

**SAF-RC-008**  
**ERDF Groundwater Well Samples**  
**FINAL VALIDATION PACKAGE**

**COMPLETE COPY OF VALIDATION PACKAGE TO:**

Kathy Wendt H4-21

**COMMENTS:**

**SDG K3842**

**SAF-RC-008**

**ERDF GROUNDWATER WELL SAMPLES – Mar. 2012**

Date: 7 May 2012  
To: Washington Closure Hanford (technical representative)  
From: ELR Consulting  
Project: ERDF Groundwater Well Samples – March 2012  
Subject: Radiochemistry - Data Package No. K3842-EB

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. K3842 prepared by Eberline Services (EB). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
B2KN96	3/19/12	Water	C	See note 1
B2KN97	3/19/12	Water	C	See note 1

1 - Gross alpha and beta; carbon-14; technetium-99; iodine-129; total radium and total uranium.

Data validation was conducted in accordance with the WCH validation statement of work and WCH-198, Rev. 0, "Groundwater Protection Plan for the Environmental Restoration Disposal Facility". Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

## DATA QUALITY OBJECTIVES

### • Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

### • Laboratory (Method) Blanks

#### Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the required detection limit (RDL), the following

qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All laboratory blank results were acceptable.

### Field Blanks

No trip blanks were submitted for analysis.

### **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 80-120%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to an LCS recovery outside QC limits (76%), all total radium results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

### **Precision**

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than 20 percent, the results are acceptable. If either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

### Field Duplicate Samples

One set of field duplicates (B2KN96/B2KN97) was submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPD for technetium-99 (69%) was outside QC limits. Under the WCH statement of work, no qualification is required. All other laboratory duplicate results were acceptable.

#### **Detection Levels**

Reported analytical detection levels are compared against the project PQLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

#### **Completeness**

Data package SDG No. K3842 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

### **MAJOR DEFICIENCIES**

None found.

### **MINOR DEFICIENCIES**

The following minor deficiency was noted:

- Due to an LCS recovery outside QC limits (76%), all total radium results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

### **REFERENCES**

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*.

WCH-198, Rev. 0, *Groundwater Protection Plan for the Environmental Restoration Disposal Facility*, February 2008.

**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

Qualifiers which may be applied by data validators in compliance with the WCH statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

**Appendix 2**  
**Summary of Data Qualification**

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY\*

<b>SDG: K3842</b>	<b>REVIEWER: ELR</b>	<b>Project: ERDF</b>	<b>PAGE <u>1</u> OF <u>1</u></b>
<b>COMPOUND</b>	<b>QUALIFIER</b>	<b>SAMPLES AFFECTED</b>	<b>REASON</b>
Total radium	J	All	LCS recovery

\* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

**Appendix 3**  
**Annotated Laboratory Reports**

**EBERLINE ANALYTICAL / RICHMOND**  
**SAMPLE DELIVERY GROUP K3424**

7655-001

B2KN96

**DATA SHEET**

SDG <u>7655</u>	Client/Case no <u>Hanford</u>	SDG <u>K3842</u>
Contact <u>Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
Lab sample id <u>S203066-01</u>	Client sample id <u>B2KN96</u>	
Dept sample id <u>7655-001</u>	Location/Matrix <u>HNF-N-506 44/48</u>	<u>WATER</u>
Received <u>03/21/12</u>	Collected/Volume <u>03/19/12 11:29</u>	<u>9.75 L</u>
	Custody/SAF No <u>RC-008P-006</u>	<u>RC-008P</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	2.08	2.3	2.94	3.00	U	93A
Gross Beta	12587-47-2	32.5	2.8	2.30	4.00		93B
Carbon 14	14762-75-5	15.2	34	56.9	200	U	C
Technetium 99	14133-76-7	66.1	3.9	4.13	15.0		TC
Iodine 129	15046-84-1	1.22	0.20	0.430	5.00		I
Total Uranium (ug/L)	7440-61-1	1.67	0.18	0.026	1.00		U_T
Total Radium	ALPHA-RA	0.049	0.12	0.435	2.00	U J	RAT

ERDF, MARCH 2012

*W*  
5/5/12

DATA SHEETS  
 Page 1  
 SUMMARY DATA SECTION  
 Page 12

Lab id <u>EBERLINE</u>
Protocol <u>RC-008</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/10/12</u>

**EBERLINE ANALYTICAL / RICHMOND**  
**SAMPLE DELIVERY GROUP K3424**

7655-002

B2KN97

**DATA SHEET**

SDG <u>7655</u>	Client/Case no <u>Hanford</u>	<u>SDG K3842</u>
Contact <u>Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
Lab sample id <u>S203066-02</u>	Client sample id <u>B2KN97</u>	
Dept sample id <u>7655-002</u>	Location/Matrix <u>HNF-N-506 44/48</u>	<u>WATER</u>
Received <u>03/21/12</u>	Collected/Volume <u>03/19/12 11:29</u>	<u>9.75 L</u>
	Custody/SAF No <u>RC-008P-007</u>	<u>RC-008P</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	0.866	1.2	1.67	3.00	U	93A
Gross Beta	12587-47-2	34.2	1.8	1.27	4.00		93B
Carbon 14	14762-75-5	21.6	35	58.5	200	U	C
Technetium 99	14133-76-7	32.5	2.5	3.07	15.0		TC
Iodine 129	15046-84-1	1.46	0.23	0.504	5.00		I
Total Uranium (ug/L)	7440-61-1	1.69	0.18	0.026	1.00		U_T
Total Radium	ALPHA-RA	0.188	0.16	0.484	2.00	UJ	RAT

ERDF, MARCH 2012

*Handwritten:* ✓  
5/5/12

Lab id <u>EBRLINE</u>
Protocol <u>RC-008</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/10/12</u>

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

## 1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K3842 was composed of two water samples designated under SAF No. RC-008P with a Project Designation of: ERDF, March 2012.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist. The results were transmitted to WCH via e-mail on April 10, 2012.

## 2.0 ANALYSIS NOTES

### 2.1 Gross Alpha/Gross Beta Analysis

No problems were encountered during the course of the analyses.

### 2.2 Carbon-14 Analysis

No problems were encountered during the course of the analyses.

### 2.3 Iodine-129 Analysis

No problems were encountered during the course of the analyses.

### 2.4 Technetium-99 Analysis

No problems were encountered during the course of the analyses.

### 2.5 Total Radium Analysis

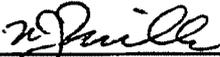
The QC-LCS percent recovery was 76%, less than the lower control limit of 80%. No other problems were encountered during the course of the analyses.

### 2.6 Total Uranium Analysis

No problems were encountered during the course of the analyses.

## 3.0 Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

  
\_\_\_\_\_  
Joseph Verville  
Client Services Manager

4/10/12  
\_\_\_\_\_  
Date

Collector **KE Hamilton** / **CHPRC**      Contact/Requester **Karen Waters-Husted**      Telephone No. **376-4650**  
 SAF No. **RC-008P**      Sampling Origin **Hanford Site**      Purchase Order/Charge Code **302326ES20**  
 Project Title **ERDF, MARCH 2012**      Logbook No. **HNF-N-506 44148**      Ice Chest No. **6WS-091**  
 Shipped To (Lab) **Eberline Services**      Method of Shipment **Commercial Carrier**      Bill of Lading/Air Bill No. **8595 4603 5493**  
 Protocol **CERCLA**      Priority: **45 Days**      Offsite Property No. **3597**

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 \*\*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CRF but are not releasable per DOE Order 5400 5 (1990/1993)

**SPECIAL INSTRUCTIONS**      Hold Time      Total Activity Exemption: Yes  No   
 \*\*Submit invoices and deliverables to JH Kessner, BHI  
 \*\*FAX copies of Eberline/Lionville log-in to JH Kessner (1-425-969-4823) and Scot Fitzgerald (509-373-7495).  
 \*\*Sample Management will send all results to Mike Peloquin.

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2KN96	N	W	03-19-12	1129	1x20-mL P	Activity Scan	6 Months	None
B2KN96	N	W			1x125-mL G/P	Carbon-14	6 Months	None
B2KN96	N	W			2x1-L G/P	Gross Alpha	6 Months	HNO3 to pH <2
B2KN96	N	W			2x1-L G/P	Gross Beta	6 Months	HNO3 to pH <2
B2KN96	N	W			1x4-L G/P	I129LL_SEP_LEPS_GS_LL: I-129 (1)	6 Months	None
B2KN96	N	W			1x250-mL G/P	Technetium-99	6 Months	HCl to pH <2
B2KN96	N	W			1x1-L G/P	Total Radium	6 Months	HNO3 to pH <2
B2KN96	N	W			03-19-12	1129	1x500-mL G/P	Total Uranium

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Relinquished By <b>KE Hamilton</b> CHPRC	Print <i>KE Hamilton</i>	Sign <i>KE Hamilton</i>	Date/Time 1530 <b>MAR 19 2012</b>	Received By <b>SSU-1</b>	Print <i>SSU-1</i>	Sign <i>SSU-1</i>	Date/Time 1530 <b>MAR 19 2012</b>	<b>Matrix *</b> S - Soil      DS - Drum Solids SE - Sediment      DL - Drum Liquids SO - Solid      T - Tissue SL - Sludge      WI - Wipe W - Water      L - Liquid O - Oil      V - Vegetation A - Air      X - Other
Relinquished By <b>SSU-1</b>	3-20-12	Date/Time 0800	Received By <i>Edgema</i>	3-20-12	Date/Time 0800			
Relinquished By <i>Edgema</i>	3-20-12	Date/Time 1500	Received By <b>FED - EX</b>		Date/Time			
Relinquished By <b>FED EX</b>		Date/Time	Received By <b>PF. NATAWANA</b>	<i>PF. NATAWANA</i>	Date/Time 03/21/12 0930			
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g. Return to customer, per lab procedure, used in process)		Disposed By		Date/Time			

CH2MHill Plateau Remediation Company	<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> <i>K3842(7655)</i>	C.O.C. # <b>RC-008P-007</b>
		Page 1 of 1

Collector <b>KE Hamilton</b> <i>CHPRC</i>	Contact/Requester <b>Karen Waters-Husted</b>	Telephone No. <b>376-4650</b>
SAF No. <b>RC-008P</b>	Sampling Origin <b>Hanford Site</b>	Purchase Order/Charge Code <b>302326ES20</b>
Project Title <b>ERDF, MARCH 2012</b>	Logbook No. <b>HNF-N-506 <u>44178</u></b>	Ice Chest No. <b>GWS-091</b>
Shipped To (Lab) <b>Eberline Services</b>	Method of Shipment <b>Commercial Carrier</b>	Bill of Lading/Air Bill No. <b>8595 4603 5493</b>
Protocol <b>CERCLA</b>	Priority: <b>45 Days</b>	Offsite Property No. <b>3597</b>

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 \*\*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CRF but are not releasable per DOE Order 5400 5 (1990/1993)

**SPECIAL INSTRUCTIONS** Hold Time Total Activity Exemption: Yes  No   
 \*\*Submit invoices and deliverables to JH Kessner, BHI  
 \*\*FAX copies of Eberline/Lionville log-in to JH Kessner (1-425-969-4823) and Scot Fitzgerald (509-373-7495).  
 \*\*Sample Management will send all results to Mike Peloquin.

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative		
B2KN97	N	W	<i>03-19-12</i>	<i>1129</i>	1x20-mL P	Activity Scan	6 Months	None		
B2KN97	N	W			1x125-mL G/P	Carbon-14	6 Months	None		
B2KN97	N	W			2x1-L G/P	Gross Alpha	6 Months	HNO3 to pH <2		
B2KN97	N	W			2x1-L G/P	Gross Beta	6 Months	HNO3 to pH <2		
B2KN97	N	W			1x4-L G/P	H129LL_SEP_LEPS_GS_LL: 1-129 (1)	6 Months	None		
B2KN97	N	W			1x250-mL G/P	Technetium-99	6 Months	HCl to pH <2		
B2KN97	N	W			1x1-L G/P	Total Radium	6 Months	HNO3 to pH <2		
B2KN97	N	W			<i>03-19-12</i>	<i>1129</i>	1x500-mL G/P	Total Uranium	6 Months	HNO3 to pH <2

Relinquished By <b>KE Hamilton</b> <i>CHPRC</i>	Print <i>KE Hamilton</i>	Sign <i>KE Hamilton</i>	Date/Time <b>MAR 19 2012</b> <i>1530</i>	Received By <b>SSU-1</b>	Print	Sign	Date/Time <b>MAR 19 2012</b> <i>1530</i>	<b>Matrix *</b> S = Soil      DS = Drum Solids SE = Sediment    DL = Drum Liquids SO = Solid      T = Tissue SL = Sludge      WI = Wipe W = Water      L = Liquid O = Oil          V = Vegetation A = Air          X = Other
Relinquished By <b>SSU-1</b>			Date/Time <b>3-20-12</b> <i>0800</i>	Received By <i>Ed Kavanagh</i>			Date/Time <b>3-20-12</b> <i>0800</i>	
Relinquished By <i>Ed Kavanagh</i>			Date/Time <b>3-20-12</b> <i>1500</i>	Received By <b>FED-EX</b>			Date/Time	
Relinquished By <b>FED EX</b>			Date/Time	Received By <i>REHAWAN</i>			Date/Time <b>03/20/12</b> <i>0930</i>	
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process)						Disposed By	Date/Time

**Appendix 5**  
**Data Validation Supporting Documentation**



3. Continuing Calibration (Levels D, E)

N/A

Calibration checked within required frequency? .....Yes No N/A

Calibration check acceptable?.....Yes No N/A

Calibration check standards traceable?.....Yes No N/A

Calibration check standards expired? .....Yes No N/A

Calculation check acceptable? .....Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Background Counts (Levels D, E)

N/A

Background Counts checked within required frequency? .....Yes No N/A

Background Counts acceptable?.....Yes No N/A

Calculation check acceptable? .....Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Blanks (Levels B, C, D, E) .....  N/A

Method blank analyzed within required frequency? ..... Yes  No  N/A

Method blank results acceptable? ..... Yes  No  N/A

Analytes detected in method blank? ..... Yes  No  N/A

Field blank(s) analyzed? ..... Yes  No  N/A

Field blank results acceptable? ..... Yes  No  N/A

Analytes detected in field blank(s)? ..... Yes  No  N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes  No  N/A

Comments: no FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) .....  N/A

LCS /BSS analyzed within required frequency? ..... Yes  No  N/A

LCS/BSS recoveries acceptable? ..... Yes  No  N/A

LCS/BSS traceable? (Levels D,E) ..... Yes  No  N/A

LCS/BSS expired? (Levels D,E) ..... Yes  No  N/A

LCS/BSS levels correct? (Levels D,E) ..... Yes  No  N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes  No  N/A

Comments: 76% - LCS - total recover - J all

7. Chemical Carrier Recovery (Levels C, D, E) .....  N/A

Chemical carrier added? ..... Yes  No  N/A

Chemical recovery acceptable? ..... Yes  No  N/A

Chemical carrier traceable? (Levels D, E) ..... Yes  No  N/A

Chemical carrier expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. Tracer Recovery (Levels C, D, E ) .....  N/A

Tracer added?..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

Tracer traceable? (Levels D, E ) ..... Yes No N/A

Tracer expired? (Levels D, E)..... Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9. Matrix Spikes (Levels C, D, E).....  N/A

Matrix spike analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Spike source traceable? (Levels D, E) ..... Yes No N/A

Spike source expired? Levels D, E)..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E)..... Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. Duplicates (Levels C, D, E) .....  N/A

Duplicates Analyzed at required frequency? .....  Yes No N/A

RPD Values Acceptable? .....  Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

11. Field QC Samples (Levels C, D E) .....  N/A

Field duplicate sample(s) analyzed? .....  Yes No N/A

Field duplicate RPD values acceptable? ..... Yes  No N/A

Field split sample(s) analyzed? ..... Yes  No N/A

Field split RPD values acceptable? ..... Yes No  N/A

Performance audit sample(s) analyzed? ..... Yes  No N/A

Performance audit sample results acceptable? ..... Yes No  N/A

Comments: LC-99-672  
\_\_\_\_\_  
no PAS or FS  
\_\_\_\_\_  
\_\_\_\_\_

12. Holding Times (All levels)

Are sample holding times acceptable? .....  Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

13. Results and Detection Limits (All Levels).....  N/A

Results reported for all required sample analyses?.....  Yes No  N/A

Results supported in raw data?(Levels D, E)..... Yes No  N/A

Results Acceptable? (Levels D, E) ..... Yes No  N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No  N/A

MDA's meet required detection limits? .....  Yes No  N/A

Transcription/calculation errors? (Levels D, E)..... Yes No  N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Appendix 6**

**Additional Documentation Requested by Client**

EBERLINE ANALYTICAL / RICHMOND  
SAMPLE DELIVERY GROUP K3424

7655-004

Method Blank

METHOD BLANK

SDG <u>7655</u>	Client/Case no <u>Hanford</u>	SDG <u>K3842</u>
Contact <u>Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
Lab sample id <u>S203066-04</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7655-004</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>RC-008P</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	-0.148	0.54	1.39	3.00	U	93A
Gross Beta	12587-47-2	0.021	1.2	2.12	4.00	U	93B
Carbon 14	14762-75-5	-24.3	50	85.4	200	U	C
Technetium 99	14133-76-7	-0.216	1.1	2.65	15.0	U	TC
Iodine 129	15046-84-1	-0.457	0.59	0.743	5.00	U	I
Total Uranium (ug/L)	7440-61-1	0	0.011	0.026	1.00	U	U_T
Total Radium	ALPHA-RA	0.058	0.12	0.430	2.00	U	RAT

QC-BLANK #81385

Lab id <u>EBERLINE</u>
Protocol <u>RC-008</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/10/12</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3424

7655-003

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7655</u>	Client/Case no <u>Hanford</u>	SDG <u>K3842</u>
Contact <u>Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
Lab sample id <u>S203066-03</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7655-003</u>	Material/Matrix <u>WATER</u>	
	SAP No <u>RC-008P</u>	

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMES (TOTAL)	PROTOCOL LIMITS
Gross Alpha	43.3	4.8	1.52	3.00	93A		37.0	1.5	117	58-142	80-120
Gross Beta	33.3	2.8	1.85	4.00	93B		34.0	1.4	98	79-121	80-120
Carbon 14	12400	190	84.0	200	C		12000	480	103	83-117	80-120
Technetium 99	1290	53	<u>16.4</u>	15.0	TC		1200	48	108	77-123	80-120
Iodine 129	57.5	0.85	0.890	5.00	I		59.8	2.4	96	71-129	80-120
Total Uranium (ug/L)	94.0	11	0.261	1.00	U_T		82.5	3.3	114	79-121	80-120
Total Radium	19.0	4.1	0.419	2.00	RAT		25.0	1.0	<u>76</u>	71-129	80-120

QC-LCS #81384

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3424

7655-005

B2KN96

DUPLICATE

SDG <u>7655</u>	Client/Case no <u>Hanford</u>	<u>SDG K3842</u>
Contact <u>Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>S203066-05</u>	Lab sample id <u>S203066-01</u>	Client sample id <u>B2KN96</u>
Dept sample id <u>7655-005</u>	Dept sample id <u>7655-001</u>	Location/Matrix <u>HNF-N-506 44/48</u> <u>WATER</u>
	Received <u>03/21/12</u>	Collected/Volume <u>03/19/12 11:29</u> <u>9.75 L</u>
		Custody/SAF No <u>RC-008P-006</u> <u>RC-008P</u>

ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI-	TEST	ORIGINAL	2σ ERR	MDA	QUALI-	RPD	3σ	DER
	pCi/L	(COUNT)	pCi/L	pCi/L	FIERS		pCi/L	(COUNT)	pCi/L	FIERS	%	TOT	σ
Gross Alpha	0.020	1.7	<u>3.19</u>	3.00	U	93A	2.08	2.3	2.94	U	-		1.4
Gross Beta	36.9	3.1	2.79	4.00		93B	32.5	2.8	2.30		13	30	1.3
Carbon 14	-14.6	33	56.4	200	U	C	15.2	34	56.9	U	-		1.3
Technetium 99	66.4	3.6	3.53	15.0		TC	66.1	3.9	4.13		0	30	0
Iodine 129	1.37	0.31	0.638	5.00		I	1.22	0.20	0.430		12	59	0.6
Total Uranium (ug/L)	1.64	0.18	0.026	1.00		U_T	1.67	0.18	0.026		2	23	0.2
Total Radium	0.036	0.26	0.489	2.00	U	RAT	0.049	0.12	0.435	U	-		0.1

QC-DUP#1 81386

ERDF, MARCH 2012

Lab id EBRLINE  
Protocol RC-008  
Version Ver 1.0  
Form DVD-DUP  
Version 3.06  
Report date 04/10/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3424

7655-006

B2KN97

MATRIX SPIKE

SDG <u>7655</u>	Client/Case no <u>Hanford</u>	SDG <u>K3842</u>
Contact <u>Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>S203066-06</u>	Lab sample id <u>S203066-02</u>	Client sample id <u>B2KN97</u>
Dept sample id <u>7655-006</u>	Dept sample id <u>7655-002</u>	Location/Matrix <u>HNF-N-506 44/48</u> <u>WATER</u>
	Received <u>03/21/12</u>	Collected/Volume <u>03/19/12 11:29</u> <u>9.75 L</u>
		Custody/SAF No <u>RC-008P-007</u> <u>RC-008P</u>

ANALYTE	SPIKE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS (TOTAL)	PROTOCOL LIMITS
Carbon 14	15100	210	84.9	200	C	14400	580	21.6	35	105	83-117	80-120

QC-MS#2 81387

ERDF, MARCH 2012

Lab id EBRLINE  
Protocol RC-008  
Version Ver 1.0  
Form DVD-MS  
Version 3.06  
Report date 04/10/12