

**SAF-RC-194**  
**Soil/Sediment Sampling – Integrated**  
**Remedial Investigation/Feasibility Study,**  
**100-F Area Boreholes**  
**FINAL DATA PACKAGE**

**COMPLETE COPY OF DATA PACKAGE TO:**

No Distribution Required

**COMMENTS:**

**SDG K3187**

**SAF-RC-194**

Rad only

Chem only

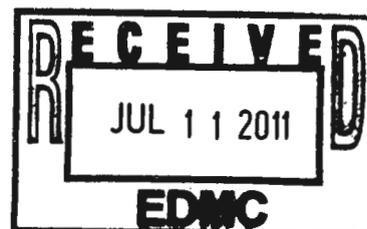
Rad & Chem

Complete

Partial

**COMPLETE SPECIAL EXTRACTION NOW INCLUDED**

**Sample Location: C7970 (116-F-14); I-002**





A division of Eberline Analytical Corporation

264 Welsh Pool Road  
Exton, Pennsylvania 19341  
Phone (610) 280-3000  
Fax (610) 280-3041

1 June 2011

Joan Kessner  
WC-Hanford, Inc.  
2620 Fermi Avenue  
MSIN H9-03  
Richland, WA 99354



Subject: Analytical Data Package

Dear Ms. Kessner:

Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	1102161
SDG #	K3187 SPEC EXT
SAF #	RC-194
Date Received	02/19/11
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	
Herbicides	
Metals	X
Inorganics	X

The electronic data deliverable (EDD) has been emailed. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory  
A Division of Eberline Analytical Corporation

Orlette S. Johnson  
Project Manager



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Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-194 Project Number: K3187 Project Manager: Joan Kessner	Reported: 05/31/2011 12:53
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**Analytical Report for Metals by SW846 6000/7000 series**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B28NP1-1	1102161-01	Soil	02/09/2011 14:40	02/19/2011 10:30
B28NP1-2	1102161-02	Soil	02/09/2011 14:40	02/19/2011 10:30
B28NP1-3	1102161-03	Soil	02/09/2011 14:40	02/19/2011 10:30
B28NP1-4	1102161-04	Soil	02/09/2011 14:40	02/19/2011 10:30
B28NP1-A1	1102161-05	Leachate	02/09/2011 14:40	02/19/2011 10:30
B28NP1-B1	1102161-06	Leachate	02/09/2011 14:40	02/19/2011 10:30
B28NP1-B2	1102161-07	Leachate	02/09/2011 14:40	02/19/2011 10:30
B28NP1-C1	1102161-08	Leachate	02/09/2011 14:40	02/19/2011 10:30



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## Case Narrative

**Client:** WC-HANFORD RC-194  
**LVL#:** 1102161  
**SDG/SAF#:** K3187/RC-194

**W.O.#:** 60049-001-001-0001-00  
**Date Received:** 02-19-11

### METALS

The following is a summary of the QC results accompanying the sample results. Lionville Laboratory (LvL) certifies that all test results meet the requirements of NELAC except as noted below.

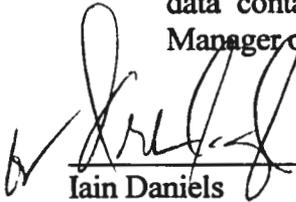
All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

1. This narrative covers the analyses of 1 soil sample analyzed in quadruplicate and 4 TCLP leachate samples.
2. The samples were prepared and analyzed in accordance with methods listed on the data report forms.

The TCLP leachate sample B28NP1-A1 was prepared with a 5-fold dilution due to insufficient sample volume.

3. All analyses were performed within the required holding times.
4. Please refer to the Sample Receipt Check List for any sample discrepancies in LvL's sample acceptance policy.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits.
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the LOQ).
7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation (3-10X the LOD), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}.
8. All ICP Interference Check Standards were within control limits.

9. All Standard Reference Material (SRM) analytes were within the Prediction Interval control limits supplied by the manufacturer. All laboratory control samples (LCS) were within the 80-120% control limits.
10. All soil matrix spike analyses were performed on WC-Hanford sample B26RD6-1 within the same digestion batch. Please refer to this package for the associated QC forms.
11. All TCLP leachate matrix spike analyses were performed on WC-Hanford sample J1CN48-B1 within the same digestion batch. Please refer to this package for the associated QC forms.
12. For the purposes of this report, the data have been reported to the Limit of Detection (LOD). Values between the LOD and the Limit of Quantitation (LOQ) are acquired in a region of less-certain quantification.
13. LvL is NELAP accredited by the State of Pennsylvania. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, 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.



Iain Daniels  
Laboratory Manager  
Lionville Laboratory

alm/02-161specext

5/31/11  
Date



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Project Number: K3187  
Project Manager: Joan Kessner

Reported:  
05/31/2011 12:53

### Notes and Definitions

- U Analyte included in the analysis, but not detected
- J Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
- B Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag)
- \* Value outside QC acceptance criteria
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- wet Sample results reported on a wet weight basis
- RPD Relative Percent Difference

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**B28NP1-1**  
**1102161-01 (Soil)**

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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**Lionville Laboratory**

**Metals by SW846 6000/7000 series**

Arsenic	1.86 B	2.71	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Barium	59.3	0.451	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Cadmium	0.904	0.271	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Chromium	100	0.271	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Lead	7.93	2.71	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Selenium	4.51 U	4.51	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Silver	0.451 U	0.451	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B



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Reported:  
 05/31/2011 12:53

**B28NP1-2**  
**1102161-02 (Soil)**

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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**Lionville Laboratory**

**Metals by SW846 6000/7000 series**

Arsenic	1.59 B	2.85	mg/kg dry	1	L104412	04/26/2011	05/13/2011	6010B
Barium	58.1	0.476	mg/kg dry	1	L104412	04/26/2011	05/13/2011	6010B
Cadmium	0.824	0.285	mg/kg dry	1	L104412	04/26/2011	05/13/2011	6010B
Chromium	91.5	0.285	mg/kg dry	1	L104412	04/26/2011	05/13/2011	6010B
Lead	7.86	2.85	mg/kg dry	1	L104412	04/26/2011	05/13/2011	6010B
Selenium	4.76 U	4.76	mg/kg dry	1	L104412	04/26/2011	05/13/2011	6010B
Silver	0.476 U	0.476	mg/kg dry	1	L104412	04/26/2011	05/13/2011	6010B



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**B28NP1-3**  
**1102161-03 (Soil)**

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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**Lionville Laboratory**

**Metals by SW846 6000/7000 series**

Arsenic	1.86 B	3.02	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Barium	61.7	0.503	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Cadmium	0.949	0.302	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Chromium	103	0.302	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Lead	8.19	3.02	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Selenium	5.03 U	5.03	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Silver	0.503 U	0.503	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B



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Reported:  
 05/31/2011 12:53

**B28NP1-4**  
**1102161-04 (Soil)**

Analyte	Result and Qualifier	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method
		Limit							

**Lionville Laboratory**

**Metals by SW846 6000/7000 series**

Arsenic	2.06	B	2.41	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Barium	55.7		0.402	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Cadmium	0.868		0.241	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Chromium	94.8		0.241	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Lead	7.63		2.41	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Selenium	4.02	U	4.02	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B
Silver	0.402	U	0.402	mg/kg dry	1	L104412	04/26/2011	05/11/2011	6010B

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Reported:  
 05/31/2011 12:53

**B28NP1-A1**  
**1102161-05 (Leachate)**

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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**Lionville Laboratory**

**TCLP Metals by SW846 1311 6000/7000 series**

Arsenic	0.150 U	0.150	mg/L	1	L105291	05/24/2011	05/27/2011	6010
<b>Barium</b>	<b>0.0265</b>	0.0250	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Cadmium	0.0150 U	0.0150	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Chromium	0.0150 U	0.0150	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Lead	0.150 U	0.150	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Selenium	0.250 U	0.250	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Silver	0.0250 U	0.0250	mg/L	1	L105291	05/24/2011	05/27/2011	6010



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 Project Number: K3187  
 Project Manager: Joan Kessner

Reported:  
 05/31/2011 12:53

**B28NP1-B1**  
**1102161-06 (Leachate)**

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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**Lionville Laboratory**

**TCLP Metals by SW846 1311 6000/7000 series**

Arsenic	0.0300 U	0.0300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Barium	0.0325	0.00500	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Cadmium	0.00151 B	0.00300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Chromium	0.00300 U	0.00300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Lead	0.0300 U	0.0300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Selenium	0.0500 U	0.0500	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Silver	0.00500 U	0.00500	mg/L	1	L105291	05/24/2011	05/27/2011	6010



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 Project Number: K3187  
 Project Manager: Joan Kessner

Reported:  
 05/31/2011 12:53

**B28NP1-B2**  
**1102161-07 (Leachate)**

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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**Lionville Laboratory**

**TCLP Metals by SW846 1311 6000/7000 series**

Arsenic	0.0300 U	0.0300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
<b>Barium</b>	<b>0.0344</b>	0.00500	mg/L	1	L105291	05/24/2011	05/27/2011	6010
<b>Cadmium</b>	<b>0.00146</b> B	0.00300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Chromium	0.00300 U	0.00300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Lead	0.0300 U	0.0300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Selenium	0.0500 U	0.0500	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Silver	0.00500 U	0.00500	mg/L	1	L105291	05/24/2011	05/27/2011	6010

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**B28NP1-C1**  
**1102161-08 (Leachate)**

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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**Lionville Laboratory**

**TCLP Metals by SW846 1311 6000/7000 series**

Arsenic	0.0300 U	0.0300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Barium	<b>0.0401</b>	0.00500	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Cadmium	0.00300 U	0.00300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Chromium	0.00300 U	0.00300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Lead	0.0300 U	0.0300	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Selenium	0.0500 U	0.0500	mg/L	1	L105291	05/24/2011	05/27/2011	6010
Silver	0.00500 U	0.00500	mg/L	1	L105291	05/24/2011	05/27/2011	6010



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Reported:  
 05/31/2011 12:53

**Metals by SW846 6000/7000 series - Quality Control**  
**Lionville Laboratory**

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch L104412 - SW 3050B</b>									
<b>Blank (L104412-BLK1)</b>					Prepared: 04/26/2011 Analyzed: 05/11/2011				
Arsenic	2.27 U	2.27	mg/kg wet						
Barium	0.379 U	0.379	mg/kg wet						
Cadmium	0.227 U	0.227	mg/kg wet						
Chromium	0.123 B	0.227	mg/kg wet						
Lead	2.27 U	2.27	mg/kg wet						
Selenium	3.79 U	3.79	mg/kg wet						
Silver	0.379 U	0.379	mg/kg wet						
<b>Reference (L104412-SRM1)</b>					Prepared: 04/26/2011 Analyzed: 05/11/2011				
Arsenic	121	7.26	mg/kg wet	114.00		106	82.8-117.54		
Barium	320	1.21	mg/kg wet	307.00		104	79.8-120.2		
Cadmium	230	0.726	mg/kg wet	225.00		102	83.6-116.4		
Chromium	85.7	0.726	mg/kg wet	77.200		111	73.3-126.4		
Lead	201	7.26	mg/kg wet	190.00		106	81.6-118.4		
Selenium	194	12.1	mg/kg wet	187.00		104	75.9-124.6		
Silver	86.0	1.21	mg/kg wet	83.500		103	82.7-117.1		



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Reported:  
05/31/2011 12:53

**TCLP Metals by SW846 1311 6000/7000 series - Quality Control**  
**Lionville Laboratory**

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch L105291 - SW 3005A</b>									
<b>Blank (L105291-BLK1)</b>					Prepared: 05/24/2011 Analyzed: 05/27/2011				
Arsenic	0.0300 U	0.0300	mg/L						
Barium	0.00500 U	0.00500	mg/L						
Cadmium	0.00300 U	0.00300	mg/L						
Chromium	0.00300 U	0.00300	mg/L						
Lead	0.0300 U	0.0300	mg/L						
Selenium	0.0500 U	0.0500	mg/L						
Silver	0.00500 U	0.00500	mg/L						
<b>Blank (L105291-BLK2)</b>					Prepared: 05/24/2011 Analyzed: 05/27/2011				
Arsenic	0.0300 U	0.0300	mg/L						
Barium	0.00500 U	0.00500	mg/L						
Cadmium	0.00300 U	0.00300	mg/L						
Chromium	0.00300 U	0.00300	mg/L						
Lead	0.0300 U	0.0300	mg/L						
Selenium	0.0500 U	0.0500	mg/L						
Silver	0.00500 U	0.00500	mg/L						
<b>LCS (L105291-BS1)</b>					Prepared: 05/24/2011 Analyzed: 05/27/2011				
Arsenic	10.1	0.0300	mg/L	10.000		101	80-120		20
Barium	5.04	0.00500	mg/L	5.0000		101	80-120		20
Cadmium	0.245	0.00300	mg/L	0.25000		97.9	80-120		20
Chromium	0.489	0.00300	mg/L	0.50000		97.7	80-120		20
Lead	2.48	0.0300	mg/L	2.5000		99.0	80-120		20
Selenium	10.2	0.0500	mg/L	10.000		102	80-120		20
Silver	0.497	0.00500	mg/L	0.50000		99.4	80-120		20

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**SAMPLE DIGESTION RECORD**

Digestion Batch #: L104412  
 Date/Time Initiated: 4/26/11 21:00  
 Date/Time Completed: 4/26/11 23:00  
 Analyst: BLH  
 Matrix (circle): Soil Water Other  
 Method (circle one): 3005A 3010A 3050 200.7 (1994)

Digested / Undigested (circle one)  
 Balance #: B-14  
 Balance Cal Verification: Q NA  
 Temp: 25°C  
 BLOCK 1 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures

Work Order #	Spike Vol (mL)	Initial Vol (mL)	Final Vol (mL)	pH <2	Type: To/Sol/TC	Texture	Color / Appearance	Artifact	Turb		
110115-1		0.55	50		TO	Course	Black	Rocks			
-1-MSI	0.5	0.70	50								
-2		0.70	50								
-3		0.69	50								
-4		0.70	50								
-5		0.56	50						Fine	Black	Rocks
-6		0.63	50								
-7		0.60	50								
-8		0.57	50								
JE BLH 4/26/11 -9		0.58	50						Course	Black	Rocks
-10		0.65	50								
-11		0.61	50								
-12		0.53	50								
-13		0.63	50						Fine	Black	Rocks
-14		0.53	50								
-15		0.51	50								
-16		0.53	50								
1102161-1		0.58	50		Fine	Brown					
-2		0.55	50								
-3		0.52	50								
-4		0.65	50								
BLH SRM		0.66	50								
		0.62	50								

~~BLH 4/26/11~~

Spiking IDs / Expiration Date:

MS#: 1001843  
 \_\_\_\_\_  
 \_\_\_\_\_  
 PLCS#: 1100103  
 \_\_\_\_\_  
 \_\_\_\_\_

Reagent IDs:

HNO<sub>3</sub> K09041  
 HCl K12046  
 H<sub>2</sub>O<sub>2</sub> J524014  
 1:1 HNO<sub>3</sub> 657041-05  
 1:1 HCl \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

File ID#: \_\_\_\_\_

Data Review By / Date:

BLH 4/28/11

SAMPLE DIGESTION RECORD

Digestion Batch #: L105291  
 Date/Time Initiated: 5/24/11 1455  
 Date/Time Completed: 5/29/11 1210  
 Analyst: JJ

Digested / Undigested (circle one)  
 Balance #: N/A  
 Balance Cal Verification: Y (NA)  
 Temp: 45  
 BLOCK 1 (2) (circle one)

Matrix (circle): Soil Water (Other)  
 Method (circle one): 3005A 3010A 3050 200.7 (1994)  
 pH/Turbidity: N/A for Solids.

NOTE: All temperatures are recorded as corrected temperatures

C/C = clear/clothes

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/TC	Texture	Color / Appearance	Artifact	Turb
1101210-09		10	50		TO	N/A	C/C	N/A	N/A
10		50	50				C/C		
11		50	50				C/C		
12		50	50				C/C		
13		10	50				C/C		
14		50	50				C/C		
15		50	50				C/C		
16		50	50				C/C		
1102123-09		10	50				C/C		
10		10	50				C/C		
11		50	50				C/C		
12		50	50				C/C		
13		10	50				C/C		
14		50	50				C/C		
15		50	50				C/C		
16		50	50				C/C		
1102161-05		10	50				C/C		
06		50	50				C/C		
07		50	50				C/C		
08		50	50				C/C		
B/H		50	50				C/C		
B/H	0.5	50	50				C/C		
B/H		50	50				C/C		
L105291-751	0.5	50	50				C/C		

JJ 5/29/11

Spiking IDs / Expiration Date:

MS#: 1100338  
1100217

LCS#: 1100290

Reagent IDs:

HNO<sub>3</sub> H109041  
 HCl H14054  
 H<sub>2</sub>O<sub>2</sub> \_\_\_\_\_  
 1:1 HNO<sub>3</sub> \_\_\_\_\_  
 1:1 HCl \_\_\_\_\_

File ID#: \_\_\_\_\_

Data Review By/Date:

Apm 5/26/11

\* Associated with Sample 1101210-10  
 † Associated with L105291.



Start Date: <u>5-17-11</u> Start Time: <u>13:00</u> Analyst: <u>Rb</u> SOP: <u>SPI-1311.1</u>	End Date: <u>5-18-11</u> End Time: <u>7:00</u> Analyst: <u>RA</u> Method: <u>1311.2</u>	Tumbler Speed: <u>30</u> RPM Leachate Batch #: <u>L105207</u> Leachate Page: <u>6</u> of <u>6</u> Room Temp. (°C): Start <u>21</u> / Finish <u>21</u> Acceptance Criteria: 23°C + 2°
--	--	---

Lvl #: <u>L105207</u> Client ID#: <u>N/A</u> pH After 5 Min: _____ pH After Acid/Heat: _____ Extraction Fluid/pH: _____ Sample Wt.(g): _____ Extract Fluid Vol.(mL): <u>500</u> pH After Extraction: <u>N/A</u>	Initial Filtration Data and Comments: Solids: _____ % / NA  <div style="text-align: center; font-size: 2em; font-weight: bold;">BLANK</div> Initial Filtrate Added: _____
--	--

<del>                     Lvl #: _____                      Client ID#: _____                      pH After 5 Min: _____                      pH After Acid/Heat: _____                      Extraction Fluid/pH: _____                      Sample Wt.(g): _____                      Extract Fluid Vol.(mL): _____                      pH After Extraction: _____                 </del>	<del>                     Initial Filtration Data and Comments:                      Solids: _____ % / NA                       Initial Filtrate Added: _____                 </del>
---	--

<del>                     Lvl #: _____                      Client ID#: _____                      pH After 5 Min: _____                      pH After Acid/Heat: _____                      Extraction Fluid/pH: _____                      Sample Wt.(g): _____                      Extract Fluid Vol.(mL): _____                      pH After Extraction: _____                 </del>	<del>                     Initial Filtration Data and Comments:                      Solids: _____ % / NA                       Initial Filtrate Added: _____                 </del>
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<del>                     Lvl #: _____                      Client ID#: _____                      pH After 5 Min: _____                      pH After Acid/Heat: _____                      Extraction Fluid/pH: _____                      Sample Wt.(g): _____                      Extract Fluid Vol.(mL): _____                      pH After Extraction: _____                 </del>	<del>                     Initial Filtration Data and Comments:                      Solids: _____ % / NA                       Initial Filtrate Added: _____                 </del>
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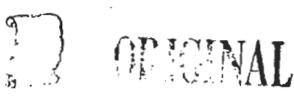
Standard	ID	Prep Date	Expir Date
MS			

Reviewed By/Date RA 5/17/11 Page # \_\_\_\_\_



CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			RC-194-008	PAGE 1 OF 1
COLLECTOR <i>Turner, Wallace, Crow</i>		COMPANY CONTACT KESSNER, JH	TELEPHONE NO. 375-4688	PROJECT COORDINATOR KESSNER, JH	PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days
SAMPLING LOCATION C7970 (116-F-14); I-002		PROJECT DESIGNATION Soil/Sediment Sampling - Integrated Remedial Investigation/Feasibility Stud		SAF NO. RC-194	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. <i>GLWS-000</i>		FIELD LOGBOOK NO. <i>HNF-N-585-14 PG 31</i>	ACTUAL SAMPLE DEPTH <i>20.2-22-7'</i>	COA 302513ES10	METHOD OF SHIPMENT FEDERAL EXPRESS	
SHIPPED TO Lionville Laboratory Incorporated		OFFSITE PROPERTY NO. SEE PTR		BILL OF LADING/AIR BILL NO. SEE PTR <i>794442702105</i>		

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)	PRESERVATION	None
	SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: <i>B28NP1</i> <i>B2BXR1 K3 2/9/11</i>	HOLDING TIME	180 Days
		TYPE OF CONTAINER	P
		NO. OF CONTAINER(S)	1
		VOLUME	500mL
	SAMPLE ANALYSIS	Special Extraction - D3987 (100 Area RIFS);	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B28NP1	SOIL	<i>2-9-11</i>	<i>1440</i>

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM <i>A. Turner</i>	RECEIVED BY/STORED IN <i>MO 413 SS9 R2</i>	
DATE/TIME <i>2-9-11 1550</i>	DATE/TIME <i>2-9-11 1550</i>	
RELINQUISHED BY/REMOVED FROM <i>SSU-R2</i>	RECEIVED BY/STORED IN <i>T.A. Wallace</i>	
DATE/TIME <i>2-18-11 0900</i>	DATE/TIME <i>2-18-11 0900</i>	
RELINQUISHED BY/REMOVED FROM <i>T.A. Wallace</i>	RECEIVED BY/STORED IN <i>CHRPC</i>	
DATE/TIME <i>2-18-11 1400</i>	DATE/TIME <i>2-18-11 0900</i>	
RELINQUISHED BY/REMOVED FROM <i>FedEx</i>	RECEIVED BY/STORED IN <i>VICTOR HERNANDEZ</i>	
DATE/TIME <i>2-19-11 1030</i>	DATE/TIME <i>2-19-11 1030</i>	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

Lionville Laboratory  
**SAMPLE RECEIPT CHECKLIST (SRC)**

CLIENT: WC Hanford  
 Project/SAJ/SOW/Release #: RC-194

Date: 2-19-11

LvL Batch #: 1102161

Sample Custodian: Victor Hernandez

NOTE: EXPLAIN ALL DISCREPANCIES

- |  |   |                                      |   |
|--|---|--------------------------------------|---|
| 1. Samples Hand Delivered or Shipped?  | Carrier                                 | <u>Fed Ex</u>                        | Airbill # <u>794442702105</u>             |
| 2. Custody Seals on coolers or shipping containers intact, signed & dated?   | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          | <input type="checkbox"/> No Seals         |
| 3. Outside of coolers or shipping containers are free from damage?   | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          | Comments:                                 |
| 4. All expected paperwork received (coc & other client specific information) sealed in plastic bag and easily accessible?                  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| 5. Samples received cooled or ambient?   | Temp                                    | <u>2.1</u> °C                        | Cooler # <u>GWS-000</u>                   |
| How was the temperature taken?   | <input checked="" type="checkbox"/> IR  | <input type="checkbox"/> Temp. Blank | <input type="checkbox"/> Other (Specify): |
| Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)   | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| 6. Custody seals on sample containers intact signed and dated?   | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          | <input type="checkbox"/> No Seals         |
| 7. COC (Client & LvL ) signed & dated?   | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| 8. Sample containers are intact?   | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| 9. All samples on COC received?  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| All samples received on COC?   | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| 10. All sample label information matches COC?  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| 11. Samples properly preserved? (If #5 is no. then this is no.)  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| 12. Samples received within hold times?  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          | <input checked="" type="checkbox"/> N/A   |
| Short holds taken to wet lab?  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          | <input checked="" type="checkbox"/> N/A   |
| 13. VOA, TOC, TOX free of headspace?   | <input type="checkbox"/> Yes            | <input type="checkbox"/> No          | <input checked="" type="checkbox"/> N/A   |
| 14. QC stickers placed on bottles designated by client?  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          | <input type="checkbox"/> N/A              |
| 15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy. which is on the reverse of this page.) | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No          |   |
| 16. Project Manager contacted concerning any discrepancies?  | <input type="checkbox"/> Yes            | <input type="checkbox"/> No          | <input checked="" type="checkbox"/> N/A   |
| Person Contacted _____   |   | Date _____                           |   |



264 Welsh Pool Road  
 Exton, PA 19341  
 Phone: 610-280-3000  
 Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-194 Project Number: K3187 Project Manager: Joan Kessner	Reported: 05/26/2011 17:00
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**Analytical Report for Wet Chemistry**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B28NP1-1	1102161-01	Soil	02/09/2011 14:40	02/19/2011 10:30
B28NP1-2	1102161-02	Soil	02/09/2011 14:40	02/19/2011 10:30
B28NP1-3	1102161-03	Soil	02/09/2011 14:40	02/19/2011 10:30
B28NP1-4	1102161-04	Soil	02/09/2011 14:40	02/19/2011 10:30
B28NP1-A1	1102161-05	Leachate	02/09/2011 14:40	02/19/2011 10:30
B28NP1-B1	1102161-06	Leachate	02/09/2011 14:40	02/19/2011 10:30
B28NP1-B2	1102161-07	Leachate	02/09/2011 14:40	02/19/2011 10:30
B28NP1-C1	1102161-08	Leachate	02/09/2011 14:40	02/19/2011 10:30



264 Welsh Pool Road  
Exton, Pennsylvania 19341  
Phone (610) 280-3000  
Fax (610) 280-3041

## Case Narrative

**Client:** WC-HANFORD RC-194 K3187  
**LVL#:** 1102161

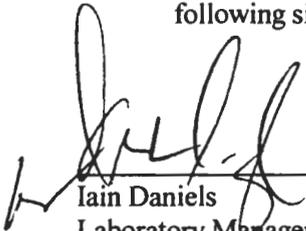
**Date Received:** 02-19-11

### INORGANIC NARRATIVE

1. This narrative covers the analyses of 4 soil and 4 leachate samples.
2. The samples were prepared using the client prescribed leaching procedure and analyzed in accordance with the methods indicated on the data summary report.

Lionville Lab (LvL) is NELAP accredited by the State of Pennsylvania. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvL certifies that all test results meet the requirements of NELAC with any exception noted in the following statements.

3. Sample holding times as required by the method and/or contract were met for total Hexavalent Chromium ( $\text{Cr}^{6+}$ ) and the leachate samples analysis were performed within 24 hours of the completion of the filtering step of the preparation procedure.
4. The method blanks were within the method criteria.
5. The Laboratory Control Samples (LCS) were within the 90-110% and 80-120% control limits.
6. The matrix spike recoveries for sample B28NP1-1 were within the 75-125% control limits.
7. The replicate analysis for Percent Solids was within the 20% Relative Percent Difference (RPD) control limit.
8. Results for soil samples are reported on a dry weight basis.
9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory  
njpli02-161

  
Date



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Exton, PA 19341  
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Fax: 610-280-3041

WC-Hanford, Inc.  
2620 Fermi Avenue  
Richland WA, 99354

Project: RC-194  
Project Number: K3187  
Project Manager: Joan Kessner

**Reported:**  
05/26/2011 17:00

### Notes and Definitions

- U Analyte included in the analysis, but not detected
- D Results reported from a dilution; related reporting limits are elevated due to the presence of an interference or a high target value
- \* Value outside QC acceptance criteria
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- Dry Sample results reported on a dry weight basis
- Wet Sample results reported on a wet weight basis
- RPD Relative Percent Difference
- LOD Limit of Detection (LOD): the minimum estimated concentration of a target analyte that can be detected reliably. Concentrations at the LOD or between the LOD and LOQ are flagged estimated with either a 'J' qualifier or client-specific qualifier.
- LOQ Limit of Quantitation (LOQ): the minimum concentration of a target analyte that can be quantified reliably



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WC-Hanford, Inc.  
 2620 Fermi Avenue  
 Richland WA, 99354

Project: RC-194  
 Project Number: K3187  
 Project Manager: Joan Kessner

Reported:  
 05/26/2011 17:00

**Wet Chemistry**  
**Lionville Laboratory**

Analyte	Result and Qualifier	LOD	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method
<b>B28NP1-1 (1102161-01) Soil</b>									
%Solids	95.6	0.1	0.1	% by Weight	1	L102344	02/23/2011	02/23/2011	SM2540G
Hexavalent Chromium	0.21 U	0.21	0.52	mg/kg dry	1	L103128	03/09/2011	03/09/2011	ISW846 7196A
<b>B28NP1-2 (1102161-02) Soil</b>									
%Solids	95.6	0.1	0.1	% by Weight	1	L102344	02/23/2011	02/23/2011	SM2540G
Hexavalent Chromium	0.21 U	0.21	0.52	mg/kg dry	1	L103128	03/09/2011	03/09/2011	ISW846 7196A
<b>B28NP1-3 (1102161-03) Soil</b>									
%Solids	95.6	0.1	0.1	% by Weight	1	L102344	02/23/2011	02/23/2011	SM2540G
Hexavalent Chromium	0.21 U	0.21	0.52	mg/kg dry	1	L103128	03/09/2011	03/09/2011	ISW846 7196A
<b>B28NP1-4 (1102161-04) Soil</b>									
%Solids	95.6	0.1	0.1	% by Weight	1	L102344	02/23/2011	02/23/2011	SM2540G
Hexavalent Chromium	0.21 U	0.21	0.52	mg/kg dry	1	L103128	03/09/2011	03/09/2011	ISW846 7196A
<b>B28NP1-A1 (1102161-05) Leachate</b>									
Hexavalent Chromium	0.03	0.01	0.02	mg/L	1	L105258	05/19/2011	05/19/2011	ISW846 7196A
<b>B28NP1-B1 (1102161-06) Leachate</b>									
Hexavalent Chromium	0.01 U	0.01	0.02	mg/L	1	L105258	05/19/2011	05/19/2011	ISW846 7196A
<b>B28NP1-B2 (1102161-07) Leachate</b>									
Hexavalent Chromium	0.01 U	0.01	0.02	mg/L	1	L105258	05/19/2011	05/19/2011	ISW846 7196A
<b>B28NP1-C1 (1102161-08) Leachate</b>									
Hexavalent Chromium	0.01 U	0.01	0.02	mg/L	1	L105258	05/19/2011	05/19/2011	ISW846 7196A

966666664



264 Welsh Pool Road  
 Exton, PA 19341  
 Phone: 610-280-3000  
 Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-194 Project Number: K3187 Project Manager: Joan Kessner	Reported: 05/26/2011 17:00
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**Wet Chemistry - Quality Control**  
**Lionville Laboratory**

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch L102344 - % Solids</b>										
<b>Duplicate (L102344-DUP1)</b>		<b>Source: 1102161-01</b>			<b>Prepared &amp; Analyzed: 02/23/2011</b>					
%Solids	95.4	0.1	0.1	% by Weight		95.6			0.2	20
<b>Batch L103128 - Default Prep GenChem</b>										
<b>Blank (L103128-BLK1)</b>		<b>Prepared &amp; Analyzed: 03/09/2011</b>								
Hexavalent Chromium	0.20 U	0.20	0.50	mg/kg wet						
<b>LCS (L103128-BS1)</b>		<b>Prepared &amp; Analyzed: 03/09/2011</b>								
Hexavalent Chromium	3.90	0.20	0.50	mg/kg wet	4.0000		98	80-120		
<b>LCS (L103128-BS2)</b>		<b>Prepared &amp; Analyzed: 03/09/2011</b>								
Hexavalent Chromium	997 D	20.0	50.0	mg/kg wet	1004.6		99	80-120		
<b>Matrix Spike (L103128-MS3)</b>		<b>Source: 1102161-01</b>			<b>Prepared &amp; Analyzed: 03/09/2011</b>					
Hexavalent Chromium	3.83	0.21	0.52	mg/kg dry	4.1860	0.21 U	92	75-125		
<b>Matrix Spike (L103128-MS4)</b>		<b>Source: 1102161-01</b>			<b>Prepared &amp; Analyzed: 03/09/2011</b>					
Hexavalent Chromium	1210 D	20.9	52.3	mg/kg dry	1287.2	0.21 U	94	75-125		
<b>Batch L105258 - Default Prep GenChem</b>										
<b>Blank (L105258-BLK1)</b>		<b>Prepared &amp; Analyzed: 05/19/2011</b>								
Hexavalent Chromium	0.01 U	0.01	0.02	mg/L						
<b>Blank (L105258-BLK2)</b>		<b>Prepared &amp; Analyzed: 05/19/2011</b>								
Hexavalent Chromium	0.01 U	0.01	0.02	mg/L						



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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-194 Project Number: K3187 Project Manager: Joan Kessner	Reported: 05/26/2011 17:00
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**Wet Chemistry - Quality Control**  
**Lionville Laboratory**

Analyte	Result and Qualifiers	LOD	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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**Batch L105258 - Default Prep GenChem**

**LCS (L105258-BS1)**

Prepared & Analyzed: 05/19/2011

Hexavalent Chromium	0.99	0.01	0.02	mg/L	1.0000		99	90-110		
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COLLECTOR <i>Turner, Wallace, coron</i>		COMPANY CONTACT KESSNER, JH		TELEPHONE NO. 375-4688	PROJECT COORDINATOR KESSNER, JH	RC-194-008	PAGE 1 OF 1
SAMPLING LOCATION C7970 (116-F-14); I-002		PROJECT DESIGNATION Soil/Sediment Sampling - Integrated Remedial Investigation/Feasibility Stud			SAF NO. RC-194	PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days
ICE CHEST NO. <i>GWS-000</i>		FIELD LOGBOOK NO. <i>HNF-N-585-14 PG 31</i>	ACTUAL SAMPLE DEPTH <i>20.2-22-7'</i>		COA 302513ES10	METHOD OF SHIPMENT FEDERAL EXPRESS	
SHIPPED TO Lonville Laboratory Incorporated		OFFSITE PROPERTY NO. SEE PTR			BILL OF LADING/AIR BILL NO. SEE PTR <i>794442702105</i>		

MATRIX* A=Air DL=Drum L=Liquid DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	<b>POSSIBLE SAMPLE HAZARDS/ REMARKS</b> Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)	PRESERVATION	None
		HOLDING TIME	180 Days
		TYPE OF CONTAINER	P
		NO. OF CONTAINER(S)	1
		VOLUME	500mL
	<b>SPECIAL HANDLING AND/OR STORAGE</b> RADIOACTIVE TIE TO: <del>B28NP1</del> <i>B2BXR1 KS 2/9/11</i>	SAMPLE ANALYSIS	Special Extraction - D3987 (100 Area RIFS);
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B28NP1	SOIL	2-9-11	1440

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM <i>A. Turner</i>	DATE/TIME <i>2-9-11 1550</i>	RECEIVED BY/STORED IN <i>MO 413 559 R2</i>
RELINQUISHED BY/REMOVED FROM <i>SSU-R2</i>	DATE/TIME <i>2-18-11 0900</i>	RECEIVED BY/STORED IN <i>T.A. Wallace</i>
RELINQUISHED BY/REMOVED FROM <i>T.A. Wallace</i>	DATE/TIME <i>2-18-11 1400</i>	RECEIVED BY/STORED IN <i>CHRPC</i>
RELINQUISHED BY/REMOVED FROM <i>CHRPC</i>	DATE/TIME <i>2-19-11 1030</i>	RECEIVED BY/STORED IN <i>Victor Hernandez</i>
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN

ORIGINAL

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

Lionville Laboratory  
SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: *W.C. Hanford*  
Project/SAB/SOW/Release #: *RC-194*

Date: *2-19-11*

LvL Batch #: *1102161*

Sample Custodian: *Victor Hernandez*

NOTE: EXPLAIN ALL DISCREPANCIES

- |  |  |  |
|--|--|--|
| 1. Samples Hand Delivered or Shipped?  | Carrier <i>fed Ex</i>  | Airbill # <i>794442702105</i>              |
| 2. Custody Seals on coolers or shipping containers intact, signed & dated?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  | <input type="checkbox"/> No Seals          |
| 3. Outside of coolers or shipping containers are free from damage?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  | Comments:                                  |
| 4. All expected paperwork received (coc & other client specific information) sealed in plastic bag and easily accessible?                  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |  |
| 5. Samples received cooled or ambient?   | Temp <i>2.1</i> °C   | Cooler # <i>GWS-000</i>                    |
| How was the temperature taken?   | <input checked="" type="checkbox"/> IR <input type="checkbox"/> Temp. Blank  | <input type="checkbox"/> Other (Specify):  |
| Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |  |
| 6. Custody seals on sample containers intact, signed and dated?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  | <input type="checkbox"/> No Seals          |
| 7. COC (Client & LvL ) signed & dated?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |  |
| 8. Sample containers are intact?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |  |
| 9. All samples on COC received?<br>All samples received on COC?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 10. All sample label information matches COC?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |  |
| 11. Samples properly preserved? (If #5 is no. then this is no.)  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |  |
| 12. Samples received within hold times?<br>Short holds taken to wet lab?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br><input type="checkbox"/> Yes <input type="checkbox"/> No            | <input type="checkbox"/> N/A               |
| 13. VOA, TOC, TOX free of headspace?   | <input type="checkbox"/> Yes <input type="checkbox"/> No   | <input type="checkbox"/> N/A               |
| 14. QC stickers placed on bottles designated by client?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  | <input type="checkbox"/> N/A               |
| 15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |  |
| 16. Project Manager contacted concerning any discrepancies?<br>Person Contacted _____  | <input type="checkbox"/> Yes <input type="checkbox"/> No   | <input type="checkbox"/> N/A<br>Date _____ |



# EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION

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June 23, 2011

Ms. Joan Kessner  
Washington Closure Hanford  
2620 Fermi Avenue  
MSIN H4-21  
Richland, WA 99352

Reference: **P.O. #S00W235A00**  
**Eberline Analytical S1-06-028-7502, SDG K3187**

Dear Ms. Kessner:

Enclosed is the data report for four leachate (water) samples designated under SAF No. RC-194, received at Eberline Analytical on June 1, 2011. The samples were analyzed according to the accompanying Lionville Laboratory Custody Transfer Record.

Please call if you have any questions concerning this report.

Sincerely,

N. Joseph Verville  
Client Services Manager

NJV/ljb

Enclosure: Data Package



## 1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K3178 was composed of four leachate (water) samples designated under SAF No. RC-194 with a Project Designation of: Soil/Sediment Sampling – Integrated Remedial Investigation/Feasibility Study.

The samples were received as stated on the chain-of-custody documents. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist. The results were transmitted to WCH via e-mail on June 22, 2011.

## 2.0 ANALYSIS NOTES

### 2.1 Strontium-90 Analysis

No problems were encountered during the course of the analyses. The individual sample MDA's were greater than the RDL due to the very small volumes available for analysis, also by agreement with WCH, no duplicate analysis was performed.

## 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."**

  
\_\_\_\_\_  
**N. Joseph Verville**  
**Client Services Manager**

6/23/11  
\_\_\_\_\_  
**Date**

EBERLINE ANALYTICAL / RICHMOND  
SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

Client Hanford  
Contract No. S00W235A00  
Case no SDG\_K3187

S U M M A R Y   D A T A   S E C T I O N

T A B L E   O F   C O N T E N T S				
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End of Section	.	.	.	28

*VB*

Prepared by \_\_\_\_\_

Reviewed by *N. Joseph Verville*

Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-TOC  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

REPORT GUIDES

Page 1

SUMMARY DATA SECTION

Page 1

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
Contract No. S00W235A00  
Case no SDG\_K3187

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

REPORT GUIDES

Page 2

SUMMARY DATA SECTION

Page 2

Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 06/22/11

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

**LAB SAMPLE SUMMARY**

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

LAB	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
S106028-01	B28NP1-A1		WATER		RC-194	RC-194, 1102161	02/09/11 14:40
S106028-02	B28NP1-B1		WATER		RC-194	RC-194, 1102161	02/09/11 14:40
S106028-03	B28NP1-B2		WATER		RC-194	RC-194, 1102161	02/09/11 14:40
S106028-04	B28NP1-C1		WATER		RC-194	RC-194, 1102161	02/09/11 14:40
S106028-05	Lab Control Sample		WATER		RC-194		
S106028-06	Method Blank		WATER		RC-194		

LAB SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-LS  
 Version 3.06  
 Report date 06/22/11

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

**QC SUMMARY**

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7502	RC-194, 1102161	B28NP1-A1	WATER		0.016 L		06/01/11 112	S106028-01		7502-001
		B28NP1-B1	WATER		0.047 L		06/01/11 112	S106028-02		7502-002
		B28NP1-B2	WATER		0.048 L		06/01/11 112	S106028-03		7502-003
		B28NP1-C1	WATER		0.050 L		06/01/11 112	S106028-04		7502-004
		Method Blank	WATER					S106028-06		7502-006
		Lab Control Sample	WATER					S106028-05		7502-005

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-QS  
 Version 3.06  
 Report date 06/22/11

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

**PREP BATCH SUMMARY**

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Beta Counting										
SR	WATER	Total Strontium in Water	7302-074	10.4	4			1	1	

Duplicates and Spikes are those with original sample in the QC Batch of some Client sample in this SDG.  
 Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-PBS  
 Version 3.06  
 Report date 06/22/11

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

**LAB WORK SUMMARY**

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

LAB SAMPLE COLLECTED RECEIVED	CLIENT SAMPLE ID LOCATION CUSTODY	SAF No	MATRIX	PLANCHET	TEST	SUP- FIX	ANALYZED	REVIEWED	BY	METHOD
S106028-01 02/09/11 06/01/11	B28NP1-A1 RC-194, 1102161	RC-194	WATER	7502-001	SR		06/14/11	06/16/11	BW	Total Strontium in Water
S106028-02 02/09/11 06/01/11	B28NP1-B1 RC-194, 1102161	RC-194	WATER	7502-002	SR		06/14/11	06/16/11	BW	Total Strontium in Water
S106028-03 02/09/11 06/01/11	B28NP1-B2 RC-194, 1102161	RC-194	WATER	7502-003	SR		06/14/11	06/16/11	BW	Total Strontium in Water
S106028-04 02/09/11 06/01/11	B28NP1-C1 RC-194, 1102161	RC-194	WATER	7502-004	SR		06/14/11	06/16/11	BW	Total Strontium in Water
S106028-05	Lab Control Sample RC-194	RC-194	WATER	7502-005	SR		06/14/11	06/16/11	BW	Total Strontium in Water
S106028-06	Method Blank RC-194	RC-194	WATER	7502-006	SR		06/14/11	06/16/11	BW	Total Strontium in Water

**COUNTS OF TESTS BY SAMPLE TYPE**

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
SR	RC-194	Total Strontium in Water	SRTOT_SEP_PRECIP_GPC	4			1	1		6
<b>TOTALS</b>				4			1	1		6

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-LWS  
 Version 3.06  
 Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND  
SAMPLE DELIVERY GROUP K3187

7502-006

Method Blank

METHOD BLANK

SDG <u>7502</u>	Client/Case no <u>Hanford</u>	<u>SDG K3187</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S106028-06</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7502-006</u>	Material/Matrix _____	<u>WATER</u>
	SAF No <u>RC-194</u>	

ANALYTE	CAS NO	RESULT pCi/L	2 $\sigma$ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Total Strontium	SR-RAD	1.06	17	<u>28.6</u>	2.00	U	SR

QC-BLANK #78707

Lab id <u>EBRLNE</u>
Protocol <u>Hanford1</u>
Version <u>Ver 1.0</u>
Form <u>DVD-US</u>
Version <u>3.06</u>
Report date <u>06/22/11</u>

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

7502-005

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7502</u>	Client/Case no <u>Hanford</u> SDG <u>K3187</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A00</u>
Lab sample id <u>S106028-05</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id <u>7502-005</u>	Material/Matrix <u>WATER</u>
	SAF No <u>RC-194</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 LMTS (TOTAL)	PROTOCOL LIMITS
Total Strontium	916	56	<u>25.8</u>	2.00	SR	954	38	96	82-118	80-120

QC-LCS #78706



EBERLINE ANALYTICAL / RICHMOND  
 SAMPLE DELIVERY GROUP K3187

7502-002

B28NP1-B1

DATA SHEET

SDG <u>7502</u>	Client/Case no <u>Hanford</u>	SDG <u>K3187</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S106028-02</u>	Client sample id <u>B28NP1-B1</u>	
Dept sample id <u>7502-002</u>	Location/Matrix _____	<u>WATER</u>
Received <u>06/01/11</u>	Collected/Volume <u>02/09/11 14:40</u>	<u>0.047 L</u>
	Custody/SAF No <u>RC-194, 1102161</u>	<u>RC-194</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Total Strontium	SR-RAD	295	15	<u>5.77</u>	2.00		SR

Lab id <u>EBRLNE</u>
Protocol <u>Hanford1</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/22/11</u>





**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

**LAB METHOD SUMMARY**

TOTAL STRONTIUM IN WATER  
BETA COUNTING

Test SR Matrix WATER  
SDG 7502  
Contact N. Joseph Verville

Client Hanford  
Contract No. S00W235A00  
Contract SDG K3187

**RESULTS**

LAB	RAW	SUF-		Total
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Strontium
Preparation batch 7302-074				
S106028-01		7502-001	B28NP1-A1	640
S106028-02		7502-002	B28NP1-B1	295
S106028-03		7502-003	B28NP1-B2	271
S106028-04		7502-004	B28NP1-C1	167
S106028-05		7502-005	Lab Control Sample	ok
S106028-06		7502-006	Method Blank	U

Nominal values and limits from method      RDLs (pCi/L)      2.00

**METHOD PERFORMANCE**

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-	
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/L	L	FAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED	DETECTOR
Preparation batch 7302-074      2σ prep error 10.4 %      Reference Lab Notebook No. 7302 pg.74														
S106028-01		B28NP1-A1	<u>18.0</u>	0.0160			94	100	125	06/14/11	06/14	GRB-231		
S106028-02		B28NP1-B1	<u>5.77</u>	0.0470			94	100	125	06/14/11	06/14	GRB-221		
S106028-03		B28NP1-B2	<u>5.43</u>	0.0480			93	100	125	06/14/11	06/14	GRB-222		
S106028-04		B28NP1-C1	<u>5.85</u>	0.0500			86	100	125	06/14/11	06/14	GRB-232		
S106028-05		Lab Control Sample	<u>25.8</u>	0.0100			95	100		06/14/11	06/14	GRB-217		
S106028-06		Method Blank	<u>28.6</u>	0.0100			88	200		06/14/11	06/14	GRB-232		

Nominal values and limits from method      2.00      0.0100      40-110      100      180

PROCEDURES      REFERENCE      SRTOT\_SEP\_PRECIP\_GPC  
SPP-062      Sample Aliquoting, rev 1  
CP-380      Strontium in Water Samples, rev 5

AVERAGES ± 2 SD      MDA 14.9 ± 21.4  
FOR 6 SAMPLES      YIELD 92 ± 7

Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-LMS  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG\_K3187

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG\_K3187

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

REPORT GUIDES

Page 3

SUMMARY DATA SECTION

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Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

- U The RESULT is less than the MDA (Minimum Detectable Activity).

REPORT GUIDES

Page 4

SUMMARY DATA SECTION

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Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG\_K3187

GUIDE, cont.

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
  - B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.
- Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.
- For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.
- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
  - H Similar to 'L' except the recovery was high.
  - P The RESULT is 'preliminary'.
  - X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
  - 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- \* An MDA is underlined if it is bigger than its RDL.

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

DATA SHEET

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
 Contract No. S0owz35A00  
 Case no SDG K3187

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of RESULT, including that introduced by rounding the result prior to printing.
 

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of ADDED.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.05  
 Report date 06/22/11

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SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:
  1. A fixed percentage specified in the protocol.

REPORT GUIDES

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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
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Case no SDG K3187

DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
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Case no SDG K3187

MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- \* The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- \* The second limits are protocol defined upper and lower QC limits

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
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Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
Contract No. S00W235A00  
Case no SDG\_K3187

MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- \* The recovery is underlined (out of spec) if it is outside either of these ranges.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7502  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

REPORT GUIDES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
  - \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.
- MDAs are underlined if greater than the printed RDL.
- \* Aliquots are underlined if less than the nominal value specified for the method.
  - \* Preparation factors are underlined if greater than the nominal value specified for the method.
  - \* Dilution factors are underlined if greater than the nominal value specified for the method.
  - \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
  - \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
  - \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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SDG 7502  
 Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

METHOD SUMMARY

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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SAMPLE DELIVERY GROUP K3187

SDG 7502  
 Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 06/22/11





# RICHMOND, CA LABORATORY

## SAMPLE RECEIPT CHECKLIST

Client: W.C. HANFORD City RICHLAND State WA

Date/Time received 6/1/11 10:00 CoC No. PC-194 K3159

Container I.D. No. BOX Requested TAT (Days) 30 P.O. Received Yes [ ] No [ ]

### INSPECTION

- 1. Custody seals on shipping container intact? Yes [ ] No [ ] N/A [  ]
- 2. Custody seals on shipping container dated & signed? Yes [ ] No [ ] N/A [  ]
- 3. Custody seals on sample containers intact? Yes [ ] No [ ] N/A [  ]
- 4. Custody seals on sample containers dated & signed? Yes [ ] No [ ] N/A [  ]

5. Packing material is: Wet [ ] Dry [ ]

6. Number of samples in shipping container: 35 Sample Matrix SOIL, WATER

7. Number of containers per sample: 1 (Or see CoC \_\_\_\_\_)

8. Samples are in correct container Yes [  ] No [ ]

9. Paperwork agrees with samples? Yes [ ] No [  ]

10. Samples have: Tape [ ] Hazard labels [ ] Rad labels [ ] Appropriate sample labels [  ]

11. Samples are: In good condition [  ] Leaking [ ] Broken Container [ ] Missing [  ]

12. Samples are: Preserved [  ] Not preserved [ ] pH \_\_\_\_\_ Preservative \_\_\_\_\_

13. Describe any anomalies:  
Sample NP2 (WATER) MISSING #19, but has 2 tube for #20

14. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date \_\_\_\_\_

15. Inspected by Jfk Date: 6/1/11 Time: 15:30

Customer Sample No.	Beta/Gamma com	Ion Chamber mR/hr	Wide	Customer Sample No.	Beta/Gamma com	Ion Chamber mR/hr	Wide
<u>All samples &lt; 80</u>							

Ion Chamber Ser. No. \_\_\_\_\_  
Alpha Meter Ser. No. \_\_\_\_\_  
Beta/Gamma Meter Ser. No. 100482

Calibration date \_\_\_\_\_  
Calibration date \_\_\_\_\_  
Calibration date 24 Sep. 2010



# EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION

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Richmond, California 94804-3849

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www.eberlineservices.com

June 23, 2011

Ms. Joan Kessner  
Washington Closure Hanford  
2620 Fermi Avenue  
MSIN H4-21  
Richland, WA 99352



Reference: **P.O. #S00W235A00**  
**Eberline Analytical S1-06-036-7506, SDG K3187**

Dear Ms. Kessner:

Enclosed is the data report for one soil sample designated under SAF No. RC-194, received at Eberline Analytical on June 1, 2011. The sample was analyzed according to the accompanying Lionville Laboratory Custody Transfer Record.

Please call if you have any questions concerning this report.

Sincerely,

N. Joseph Verville  
Client Services Manager

NJV/ljb

Enclosure: Data Package

## 1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K3187 was composed of one soil sample designated under SAF No. RC-194 with a Project Designation of: Soil/Sediment Sampling – Integrated Remedial Investigation/Feasibility Study.

The sample was 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 June 22, 2011.

## 2.0 ANALYSIS NOTES

### 2.1 Strontium-90 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."**

  
\_\_\_\_\_  
N. Joseph Verville  
Client Services Manager

6/23/11  
\_\_\_\_\_  
Date

EBERLINE ANALYTICAL / RICHMOND  
SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

Client Hanford  
Contract No. S00W235A00  
Case no SDG\_K3187

S U M M A R Y   D A T A   S E C T I O N

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*VP*

Prepared by \_\_\_\_\_

Reviewed by *N. J. Verville*

Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-TOC  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

REPORT GUIDES

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SUMMARY DATA SECTION

Page 1

Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
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Version 3.06  
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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

GUIDE , c o n t .

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

REPORT GUIDES

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SUMMARY DATA SECTION

Page 2

Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3187

LAB SAMPLE SUMMARY

SDG 7506  
Contact N. Joseph Verville

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

LAB	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
S106036-01	B28NP1		SOIL		RC-194	RC-194, 1102161	02/09/11 14:40
S106036-02	Lab Control Sample		SOIL		RC-194		
S106036-03	Method Blank		SOIL		RC-194		
S106036-04	Duplicate (S106036-01)		SOIL		RC-194		02/09/11 14:40

LAB SUMMARY

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SUMMARY DATA SECTION

Page 3

Lab id EBRLINE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-LS  
Version 3.06  
Report date 06/22/11

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

SDG 7506  
 Contact N. Joseph Verville

**QC SUMMARY**

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
7506	RC-194, 1102161	B28NP1	SOIL	95.4	9.07 g		06/01/11 112	S106036-01	7506-001
		Method Blank	SOIL					S106036-03	7506-003
		Lab Control Sample	SOIL					S106036-02	7506-002
		Duplicate (S106036-01)	SOIL	95.4	9.07 g		06/01/11 112	S106036-04	7506-004

QC SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-QS  
 Version 3.06  
 Report date 06/22/11

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

SDG 7506  
 Contact N. Joseph Verville

**PREP BATCH SUMMARY**

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

TEST MATRIX	METHOD	PREPARATION ERROR BATCH	2σ %	CLIENT MORE	PLANCHETS ANALYZED			QUALI- FIERS
					RE	BLANK	LCS DUP/ORIG MS/ORIG	
Beta Counting								
SR	SOIL	Total Strontium in Solids	7302-079	10.4	1	1	1	1/1

Duplicates and Spikes are those with original sample in the QC Batch of some Client sample in this SDG.  
 Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-PBS  
 Version 3.06  
 Report date 06/22/11

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

SDG 7506  
 Contact N. Joseph Verville

**LAB WORK SUMMARY**

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

LAB SAMPLE	CLIENT SAMPLE ID				SUF-					
COLLECTED	LOCATION	MATRIX			FIX	ANALYZED	REVIEWED	BY	METHOD	
RECEIVED	CUSTODY	SAF No	PLANCHET	TEST						
S106036-01 02/09/11 06/01/11	B28NP1 RC-194, 1102161 RC-194	SOIL	7506-001	SR		06/16/11	06/20/11	BW	Total Strontium in Solids	
S106036-02	Lab Control Sample RC-194	SOIL	7506-002	SR		06/16/11	06/20/11	BW	Total Strontium in Solids	
S106036-03	Method Blank RC-194	SOIL	7506-003	SR		06/16/11	06/20/11	BW	Total Strontium in Solids	
S106036-04 02/09/11 06/01/11	Duplicate (S106036-01) RC-194	SOIL	7506-004	SR		06/16/11	06/20/11	BW	Total Strontium in Solids	

**COUNTS OF TESTS BY SAMPLE TYPE**

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
SR	RC-194	Total Strontium in Solids	SRTOT_SEP_PRECIP_GPC	1			1	1	1		4
<b>TOTALS</b>				1			1	1	1		4

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

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Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-LWS  
 Version 3.06  
 Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

7506-003

Method Blank

METHOD BLANK

SDG <u>7506</u>	Client/Case no <u>Hanford</u>	SDG <u>K3187</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S106036-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7506-003</u>	Material/Matrix _____	<u>SOIL</u>
	SAF No <u>RC-194</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Total Strontium	SR-RAD	-0.032	0.15	0.312	1.00	U	SR

QC-BLANK #78719

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

7506-002

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7506</u> Contact <u>N. Joseph Verville</u>  Lab sample id <u>S106036-02</u> Dept sample id <u>7506-002</u>	Client/Case no <u>Hanford</u> <u>SDG K3187</u> Contract No. <u>S00W235A00</u>  Client sample id <u>Lab Control Sample</u> Material/Matrix _____ <u>SOIL</u> SAF No <u>RC-194</u>
---	---

ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ LMTS	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS	TEST	pCi/g	¢	(TOTAL)	LIMITS
Total Strontium	9.22	0.57	0.266	1.00		SR	8.67	0.35	106	80-120    80-120

QC-LCS #78718

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

7506-004

B28NP1

**DUPLICATE**

SDG <u>7506</u>	Client/Case no <u>Hanford</u>	SDG <u>K3187</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
<b>DUPLICATE</b>	<b>ORIGINAL</b>	
Lab sample id <u>S106036-04</u>	Lab sample id <u>S106036-01</u>	Client sample id <u>B28NP1</u>
Dept sample id <u>7506-004</u>	Dept sample id <u>7506-001</u>	Location/Matrix <u>SOIL</u>
	Received <u>06/01/11</u>	Collected/Weight <u>02/09/11 14:40 9.07 g</u>
% solids <u>95.4</u>	% solids <u>95.4</u>	Custody/SAF No <u>RC-194, 1102161 RC-194</u>

ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI-	ORIGINAL	2σ ERR	MDA	QUALI-	RPD	3σ	DER
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS TEST		pCi/g	(COUNT)	pCi/g	FIERS	%	TOT
Total Strontium	6.76	0.49	0.274	1.00	SR	6.74	0.49	0.270		0	27	0

QC-DUP#1 78720

DUPLICATES

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SUMMARY DATA SECTION

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Lab id <u>EBRLNE</u>
Protocol <u>Hanford1</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>06/22/11</u>

EBERLINE ANALYTICAL / RICHMOND  
SAMPLE DELIVERY GROUP K3187

7506-001

B28NP1

DATA SHEET

SDG <u>7506</u>	Client/Case no <u>Hanford</u>	SDG <u>K3187</u>
Contact <u>N. Joseph Verville</u>	Contract <u>No. S00W235A00</u>	
Lab sample id <u>S106036-01</u>	Client sample id <u>B28NP1</u>	
Dept sample id <u>7506-001</u>	Location/Matrix <u>soil</u>	
Received <u>06/01/11</u>	Collected/Weight <u>02/09/11 14:40 9.07 g</u>	
% solids <u>95.4</u>	Custody/SAF No <u>RC-194, 1102161 RC-194</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Total Strontium	SR-RAD	6.74	0.49	0.270	1.00		SR

Lab id <u>EBRLNE</u>
Protocol <u>Hanford1</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/22/11</u>

**EBERLINE ANALYTICAL/RICHMOND**

SAMPLE DELIVERY GROUP K3187

**LAB METHOD SUMMARY**

TOTAL STRONTIUM IN SOLIDS  
BETA COUNTING

Test SR Matrix SOIL  
SDG 7506  
Contact N. Joseph Verville

Client Hanford  
Contract No. S00W235A00  
Contract SDG K3187

**RESULTS**

LAB	RAW	SUF-		Total
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Strontium
Preparation batch 7302-079				
S106036-01		7506-001	B28NP1	6.74
S106036-02		7506-002	Lab Control Sample	ok
S106036-03		7506-003	Method Blank	U
S106036-04		7506-004	Duplicate (S106036-01)	ok
Nominal values and limits from method			RDLs (pCi/g)	1.00

**METHOD PERFORMANCE**

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7302-079			2σ prep error 10.4 % Reference Lab Notebook No. 7302 pg.79												
S106036-01		B28NP1	0.270	1.00			97	100				127	06/16/11	06/16	GRB-229
S106036-02		Lab Control Sample	0.266	1.00			93	100					06/16/11	06/16	GRB-230
S106036-03		Method Blank	0.312	1.00			95	100					06/16/11	06/16	GRB-232
S106036-04		Duplicate (S106036-01)	0.274	1.00			97	100				127	06/16/11	06/16	GRB-231
Nominal values and limits from method			1.00	1.00			40-110	100				180			

PROCEDURES REFERENCE SRTOT\_SEP\_PRECIP\_GPC  
 SPP-061 Determination of Moisture Content in Solid Samples rev 0  
 SPP-060 Soil Preparation, rev 0  
 SPP-070 Soil Dissolution, < 1.0g Aliquot, rev 1  
 CP-383 Strontium in Dissolved Solid of < 5.0g Aliquot, rev 4

AVERAGES ± 2 SD MDA 0.280 ± 0.043  
 FOR 4 SAMPLES YIELD 96 ± 4

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-LMS  
 Version 1.06  
 Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

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SUMMARY DATA SECTION

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Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG\_K3187

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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Lab id EBRLNE  
Protocol Hanford1  
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Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

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SUMMARY DATA SECTION

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Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
 Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
  - B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.
- Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.
- For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.
- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
  - H Similar to 'L' except the recovery was high.
  - P The RESULT is 'preliminary'.
  - X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
  - 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- \* An MDA is underlined if it is bigger than its RDL.

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SUMMARY DATA SECTION

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Lab id EBRLNE  
 Protocol Hanford1  
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SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
Contract No. S00W235A00  
Case no SDG\_K3187

DATA SHEET

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
 Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of RESULT, including that introduced by rounding the result prior to printing.
 

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of ADDED.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
 Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:
  1. A fixed percentage specified in the protocol.

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 Protocol Hanford1  
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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

GUIDE , cont .

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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Protocol Hanford1  
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SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- \* The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- \* The second limits are protocol defined upper and lower QC limits

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SUMMARY DATA SECTION

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Lab id EBERLINE  
Protocol Hanford1  
Version Ver 1.0  
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Version 3.06  
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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506

Contact N. Joseph Verville

Client Hanford

Contract No. S00W235A00

Case no SDG K3187

GUIDE, cont.

MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- \* The recovery is underlined (out of spec) if it is outside either of these ranges.

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SUMMARY DATA SECTION

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Lab id EBRLNE

Protocol Hanford1

Version Ver 1.0

Form DVD-RG

Version 3.06

Report date 06/22/11

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SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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Protocol Hanford1  
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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
 Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
  - \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.
- MDAs are underlined if greater than the printed RDL.
- \* Aliquots are underlined if less than the nominal value specified for the method.
  - \* Preparation factors are underlined if greater than the nominal value specified for the method.
  - \* Dilution factors are underlined if greater than the nominal value specified for the method.
  - \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
  - \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
  - \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

Lab id EBRLNE  
 Protocol Hanford1  
 Version Ver 1.0  
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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
Contact N. Joseph Verville

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Client Hanford  
Contract No. S00W235A00  
Case no SDG K3187

METHOD SUMMARY

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE  
Protocol Hanford1  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 06/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3187

SDG 7506  
 Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
 Contract No. S00W235A00  
 Case no SDG K3187

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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# RICHMOND, CA LABORATORY

## SAMPLE RECEIPT CHECKLIST

Client: W.C. HANFORD City RICHLAND State WA

Date/Time received 6/1/11 10:00 CoC No. PC-194 K3159

Container I.D. No. BOX Requested TAT (Days) 30 P.O. Received Yes [ ] No [ ]

### INSPECTION

1. Custody seals on shipping container intact? Yes [ ] No [ ] N/A [  ]
2. Custody seals on shipping container dated & signed? Yes [ ] No [ ] N/A [  ]
3. Custody seals on sample containers intact? Yes [ ] No [ ] N/A [  ]
4. Custody seals on sample containers dated & signed? Yes [ ] No [ ] N/A [  ]
5. Packing material is: Wet [ ] Dry [ ]
6. Number of samples in shipping container: 35 Sample Matrix SOIL, WATER
7. Number of containers per sample: 1 (Or see CoC \_\_\_\_\_)
8. Samples are in correct container Yes [  ] No [ ]
9. Paperwork agrees with samples? Yes [ ] No [  ]
10. Samples have: Tape [ ] Hazard labels [ ] Rad labels [ ] Appropriate sample labels [  ]
11. Samples are: In good condition [  ] Leaking [ ] Broken Container [ ] Missing [  ]
12. Samples are: Preserved [  ] Not preserved [ ] pH \_\_\_\_\_ Preservative \_\_\_\_\_
13. Describe any anomalies:  
Sample NP2 (WATER) MISSING #19, but has 2 tube for #20

14. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date \_\_\_\_\_

15. Inspected by Jfk Date: 6/1/11 Time: 15:30

Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	Wide	Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	Wide
<u>All samples &lt; 80</u>							

Ion Chamber Ser. No. \_\_\_\_\_ Calibration date \_\_\_\_\_  
 Alpha Meter Ser. No. \_\_\_\_\_ Calibration date \_\_\_\_\_  
 Beta/Gamma Meter Ser. No. 100482 Calibration date 24 Sep. 2010