SAF-RC-074
100-D/DR Burial Grounds & Remaining Sites – Soil In-Process
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 1/29/14
INITIAL/DATE

COMMENTS:

SDG J02071 SAF RC-074

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Waste Site: 100-D-100 InSitu Sampling

Analytical Data Package Prepared For

Washington Closure Hanford

Radiochemical Analysis By

TestAmerica Inc

2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.

Assigned Laboratory Code: TARL

Data Package Contains 20 *Pages*

Report No.: 58536

Results in this report relate only to the sample(s) analyzed.

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
J02071	RC-074	J1T839	J4A220427-1	M2WM61AC	9M2WM610	4022034
		J1T840	J4A220427-2	M2WM71AC	9M2WM710	4022034

TestAmerica Inc
rptSTLRchTitle v3.73

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Certificate of Analysis

Washington Closure Hanford
2620 Fermi Avenue
Richland, WA 99354

January 24, 2014

Attention: Joan Kessner

SAF Number	:	RC-074
Date SDG Closed	:	January 24, 2014
Number of Samples	:	Two (2)
Sample Type	:	Soil
SDG Number	:	J02071
Data Deliverable	:	Quick Turn Metals / Summary

CASE NARRATIVE

I. Introduction

On January 22, 2014, two soil samples was received at TestAmerica for 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
J1T839	M2WM6	SOIL	1/22/14
J1T840	M2WM7	SOIL	1/22/14

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:

ICP Metals
ICP Metals by method SW-846 6010A
Chemical Analysis
Hexavalent Chromium by EPA method 7196A

IV. Quality Control

SDG J02071 includes a minimum of one Laboratory Control Samples (LCS), one method (reagent) blank, a duplicate sample, matrix spike sample and a matrix spike duplicate sample. Any exceptions have been noted in the "Comments" section.

Blanks and LCS are reported in mg/L units, other QC and sample results are reported in the same units.

V. Comments

ICP Metals

ICP Metals by method SW-846 6010A

One batch was analyzed for the samples with the standard metal request list.

Batch 4022038:

The LCS, batch blank, samples, sample duplicate, MS, MSD, ICB, ICV, CCB and CCV results are within contractual limits.

Chemical Analysis

Hexavalent Chromium by EPA method 7196A

One batch was analyzed.

Batch 4022034:

The LCS, batch blank, samples, sample duplicate (J1T839) and sample matrix spike (J1T839) 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

Drinking Water Method Cross References

	DRINKING WATER ASTM METHOD CROSS REFERENCES	
Referenced Method	**Isotope(s)**	**TestAmerica Richland's SOP No.**
EPA 901.1	Cs-134, I-131	RL-GAM-001
EPA 900.0	Alpha & Beta	RL-GPC-001
EPA 00-02	Gross Alpha (Coprecipitation)	RL-GPC-002
EPA 903.0	Total Alpha Radium (Ra-226)	RL-RA-002
EPA 903.1	Ra-226	RL-RA-001
EPA 904.0	Ra-228	RL-RA-001
EPA 905.0	Sr-89/90	RL-GPC-003
ASTM D5174	Uranium	RL-KPA-003
EPA 906.0	Tritium	RL-LSC-005

Results in this report relate only to the sample(s) analyzed.

Uncertainty Estimation

TestAmerica Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/?n), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or TestAmerica.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
Total Uncert (#s) ***u_c – Combined Uncertainty.***	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, *u_c the combined uncertainty.* The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or TestAmerica "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC|MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the **Work Order** Number.
RER	The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by TestAmerica upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

Sample Results Summary

Date: 24-Jan-14

TestAmerica Inc TARL

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

Report No. : 58536

SDG No: J02071

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
4022034	7196_CR6								
J1T839									
	M2WM61AC	HEXCHROME	3.55E+01 +- 0.0E+00		mg/kg	N/A	1.55E-01	1.55E-01	
	M2WM61A	HEXCHROME	3.49E+01 +- 0.0E+00		mg/kg	N/A	1.55E-01	1.55E-01	1.8
J1T840									
	M2WM71AC	HEXCHROME	1.40E+01 +- 0.0E+00		mg/kg	N/A	1.55E-01	1.55E-01	

No. of Results: 3

TestAmerica Inc **RPD** - Relative Percent Difference.

rptTALRchSaSum mary2 V5.2.26 A2002

QC Results Summary

Date: 24-Jan-14

TestAmerica Inc TARL

Ordered by Method, Batch No, QC Type,.

Report No. : 58536

SDG No.: J02071

Batch Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
7196_CR6								
4022034 MATRIX SPIKE, J1T839								
M2WM61AL	HEXCHROME	6.14E+01 +- 0.0E+00		mg/kg	N/A	92%	-0.1	1.55E-01
4022034 LCS,								
M2WNC1AC	HEXCHROME	1.92E+01 +- 0.0E+00		mg/kg	N/A	96%	0.0	1.55E-01
4022034 BLANK QC,								
M2WNC1AA	HEXCHROME	1.55E-01 +- 0.0E+00	U	mg/kg	N/A			1.55E-01

No. of Results: 3

TestAmerica Inc

rptSTLRchQcSummary V5.2.26
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.

FORM I

SAMPLE RESULTS

Date: 24-Jan-14

Lab Name:	TestAmerica Inc	**SDG:**	J02071	**Collection Date:**	1/22/2014 10:02:00 AM
Lot-Sample No.:	J4A220427-1	**Report No. :**	58536	**Received Date:**	1/22/2014 2:15:00 PM
Client Sample ID:	J1T839	**COC No. :**	RC-074-631	**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4022034	7196_CR6			**Work Order:**	M2WM61AC		**Report DB ID:**	9M2WM610				
HEXCHROME	**3.55E+01**			0.0E+00	1.55E-01	mg/kg	N/A	*(229.1)*	1/23/14 06:20 a		2.5069	
							1.55E-01	*N/A*			g	

No. of Results: 1 **Comments:**

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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.

FORM I

SAMPLE RESULTS

Date: 24-Jan-14

Lab Name:	TestAmerica Inc	**SDG:**	J02071	**Collection Date:**	1/22/2014 10:08:00 AM
Lot-Sample No.:	J4A220427-2	**Report No. :**	58536	**Received Date:**	1/22/2014 2:15:00 PM
Client Sample ID:	J1T840	**COC No. :**	RC-074-631	**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4022034	7196_CR6			**Work Order:** M2WM71AC			**Report DB ID:** 9M2WM710					
HEXCHROME	**1.40E+01**			0.0E+00	1.55E-01	mg/kg	N/A	*(90.3)*	1/23/14 06:20 a		2.505	
							1.55E-01	*N/A*			g	

No. of Results: 1 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.2.26 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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.

FORM II

Date: 24-Jan-14

DUPLICATE RESULTS

Lab Name:	TestAmerica Inc	**SDG:**	J02071	**Collection Date:**	1/22/2014 10:02:00 AM
Lot-Sample No.:	J4A220427-1	**Report No. :**	58536	**Received Date:**	1/22/2014 2:15:00 PM
Client Sample ID:	J1T839	**COC No. :**	RC-074-631	**Matrix:**	SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4022034	7196_CR6			**Work Order:**	M2WM61AM		**Report DB ID:**	M2WM61ER	**Orig Sa DB ID:**	9M2WM610		
HEXCHROME	3.49E+01			0.0E+00	1.55E-01	mg/kg	N/A	(224.9)	1/23/14 06:20 a		2.5014	
	3.55E+01		**RPD**	**1.8**		1.55E-01		N/A			g	

No. of Results: 1 **Comments:**

TestAmerica Inc RPD - Relative Percent Difference.

rptSTLRchDupV5.2.26 A2002 MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

FORM II

BLANK RESULTS

Date: 24-Jan-14

Lab Name: TestAmerica Inc

Matrix: SOIL

SDG: J02071

Report No. : 58536

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Lc	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4022034	7196_CR6			**Work Order:**	M2WNC1AA		**Report DB ID:**	M2WNC1AB				
HEXCHROME	1.55E-01	U		0.0E+00	1.55E-01	mg/kg	N/A	1.	1/23/14 06:20 a		2.5	
						1.55E-01		N/A			g	

No. of Results: 1 **Comments:**

TestAmerica Inc
rptSTLRchBlank
V5.2.26 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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.

FORM II

LCS RESULTS

Date: 24-Jan-14

Lab Name: TestAmerica Inc

SDG: J02071

Matrix: SOIL

Report No. : 58536

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 4022034	7196_CR6			**Work Order:**	M2WNC1AC		**Report DB ID:**	M2WNC1AS					
HEXCHROME	1.92E+01			0.0E+00	1.55E-01	mg/kg	N/A	2.00E+01		96%	1/23/14 06:20 a	2.5	
							Rec Limits:	80	120	0.0		g	

No. of Results: 1 **Comments:**

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

rptSTLRchLcs
V5.2.26 A2002

FORM II

MATRIX SPIKE RESULTS

Date: 24-Jan-14

Lab Name: TestAmerica Inc **SDG:** J02071

Lot-Sample No.: J4A220427-1, J1T839 **Report No. :** 58536 **Matrix:** SOIL

Parameter	SpikeResult, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Rpt Unit	Yield	Rec-overy	Expected, Uncert	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 4022034	**Work Order:** M2WM61AL			**Report DB ID:** M2WM61CW			**Orig Sa DB ID:** 9M2WM610					
HEXCHROME	6.14E+01			0.0E+00	1.55E-01	mg/kg	N/A	92.41%	6.64E+01	1/23/14 06:20 a	2.506	7196_CR6
	3.55E+01										g	

Number of Results: 1

Comments:

TestAmerica Inc
rptSTLRchMs
V5.2.26 A2002

RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
Bias - (Result/Expected)-1 as defined by ANSI N13.30.

SDG: J02071
SAF: RC-074
BATCH: 4022038
MATRIX: SOIL
ANALYSIS DATE: 1/23/14

Client_id	Matrix	Result_Cas_nbr	Parameter	Result	Qualifier	Units	Reporting_Limits_S	Reporting_Limits	Uncertainty_1s	Analyzed_:	Analyze	Decision_level_lc	LCS	Reco	Adde	Analysis_date_time	Batch_nbr	Test_Meth	Lab_sample_id
J1T839	**SOIL**	**CS 7440-22-4**	**Ag**	**-3.14E-01**	**U**	**UG/G**	1.01E+01	1.01E+01	1.50E-01	0.2483	G	1.22E-01				1/23/2014 10:52	4022038	46DQ	M2WM61A0
J1T839	**SOIL**	**CS 7440-38-2**	**As**	**2.03E+00**	**U**	**UG/G**	1.01E+01	1.01E+01	2.30E+00	0.2483	G	1.92E+00				1/23/2014 10:52	4022038	46DQ	M2WM61A0
J1T839	**SOIL**	**CS 7440-39-3**	**Ba**	**7.32E+01**		**UG/G**	2.01E+00	2.01E+00	3.30E-01	0.2483	G	2.69E-01				1/23/2014 10:52	4022038	46DQ	M2WM61A0
J1T839	**SOIL**	**CS 7440-41-7**	**Beryllium**	**2.29E-01**		**UG/G**	1.01E-01	1.01E-01	1.30E-02	0.2483	G	1.04E-02				1/23/2014 10:52	4022038	46DQ	M2WM61A0
J1T839	**SOIL**	**CS 7440-43-9**	**Cadmium**	**9.43E-02**	**U**	**UG/G**	2.01E+00	2.01E+00	7.00E-02	0.2483	G	5.73E-02				1/23/2014 10:52	4022038	46DQ	M2WM61A0
J1T839	**SOIL**	**CS 7440-47-3**	**Chromium**	**4.81E+01**		**UG/G**	1.01E+01	1.01E+01	3.50E-01	0.2483	G	2.91E-01				1/23/2014 10:52	4022038	46DQ	M2WM61A0
J1T839	**SOIL**	**CS 7439-92-1**	**Lead**	**3.52E+00**	**U**	**UG/G**	1.01E+01	1.01E+01	6.00E-01	0.2483	G	4.92E-01				1/23/2014 10:52	4022038	46DQ	M2WM61A0
J1T839	**SOIL**	**CS 7782-49-2**	**Se**	**-1.41E-01**	**U**	**UG/G**	1.01E+01	1.01E+01	2.30E+00	0.2483	G	1.86E+00				1/23/2014 10:52	4022038	46DQ	M2WM61A0
J1T840	**SOIL**	**CS 7440-22-4**	**Ag**	**-3.59E-01**	**U**	**UG/G**	9.98E+00	9.98E+00	1.50E-01	0.2505	G	1.27E-01				1/23/2014 11:20	4022038	46DQ	M2WM71AA
J1T840	**SOIL**	**CS 7440-38-2**	**As**	**1.03E+00**	**U**	**UG/G**	9.98E+00	9.98E+00	6.10E-01	0.2505	G	5.05E-01				1/23/2014 11:20	4022038	46DQ	M2WM71AA
J1T840	**SOIL**	**CS 7440-39-3**	**Ba**	**5.71E+01**		**UG/G**	2.00E+00	2.00E+00	1.30E-01	0.2505	G	1.04E-01				1/23/2014 11:20	4022038	46DQ	M2WM71AA
J1T840	**SOIL**	**CS 7440-41-7**	**Beryllium**	**1.95E-01**		**UG/G**	9.98E-02	9.98E-02	1.30E-02	0.2505	G	1.06E-02				1/23/2014 11:20	4022038	46DQ	M2WM71AA
J1T840	**SOIL**	**CS 7440-43-9**	**Cadmium**	**1.18E-01**	**U**	**UG/G**	2.00E+00	2.00E+00	7.40E-02	0.2505	G	6.11E-02				1/23/2014 11:20	4022038	46DQ	M2WM71AA
J1T840	**SOIL**	**CS 7440-47-3**	**Chromium**	**2.10E+01**		**UG/G**	9.98E+00	9.98E+00	8.40E-02	0.2505	G	6.94E-02				1/23/2014 11:20	4022038	46DQ	M2WM71AA
J1T840	**SOIL**	**CS 7439-92-1**	**Lead**	**2.71E+00**	**U**	**UG/G**	9.98E+00	9.98E+00	3.00E-01	0.2505	G	2.48E-01				1/23/2014 11:20	4022038	46DQ	M2WM71AA
J1T840	**SOIL**	**CS 7782-49-2**	**Se**	**-5.77E-01**	**U**	**UG/G**	9.98E+00	9.98E+00	1.20E+00	0.2505	G	9.63E-01				1/23/2014 11:20	4022038	46DQ	M2WM71AA
INTRA-LAB BLANK	SOIL	BLK 7440-22-4	Ag	5.52E-02	U	MG/L	1.01E+01	1.01E+01	2.70E-01	0.2468	L	2.25E-01				1/23/2014 10:40	4022038	46DQ	M2WNH1AA
INTRA-LAB BLANK	SOIL	BLK 7440-38-2	As	1.50E+00	U	MG/L	1.01E+01	1.01E+01	7.90E-01	0.2468	L	6.46E-01				1/23/2014 10:40	4022038	46DQ	M2WNH1AA
INTRA-LAB BLANK	SOIL	BLK 7440-39-3	Ba	6.98E-02	U	MG/L	2.03E+00	2.03E+00	1.70E-02	0.2468	L	1.36E-02				1/23/2014 10:40	4022038	46DQ	M2WNH1AA
INTRA-LAB BLANK	SOIL	BLK 7440-41-7	Beryllium	2.80E-03	U	MG/L	1.01E-01	1.01E-01	3.70E-03	0.2468	L	3.08E-03				1/23/2014 10:40	4022038	46DQ	M2WNH1AA
INTRA-LAB BLANK	SOIL	BLK 7440-43-9	Cadmium	8.73E-02	U	MG/L	2.03E+00	2.03E+00	8.40E-02	0.2468	L	6.92E-02				1/23/2014 10:40	4022038	46DQ	M2WNH1AA
INTRA-LAB BLANK	SOIL	BLK 7440-47-3	Chromium	8.21E-02	U	MG/L	1.01E+01	1.01E+01	9.10E-02	0.2468	L	7.45E-02				1/23/2014 10:40	4022038	46DQ	M2WNH1AA
INTRA-LAB BLANK	SOIL	BLK 7439-92-1	Lead	4.39E-01	U	MG/L	1.01E+01	1.01E+01	3.10E-01	0.2468	L	2.52E-01				1/23/2014 10:40	4022038	46DQ	M2WNH1AA
INTRA-LAB BLANK	SOIL	BLK 7782-49-2	Se	5.78E-01	U	MG/L	1.01E+01	1.01E+01	4.90E-01	0.2468	L	4.04E-01				1/23/2014 10:40	4022038	46DQ	M2WNH1AA
INTRA-LAB CHECK	SOIL	LCS 7440-22-4	Ag	2.01E+02		MG/L	9.91E+00	9.91E+00	8.90E-01	0.2523	L	7.34E-01	1.01	198		1/23/2014 10:43	4022038	46DQ	M2WNH1AA
INTRA-LAB CHECK	SOIL	LCS 7440-38-2	As	1.94E+02		MG/L	9.91E+00	9.91E+00	2.20E+00	0.2523	L	1.82E+00	0.98	198		1/23/2014 10:43	4022038	46DQ	M2WNH1AA
INTRA-LAB CHECK	SOIL	LCS 7440-39-3	Ba	2.06E+02		MG/L	1.98E+00	1.98E+00	1.90E+00	0.2523	L	1.60E+00	1.04	198		1/23/2014 10:43	4022038	46DQ	M2WNH1AA
INTRA-LAB CHECK	SOIL	LCS 7440-41-7	Beryllium	1.97E+02		MG/L	9.91E-02	9.91E-02	1.10E+00	0.2523	L	9.11E-01	0.99	198		1/23/2014 10:43	4022038	46DQ	M2WNH1AA
INTRA-LAB CHECK	SOIL	LCS 7440-43-9	Cadmium	1.89E+02		MG/L	1.98E+00	1.98E+00	2.20E+00	0.2523	L	1.77E+00	0.96	198		1/23/2014 10:43	4022038	46DQ	M2WNH1AA
INTRA-LAB CHECK	SOIL	LCS 7440-47-3	Chromium	2.03E+02		MG/L	9.91E+00	9.91E+00	1.40E+00	0.2523	L	1.15E+00	1.03	198		1/23/2014 10:43	4022038	46DQ	M2WNH1AA
INTRA-LAB CHECK	SOIL	LCS 7439-92-1	Lead	1.92E+02		MG/L	9.91E+00	9.91E+00	2.40E+00	0.2523	L	1.95E+00	0.97	198		1/23/2014 10:43	4022038	46DQ	M2WNH1AA
INTRA-LAB CHECK	SOIL	LCS 7782-49-2	Se	1.84E+02		MG/L	9.91E+00	9.91E+00	7.90E-01	0.2523	L	6.51E-01	0.93	198		1/23/2014 10:43	4022038	46DQ	M2WNH1AA
J1T839 DUP	SOIL	DUP 7440-22-4	Ag	-3.97E-01	U	UG/G	9.96E+00	9.96E+00	7.90E-02	0.2509	G	6.49E-02				1/23/2014 11:16	4022038	46DQ	M2WM61A0
J1T839 DUP	SOIL	DUP 7440-38-2	As	1.71E+00	U	UG/G	9.96E+00	9.96E+00	7.40E-01	0.2509	G	6.08E-01				1/23/2014 11:16	4022038	46DQ	M2WM61A0
J1T839 DUP	SOIL	DUP 7440-39-3	Ba	7.16E+01		UG/G	1.99E+00	1.99E+00	4.00E-01	0.2509	G	3.25E-01				1/23/2014 11:16	4022038	46DQ	M2WM61A0
J1T839 DUP	SOIL	DUP 7440-41-7	Beryllium	2.30E-01		UG/G	9.96E-02	9.96E-02	4.50E-03	0.2509	G	3.73E-03				1/23/2014 11:16	4022038	46DQ	M2WM61A0
J1T839 DUP	SOIL	DUP 7440-43-9	Cadmium	1.23E-01	U	UG/G	1.99E+00	1.99E+00	3.90E-02	0.2509	G	3.25E-02				1/23/2014 11:16	4022038	46DQ	M2WM61A0
J1T839 DUP	SOIL	DUP 7440-47-3	Chromium	4.43E+01		UG/G	9.96E+00	9.96E+00	2.10E-01	0.2509	G	1.74E-01				1/23/2014 11:16	4022038	46DQ	M2WM61A0
J1T839 DUP	SOIL	DUP 7439-92-1	Lead	3.31E+00	U	UG/G	9.96E+00	9.96E+00	5.80E-01	0.2509	G	4.78E-01				1/23/2014 11:16	4022038	46DQ	M2WM61A0
J1T839 DUP	SOIL	DUP 7782-49-2	Se	4.26E-01	U	UG/G	9.96E+00	9.96E+00	5.20E-01	0.2509	G	4.26E-01				1/23/2014 11:16	4022038	46DQ	M2WM61A0
J1T839	SOIL	MS 7440-22-4	Ag	1.91E+02		% RECC	9.98E+00	9.98E+00	3.60E-01	0.2506	L	2.93E-01	0.96	200		1/23/2014 10:55	4022038	46DQ	M2WM61A0
J1T839	SOIL	MS 7440-38-2	As	1.91E+02		% RECC	9.98E+00	9.98E+00	5.60E-01	0.2506	L	4.61E-01	0.96	200		1/23/2014 10:55	4022038	46DQ	M2WM61A0
J1T839	SOIL	MS 7440-39-3	Ba	1.88E+02		% RECC	2.00E+00	2.00E+00	3.20E+00	0.2506	L	2.60E+00	0.94	200		1/23/2014 10:55	4022038	46DQ	M2WM61A0
J1T839	SOIL	MS 7440-41-7	Beryllium	1.94E+02		% RECC	9.98E-02	9.98E-02	1.90E+00	0.2506	L	1.58E+00	0.97	200		1/23/2014 10:55	4022038	46DQ	M2WM61A0
J1T839	SOIL	MS 7440-43-9	Cadmium	1.87E+02		% RECC	2.00E+00	2.00E+00	5.60E-01	0.2506	L	4.61E-01	0.94	200		1/23/2014 10:55	4022038	46DQ	M2WM61A0
J1T839	SOIL	MS 7440-47-3	Chromium	1.91E+02		% RECC	9.98E+00	9.98E+00	1.50E+00	0.2506	L	1.21E+00	0.96	200		1/23/2014 10:55	4022038	46DQ	M2WM61A0
J1T839	SOIL	MS 7439-92-1	Lead	1.83E+02		% RECC	9.98E+00	9.98E+00	3.40E-01	0.2506	L	2.79E-01	0.92	200		1/23/2014 10:55	4022038	46DQ	M2WM61A0
J1T839	SOIL	MS 7782-49-2	Se	1.82E+02		% RECC	9.98E+00	9.98E+00	1.60E+00	0.2506	L	1.29E+00	0.91	200		1/23/2014 10:55	4022038	46DQ	M2WM61A0
J1T839	SOIL	MSD 7440-22-4	Ag	1.88E+02		% RECC	9.94E+00	9.94E+00	2.20E-01	0.2515	L	1.79E-01	0.95	199		1/23/2014 11:00	4022038	46DQ	M2WM61A0
J1T839	SOIL	MSD 7440-38-2	As	1.92E+02		% RECC	9.94E+00	9.94E+00	2.90E+00	0.2515	L	2.37E+00	0.96	199		1/23/2014 11:00	4022038	46DQ	M2WM61A0
J1T839	SOIL	MSD 7440-39-3	Ba	1.79E+02		% RECC	1.99E+00	1.99E+00	3.10E+00	0.2515	L	2.59E+00	0.9	199		1/23/2014 11:00	4022038	46DQ	M2WM61A0
J1T839	SOIL	MSD 7440-41-7	Beryllium	1.93E+02		% RECC	9.94E-02	9.94E-02	7.20E-01	0.2515	L	5.93E-01	0.97	199		1/23/2014 11:00	4022038	46DQ	M2WM61A0
J1T839	SOIL	MSD 7440-43-9	Cadmium	1.84E+02		% RECC	1.99E+00	1.99E+00	2.10E-01	0.2515	L	1.72E-01	0.93	199		1/23/2014 11:00	4022038	46DQ	M2WM61A0
J1T839	SOIL	MSD 7440-47-3	Chromium	1.89E+02		% RECC	9.94E+00	9.94E+00	7.00E-01	0.2515	L	5.74E-01	0.95	199		1/23/2014 11:00	4022038	46DQ	M2WM61A0
J1T839	SOIL	MSD 7439-92-1	Lead	1.82E+02		% RECC	9.94E+00	9.94E+00	7.20E-01	0.2515	L	5.91E-01	0.91	199		1/23/2014 11:00	4022038	46DQ	M2WM61A0
J1T839	SOIL	MSD 7782-49-2	Se	1.83E+02		% RECC	9.94E+00	9.94E+00	1.80E+00	0.2515	L	1.49E+00	0.92	199		1/23/2014 11:00	4022038	46DQ	M2WM61A0

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Richland Laboratory
Data Review Check List
Hexavalent Chromium

Batch Number(s):	4022034	Lab Sample Numbers or SDG:	J02071

Method/Test/Parameter: Cr+6 ☐ RL-WC-003(Aqueous) ☒ RL-WC-004(Solid)

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level Review (✓)
A. Initial Calibration 1. Performed at required frequency with required number of levels?	✓			✓
2. Correlation coefficient greater than 0.97?	✓			✓
3. Initial calibration verification (ICV) analyzed immediately after calibration and results within 10% of expected?	✓			✓
4. Initial calibration blank (ICB) analyzed immediately after ICV and concentrations of all parameters ≤ reporting limit?	✓			✓
B. Continuing Calibration 1. CCV analyzed at required frequency and all parameters within 10% of expected?	✓			✓
2. CCB analyzed at required frequency and all results ≤ reporting limit?	✓			✓
C. Sample Analysis 1. Were any samples with concentrations above the linear range diluted and reanalyzed?	✓			✓
2. Were all sample holding times met?	✓			✓
D. QC Samples 1. All results for the preparation blank below limits?	✓			✓
2. LCS percent recovery within 85-115%	✓			✓
3. $PbCrO_4$ percent recovery within 75-125%?	✓			✓
4. Sample and Duplicate within 20% (aqueous) or 35% (solid) RPD?	✓			✓
5. MS or MS/MSD recoveries within 85-115% (aqueous) or 75-125% (solid)?	✓			✓
6. On MS failure, PDMS within 85-115%?			✓	✓
E. Other 1. Are all nonconformances included and noted?			✓	✓
2. Is the correct date and time of analysis shown?	✓			✓
3. Did the analyst sign and date the front page of the analytical run?	✓			✓
4. Correct methodology used?	✓			✓
5. Transcriptions checked?	✓			✓
6. Calculations checked at minimum frequency?	✓			✓
7. Units checked?	✓			✓

Comments on any "No" response or list NCM number:

Analyst I. Salifu Date 1/23/14 2nd Review [illegible] Date 1/23/14

CG-231 Rev 1, 5/12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Data Review/Verification Checklist

CHEMISTRY, First/Second Level Review

1/23/2014 12:28:38 PM

Lot No., Due Date: J4A220427; 01/23/2014
Client, Site: 127642; S00X235B00 HANFORD
QC Batch No., Method Test: 4022038; M6010_S 6010A
SDG, Matrix: J02071; SOIL

	Yes	No	N/A	2nd
1.0 Initial Calibration				
1.1 Performed at required frequency with required number of levels?	✓			✓
1.2 Correlation coefficient within QC limits?	✓			✓
1.3 Initial calibration verification (ICV) analyzed immediately after calibr. and results within QC limits of +/- 10% at 0.75 ppm?	✓			✓
1.4 ICB analyzed immediately after ICV and concentration of all parameters +/- report limit from zero? RL per RadCalc.	✓			✓
2.0 Continuing Calibration				
2.1 CCV analyzed at required frequency and all parameters within QC limits or +/- 10% at 0.7500 ppm?	✓			✓
2.2 CCB analyzed at required frequency and all results +/- reporting limit from zero?	✓			✓
3.0 Sample Analysis				
3.1 Were any samples with concentration above the linear range diluted and reanalyzed?			✓	✓
3.2 Were all sample holding times met?	✓			✓
4.0 QC Samples				
4.1 All results for the preparation blank < reporting limits?	✓			✓
4.2 MS or MS/MSD recoveries within 25% at 1 ppm and within 20% RPD (for MSD)?	✓			✓
4.3 LCS precent recovery within 20% at 1 ppm and 20% RPD (for LCSD)?	✓			✓
4.4 "ICP Only: Sample and DUP within 35% RPD?"	✓			✓
4.5 ICP only: One serial dilution performed and within 10% of parent per SDG?	✓			✓
4.6 ICP only: RLV run per batch and within 20% of current values?	✓			✓
4.7 ICP only: ICSA,ICSAB analyzed at the required frequencies and within 20% of values per dilution record?	✓			✓
5.0 Other				
5.1 Are all nonconformances included and noted?			✓	✓
5.2 Is the correct date and time of analysis shown?	✓			✓
5.3 Did the analyst sign and date the digestion log for the analytical run?	✓			✓
5.4 Correct methodology used?	✓			✓
5.5 Transcriptions checked?	✓			✓
5.6 Calculations checked at minimum frequency?	✓			✓
5.7 Units checked?	✓			✓
5.8 Verified that appropriate data transferred to ReportDB?	✓			✓

6.0 Comments on any 'No' response:

First Level [signature] **Date** 01/23/14 **Second** H. Rahani **Date** 1/23/14

TestAmerica Richland
QAS_RADCALCv4.8.66.3

Washington Closure Hanford — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-074-631 | Page 1 of 1

Collector: H. Weber	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code: Q.T.	Data Turnaround		
Project Designation: 100-D/DR Field Remediation	Sampling Location: 100-D-100 InSitu Sampling		SAF No.: RC-074
Ice Chest No.: N/A	Field Logbook No.: EL-1607-22	COA: 0D10032600	Method of Shipment: Local Delivery
Shipped To: TestAmerica Richland	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A

Other Labs Shipped To: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS
N/A

Special Handling and/or Storage
Cool 4C

Preservation	Cool 4C	None									
Type of Container	G/P	G/P									
No. of Container(s)	1	1									
Volume	125mL	125mL									
Sample Analysis	Chromium Hex - 7196 - Quick Turn {Hexavalent Chromium}	See item (1) in Special Instructions									

Sample No.	Matrix	Sample Date	Sample Time										
J1T839 mawm6	SOIL	1/22/14	1002	X	X								
J1T840 mawm7	SOIL	1/22/14	1008	X	X								

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Heather Weber	1/22/14 1013	SM Sexton WCH	1/22/14 1013
SM Sexton	1/22/14 1230	C. Martinez/C. Martinez	01/22/14 1230
C. Martinez/C. Martinez	01/22/14 1330	C. Bingham	1-22-14 1330
C. Bingham WCH	1-22-14 1415	J. Beck TALR	1-22-14 1415

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS
(1) Metals by ICP - 6010 - Quick Turn {Arsenic, Barium, Beryllium, Cadmium, Chromium, Lead, Selenium, Silver}

J4A220427
J02071
Due 1-23-14

J4A220427

REVIEWED BY K. Woodvia email
DATE 1-22-14

WCH-EE-011

TestAmerica
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Sample Check-in List

Date/Time Received: 1-22-14 / 1415 Container GM Screen Result: (Airlock) 80 cpm Initials [JB]
Sample GM Screen Result (Sample Receiving) 20 cpm Initials [JB]

Client: WCH SDG #: J02071 SAF #: RC-074 NA [ ]

Lot Number: J4A220427

Chain of Custody # RC-074-631

Shipping Container ID or Air Bill Number : hand de Ov. NA [RW]

Samples received inside shipping container/cooler/box Yes [JB] Continue with 1 through 4. Initial appropriate response.
No [ ] Go to 5, add comment to #16.

1. Custody Seals on shipping container intact? Yes [ ] No [ ] No Custody Seal [JB]
2. Custody Seals dated and signed? Yes [ ] No [ ] No Custody Seal [JB]
3. Cooler temperature: 9.7 °C Ice NA [ ]
4. Vermiculite/packing materials is NA [JB] Wet [ ] Dry [ ]

Item 5 through 16 for samples. Initial appropriate response.

5. Chain of Custody record present? Yes [JB] No [ ]
6. Number of samples received (Each sample may contain multiple bottles): 2
7. Containers received: 4 x 125mLp
8. Sample holding times exceeded? NA [ ] Yes [ ] No [JB]
9. Samples have: ____tape ____hazard labels JB custody seals JB appropriate sample labels
10. Matrix: JB A (FLT, Wipe, Solid, Soil) ____I (Water) ____S (Air, Niosh 7400) ____T (Biological, Ni-63)
11. Samples:
JB are in good condition ____are leaking ____are broken
____have air bubbles (Only for samples requiring no head space) ____Other ____
12. Sample pH appropriate for analysis requested Yes [ ] No [ ] NA [JB]
(If acidification is necessary go to pH area & document sample ID, initial pH, amount of HNO_3 added and pH after addition on table)
13. Were any anomalies identified in sample receipt? Yes [ ] No [JB]
14. Description of anomalies (include sample numbers): NA [JB]
15. Sample Location, Sample Collector Listed on COC? * Yes [JB] No [ ]
*For documentation only. No corrective action needed.
16. Additional Information: N/A

[ ] Client/Courier denied temperature check. [ ] Client/Courier unpack cooler.

Sample Check-in List completed by Sample Custodian:
Signature: [signature] Date: 1-22-14

Client Notification needed? Yes [ ] No [X] Date:
By:
Person contacted:

[X] No action necessary; process as is

Project Manager [signature] Date 1/22/14

LS-023 Rev. 17, 05/13

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1/22/2014 3:58:32 PM

Sample Preparation/Analysis

127642, Washington Closure Hanford LLC ,
Washington Closure Hanford LLC

DW Alkaline Digestion by method 3060A
EA Chromium, Hexavalent (7196A)
5I CLIENT: HANFORD

AnalyDueDate: 01/23/2014

Batch: 4022034 **SOIL** **mg/kg** **PM, Quote: RW2, 88144**
SEQ Batch, Test: None All Tests: , 46DQ, 4022034 DWEA,

Balance Id:
Pipet #:
Sep1 DT/Tm Tech:
Sep2 DT/Tm Tech:
Prep Tech:

Work Ord, Lot, Sample Date	Total Amt/Unit	Total Acidified/Unit	Initial Aliquot Amt/Unit	Adj Aliq Amt (Un-Acidified)	QC Tracer Prep Date	Tracer Yield	Dish Size	Ppt or Geometry	Count Time Min	Detector Id	Count On | Off (24hr) Circle	CR Analyst, Init/Date	Comments:
1 M2WM6-1-AC J4A220427-1-SAMP 01/22/2014 10:02	AmtRec: 2X125MLP	#Containers: 2	Scr:	Alpha:	Beta:								
2 M2WM6-1-AL-S J4A220427-1-MS 01/22/2014 10:02	AmtRec: 2X125MLP	#Containers: 2	Scr:	Alpha:	Beta:								
3 M2WM6-1-AM-X J4A220427-1-DUP 01/22/2014 10:02	AmtRec: 2X125MLP	#Containers: 2	Scr:	Alpha:	Beta:								
4 M2WM6-1-AN-S J4A220427-1-MS 01/22/2014 10:02	AmtRec: 2X125MLP	#Containers: 2	Scr:	Alpha:	Beta:								
5 M2WM7-1-AC J4A220427-2-SAMP 01/22/2014 10:08	AmtRec: 2X125MLP	#Containers: 2	Scr:	Alpha:	Beta:								
6 M2WNC-1-AA-B J4A220000-34-BLK 01/22/2014 15:58 pd	AmtRec:	#Containers: 1	Scr:	Alpha:	Beta:								
7 M2WNC-1-AC-C J4A220000-34-LCS 01/22/2014 15:58 pd	AmtRec:	#Containers: 1	Scr:	Alpha:	Beta:								

TestAmerica Richland Wa. Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2 Page 1
pd - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added
ISV - Insufficient Volume for Analysis
WO Cnt: 7
ICOC v4.8.49

1/22/2014 3:58:32 PM

Sample Preparation/Analysis

DW Alkaline Digestion by method 3060A
EA Chromium, Hexavalent (7196A)
5I CLIENT: HANFORD

Balance Id:
Pipet #:
Sep1 DT/Tm Tech:
Sep2 DT/Tm Tech:
Prep Tech:

AnalyDueDate: 01/23/2014

Batch: 4022034 mg/kg
SEQ Batch, Test: None

Work Ord, Lot, Sample Date	Total Amt/Unit	Total Acidified/Unit	Initial Aliquot Amt/Unit	Adj Aliq Amt (Un-Acidified)	QC Tracer Prep Date	Tracer Yield	Dish Size	Ppt or Geometry	Count Time Min	Detector Id	Count On | Off (24hr) Circle	CR Analyst, Init/Date	Comments:

Comments:

All Clients for Batch:
127642, Washington Closure Hanford LLC Washington Closure Hanford LLC, RW2, 88144

M2WM61AC-SAMP Constituent List:

M2WM61AL-MS Constituent List:

M2WM61AN-MS:

M2WNC1AA-BLK:

M2WNC1AC-LCS:

M2WM61AC-SAMP Calc Info:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B
M2WM61AL-MS Calc Info:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B
M2WM61AN-MS:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B
M2WNC1AA-BLK:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B
M2WNC1AC-LCS:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B