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January 29, 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 R9-12-072-7540, SDG H4105

Dear Mr. Neely:

Enclosed is a data report for three solid (soil) samples designated under SAF No. F10-011 received at Eberline Analytical on December 17, 2009. The samples were 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/ljb

Enclosure: Data Package

RECEIVED
JUL 21 2010
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1.0 GENERAL

CH2M Hill Plateau Remediation Company (CHPRC) Sample Delivery Group H4105 was composed of three solid (soil) samples designated under SAF No. F10-011 with a Project Designation of: ARRA 200-LW-2 OU Characterization Vadose Zone – Soil ("K" Well).

The samples were received as stated on the chain-of-custody documents. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium 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.

2.2 Carbon-14 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.

2.3 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 Iodine-129 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 Isotopic Thorium Analysis

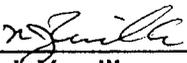
No problems were encountered during the course of the analyses.

2.5 Neptunium-237 Analysis

Due to initial low chemical yields, samples B22RJ6, B22RJ9 and B22RL1 were replated from the original plating solution and reanalyzed. The reanalysis yielded acceptable results. 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 reanalyses.

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

1/29/10

Date

E B E R L I N E A N A L Y T I C A L / R I C H M O N D
S A M P L E D E L I V E R Y G R O U P H 4 1 0 5

SDG 7540
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Case no SDG_H4105

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

T A B L E O F C O N T E N T S	
About this section	1
Sample Summaries	3
Prep Batch Summary	5
Work Summary	6
Method Blanks	8
Lab Control Samples	9
Duplicates	10
Data Sheets	11
Method Summaries	14
Report Guides	20
End of Section	34

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Prepared by _____

Reviewed by *N. Joseph Verville*

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540

Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC

Contract No. 33677

Case no SDG H4105

ABOUT THE DATA SUMMARY SECTION

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

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

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

PREPARATION BATCH SUMMARY

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

WORK SUMMARY

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

METHOD BLANKS

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

LAB CONTROL SAMPLES

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

REPORT GUIDES

Page 1

SUMMARY DATA SECTION

Page 1

Lab id EBRLNE

Protocol CHPRC

Version Ver 1.0

Form DVD-RG

Version 3.06

Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
Contact N. Joseph Verville

GUIDE , c o n t .

Client CHPRC
Contract No. 33677
Case no SDG H4105

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

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

MATRIX SPIKES

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

DATA SHEETS

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

METHOD SUMMARIES

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

REPORT GUIDES

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

REPORT GUIDES

Page 2

SUMMARY DATA SECTION

Page 2

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

LAB SAMPLE SUMMARY

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

LAB						CHAIN OF	
SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CUSTODY	COLLECTED
R912072-01	B22RJ6	C5860 (299-E29-54); I-007A	SOLID		F10-011	F10-011-005	11/30/09 09:07
R912072-02	B22RJ9	C5860 (299-E29-54); I-008A	SOLID		F10-011	F10-011-010	11/30/09 13:11
R912072-03	B22RL1	C5860 (299-E29-54); I-045	SOLID		F10-011	F10-011-032	12/09/09 09:02
R912072-04	Lab Control Sample		SOLID		F10-011		
R912072-05	Method Blank		SOLID		F10-011		
R912072-06	Duplicate (R912072-01)	C5860 (299-E29-54); I-007A	SOLID		F10-011		11/30/09 09:07

LAB SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LS
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

QC SUMMARY

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

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
7540	F10-011-005	B22RJ6	SOLID	87.9	116 g		12/17/09 17	R912072-01		7540-001
	F10-011-010	B22RJ9	SOLID	95.9	104 g		12/17/09 17	R912072-02		7540-002
	F10-011-032	B22RL1	SOLID	94.9	181 g		12/17/09 8	R912072-03		7540-003
		Method Blank	SOLID					R912072-05		7540-005
		Lab Control Sample	SOLID					R912072-04		7540-004
		Duplicate (R912072-01)	SOLID	87.9	116 g		12/17/09 17	R912072-06		7540-006

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-QS
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

PREP BATCH SUMMARY

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED			QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE BLANK		LCS
Alpha Spectroscopy									
NP	SOLID	Neptunium in Solids	7236-018	14.8	3		1	1	1/1
TH	SOLID	Thorium, Isotopic in Solids	7236-018	8.0	3		1	1	1/1
Gamma Spectroscopy									
I	SOLID	Iodine 129 in Solids	7236-018	19.4	3		1	1	1/1
Liquid Scintillation Counting									
C	SOLID	Carbon 14 in Solids	7236-018	10.0	3		1	1	1/1
H	SOLID	Tritium in Solids	7236-018	10.0	3		1	1	1/1
NI_L	SOLID	Nickel 63 in Solids	7236-018	11.2	3		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.

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-PBS
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

LAB WORK SUMMARY

SDG 7540
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Case no SDG H4105

LAB SAMPLE	CLIENT SAMPLE ID				SUP-					
COLLECTED	LOCATION	MATRIX			FIX	ANALYZED	REVIEWED	BY	METHOD	
RECEIVED	CUSTODY	SAF No	PLANCHET	TEST						
R912072-01	B22RJ6		7540-001	C		01/14/10	01/18/10	BW	Carbon 14 in Solids	
11/30/09	C5860 (299-E29-54); I-007A	SOLID	7540-001	H		01/14/10	01/18/10	BW	Tritium in Solids	
12/17/09	F10-011-005	F10-011	7540-001	I		01/19/10	01/21/10	BW	Iodine 129 in Solids	
			7540-001	NI_L		01/20/10	01/22/10	BW	Nickel 63 in Solids	
			7540-001	NP	R1	01/22/10	01/25/10	BW	Neptunium in Solids	
			7540-001	TH		01/08/10	01/11/10	BW	Thorium, Isotopic in Solids	
R912072-02	B22RJ9		7540-002	C		01/14/10	01/18/10	BW	Carbon 14 in Solids	
11/30/09	C5860 (299-E29-54); I-008A	SOLID	7540-002	H		01/14/10	01/18/10	BW	Tritium in Solids	
12/17/09	F10-011-010	F10-011	7540-002	I		01/19/10	01/21/10	BW	Iodine 129 in Solids	
			7540-002	NI_L		01/20/10	01/22/10	BW	Nickel 63 in Solids	
			7540-002	NP	R1	01/22/10	01/25/10	BW	Neptunium in Solids	
			7540-002	TH		01/08/10	01/11/10	BW	Thorium, Isotopic in Solids	
R912072-03	B22RL1		7540-003	C		01/14/10	01/18/10	BW	Carbon 14 in Solids	
12/09/09	C5860 (299-E29-54); I-045	SOLID	7540-003	H		01/14/10	01/18/10	BW	Tritium in Solids	
12/17/09	F10-011-032	F10-011	7540-003	I		01/19/10	01/21/10	BW	Iodine 129 in Solids	
			7540-003	NI_L		01/20/10	01/22/10	BW	Nickel 63 in Solids	
			7540-003	NP	R1	01/22/10	01/25/10	BW	Neptunium in Solids	
			7540-003	TH		01/08/10	01/11/10	BW	Thorium, Isotopic in Solids	
R912072-04	Lab Control Sample		7540-004	C		01/15/10	01/18/10	BW	Carbon 14 in Solids	
		SOLID	7540-004	H		01/14/10	01/18/10	BW	Tritium in Solids	
		F10-011	7540-004	I		01/19/10	01/21/10	BW	Iodine 129 in Solids	
			7540-004	NI_L		01/20/10	01/22/10	BW	Nickel 63 in Solids	
			7540-004	NP	R1	01/22/10	01/25/10	BW	Neptunium in Solids	
			7540-004	TH		01/08/10	01/11/10	BW	Thorium, Isotopic in Solids	
R912072-05	Method Blank		7540-005	C		01/14/10	01/18/10	BW	Carbon 14 in Solids	
		SOLID	7540-005	H		01/14/10	01/18/10	BW	Tritium in Solids	
		F10-011	7540-005	I		01/19/10	01/21/10	BW	Iodine 129 in Solids	
			7540-005	NI_L		01/20/10	01/22/10	BW	Nickel 63 in Solids	
			7540-005	NP		01/19/10	01/25/10	BW	Neptunium in Solids	
			7540-005	TH		01/09/10	01/11/10	BW	Thorium, Isotopic in Solids	

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 6

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LWS
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

WORK SUMMARY, cont.

SDG 7540
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Case no SDG H4105

LAB SAMPLE	CLIENT SAMPLE ID				SUF-					
COLLECTED	LOCATION	MATRIX			FIX	ANALYZED	REVIEWED	BY	METHOD	
RECEIVED	CUSTODY	SAF No	PLANCHET	TEST						
R912072-06	Duplicate (R912072-01)		7540-006	C		01/14/10	01/18/10	BW	Carbon 14 in Solids	
11/30/09	C5860 (299-E29-54); I-007A SOLID		7540-006	H		01/14/10	01/18/10	BW	Tritium in Solids	
12/17/09		F10-011	7540-006	I		01/20/10	01/21/10	BW	Iodine 129 in Solids	
			7540-006	NI_L		01/20/10	01/22/10	BW	Nickel 63 in Solids	
			7540-006	NP		01/22/10	01/25/10	BW	Neptunium in Solids	
			7540-006	TH		01/08/10	01/11/10	BW	Thorium, Isotopic in Solids	

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
C	F10-011	Carbon 14 in Solids	C14_COX_LSC	3			1	1	1		6
H	F10-011	Tritium in Solids	TRITIUM_COX_LSC	3			1	1	1		6
I	F10-011	Iodine 129 in Solids	I129_SEP_LEPS_GS	3			1	1	1		6
NI_L	F10-011	Nickel 63 in Solids	NI63_LSC	3			1	1	1		6
NP	F10-011	Neptunium in Solids	NP237_LLE_PLATE_AEA	3			1	1	1		6
TH	F10-011	Thorium, Isotopic in Solids	THISO_IE_PLATE_AEA	3			1	1	1		6
TOTALS				18			6	6	6		36

WORK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 7

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LWS
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP H4105

7540-005

Method Blank

METHOD BLANK

SDG <u>7540</u>	Client/Case no <u>CHPRC</u>	<u>SDG H4105</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
Lab sample id <u>R912072-05</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7540-005</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>F10-011</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-0.833	5.5	9.57	400	U	H
Carbon 14	14762-75-5	2.57	3.8	6.29	50.0	U	C
Nickel 63	13981-37-8	0.244	<u>6.6</u>	5.29	30.0	U	NI_L
Iodine 129	15046-84-1	0.144	1.3	1.61	5.00	U	I
Thorium 228	14274-82-9	-0.190	0.19	0.908	1.00	U	TH
Thorium 230	14269-63-7	0.851	0.95	<u>1.68</u>	1.00	U	TH
Thorium 232	TH-232	0.189	0.19	0.724	1.00	U	TH
Neptunium 237	13994-20-2	0	0.48	<u>1.85</u>	1.00	U	NP

QC-BLANK #71846

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>01/28/10</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

7540-004

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7540</u> Contact <u>N. Joseph Verville</u> Lab sample id <u>R912072-04</u> Dept sample id <u>7540-004</u>	Client/Case no <u>CHPRC</u> <u>SDG H4105</u> Contract No. <u>33677</u> Client sample id <u>Lab Control Sample</u> Material/Matrix _____ <u>SOLID</u> SAF No <u>F10-011</u>
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ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ	LMTS	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS	TEST	pCi/g	pCi/g	‡	(TOTAL)	LIMITS
Tritium	1040	24	9.33	400		H	1070	43	97	84-116	80-120
Carbon 14	3220	65	14.9	50.0		C	3040	120	106	83-117	80-120
Nickel 63	544	16	8.08	30.0		NI_L	545	22	100	82-118	80-120
Iodine 129	116	3.6	1.49	5.00		I	116	4.6	100	70-130	80-120
Thorium 230	46.9	5.6	<u>1.58</u>	1.00		TH	47.2	1.9	99	78-122	80-120
Neptunium 237	54.1	9.0	0.945	1.00		NP	49.6	2.0	109	63-137	80-120

QC-LCS #71845

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>01/28/10</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

7540-006

B22RJ6

DUPLICATE

SDG <u>7540</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4105</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>R912072-06</u>	Lab sample id <u>R912072-01</u>	Client sample id <u>B22RJ6</u>
Dept sample id <u>7540-006</u>	Dept sample id <u>7540-001</u>	Location/Matrix <u>C5860(299-E29-54);I-007A SOLID</u>
	Received <u>12/17/09</u>	Collected/Weight <u>11/30/09 09:07</u> <u>116 g</u>
% solids <u>87.9</u>	% solids <u>87.9</u>	Custody/SAF No <u>F10-011-005</u> <u>F10-011</u>

ANALYTE	DUPLICATE		MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL		MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	DER σ
	pCi/g	2σ ERR (COUNT)					pCi/g	2σ ERR (COUNT)					
Tritium	-4.43	4.7	8.48	400	U	H	-4.00	4.7	8.35	U	-	0.1	
Carbon 14	0.799	3.3	5.59	50.0	U	C	-0.753	3.3	5.67	U	-	0.7	
Nickel 63	-2.65	4.7	8.33	30.0	U	NI_L	-0.312	4.6	7.84	U	-	0.7	
Iodine 129	-0.249	1.2	1.51	5.00	U	I	-0.727	1.1	1.58	U	-	0.6	
Thorium 228	1.01	0.74	<u>1.13</u>	1.00	U	TH	1.12	0.69	0.949		10	144	0.2
Thorium 230	0.644	0.92	<u>1.63</u>	1.00	U	TH	0.514	0.86	<u>1.58</u>	U	-	0.2	
Thorium 232	0.828	0.56	0.703	1.00		TH	0.858	0.52	0.656		4	137	0.1
Neptunium 237	0	0.31	<u>1.19</u>	1.00	U	NP	0	0.49	<u>1.86</u>	U	-	0	

QC-DUP#1 71847

ARRA 200-LW-2 OU Characterization Vadose Zone - Soil
(*K" Well)

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP H4105

7540-001

B22RJ6

DATA SHEET

SDG <u>7540</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4105</u>
Contact <u>N. Joseph Verville</u>	Contract <u>No. 33677</u>	
Lab sample id <u>R912072-01</u>	Client sample id <u>B22RJ6</u>	
Dept sample id <u>7540-001</u>	Location/Matrix <u>C5860(299-E29-54);I-007A SOLID</u>	
Received <u>12/17/09</u>	Collected/Weight <u>11/30/09 09:07</u> <u>116 g</u>	
% solids <u>87.9</u>	Custody/SAF No <u>F10-011-005</u> <u>F10-011</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-4.00	4.7	8.35	400	U	H
Carbon 14	14762-75-5	-0.753	3.3	5.67	50.0	U	C
Nickel 63	13981-37-8	-0.312	4.6	7.84	30.0	U	NI_L
Iodine 129	15046-84-1	-0.727	1.1	1.58	5.00	U	I
Thorium 228	14274-82-9	1.12	0.69	0.949	1.00		TH
Thorium 230	14269-63-7	0.514	0.86	<u>1.58</u>	1.00	U	TH
Thorium 232	TH-232	0.858	0.52	0.656	1.00		TH
Neptunium 237	13994-20-2	0	0.49	<u>1.86</u>	1.00	U	NP

ARRA 200-LW-2 OU Characterization Vadose Zone - Soil
 ("K" Well)

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>01/28/10</u>

EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP H4105

7540-002

B22RJ9

DATA SHEET

SDG <u>7540</u>	Client/Case no <u>CHPRC</u>	<u>SDG_H4105</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>33677</u>	
Lab sample id <u>R912072-02</u>	Client sample id <u>B22RJ9</u>	
Dept sample id <u>7540-002</u>	Location/Matrix <u>C5860(299-E29-54);I-008A</u>	<u>SOLID</u>
Received <u>12/17/09</u>	Collected/Weight <u>11/30/09 13:11</u>	<u>104 g</u>
% solids <u>95.9</u>	Custody/SAF No <u>F10-011-010</u>	<u>F10-011</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-5.96	4.9	8.92	400	U	H
Carbon 14	14762-75-5	-0.582	3.3	5.70	50.0	U	C
Nickel 63	13981-37-8	-1.59	2.0	3.53	30.0	U	NI_L
Iodine 129	15046-84-1	-0.025	1.1	1.52	5.00	U	I
Thorium 228	14274-82-9	0.747	0.38	0.417	1.00		TH
Thorium 230	14269-63-7	0.684	0.44	0.594	1.00		TH
Thorium 232	TH-232	0.809	0.32	0.238	1.00		TH
Neptunium 237	13994-20-2	-0.046	0.091	0.349	1.00	U	NP

ARRA 200-LW-2 OU Characterization Vadose Zone - Soil
("K" Well)

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>01/28/10</u>

EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP H4105

7540-003

B22RL1

DATA SHEET

SDG <u>7540</u>	Client/Case no <u>CHPRC</u>	SDG <u>H4105</u>
Contact <u>N. Joseph Verville</u>	Contract <u>No. 33677</u>	
Lab sample id <u>R912072-03</u>	Client sample id <u>B22RL1</u>	
Dept sample id <u>7540-003</u>	Location/Matrix <u>C5860(299-E29-54);I-045</u>	<u>SOLID</u>
Received <u>12/17/09</u>	Collected/Weight <u>12/09/09 09:02</u>	<u>181 g</u>
% solids <u>94.9</u>	Custody/SAF No <u>F10-011-032</u>	<u>F10-011</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-8.84	4.8	9.10	400	U	H
Carbon 14	14762-75-5	1.33	3.5	5.91	50.0	U	C
Nickel 63	13981-37-8	-2.16	1.9	3.46	30.0	U	NI_L
Iodine 129	15046-84-1	-0.552	1.1	1.56	5.00	U	I
Thorium 228	14274-82-9	0.463	0.29	0.394	1.00		TH
Thorium 230	14269-63-7	0.498	0.43	0.656	1.00	U	TH
Thorium 232	TH-232	0.570	0.29	0.272	1.00		TH
Neptunium 237	13994-20-2	0.048	0.097	0.145	1.00	U	NP

ARRA 200-LW-2 OU Characterization Vadose Zone - Soil
("K" Well)

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>01/28/10</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

Test NP Matrix SOLID
 SDG 7540
 Contact N. Joseph Verville

LAB METHOD SUMMARY

NEPTUNIUM IN SOLIDS
 ALPHA SPECTROSCOPY

Client CHPRC
 Contract No. 33677
 Contract SDG H4105

RESULTS

LAB	RAW	SUF-			Neptunium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT	SAMPLE ID	237
Preparation batch 7236-018					
R912072-01	R1	7540-001	B22RJ6		U
R912072-02	R1	7540-002	B22RJ9		U
R912072-03	R1	7540-003	B22RL1		U
R912072-04	R1	7540-004	Lab Control Sample		ok
R912072-05		7540-005	Method Blank		U
R912072-06		7540-006	Duplicate (R912072-01)		- U

Nominal values and limits from method RDLs (pCi/g) 1.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-			
SAMPLE ID	TEST FIX	CLIENT	SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7236-018 2σ prep error 14.8 % Reference Lab Notebook No. 7236 pg. 018																
R912072-01	R1	B22RJ6		<u>1.86</u>	0.100			45		109		53	01/19/10	01/22	SS-063	
R912072-02	R1	B22RJ9		0.349	0.500			49		110		53	01/19/10	01/22	SS-064	
R912072-03	R1	B22RL1		0.145	0.500			44		109		44	01/19/10	01/22	SS-063	
R912072-04	R1	Lab Control Sample		0.945	0.100			35		110			01/19/10	01/22	SS-064	
R912072-05		Method Blank		<u>1.85</u>	0.100			46		111			01/19/10	01/19	SS-033	
R912072-06		Duplicate (R912072-01)		<u>1.19</u>	0.100			48		168		53	01/19/10	01/22	SS-033	

Nominal values and limits from method 1.00 0.100 30-110 100 180

PROCEDURES REFERENCE NP237_LLE_PLATE_AEA
 SPP-071 Soil Dissolution, > 1.0g Aliquot, rev 1
 CP-930 Neptunium from Solids and Water by Extraction
 Chromatography, rev 5
 CP-008 Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD MDA 1.06 ± 1.45
 FOR 6 SAMPLES YIELD 44 ± 10

METHOD SUMMARIES
 Page 1
 SUMMARY DATA SECTION
 Page 14

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

Test TH Matrix SOLID
 SDG 7540
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Contract SDG H4105

LAB METHOD SUMMARY

THORIUM, ISOTOPIC IN SOLIDS
 ALPHA SPECTROSCOPY

RESULTS

LAB RAW SUF-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Thorium 230

Preparation batch 7236-018

R912072-01	7540-001	B22RJ6	U
R912072-02	7540-002	B22RJ9	0.684
R912072-03	7540-003	B22RL1	U
R912072-04	7540-004	Lab Control Sample	ok
R912072-05	7540-005	Method Blank	U
R912072-06	7540-006	Duplicate (R912072-01)	- U

Nominal values and limits from method RDLs (pCi/g) 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/g g FAC TION % % min keV KeV HELD PREPARED YZED DETECTOR

Preparation batch 7236-018 2σ prep error 8.0 % Reference Lab Notebook No. 7236 pg. 018

R912072-01	B22RJ6	<u>1.58</u>	0.100	89	156	39	01/08/10	01/08	SS-055
R912072-02	B22RJ9	0.594	0.250	98	156	39	01/08/10	01/08	SS-061
R912072-03	B22RL1	0.656	0.250	88	156	30	01/08/10	01/08	SS-062
R912072-04	Lab Control Sample	<u>1.58</u>	0.100	87	157		01/08/10	01/08	SS-063
R912072-05	Method Blank	<u>1.68</u>	0.100	77	165		01/08/10	01/09	SS-039
R912072-06	Duplicate (R912072-01)	<u>1.63</u>	0.100	84	157	39	01/08/10	01/08	SS-065

Nominal values and limits from method 1.00 0.100 30-110 150 180

PROCEDURES	REFERENCE	THISO_IE_PLATE_AEA
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 1
	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 <u>1.29</u> ± <u>1.03</u>
FOR 6 SAMPLES	YIELD <u>87</u> ± <u>14</u>

METHOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 15

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

LAB METHOD SUMMARY

IODINE 129 IN SOLIDS
GAMMA SPECTROSCOPY

Test I Matrix SOLID
SDG 7540
Contact N. Joseph Verville

Client CHPRC
Contract No. 33677
Contract SDG H4105

RESULTS

LAB	RAW	SUF-			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID		Iodine 129
Preparation batch 7236-018					
R912072-01		7540-001	B22RJ6		U
R912072-02		7540-002	B22RJ9		U
R912072-03		7540-003	B22RL1		U
R912072-04		7540-004	Lab Control Sample		ok
R912072-05		7540-005	Method Blank		U
R912072-06		7540-006	Duplicate (R912072-01)	-	U

Nominal values and limits from method RDLs (pCi/g) 5.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7236-018 2σ prep error 19.4 % Reference Lab Notebook No. 7236 pg. 018															
R912072-01		B22RJ6	1.58	1.00			92		400			50	01/19/10	01/19	GRB-221
R912072-02		B22RJ9	1.52	1.00			92		400			50	01/19/10	01/19	GRB-222
R912072-03		B22RL1	1.56	1.00			92		400			41	01/19/10	01/19	GRB-223
R912072-04		Lab Control Sample	1.49	1.00			95		400				01/19/10	01/19	GRB-224
R912072-05		Method Blank	1.61	1.00			97		400				01/19/10	01/19	GRB-225
R912072-06		Duplicate (R912072-01)	1.51	1.00			90		500			51	01/19/10	01/20	GRB-201

Nominal values and limits from method 5.00 1.00 40-110 300 180

PROCEDURES	REFERENCE	I129_SEP_LEPS_GS
SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1	
SPP-062	Sample Aliquoting, rev 1	
CP-024	Iodine-129, Sample Dissolution, rev 8	
CP-530	Iodine-129 Purification, rev 6	
CP-008	Heavy Element Electroplating, rev 13	

AVERAGES ± 2 SD	MDA	<u>1.54</u> ± <u>0.092</u>
FOR 6 SAMPLES	YIELD	<u>93</u> ± <u>5</u>

METHOD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 16

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

LAB METHOD SUMMARY

CARBON 14 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Test C Matrix SOLID
 SDG 7540
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Contract SDG H4105

RESULTS

LAB	RAW	SUF-	CLIENT SAMPLE ID	Carbon 14
SAMPLE ID	TEST FIX	PLANCHET		
Preparation batch 7236-018				
R912072-01		7540-001	B22RJ6	U
R912072-02		7540-002	B22RJ9	U
R912072-03		7540-003	B22RL1	U
R912072-04		7540-004	Lab Control Sample	ok
R912072-05		7540-005	Method Blank	U
R912072-06		7540-006	Duplicate (R912072-01)	- U

Nominal values and limits from method RDLs (pCi/g) 50.0

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	PAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED DETECTOR
Preparation batch 7236-018 2σ prep error 10.0 % Reference Lab Notebook No. 7236 pg. 018													
R912072-01		B22RJ6	5.67	0.235			100		50		45	01/14/10 01/14	LSC-006
R912072-02		B22RJ9	5.70	0.224			100		50		45	01/14/10 01/14	LSC-006
R912072-03		B22RL1	5.91	0.217			100		50		36	01/14/10 01/14	LSC-006
R912072-04		Lab Control Sample	14.9	0.210			100		10			01/14/10 01/15	LSC-006
R912072-05		Method Blank	6.29	0.210			100		50			01/14/10 01/14	LSC-006
R912072-06		Duplicate (R912072-01)	5.59	0.231			100		50		45	01/14/10 01/14	LSC-006

Nominal values and limits from method 50.0 0.210 10 180

PROCEDURES REFERENCE C14_COX_LSC
 CP-251 Tritium/Carbon-14 Oxidation, rev 11

AVERAGES ± 2 SD MDA 7.34 ± 7.42
 FOR 6 SAMPLES YIELD 100 ± 0

Lab id EBRLINE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

LAB METHOD SUMMARY

TRITIUM IN SOLIDS

LIQUID SCINTILLATION COUNTING

Test H Matrix SOLID
 SDG 7540
 Contact N. Joseph Verville

Client CHPRC
 Contract No. 33677
 Contract SDG H4105

RESULTS

LAB	RAW	SUF-			Tritium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT	SAMPLE ID	
Preparation batch 7236-018					
R912072-01		7540-001	B22RJ6		U
R912072-02		7540-002	B22RJ9		U
R912072-03		7540-003	B22RL1		U
R912072-04		7540-004	Lab Control Sample		ok
R912072-05		7540-005	Method Blank		U
R912072-06		7540-006	Duplicate (R912072-01)		- U
Nominal values and limits from method			RDLs (pCi/g)	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/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7236-018 2σ prep error 10.0 % Reference Lab Notebook No. 7236 pg. 018																
R912072-01		B22RJ6		8.35	0.235			100		50		45	01/14/10	01/14	LSC-005	
R912072-02		B22RJ9		8.92	0.224			100		50		45	01/14/10	01/14	LSC-005	
R912072-03		B22RL1		9.10	0.217			100		50		36	01/14/10	01/14	LSC-005	
R912072-04		Lab Control Sample		9.33	0.210			100		50			01/14/10	01/14	LSC-005	
R912072-05		Method Blank		9.57	0.210			100		50			01/14/10	01/14	LSC-005	
R912072-06		Duplicate (R912072-01)		8.48	0.231			100		50		45	01/14/10	01/14	LSC-005	
Nominal values and limits from method				400	0.210					25		180				

PROCEDURES REFERENCE TRITIUM_COX_LSC
 CP-251 Tritium/Carbon-14 Oxidation, rev 11

AVERAGES ± 2 SD MDA 8.96 ± 0.952
 FOR 6 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 18

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP H4105

LAB METHOD SUMMARY

NICKEL 63 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID

SDG 7540

Contact N. Joseph Verville

Client CHPRC

Contract No. 33677

Contract SDG H4105

RESULTS

LAB	RAW	SUF-		
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Nickel 63
Preparation batch 7236-018				
R912072-01		7540-001	B22RJ6	U
R912072-02		7540-002	B22RJ9	U
R912072-03		7540-003	B22RL1	U
R912072-04		7540-004	Lab Control Sample	ok
R912072-05		7540-005	Method Blank	U
R912072-06		7540-006	Duplicate (R912072-01)	- U

Nominal values and limits from method RDLs (pCi/g) 30.0

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7236-018 2σ prep error 11.2 % Reference Lab Notebook No. 7236 pg. 018															
R912072-01		B22RJ6	7.84	0.200			87	50				51	01/19/10	01/20	LSC-005
R912072-02		B22RJ9	3.53	0.500			77	50				51	01/19/10	01/20	LSC-005
R912072-03		B22RL1	3.46	0.500			79	50				42	01/19/10	01/20	LSC-005
R912072-04		Lab Control Sample	8.08	0.200			85	50					01/19/10	01/20	LSC-005
R912072-05		Method Blank	5.29	0.200			83	100					01/19/10	01/20	LSC-005
R912072-06		Duplicate (R912072-01)	8.33	0.200			82	50				51	01/19/10	01/20	LSC-005

Nominal values and limits from method 30.0 0.200 40-110 25 180

PROCEDURES REFERENCE NI63_LSC
 SPP-070 Soil Dissolution, < 1.0g Aliquot, rev 1
 CP-281 Nickel-63 Purification By Extraction
 Chromatography, rev 5

AVERAGES ± 2 SD MDA 6.09 ± 4.57
 FOR 6 SAMPLES YIELD 82 ± 7

METHOD SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 19

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
Contract No. 33677
Case no SDG_H4105

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

Page 1

SUMMARY DATA SECTION

Page 20

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

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

Page 2

SUMMARY DATA SECTION

Page 21

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

WORK SUMMARY

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

The following notes apply to this report:

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

REPORT GUIDES

Page 3

SUMMARY DATA SECTION

Page 22

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

DATA SHEET

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

The following notes apply to this report:

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

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

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

The following qualifiers are defined by the DVD system:

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

REPORT GUIDES

Page 4

SUMMARY DATA SECTION

Page 23

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
 Contract No. 33677
 Case no SDG_H4105

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.

REPORT GUIDES

Page 5

SUMMARY DATA SECTION

Page 24

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

DATA SHEET

* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.

* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.

* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
Contract No. 33677
Case no SDG H4105

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.

REPORT GUIDES

Page 7

SUMMARY DATA SECTION

Page 26

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

DUPLICATE

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

The following notes apply to this report:

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

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

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

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

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

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

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

This value reported for this limit is at most 999.

- * The second limit for the RPD is the larger of:

1. A fixed percentage specified in the protocol.

REPORT GUIDES

Page 8

SUMMARY DATA SECTION

Page 27

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

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.

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

MATRIX SPIKE

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

The following notes apply to this report:

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

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

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

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

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

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

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

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

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

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

REPORT GUIDES

Page 10

SUMMARY DATA SECTION

Page 29

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
Contract No. 33677
Case no SDG_H4105

MATRIX SPIKE

for the recovery.

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

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

REPORT GUIDES

Page 11

SUMMARY DATA SECTION

Page 30

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

REPORT GUIDE

Client CHPRC
 Contract No. 33677
 Case no SDG_H4105

METHOD SUMMARY

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

The following notes apply to this report:

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

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

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

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

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

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

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

REPORT GUIDES

Page 12

SUMMARY DATA SECTION

Page 31

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
 Contract No. 33677
 Case no SDG_H4105

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.

REPORT GUIDES

Page 13

SUMMARY DATA SECTION

Page 32

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
 Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
 Contract No. 33677
 Case no SDG H4105

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

Lab id EBRLNE
 Protocol CHPRC
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
 Report date 01/28/10

REPORT GUIDES

Page 14

SUMMARY DATA SECTION

Page 33

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP H4105

SDG 7540
Contact N. Joseph Verville

GUIDE, cont.

Client CHPRC
Contract No. 33677
Case no SDG_H4105

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.

REPORT GUIDES

Page 15

SUMMARY DATA SECTION

Page 34

Lab id EBRLNE
Protocol CHPRC
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/28/10

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COLLECTOR: *Ryan Turner Rust*

COMPANY CONTACT: DYKMAN, DL

TELEPHONE NO.: 373-2530

PROJECT COORDINATOR: DYKMAN, DL

PRICE CODE: 8N

F10-011-005

PRICE CODE: 8N

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: C5860 (299-E29-54); 1-007A

PROJECT DESIGNATION: *H4105 (7540)*

ARRA 200-LW-2 OU Characterization Vadose Zone - Soil ("K" Well)

SAF NO.: F10-011

AIR QUALITY:

METHOD OF SHIPMENT: FEDERAL EXPRESS

ICE CHEST NO.: *GIRP-08-06*

FIELD LOGBOOK NO.: *HNF-N-5763 p87*

ACTUAL SAMPLE DEPTH: *74.7-76.4 ft*

COA: 302143ES10

COA: 302143ES10

SHIPPED TO: Eberline Services

OFFSITE PROPERTY NO.: *7902 2486 1921*

SEE PTR

SEE PTR

BILL OF LADING/AIR BILL NO.:

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME	DATE/TIME
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	Contains Radioactive Material at concentrations that may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)	None	G/P	1	120ml	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	11-30-09	0907	11-30-09

SAMPLE NO.	MATRIX*	RECEIVED BY/STORED IN	DATE/TIME
B22RJ6	SOIL	AL EMBERSON	11-30-09

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		AL EMBERSON	11-30-09
RELINQUISHED BY/REMOVED FROM		AL EMBERSON	11-30-09
RELINQUISHED BY/REMOVED FROM		AL EMBERSON	11-30-09
RELINQUISHED BY/REMOVED FROM		AL EMBERSON	11-30-09
RELINQUISHED BY/REMOVED FROM		AL EMBERSON	11-30-09
RELINQUISHED BY/REMOVED FROM		AL EMBERSON	11-30-09

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

(1) Carbon-14; Nickel-63; Neptunium-237; Iodine-129; Isotopic Thorium (Thorium-232); Tritium - H3;

ORIGINAL

LABORATORY SECTION: RECEIVED BY

FINAL SAMPLE DISPOSITION: DISPOSAL METHOD

TITLE: DATE/TIME

DISPOSED BY: DATE/TIME

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F10-011-010	PAGE 1 OF 1
COLLECTOR <i>Rozanne Rust</i>	COMPANY CONTACT DYKMAN, DL	TELEPHONE NO. 373-2530	PROJECT COORDINATOR DYKMAN, DL	PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days	
SAMPLING LOCATION C5860 (299-E29-54); I-008A	PROJECT DESIGNATION ARRA 200-LW-2 OU Characterization Vadose Zone - Soil ("K" Well)	<i>H4105 (7540)</i>	SAF NO. F10-011	AIR QUALITY		
ICE CHEST NO. <i>GRP-08-06</i>	FINF-BOOK NO. <i>FINF-N-576-3 p 87</i>	ACTUAL SAMPLE DEPTH <i>77.1-79.4 ft</i>	COA 302143E510	METHOD OF SHIPMENT FEDERAL EXPRESS		
SHIPPED TO Eberline Services	OFFSITE PROPERTY NO.	BILL OF LADING/AIR BILL NO. <i>7982 2486 1921</i>				
MATRIX* A=Air DL=Drum L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)	PRESERVATION None	TYPE OF CONTAINER G/P	NO. OF CONTAINER(S) 1	VOLUME 120ml	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B22T90	SAMPLE ANALYSIS					
SAMPLE NO. B22RJ9	MATRIX* SOIL	SAMPLE DATE NOV 30 2009	SAMPLE TIME 1321	SIGN/ PRINT NAMES		
CHAIN OF POSSESSION						
RELINQUISHED BY/REMOVED FROM <i>AL ENRICH</i>	DATE/TIME NOV 30 2009 1530	RECEIVED BY/STORED IN MO413 SSU-R1	DATE/TIME 11-30-09/1530	SPECIAL INSTRUCTIONS ** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. □ (1) Carbon-14; Neptunium-237; Iodine-129; Isotopic Thorium (Thorium-232) Tritium - H3;		
RELINQUISHED BY/REMOVED FROM <i>AL ENRICH</i>	DATE/TIME DEC 15 2009 1102	RECEIVED BY/STORED IN CHPRG	DATE/TIME DEC 15 2009 1102	ORIGINAL		
RELINQUISHED BY/REMOVED FROM <i>AL ENRICH</i>	DATE/TIME DEC 15 2009 1400	RECEIVED BY/STORED IN Fedex	DATE/TIME DEC 15 2009 1400			
RELINQUISHED BY/REMOVED FROM <i>AL ENRICH</i>	DATE/TIME	RECEIVED BY/STORED IN <i>M. HATHAWAY</i>	DATE/TIME 11/17/09 0930			
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME			
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		



RICHMOND, CA LABORATORY
SAMPLE RECEIPT CHECKLIST

JK 12/17/09

Client: CHPRC City RICHMOND State WA

Date/Time received 12/17/09 0930 CoC No. F10-011-005, 010, 032

Container I.D. No. GRP-08-06 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: 3 Sample Matrix S
- 7. Number of containers per sample: 1 (Or see CoC)
- 8. Samples are in correct container Yes [] No []
- 9. Paperwork agrees with samples? Yes [] No []
- 10. Samples have: Tape [] Hazard labels [] Rad labels [] ¹⁶ Appropriate sample labels []
- 11. Samples are: In good condition [] Leaking [] Broken Container [] Missing []
- 12. Samples are: Preserved [] Not preserved [] pH Preservative
- 13. Describe any anomalies: UB 12/18/09

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

15. Inspected by [Signature] Date: 12/17/09 Time: 1150

Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	Wipe	Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	wipe
<u>See Sample 432</u>	<u>260</u>						

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

Calibration date
Calibration date
Calibration date 05 AUG 09