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November 16, 2010

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 S0-09-035-7153, SDG H4362**

Dear Mr. Neely:

Enclosed is a data report for one water sample designated under SAF No. X10-099 received at Eberline Analytical on September 3, 2010. The chain of custody Sample Analysis requested Total Radium, however, at the instructions of Ms. Dana Widrig the sample analysis was changed to Ra-228 (RAISO\_SEP\_GPC).

Please call if you have any questions concerning this report.

Sincerely,

N. Joseph Verville  
Client Services Manager

NJV/ljb

Enclosure: Data Package

**Case Narrative**

**1.0 GENERAL**

CH2M Hill Plateau Remediation Company (CHPRC) Sample Delivery Group H4362 was composed of one water sample designated under SAF No. X10-099 with a Project Designation of: IU2,IU6DURA.

The sample was received as stated on the chain-of-custody document. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist.

**2.0 ANALYSIS NOTES**

**2.1 Radium-228 Analysis**

The results for both the original and duplicate analyses were less than their respective MDA's, therefore no RPD or statistical control limit is calculated. No other 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

11/16/10

\_\_\_\_\_  
Date

EBRLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

Client CHPRC  
Contract No. 33677  
Case no SDG\_H4362

SUMMARY DATA SECTION

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*UB*

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

*N. Joseph Verville*  
Reviewed by \_\_\_\_\_

Lab id	<u>EBRLNE</u>
Protocol	<u>CHPRC</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-TOC</u>
Version	<u>3.06</u>
Report date	<u>11/13/10</u>

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC  
Contract No. 33677  
Case no SDG H4362

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

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Lab id EBRLNE  
Protocol CHPRC  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 11/13/10

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC  
Contract No. 33677  
Case no SDG H4362

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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Lab id EBRLNE  
Protocol CHPRC  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 11/13/10

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H4362

**LAB SAMPLE SUMMARY**

SDG 7153  
 Contact N. Joseph Verville

Client CHPRC  
 Contract No. 33577  
 Case no SDG H4362

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
S009035-01	B26M16	HNF-N-506 32/57	WATER		X10-099	X10-099-1	09/01/10 13:19
S009035-05	Lab Control Sample		WATER		X10-099		
S009035-06	Method Blank		WATER		X10-099		
S009035-07	Duplicate (S009035-01)	HNF-N-506 32/57	WATER		X10-099		09/01/10 13:19

Lab id EBRLNE  
 Protocol CHPRC  
 Version Ver 1.0  
 Form DVD-LS  
 Version 3.06  
 Report date 11/13/10

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H4362

SDG 7153  
 Contact N. Joseph Verville

**QC SUMMARY**

Client CHPRC  
 Contract No. 33677  
 Case no SDG H4362

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
7153	X10-099-1	B26M16	WATER		1.020 L		09/03/10 2		S009035-01	7153-001
		Method Blank	WATER						S009035-06	7153-006
		Lab Control Sample	WATER						S009035-05	7153-005
		Duplicate (S009035-01)	WATER		1.020 L		09/03/10 2		S009035-07	7153-007

QC SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRINE  
 Protocol CHPRC  
 Version Ver 1.0  
 Form DVD-QS  
 Version 3.06  
 Report date 11/13/10

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
 Contact N. Joseph Verville

PREP BATCH SUMMARY

Client CHPRC  
 Contract No. 33677  
 Case no SDG H4362

TEST MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALIFIERS	
		BATCH	2σ %	CLIENT	MORE	RE BLANK	LCS		DUP/ORIG MS/ORIG
Beta Counting									
AC	WATER	Radium 228 in Water	7276-126	10.4	1		1	1	1/1

Blank, LCS, Duplicate and Spike planchets are those in the same preparation batch as some Client sample.

Lab id EBRLNE  
 Protocol CHPRC  
 Version Ver 1.0  
 Form DVD-PBS  
 Version 3.06  
 Report date 11/13/10

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H4362

**LAB WORK SUMMARY**

SDG 7153  
Contact N. Joseph Verville

Client CHPRC  
Contract No. 33677  
Case no SDG H4362

LAB SAMPLE COLLECTED RECEIVED	CLIENT SAMPLE ID LOCATION CUSTODY	SAF No	MATRIX	PLANCHET	TEST	SUP-FIX ANALYZED	REVIEWED	BY	METHOD
S009035-01 09/01/10 09/03/10	B26ML6 HNF-N-506 32/57 X10-099-1	X10-099	WATER	7153-001	AC	11/10/10	11/11/10	BW	Radium 228 in Water
S009035-05	Lab Control Sample	X10-099	WATER	7153-005	AC	11/10/10	11/11/10	BW	Radium 228 in Water
S009035-06	Method Blank	X10-099	WATER	7153-006	AC	11/10/10	11/11/10	BW	Radium 228 in Water
S009035-07 09/01/10 09/03/10	Duplicate (S009035-01) HNF-N-506 32/57	X10-099	WATER	7153-007	AC	11/10/10	11/11/10	BW	Radium 228 in Water

**COUNTS OF TESTS BY SAMPLE TYPE**

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
AC	X10-099	Radium 228 in Water	RAISO_SEP_GPC	1			1	1	1		4
<b>TOTALS</b>				1			1	1	1		4

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLINE  
Protocol CHPRC  
Version Ver 1.0  
Form DVD-LWS  
Version 3.06  
Report date 11/13/10

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H4362**

7153-006

Method Blank

**METHOD BLANK**

SDG <u>7153</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4362</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
Lab sample id <u>S009035-06</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7153-006</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>X10-099</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Radium 228	15262-20-1	-0.423	0.89	2.26	3.00	U	AC

QC BLANK QC-BLANK #75809
-----------------------------

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>11/13/10</u>

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H4362

7153-005

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7153</u> Contact <u>N. Joseph Verville</u>  Lab sample id <u>S009035-05</u> Dept sample id <u>7153-005</u>	Client/Case no <u>CHPRC</u> <u>SDG H4362</u> Contract No. <u>33677</u>  Client sample id <u>Lab Control Sample</u> Material/Matrix <u>WATER</u> SAF No <u>X10-099</u>
---	--

ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ LMITS	PROTOCOL
	pCi/L	(COUNT)	pCi/L	pCi/L	FIERS	TEST	pCi/L	pCi/L	% (TOTAL)	LIMITS
Radium 228	18.8	1.8	2.91	3.00		AC	17.1	0.68	110	76-124 80-120

QC LSC  
QC-LCS #75808

Lab id EBRLNE  
 Protocol CHPRC  
 Version Ver 1.0  
 Form DVD-LCS  
 Version 3.06  
 Report date 11/13/10

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H4362

7153-007

B26M16

**DUPLICATE**

SDG <u>7153</u> Contact <u>N. Joseph Verville</u> <b>DUPLICATE</b> Lab sample id <u>S009035-07</u> Dept sample id <u>7153-007</u>	ORIGINAL Lab sample id <u>S009035-01</u> Dept sample id <u>7153-001</u> Received <u>09/03/10</u>	Client/Case no <u>CHPRC</u> <u>SDG H4362</u> Contract No. <u>33677</u> Client sample id <u>B26M16</u> Location/Matrix <u>HNF-N-506 32/57</u> <u>WATER</u> Collected/Volume <u>09/01/10 13:19</u> <u>1.020 L</u> Custody/SAF No <u>X10-099-1</u> <u>X10-099</u>
---	---	---

ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI-	ORIGINAL	2σ ERR	MDA	QUALI-	RPD	3σ	DER
	pCi/L	(COUNT)	pCi/L	pCi/L	FIERS		TEST	pCi/L	(COUNT)	pCi/L	FIERS	‡
Radium 228	0.275	0.79	2.08	3.00	U	AC	-0.811	0.91	2.37	U	-	1.8

DUP#1  
QC-DUP#1 75810

IU2, IU6DURA

Lab id EBRINE  
 Protocol CHPRC  
 Version Ver 1.0  
 Form DVD-DUP  
 Version 3.06  
 Report date 11/13/10

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H4362**

7153-001

B26M16

**DATA SHEET**

SDG <u>7153</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4362</u>
Contact <u>N. Joseph Verville</u>	Contract <u>No. 33677</u>	
Lab sample id <u>S009035-01</u>	Client sample id <u>B26M16</u>	
Dept sample id <u>7153-001</u>	Location/Matrix <u>HNF-N-506 32/57</u>	<u>WATER</u>
Received <u>09/03/10</u>	Collected/Volume <u>09/01/10 13:19</u>	<u>1.020 L</u>
	Custody/SAF No <u>X10-099-1</u>	<u>X10-099</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Radium 228	15262-20-1	-0.811	0.91	2.37	3.00	U	AC

IU2, IU6DURA

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>11/13/10</u>

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H4362

Test AC Matrix WATER  
 SDG 7153  
 Contact N. Joseph Verville

**LAB METHOD SUMMARY**

RADIUM 228 IN WATER

BETA COUNTING

Client CHPRC  
 Contract No. 33677  
 Contract SDG H4362

**RESULTS**

LAB            RAW    SUF-  
 SAMPLE ID    TEST FIX    PLANCHET    CLIENT SAMPLE ID            Radium 228

Preparation batch 7276-126

S009035-01	7153-001	B26M16		U
S009035-05	7153-005	Lab Control Sample		ok
S009035-06	7153-006	Method Blank		U
S009035-07	7153-007	Duplicate (S009035-01)		- U

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

**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 7276-126            2σ prep error 10.4 %    Reference Lab Notebook No. 7276 pg.126

S009035-01		B26M16	2.37	0.500				73	150		70	11/10/10	11/10	GRB-225
S009035-05		Lab Control Sample	2.91	0.500				71	150			11/10/10	11/10	GRB-226
S009035-06		Method Blank	2.26	0.500				73	150			11/10/10	11/10	GRB-227
S009035-07		Duplicate (S009035-01)	2.08	0.500				75	150		70	11/10/10	11/10	GRB-228

Nominal values and limits from method            3.00    0.500            40-110            100            180

PROCEDURES    REFERENCE    RAISO\_SEP\_GPC  
 SPP-062        Sample Aliquoting, rev 1  
 DWP-894        Sequential Separation of Actinium-228 and  
                   Radium-226 in Drinking Water (>1 Liter Aliquot),  
                   rev 5

AVERAGES ± 2 SD            MDA 2.40 ± 0.715  
 FOR 4 SAMPLES            YIELD 73 ± 3

Lab id EBRLNE  
 Protocol CHPRC  
 Version Ver 1.0  
 Form DVD-LMS  
 Version 3.06  
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC  
Contract No. 33677  
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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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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC  
Contract No. 33677  
Case no SDG\_H4362

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 SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC  
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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

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SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC  
Contract No. 33677  
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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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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
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GUIDE, cont.

Client CHPRC  
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 Case no SDG H4362

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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SAMPLE DELIVERY GROUP H4362

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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.

REPORT GUIDES

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SAMPLE DELIVERY GROUP H4362

SDG 7153  
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REPORT GUIDE

Client CHPRC  
 Contract No. 33677  
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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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 Form DVD-RG  
 Version 3.06  
 Report date 11/13/10

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

R E P O R T   G U I D E

Client CHPRC  
Contract No. 33677  
Case no SDG\_H4362

D U P L I C A T E

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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SDG 7153  
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC  
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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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SDG 7153  
Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC  
Contract No. 33677  
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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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Version 3.06  
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H4362

SDG 7153  
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC  
Contract No. 33677  
Case no SDG\_H4362

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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SAMPLE DELIVERY GROUP H4362

SDG 7153  
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC  
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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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**RE: Please hold total radium and Gammall analyses for all SAF X10-107 samples**

**Widrig, Dana L** to: 'jverville@eberlineservices.com'

10/06/2010 03:04 PM

Cc: "Fitzgerald, Scot L", "Ayres, Doris E", "Caraway, Mary Jo",

Cc: "Crisp, Bryan D", "Neely, Michael", "Narquis, Clifford T"

---

**History:** This message has been replied to.

---

Joe,

Per our conversation, we erroneously requested total Radium (RATOT\_AEAGEA) for the attached SAFs and associated samples which did not include the desired Ra-228 analysis. Scot Fitzgerald will work with you on getting these samples analyzed for Ra-228 by the proper service list RAISO\_SEP\_GPC at Eberline. Please ensure all future samples associated with these SAFs are also logged and analyzed accordingly. All COCs should be corrected accordingly (signed and dated) and sent or resent to us for our tracking purposes.

As soon as you obtain the requested MDA information we discussed (preferably 1 pCi/L) and the turnaround times you expect, please let Scot know at (509) 373-7495. Please also let us know in writing so we will be able to track this in our systems.

Of course, let me know if there are questions --

Thanks,

Dana L. Widrig  
Project Coordinator  
CH2MHill Plateau Remediation Company  
SMR/SGRP  
Ph: (509) 376-2858  
Cell: (509) 392-2297

**From:** Douglas, James G (Jim)

**Sent:** Wednesday, October 06, 2010 1:55 PM

**To:** 'jverville@eberlineservices.com'

**Cc:** Waters-husted, Karen S; Trent, Stephen J; Narbutovskih, Susan M; Widrig, Dana L; Fitzgerald, Scot L

**Subject:** RE: Please hold total radium and Gammall analyses for all SAF X10-107 samples

Joe:

Thank you for your continued follow-up on this issue.

Please direct future correspondence to our project coordinator Dana Widrig; I'm turning over my participation on this issue to her. Scot Fitzgerald will assist Dana

\*RED = results received from Eberline\*

EBERLINE SAMPLES

Total Radium (RATOT\_GPC)

APRIL	MAY		JUNE	JULY	AUGUST		SEPTEMBER	
X10-039	X10-053	X10-056	X10-073	X10-081	X10-098	X10-099	X10-107	X10-108
SAMP_NUM	SAMP_NUM							
B24M49	B25923	B259D5	B25NF4	B26535	B26ML6	B26M16	B275D4	B27560
B24M50	B25929		B25NF5	B26541	B26ML7	B26M21	B275D5	
B24M51	B25935			B26547	B26MM7	B26M22	B275F5	
B24M52	B25941			B26548	B26MM8		B275H1	
B24M53	B25947			B26558	B26MN8		B275H7	
B24M54	B25953			B26564	B26MP4		B275J3	
B24M55	B25959			B26570	B26MR4		B275J9	
B24M58	B25965			B26576	B26MR9		B275K5	
B25023	B25971			B265K3	B26MT5		B275L1	
B25025	B25977			B265K9	B26MV1		B275L7	
B25027	B25983			B265L5	B26MV7		B275M3	
B25037	B25989			B265M1	B26MW3		B275M9	
B25038	B25995			B265M7	B26MW9		B275N5	
B25040	B25981			B265N3	B26MX5		B275P1	
B25042	B25987			B265N9	B26MY1		B275P7	
B25044	B259C3			B265PS	B26MY7		B275R3	
B25046	B259C9			B265R1	B26N10		B275R9	
B25047				B265R7	B26N16		B275T5	
B25048				B265T3	B26N22		B27620	
B25050				B265T9				
B25052				B265V5				
B25053				B265W1				
B25054				B265W7				
B25055				B265X3				
B25056				B265X9				
B25062				B265Y5				
B25064				B265Y6				
B25065				B26606				
B25066				B26607				
B25067				B26617				
B25068				B26623				
B25069				B26629				
B25070				B26635				
B25071				B26641				
B25072				B26647				
B25073				B26858				
B25074								
B25075								
B25076								
B25077								

Collector <b>JOSHARTZER CHPRC</b>	Contact/Requester Karen Waters-Husted <b>H4362 (7153)</b>	Telephone No. 376-4650
SAF No. X10-099	Sampling Origin Hanford Site	Purchase Order/Charge Code 300118ES20
Project Title IU2 IU6DURA	Logbook No: HNF-N-506 <b>32157</b>	Ice Chest No. <b>GWS-213</b>
Shipped To (Lab) Eberline Services	Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No. <b>7938 7804 3432</b>
Protocol CERCLA	Priority: 45 Days	Offsite Property No. <b>01920</b>

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 \*\* \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

**SPECIAL INSTRUCTIONS** Hold Time  
 Site Wide Area Generator Knowledge Information Form applies.  
 The CACN for all analytical work at WSCF is 401922.  
 Total Activity Exemption: Yes  No

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B26M16	N	W	9-1-10	1319	1x20-mL P	Activity Scan	6 Months	None
B26M16	N	W	↓	↓	1x1000-mL G/P	Total Radium	6 Months	HNO3 to pH <2

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Relinquished By <b>JOSHARTZER CHPRC</b>	Print <i>Josh Artzer</i>	Sign <i>Josh Artzer</i>	Date/Time SEP 01 2010 1450	Received By <b>SSU #1</b>	Print <i>SSU #1</i>	Sign <i>SSU #1</i>	Date/Time SEP 01 2010 1450	<b>Matrix *</b> S = Soil DS = Drum Solid SE = Sediment DJL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wine W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other
Relinquished By <b>SSU #1</b>			SEP 02 2010 0700	Received By <i>K. A. Hansen</i>			SEP 02 2010 0700	
Relinquished By <i>K. A. Hansen</i>			SEP 02 2010 1500	Received By <b>EDEX</b>				
Relinquished By <b>FED EX</b>				Received By <i>M. F. ...</i>			SEP 03 2010 0530	
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g. Return to customer, per lab procedure, used in process)						Disposed By	Date/Time



# RICHMOND, CA LABORATORY

## SAMPLE RECEIPT CHECKLIST

Client: CHPRC City RICHMOND State WA

Date/Time received 05/03/10 0930 CoC No. X10-099-1

Container I.D. No. QWS-213 Requested TAT (Days) 45 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: 1 Sample Matrix W
7. Number of containers per sample: 2 (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 1/6 Preservative HNO3
13. Describe any anomalies:  
\_\_\_\_\_  
\_\_\_\_\_

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

15. Inspected by [Signature] Date: 05/03/10 Time: 1100

Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	Wipe	Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	wipe
<u>B26M16</u>	<u>260</u>						

Ion Chamber Ser. No. \_\_\_\_\_  
 Alpha Meter Ser. No. \_\_\_\_\_  
 Beta/Gamma Meter Ser. No. 99574

Calibration date \_\_\_\_\_  
 Calibration date \_\_\_\_\_  
 Calibration date 23 JUN 10