



EBERLINE
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REVISION 1

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February 12, 2010 (original)
April 14, 2010 (revised)

Mr. Michael Neely
CH2M Hill Plateau Remediation Company
P.O. Box 1600
Mail Stop - B6-06
Richland, WA 99352

Reference: **P.O. #33677**
Eberline Analytical S0-02-030-7762, SDG H4152

Dear Mr. Neely:

Enclosed is a data report for one water sample designated under SAF No. F10-023 received at Eberline Analytical on February 5, 2010. The sample was analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

Sincerely,

N. Joseph Verville
Client Services Manager

NJV/ijb

Enclosure: Case Narrative

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JUL 14 2010
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Eberline Analytical
W.O. No. S0-02-030-7762

CH2M Hill Plateau Remediation Company
SDG H4152

Case Narrative

Page 1 of 2

1.0 GENERAL

CH2M Hill Plateau Remediation Company (CHPRC) Sample Delivery Group H4152 was composed of one water sample designated under SAF No. F10-023 with a Project Designation of: ARRA Upper & Lower ALE Building Science Laboratory – QC.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist.

Per the request of CHPRC (Dana Widrig), Eberline Analytical performed all the rad analyses listed in SAF F10-023.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analysis

Eberline Analytical's gross alpha/gross beta GPC efficiency vs. mg residue counted calibration ranges from 0-250 mg, however the reporting software reporting limits were set-up to reflect a calibration range of 5-250 mg. The reporting software limits have been changed to reflect the entire calibration range of 0-250 mg. The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.2 Tritium Analysis

The tritium QC MS analysis data sheet denotes an "X" qualifier, which indicates that some data was manually entered and may need to be double checked; in this case the "added amount" was manually entered, and subsequently double checked. The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analysis

The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.4 Strontium-90 Analysis

The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.5 Technetium-99 Analysis

The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.6 Isotopic Thorium Analysis

The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.7 Isotopic Uranium Analysis

The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.8 Isotopic Plutonium Analysis

The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.9 Americium-241 and Curium-243/244 Analysis

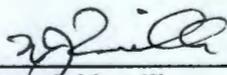
The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. No problems were encountered during the course of the analyses.

2.10 Gamma Spectroscopy

All gamma spectroscopy MDA's were less than the RDL's for those nuclides that have an RDL. The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD is calculated, and there is no associated control limit. 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
Senior Program Manager

4/14/10
Date

Problem and Discrepancy Report

Eberline

SDG H4152

1. The data package has the following issues:

- a) Lab Method Summary, Gross Alpha and Gross Beta, "RESID" in mg is out of limits. Please discuss in narrative.

Resolution: *Provide comment.*

Lab Response: **Provided comment in the Case Narrative.**

- b) MDA for gamma emitters was >RDL. Please discuss in narrative.

Resolution: *Provide comment.*

Lab Response: **Provided comment in the Case Narrative.**

Please correct the issues and resubmit the hard copy data package.

SDG 7762
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Case no SDG_H4152

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

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UB
 Prepared by _____

 Reviewed by _____

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-TOC
 Version 3.06
 Report date 04/14/10

SDG 7762
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG H4152

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.

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.05
 Report date 04/14/10

SDG 7762
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
 Contract No. 33677
 Case no SDG H4152

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

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 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

SDG 7762
 Contact N. Joseph Verville

LAB SAMPLE SUMMARY

Client CHPRC
 Contract No. 33677
 Case no SDG H4152

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
S002030-01	B23K51	FT8	WATER		F10-023	F10-023-002	02/04/10 08:00
S002030-02	Lab Control Sample		WATER		F10-023		
S002030-03	Method Blank		WATER		F10-023		
S002030-04	Duplicate (S002030-01)	FT8	WATER		F10-023		02/04/10 08:00
S002030-05	Spike (S002030-01)	FT8	WATER		F10-023		02/04/10 08:00
S002030-06	Lab Control Sample		WATER		F10-023		
S002030-07	Method Blank		WATER		F10-023		
S002030-08	Duplicate (S002030-01)	FT8	WATER		F10-023		02/04/10 08:00

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LS
 Version 3.06
 Report date 04/14/10

EBERLINE ANALYTICAL REVISION 1

SAMPLE DELIVERY GROUP H4152

QC SUMMARY

SDG 7762
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Case no SDG H4152

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
7762	F10-023-002	B23K51	WATER		6.0 L		02/05/10	1	S002030-01	7762-001
		Method Blank	WATER						S002030-03	7762-003
		Method Blank	WATER						S002030-07	7762-007
		Lab Control Sample	WATER						S002030-02	7762-002
		Lab Control Sample	WATER						S002030-06	7762-006
		Duplicate (S002030-01)	WATER		6.0 L		02/05/10	1	S002030-04	7762-004
		Duplicate (S002030-01)	WATER		6.0 L		02/05/10	1	S002030-08	7762-008
		Spike (S002030-01)	WATER		6.0 L		02/05/10	1	S002030-05	7762-005

Lab id EBRINE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-QS
 Version 3.06
 Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

SDG 7762
Contact N. Joseph Verville

PREP BATCH SUMMARY

Client CHPRC
Contract No. 33677
Case no SDG H4152

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALIFIERS	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Alpha Spectroscopy										
PU	WATER	Plutonium, Isotopic in Water	7240-143	8.0	1			1	1	1/1
TH	WATER	Thorium, Isotopic in Water	7240-143	8.0	1			1	1	1/1
TP	WATER	Americium 241/Curium	7240-143	8.0	1			1	1	1/1
U	WATER	Uranium, Isotopic in Water	7240-143	8.0	1			1	1	1/1
Beta Counting										
SR	WATER	Total Strontium in Water	7240-143	10.4	1			1	1	1/1
TC	WATER	Technetium 99 in Water	7240-143	13.2	1			1	1	1/1
Gas Proportional Counting										
93A	WATER	Gross Alpha in Water	7240-143	20.6	1			1	1	1/1
93B	WATER	Gross Beta in Water	7240-143	11.0	1			1	1	1/1
Gamma Spectroscopy										
GAM	WATER	Gamma Emitters	7240-143	7.0	1			1	1	1/1
Liquid Scintillation Counting										
H	WATER	Tritium in Water	7240-143	10.0	1			1	1	1/1 1/1 X
NI_L	WATER	Nickel-63 in Liquid	7240-143	11.2	1			1	1	1/1

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY
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SUMMARY DATA SECTION
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Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

SDG 7762
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Case no SDG H4152

LAB WORK SUMMARY

LAB SAMPLE	CLIENT SAMPLE ID	COLLECTED	LOCATION	MATRIX	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD
RECEIVED	CUSTODY	SAF No					FIX				
S002030-01	B23K51				7762-001	93A/93		02/09/10	02/11/10	BW	Gross Alpha in Water
02/04/10	FT8			WATER	7762-001	93B/93		02/09/10	02/11/10	BW	Gross Beta in Water
02/05/10	F10-023-002	F10-023			7762-001	GAM		02/08/10	02/11/10	CSS	Gamma Emitters
					7762-001	H		02/08/10	02/11/10	BW	Tritium in Water
					7762-001	NI_L		02/10/10	02/11/10	BW	Nickel-63 in Liquid
					7762-001	PU		02/11/10	02/11/10	BW	Plutonium, Isotopic in Water
					7762-001	SR		02/10/10	02/12/10	BW	Total Strontium in Water
					7762-001	TC		02/09/10	02/11/10	BW	Technetium 99 in Water
					7762-001	TH		02/11/10	02/11/10	BW	Thorium, Isotopic in Water
					7762-001	TP		02/11/10	02/12/10	BW	Americium 241/Curium
					7762-001	U		02/10/10	02/11/10	BW	Uranium, Isotopic in Water
S002030-02	Lab Control Sample				7762-002	93A/93		02/09/10	02/11/10	BW	Gross Alpha in Water
				WATER	7762-002	93B/93		02/09/10	02/11/10	BW	Gross Beta in Water
		F10-023			7762-002	GAM		02/08/10	02/11/10	CSS	Gamma Emitters
					7762-002	H		02/08/10	02/11/10	BW	Tritium in Water
					7762-002	NI_L		02/10/10	02/11/10	BW	Nickel-63 in Liquid
					7762-002	TC		02/09/10	02/11/10	BW	Technetium 99 in Water
					7762-002	TP		02/11/10	02/12/10	BW	Americium 241/Curium
					7762-002	U		02/10/10	02/11/10	BW	Uranium, Isotopic in Water
S002030-03	Method Blank				7762-003	93A/93		02/10/10	02/11/10	BW	Gross Alpha in Water
				WATER	7762-003	93B/93		02/10/10	02/11/10	BW	Gross Beta in Water
		F10-023			7762-003	GAM		02/08/10	02/11/10	CSS	Gamma Emitters
					7762-003	H		02/08/10	02/11/10	BW	Tritium in Water
					7762-003	NI_L		02/10/10	02/11/10	BW	Nickel-63 in Liquid
					7762-003	TC		02/10/10	02/11/10	BW	Technetium 99 in Water
					7762-003	TP		02/11/10	02/12/10	BW	Americium 241/Curium
					7762-003	U		02/10/10	02/11/10	BW	Uranium, Isotopic in Water
S002030-04	Duplicate (S002030-01)				7762-004	93A/93		02/09/10	02/11/10	BW	Gross Alpha in Water
02/04/10	FT8			WATER	7762-004	93B/93		02/09/10	02/11/10	BW	Gross Beta in Water
02/05/10		F10-023			7762-004	GAM		02/10/10	02/11/10	CSS	Gamma Emitters
					7762-004	H		02/08/10	02/11/10	BW	Tritium in Water
					7762-004	NI_L		02/10/10	02/11/10	BW	Nickel-63 in Liquid
					7762-004	TC		02/09/10	02/11/10	BW	Technetium 99 in Water
					7762-004	TP		02/11/10	02/12/10	BW	Americium 241/Curium
					7762-004	U		02/10/10	02/11/10	BW	Uranium, Isotopic in Water

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LWS
Version 3.06
Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND
SAMPLE DELIVERY GROUP H4152

REVISION 1

SDG 7762
Contact N. Joseph Verville

WORK SUMMARY, cont.

Client CHPRC
Contract No. 33677
Case no SDG H4152

LAB SAMPLE	CLIENT SAMPLE ID	MATRIX	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD
COLLECTED	LOCATION								
RECEIVED	CUSTODY	SAF No			FIX				
S002030-05	Spike (S002030-01)		7762-005	H		02/08/10	02/11/10	BW	Tritium in Water
02/04/10	FT8								
02/05/10		F10-023							
S002030-06	Lab Control Sample		7762-006	PU		02/11/10	02/11/10	BW	Plutonium, Isotopic in Water
			7762-006	SR		02/10/10	02/12/10	BW	Total Strontium in Water
		F10-023	7762-006	TH		02/11/10	02/11/10	BW	Thorium, Isotopic in Water
S002030-07	Method Blank		7762-007	PU		02/11/10	02/11/10	BW	Plutonium, Isotopic in Water
			7762-007	SR		02/10/10	02/12/10	BW	Total Strontium in Water
		F10-023	7762-007	TH		02/11/10	02/11/10	BW	Thorium, Isotopic in Water
S002030-08	Duplicate (S002030-01)		7762-008	PU		02/11/10	02/11/10	BW	Plutonium, Isotopic in Water
02/04/10	FT8		7762-008	SR		02/10/10	02/12/10	BW	Total Strontium in Water
02/05/10		F10-023	7762-008	TH		02/11/10	02/11/10	BW	Thorium, Isotopic in Water

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
93A/93	F10-023	Gross Alpha in Water	900.0_ALPHABETA_GPC	1			1	1	1		4
93B/93	F10-023	Gross Beta in Water	900.0_ALPHABETA_GPC	1			1	1	1		4
GAM	F10-023	Gamma Emitters	GAMMA_GS	1			1	1	1		4
H	F10-023	Tritium in Water	906.0_H3_LSC	1			1	1	1	1	5
NI_L	F10-023	Nickel-63 in Liquid	NI63_LSC	1			1	1	1		4
PU	F10-023	Plutonium, Isotopic in Water	PUISO_PLATE_AEA	1			1	1	1		4
SR	F10-023	Total Strontium in Water	SRTOT_SEP_PRECIP_GPC	1			1	1	1		4
TC	F10-023	Technetium 99 in Water	TC99_TR_SEP_GPC	1			1	1	1		4
TH	F10-023	Thorium, Isotopic in Water	THISO_IE_PLATE_AEA	1			1	1	1		4
TP	F10-023	Americium 241/Curium	AMCMISO_IE_PLATE_AEA	1			1	1	1		4
U	F10-023	Uranium, Isotopic in Water	UIISO_PLATE_AEA	1			1	1	1		4
TOTALS				11			11	11	11	1	45

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
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WORK SUMMARY

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SUMMARY DATA SECTION

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EBERLINE ANALYTICAL / RICHMOND REVISION 1
 SAMPLE DELIVERY GROUP H4152

7762-003

Method Blank

METHOD BLANK

SDG <u>7762</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4152</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
Lab sample id <u>S002030-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7762-003</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>F10-023</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	0.346	0.90	1.73	3.00	U	93A
Gross Beta	12587-47-2	0.088	1.5	2.57	4.00	U	93B
Tritium	10028-17-8	-15.1	86	146	400	U	H
Nickel 63	13981-37-8	-0.038	1.6	2.83	15.0	U	NI_L
Technetium 99	14133-76-7	-1.47	1.8	4.88	15.0	U	TC
Uranium 233/234	U-233/234	-0.019	0.031	0.069	1.00	U	U
Uranium 235	15117-96-1	0	0.015	0.036	1.00	U	U
Uranium 238	U-238	-0.003	0.006	0.030	1.00	U	U
Americium 241	14596-10-2	-0.046	0.046	0.256	1.00	U	TP
Curium 242	15510-73-3	0	0.046	0.177	1.00	U	TP
Curium 243/244	CM-243/244	0.046	0.093	0.177	1.00	U	TP
Tin 126	15832-50-5	U		12.7		U	GAM
Beryllium 7	13966-02-4	U		54.3		U	GAM
Potassium 40	13966-00-2	U		103		U	GAM
Cobalt 60	10198-40-0	U		8.87	25.0	U	GAM
Ruthenium 106	13967-48-1	U		69.3		U	GAM
Antimony 125	14234-35-6	U		18.7		U	GAM
Cesium 134	13967-70-9	U		10.2		U	GAM
Cesium 137	10045-97-3	U		8.72	15.0	U	GAM
Europium 152	14683-23-9	U		21.4	50.0	U	GAM
Europium 154	15585-10-1	U		26.5	50.0	U	GAM
Europium 155	14391-16-3	U		17.0	50.0	U	GAM
Niobium 94	14681-63-1	U		8.09		U	GAM
Radium 226	13982-63-3	U		14.6		U	GAM
Radium 228	15262-20-1	U		33.0		U	GAM

QC-BLANK #72281

Lab id <u>EBRLNE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

7762-007

Method Blank

METHOD BLANK

SDG <u>7762</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4152</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
Lab sample id <u>S002030-07</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7762-007</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>F10-023</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Total Strontium	SR-RAD	-0.016	0.33	0.669	2.00	U	SR
Thorium 228	14274-82-9	0.042	0.084	0.202		U	TH
Thorium 230	14269-63-7	0.210	0.21	0.388	1.00	U	TH
Thorium 232	TH-232	0	0.042	0.161	1.00	U	TH
Plutonium 238	13981-16-3	0	0.14	0.342	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.071	0.273	1.00	U	PU

QC-BLANK #72304

Lab id <u>EBRLINE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

7762-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7762</u>	Client/Case no <u>CHPRC</u>	<u>SDG H4152</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
Lab sample id <u>S002030-02</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7762-002</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>F10-023</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
Gross Alpha	57.0	6.4	1.77	3.00		93A	56.0	2.2	102	64-136	70-130
Gross Beta	49.6	3.9	3.21	4.00		93B	54.0	2.2	92	80-120	70-130
Tritium	2330	140	146	400		H	2360	94	99	82-118	80-120
Nickel 63	229	6.1	2.81	15.0		NI_L	262	10	87	84-116	80-120
Technetium 99	1310	25	4.07	15.0		TC	1200	48	109	77-123	80-120
Uranium 233/234	9.82	0.44	0.220	1.00		U	9.66	0.39	102	85-115	80-120
Uranium 235	7.63	0.38	0.038	1.00		U	7.84	0.31	97	85-115	80-120
Uranium 238	10.3	0.46	0.208	1.00		U	10.5	0.42	98	85-115	80-120
Americium 241	11.9	1.3	0.285	1.00		TP	12.2	0.49	98	79-121	80-120
Curium 243/244	11.0	1.2	0.222	1.00		TP	10.8	0.43	102	78-122	80-120
Cobalt 60	551	31	13.9	25.0		GAM	520	21	106	84-116	80-120
Cesium 137	559	28	<u>21.9</u>	15.0		GAM	540	22	104	85-115	80-120

QC-LCS #72280

LAB CONTROL SAMPLES

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Lab id <u>EBRLNE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

LAB CONTROL SAMPLE

SDG <u>7762</u>	Client/Case no <u>CHPRC</u>	<u>SDG H4152</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33577</u>	
Lab sample id <u>S002030-06</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7762-006</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>F10-023</u>	

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMES (TOTAL)	PROTOCOL LIMITS
Total Strontium	20.8	1.2	0.548	2.00		SR	19.7	0.79	106	80-120	80-120
Thorium 230	14.5	1.7	0.431	1.00		TH	14.2	0.57	102	77-123	80-120
Plutonium 238	14.8	1.9	0.291	1.00		PU	17.3	0.69	86	80-120	80-120
Plutonium 239/240	16.5	2.1	0.291	1.00		PU	19.8	0.79	83	80-120	80-120

QC-LCS #72303

Lab id <u>EBRLNE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

7762-004

B23K51

DUPLICATE

SDG <u>7762</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4152</u>
Contact <u>N. Joseph Verville</u>	Contract <u>No. 33677</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>S002030-04</u>	Lab sample id <u>S002030-01</u>	Client sample id <u>B23K51</u>
Dept sample id <u>7762-004</u>	Dept sample id <u>7762-001</u>	Location/Matrix <u>FT8</u> <u>WATER</u>
	Received <u>02/05/10</u>	Collected/Volume <u>02/04/10 08:00</u> <u>6.0 L</u>
		Custody/SAF No <u>F10-023-002</u> <u>F10-023</u>

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	DER σ
Gross Alpha	0.180	0.43	0.781	3.00	U	93A	0.405	0.52	0.808	U	-	0.7	
Gross Beta	1.14	1.4	2.27	4.00	U	93B	2.98	1.4	2.08		89	146	1.8
Tritium	22.6	87	145	400	U	H	90.7	91	150	U	-		1.1
Nickel 63	1.60	1.8	2.97	15.0	U	NI_L	1.73	1.7	2.85	U	-		0.1
Technetium 99	0.029	1.9	5.34	15.0	U	TC	0.528	2.0	4.94	U	-		0.4
Uranium 232/234	-0.029	0.029	0.073	1.00	U	U	-0.020	0.023	0.056	U	-		0.5
Uranium 235	0.026	0.026	0.041	1.00	U	U	-0.010	0.014	0.042	U	-		2.4
Uranium 238	-0.021	0.021	0.058	1.00	U	U	-0.006	0.011	0.038	U	-		1.3
Americium 241	-0.023	0.090	0.278	1.00	U	TP	0.100	0.13	0.320	U	-		1.6
Curium 242	0.023	0.093	0.178	1.00	U	TP	0	0.069	0.264	U	-		0.4
Curium 243/244	0.045	0.090	0.216	1.00	U	TP	0.033	0.13	0.256	U	-		0.2
Tin 126	U		11.3		U	GAM	U		13.7	U	-		0.3
Beryllium 7	U		45.0		U	GAM	U		49.9	U	-		0.1
Potassium 40	U		111		U	GAM	U		129	U	-		0.2
Cobalt 60	U		5.16	25.0	U	GAM	U		6.37	U	-		0.3
Ruthenium 106	U		45.0		U	GAM	U		56.8	U	-		0.3
Antimony 125	U		13.4		U	GAM	U		16.6	U	-		0.3
Cesium 134	U		6.51		U	GAM	U		8.00	U	-		0.3
Cesium 137	U		5.09	15.0	U	GAM	U		6.30	U	-		0.3
Europium 152	U		17.8	50.0	U	GAM	U		19.5	U	-		0.1
Europium 154	U		14.4	50.0	U	GAM	U		19.2	U	-		0.4
Europium 155	U		18.5	50.0	U	GAM	U		20.5	U	-		0.1
Niobium 94	U		4.68		U	GAM	U		5.25	U	-		0.2
Radium 226	U		12.0		U	GAM	U		14.0	U	-		0.2
Radium 228	U		25.1		U	GAM	U		28.3	U	-		0.2

Lab id <u>EBRLNE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

DUPLICATES

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DUPLICATE, cont.

SDG <u>7762</u>		Client/Case no <u>CHPRC</u>	<u>SDG H4152</u>
Contact <u>N. Joseph Verville</u>		Contract <u>No. 33677</u>	
DUPLICATE	ORIGINAL		
Lab sample id <u>S002030-04</u>	Lab sample id <u>S002030-01</u>	Client sample id <u>B23K51</u>	
Dept sample id <u>7762-004</u>	Dept sample id <u>7762-001</u>	Location/Matrix <u>FT8</u>	<u>WATER</u>
	Received <u>02/05/10</u>	Collected/Volume <u>02/04/10 08:00</u>	<u>6.0 L</u>
		Custody/SAF No <u>F10-023-002</u>	<u>F10-023</u>

QC-DUP#1 72282

ARRA UpperaLower ALE Building Science Laboratory-QC

DUPLICATES

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Lab id <u>EBRLNE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

7762-008

B23K51

DUPLICATE

SDG <u>7762</u>	Client/Case no <u>CHPRC</u>	<u>SDG H4152</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>S002030-08</u>	Lab sample id <u>S002030-01</u>	Client sample id <u>B23K51</u>
Dept sample id <u>7762-008</u>	Dept sample id <u>7762-001</u>	Location/Matrix <u>FTS</u> <u>WATER</u>
	Received <u>02/05/10</u>	Collected/Volume <u>02/04/10 08:00</u> <u>6.0 L</u>
		Custody/SAP No <u>F10-023-002</u> <u>F10-023</u>

ANALYTE	DUPLICATE		MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL		MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	DER σ
	pCi/L	2σ ERR (COUNT)					pCi/L	2σ ERR (COUNT)					
Total Strontium	0.273	0.31	0.560	2.00	U	SR	0.118	0.34	0.656	U	-	0.7	
Thorium 228	0	0.094	0.225		U	TH	0	0.11	0.269	U	-	0	
Thorium 230	0.094	0.24	0.433	1.00	U	TH	0.224	0.28	0.476	U	-	0.7	
Thorium 232	0	0.047	0.180	1.00	U	TH	0	0.056	0.215	U	-	0	
Plutonium 238	0.071	0.14	0.338	1.00	U	PU	0.080	0.16	0.384	U	-	0.1	
Plutonium 239/240	0	0.071	0.270	1.00	U	PU	0	0.080	0.307	U	-	0	

QC-DUP#1 72305

ARRA Upper&Lower ALE Building Science Laboratory-QC

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 04/14/10

EBERLINE ANALYTICAL REVISION 1

SAMPLE DELIVERY GROUP H4152

7762-005

B23K51

MATRIX SPIKE

SDG <u>7762</u> Contact <u>N. Joseph Verville</u> MATRIX SPIKE Lab sample id <u>S002030-05</u> Dept sample id <u>7762-005</u>	Client/Case no <u>CHPRC</u> SDG <u>H4152</u> Contract No. <u>33677</u> ORIGINAL Lab sample id <u>S002030-01</u> Dept sample id <u>7762-001</u> Received <u>02/05/10</u>	Client sample id <u>B23K51</u> Location/Matrix <u>FTB</u> <u>WATER</u> Collected/Volume <u>02/04/10 08:00</u> <u>6.0 L</u> Custody/SAF No <u>F10-023-002</u> <u>F10-023</u>
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ANALYTE	SPIKE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	13900	280	147	400	X H	14300	570	90.7	91	97	84-116	60-140

QC-MS#1 72299

ARRA Upper&Lower ALE Building Science Laboratory-QC

Lab id <u>EBRLNE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-MS</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

EBERLINE ANALYTICAL / RICHMOND REVISION 1
SAMPLE DELIVERY GROUP H4152

7762-001

B23K51

DATA SHEET

<u>SDG 7762</u>	<u>Client/Case no CHPRC</u>	<u>SDG H4152</u>
<u>Contact N. Joseph Verville</u>	<u>Contract No. 33677</u>	
<u>Lab sample id S002030-01</u>	<u>Client sample id B23K51</u>	
<u>Dept sample id 7762-001</u>	<u>Location/Matrix FT8</u>	<u>WATER</u>
<u>Received 02/05/10</u>	<u>Collected/Volume 02/04/10 08:00 6.0 L</u>	
	<u>Custody/SAF No F10-023-002</u>	<u>F10-023</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	0.405	0.52	0.808	3.00	U	93A
Gross Beta	12587-47-2	2.98	1.4	2.08	4.00		93B
Tritium	10028-17-8	90.7	91	150	400	U	H
Nickel 63	13981-37-8	1.73	1.7	2.85	15.0	U	NI_L
Total Strontium	SR-RAD	0.118	0.34	0.656	2.00	U	SR
Technetium 99	14133-76-7	0.528	2.0	4.94	15.0	U	TC
Thorium 228	14274-82-9	0	0.11	0.269		U	TH
Thorium 230	14269-63-7	0.224	0.28	0.476	1.00	U	TH
Thorium 232	TH-232	0	0.056	0.215	1.00	U	TH
Uranium 233/234	U-233/234	-0.020	0.023	0.056	1.00	U	U
Uranium 235	15117-96-1	-0.010	0.014	0.042	1.00	U	U
Uranium 238	U-238	-0.006	0.011	0.038	1.00	U	U
Americium 241	14596-10-2	0.100	0.13	0.320	1.00	U	TP
Curium 242	15510-73-3	0	0.069	0.264	1.00	U	TP
Curium 243/244	CM-243/244	0.033	0.13	0.256	1.00	U	TP
Plutonium 238	13981-16-3	0.080	0.16	0.384	1.00	U	PU
Plutonium 239/240	PU-239/240	0	0.080	0.307	1.00	U	PU
Tin 126	15832-50-5	U		13.7		U	GAM
Beryllium 7	13966-02-4	U		49.9		U	GAM
Potassium 40	13966-00-2	U		129		U	GAM
Cobalt 60	10198-40-0	U		6.37	25.0	U	GAM
Ruthenium 106	13967-48-1	U		56.8		U	GAM
Antimony 125	14234-35-6	U		16.6		U	GAM
Cesium 134	13967-70-9	U		8.00		U	GAM
Cesium 137	10045-97-3	U		6.30	15.0	U	GAM
Europium 152	14683-23-9	U		19.5	50.0	U	GAM
Europium 154	15585-10-1	U		19.2	50.0	U	GAM
Europium 155	14391-16-3	U		20.5	50.0	U	GAM

Lab id <u>EBRLNE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

DATA SHEETS

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EBERLINE ANALYTICAL / RICHMOND REVISION 1
 SAMPLE DELIVERY GROUP H4152

7762-001

B23K51

DATA SHEET, cont

SDG <u>7762</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4152</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
Lab sample id <u>S002030-01</u>	Client sample id <u>B23K51</u>	
Dept sample id <u>7762-001</u>	Location/Matrix <u>FT8</u>	<u>WATER</u>
Received <u>02/05/10</u>	Collected/Volume <u>02/04/10 08:00</u>	<u>6.0 L</u>
	Custody/SAF No <u>F10-023-002</u>	<u>F10-023</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Niobium 94	14681-63-1	U		5.25		U	GAM
Radium 226	13982-63-3	U		14.0		U	GAM
Radium 228	15262-20-1	U		28.3		U	GAM

ARRA Upper&Lower ALE Building Science Laboratory-QC

Lab id <u>EBRLNE</u>
Protocol <u>CHPRC</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/14/10</u>

SAMPLE DELIVERY GROUP H4152

Test PU Matrix WATER
SDG 7762
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Contract SDG H4152

LAB METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

RESULTS

LAB	RAW	SUF-		Plutonium	Plutonium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	238	239/240
Preparation batch 7240-143					
S002030-01	7762-001	B23K51		U	U
S002030-06	7762-006	Lab Control Sample		ok	ok
S002030-07	7762-007	Method Blank		U	U
S002030-08	7762-008	Duplicate (S002030-01)		- U	- U
Nominal values and limits from method			RDLs (pCi/L)	1.00	1.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MAX 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 7240-143			2σ prep error 8.0 %		Reference Lab Notebook No. 7243 pg 143										
S002030-01		B23K51	0.384	0.400			65		109			7	02/11/10	02/11	SS-063
S002030-06		Lab Control Sample	0.291	0.400			74		109				02/11/10	02/11	SS-064
S002030-07		Method Blank	0.342	0.400			74		110				02/11/10	02/11	SS-065
S002030-08		Duplicate (S002030-01)	0.338	0.400			75		110			7	02/11/10	02/11	SS-061
Nominal values and limits from method			1.00	0.400			30-110		100	100		180			

PROCEDURES	REFERENCE	PUISO_PLATE_AEA
SPP-040	Environmental Water Dissolution, rev 2	
CP-941	Plutonium in Water and Dissolved Samples by Extraction Chromatography, rev 12	
CP-008	Heavy Element Electroplating, rev 13	

AVERAGES ± 2 SD	MDA	0.339 ± 0.076
FOR 4 SAMPLES	YIELD	72 ± 9

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

Test TH Matrix WATER
SDG 7762
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Contract SDG H4152

LAB METHOD SUMMARY

THORIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

RESULTS

LAB	RAW	SUF-				
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Thorium 228	Thorium 230	Thorium 232
Preparation batch 7240-143						
S002030-01	7762-001	B23K51		U	U	U
S002030-06	7762-006	Lab Control Sample			ok	
S002030-07	7762-007	Method Blank		U	U	U
S002030-08	7762-008	Duplicate (S002030-01)		- U	- U	- U
Nominal values and limits from method				RDLs (pCi/L)	1.00	1.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MAX 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 7240-143 2σ prep error 8.0 % Reference Lab Notebook No. 7243 pg 143														
S002030-01		B23K51	0.476	0.400			77		164			7 02/11/10	02/11	SS-031
S002030-06		Lab Control Sample	0.431	0.400			92		164			02/11/10	02/11	SS-032
S002030-07		Method Blank	0.388	0.400			88		164			02/11/10	02/11	SS-033
S002030-08		Duplicate (S002030-01)	0.433	0.400			92		165			7 02/11/10	02/11	SS-034
Nominal values and limits from method			1.00	0.400			30-110		150	100		180		

PROCEDURES	REFERENCE	THISO IE PLATE_AEA
SPP-062		Sample Aliquoting, rev 1
SPP-040		Environmental Water Dissolution, rev 2
CP-900		Thorium in Water and Dissolved Solid Samples by Extraction Chromatography, rev 5
CP-008		Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD	MDA	0.432 ± 0.072
FOR 4 SAMPLES	YIELD	87 ± 14

Lab id EBRLINE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 04/14/10

SAMPLE DELIVERY GROUP H4152

Test TP Matrix WATER
 SDG 7762
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Contract SDG H4152

LAB METHOD SUMMARY

AMERICIUM 241/CURIUM
 ALPHA SPECTROSCOPY

RESULTS

LAB	RAW	SUF-		Americium	Curium	
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	241	243/244	
Preparation batch 7240-143						
S002030-01	7762-001	B23K51		U	U	
S002030-02	7762-002	Lab Control Sample		ok	ok	
S002030-03	7762-003	Method Blank		U	U	
S002030-04	7762-004	Duplicate (S002030-01)		- U	- U	
Nominal values and limits from method				RDLs (pCi/L)	1.00	1.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MAX 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 7240-143 2σ prep error 8.0 % Reference Lab Notebook No. 7243 pg 143															
S002030-01		B23K51	0.320	0.500			58	118				7	02/11/10	02/11	SS-055
S002030-02		Lab Control Sample	0.285	0.500			82	119					02/11/10	02/11	SS-056
S002030-03		Method Blank	0.256	0.500			81	119					02/11/10	02/11	SS-058
S002030-04		Duplicate (S002030-01)	0.278	0.500			87	119				7	02/11/10	02/11	SS-061
Nominal values and limits from method			1.00	0.500			30-110	100	100			180			

PROCEDURES	REFERENCE	AMCMISO_IE_PLATE_AEA
CP-002		Q.C. Preparation, rev 9
CP-003		Addition of Carriers and Tracers, rev 9
CP-040		Environmental Water Dissolution, rev 9
CP-961		Am-Cm Purification, Large Aliquot by Oxalate Precipitation, rev 5
CP-008		Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD	MDA	0.285 ± 0.053
FOR 4 SAMPLES	YIELD	77 ± 26

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

Test U Matrix WATER
 SDG 7762
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Contract SDG H4152

LAB METHOD SUMMARY

URANIUM, ISOTOPIC IN WATER
 ALPHA SPECTROSCOPY

RESULTS

LAB	RAW	SUF-		1: Uranium	2: Uranium	3: Uranium	RESULT RATIOS (%)			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	233/234	235	238	1+3	2σ	2+3	2σ

Preparation batch 7240-143

S002030-01	7762-001	B23K51		U	U	U				
S002030-02	7762-002	Lab Control Sample		ok	ok	ok				
S002030-03	7762-003	Method Blank		U	U	U				
S002030-04	7762-004	Duplicate (S002030-01)		- U	- U	- U				

Nominal values and limits from method	RDLs (pCi/L)	1.00	1.00	1.00	100	4	Averages			
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METHOD PERFORMANCE

LAB	RAW	SUF-	MAX MDA	ALIQ	PREP	DILU-	YIELD	EPF	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 7240-143 2σ prep error 8.0 % Reference Lab Notebook No. 7243 pg 143

S002030-01		B23K51	0.056	0.500			101		815			6	02/10/10	02/10	SS-035
S002030-02		Lab Control Sample	0.220	0.500			98		815				02/10/10	02/10	SS-036
S002030-03		Method Blank	0.069	0.500			91		815				02/10/10	02/10	SS-037
S002030-04		Duplicate (S002030-01)	0.073	0.500			93		815			6	02/10/10	02/10	SS-038

Nominal values and limits from method	1.00	0.500	30-110	100	100	180
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PROCEDURES	REFERENCE	UIISO_PLATE_AREA
SFP-062		Sample Aliquoting, rev 1
CP-921		Uranium in Water and Dissolved Samples by Extraction Chromatography, rev 5
CP-008		Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD	MDA	0.104 ± 0.155
FOR 4 SAMPLES	YIELD	96 ± 9

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

Test SR Matrix WATER
SDG 7762
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Contract SDG H4152

LAB METHOD SUMMARY

TOTAL STRONTIUM IN WATER
BETA COUNTING

RESULTS

LAB	RAW	SUF-		Total
SAMPLE ID	TEST FIX	FLANCHET	CLIENT SAMPLE ID	Strontium
Preparation batch 7240-143				
S002030-01		7762-001	B23K51	U
S002030-06		7762-006	Lab Control Sample	ok
S002030-07		7762-007	Method Blank	U
S002030-08		7762-008	Duplicate (S002030-01)	- 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	PAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7240-143 2σ prep error 10.4 % Reference Lab Notebook No. 7243 pg 143															
S002030-01		B23K51	0.656	0.500			93		100			6	02/10/10	02/10	GRB-225
S002030-06		Lab Control Sample	0.548	0.500			91		100				02/10/10	02/10	GRB-221
S002030-07		Method Blank	0.669	0.500			90		100				02/10/10	02/10	GRB-227
S002030-08		Duplicate (S002030-01)	0.560	0.500			86		100			6	02/10/10	02/10	GRB-223
Nominal values and limits from method			2.00	0.500			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 0.608 ± 0.126
FOR 4 SAMPLES YIELD 90 ± 6

Lab id EBRLINE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 04/14/10

SAMPLE DELIVERY GROUP H4152

Test TC Matrix WATER
SDG 7762
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Contract SDG H4152

LAB METHOD SUMMARY

TECHNETIUM 99 IN WATER

BETA COUNTING

RESULTS

LAB	RAW	SUF-	Technetium	
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	99
Preparation batch 7240-143				
S002030-01	7762-001	B23K51		U
S002030-02	7762-002	Lab Control Sample		ok
S002030-03	7762-003	Method Blank		U
S002030-04	7762-004	Duplicate (S002030-01)		- U

Nominal values and limits from method RDLs (pCi/L) 15.0

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 7240-143 2σ prep error 13.2 % Reference Lab Notebook No. 7243 pg 143															
S002030-01		B23K51	4.94	0.100			70	100				5	02/06/10	02/09	GRB-202
S002030-02		Lab Control Sample	4.07	0.100			91	100					02/06/10	02/09	GRB-204
S002030-03		Method Blank	4.88	0.100			77	100					02/06/10	02/10	GRB-207
S002030-04		Duplicate (S002030-01)	5.34	0.100			70	100				5	02/06/10	02/09	GRB-207

Nominal values and limits from method 15.0 0.100 30-110 50 180

PROCEDURES	REFERENCE	TC99_TR_SEP_GPC
	SPP-062	Sample Aliquoting, rev 1
	CP-431	Technetium-99 Purification of Soil or Resin by Extraction Chromatography, rev 8
	CP-008	Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD	MDA	4.81 ± 1.06
FOR 4 SAMPLES	YIELD	77 ± 20

Lab id EBRLINE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 04/14/10

SAMPLE DELIVERY GROUP H4152

Test 93A Matrix WATER
 SDG 7762
 Contact N. Joseph Verville

LAB METHOD SUMMARY

GROSS ALPHA IN WATER
 GAS PROPORTIONAL COUNTING

Client CHPRC
 Contract No. 33677
 Contract SDG H4152

RESULTS

LAB	RAW	SUF-			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID		Gross Alpha
Preparation batch 7240-143					
S002030-01	93	7762-001	B23K51		U
S002030-02	93	7762-002	Lab Control Sample		ok
S002030-03	93	7762-003	Method Blank		U
S002030-04	93	7762-004	Duplicate (S002030-01)	-	U

Nominal values and limits from method RDLs (pCi/L) 3.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	RESID	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/L	L	FAC	TION	mg	%	min	keV	KeV	HELD PREPARED	YZED DETECTOR
Preparation batch 7240-143 2σ prep error 20.6 % Reference Lab Notebook No. 7243 pg 143													
S002030-01	93	B23K51	0.808	0.235			0		100			5 02/09/10	02/09 GRB-101
S002030-02	93	Lab Control Sample	1.77	0.200			60		100			02/09/10	02/09 GRB-103
S002030-03	93	Method Blank	1.73	0.200			63		100			02/09/10	02/10 GRB-101
S002030-04	93	Duplicate (S002030-01)	0.781	0.235			0		100			5 02/09/10	02/09 GRB-105

Nominal values and limits from method 3.00 0.200 0-250 100 180

PROCEDURES REFERENCE 900.0_ALPHABETA_GPC
 SPP-007 Aqueous Sample Receipt by Chemistry Laboratory, rev 1
 SPP-120 Gross Alpha and Gross Beta in Water, rev 3

AVERAGES ± 2 SD MDA 1.27 ± 1.10
 FOR 4 SAMPLES RESIDUE 31 ± 71

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

Test 93B Matrix WATER
 SDG 7762
 Contact N. Joseph Verville

LAB METHOD SUMMARY

GROSS BETA IN WATER
 GAS PROPORTIONAL COUNTING

Client CHPRC
 Contract No. 33677
 Contract SDG H4152

RESULTS

LAB	RAW	SUF-			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID		Gross Beta
Preparation batch 7240-143					
S002030-01	93	7762-001	B23K51		2.98
S002030-02	93	7762-002	Lab Control Sample		ok
S002030-03	93	7762-003	Method Blank		U
S002030-04	93	7762-004	Duplicate (S002030-01)		ok U

Nominal values and limits from method RDLs (pCi/L) 4.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	RESID	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/L	L	FAC	TION	mg	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7240-143 2σ prep error 11.0 % Reference Lab Notebook No. 7243 pg 143															
S002030-01	93	B23K51	2.08	0.235			0		100			5	02/09/10	02/09	GRB-101
S002030-02	93	Lab Control Sample	3.21	0.200			60		100				02/09/10	02/09	GRB-103
S002030-03	93	Method Blank	2.57	0.200			63		100				02/09/10	02/10	GRB-101
S002030-04	93	Duplicate (S002030-01)	2.27	0.235			0		100			5	02/09/10	02/09	GRB-105

Nominal values and limits from method 4.00 0.200 0-250 100 180

PROCEDURES REFERENCE 900.0_ALPHABETA_GPC
 SPP-007 Aqueous Sample Receipt by Chemistry Laboratory, rev 1
 SPP-120 Gross Alpha and Gross Beta in Water, rev 3

AVERAGES ± 2 SD MDA 2.53 ± 0.989
 FOR 4 SAMPLES RESIDUE 31 ± 71

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/14/10

SAMPLE DELIVERY GROUP H4152

Test GAM Matrix WATER
 SDG 7762
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Contract SDG H4152

LAB METHOD SUMMARY

GAMMA EMITTERS
 GAMMA SPECTROSCOPY

RESULTS

LAB RAW SUP-
 SAMPLE ID TEST FIX FLANCHET CLIENT SAMPLE ID Cobalt 60 Cesium 137

Preparation batch 7240-143

S002030-01	7762-001	B23K51	U	U
S002030-02	7762-002	Lab Control Sample	ok	ok
S002030-03	7762-003	Method Blank	U	U
S002030-04	7762-004	Duplicate (S002030-01)	- U	- U

Nominal values and limits from method RDLs (pCi/L) 25.0 15.0

METHOD PERFORMANCE

LAB RAW SUP- 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 7240-143 2σ prep error 7.0 % Reference Lab Notebook No. 7243 pg 143

S002030-01	B23K51	<u>41.4</u>	0.500	505	4	02/06/10	02/08	01,02,00
S002030-02	Lab Control Sample	<u>21.9</u>	0.500	506		02/06/10	02/08	MB,05,00
S002030-03	Method Blank	<u>33.1</u>	0.500	506		02/06/10	02/08	01,04,00
S002030-04	Duplicate (S002030-01)	<u>34.3</u>	0.500	732	6	02/06/10	02/10	01,02,00

Nominal values and limits from method 15.0 0.500 100 180

PROCEDURES REFERENCE GAMMA_GS
 SPP-007 Aqueous Sample Receipt by Chemistry Laboratory, rev 1
 SPP-100 Preparation of Sample for Gamma Spectroscopy, rev 0

AVERAGES ± 2 SD MDA 32.7 ± 16.1
 FOR 4 SAMPLES YIELD _____ ± _____

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

Test H Matrix WATER
 SDG 7762
 Contact N. Joseph Verville

LAB METHOD SUMMARY

TRITIUM IN WATER
 LIQUID SCINTILLATION COUNTING

Client CHPRC
 Contract No. 33677
 Contract SDG H4152

RESULTS

LAB	RAW	SUF-			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID		Tritium
Preparation batch 7240-143					
S002030-01		7762-001	B23K51		U
S002030-02		7762-002	Lab Control Sample		ok
S002030-03		7762-003	Method Blank		U
S002030-04		7762-004	Duplicate (S002030-01)	-	U
S002030-05		7762-005	Spike (S002030-01)	ok	X

Nominal values and limits from method RDLs (pCi/L) 400

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	HBLD	PREPARED	YZED	DETECTOR
Preparation batch 7240-143 2g prep error 10.0 % Reference Lab Notebook No. 7243 pg 143															
S002030-01		B23K51	150	0.0100			100		200			4	02/08/10	02/08	LSC-006
S002030-02		Lab Control Sample	146	0.100			10		200				02/08/10	02/08	LSC-006
S002030-03		Method Blank	146	0.100			10		200				02/08/10	02/08	LSC-006
S002030-04		Duplicate (S002030-01)	145	0.0100			100		200			4	02/08/10	02/08	LSC-006
S002030-05		Spike (S002030-01)	147	0.0500			20		200			4	02/08/10	02/08	LSC-006

Nominal values and limits from method 400 0.0100 25 180

PROCEDURES REFERENCE 906.0_H3_LSC
 CP-210 Tritium in Water Samples by Distillation, rev 11

AVERAGES ± 2 SD MDA 147 ± 3.95
 FOR 5 SAMPLES YIELD 48 ± 95

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/14/10

EBERLINE ANALYTICAL/RICHMOND

REVISION 1

SAMPLE DELIVERY GROUP H4152

Test NI L Matrix WATER
 SDG 7762
 Contact N. Joseph Verville

LAB METHOD SUMMARY

NICKEL-63 IN LIQUID

LIQUID SCINTILLATION COUNTING

Client CHPRC
 Contract No. 33677
 Contract SDG H4152

RESULTS

LAB RAW SUP-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Nickel 63

Preparation batch 7240-143

S002030-01	7762-001	B23K51	U
S002030-02	7762-002	Lab Control Sample	ok
S002030-03	7762-003	Method Blank	U
S002030-04	7762-004	Duplicate (S002030-01)	- U

Nominal values and limits from method RDLs (pCi/L) 15.0

METHOD PERFORMANCE

LAB RAW SUP- 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 7240-143 2σ prep error 11.2 % Reference Lab Notebook No. 7243 pg 143

S002030-01	B23K51	2.85	0.500	101	50	6	02/10/10	02/10	LSC-006
S002030-02	Lab Control Sample	2.81	0.500	101	50		02/10/10	02/10	LSC-006
S002030-03	Method Blank	2.83	0.500	100	50		02/10/10	02/10	LSC-006
S002030-04	Duplicate (S002030-01)	2.97	0.500	95	50	6	02/10/10	02/10	LSC-006

Nominal values and limits from method 15.0 0.500 40-110 50 180

PROCEDURES REFERENCE NI63_LSC
 SPP-040 Environmental Water Dissolution, rev 2
 CP-280 Nickel-63 Purification, rev 5

AVERAGES ± 2 SD MDA 2.86 ± 0.144
 FOR 4 SAMPLES YIELD 99 ± 6

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/14/10

SAMPLE DELIVERY GROUP H4152

SDG 7762
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG H4152

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 CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 04/14/10

SDG 7762
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
Contract No. 33677
Case no SDG H4152

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.

REPORT GUIDES

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SUMMARY DATA SECTION

Page 30

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 04/14/10

SDG 7762
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG H4152

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.

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.05
 Report date 04/14/10

SAMPLE DELIVERY GROUP H4152

SDG 7762
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
Contract No. 33677
Case no SDG H4152

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

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 04/14/10

SDG 7762
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
 Contract No. 33677
 Case no SDG H4152

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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 Form DVD-RG
 Version 3.06
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SAMPLE DELIVERY GROUP H4152

SDG 7762
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GUIDE, cont.

Client CHPRC
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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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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.

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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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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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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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Version 3.05
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SDG 7762
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
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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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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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GUIDE, cont.

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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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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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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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COLLECTOR AL McIntyre	COMPANY CONTACT WIDRIG, DL H4152	TELEPHONE NO. 376-2858 (7762)	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 7B	DATA TURNAROUND 7 Days / 15 Days
SAMPLING LOCATION FTB	PROJECT DESIGNATION ARRA Upper & Lower ALE Building Science Laboratory - QC		SAF NO. F10-023	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GWS-121	FIELD LOGBOOK NO. HNF-N-507-8	ACTUAL SAMPLE DEPTH	COA 302228ES10	METHOD OF SHIPMENT GOVERNMENT VEHICLE	

SHIPPED TO Waste Sampling & Characterization Eberline	OFFSITE PROPERTY NO. N/A 2-410 00727	BILL OF LADING/AIR BILL NO. N/A 2-410 7983 6540 5740
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MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HNO3 to pH <2	HNO3 to pH <2	HNO3 to pH <2	HNO3 to pH <2	HCl to pH <2	HNO3 to pH <2	None				
		TYPE OF CONTAINER	Square Bottle - Poly	G/P	G/P	G/P	G/P	G/P	G				
		NO. OF CONTAINER(S)	1	1	1	1	2	1	1				
		VOLUME	500mL	500mL	1000mL	1000mL	1L	1000mL	250mL				
	SPECIAL HANDLING AND/OR STORAGE	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Gross Alpha (Gross alpha) Gross Beta (Gross beta)	Americium-241;	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Technetium-99;	Americium-241/Curium-244 (Curium-244)	Tritium - H3 (Tritium)				

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	HNO3 to pH <2	HNO3 to pH <2	HNO3 to pH <2	HCl to pH <2	HNO3 to pH <2	None				
B23K51	WATER	2/4/10	0800	✓	✓	✓	✓	✓	✓				

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM AR McIntyre	DATE/TIME 3/4/10 1400	RECEIVED BY/STORED IN Fed RP
RELINQUISHED BY/REMOVED FROM Fed EX	DATE/TIME 02/05/10 0915	RECEIVED BY/STORED IN THE WATKINS
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN

** The CACN for all analytical work at WSCF laboratory is 401587.
(1)Gamma Spectroscopy {Europium-155, Europium-154, Cesium-137, Europium-152, Cobalt-60}
(2)Isotopic Uranium {Uranium-233/234, Uranium-235, Uranium-238}

ORIGINAL

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

REVISION 1

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F10-023-003	PAGE 1 OF 1
COLLECTOR <i>AL McIntyre</i>		COMPANY CONTACT WIDRIG, DL <i>HA152</i>	TELEPHONE NO. 376-2858 <i>(7762)</i>	PROJECT COORDINATOR WIDRIG, DL		PRICE CODE 7B	DATA TURNAROUND 7 Days / 15 Days
SAMPLING LOCATION FTB		PROJECT DESIGNATION ARRA Upper & Lower ALE Building Science Laboratory - QC		SAF NO. F10-023		AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. <i>GWS-121</i>		FIELD LOGBOOK NO. <i>HNF-N-507-B</i>	ACTUAL SAMPLE DEPTH	COA 302228E510		METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO Eberline Services		OFFSITE PROPERTY NO. <i>00727</i>		BILL OF LADING/AIR BILL NO. <i>N/A 7883 6540 5740</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	HNO3 to pH <2				
		TYPE OF CONTAINER	G/P				
		NO. OF CONTAINER(S)	1				
		VOLUME	1000mL				
	SPECIAL HANDLING AND/OR STORAGE	SAMPLE ANALYSIS	Nickel-63;				
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME				
B23K51	WATER	2/4/10	0800	✓			
CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	<div style="text-align: center;">  </div>			
<i>AR McIntyre</i>	<i>2/4/10 1400</i>	<i>Fed Ex</i>					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME				
		<i>FF. LEATON</i>	<i>02/05/10 0915</i>				
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME				
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME				
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME			
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME			

REVISION 1



RICHMOND, CA LABORATORY
SAMPLE RECEIPT CHECKLIST

Client: CHPRC City MICHIGAN State WA
 Date/Time received 07/05/10 0915 CoC No. Perin F10-023-002, 003
 Container I.D. No. QWS-121 Requested TAT (Days) 7/15 P.O. Received Yes [] No []

INSPECTION

1. Custody seals on shipping container intact? Yes [x] No [] N/A []
2. Custody seals on shipping container dated & signed? Yes [x] No [] N/A []
3. Custody seals on sample containers intact? Yes [x] No [] N/A []
4. Custody seals on sample containers dated & signed? Yes [x] No [] N/A []
5. Packing material is: Wet [] Dry [x]
6. Number of samples in shipping container: 1 Sample Matrix _____
7. Number of containers per sample: 9 (Or see CoC _____)
8. Samples are in correct container Yes [x] No []
9. Paperwork agrees with samples? Yes [x] No []
10. Samples have: Tape [] Hazard labels [] Rad labels [] Appropriate sample labels [x]
11. Samples are: In good condition [x] Leaking [] Broken Container [] Missing []
12. Samples are: Preserved [x] Not preserved [x] pH 1 / ~~N/A~~ Preservative HNO3
13. Describe any anomalies:

14. Was P.M. notified of any anomalies? Yes [] No [] Date _____
15. Inspected by [Signature] Date: 07/05/10 Time: 1230

Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	Wipe	Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	wipe
B23K51	260						

Ion Chamber Ser. No. _____
 Alpha Meter Ser. No. _____
 Beta/Gamma Meter Ser. No. 100482

Calibration date _____
 Calibration date _____
 Calibration date 05 AUG 09