



EBERLINE
SERVICES

April 29, 2003

Ms. Joan Kessner
Bechtel Hanford Inc.
3350 George Washington Way
Richland, WA 99352
MSIN: H0-25

Reference: **P.O. #630**
Eberline Services R3-04-138-7494, SDG H2177

Dear Ms. Kessner:

Enclosed is the data report for one water sample designated under SAF No. B00-056 received at Eberline Services on April 22, 2003. The sample was analyzed according to the accompanying chain-of-custody document.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion
Program Manager

MCM

Enclosure: Data Package



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1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H2177 was composed of one water sample designated under SAF No. B00-056 with a Project Designation of: 100-NR-1 TSD Sites R.A. Sampling – Water, 100-NR-1 Decon Pad Sump #10.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analyses

No problems were encountered during the course of the analyses.

2.2 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.3 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

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."

Melissa C. Mannion
Melissa C. Mannion
Program Manager

4/29/13
Date

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2177

SDG 7494
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG H2177

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Melissa Mannion
Prepared by

Melissa Mannion
Reviewed by

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 04/29/03

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2177

SDG 7494
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG H2177

ABOUT THE DATA SUMMARY SECTION

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

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

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

PREPARATION BATCH SUMMARY

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

WORK SUMMARY

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

METHOD BLANKS

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

LAB CONTROL SAMPLES

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

REPORT GUIDES

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SUMMARY DATA SECTION

Page 1

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 04/29/03

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2177

SDG 7494
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford
Contract No. 630
Case no SDG H2177

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 Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 04/29/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2177

SDG 7494
 Contact Melissa C. Mannion

LAB SAMPLE SUMMARY

Client Hanford
 Contract No. 630
 Case no SDG H2177

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
R304138-01	J00M55	100-NR-1 Decon Pad Sump	WATER		B00-056	B00-056-049	04/17/03 08:15
R304138-02	Lab Control Sample		WATER		B00-056		
R304138-03	Method Blank		WATER		B00-056		
R304138-04	Duplicate (R304138-01)	100-NR-1 Decon Pad Sump	WATER		B00-056		04/17/03 08:15

LAB SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id EBRLNE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-LS
 Version 3.06
 Report date 04/29/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2177

QC SUMMARY

SDG 7494
 Contact Melissa C. Mannion

Client Hanford
 Contract No. 630
 Case no SDG H2177

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
7494	B00-056-049	J00M55	WATER		1.05 L		04/22/03 5	R304138-01		7494-001
		Method Blank	WATER					R304138-03		7494-003
		Lab Control Sample	WATER					R304138-02		7494-002
		Duplicate (R304138-01)	WATER		1.05 L		04/22/03 5	R304138-04		7494-004

Lab id EBRLNE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-QS
 Version 3.06
 Report date 04/29/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2177

SDG 7494
Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford
Contract No. 630
Case no SDG H2177

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI- FIERS
			BATCH	2σ %	CLIENT	MORE	RE BLANK	LCS	
Beta Counting									
SR	WATER	Total Strontium in Water	7060-110	10.0	1		1	1	1/1
Gas Proportional Counting									
93A	WATER	Gross Alpha in Water	7060-110	20.0	1		1	1	1/1
93B	WATER	Gross Beta in Water	7060-110	15.0	1		1	1	1/1
Gamma Scan									
GAM	WATER	Gamma Emitters	7060-110	15.0	1		1	1	1/1

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

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 04/29/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2177

SDG 7494
Contact Melissa C. Mannion

LAB WORK SUMMARY

Client Hanford
Contract No. 630
Case no SDG H2177

LAB SAMPLE COLLECTED RECEIVED	CLIENT SAMPLE ID LOCATION CUSTODY	SAF No	MATRIX	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
R304138-01 04/17/03 04/22/03	J00M55 100-NR-1 Decon Pad Sump B00-056-049	B00-056	WATER	7494-001 7494-001 7494-001 7494-001	93A/93 93B/93 GAM SR		04/24/03 04/24/03 04/24/03 04/24/03	04/29/03 04/29/03 04/29/03 04/29/03	MCM	Gross Alpha in Water Gross Beta in Water Gamma Emitters Total Strontium in Water
R304138-02	Lab Control Sample	B00-056	WATER	7494-002 7494-002 7494-002 7494-002	93A/93 93B/93 GAM SR		04/26/03 04/26/03 04/24/03 04/24/03	04/29/03 04/29/03 04/29/03 04/29/03	MCM	Gross Alpha in Water Gross Beta in Water Gamma Emitters Total Strontium in Water
R304138-03	Method Blank	B00-056	WATER	7494-003 7494-003 7494-003 7494-003	93A/93 93B/93 GAM SR		04/24/03 04/24/03 04/24/03 04/24/03	04/29/03 04/29/03 04/29/03 04/29/03	MCM	Gross Alpha in Water Gross Beta in Water Gamma Emitters Total Strontium in Water
R304138-04 04/17/03 04/22/03	Duplicate (R304138-01) 100-NR-1 Decon Pad Sump B00-056	B00-056	WATER	7494-004 7494-004 7494-004 7494-004	93A/93 93B/93 GAM SR		04/24/03 04/24/03 04/28/03 04/24/03	04/29/03 04/29/03 04/29/03 04/29/03	MCM	Gross Alpha in Water Gross Beta in Water Gamma Emitters Total Strontium in Water

COUNTS OF TESTS BY SAMPLE TYPE											
TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
93A/93	B00-056	Gross Alpha in Water	900.0_ALPHABETA_GPC	1			1	1	1		4
93B/93	B00-056	Gross Beta in Water	900.0_ALPHABETA_GPC	1			1	1	1		4
GAM	B00-056	Gamma Emitters	GAMMA_GS	1			1	1	1		4
SR	B00-056	Total Strontium in Water	SRTOT_SEP_PRECIP_GPC	1			1	1	1		4
TOTALS				4			4	4	4		16

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LWS
Version 3.06
Report date 04/29/03

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2177

7494-003

Method Blank

METHOD BLANK

SDG <u>7494</u>	Client/Case no <u>Hanford</u>	SDG <u>H2177</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304138-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7494-003</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>B00-056</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	-0.161	1.4	2.9	3.0	U	93A
Gross Beta	12587-47-2	-0.388	3.3	<u>5.7</u>	4.0	U	93B
Total Strontium	SR-RAD	0.314	0.77	1.5	2.0	U	SR
Potassium 40	13966-00-2	U		240		U	GAM
Cobalt 60	10198-40-0	U		10	25	U	GAM
Cesium 137	10045-97-3	U		8.7	15	U	GAM
Radium 226	13982-63-3	U		18		U	GAM
Radium 228	15262-20-1	U		40		U	GAM
Europium 152	14683-23-9	U		21	50	U	GAM
Europium 154	15585-10-1	U		26	50	U	GAM
Europium 155	14391-16-3	U		16	50	U	GAM
Thorium 228	14274-82-9	U		11		U	GAM
Thorium 232	TH-232	U		40		U	GAM
Uranium 235	15117-96-1	U		32		U	GAM
Uranium 238	U-238	U		1000		U	GAM
Americium 241	14596-10-2	U		9.4		U	GAM

100-NR-1 TSD Sites R.A. Smlg.-Water

QC-BLANK #44507

Lab id <u>EBRLINE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/29/03</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2177

7494-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7494</u> Contact <u>Melissa C. Mannion</u> Lab sample id <u>R304138-02</u> Dept sample id <u>7494-002</u>	Client/Case no <u>Hanford</u> <u>SDG H2177</u> Contract No. <u>630</u> Client sample id <u>Lab Control Sample</u> Material/Matrix _____ <u>WATER</u> SAF No <u>B00-056</u>
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ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	207	15	<u>3.4</u>	3.0		93A	214	8.6	97	69-131	70-130
Gross Beta	226	11	<u>6.4</u>	4.0		93B	232	9.3	97	76-124	70-130
Total Strontium	133	5.3	1.6	2.0		SR	126	5.0	106	82-118	80-120
Cobalt 60	517	24	13	25		GAM	530	21	98	76-124	80-120
Cesium 137	510	20	15	15		GAM	512	20	100	76-124	80-120

100-NR-1 TSD Sites R.A. Smpg.-Water

QC-LCS #44506

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>04/29/03</u>

EBERLINE SERVICES/RICHMOND
SAMPLE DELIVERY GROUP H2177

7494-004

J00M55

DUPLICATE

SDG <u>7494</u>	Client/Case no <u>Hanford</u>	SDG <u>H2177</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>R304138-04</u>	Lab sample id <u>R304138-01</u>	Client sample id <u>J00M55</u>
Dept sample id <u>7494-004</u>	Dept sample id <u>7494-001</u>	Location/Matrix <u>100-NR-1 Decon Pad Sump WATER</u>
	Received <u>04/22/03</u>	Collected/Volume <u>04/17/03 08:15 1.05 L</u>
		Custody/SAF No <u>B00-056-049 B00-056</u>

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Gross Alpha	8.21	3.8	2.6	3.0		93A	6.48	3.5	2.4		24	114	
Gross Beta	244	11	<u>6.4</u>	4.0		93B	236	11	<u>5.4</u>		3	33	
Total Strontium	89.9	4.0	1.4	2.0		SR	88.2	4.1	1.4		2	23	
Potassium 40	U		260		U	GAM	U		60	U	-		
Cobalt 60	15.9	16	16	25	U	GAM	11.0	6.5	6.5		36	195	
Cesium 137	27.7	11	12	15		GAM	37.8	5.8	5.7		31	65	
Radium 226	U		25		U	GAM	U		8.9	U	-		
Radium 228	U		58		U	GAM	U		20	U	-		
Europium 152	U		33	50	U	GAM	U		12	U	-		
Europium 154	U		39	50	U	GAM	U		15	U	-		
Europium 155	U		45	50	U	GAM	U		11	U	-		
Thorium 228	U		19		U	GAM	U		6.8	U	-		
Thorium 232	U		58		U	GAM	U		20	U	-		
Uranium 235	U		58		U	GAM	U		15	U	-		
Uranium 238	U		1700		U	GAM	U		600	U	-		
Americium 241	U		110		U	GAM	U		16	U	-		

100-NR-1 TSD Sites R.A. Smpg.-Water

QC-DUP#1 44508

Note: Sample pH - 6.0

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2177

7494-001

J00M55

DATA SHEET

SDG <u>7494</u>	Client/Case no <u>Hanford</u>	<u>SDG H2177</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304138-01</u>	Client sample id <u>J00M55</u>	
Dept sample id <u>7494-001</u>	Location/Matrix <u>100-NR-1 Decon Pad Sump</u>	<u>WATER</u>
Received <u>04/22/03</u>	Collected/Volume <u>04/17/03 08:15</u>	<u>1.05 L</u>
	Custody/SAF No <u>B00-056-049</u>	<u>B00-056</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	6.48	3.5	2.4	3.0		93A
Gross Beta	12587-47-2	236	11	5.4	4.0		93B
Total Strontium	SR-RAD	88.2	4.1	1.4	2.0		SR
Potassium 40	13966-00-2	U		60		U	GAM
Cobalt 60	10198-40-0	11.0	6.5	6.5	25		GAM
Cesium 137	10045-97-3	37.8	5.8	5.7	15		GAM
Radium 226	13982-63-3	U		8.9		U	GAM
Radium 228	15262-20-1	U		20		U	GAM
Europium 152	14683-23-9	U		12	50	U	GAM
Europium 154	15585-10-1	U		15	50	U	GAM
Europium 155	14391-16-3	U		11	50	U	GAM
Thorium 228	14274-82-9	U		6.8		U	GAM
Thorium 232	TH-232	U		20		U	GAM
Uranium 235	15117-96-1	U		15		U	GAM
Uranium 238	U-238	U		600		U	GAM
Americium 241	14596-10-2	U		16		U	GAM

100-NR-1 TSD Sites R.A. Smplg.-Water

Note: Sample pH - 6.0

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
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Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/29/03</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2177

Test SR Matrix WATER
 SDG 7494
 Contact Melissa C. Mannion

LAB METHOD SUMMARY

TOTAL STRONTIUM IN WATER
 BETA COUNTING

Client Hanford
 Contract No. 630
 Contract SDG H2177

RESULTS

LAB	RAW	SUF-		Total	
SAMPLE ID	TEST	FIX	PLANCHET	CLIENT SAMPLE ID	Strontium
Preparation batch 7060-110					
R304138-01			7494-001	J00M55	88.2
R304138-02			7494-002	LCS (QC ID=44506)	ok
R304138-03			7494-003	BLK (QC ID=44507)	U
R304138-04			7494-004	Duplicate (R304138-01)	ok

Nominal values and limits from method RDLs (pCi/L) 2.0
 100-NR-1 TSD Sites R.A. Smplg.-Water

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 7060-110			2σ prep error 10.0 %		Reference Lab Notebook 7060 pg. 110												
R304138-01			J00M55		1.4	0.175			91	100			7	04/24/03	04/24	GRB-219	
R304138-02			LCS (QC ID=44506)		1.6	0.175			82	100				04/24/03	04/24	GRB-217	
R304138-03			BLK (QC ID=44507)		1.5	0.175			82	100				04/24/03	04/24	GRB-220	
R304138-04			Duplicate (R304138-01)		1.4	0.175			94	100			7	04/24/03	04/24	GRB-218	
			(QC ID=44508)														

Nominal values and limits from method 2.0 0.175 100 180

PROCEDURES REFERENCE SRTOT_SEP_PRECIP_GPC
 CP-380 Strontium in Water Samples, rev 0

AVERAGES ± 2 SD MDA 1.5 ± 0.19
 FOR 4 SAMPLES YIELD 87 ± 12

Lab id EBRLNE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 04/29/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2177

Test 93A Matrix WATER
 SDG 7494
 Contact Melissa C. Mannion

LAB METHOD SUMMARY

GROSS ALPHA IN WATER
 GAS PROPORTIONAL COUNTING

Client Hanford
 Contract No. 630
 Contract SDG H2177

RESULTS

LAB	RAW	SUF-			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID		Gross Alpha
Preparation batch 7060-110					
R304138-01	93	7494-001	J00M55		6.48
R304138-02	93	7494-002	LCS (QC ID=44506)		ok
R304138-03	93	7494-003	BLK (QC ID=44507)		U
R304138-04	93	7494-004	Duplicate (R304138-01)		ok
Nominal values and limits from method			RDLs (pCi/L)		3.0
100-NR-1 TSD Sites R.A. Smpg.-Water					

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	RESID	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-	
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/L	L	FAC	TION	mg	%	min	keV	KeV	HELD PREPARED	YZED	DETECTOR
Preparation batch 7060-110			2σ prep error 20.0 %			Reference Lab Notebook 7060 pg. 110								
R304138-01	93	J00M55	2.4	0.100			15		100			7	04/24/03	04/24 GRB-109
R304138-02	93	LCS (QC ID=44506)	<u>3.4</u>	0.100			21		100				04/24/03	04/26 GRB-115
R304138-03	93	BLK (QC ID=44507)	2.9	0.100			22		100				04/24/03	04/24 GRB-111
R304138-04	93	Duplicate (R304138-01) (QC ID=44508)	2.6	0.100			14		100			7	04/24/03	04/24 GRB-112
Nominal values and limits from method			3.0	0.100			5-250		100					180

PROCEDURES REFERENCE 900.0_ALPHABETA_GPC
 CP-120 Gross Alpha and Gross Beta in Water, rev 5

AVERAGES ± 2 SD MDA 2.8 ± 0.87
 FOR 4 SAMPLES RESIDUE 18 ± 8

Lab id EBRLNE
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2177

LAB METHOD SUMMARY

GROSS BETA IN WATER
GAS PROPORTIONAL COUNTING

Test 93B Matrix WATER
SDG 7494
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H2177

RESULTS

LAB	RAW	SUF-			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID		Gross Beta
Preparation batch 7060-110					
R304138-01	93	7494-001	J00M55		236
R304138-02	93	7494-002	LCS (QC ID=44506)		ok
R304138-03	93	7494-003	BLK (QC ID=44507)		U
R304138-04	93	7494-004	Duplicate (R304138-01)		ok
Nominal values and limits from method			RDLs (pCi/L)		4.0
100-NR-1 TSD Sites R.A. Smpg.-Water					

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	RESID	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/L	L	FAC	TION	mg	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7060-110			2σ prep error 15.0 %		Reference Lab Notebook 7060 pg. 110										
R304138-01	93	J00M55	<u>5.4</u>	0.100			15	100				7	04/24/03	04/24	GRB-109
R304138-02	93	LCS (QC ID=44506)	<u>6.4</u>	0.100			21	100					04/24/03	04/26	GRB-115
R304138-03	93	BLK (QC ID=44507)	<u>5.7</u>	0.100			22	100					04/24/03	04/24	GRB-111
R304138-04	93	Duplicate (R304138-01) (QC ID=44508)	<u>6.4</u>	0.100			14	100				7	04/24/03	04/24	GRB-112
Nominal values and limits from method			4.0	0.100			5-250	100				180			

PROCEDURES REFERENCE 900.0_ALPHABETA_GPC
CP-120 Gross Alpha and Gross Beta in Water, rev 5

AVERAGES ± 2 SD MDA 6.0 ± 1.0
FOR 4 SAMPLES RESIDUE 18 ± 8

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Version 3.06
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LAB METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Test GAM Matrix WATER
 SDG 7494
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RESULTS

LAB RAW SUF-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Cobalt 60 Cesium 137

Preparation batch 7060-110

R304138-01	7494-001	J00M55	11.0	37.8
R304138-02	7494-002	LCS (QC ID=44506)	ok	ok
R304138-03	7494-003	BLK (QC ID=44507)	U	U
R304138-04	7494-004	Duplicate (R304138-01)	ok U	ok

Nominal values and limits from method RDLs (pCi/L) 25 15
 100-NR-1 TSD Sites R.A. Smplg.-Water

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 7060-110 2σ prep error 15.0 % Reference Lab Notebook 7060 pg. 110

R304138-01	J00M55	19	0.500	882	7	04/23/03	04/24	01,04,00
R304138-02	LCS (QC ID=44506)	15	0.500	883		04/23/03	04/24	MB,05,00
R304138-03	BLK (QC ID=44507)	33	0.500	883		04/23/03	04/24	MB,07,00
R304138-04	Duplicate (R304138-01) (QC ID=44508)	73	0.500	376	11	04/23/03	04/28	MB,05,00

Nominal values and limits from method 15 0.500 100 180

PROCEDURES REFERENCE GAMMA_GS
 CP-100 Ge(Li) Preparation for Commercial Samples, rev 5

AVERAGES ± 2 SD MDA 35 ± 53
 FOR 4 SAMPLES YIELD _____ ± _____

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SDG 7494
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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.

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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.

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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.

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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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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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DATA SHEET

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

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LAB CONTROL SAMPLE

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

The following notes apply to this report:

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

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

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

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

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DUPLICATE

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

The following notes apply to this report:

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

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

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

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

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

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

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

This value reported for this limit is at most 999.

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

1. A fixed percentage specified in the protocol.

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DUPLICATE

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

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

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

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

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MATRIX SPIKE

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

The following notes apply to this report:

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

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

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

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

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

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

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

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

2. The error of ADDED.

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

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

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MATRIX SPIKE

for the recovery.

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

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

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METHOD SUMMARY

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

The following notes apply to this report:

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

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

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

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

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

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

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

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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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Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B00-056-049		Page 1 of 1	
Collector R.B. Kerkow		Company Contact R.B. Kerkow		Telephone No. 372-2187		Project Coordinator KESSNER, JH		Price Code	
Project Designation 100-NR-1 TSD Sites R. A. Sampling - Water		Sampling Location 100-NR-1 Decon Pad Sump #10		506 Hall 77 (7494)		SAF No. B00-056		Air Quality <input type="checkbox"/> 7 DAY	
Ice Chest No. ERC 01 021		Field Logbook No. EL-1524-3		COA R1301N2600		Method of Shipment Federal Express			
Shipped To TMA/RECRA		Offsite Property No. A030241		Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS Potentially Radiactive					Preservation NONE 4-17-03				
Special Handling and/or Storage None					Type of Container P				
					No. of Container(s) 21				
					Volume 1L				
SAMPLE ANALYSIS					See item (1) in Special Instructions.				
Sample No.	Matrix *	Sample Date	Sample Time						
J00M55	WATER	4-17-03	0815	X					TETO RCF: J00M53
CHAIN OF POSSESSION					SPECIAL INSTRUCTIONS				
Relinquished By/Removed From R.B. Kerkow / RB Kub		Date/Time 4-17-03		Sign/Print Names REF #3B RBK		Date/Time 4-17-03		Matrix *	
Relinquished By/Removed From REF 3B		Date/Time 42103 0930		Received By/Stored In S. J. GALE		Date/Time 42103 0930		(1) Gross Alpha; Gross Beta; Gamma Spectroscopy (Water) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on (Americium-241); Isotopic Plutonium; Americium-241; Strontium-89,90 - Total Sr; Nickel-63; Isotopic Uranium DELUTE: 150 Pu, Am-241, Ni-63, 150 URANIUM ADD: PH TEST Personnel not available to relinquish samples from the 3728 Ref # 3B on 4/21/03	
Relinquished By/Removed From S. J. GALE		Date/Time 42103 0930		Received By/Stored In FED EX		Date/Time			
Relinquished By/Removed From FED EX		Date/Time		Received By/Stored In J. C.		Date/Time 4-22-03 (100)			
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			



ANALYTICAL SERVICES GROUP

Richmond, CA Laboratory

SAMPLE RECEIPT CHECKLIST

Client: BHI Date/Time received 1000 4-22-03
 CoC No. 800-056-049
 Container I.D. No. ERC-01-021 Requested TAT (Days) 7 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
7. Number of containers per sample: 1 (Or see CoC _____)
8. Paperwork agrees with samples? Yes [] No []
9. Samples have: Tape [] Hazard labels [] Rad labels [] Appropriate sample labels []
10. Samples are: In good condition [] Leaking [] Broken Container [] Missing []
11. Samples are: Preserved [] Not preserved [] Preservative _____
12. Describe any anomalies: _____

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

14. Received by [Signature] Date: 4-22-03 Time: 1000

Customer Sample No.	cpm	mR/hr	wipe	Customer Sample No.	cpm	mR/hr	wipe
<u>J00M55</u>	<u>240</u>	<u>.034</u>					

Ion Chamber Ser. No. 4011 Calibration date 3-20-03
 Alpha Meter Ser. No. _____ Calibration date _____
 Beta/Gamma Meter Ser. No. 99574 Calibration date 12-12-03