

Analytical Data Package Prepared For
Washington Closure Hanford



Radiochemical Analysis By
STL Richland

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

Assigned Laboratory Code: STLRL

Data Package Contains 30 Pages

Report No.: 31214

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
J00053	RC-048	J111K7	J6A190355-3	HV05A1AA	9HV05A10	6019567
		J111L0	J6A190355-6	HV05F1AA	9HV05F10	6019567
		J111M7	J6A190355-5	HV05E1AA	9HV05E10	6019567
		J111M8	J6A190355-4	HV05C1AA	9HV05C10	6019567
		J111P7	J6A190355-2	HV0481AA	9HV04810	6019567
		J111P8	J6A190355-1	HV0471AA	9HV04710	6019567

Certificate of Analysis

Washington Closure Hanford
3190 George Washington Way
Richland, WA 99354

January 31, 2005

Attention: Joan Kessner

SAF Number	:	RC-048
Date SDG Closed	:	January 19, 2006
Number of Samples	:	Six (6)
Sample Type	:	Water
SDG Number	:	J00053
Data Deliverable	:	45-Day / Summary

CASE NARRATIVE

I. Introduction

On January 19, 2006, six water samples were received at STL Richland (STLR) for chemistry 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>
J111P8	HV047	WATER	01/19/06
J111P7	HV048	WATER	01/19/06
J111K7	HV05A	WATER	01/19/06
J111M8	HV05C	WATER	01/19/06
J111M7	HV05E	WATER	01/19/06
J111L0	HV05F	WATER	01/19/06

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

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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 matrix spike (J111K7), matrix spike duplicate (J111K7) and sample duplicate (J111K7) 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:



Hans Carman
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 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr89/90	RICH-RC-5006
ASTM D2460	Total Radium	RICH-RC-5027
Standard Method 7500-U-C & ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007
NOTE:		
The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative)		
The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative)		

Uncertainty Estimation

STL 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, $R = \text{constants} * f(x,y,z,...)$. 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 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) <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 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 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 = $(S-D)/[\text{sqrt}(\text{TPUs}^2 + \text{TPUd}^2)]$ 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: 27-Jan-06

STL Richland STLR

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

Report No. : 31214

SDG No: J00053

Batch	Client Id Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Yield	MDC or MDA	CRDL	RPD
6019567	7196_CR6								
	J111K7								
	HV05A1AA	HEXCHROME	2.00E-03 +/- 0.0E+00	U	mg/L	N/A	2.00E-03	2.00E-03	
	HV05A1AE	HEXCHROME	2.00E-03 +/- 0.0E+00		mg/L	N/A	2.00E-03	2.00E-03	0.0
	J111L0								
	HV05F1AA	HEXCHROME	2.00E-03 +/- 0.0E+00	U	mg/L	N/A	2.00E-03	2.00E-03	
	J111M7								
	HV05E1AA	HEXCHROME	2.00E-03 +/- 0.0E+00	U	mg/L	N/A	2.00E-03	2.00E-03	
	J111M8								
	HV05C1AA	HEXCHROME	2.00E-03 +/- 0.0E+00	U	mg/L	N/A	2.00E-03	2.00E-03	
	J111P7								
	HV0481AA	HEXCHROME	2.00E-03 +/- 0.0E+00	U	mg/L	N/A	2.00E-03	2.00E-03	
	J111P8								
	HV0471AA	HEXCHROME	2.00E-03 +/- 0.0E+00	U	mg/L	N/A	2.00E-03	2.00E-03	
No. of Results:		7							

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rptSTLRchSaSummary2 V4.14.4 A97

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
STL Richland STLRL
 Ordered by Method, Batch No, QC Type,.

Date: 27-Jan-06

Report No. : 31214

SDG No.: J00053

Batch	Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Yield	Recovery	Bias	MDCjMDA
7196_CR6	6019567	MATRIX SPIKE							
	HV05A1AC	HEXCHROME	5.55E-01 +- 0.0E+00		mg/L	N/A	106%	0.1	2.00E-03
	HV05A1AD	HEXCHROME	5.57E-01 +- 0.0E+00		mg/L	N/A	106%	0.1	2.00E-03
	6019567	LCS							
	HV0571AC	HEXCHROME	5.27E-01 +- 0.0E+00		mg/L	N/A	105%	0.1	2.00E-03
	6019567	BLANK QC							
	HV0571AA	HEXCHROME	2.00E-03 +- 0.0E+00	U	mg/L	N/A			2.00E-03
No. of Results: 4									

STL Richland Bias - (Result/Expected)-1 as defined by ANSI N13.30.
 rptSTLRchQcSummary V4.14.4 A97 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: 27-Jan-06

SAMPLE RESULTS

Lab Name: STL Richland

SDG: J00053

Collection Date: 1/19/2006 10:00:00 AM

Lot-Sample No.: J6A190355-3

Report No.: 31214

Received Date: 1/19/2006 4:00:00 PM

Client Sample ID: J111K7

COC No.: RC-048-147

Matrix: WATER

Ordered by Client Sample ID, Batch No.

Parameter	Result	Count 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	Allquot Size	Primary Detector
Batch: 6019567	7196_CR6			Work Order: HV05A1AA			Report DB ID: 9HV05A10					
HEXCHROME	2.00E-03	U		0.0E+00	2.00E-03	mg/L	N/A	1.	1/19/06		100.0	
							2.00E-03	N/A			ML	

No. of Results: 1

Comments:

FORM I
SAMPLE RESULTS

Date: 27-Jan-06

Lab Name: STL Richland

SDG: J00053

Collection Date: 1/19/2006 9:00:00 AM

Lot-Sample No.: J6A190355-6

Report No.: 31214

Received Date: 1/19/2006 4:00:00 PM

Client Sample ID: J111L0

COC No.: RC-048-150

Matrix: WATER

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: 6019567	7196_CR6				Work Order: HV05F1AA		Report DB ID: 9HV05F10					
HEXCHROME	2.00E-03	U		0.0E+00	2.00E-03	mg/L	N/A	1.	1/19/06		100.0	
							2.00E-03	N/A			ML	

No. of Results: 1

Comments:

FORM I
SAMPLE RESULTS

Date: 27-Jan-06

Lab Name: STL Richland

SDG: J00053

Collection Date: 1/19/2006 12:30:00 PM

Lot-Sample No.: J6A190355-5

Report No. : 31214

Received Date: 1/19/2006 4:00:00 PM

Client Sample ID: J111M7

COC No. : RC-048-154

Matrix: WATER

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: 6019567	7196_CR6				Work Order: HV05E1AA		Report DB ID: 9HV05E10					
HEXCHROME	2.00E-03	U		0.0E+00	2.00E-03	mg/L	N/A	1.	1/19/06		100.0	
							2.00E-03	N/A			ML	

No. of Results: 1

Comments:

FORM I
SAMPLE RESULTS

Date: 27-Jan-06

Lab Name: STL Richland

SDG: J00053

Collection Date: 1/19/2006 2:00:00 PM

Lot-Sample No.: J6A190355-4

Report No.: 31214

Received Date: 1/19/2006 4:00:00 PM

Client Sample ID: J111M8

COC No.: RC-048-167

Matrix: WATER

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: 6019567	7196_CR6				Work Order: HV05C1AA		Report DB ID: 9HV05C10					
HEXCHROME	2.00E-03	U		0.0E+00	2.00E-03	mg/L	N/A	1.	1/19/06		100.0	
							2.00E-03	N/A			ML	

No. of Results: 1

Comments:

STL Richland

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

rptSTLRchSample
V4.14.4 A97

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: 27-Jan-06

SAMPLE RESULTS

Lab Name: STL Richland

SDG: J00053

Collection Date: 1/19/2006 11:30:00 AM

Lot-Sample No.: J6A190355-2

Report No.: 31214

Received Date: 1/19/2006 4:00:00 PM

Client Sample ID: J111P7

COC No.: RC-048-186

Matrix: WATER

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: 6019567	7196_CR6				Work Order: HV0481AA		Report DB ID: 9HV04810					
HEXCHROME	2.00E-03	U		0.0E+00	2.00E-03	mg/L	N/A	1.	1/19/06		100.0	
							2.00E-03	N/A			ML	
No. of Results:	1	Comments:										

FORM I

Date: 27-Jan-06

SAMPLE RESULTS

Lab Name: STL Richland

SDG: J00053

Collection Date: 1/19/2006 1:30:00 PM

Lot-Sample No.: J6A190355-1

Report No.: 31214

Received Date: 1/19/2006 4:00:00 PM

Client Sample ID: J111P8

COC No.: RC-048-187

Matrix: WATER

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: 6019567	7196_CR6				Work Order: HV0471AA		Report DB ID: 9HV04710					
HEXCHROME	2.00E-03	U		0.0E+00	2.00E-03	mg/L	N/A	1.	1/19/06		100.0	
							2.00E-03	N/A			ML	

No. of Results: 1

Comments:

FORM II

Date: 27-Jan-06

DUPLICATE RESULTS

Lab Name: STL Richland

SDG: J00053

Collection Date: 1/19/2006 10:00:00 AM

Lot-Sample No.: J6A190355-3

Report No.: 31214

Received Date: 1/19/2006 4:00:00 PM

Client Sample ID: J111K7

COC No.: RC-048-147

Matrix: WATER

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: 6019567	7196_CR6			Work Order: HV05A1AE		Report DB ID: HV05A1ER		Orig Sa DB ID: 9HV05A10				
HEXCHROME	2.00E-03			0.0E+00	2.00E-03	mg/L	N/A	1.	1/19/06		100.0	
	2.00E-03	U		RPD 0.0		2.00E-03		N/A			ML	

No. of Results: 1 Comments:

STL Richland

RPD - Relative Percent Difference.

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4.4 A97

MDC|MDA,Le - 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 or Total Uncert or not identified by gamma scan software.

FORM II
BLANK RESULTS

Date: 27-Jan-06

Lab Name: STL Richland

SDG: J00053

Matrix: WATER

Report No. : 31214

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA ,	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 6019567	7196_CR6				Work Order: HV0571AA		Report DB ID: HV0571AB					
HEXCHROME	2.00E-03	U		0.0E+00	2.00E-03	mg/L	N/A	1.	1/19/06		100.0	
						2.00E-03		N/A			ML	

No. of Results: 1 Comments:

FORM II
LCS RESULTS

Date: 27-Jan-06

Lab Name: STL Richland

SDG: J00053

Matrix: WATER

Report No. : 31214

Parameter	Result	Count Qual Error (2 s)	Total Uncert(2 s)	MDC MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Blas	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 6019567	7196_CR6				Work Order: HV0571AC							
HEXCHROME	5.27E-01		0.0E+00	2.00E-03	mg/L	N/A	5.00E-01		105%	1/19/06	100.0	
						Rec Limits:	85	115	0.1		ML	
No. of Results: 1	Comments:											

FORM II
MATRIX SPIKE RESULTS

Date: 27-Jan-06

Lab Name: STL Richland

SDG: J00053

Lot-Sample No.: J6A190355-3

Report No.: 31214

Matrix: WATER

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: 6019567 HEXCHROME	Work Order: HV05A1AC 5.55E-01 2.00E-03	Report DB ID: HV05A1CW	0.0E+00	2.00E-03	mg/L	Orig Sa DB ID: 9HV05A10 N/A	105.51%	5.26E-01		1/19/06	100.0 ML	7196_CR6
Batch: 6019567 HEXCHROME	Work Order: HV05A1AD 5.57E-01 5.55E-01	Report DB ID: HV05A1DW	0.0E+00	2.00E-03	mg/L	Orig Sa DB ID: HV05A1CW N/A	105.89%	5.26E-01		1/19/06	100.0 ML	7196_CR6

Number of Results: 2

Comments:

STL Richland RER - Replicate Error Ratio = $(S-D)/[\text{sqrt}(\text{sq}(\text{TPUs})+\text{sq}(\text{TPUd}))]$ as defined by ICPT BOA.
 rptSTLRchMs Bias - $(\text{Result}/\text{Expected})-1$ as defined by ANSI N13.30.
 V4.14.4 A97

FORM II

Date: 27-Jan-06

MATRIX SPIKE DUPLICATE RESULTS

Lab Name: STL Richland

SDG: J00053

Lot-Sample No.: J6A190355-3

Report No.: 31214

Matrix: WATER

Parameter	SpikeResult, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rec- overy	Exp- ected	Exp Uncert	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 6019567	7196_CR6			Work Order: HV05A1AC		Report DB ID: HV05A1CW		Orig Sa DB ID: HV05A1DW					
HEXCHROME	5.55E-01			0.0E+00	2.00E-03	mg/L	N/A	105.51%	5.26E-01		1/19/06	100.0	
	5.57E-01	RPD	0.4									ML	
Batch: 6019567	7196_CR6			Work Order: HV05A1AD		Report DB ID: HV05A1DW		Orig Sa DB ID: HV05A1CW					
HEXCHROME	5.57E-01			0.0E+00	2.00E-03	mg/L	N/A	105.89%	5.26E-01		1/19/06	100.0	
	5.55E-01	RPD	0.4									ML	
No. of Results: 2	Comments:												

STL Richland RER - Replicate Error Ratio = $(S-D)/[\text{sqrt}(\text{sq}(\text{TPUs})+\text{sq}(\text{TPUd}))]$ as defined by ICPT BOA.
 rptSTLRchMsDup2 Bias - (Result/Expected)-1 as defined by ANSI N13.30.
 V4.14.4 A97

Work Order Number(s): HV047, HV048, HV05A, HV05C, HV05E, HV05F				
Lab Sample Numbers or SDG: J00053				
Method/Test/Parameter: Cr+6 in Water / RICH-WC-5003, Rev 7				
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 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?	✓			✓

Comments on any "No" response:

Analyst: Domenis

Date: 1/30/06

Second-Level Review: [Signature]

Date: 1-31-06

BHI 27023

Washington Closure Hanford			CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-048-187		Page 1 of 1		
Collector TILLER, B <i>Bekuband</i>			Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 7N Data Turnaround 45 Days		
Project Designation 100 Area and 300 Area Component of the RCBRA Water Sa			Sampling Location U-7, SURFACE WATER			SAF No. RC-048		Air Quality <input type="checkbox"/>			
Ice Chest No.			Field Logbook No. EL-1597		COA BESRAS6520		Method of Shipment GROUND TRANSPORT				
Shipped To Severn Trent Incorporated, Richland			Offsite Property No.			Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS POTENTIAL RADIOACTIVE < DOT LIMITS					Preservation Cool 4C						
Special Handling and/or Storage <i>J 00053</i> <i>J6A190355</i> <i>Dec 03 06 06</i>					Type of Container G/P						
					No. of Container(s) 1						
					Volume 250mL						
					Chromium Hex - 7196						
SAMPLE ANALYSIS											
Sample No.	Matrix *	Sample Date	Sample Time								
J111P8	HVP47	1-19-06	1330	X							
CHAIN OF POSSESSION					SPECIAL INSTRUCTIONS					Matrix *	
Relinquished By/Removed From		Date/Time	Sign/Print Names		Received By/Stored In		Date/Time		2.0°C		S=Soil SE=Sediment SO=Solid SI=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other
<i>J. G. Miller</i>		<i>1/19/06 1600</i>	<i>Jeff Jensen</i>		<i>JMJ</i>		<i>01/19/06 1600</i>				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time		Date/Time				
LABORATORY SECTION	Received By			Title			Date/Time				
FINAL SAMPLE DISPOSITION	Disposal Method			Disposed By			Date/Time				

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-048-186	Page 1 of 1
Collector TILLER, B <i>Bernhard</i>		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH	
Project Designation 100 Area and 300 Area Component of the RCBRA Water Sa		Sampling Location U-6, SURFACE WATER		SAF No. RC-048		Price Code 7N Data Turnaround 45 Days	
Ice Chest No.		Field Logbook No. EL-1597		COA BESRAS6520		Method of Shipment GROUND TRANSPORT	
Shipped To Severn Trent Incorporated, Richland		Offsite Property No.		Bill of Lading/Air Bill No. SEE OSPC			
POSSIBLE SAMPLE HAZARDS/REMARKS <i>POTENTIAL RADIOACTIVE < DOT LIMITS</i>					Preservation	Cool 4C	
Special Handling and/or Storage <i>50053</i>					Type of Container	G/P	
					No. of Container(s)	1	
					Volume	250mL	
SAMPLE ANALYSIS					Chromium Hex - 7196		
Sample No.	Matrix *	Sample Date	Sample Time				
J111P7 <i>HV098</i>	WATER	<i>1-19-06</i>	<i>1130</i>	X			
CHAIN OF POSSESSION					SPECIAL INSTRUCTIONS		Matrix *
Relinquished By/Removed From <i>James E. Bernhard</i>		Date/Time <i>1/19/06 1600</i>		Received By/Stored In <i>Jeff Jensen</i>		Date/Time <i>01/19/06 1600</i>	
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	
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	

Washington Closure Hanford				CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-048-147		Page 1 of 1		
Collector TILLER, B <i>Bernhard</i>				Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 7N Data Turnaround 45 Days		
Project Designation 100 Area and 300 Area Component of the RCBRA Water Sa				Sampling Location U-S, PORE WATER, FULL QC				SAF No. RC-048		Air Quality <input type="checkbox"/>		
Ice Chest No.				Field Logbook No. EL-1597		COA BESRAS6520		Method of Shipment GROUND TRANSPORT				
Shipped To Severn Trent Incorporated, Richland				Offsite Property No.				Bill of Lading/Air Bill No. SEE OSPC				
POSSIBLE SAMPLE HAZARDS/REMARKS POTENTIAL RADIOACTIVE < DOT LIMITS Special Handling and/or Storage <i>J00053</i>				Preservation		Cool 4C						
				Type of Container		G/P						
				No. of Container(s)		1						
				Volume		500mL						
SAMPLE ANALYSIS				Chromium Hex - 7196								
Sample No.		Matrix *	Sample Date	Sample Time								
J111K7 <i>HV05A</i>		WATER	1-19-06	1000	X							
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		3.5 °C S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Dryn Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other				
<i>John E. Rumb</i>		<i>1/19/06 1600</i>		<i>Jeff Jensen</i>		<i>01/19/06 1600</i>						
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		

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-048-167	Page 1 of 1
Collector TILLER, B <i>Bernhard</i>		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH	
Project Designation 100 Area and 300 Area Component of the RCBRA Water Sa		Sampling Location U-7, PORE WATER		SAF No. RC-048		Price Code 7N Data Turnaround 45 Days	
Ice Chest No.		Field Logbook No. EL-1597		COA BESRAS6520		Method of Shipment GROUND TRANSPORT	
Shipped To Severn Trent Incorporated, Richland		Offsite Property No.		Bill of Lading/Air Bill No. SEE OSPC			
POSSIBLE SAMPLE HAZARDS/REMARKS <i>POTENTIAL RADIOACTIVE < DOT LIMITS</i>					Preservation	Cool AC	
Special Handling and/or Storage <i>50053</i>					Type of Container	G/P	
					No. of Container(s)	1	
					Volume	250mL	
					SAMPLE ANALYSIS		Chromium Hex - 7196
Sample No.	Matrix *	Sample Date	Sample Time				
J111M8	<i>HV05C</i>	<i>1-19-06</i>	<i>1400</i>	<i>X</i>			
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS	
Relinquished By/Removed From <i>Lab Off Same E. Bernhard</i>		Date/Time <i>1/19/06 1600</i>		Received By/Stored In <i>Jeff Jensen</i>		Date/Time <i>01/19/06 1600</i>	
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	
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=Sediment SO=Solid Sl=Sludge W = Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue Wl=Wipe L=Liquid V=Vegetation X=Other							

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-048-154	Page 1 of 1
Collector TILLER, B <i>Bernhard</i>	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 7N	Data Turnaround 45 Days		
Project Designation 100 Area and 300 Area Component of the RCBRA Water Sa	Sampling Location U-6, PORE WATER	SAF No. RC-048	Air Quality <input type="checkbox"/>				
Ice Chest No.	Field Logbook No. EL-1597	COA BESRAS6520	Method of Shipment GROUND TRANSPORT				
Shipped To Severn Trent Incorporated, Richland	Offsite Property No.	Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS <i>POTENTIAL RADIOACTIVE < DOT LIMITS</i>		Preservation Cool 4C					
Special Handling and/or Storage <i>50053</i>		Type of Container G/P					
		No. of Container(s) 1					
		Volume 250mL					
SAMPLE ANALYSIS		Chromium Hex - 7196					
Sample No.	Matrix *	Sample Date	Sample Time				
J111M7	HVOSE	1-19-06	1230	X			
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix *	
Relinquished By/Removed From <i>John E. Hall</i>	Date/Time <i>01/19/06 1600</i>	Received By/Stored In <i>Jeff Jensen</i>	Date/Time <i>01/19/06 1600</i>	<i>1.0 u</i>		S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other	
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				
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			

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-048-150		Page 1 of 1		
Collector TILLER, B <i>Bearland</i>		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 7N Data Turnaround		
Project Designation 100 Area and 300 Area Component of the RCBRA Water Sa		Sampling Location U-5, SURFACE WATER, FULL QC		SAF No. RC-048		Air Quality <input type="checkbox"/>		45 Days		
Ice Chest No.		Field Logbook No. EL-1597		COA BESRAS6520		Method of Shipment GROUND TRANSPORT				
Shipped To Severn Trent Incorporated, Richland		Offsite Property No.		Bill of Lading/Air Bill No. SEE OSPC						
POSSIBLE SAMPLE HAZARDS/REMARKS POTENTIAL RADIOACTIVE < DOT LIMITS		Preservation		Cool 4C						
Special Handling and/or Storage <i>560053</i>		Type of Container		G/P						
		No. of Container(s)		1						
		Volume		500mL						
SAMPLE ANALYSIS		Chromium Hex - 7196								
Sample No.	Matrix *	Sample Date	Sample Time							
J111L0	<i>HVDF</i>	<i>1-19-06</i>	<i>0900</i>	<i>X</i>						
CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From <i>JL of same C. Gould</i>		Date/Time <i>1/19/06 1600</i>		Received By/Stored In <i>Jeff Jensen</i>		Date/Time <i>1/19/06 1400</i>		<i>7.500</i>		S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other
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			

Sample Check-in List

Date/Time Received: 01/19/06 1600

Client: BHE SDG #: J10053 NA SAF #: RC-016 NA

Work Order Number: J64190355 Chain of Custody # RC-016 - 147, 148, 149, 150

Shipping Container ID: NA 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? Yes No
4. Cooler temperature: 2.0 - 4.0 NA 5. Vermiculite/packing materials is NA Wet Dry
6. Number of samples in shipping container: 6
7. Sample holding times exceeded? NA Yes No
8. Samples have:
 - _____ tape _____ hazard labels
 - custody seals appropriate samples labels
9. Samples are:
 - in good condition _____ leaking
 - _____ broken _____ have air bubbles

(Only for samples requiring head space)
10. Sample pH taken? NA pH<2 pH>2 adjusted pH
11. Sample Location, Sample Collector Listed? * Yes No
*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: JAH Date: 01/19/06

Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on _____ by _____ Person contacted _____

No action necessary; process as is.

Project Manager _____ Date _____

STL RICHLAND

1/19/2006 4:39:58 PM

Sample Preparation/Analysis

Balance Id:

127642, Bechtel Hanford, Inc.
Hanford, Inc.

, Bechtel

88 NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION
EA Chromium, Hexavalent (7196A)

Pipet #:

Report Due: 03/06/2006

SI CLIENT: HANFORD

J00058

Sep1 DT/Tm Tech:

Batch: 6019567 WATER mg/L
SEQ Batch, Test: None

PM, Quote: HC , 27023

Sep2 DT/Tm Tech:

Prep Tech:

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	CR Analyst, Init/Date	Comments:
1 HV047-1-AA J6A190355-1-SAMP [REDACTED] 01/19/2006 13:30								
		AmtRec: 250P	#Containers: 1			Scr:	Alpha:	Beta:
2 HV048-1-AA J6A190355-2-SAMP [REDACTED] 01/19/2006 11:30								
		AmtRec: 250P	#Containers: 1			Scr:	Alpha:	Beta:
3 HV05A-1-AA J6A190355-3-SAMP [REDACTED] 01/19/2006 10:00								
		AmtRec: 250P	#Containers: 1			Scr:	Alpha:	Beta:
4 HV05A-1-AC-S J6A190355-3-MS [REDACTED] 01/19/2006 10:00								
		AmtRec: 250P	#Containers: 1			Scr:	Alpha:	Beta:
5 HV05A-1-AD-D J6A190355-3-MSD [REDACTED] 01/19/2006 10:00								
		AmtRec: 250P	#Containers: 1			Scr:	Alpha:	Beta:
6 HV05A-1-AE-X J6A190355-3-DUP [REDACTED] 01/19/2006 10:00								
		AmtRec: 250P	#Containers: 1			Scr:	Alpha:	Beta:
7 HV05C-1-AA J6A190355-4-SAMP [REDACTED] 01/19/2006 14:00								
		AmtRec: 250P	#Containers: 1			Scr:	Alpha:	Beta:

STL RICHLAND

1/19/2006 4:39:59 PM
 127642, Bechtel Hanford, Inc. , Bechtel
 Hanford, Inc.
Report Due: 03/06/2006
Batch: 6019567 WATER mg/L
 SEQ Batch, Test: None
Sample Preparation/Analysis
88 NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION
EA Chromium, Hexavalent (7196A)
5I CLIENT: HANFORD
 Balance Id:
 Pipet #:
 Sep1 DT/Tm Tech:
 Sep2 DT/Tm Tech:
 Prep Tech:

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	CR Analyst, Init/Date	Comments:
8 HV05E-1-AA J6A190355-5-SAMP [REDACTED] 01/19/2006 12:30								
		AmtRec: 250P	#Containers: 1				Scr: Alpha: Beta:	
9 HV05F-1-AA J6A190355-6-SAMP [REDACTED] 01/19/2006 09:00								
		AmtRec: 250P	#Containers: 1				Scr: Alpha: Beta:	
10 HV057-1-AA-B J6A190000-567-BLK [REDACTED] 01/19/2006 10:00								
		AmtRec:	#Containers: 1				Scr: Alpha: Beta:	
11 HV057-1-AC-C J6A190000-567-LCS [REDACTED] 01/19/2006 10:00								
		AmtRec:	#Containers: 1				Scr: Alpha: Beta:	

Comments:

All Clients for Batch:
 127642, Bechtel Hanford, Inc. , Bechtel Hanford, Inc. , HC , 27023

HV0471AA-SAMP Constituent List:

Constituent	RDL	mg/L	LCL	UCL	RPD
HEXCHROME	0.002		85	115	20
HV05A1AC-MS:					
HEXCHROME	0.002		85	115	20
HV05A1AD-MSD:					
HEXCHROME	0.002		85	115	20
HV0571AA-BLK:					
HEXCHROME	0.002				

6

STL RICHLAND

1/19/2006 4:39:59 PM

Sample Preparation/Analysis

Balance Id: _____

88 NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION

Pipet #: _____

EA Chromium, Hexavalent (7196A)

SI CLIENT: HANFORD

Report Due: 03/06/2006

Sep1 DT/Tm Tech: _____

Batch: 6019567

mg/L

Sep2 DT/Tm Tech: _____

SEQ Batch, Test: None

Prep Tech: _____



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	CR Analyst, Init/Date	Comments:
HV0571AC-LCS: HEXCHROME RDL:0.002 mg/L LCL:85 UCL:115 RPD:20 HV0471AA-SAMP Calc Info: Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B HV05ALAC-MS: Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B HV05ALAD-MSD: Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B HV0571AA-BLK: Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B HV0571AC-LCS: Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B								

Approved By _____ Date: _____