

Analytical Data Package Prepared For
Washington Closure Hanford



Radiochemical Analysis By

TAL Richland

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

Assigned Laboratory Code: STLRL

Data Package Contains 18 Pages

Report No.: 38490

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
J00159	RC-030	J169R1	J8B140272-1	KG46J1AA	9KG46J10	J00159
		J169R2	J8B140272-2	KG46K1AA	9KG46K10	J00159
		J169R3	J8B140272-3	KG46L1AA	9KG46L10	J00159

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Certificate of Analysis

Washington Hanford Closure
2620 Fermi Avenue
Richland, WA 99354

March 3, 2008

Attention: Joan Kessner

SAF Number	:	RC-030
Date SDG Closed	:	February 14, 2008
Number of Samples	:	Three (3)
Sample Type	:	Other Solid
SDG Number	:	J00159
Data Deliverable	:	15 Day

CASE NARRATIVE

I. Introduction

On February 14, 2008 three water samples were received at STL Richland (STLR) for chemical analysis. Upon receipt, the samples were assigned the following laboratory ID number to correspond with the Washington Closure Hanford (WCH) specific ID:

<u>WCH ID#</u>	<u>STLR ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
J169R1	KG46J	OTHER SOLID	2/14/08
J169R2	KG46K	OTHER SOLID	2/14/08
J169R3	KG46L	OTHER SOLID	2/14/08

I. 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:

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

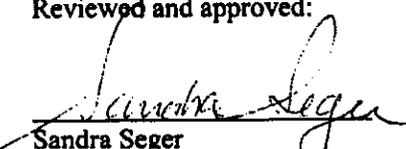
Chemical Analysis

Hexavalent Chromium by EPA method 7196A:

The LCS, batch blank, sample, sample duplicate (J169R1) and sample matrix spike (J169R1) 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)	STL Richland's SOP number
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 00-02	Gross Alpha (Coprecipitation)	RICH-RC-5021
EPA 903.0	Total Alpha Radium (Ra-226)	RICH-RC-5027
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr-89/90	RICH-RC-5006
ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007

Uncertainty Estimation

Test America 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 $(\text{Result}/\text{Expected}) - 1$ as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or STL Richland.
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 STL Richland "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%. $Lc = (1.645 * \text{Sqrt}(2 * (\text{BkgndCnt}/\text{BkgndCntMin})/\text{SCntMin})) * (\text{ConvFct}/(\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol}) * \text{IngrFct})$. 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%. $MDC = (4.65 * \text{Sqrt}((\text{BkgndCnt}/\text{BkgndCntMin})/\text{SCntMin}) + 2.71/\text{SCntMin}) * (\text{ConvFct}/(\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol}) * \text{IngrFct})$. 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 4321 C 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 = $(S-D)/\{\text{sqrt}(\text{TPUs}^2 + \text{TPUd}^2)\}$ 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 STL Richland 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: 03-Mar-08

TAL Richland STLRL

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

Report No. : 38490

SDG No: J00159

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDC or MDA	CRDL	RPD
J00159	7196_CR6								
	J169R1								
	KG46J1AA	HEXCHROME	3.50E-01 +- 0.00E+00	U	mg/kg	N/A	3.50E-01	3.50E-01	
	KG46J1AE	HEXCHROME	3.50E-01 +- 0.00E+00	U	mg/kg	N/A	3.50E-01	3.50E-01	0.0
	J169R2								
	KG46K1AA	HEXCHROME	3.50E-01 +- 0.00E+00	U	mg/kg	N/A	3.50E-01	3.50E-01	
	J169R3								
	KG46L1AA	HEXCHROME	1.51E+00 +- 0.00E+00		mg/kg	N/A	3.50E-01	3.50E-01	
No. of Results: 4									

TAL Richland
rptSTLRchSaSum
mary2 V5.1.5
A2002

RPD - Relative Percent Difference.

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

QC Results Summary
TAL Richland STLRL
 Ordered by Method, Batch No, QC Type..

Date: 03-Mar-08

Report No. : 38490

SDG No.: J00159

Batch	Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDC MDA
7196_CR8									
J00159	MATRIX SPIKE, J169R1								
	KG46J1AC	HEXCHROME	7.53E+00 +/- 0.00E+00		mg/kg	N/A	74%	-0.3	3.50E-01
J00159	BLANK QC,								
	J00159BL	HEXCHROME	3.50E-01 +/- 0.00E+00	U	mg/kg	N/A			3.50E-01
J00159	LCS,								
	J00159LC	HEXCHROME	1.93E+01 +/- 0.00E+00		mg/kg	N/A	97%	0.0	3.50E-01
No. of Results: 3									

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

rptSTLRchQcSummary V5.1.5 A2002 U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by gamma scan software.

FORM I

Date: 03-Mar-08

SAMPLE RESULTS

Lab Name: TA Richland
 Lot-Sample No.: J8B140272-1
 Client Sample ID: J169R1

SDG: J00159
 Report No. : 38490
 COC No. : RC-030-074

Collection Date: 2/14/2008 11:50:00 AM
 Received Date: 2/14/2008 3:00:00 PM
 Matrix: OTHER SOLI OTHERSOLID

Ordered by Client Sample ID, Batch No.

Parameter	Result	Count Qual	Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Allquot Size	Primary Detector
Batch: J00159	7196_CR6				Work Order: KG46J1AA		Report DB ID: 9KG46J10					
HEXCHROME	3.50E-01	U		0.0E+00	3.50E-01	mg/kg	N/A	(1.)	2/14/08		2.5	
							3.50E-01	N/A			G	

No. of Results: 1 Comments:

FORM I

Date: 03-Mar-08

SAMPLE RESULTS

Lab Name: TA Richland

SDG: J00159

Collection Date: 2/14/2008 12:10:00 PM

Lot-Sample No.: J8B140272-2

Report No.: 38490

Received Date: 2/14/2008 3:00:00 PM

Client Sample ID: J169R2

COC No.: RC-030-074

Matrix: OTHER SOLI OTHERSOLID

Ordered by Client Sample ID, Batch No.

Parameter	Result	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Allquot Size	Primary Detector
Batch: J00159	7196_CR6			Work Order: KG46K1AA		Report DB ID: 9KG46K10					
HEXCHROME	3.50E-01	U	0.0E+00	3.50E-01	mg/kg	N/A	(1.)	2/14/08		2.5	
						3.50E-01	N/A			G	

No. of Results: 1

Comments:

FORM I

Date: 03-Mar-08

SAMPLE RESULTS

Lab Name: TA Richland

SDG: J00159

Collection Date: 2/14/2008 12:15:00 PM

Lot-Sample No.: J8B140272-3

Report No.: 38490

Received Date: 2/14/2008 3:00:00 PM

Client Sample ID: J169R3

COC No.: RC-030-074

Matrix: OTHER SOLI OTHERSOLID

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: J00159	7196_CR6				Work Order: KG46L1AA		Report DB ID: 9KG46L10					
HEXCHROME	1.51E+00			0.0E+00	3.50E-01	mg/kg	N/A	(4.3)	2/14/08		2.5	
							3.50E-01	N/A			G	

No. of Results: 1

Comments:

FORM II

Date: 03-Mar-08

DUPLICATE RESULTS

Lab Name: TA Richland
 Lot-Sample No.: J8B140272-1
 Client Sample ID: J169R1

SDG: J00159
 Report No.: 38490
 COC No.: RC-030-074

Collection Date: 2/14/2008 11:50:00 AM
 Received Date: 2/14/2008 3:00:00 PM
 Matrix: OTHER SOLI OTHERSOLID

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: J00159	7196_CR6			Work Order: KG46J1AE		Report DB ID: KG46J1ER		Orig Sa DB ID: 9KG46J10				
HEXCHROME	3.50E-01	U		0.0E+00	3.50E-01	mg/kg	N/A	(1.)	2/14/08		25	
	3.50E-01	U		RPD 0.0		3.50E-01		N/A			G	

No. of Results: 1 Comments:

TAL Richland RPD - Relative Percent Difference.
 rptSTLRchDupV5.1 MDC|MDA,Le - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
 .5 A2002 ! Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by gamma scan software.

FORM II
BLANK RESULTS

Date: 03-Mar-08

Lab Name: TA Richland
Matrix: OTHER SOLID

SDG: J00159

Report No. : 38490

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: J00159	7196_CR6			Work Order: J00159BL		Report DB ID: J00159BLK						
HEXCHROME	3.50E-01	U		0.0E+00	3.50E-01	mg/kg	N/A	(1.) N/A	2/14/08		2.5 G	

No. of Results: 1 Comments:

FORM II
LCS RESULTS

Date: 03-Mar-08

Lab Name: TA Richland
Matrix: OTHER SOLIDSDG: J00159
Report No. : 38490

Parameter	Result	Count Qual Error (2 s)	Total Uncert(2 s)	MDC MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: J00159	7196_CR6			Work Order: J00159LC			Report DB ID: J00159LCS					
HEXCHROME	1.93E+01		0.0E+00	3.50E-01	mg/kg	N/A	2.00E+01		97%	2/14/08	2.5	
						Rec Limits:			0.0		G	
No. of Results:	1	Comments:										

FORM II

Date: 03-Mar-08

MATRIX SPIKE RESULTS

Lab Name: TA Richland

SDG: J00159

Lot-Sample No.: J8B140272-1, J169R1

Report No.: 38490

Matrix: OTHER SOLI OTHERSOLID

Parameter	SpikeResult, Orig Rst	Count Qual Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rec- overy	Exp- ected	Exp Uncert	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: J00159	Work Order: KG46J1AC	Report DB ID: KG46J1CW	Orig Sa DB ID: 9KG46J10									
HEXCHROME	7.53E+00	0.0E+00	3.50E-01	mg/kg	N/A	73.54%	1.02E+01	2/14/08			2.5	7196_CR6
	3.50E-01										G	

Number of Results: 1

Comments:

Batch Number(s): <u>8059445 J00159 SKS313/08</u>				
Lab Sample Numbers or SDG: <u>J00159</u>				
Method/Test/Parameter: <u>Cr+6 in SOLID / RICII-WC-5005, Rev 8</u>				
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?			✓	/

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?	✓			/

Analyst: *Steven E. Whitland*
 Second-Level Review: *Jodie C.*

Date: 2/28/08
 Date: 3/3/08

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-030-074	Page 1 of 1
Collector Welch/Kochling <i>Etherington</i>		Company Contact Matt Perrott		Telephone No. 372-9088		Project Coordinator KESSNER, JH	
Project Designation Remaining Sites Confirmation Sampling - Other Solid		Sampling Location 100-F-45		SAF No. RC-030		Price Code 9C Data Turnaround 15 Days	
Ice Chest No.		Field Logbook No. EL-1601-2		COA C00F45A000		Method of Shipment	
Shipped To TestAmerica Incorporated, Richland		Offsite Property No.		Bill of Lading/Air Bill No.			
POSSIBLE SAMPLE HAZARDS/REMARKS		Preservation		Cool -C			
Special Handling and/or Storage		Type of Container		G/P			
		No. of Container(s)		1			
		Volume		60ml.			
SAMPLE ANALYSIS		Chevron Hex - 7196					
Sample No.	Matrix *	Sample Date	Sample Time				
J169R1 #5	OTHER SOLID	2/14/08	1150	X	KG 46J		
J169R2 #6	OTHER SOLID	2/14/08	1210	X	KG 46K		
J169R3 #7	OTHER SOLID	2/14/08	1215	X	KG 46L		
J169R4	OTHER SOLID						
J169R5	OTHER SOLID	2/14/08					
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS	
Relinquished By/Removed From <i>[Signature]</i>		Date/Time 2-14-08 1400		Received By/Stored In <i>[Signature]</i>		Date/Time 2/14/08 1400	
Relinquished By/Removed From <i>[Signature]</i>		Date/Time 2/14/08 1500		Received By/Stored In <i>[Signature]</i>		Date/Time 2-14-08 1500	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
LABORATORY SECTION		Received By		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time	
						Matrix *	
						S=Soil SE=Soilment SO=Soil SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Trash Wt=Wipe L=Liquid V=Vegetation X=Other	



Sample Check-in List DUE 2-29-08

Date/Time Received: 2-14-08 1500 GM Screen Result 0.2K

Client: WCH SDG #: J00159 NA [] SAF #: RC-030 NA []

Work Order Number: J8B140272 Chain of Custody # RC-030-074

Shipping Container ID: _____ Air Bill # _____

- 1. Custody Seals on shipping container intact? NA [] Yes No []
- 2. Custody Seals dated and signed? NA [] Yes No []
- 3. Chain of Custody record present? NA [] Yes No []
- 4. Cooler Temperature: _____ NA 5. Vermiculite/packing materials is NA Wet [] Dry []
- 6. Number of samples in shipping container: 3
- 7. Sample holding times exceeded? NA Yes [] No []
- 8. Samples have:
 - _____ Tape
 - Custody Seals
 - _____ Hazard Lables
 - Appropriate Sample Lables
- 9. Samples are:
 - In Good Condition
 - _____ Broken
 - _____ Leaking
 - _____ Have Air Bubbles
 - (Only for samples requiring no head space.)
- 10. Sample pH taken? ^{SOLID} NA pH<2 [] pH>2 [] pH>9 [] Amount HNO₃ Added _____
- 11. Sample Location, Sample Collector Listed? *
*For documentation only. No corrective action needed.
- 12. Were any anomalies identified in sample receipt? Yes [] No
- 13. Description of anomalies (include sample numbers): _____

Sample Custodian: [Signature] Date: 2-14-08

Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on _____ by _____ Person Contacted _____

[] No action necessary; process as is.

Project Manager _____ Date _____