample duplicate (J1RR54) results are within contractual requirements.

Liquid Scintillation Counting
Tritium by method RL-LSC-005:
The LCS, batch blank, samples and sample duplicate (J1RR49) results are within contractual requirements.

Carbon-14 by method RL-LSC-008:
The LCS, batch blank, samples and sample duplicate (J1RR57) results are within contractual requirements.

Nickel-63 by method RL-LCS-017:
The LCS, batch blank, samples and sample duplicate (J1RR50) results are within contractual requirements.

Chemical Analysis
Hexavalent Chromium by EPA method 7196A
The LCS, batch blank, samples, sample duplicate (J1RR49) and sample matrix spike (J1RR49) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for 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.

Reviewed and approved:

Rhonda Wagar
Project Manager

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005

Collector: WHITE, EC	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: NA	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Local Delivery
Shipped To: TestAmerica - Richland	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

~~NA~~ 8-12-13 CMB

C0014C 8-12-13 CMB

J3H120421
J01905
Due 8-27-13

SAMPLE ANALYSIS J3H120421

Preservation			Cool 4C	None	None	None							
Type of Container			G/P	G/P	G/P	G/P							
No. of Container(s)			1	1	1	1							
Volume			250mL	500mL	250mL	250mL							
			romium Hex - 7196 Hexavalent Chromium)	See item (2) in Special Instructions	Isotopic Plutonium; Nickel-63; Strontium-89,90 -- Total Sr	Carbon-14; Tritium - H3			RCF				
Sample No.	Matrix	Sample Date	Sample Time										
J1RR49	SOIL	8-6-13	0742	X	X	X	X		E-11L	35957		MILLER	
J1RR50	SOIL	8-6-13	0759	X	X	X	X		E-11L	35958		MILLER	
	SOIL												
	SOIL												
	SOIL												

CHAIN OF POSSESSION DZA 8-7-13 — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
E. White	8-6-13 0845	Doug Bowers/Bruce Bowers	8-6-13 0845
Doug Bowers/Bruce Bowers	8-6-13 1620	1060 Battelle Blvd Ref 2A	8-6-13 1620
1060 Battelle Blvd Ref 2A	8-12-13 1410	Chuck Singleton	8-12-13 1410 *
Chuck Singleton	8-12-13 1438	TAL / McGinnis	8/12/13 1438

SPECIAL INSTRUCTIONS

(2) Gamma Spec (Client List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

* Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to la

REVIEWED BY Anishen DATE 8/12/13

FINAL SAMPLE DISPOSITION: Disposal Method: Disposed By: Date/Time

WCH-EE-011

Generated Date/Time: 08/27/2013 08:47, PDT

Washington Closure Hanford — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005 | Page 1 of 2

Collector ~~WHITE, EC~~ JH 8-7-13 B. Moeller	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: NA	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Local Delivery
Shipped To: TestAmerica - Richland 8-12-13	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

cool 4C

8-12-13 CMB

J3H120421
J01905
Due 8-21-13

SAMPLE ANALYSIS

	Chromium Hex - 7196 (Hexavalent Chromium)	* See item (2) in Special Instructions	Isotopic, Plutonium; Nickel-63; Strontium-89,90 – Total Sr	Carbon-14; Tritium - H3	RCF					
Preservation	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1						
Volume	250mL	500mL	250mL	250mL						

Sample No.	Matrix	Sample Date	Sample Time										
J1RR53	SOIL	8-7-13	0716	X	X	X	X	35959	E-84		MLR	V	
J1RR54	SOIL	8-7-13	0722	X	X	X	X	35960	E-84		MLR	W	
	SOIL												
	SOIL												
	SOIL												

CHAIN OF POSSESSION	Sign/Print Names
Relinquished By/Removed From — Date/Time: Brooke Moeller 8-7-13/0815	Received By/Stored In — Date/Time: Doug Bowers 8-7-13/0815
Relinquished By/Removed From — Date/Time: Doug Bowers 8-7-13/1600	Received By/Stored In — Date/Time: A. Freier 8-7-13 1600
Relinquished By/Removed From — Date/Time: A. Freier 8-7-13 1605	Received By/Stored In — Date/Time: 1060 Battelle #18 8-7-13 1605
Relinquished By/Removed From — Date/Time: 1060 Battelle #18 8-12-13 1407	Received By/Stored In — Date/Time: A. Freier 8-12-13 1407
Relinquished By/Removed From — Date/Time: A. Freier 8-12-13 1408	Received By/Stored In — Date/Time: 08-12-13 1408
Relinquished By/Removed From — Date/Time: 8-12-13 1438	Received By/Stored In — Date/Time: 8/12/13 1438
Relinquished By/Removed From — Date/Time:	Received By/Stored In — Date/Time:

FINAL SAMPLE DISPOSITION — Disposal Method: | Disposed By: | Date/Time:

SPECIAL INSTRUCTIONS

(2) Gamma Spec (Client List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

* Samples from RCF pg. 2 of this COC.
AJ
8.7.13

REVIEWED BY
DATE 8/12/13

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005

Collector JH 8-7-13 ~~WHITE, EC~~ B. Moeller	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: NA	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Local Delivery
Shipped To: TestAmerica - Richland	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

Price Code: 8C

Data Turnaround: 15 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

C001 4C

8-12-13 CMB

J3H120421
J01905
Due 8-27-13

SAMPLE ANALYSIS

Preservation	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1						
Volume	250mL	500mL	250mL	250mL						
	Chromium Hex - 7196 (Hexavalent Chromium)	* See item (2) in Special Instructions	Isotopic Plutonium; Nickel-63; Strontium-89,90 – Total Sr	Carbon-14; Tritium - H3	RCF					
Sample No. / Matrix / Sample Date / Sample Time										
J1RR57 / SOIL / 8-7-13 / 1145	X	X	X	X	35961	ETA 4	MILRO			
J1RR56 / SOIL / 8-7-13 / 1148	X	X	X	X	35962	ETA 4	MILR1			
J1RR55 / SOIL / 8-7-13 / 1200	X	X	X	X	35963	ETA 4	MILR2			
	SOIL									
	SOIL									

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
[signature]	8-7-13 1240	Doug Bowers [signature]	8-7-13 1240
Doug Bowers [signature]	8-7-13 1600	A. Freier [signature]	8-7-13 1600
A. Freier [signature]	8-7-13 1605	1060 Battelle #1B	8-7-13 1605
AJ 8-12-13 1060 Battelle #1B	8-12-13 1407	A. Freier [signature]	8-12-13 1407
A. Freier [signature]	8-12-13 1408	Cynthia Bingham [signature]	8-12-13 1408
Cynthia Bingham [signature]	8-12-13 1438	[signature] Tom McGinnis	8/12/13 1438
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

FINAL SAMPLE DISPOSITION: Disposal Method — Disposed By — Date/Time

SPECIAL INSTRUCTIONS

(2) Gamma Spec (Client List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

*Samples from RCF pg. 2 of this COC.

AJ 8-7-13

REVIEWED BY Moshen DATE 8/12/13

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

TestAmerica Laboratories, Inc.

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005

Page 1 of 2

Collector JHB 7-13 ~~WHITE, EC~~ B. Moeller	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: NA	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Local Delivery
Shipped To: TestAmerica - Richland	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

Price Code: 8C

Data Turnaround: 15 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4C
8-12-13 CMB

J3H120421
J01905
Due 8-27-13

SAMPLE ANALYSIS

			Preservation	Cool 4C	None	None	None						
			Type of Container	G/P	G/P	G/P	G/P						
			No. of Container(s)	1	1	1	1						
			Volume	250mL	500mL	250mL	250mL						
				Chromium Hex - 7196 (Hexavalent Chromium)	* See item (2) in Special Instructions	Isotopic Plutonium; Nickel-63; Strontium-89,90 – Total Sr	Carbon-14; Tritium - H3	RCF					
Sample No.	Matrix	Sample Date	Sample Time						JH 8-7-13				
J1RR58	SOIL	8-7-13	1355	X	X	X	X	35914	EGAL		MILR3		
J1RR59	SOIL	8-7-13	1402	X	X	X	X	35915	EGAU		MILR4		
	SOIL								JH 8-7-13				
	SOIL												
	SOIL												

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Doug Bowers	8-7-13/1435	Doug Bowers	8-7-13/1435
Doug Bowers	8-7-13/1600	A. Freier	8-7-13 1600
A. Freier	8-7-13 1605	1060 Battelle #1B	8-7-13 1605
1060 Battelle #1B	8-12-13 1407	A. Freier	8-12-13 1407
A. Freier	8-12-13 1408	Cinda Bingham	8-12-13 1408
Cinda Bingham	8-12-13 1438	Bonnie Tomlinson	8/12/13 1438

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

SPECIAL INSTRUCTIONS

(2) Gamma Spec (Client List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

* Samples from RCF pg. 2 of this COC.
AJ
8-7-13

REVIEWED BY Muslen DATE 8/12/13

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

TestAmerica Laboratories, Inc.

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-K-111			DATA PACKAGE: J01905		
VALIDATOR: ELR		LAB: TAL		DATE: 9/18/13	
			SDG: J01905		
ANALYSES PERFORMED					
☐ Gross Alpha/Beta ☐ Total Uranium	X Strontium-90 ☐ Radium-22	☐ Technetium-99 X Tritium	X Alpha Spectroscopy X C-14	☐ Gamma Spectroscopy Ni-63	
SAMPLES/MATRIX					
J1RR49 J1RRS0 J1RRS3 J1RRS4 J1RRS5					
J1RRS6 J1RRS7 J1RRS8 J1RRS9					
					Soil

1. Completeness ..... ☐ N/A

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

Comments: _____

2. Initial Calibration (Levels D, E) ..... X ☐ 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 Pu-238 LCS - Jael

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: no 3H or C-14 ms - Jeff

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

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

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

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

Comments: _____

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

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

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

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

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

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

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

Comments: no FS or PAS

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: Same

Appendix 6

Additional Documentation Requested by Client

Date: 28-Aug-13

QC Results Summary
TestAmerica Inc TARL
Ordered by Method, Batch No, QC Type,.

Report No. : 56712

SDG No.: J01905

Batch Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
C14_LSC								
3224077 BLANK QC, M1LTJ1AA	C-14	-7.35E-02 +- 2.1E-01	U	pCi/g	100%			4.53E-01
3224077 LCS, M1LTJ1AC	C-14	7.36E+00 +- 7.4E-01		pCi/g	100%	101%	0.0	4.56E-01
PUISO_PLATE_AEA								
3224080 BLANK QC, M1LTN1AA	Pu-238	1.20E-02 +- 2.9E-02	U	pCi/g	96%			6.51E-02
	PU239/40	2.74E-02 +- 4.1E-02	U	pCi/g	96%			5.73E-02
3224080 LCS, M1LTN1AC	PU239/40	7.50E+00 +- 1.5E+00		pCi/g	92%	110%	0.1	5.63E-02
GAMMA_GS								
3224075 BLANK QC, M1LTG1AA	CO-60	-2.18E-04 +- 9.0E-03	U	pCi/g				1.69E-02
	CS-137	5.72E-05 +- 8.2E-03	U	pCi/g				1.49E-02
	EU-152	2.62E-03 +- 2.1E-02	U	pCi/g				3.63E-02
	EU-154	2.25E-03 +- 2.7E-02	U	pCi/g				5.05E-02
	EU-155	5.17E-03 +- 1.6E-02	U	pCi/g				2.76E-02
	K-40	-1.51E-01 +- 2.4E-01	U	pCi/g				5.03E-01
3224075 LCS, M1LTG1AC	CS-137	1.02E+00 +- 1.3E-01		pCi/g		100%	0.0	3.31E-02
	RA-226	9.39E-01 +- 1.4E-01		pCi/g		83%	-0.2	6.21E-02
	RA-228	6.73E-01 +- 1.7E-01		pCi/g		96%	0.0	1.28E-01
	U-238	1.00E+00 +- 1.5E-01		pCi/g		84%	-0.2	6.39E-02
SRTOT_SEP_PRECIP_GPC								
3224076 BLANK QC, M1LTH1AA	STRONTIUM	1.27E-01 +- 1.1E-01	U	pCi/g	75%			2.18E-01
3224076 LCS, M1LTH1AC	STRONTIUM	2.45E+00 +- 6.1E-01		pCi/g	79%	108%	0.1	2.08E-01
906.0_H3_LSC								
3224078 BLANK QC, M1LTK1AA	H-3	-5.53E-03 +- 3.0E-02	U	pCi/g	100%			7.11E-02
3224078 LCS, M1LTK1AC	H-3	4.24E-01 +- 6.5E-02		pCi/g	100%	76%	-0.2	1.00E-01
NI63_LSC								
3224079 BLANK QC, M1LTL1AA	NI-63	3.33E+00 +- 3.8E+00	U	pCi/g	83%			7.42E+00
3224079 LCS, M1LTL1AC	NI-63	2.48E+02 +- 2.8E+01		pCi/g	90%	86%	-0.1	6.51E+00
7196_CR6								
3225035 MATRIX SPIKE, J1RR49 M1LR01AL	HEXCHROME	2.49E+01 +- 0.0E+00		mg/kg	N/A	85%	-0.1	1.55E-02
3225035 LCS,								

TestAmerica Inc

rptSTLRchQcSummary V5.2.23 A2002

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Date: 23 September 2013
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: Characterization of Surface Soils at 100-K-64 & 100-K-111 - Waste Site 100-K-111
Subject: Wet Chemistry - Data Package No. J01905-TAL

INTRODUCTION

This memo presents the results of data validation on Data Package No. J01905 prepared by TestAmerica Laboratories (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
J1RR49	8/6/13	Soil	C	See note 1
J1RR50	8/6/13	Soil	C	See note 1
J1RR53	8/7/13	Soil	C	See note 1
J1RR54	8/7/13	Soil	C	See note 1
J1RR55	8/7/13	Soil	C	See note 1
J1RR56	8/7/13	Soil	C	See note 1
J1RR57	8/7/13	Soil	C	See note 1
J1RR58	8/7/13	Soil	C	See note 1
J1RR59	8/7/13	Soil	C	See note 1

1 – Chromium VI by 7196A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the Sampling and Analysis Instruction for Characterization of Surface Soils in the 100-K-64 and 100-K-111 Waste Site Areas (WHC-570, Rev. 1, May 2013). 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 30 days for chromium VI.

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

All 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 Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

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

All accuracy results were acceptable.

Precision

Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J1RR55/J1RR56) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

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

Completeness

Data package J01905 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*.

WCH-570, Rev. 1, Sampling and Analysis Instruction for Characterization of Surface Soils in the 100-K-64 and 100-K-111 Waste Site Areas, May 2013.

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 CHEMSTRY DATA QUALIFICATION SUMMARY*

SDG: J01905	REVIEWER: ELR	Project: 100-K-111	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

Sample Results Summary

Date: 28-Aug-13

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Report No.: 56712 **SDG No:** J01905

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
3225036 7196_CR6									
J1RR49									
	M1LRR1AA	HEXCHROME	1.91E-01 +- 0.0E+00		mg/kg	N/A	1.55E-02	1.55E-01	
	M1LRR1AN	HEXCHROME	1.55E-01 +- 0.0E+00	U	mg/kg	N/A	1.55E-02	3.50E-01	20.8
J1RR50									
	M1LRT1AA	HEXCHROME	1.55E-01 +- 0.0E+00	U	mg/kg	N/A	1.55E-02	1.55E-01	
J1RR53									
	M1LRV1AA	HEXCHROME	1.04E+00 +- 0.0E+00		mg/kg	N/A	1.55E-02	1.55E-01	
J1RR54									
	M1LRW1AA	HEXCHROME	2.35E+00 +- 0.0E+00		mg/kg	N/A	1.55E-02	1.55E-01	
J1RR55									
	M1LR21AA	HEXCHROME	1.55E-01 +- 0.0E+00	U	mg/kg	N/A	1.55E-02	1.55E-01	
J1RR56									
	M1LR11AA	HEXCHROME	1.55E-01 +- 0.0E+00	U	mg/kg	N/A	1.55E-02	1.55E-01	
J1RR57									
	M1LR01AA	HEXCHROME	1.87E-01 +- 0.0E+00		mg/kg	N/A	1.55E-02	1.55E-01	
J1RR58									
	M1LR31AA	HEXCHROME	1.55E-01 +- 0.0E+00	U	mg/kg	N/A	1.55E-02	1.55E-01	
J1RR59									
	M1LR41AA	HEXCHROME	1.55E-01 +- 0.0E+00	U	mg/kg	N/A	1.55E-02	1.55E-01	

No. of Results: 130

9/20/13

TestAmerica Inc

rptSTLRchSaSummary2 V5.2.23 A2002

RPD - Relative Percent Difference.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Certificate of Analysis

Washington Hanford Closure
2620 Fermi Avenue
Richland, WA 99354

August 28, 2013

Attention: Joan Kessner

SAF Number	:	RC-238
Date SDG Closed	:	August 12, 2013
Number of Samples	:	Nine (9)
Sample Type	:	Soil
SDG Number	:	J01905
Data Deliverable	:	15– Day / Summary

CASE NARRATIVE

I. Introduction

On August 12, 2013, nine soil samples were received at TestAmerica for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Washington Closure Hanford (WCH) specific ID:

WCH ID#	TARL ID#	MATRIX	DATE OF RECEIPT
J1RR49	M1LRR	SOIL	08/12/13
J1RR50	M1LRT	SOIL	08/12/13
J1RR53	M1LRV	SOIL	08/12/13
J1RR54	M1LRW	SOIL	08/12/13
J1RR55	M1LR2	SOIL	08/12/13
J1RR56	M1LR1	SOIL	08/12/13
J1RR57	M1LR0	SOIL	08/12/13
J1RR58	M1LR3	SOIL	08/12/13
J1RR59	M1LR4	SOIL	08/12/13

II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Alpha Spectroscopy
Plutonium-238, -239/240 by method RL-ALP-002
Gas Proportional Counting
Strontium-90 by method RL-GPC-010
Gamma Spectroscopy
Gamma Spec by method RL-GAM-001
Liquid Scintillation Counting
Tritium by method RL-LSC-005
Carbon-14 by method RL-LSC-008
Nickel-63 by method RL-LCS-017
Chemical Analysis
Hexavalent Chromium by EPA method 7196A

IV. Quality Control

The analytical results for each analysis performed includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

V. Comments

Alpha Spectroscopy
Plutonium-238, -239/240 by method RL-ALP-002:
Sample J1RR53 tracer recovery was outside the acceptance limits on the original count. The sample was recounted for an acceptable tracer recovery. Except as noted; the LCS, batch blank, samples and sample duplicate (J1RR49) results are within contractual requirements.

Gas Proportional Counting
Strontium-90 by method RL-GPC-010:
The LCS, batch blank, samples and sample duplicate (J1RR56) results are within contractual requirements.

Gamma Spectroscopy
Gamma Spec by method RL-GAM-001:
The CRDL was not met for some of the analytes. Except as noted, the LCS, batch blank, samples and sample duplicate (J1RR54) results are within contractual requirements.

Liquid Scintillation Counting
Tritium by method RL-LSC-005:
The LCS, batch blank, samples and sample duplicate (J1RR49) results are within contractual requirements.

Carbon-14 by method RL-LSC-008:
The LCS, batch blank, samples and sample duplicate (J1RR57) results are within contractual requirements.

Nickel-63 by method RL-LCS-017:
The LCS, batch blank, samples and sample duplicate (J1RR50) results are within contractual requirements.

Chemical Analysis
Hexavalent Chromium by EPA method 7196A
The LCS, batch blank, samples, sample duplicate (J1RR49) and sample matrix spike (J1RR49) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for 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.

Reviewed and approved:

Rhonda Wagar
Project Manager

Washington Closure Hanford — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005 — Page 1 of 2

Collector: WHITE, EC	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: NA	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Local Delivery
Shipped To: TestAmerica - Richland	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

~~NA~~ 8-12-13 CMB

C0014C 8-12-13 CMB

Preservation	Cool 4C	None	None	None						
Type of Container	G/P	G/P	G/P	G/P						
No. of Container(s)	1	1	1	1						
Volume	250mL	500mL	250mL	250mL						
SAMPLE ANALYSIS	Chromium Hex - 7196 (Hexavalent Chromium)	See item (2) in Special Instructions	Isotopic Plutonium; Nickel-63; Strontium-89,90 -- Total Sr	Carbon-14; Tritium - H3						

J3H120421
301905
Due 8-27-13

J3H120421

RCF

Sample No.	Matrix	Sample Date	Sample Time	Chromium Hex	See item (2)	Isotopic Pu; Ni-63; Sr-89,90	Carbon-14; Tritium - H3					
J1RR49	SOIL	8-6-13	0742	X	X	X	X		E-114	35957	MILLER	
J1RR50	SOIL	8-6-13	0759	X	X	X	X		E-114	35958	MILLER	
	SOIL											
	SOIL											
	SOIL											

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
E. White	8-6-13	Doug Bowers/Doug Bowers	8-6-13 0845
Doug Bowers/Doug Bowers	8-6-13 1620	1060 Battelle Blvd Ref 2A	8-6-13 1620
1060 Battelle Blvd Ref 2A	8-12-13 1410	Cynthia Bingham	8-12-13 1410 *
Cynthia Bingham	8-12-13 1438	TALL	8/12/13
		DM McGinnis	1438

SPECIAL INSTRUCTIONS

(2) Gamma Spec (Client List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

* Custodian unavailable to remove samples from controlled storage. Shipper removed samples, taking custody for shipment to la

REVIEWED BY Bruskin DATE 8/12/13

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

TestAmerica Laboratories, Inc.

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005

Collector JH 8-7-13 ~~WHITE, EC~~ B. Moeller	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: NA	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Local Delivery
Shipped To: TestAmerica - Richland 8-12-13	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

cool 4C

8-12-13 CMB

J3H120421
J01905
Due 8-27-13

SAMPLE ANALYSIS

			Preservation	Cool 4C	None	None	None					
			Type of Container	G/P	G/P	G/P	G/P					
			No. of Container(s)	1	1	1	1					
			Volume	250mL	500mL	250mL	250mL					
				Chromium Hex - 7196 (Hexavalent Chromium)	* See Item (2) in Special Instructions	Isotopic Plutonium; Nickel-63; Strontium-89,90 -- Total Sr	Carbon-14; Tritium - H3	RCF				
Sample No.	Matrix	Sample Date	Sample Time									
J1RR53	SOIL	8-7-13	0716	X	X	X	X	35959	E-84		MILRV	
J1RR54	SOIL	8-7-13	0722	X	X	X	X	35960	E-84		MILRW	
	SOIL											
	SOIL											
	SOIL											

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Brady Moeller	8-7-13/0815	Doug Bowers	8-7-13/0815
Doug Bowers	8-7-13/1600	A. Freier	8-7-13 1600
A. Freier	8-7-13 1605	1060 Battelle #18	8-7-13 1605
1060 Battelle #18	8-12-13 1407	A. Freier	8-12-13 1407
A. Freier	8-12-13 1408	Cindy Bingham	8-12-13 1408
Cindy Bingham	8-12-13 1438	Tom McGuire	8/12/13 1438

SPECIAL INSTRUCTIONS

(2) Gamma Spec (Client List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

* Samples from RCF pg. 2 of this COC.

AJ 8-7-13

REVIEWED BY [signature] DATE 8/12/13

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-238-005	Page 1 of 2

Collector JH 8-7-13 ~~WHITE, EC~~ B. Moeller	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: NA	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Local Delivery
Shipped To: TestAmerica - Richland	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

C0014C

8-12-13 cmb

J3H120421
J01905
Due 8-27-13

SAMPLE ANALYSIS

Preservation				Cool 4C	None	None	None						
Type of Container				G/P	G/P	G/P	G/P						
No. of Container(s)				1	1	1	1						
Volume				250mL	500mL	250mL	250mL						
				Chromium Hex - 7196 (Hexavalent Chromium)	* See item (2) in Special Instructions	Isotopic Plutonium; Nickel-63; Strontium-89,90 -- Total Sr	Carbon-14; Tritium - H3	RCF					
Sample No.	Matrix	Sample Date	Sample Time										
J1RR57	SOIL	8-7-13	1145	X	X	X	X	35961	ETA L	MILR0			
J1RR56	SOIL	8-7-13	1148	X	X	X	X	35962	ETA U	MILR1			
J1RR55	SOIL	8-7-13	1200	X	X	X	X	35963	ETA-1U	MILR2			
	SOIL												
	SOIL												

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Doug Bowers/Doug Bowers	8-7-13/1240	Doug Bowers/Doug Bowers	8-7-13/1240
Doug Bowers/Doug Bowers	8-7-13/1600	A. Freier A. Freier	8-7-13 1600
A. Freier A. Freier	8-7-13 1605	1060 Battelle #1B	8-7-13 1605
AJ 8-12-13 1060 Battelle #1B	8-12-13 1407	A. Freier A. Freier	8-12-13 1407
A. Freier A. Freier	8-12-13 1408	Cynthia Bingham Cynthia Bingham	8-12-13 1408
Cynthia Bingham Cynthia Bingham	8-12-13 1438	Tom McGinnis Tom McGinnis	8/12/13 1438

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

SPECIAL INSTRUCTIONS

(2) Gamma Spec (Client List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

*Samples from RCF pg. 2 of this coc.

AJ
8-7-13

REVIEWED BY Moshen
DATE 8/12/13

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

TestAmerica Laboratories, Inc.

Washington Closure Hanford — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-005 | Page 1 of 2

Collector JAB 8-7-13 ~~WHITE, EC~~ B. Moeller	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: 8C	Data Turnaround: 15 Days		
Project Designation: 100K Shoreline Characterization	Sampling Location: 100-K-111 - 100-K-111 East Sample area (statistical only)		SAF No.: RC-238
Ice Chest No.: NA	Field Logbook No.: EL-1668	COA: 0ESKSH6520	Method of Shipment: Local Delivery
Shipped To: TestAmerica - Richland	Offsite Property No.: NA		Bill of Lading/Air Bill No.: NA

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

Cool 4C
8-12-13 CMB

Preservation	Cool 4C	None	None	None							
Type of Container	G/P	G/P	G/P	G/P							
No. of Container(s)	1	1	1	1							
Volume	250mL	500mL	250mL	250mL							

J3H120421
J01905
Due 8-27-13

SAMPLE ANALYSIS

Sample No.	Matrix	Sample Date	Sample Time	Chromium Hex - 7196 (Hexavalent Chromium)	* See item (2) in Special Instructions	Isotopic Plutonium; Nickel-63; Strontium-89,90 – Total Sr	Carbon-14; Tritium - H3	RCF					
									JH 8-7-13				
J1RR58	SOIL	8-7-13	1355	X	X	X	X	35914	EGA 2		mILR3		
J1RR59	SOIL	8-7-13	1402	X	X	X	X	35915	EGA 4		mILR4		
	SOIL								JH 8-7-13				
	SOIL												
	SOIL												

CHAIN OF POSSESSION	Sign/Print Names
Relinquished By/Removed From — Date/Time: [signature] 8-7-13/1435	Received By/Stored In — Date/Time: Doug Bowers 8-7-13/1435
Relinquished By/Removed From — Date/Time: Doug Bowers 8-7-13/1600	Received By/Stored In — Date/Time: A. Freier 8-7-13 1600
Relinquished By/Removed From — Date/Time: A. Freier 8-7-13 1605	Received By/Stored In — Date/Time: 1060 Battelle #18 8-7-13 1605
Relinquished By/Removed From — Date/Time: 1060 Battelle #18 8-12-13 1407	Received By/Stored In — Date/Time: A. Freier 8-12-13 1407
Relinquished By/Removed From — Date/Time: A. Freier 8-12-13 1408	Received By/Stored In — Date/Time: Cynthia Bingham 8-12-13 1408
Relinquished By/Removed From — Date/Time: Cynthia Bingham 8-12-13 1438	Received By/Stored In — Date/Time: 8/12/13 1438
Relinquished By/Removed From — Date/Time:	Received By/Stored In — Date/Time:

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

SPECIAL INSTRUCTIONS

(2) Gamma Spec (Client List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

* Samples from RCF pg. 2 of this COC.
AJ
8-7-13

REVIEWED BY [signature] DATE 8/12/13

WCH-EE-011

Generated Date/Time: 06/27/2013 08:47, PDT

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-K-111			DATA PACKAGE: J01905		
VALIDATOR: ELR		LAB: TAL		DATE: 9/18/13	
			SDG: J01905		

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				
J1RR49	J1RR50	J1RR53	J1RR54	J1RR55
J1RR56	J1RR57	J1RR58	J1RR59	
				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: _____

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

QC Results Summary

TestAmerica Inc TARL

Ordered by Method, Batch No, QC Type,.

Date: 28-Aug-13

Report No. : 56712

SDG No.: J01905

Batch Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
C14_LSC								
3224077 BLANK QC,								
M1LTJ1AA	C-14	-7.35E-02 +- 2.1E-01	U	pCi/g	100%			4.53E-01
3224077 LCS,								
M1LTJ1AC	C-14	7.36E+00 +- 7.4E-01		pCi/g	100%	101%	0.0	4.56E-01
PUISO_PLATE_AEA								
3224080 BLANK QC,								
M1LTN1AA	Pu-238	1.20E-02 +- 2.9E-02	U	pCi/g	96%			6.51E-02
	PU239/40	2.74E-02 +- 4.1E-02	U	pCi/g	96%			5.73E-02
3224080 LCS,								
M1LTN1AC	PU239/40	7.50E+00 +- 1.5E+00		pCi/g	92%	110%	0.1	5.63E-02
GAMMA_GS								
3224075 BLANK QC,								
M1LTG1AA	CO-60	-2.18E-04 +- 9.0E-03	U	pCi/g				1.69E-02
	CS-137	5.72E-05 +- 8.2E-03	U	pCi/g				1.49E-02
	EU-152	2.62E-03 +- 2.1E-02	U	pCi/g				3.63E-02
	EU-154	2.25E-03 +- 2.7E-02	U	pCi/g				5.05E-02
	EU-155	5.17E-03 +- 1.6E-02	U	pCi/g				2.76E-02
	K-40	-1.51E-01 +- 2.4E-01	U	pCi/g				5.03E-01
3224075 LCS,								
M1LTG1AC	CS-137	1.02E+00 +- 1.3E-01		pCi/g		100%	0.0	3.31E-02
	RA-226	9.39E-01 +- 1.4E-01		pCi/g		83%	-0.2	6.21E-02
	RA-228	6.73E-01 +- 1.7E-01		pCi/g		96%	0.0	1.28E-01
	U-238	1.00E+00 +- 1.5E-01		pCi/g		84%	-0.2	6.39E-02
SRTOT_SEP_PRECIP_GPC								
3224076 BLANK QC,								
M1LTH1AA	STRONTIUM	1.27E-01 +- 1.1E-01	U	pCi/g	75%			2.18E-01
3224076 LCS,								
M1LTH1AC	STRONTIUM	2.45E+00 +- 6.1E-01		pCi/g	79%	108%	0.1	2.08E-01
906.0_H3_LSC								
3224078 BLANK QC,								
M1LTK1AA	H-3	-5.53E-03 +- 3.0E-02	U	pCi/g	100%			7.11E-02
3224078 LCS,								
M1LTK1AC	H-3	4.24E-01 +- 6.5E-02		pCi/g	100%	76%	-0.2	1.00E-01
NI63_LSC								
3224079 BLANK QC,								
M1LTL1AA	NI-63	3.33E+00 +- 3.8E+00	U	pCi/g	83%			7.42E+00
3224079 LCS,								
M1LTL1AC	NI-63	2.48E+02 +- 2.8E+01		pCi/g	90%	86%	-0.1	6.51E+00
7196_CR6								
3225035 MATRIX SPIKE, J1RR49								
M1LR01AL	HEXCHROME	2.49E+01 +- 0.0E+00		mg/kg	N/A	85%	-0.1	1.55E-02
3225035 LCS,								

TestAmerica Inc

rptSTLRchQcSummary V5.2.23
A2002

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Date: 28-Aug-13

QC Results Summary
TestAmerica Inc TARL
Ordered by Method, Batch No, QC Type,.

Report No. : 56712

SDG No.: J01905

Batch Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
M1LX01AC	HEXCHROME	1.82E+01 +- 0.0E+00		mg/kg	N/A	96%	0.0	1.55E-02
3225035 BLANK QC,								
M1LX01AA	HEXCHROME	1.55E-01 +- 0.0E+00	U	mg/kg	N/A			1.55E-02

No. of Results: 24

TestAmerica Inc
rptSTLRchQcSummary V5.2.23
A2002

Bias - (Result/Expected)-1 as defined by ANSI N13.30.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.