

Analytical Data Package Prepared For
CH2M Hill Plateau Remediation

Radiochemical Analysis By
TestAmerica

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

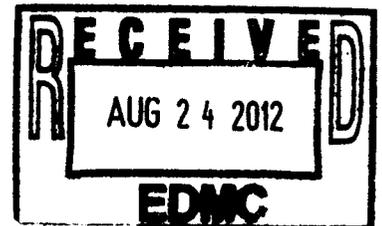
Assigned Laboratory Code: TARL

Data Package Contains _____ Pages

Report No.: 49906

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.
W06305	F11-069	B2CP08	J1J310453-1	MNLLL1AA	9MNLLL10	1304193
		B2CP08	J1J310453-1	MNLLL1AC	9MNLLL10	1304194



DECEMBER 21, 2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Certificate of Analysis

TestAmerica Laboratories, Inc.

CH2M Hill Plateau Remediation Company
P.O. Box 1600
Mail Stop – R3-60
Richland, WA 99352

December 21, 2011

Attention: Scot Fitzgerald

SAF Number	:	F11-069
Date SDG Closed	:	October 31, 2011
Number of Samples	:	One (1)
Sample Type	:	Water
SDG Number	:	W06305
Data Deliverable	:	45 Day / 45 Day Summary

CASE NARRATIVE

I. Introduction

On October 31, 2011 one water sample was received at TestAmerica (TARL). Upon receipt, the sample was assigned the following laboratory ID numbers to correspond with the CH2M specific ID:

<u>CH2M ID#</u>	<u>TARL ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
B2CP08	MNLLL	WATER	10/31/11

II. Sample Receipt

The sample was 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.

DECEMBER 21, 2011

CH2M Hill Plateau Remediation Company
December 21, 2011

The requested analyses were:

Liquid Scintillation Counting

Tritium by method RL-LSC-005

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

Liquid Scintillation Counting

Tritium by method RL-LSC-005:

The LCS, batch blank, samples and sample duplicate (B2CP08) results are within contractual requirements.

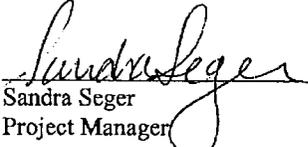
Chemical Analysis

Hexavalent Chromium by EPA method 7196A

The LCS, batch blank, samples, sample duplicate (B2CP08), sample matrix spike (B2CP08) and sample matrix spike duplicate (B2CP08) 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:


Sandra Seger
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, $R = \text{constants} * f(x,y,z, \dots)$. 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/\sqrt{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) <i>u_c - Combined Uncertainty.</i>	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, <i>u_c the combined uncertainty.</i> 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.

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Sample Results Summary

Date: 21-Dec-11

TestAmerica TARL

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

Report No. : 49906

SDG No: W06305

Batch	Client Id Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
1304193	906.0_H3_LSC								
	B2CP08								
	MNLLL1AA	H-3	7.78E+02 +/- 1.8E+02		pCi/L	100%	3.51E+02	4.00E+02	
	B2CP08 DUP								
	MNLLL1AF	H-3	7.13E+02 +/- 1.8E+02		pCi/L	100%	3.46E+02	4.00E+02	8.8
1304194	7196_CR6								
	B2CP08								
	MNLLL1AC	HEXCHROME	3.70E-03 +/- 0.0E+00	U	mg/L	N/A	3.70E-03	3.50E-01	
	MNLLL1AJ	HEXCHROME	3.70E-03 +/- 0.0E+00	U	mg/L	N/A	3.70E-03	3.50E-01	0.0
No. of Results: 4									

TestAmerica

RPD - Relative Percent Difference.

rptSTLRchSaSum
mary2 V5.2.18.1
A2002

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.

DECEMBER 21, 2011

QC Results Summary

Date: 21-Dec-11

TestAmerica TARL

Ordered by Method, Batch No, QC Type,.

Report No. : 49906

SDG No.: W06305

Batch	Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
906.0_H3_LSC									
1304193 BLANK QC,									
	MNLMG1AA	H-3	-1.25E+02 +/- 1.5E+02	U	pCi/L	100%			3.52E+02
	MNLMG1AD	H-3	-6.67E+01 +/- 1.5E+02	U	pCi/L	100%			3.53E+02
1304193 LCS,									
	MNLMG1AE	H-3	3.03E+03 +/- 2.6E+02		pCi/L	100%	112%	0.1	3.53E+02
	MNLMG1AC	H-3	2.76E+03 +/- 2.5E+02		pCi/L	100%	102%	0.0	3.50E+02
7196_CR6									
1304194 MATRIX SPIKE, B2CP08									
	MNLLL1AG	HEXCHROME	2.71E-01 +/- 0.0E+00		mg/L	N/A	103%	0.0	3.70E-03
	MNLLL1AH	HEXCHROME	2.68E-01 +/- 0.0E+00		mg/L	N/A	102%	0.0	3.70E-03
1304194 LCS,									
	MNLMR1AC	HEXCHROME	5.12E-01 +/- 0.0E+00		mg/L	N/A	102%	0.0	3.70E-03
1304194 BLANK QC,									
	MNLMR1AA	HEXCHROME	3.70E-03 +/- 0.0E+00	U	mg/L	N/A			3.70E-03
No. of Results: 8									

TestAmerica Bias - (Result/Expected)-1 as defined by ANSI N13.30.
 rptSTLRchQcSummary V5.2.18.1 U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or
 A2002 not identified by gamma scan software.

Date: 21-Dec-11

FORM I
SAMPLE RESULTS

Lab Name: TestAmerica
 Lot-Sample No.: J1J310453-1
 Client Sample ID: B2CP08
 SDG: W06305
 Report No.: 49906
 COC No.: F11-069-010
 Collection Date: 10/31/2011 11:27:00 AM
 Received Date: 10/31/2011 3:10:00 PM
 Matrix: WATER

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/Tox/Ucert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 1304193	906.0_H3_LSC											
H-3	7.78E+02		1.7E+02	1.8E+02	3.51E+02 pCi/L	1.67E+02	100%	(2.2)	12/18/11 03:19 p		0.00502	LSC8
								(8.5)			L	
Batch: 1304194	7196_CR6											
HEXCHROME	3.70E-03 U			0.0E+00	3.70E-03 mg/L	N/A	N/A	1.	10/31/11 04:30 p		100.0	MIL
								N/A				

No. of Results: 2 Comments:

TestAmerica MDC|MDA|Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
 rpt|STL|Rch|Sample U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdi, Total Uncert, CRDL, RDL or not identified by gamma scan software.
 V5.2.18.1 A2002

FORM II
 Date: 21-Dec-11

DUPLICATE RESULTS

Lab Name: TestAmerica
 Lot-Sample No.: J1J310453-1
 Client Sample ID: B2CP08
 SDG: W06305
 Report No.: 49906
 COC No.: F11-069-010
 Matrix: WATER
 Collection Date: 10/31/2011 11:27:00 AM
 Received Date: 10/31/2011 3:10:00 PM

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: 1304194	7196_CR6								Orig Sa DB ID: 9MNL110			
HEXCHROME	3.70E-03	U		0.0E+00	3.70E-03	mg/L	N/A	1.	10/31/11 04:30 P		100.0	
	3.70E-03	U	RPD 0.0			3.50E-01	N/A	N/A			MIL	

No. of Results: 1 Comments:

TestAmerica RPD - Relative Percent Difference.
 rptSTLRchDupV5.2 MDC\MDA,Le - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
 .18.1 A2002 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: 21-Dec-11

DUPLICATE RESULTS

Lab Name: TestAmerica
 Lot-Sample No.: J1J310453-1
 Client Sample ID: B2CP08 DUP

SDG: W06305
 Report No.: 49906
 COC No.: F11-069-010-

Collection Date: 10/31/2011 11:27:00 AM
 Received Date: 10/31/2011 3:10:00 PM
 Matrix: WATER

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: 1304193	906.0_H3_LSC		1.7E+02	1.8E+02	3.46E+02	pCi/L	100%	(2.1)	Orig Sa DB ID: 9MNL110	12/18/11 04:40 P	0.00504	LSC8
H-3	7.13E+02		RPD 8.8			4.00E+02	MNLLL1AF	MNLLL1FR			L	
	7.78E+02							(8.)				

No. of Results: 1 Comments:

TestAmerica RPD - Relative Percent Difference.
 rpt\$TLRchDupV5.2 MDC|MDA,Le - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
 .18.1 A2002

Date: 21-Dec-11

FORM II
BLANK RESULTS

Lab Name: TestAmerica
Matrix: WATER

SDG: W06305
Report No.: 49906

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: 1304194												
HEXCHROME	7196_CR6	U	3.70E-03	0.0E+00	3.70E-03	mg/L	N/A	1.	10/31/11 04:30 p	100.0	ML	LSC8
Work Order: MNLMR1AA												
Report DB ID: MNLMR1AB												
3.50E-01												
N/A												
Batch: 1304193												
H-3	906.0_H3_LSC	U	1.4E+02	1.5E+02	3.52E+02	pCi/L	100%	-0.35	12/18/11 06:02 p	0.00505	L	LSC8
Work Order: MNLMG1AA												
Report DB ID: MNLMG1AB												
1.68E+02 4.00E+02												
-(1.7)												
Batch: 1304193												
H-3	906.0_H3_LSC	U	1.4E+02	1.5E+02	3.53E+02	pCi/L	100%	-0.19	12/18/11 08:46 p	0.00501	L	LSC8
Work Order: MNLMG1AD												
Report DB ID: MNLMG1DX												
1.68E+02 4.00E+02												
-0.89												

No. of Results: 3

Comments:

TestAmerica MDC/MDA/Lc - Detection, Decision Level based on Instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
 rpt/STL/Rch/Blank 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.
 V5.2.18.1 A2002

Date: 21-Dec-11

FORM II
LCS RESULTS

Lab Name: TestAmerica SDG: W06305
Matrix: WATER Report No.: 49906

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: 1304194	7196_CR6												
HEXCHROME	5.12E-01		0.0E+00	3.70E-03	mg/L		N/A	5.00E-01		102%	10/31/11 04:30 p	100.0	
							Rec Limits:	70	130	0.0		ML	
Batch: 1304193	906.0_H3_LSC												
H-3	2.76E+03		2.3E+02	2.5E+02	3.50E+02	pCi/L	100%	2.72E+03	8.15E+01	102%	12/18/11 07:24 p	0.00501	LSC8
							Rec Limits:	70	130	0.0		L	
Batch: 1304193	906.0_H3_LSC												
H-3	3.03E+03		2.4E+02	2.6E+02	3.53E+02	pCi/L	100%	2.71E+03	8.13E+01	112%	12/18/11 10:08 p	0.00502	LSC8
							Rec Limits:	70	130	0.1		L	

No. of Results: 3 Comments:

TestAmerica Bias - (Result/Expected)-1 as defined by ANSI N13.30.
rptSTLRchLcs
V5.2.18.1 A2002

Date: 21-Dec-11

FORM II
MATRIX SPIKE RESULTS

Lab Name: TestAmerica TestAmerica SDG: W06305 Matrix: WATER
 Lot-Sample No.: J1J310453-1, B2CP08 Report No.: 49906

Parameter	SpikeResult, Orig Rst	Count Qual Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rec-covery	Expected, Uncert	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 1304194 HEXCHROME	2.71E-01 3.70E-03	MNLLL1AG	0.0E+00	MNLLL1CW	mg/L	N/A	102.98%	2.63E-01	10/31/11 04:30 p	100.0 ML	7196_CR6
Batch: 1304194 HEXCHROME	2.68E-01 2.71E-01	MNLLL1AH	0.0E+00	MNLLL1DW	mg/L	N/A	101.84%	2.63E-01	10/31/11 04:30 p	100.0 ML	7196_CR6

Number of Results: 2

Comments:

TestAmerica RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs))+sq(TPUd)] as defined by ICPT BOA.
 rpt\$TLRchMs Bias - (Result/Expected)-1 as defined by ANSI N13.30.
 V5.2.18.1 A2002

Lot No., Due Date: J1J310453; 12/15/2011
Client, Site: 108302; FLH HANFORD
QC Batch No., Method Test: 1304193; TRITIUM H-3 by LSC
SDG, Matrix: W06305; WATER

- 1.0 COC
 - 1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions? Yes No N/A ✓
- 2.0 QC Batch
 - 2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet? Yes No N/A ✓
 - 2.2 Are the QC appropriate for the analysis included in the batch? Yes No N/A ✓
 - 2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc? Yes No N/A ✓
 - 2.4 Does the Worksheets include a Tracer Vial label for each sample? Yes No N/A ✓
- 3.0 QC & Samples
 - 3.1 Is the blank results, yield, and MDA within contract limits? Yes No N/A ✓
 - 3.2 Is the LCS result, yield, and MDA within contract limits? Yes No N/A ✓
 - 3.3 Are the MS/MSD results, yields, and MDA within contract limits? Yes No N/A ✓
 - 3.4 Are the duplicate result, yields, and MDAs within contract limits? Yes No N/A ✓
 - 3.5 Are the sample yields and MDAs within contract limits? Yes No N/A ✓
- 4.0 Raw Data
 - 4.1 Were results calculated in the correct units? Yes No N/A ✓
 - 4.2 Were analysis volumes entered correctly? Yes No N/A ✓
 - 4.3 Were Yields entered correctly? Yes No N/A ✓
 - 4.4 Were spectra reviewed/meet contractual requirements? Yes No N/A ✓
 - 4.5 Were raw counts reviewed for anomalies? Yes No N/A ✓
- 5.0 Other
 - 5.1 Are all nonconformances included and noted? Yes No N/A ✓
 - 5.2 Are all required forms filled out? Yes No N/A ✓
 - 5.3 Was the correct methodology used? Yes No N/A ✓
 - 5.4 Was transcription checked? Yes No N/A ✓
 - 5.5 Were all calculations checked at a minimum frequency? Yes No N/A ✓
 - 5.6 Are worksheet entries complete and correct? Yes No N/A ✓
- 6.0 Comments on any No response:

First Level *John North* Date 12-20-11

DECEMBER 21, 2011



THE LEADER IN ENVIRONMENTAL TESTING

Data Review Checklist
RADIOCHEMISTRY
Second Level Review

Batch Number: 130 4193

Review Item	Yes (✓)	No (✓)	NA (✓)
A. Sample Analysis			✓
1. Are the sample yields within acceptance criteria?			
2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓		
3. Are the correct isotopes reported?	✓		
B. QC Samples			
1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓		
2. Does the blank result meet the Contract criteria?	✓		
3. Is the blank result < the Contract Detection Limit?	✓		
4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓
5. Is the LCS recovery within contract acceptance criteria?	✓		
6. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓		
7. Do the MS/MSD results and yields meet acceptance criteria?			✓
8. Do the duplicate sample results and yields meet acceptance criteria?	✓		
C. Other			
1. Are all Non-conformances included and noted?			✓
2. Are all required forms filled out?	✓		
3. Was the correct methodology used?	✓		
4. Was transcription checked?	✓		
5. Were all calculations checked at a minimum frequency?	✓		
6. Were units checked?	✓		

Comments on any "No" response: _____

Second Level Review: Jodie C

Date: 12/21/11

LS-038B, Rev. 10, 9/07

DECEMBER 21, 2011



**Richland Laboratory
Data Review Check List
Hexavalent Chromium**

Batch Number(s): 1299194				
Lab Sample Numbers or SDG: W06305				
Method/Test/Parameter: Cr+6 in Water / RL-WC-003				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Initial Calibration				
1. Performed at required frequency with required number of levels?	✓			✓
2. Correlation coefficient within QC limits?	✓			✓
3. Initial calibration verification (ICV) analyzed immediately after calibration and results within QC limits?	✓			✓
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 QC limits?	✓			✓
2. CCB analyzed at required frequency and all results ≤ reporting limit?	✓			✓
C. Sample Analysis				
1. Were any samples with concentrations above the linear range for any parameter diluted and reanalyzed?			✓	✓
2. Were all sample holding times met?	✓			✓
D. QC Samples				
1. All results for the preparation blank below limits?	✓			✓
2. MS or MS/MSD recoveries within QC limits and %RPD (for MSD) acceptable?	✓			✓
3. LCS percent recovery within QC limits and %RPD (for LCSD) acceptable?	✓			✓
4. Analytical spikes within QC limits where applicable?	✓			✓
5. ICP only: One serial dilution performed per SDG?			✓	✓
6. ICP only: CRDL standard (CRI or CRA) analyzed at required frequency?			✓	✓
7. ICP only: Interference check samples (ICSA, ICSAB) and HICAL analyzed at the required frequencies and within QC limits?			✓	✓

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Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
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:

Analyst: H. Rahavj

Date: 10-31-11

Second-Level Review: [Signature]

Date: 10/31/11

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F11-069-010-8	PAGE 1 OF 1
COLLECTOR <i>Krusc RUST</i>	COMPANY CONTACT STINNETT, MW	TELEPHONE NO. 373-5940	PROJECT COORDINATOR STINNETT, MW	PRICE CODE 7N	DATA TURNAROUND 45 Days / 45 Days
SAMPLING LOCATION C8095 (299-W22-90); L-009	PROJECT DESIGNATION 200-UP-1 Remedial Wells - Groundwater	FIELD LOGBOOK NO. HNF-N-645-1-0836	SAF NO. F11-069	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT GOVERNMENT VEHICLE
ICE CHEST NO.	ACTUAL SAMPLE DEPTH 211.8 FT	COA 300191ES10	BILL OF LADING/AIR BILL NO. N/A	ORIGINAL	
SHIPPED TO Waste-Sampling & Characterization 10-31-11	OFFSITE PROPERTY NO. N/A	<p><i>SDGH W06305</i></p> <p><i>LOT# J1J310453</i></p> <p><i>DVE</i></p> <p><i>CK 60-3111</i></p> <p><i>Due 12/15/11</i></p>			
MATRIX* A=Air DL=Drum L=Liquid S=Solid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	PRESERVATION H2O or H2SO4 to pH <2 14 Days	HN03 to pH <2 6 Months	Cool--4C 48 Hours	None	6 Months
POSSIBLE SAMPLE HAZARDS/ REMARKS Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)	HOLDING TIME 3	AG* 3	P 1	G 1	G 1
SPECIAL HANDLING AND/OR STORAGE	TYPE OF CONTAINER 40mL	250mL	500mL	60mL	250mL
	NO. OF CONTAINER(S)	SEE IBA (1) IN SPECIAL INSTRUCTIONS	Chromium Hex. - 7196;	IC Analysis - 300.0 (Nitrogen in Nitrate);	Tribium - Ion Ex.
	SAMPLE DATE	10-31-11	11-27	N/A	N/A
	MATRIX*	WATER			

M N L L L

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM <i>Ed Krusc</i>	DATE/TIME 10-31-11 1230	RECEIVED BY/STORED IN <i>M N L L L</i>	DATE/TIME 10-31-11 1230	** The CACN for all analytical work at WSCF laboratory is 402813ES20.	
RELINQUISHED BY/REMOVED FROM <i>M N L L L</i>	DATE/TIME 10-31-11 1510	RECEIVED BY/STORED IN <i>Carly King</i>	DATE/TIME 10-31-11 1510	** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(1) VOA - 8260 (TCL) {Carbon tetrachloride, Trichloroethene};	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(2) ICP/MS - 200.8 (TAL) {Chromium}; ICP/MS - 200.8 (Add-on) {Uranium};	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TITLE	
LABORATORY SECTION	RECEIVED BY	DISPOSED BY		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DATE/TIME		DATE/TIME	

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Sample Check-in List

Date/Time Received: 10-31-11 1510 Container GM Screen Result: (Airlock) .07 Initials [CK]
Sample GM Screen Result (Sample Receiving) .07 Initials [CK]

Client: FLH SDG #: W06305 NA [] SAF #: F11-069 NA []

Lot Number: J1J310453

Chain of Custody # F11-069-010-B

Shipping Container ID: hand delivery NA [CK] Air Bill Number: NA [CK]

Samples received inside shipping container/cooler/box Yes [CK] 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 [CK]
2. Custody Seals dated and signed? Yes [] No [] No Custody Seal [CK]
3. Cooler temperature: 3 °C NA [CK]
4. Vermiculite/packing materials is NA [] Wet [] Dry [CK]

Item 5 through 16 for samples. Initial appropriate response.

- 5. Chain of Custody record present? Yes [CK] No [CK]
6. Number of samples received (Each sample may contain multiple bottles): 2 1
7. Containers received: 2 (500ml & 250ml)

8. Sample holding times exceeded? NA [] Yes [] No [CK]

9. Samples have: OK tape OK hazard labels
OK custody seals OK appropriate sample labels

10. Matrix: A (FLT, Wipe, Solid, Soil) OK I (Water)
S (Air, Niosh 7400) T (Biological, Ni-63)

11. Samples: OK 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 [CK] No [] NA []
(If acidification is necessary, then document sample ID, initial pH, amount of HNO3 added and pH after addition on table overleaf)
RPL ID # of preservative used: N/A

13. Were any anomalies identified in sample receipt? Yes [] No [CK]

14. Description of anomalies (include sample numbers): NA [CK]

Sample Preparation/Analysis														
11/1/2011 2:31:46 PM	Balance Id:													
108302, CH2M Hilli Plateau Remediation DOE RL Waste Management Federal Servi	Pipet #:													
AR H-3 Prp/Sep LSC005 S6 Tritium by Liquid Scint	Sep1 DT/Tm Tech:													
5I CLIENT: HANFORD	Sep2 DT/Tm Tech:													
PM, Quote: SS, 29754	Prep Tech:													
Batch: 1304193 WATER SEQ Batch, Test None	pCi/L													
All Tests: 1304193 ARS6, 1304194 88EA,														
Work Ord, Lot, Sample Date	Total Amt/Unit	Total Acidified/Unit	Initial Aliquot Amt/Unit	Adj Aliq Amt (Un-Acidified)	QC Tracer Prep Date	QC Tracer Yield	Tracer Yield	Dish Size	Ppt or Geometry	Count Time Min	Detector Id	Count On Off (24hr) Circle	CR Analyst, Init/Date	Comments:
1 MNLL-1-AA														
J1J310453-1-SAMP														
10/31/2011 11:27														Beta:
2 MNLL-1-AF-X														
J1J310453-1-DUP														
10/31/2011 11:27														Beta:
3 MNLMG-1-AA-B														
J1J310000-193-BLK														
11/01/2011 14:31 pd														Beta:
4 MNLMG-1-AC-C														
J1J310000-193-LCS														
11/01/2011 14:31 pd														Beta:
5 MNLMG-1-AD-BX														
J1J310000-193-MBLK														
11/01/2011 14:31 pd														Beta:
6 MNLMG-1-AE-CW														
J1J310000-193-MLCS														
11/01/2011 14:31 pd														Beta:
7 MNLMG-1-AF-BN														
J1J310000-193-IBLK														
11/01/2011 14:31 pd														Beta:

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

<p>11/1/2011 2:31:47 PM Sample Preparation/Analysis Balance Id: _____ Pipet #: _____</p> <p>AR H-3 Prr/Sep LSC005 S6 Tritium by Liquid Scint 51 CLIENT: HANFORD</p> <p>AnalyDueDate: 12/15/2011 Batch: 1304193 SEQ Batch, Test: None</p> <p>Initial Aliquot Amt/Unit: _____ Total Amt/Unit: _____ Total Acidified/Unit: _____</p> <p>QC Tracer Prep Date: _____ QC Tracer Amt (Un-Acidified): _____ Adj Aliq Amt (Un-Acidified): _____</p> <p>Tracer Yield: _____ Dish Size: _____ Ppt or Geometry: _____</p> <p>Count Time Min: _____ Detector Id: _____ Count On Off (24hr) Circle: _____</p> <p>Prep Tech: _____ CR Analyst, In/Date: _____</p> <p>Comments: _____</p>																																																															
<p>8 MNLMG-1-AG-BN</p> <p>J1J310000-193-IBLK</p> <p>11/01/2011 14:31 pd</p> <p>AmRec: _____ #Containers: 1</p> <p>Scr: _____ Alpha: _____ Beta: _____</p>																																																															
<p>Comments:</p> <p>All Clients for Batch: 108302, CH2M Hill Plateau Remediation DOE RL Waste Management Federal Servi, SS , 29754</p>																																																															
<p>Uncert Level List:</p> <table border="1"> <thead> <tr> <th>Constituent</th> <th>Unit</th> <th>Decay to SaDt</th> <th>Blk Subt.</th> <th>Sci. Not.</th> <th>ODRs</th> </tr> </thead> <tbody> <tr> <td>H-3 RDL:400</td> <td>pCi/L</td> <td>Y</td> <td>N</td> <td>Y</td> <td>B</td> </tr> <tr> <td>MNLMGLAA-BLK</td> <td>pCi/L</td> <td>Y</td> <td>N</td> <td>Y</td> <td>B</td> </tr> <tr> <td>MNLMGLAC-LCS</td> <td>pCi/L</td> <td>Y</td> <td>N</td> <td>Y</td> <td>B</td> </tr> <tr> <td>H-3 RDL:400</td> <td>pCi/L</td> <td>Y</td> <td>N</td> <td>Y</td> <td>B</td> </tr> <tr> <td>MNLMGLAD-MBLK</td> <td>pCi/L</td> <td>Y</td> <td>N</td> <td>Y</td> <td>B</td> </tr> <tr> <td>MNLMGLAE-MLCS</td> <td>pCi/L</td> <td>Y</td> <td>N</td> <td>Y</td> <td>B</td> </tr> <tr> <td>MNLMGLAF-IBLK</td> <td>pCi/L</td> <td>Y</td> <td>N</td> <td>Y</td> <td>B</td> </tr> <tr> <td>MNLMGLAG-IBLK</td> <td>pCi/L</td> <td>Y</td> <td>N</td> <td>Y</td> <td>B</td> </tr> </tbody> </table>										Constituent	Unit	Decay to SaDt	Blk Subt.	Sci. Not.	ODRs	H-3 RDL:400	pCi/L	Y	N	Y	B	MNLMGLAA-BLK	pCi/L	Y	N	Y	B	MNLMGLAC-LCS	pCi/L	Y	N	Y	B	H-3 RDL:400	pCi/L	Y	N	Y	B	MNLMGLAD-MBLK	pCi/L	Y	N	Y	B	MNLMGLAE-MLCS	pCi/L	Y	N	Y	B	MNLMGLAF-IBLK	pCi/L	Y	N	Y	B	MNLMGLAG-IBLK	pCi/L	Y	N	Y	B
Constituent	Unit	Decay to SaDt	Blk Subt.	Sci. Not.	ODRs																																																										
H-3 RDL:400	pCi/L	Y	N	Y	B																																																										
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H-3 RDL:400	pCi/L	Y	N	Y	B																																																										
MNLMGLAD-MBLK	pCi/L	Y	N	Y	B																																																										
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MNLMGLAF-IBLK	pCi/L	Y	N	Y	B																																																										
MNLMGLAG-IBLK	pCi/L	Y	N	Y	B																																																										
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WO Cnt: 8
ICOC v4.8.49

11/1/2011 2:31:47 PM		Sample Preparation/Analysis		Balance Id:		Pipet #:	
AR H-3 Prp/Sep LSC005		S6 Tritium by Liquid Scint		Sep1 DT/Tm Tech:		Sep2 DT/Tm Tech:	
51 CLIENT: HANFORD		pCi/L		Prep Tech:			
Batch: 1304193		SEQ Batch, Test: None		Detector Id		Count On Off (24hr) Circle	
Work Ord, Lot, Sample Date		Total Amt/Unit		Dish Size		CR Analyst, Iniv/Date	
Initial Aliquot Amt/Unit		Total Acidified/Unit		Ppt or Geometry		Comments:	
Adj Aliq Amt (Un-Acidified)		Tracer Yield		Count Time Min			
QC Tracer Prep Date		Sci.Not.: Y		ODRs: B			
Blk Subt.: N		Decay to sadt: Y		Blk Subt.: N			
Uncert Level (#s): 2		Blk Subt.: N		Sci.Not.: Y			
ONTMGLAG-IBLK:							
TestAmerica		Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2		Page 3		WO Cnt: 8	
Richland Wa.		pd - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktalled Added		ISV - Insufficient Volume for Analysis		ICOC v4.8.49	

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12/20/2011 2:48:51 PM

ICOC Fraction Transfer/Status Report

ByDate: 12/20/2010, 12/25/2011, Batch: '1304193', User: *ALL Order By DateTimeAccepting

Q Batch	Work Ord	CurStatus	Accepting	Comments
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1304193

AC		Rev1C	DefordP	12/15/2011 12:17:05	
SC			wagarr	IsBatched 11/1/2011 2:33:35 PM	ICOC_RADCALC v4.8.49
SC			DefordP	Sep1C 12/15/2011 12:17:05 PM	RL-LSC-005 REV. 2
SC			WagnerF	Sep1C 12/15/2011 12:17:30 PM	RL-LSC-005 REV. 2
SC			ClarkR	InCnt1 12/15/2011 12:32:36 PM	RL-CI-005 REV. 2
SC			HiattC	CalcC 12/19/2011 6:35:57 PM	RL-CI-005 REV. 2
SC			nortonj	Rev1C 12/20/2011 2:48:41 PM	RL-DR-001 Rev 2
AC			WagnerF	12/15/2011 12:17:30	
AC			ClarkR	12/15/2011 12:32:36	
AC			HiattC	12/19/2011 6:35:57	
AC			nortonj	12/20/2011 2:48:41	

AC: Accepting Entry; SC: Status Change

TestAmerica Richland

Richland Wa.

Page 1

Grp Rec Cnt: 5

ICOCFractions v4.8.44

Sample Preparation/Analysis									
10/31/2011 5:14:13 PM	108302, CH2M Hill Plateau Remediation DOE RL Waste Management Federal Servi	Balance Id:	88 NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION	Pipet #:					
Batch: 1304194	WATER	PM, Quote: SS, 29754	EA Chromium, Hexavalent (7196A)	Sep1 DT/Tm Tech:					
SEQ Batch, Test: None	ug/L		01 STANDARD TEST SET	Sep2 DT/Tm Tech:					
Work Order, Lot, Sample Date Time	Total Amt/Unit	Initial Aliquot Amt/Unit	GC Tracer Prep Date	Count Time Min	Detector Id	Count On Off (24hr) Circle	CR Analyst, Init/Date	Comments:	
1 MNULL-1-AC									
J1J310453-1-SAMP									
10/31/2011 11:27								Alpha:	Beta:
2 MNULL-1-AG-S									
J1J310453-1-MS									
10/31/2011 11:27								Alpha:	Beta:
3 MNULL-1-AH-D									
J1J310453-1-MSD									
10/31/2011 11:27								Alpha:	Beta:
4 MNULL-1-AJ-X									
J1J310453-1-DUP									
10/31/2011 11:27								Alpha:	Beta:
5 MNLMR-1-AA-B									
J1J310000-194-BLK									
10/31/2011 17:14 pd								Alpha:	Beta:
6 MNLMR-1-AC-C									
J1J310000-194-LCS									
10/31/2011 17:14 pd								Alpha:	Beta:

10/31/2011 5:14:13 PM		Sample Preparation/Analysis				Balance Id:	
		88 NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION				Pipet #:	
		EA Chromium, Hexavalent (7196A)				Sep1 DT/Tm Tech:	
		01 STANDARD TEST SET				Sep2 DT/Tm Tech:	
AnalyteDueDate: 12/15/2011		ug/L				Prep Tech:	
Batch: 1304194						CR Analyst, Init/Date	
SEQ Batch, Test: None						Comments:	
Work Order, Lot, Sample Date/Time	Total Amt/Unit	Initial Aliquot Amt/Unit	QC Tracer Prep Date	Count Time Min	Detector Id	Count On Off (24hr) Circle	
Comments:							
All Clients for Batch:							
108302, CH2M Hill Plateau Remediation DOE RL Waste Management Federal Servi, SS , 29754							
MNLMLIAC-SAMP Constituent List:							
MNLMLIAG-MS Constituent List:							
MNLMLIAE-MSD:							
MNLMLIAA-BLK:							
MNLMLIAC-LCS:							
MNLMLIAC-SAMP Calc Info:							
Uncert Level (#s):	2	Decay to Sadt:	Y	Blk Subst.:	N	Sci. Not.:	Y ODRs: B
MNLMLIAG-MS Calc Info:							
Uncert Level (#s):	2	Decay to Sadt:	Y	Blk Subst.:	N	Sci. Not.:	Y ODRs: B
MNLMLIAE-MSD:							
Uncert Level (#s):	2	Decay to Sadt:	Y	Blk Subst.:	N	Sci. Not.:	Y ODRs: B
MNLMLIAA-BLK:							
Uncert Level (#s):	2	Decay to Sadt:	Y	Blk Subst.:	N	Sci. Not.:	Y ODRs: B
MNLMLIAC-LCS:							
Uncert Level (#s):	2	Decay to Sadt:	Y	Blk Subst.:	N	Sci. Not.:	Y ODRs: B
TestAmerica		Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2		Page 2		Page 2	
Richland Wa.		pg - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added		ISV - Insufficient Volume for Analysis		WO Cnt: 6	
						ICOC v4.8.49	