

W0 3654

0056812



**CERTIFICATE OF ANALYSIS**

Bechtel Hanford, Inc.  
3350 George Washington Way  
Richland, WA 99352

December 18, 2001

Attention: Joan Kessner

---

SAF Number	:	B01-114
Date SDG Closed	:	December 14, 2001
Number of Samples	:	One (1)
Sample Type	:	Water
SDG Number	:	W03654
Data Deliverable	:	45 Day/Summary

---

**RECEIVED**  
APR 08 2002  
**EDMC**

I. Introduction

On November 30, 2001, one water sample was received at STL Richland (STLR) for chemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford, Inc. (BHI) specific ID:

<u>STLR ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
EPP66	B13F25	WATER	11/30/01

II. 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 analysis was: **Chemical Analysis**  
Chromium Hex by EPA method 7196

Bechtel Hanford, Inc.  
December 18, 2001  
Page 2

---

III. Quality Control

The analytical results for each analysis performed under SDG W03654 include 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.

Quality control sample results are reported in mg/L.

IV. Comments

**Chemical Analyses**

Chromium Hex by EPA method 7196:

The LCS, batch blank, sample, sample duplicate (B13F25) and sample matrix spike/matrix spike duplicate (B13F25) 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:

  
Jackie Waddell  
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

<b>Action Lev</b>	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.
<b>Batch</b>	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
<b>Bias</b>	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
<b>COC No</b>	Chain of Custody Number assigned by the Client or STL Richland.
<b>Count Error (#s)</b>	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.
<b>Total Uncert (#s) <i>u<sub>c</sub> Combined Uncertainty.</i></b>	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<sub>c</sub> the combined uncertainty.</i> The uncertainty is absolute and in the same units as the result.
<b>(#s), Coverage Factor CRDL (RL)</b>	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.  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)
<b>Lc</b>	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.
<b>Lot-Sample No</b>	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.
<b>MDC MDA</b>	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.
<b>Primary Detector</b>	The instrument identifier associated with the analysis of the sample aliquot.
<b>Ratio U-234/U-238</b>	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.
<b>Rst/MDC</b>	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.
<b>Rst/TotUcert</b>	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.
<b>Report DB No</b>	Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number.
<b>RER</b>	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.
<b>SDG</b>	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
<b>Sum Rpt Alpha Spec Rst(s)</b>	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.
<b>Work Order</b>	The LIMS software assign test specific identifier.
<b>Yield</b>	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.



**DUPLICATE RESULTS**

**LAB NAME:** STL Richland **SDG: /RPT GRP:** W03654 / 18394  
**LOT,RPT DB ID:** J1K300194- EPP661AE **MATRIX:** WATER  
**CLIENT ID:** B13F25 DUP **DATE RECEIVED** 11/30/01 10:35:00  
**ORIG LAB ID:** 9EPP661AA

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERR <sub>2</sub> ( s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
HEXCHROME	0.00E+00	U	N/A	N/A	2.00E-03	mg/L	N/A	EPA7196	0.00E+00	0.00%

Number of Results:



LABORATORY CONTROL SAMPLE

LAB NAME: STL Richland SDG: /RPT GRP: W03654 / 18394  
LAB SAMPLE ID: EPT3L1AC MATRIX: WATER

---

ANALYTE	RESULT	Q	COUNTING ERROR ( s)	TOTAL ERROR ( s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
HEXCHROME	5.05E-01		N/A	N/A	2.00E-03	mg/L	N/A	5.00E-01	101.00%

---

Number of Results:

---

Result = IDL When Not Detecto

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result < RDL.

STL Richland

rptChemRadLcs; v3.41

009

### MATRIX SPIKE RESULTS

LAB NAME: STL Richland SDG: /RPT GRP: W03654 / 18394  
LAB SAMPLE ID: EPP661AC MATRIX: WATER

ANALYTE	SPIKE RESULT* Q	COUNTING ERROR ( s)	TOTAL ERROR ( s)	MDA/IDL	REPORT UNIT	SAMPLE RESULT	EXPECTED	RECOVERY
HEXCHROME	5.29E-01	N/A	N/A	2.00E-03	mg/L	0.00E+00	5.26E-01	100.57%

Number of Results:

\*Spike Result Corrected For Sample Result

Result = IDL When Not Detects

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result < RDL.

STL Richland

rptChemRadMatrixSpike; v3.41

010

## MATRIX SPIKE RESULTS

**LAB NAME:** STL Richland                      **SDG: /RPT GRP:** W03654 / 18394  
**LAB SAMPLE ID:** EPP661AD                      **MATRIX:** WATER

ANALYTE	SPIKE RESULT*	COUNTING Q ERROR ( s)	TOTAL ERROR ( s)	MDA/IDL	REPORT UNIT	SAMPLE RESULT	EXPECTED	RECOVERY
HEXCHROME	5.29E-01	N/A	N/A	2.00E-03	mg/L	0.00E+00	5.26E-01	100.57%

**Number of Results:**

\*Spike Result Corrected For Sample Result

Result = IDL When Not Detects

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result < RDL.

STL Richland

rptChemRadMatrixSpike; v3.41



Richland Laboratory  
Data Review Check List  
METALS

Work Order Number(s): <u>FPPL6</u>		BATCH # <u>1340427</u>		
Lab Sample Numbers or SDG: <u>W031654</u>		LOT# <u>JIK 300194</u>		
Method/Test/Parameter: <u>CR+6 IN WATER</u>		<u>RICHWC 5003 R4</u>		
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
<b>A. Initial Calibration</b>				
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 $\leq$ reporting limit?	✓			✓
<b>B. Continuing Calibration</b>				
1. CCV analyzed at required frequency and all parameters within QC limits?	✓			✓
2. CCB analyzed at required frequency and all results $\leq$ reporting limit?	✓			✓
<b>C. Sample Analysis</b>				
1. Were any samples with concentrations above the linear range for any parameter diluted and reanalyzed?			✓	✓
2. Were all sample holding times met?	✓			✓
<b>D. QC Samples</b>				
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?			✓	✓

012  
012  
J.C.  
12/19/17



Q-27023

<b>Bechtel Hanford Inc.</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>			B01-114-29	Page 1 of 1
Collector Renee Nielson / <i>R. Fahberg</i>	Company Contact Virginia Rohay	Telephone No. 372-9100	Project Coordinator TRENT, SJ		Price Code 7N	Data Turnaround
Project Designation PFP Well Installation Sampling and Analysis - Water	Sampling Location 200 West	SAF No. B01-114	Air Quality <input type="checkbox"/>		45 Days	
Ice Chest No. <i>ERC 99-023</i>	Field Logbook No. EL-1562	COA T202P1D722	Method of Shipment <i>RA 11:30 AM</i> Federal Express <i>Government Vehicle</i>			
Shipped To Severn Trent Incorporated, Richland	Offsite Property No.	Bill of Lading/Air Bill No.				

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C																		
	Type of Container	P																		
	No. of Container(s)	1																		
	Special Handling and/or Storage	Volume	500ml.																	
SDG W03654		SAMPLE ANALYSIS		Chromium Hex - 7196																
		<i>JIK300194</i>																		
Sample No.	Matrix *	Sample Date	Sample Time																	
B13F25 <i>EPP66</i>	WATER	<i>11-30-01</i>	<i>0430</i>	X																

<b>CHAIN OF POSSESSION</b>		<b>Sign/Print Names</b>		<b>SPECIAL INSTRUCTIONS</b>				<b>Matrix *</b>
Relinquished By <i>R. Fahberg</i>	Date/Time <i>11-30-01</i>	Received By <i>Doug Bowman</i>	Date/Time <i>11-30-01/1020</i>	** All requests for Cr VI at the Severn Trent Laboratory, MUST BE routed to Richland.  Samples did not originate in radiological controlled area. No total activity associated with sample/samples.				S=Soil SE=Soil/soil SO=Solid S=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 <i>Doug Bowman</i>	Date/Time <i>11-30-01/1035</i>	Received By <i>A. Pihnehan</i>	Date/Time <i>11/30/01</i>					
Relinquished By	Date/Time	Received By	Date/Time					
Relinquished By	Date/Time	Received By	Date/Time					
Relinquished By	Date/Time	Received By	Date/Time					

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

110

**Sample Check-in List**

Date/Time Received: 11/30/01 10:35 AM  
 Client: BHI SDG #: W03054 NA [] SAF #: B01-114 NA []  
 Work Order Number: JIK300194 Chain of Custody #: B01-114-29  
 Shipping Container ID: ERC 99-033 Air Bill #: N/A

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: 10C NA [] 5. Vermiculite/packing materials is NA [] Wet [] Dry []
6. Number of samples in shipping container: 1
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 []
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: April Plunkett / Ricka Date: 11/30/01

Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on \_\_\_\_\_ by \_\_\_\_\_ Person contacted \_\_\_\_\_  
 [ ] No action necessary; process as is.  
 Project Manager \_\_\_\_\_ Date \_\_\_\_\_