



NOVEMBER 28, 2005

EBERLINE
SERVICES

November 23, 2005

Ms. Dorothy Stewart
Pacific Northwest National Laboratory
3110 Port of Benton Boulevard
MSIN K6-96
Richland, WA 99352

Reference: **P.O. #630**
Eberline Services R5-10-015-7309, SDG H3364

Dear Ms. Stewart:

Enclosed is the data report for one water sample designated under SAF No. I06-001 received at Eberline Services on October 5, 2005. 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
Senior Program Manager

MCM/

Enclosure: *Data Package*

Analytical Services
2030 Wright Avenue
P.O. Box 4040
Richmond, California 94804-0040
(510) 235-2633 Fax (510) 235-0438
Toll Free (800) 841-5487
www.eberlineservices.com

1.0 GENERAL

Pacific Northwest National Laboratory (PNNL) Sample Delivery Group H3364 was composed of one water sample designated under SAF No. I06-001 with a Project Designation of: CERCLA 100KR4IAM(1)/(2) 100 NR2IAM ISRM.

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 Analysis

No problems were encountered during the course of the analyses.

2.2 Tritium Analysis

No problems were encountered during the course of the analyses.

2.3 Gamma Spectroscopy

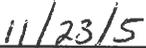
No problems were encountered during the course of the analyses.

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
Senior Program Manager



Date

NOVEMBER 28, 2005

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG H3364

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Melissa C. Mannion
Prepared by

Melissa C. Mannion
Reviewed by

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 11/22/05

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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG H3364

ABOUT THE DATA SUMMARY SECTION

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

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

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

PREPARATION BATCH SUMMARY

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

WORK SUMMARY

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

METHOD BLANKS

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

LAB CONTROL SAMPLES

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

REPORT GUIDES

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SUMMARY DATA SECTION

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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

GUIDE , c o n t .

Client Hanford
Contract No. 630
Case no SDG_H3364

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

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

MATRIX SPIKES

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

DATA SHEETS

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

METHOD SUMMARIES

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

REPORT GUIDES

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

REPORT GUIDES

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SUMMARY DATA SECTION

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

SDG 7309
 Contact Melissa C. Mannion

SAMPLE SUMMARY

Client Hanford
 Contract No. 630
 Case no SDG H3364

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB		CHAIN OF	
				SAMPLE ID	SAF NO	CUSTODY	COLLECTED
B1F304	Hanford Site	WATER		R510015-01	I06-001	I06-001-104	10/04/05 10:11
Method Blank		WATER		R510015-03	I06-001		
Lab Control Sample		WATER		R510015-02	I06-001		
Duplicate (R510015-01)	Hanford Site	WATER		R510015-04	I06-001		10/04/05 10:11
Spike (R510015-01)	Hanford Site	WATER		R510015-05	I06-001		10/04/05 10:11

SAMPLE SUMMARY

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG H3364

QC SUMMARY

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7309	I06-001-104	B1F304	WATER		6.02 L		10/05/05	1	R510015-01	7309-001
		Method Blank	WATER						R510015-03	7309-003
		Lab Control Sample	WATER						R510015-02	7309-002
		Duplicate (R510015-01)	WATER		6.02 L		10/05/05	1	R510015-04	7309-004
		Spike (R510015-01)	WATER		6.02 L		10/05/05	1	R510015-05	7309-005

QC SUMMARY

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford
Contract No. 630
Case no SDG H3364

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI-		
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS	DUP/ORIG
Gas Proportional Counting											
82B	WATER	Gross Beta in Water	7148-055	15.0	1			1	1	1/1	
Gamma Scan											
88A	WATER	Gross Alpha in Water	7148-055	20.0	1			1	1	1/1	
Gamma Scan											
GAM	WATER	Gamma Emitters	7148-055	15.0	1			1	1	1/1	
Liquid Scintillation Counting											
H	WATER	Tritium in Water	7148-055	10.0	1			1	1	1/1	1/1 X

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.

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG H3364

WORK SUMMARY

CLIENT SAMPLE ID	LAB SAMPLE ID	LOCATION	MATRIX	COLLECTED	SUF-	ANALYZED	REVIEWED	BY	METHOD
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX				
B1F304		R510015-01		7309-001	82B/82	11/11/05	11/14/05	MWT	Gross Beta in Water
Hanford Site		10/04/05		7309-001	88A/88	11/18/05	11/21/05	MWT	Gross Alpha in Water
I06-001-104	I06-001	10/05/05		7309-001	GAM	11/09/05	11/21/05		Gamma Emitters
				7309-001	H	11/03/05	11/08/05	MWT	Tritium in Water
Method Blank		R510015-03		7309-003	82B/82	11/12/05	11/14/05	MWT	Gross Beta in Water
			WATER	7309-003	88A/88	11/18/05	11/21/05	MWT	Gross Alpha in Water
	I06-001			7309-003	GAM	11/17/05	11/21/05		Gamma Emitters
				7309-003	H	11/03/05	11/08/05	MWT	Tritium in Water
Lab Control Sample		R510015-02		7309-002	82B/82	11/11/05	11/14/05	MWT	Gross Beta in Water
			WATER	7309-002	88A/88	11/18/05	11/21/05	MWT	Gross Alpha in Water
	I06-001			7309-002	GAM	11/17/05	11/21/05		Gamma Emitters
				7309-002	H	11/03/05	11/08/05	MWT	Tritium in Water
Duplicate (R510015-01)		R510015-04		7309-004	82B/82	11/12/05	11/14/05	MWT	Gross Beta in Water
Hanford Site		10/04/05	WATER	7309-004	88A/88	11/18/05	11/21/05	MWT	Gross Alpha in Water
	I06-001	10/05/05		7309-004	GAM	11/17/05	11/21/05		Gamma Emitters
				7309-004	H	11/03/05	11/08/05	MWT	Tritium in Water
Spike (R510015-01)		R510015-05		7309-005	H	11/03/05	11/08/05	MWT	Tritium in Water
Hanford Site		10/04/05	WATER						
	I06-001	10/05/05							

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
82B/82	I06-001	Gross Beta in Water	BETA_GPC	1			1	1	1		4
88A/88	I06-001	Gross Alpha in Water	ALPHA_GPC	1			1	1	1		4
GAM	I06-001	Gamma Emitters	GAMMA_GS	1			1	1	1		4
H	I06-001	Tritium in Water	TRITIUM_DIST_LSC	1			1	1	1	1	5
TOTALS				4			4	4	4	1	17

WORK SUMMARY

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EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3364

R510015-03

Method Blank

METHOD BLANK

SDG <u>7309</u>	Client/Case no <u>Hanford</u>	SDG <u>H3364</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R510015-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7309-003</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>I06-001</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	TPE	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	-0.284	0.48	0.48	1.3	3.0	U	88A
Gross Beta	12587-47-2	-0.160	1.2	1.2	2.0	4.0	U	82B
Tritium	10028-17-8	-123	1000	1000	<u>1700</u>	400	U	H
Cobalt 58	13981-38-9	U			19		U	GAM
Iron 59	14596-12-4	U			42		U	GAM
Cobalt 60	10198-40-0	U			25	25	U	GAM
Potassium 40	13966-00-2	U			650		U	GAM
Ruthenium 106	13967-48-1	U			180		U	GAM
Antimony 125	14234-35-6	U			54		U	GAM
Cesium 137	10045-97-3	U			<u>24</u>	15	U	GAM
Radium 226	13982-63-3	U			54		U	GAM
Radium 228	15262-20-1	U			110		U	GAM
Europium 152	14683-23-9	U			<u>64</u>	50	U	GAM
Europium 154	15585-10-1	U			<u>66</u>	50	U	GAM
Europium 155	14391-16-3	U			<u>78</u>	50	U	GAM
Thorium 228	14274-82-9	U			36		U	GAM
Thorium 232	TH-232	U			110		U	GAM
Uranium 235	15117-96-1	U			100		U	GAM
Uranium 238	U-238	U			2700		U	GAM
Americium 241	14596-10-2	U			190		U	GAM

CERCLA 100KR4IAM(1)/(2)100NR2IAMISRM

QC-BLANK #54691

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>11/22/05</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

R510015-02

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7309</u>	Client/Case no <u>Hanford</u>	<u>SDG H3364</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
Lab sample id <u>R510015-02</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7309-002</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>I06-001</u>	

ANALYTE	RESULT	2σ ERR (COUNT)	TPE	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR	REC %	3σ LMFS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	34.9	4.1	8.1	1.0	3.0		88A	37.3	1.5	94	67-133	70-130
Gross Beta	38.2	2.6	6.3	1.8	4.0		82B	39.7	1.6	96	75-125	70-130
Tritium	24400	1600	2900	<u>1700</u>	400		H	24900	1000	98	81-119	80-120
Cobalt 60	433	31	72	19	25		GAM	516	21	84	78-122	80-120
Cesium 137	464	31	76	<u>25</u>	15		GAM	526	21	88	77-123	80-120

CERCLA 100KR4IAM(1)/(2)100NR2IAMISRM

QC-LCS #54690

LAB CONTROL SAMPLES

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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>11/22/05</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

R510015-04

B1F304

DUPLICATE

SDG <u>7309</u>	Client/Case no <u>Hanford</u>	<u>SDG H3364</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>R510015-04</u>	Lab sample id <u>R510015-01</u>	Client sample id <u>B1F304</u>
Dept sample id <u>7309-004</u>	Dept sample id <u>7309-001</u>	Location/Matrix <u>Hanford Site</u> <u>WATER</u>
	Received <u>10/05/05</u>	Collected/Volume <u>10/04/05 10:11</u> <u>6.02 L</u>
		Custody/SAF No <u>I06-001-104</u> <u>I06-001</u>

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	TPE	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	0.555	0.78	0.79	1.3	3.0	U	88A	0.361	0.82	1.5	U	-	-	-
Gross Beta	20.9	2.1	3.8	1.8	4.0		82B	19.2	2.0	2.0		8	39	20
Tritium	154	110	110	180	400	U	H	165	110	180	U	-	-	-
Cobalt 58	U			15		U	GAM	U		12	U	-	-	-
Iron 59	U			33		U	GAM	U		32	U	-	-	-
Cobalt 60	U			8.6	25	U	GAM	U		10	U	-	-	-
Potassium 40	U			99		U	GAM	U		150	U	-	-	-
Ruthenium 106	U			97		U	GAM	U		82	U	-	-	-
Antimony 125	U			27		U	GAM	U		23	U	-	-	-
Cesium 137	U			10	15	U	GAM	U		9.8	U	-	-	-
Radium 226	U			18		U	GAM	U		17	U	-	-	-
Radium 228	U			41		U	GAM	U		40	U	-	-	-
Europium 152	U			29	50	U	GAM	U		23	U	-	-	-
Europium 154	U			30	50	U	GAM	U		29	U	-	-	-
Europium 155	U			32	50	U	GAM	U		23	U	-	-	-
Thorium 228	U			17		U	GAM	U		13	U	-	-	-
Thorium 232	U			41		U	GAM	U		40	U	-	-	-
Uranium 235	U			45		U	GAM	U		33	U	-	-	-
Uranium 238	U			1200		U	GAM	U		1000	U	-	-	-
Americium 241	U			44		U	GAM	U		32	U	-	-	-

CERCLA 100KR4IAM(1)/(2)100NR2IAMISRM

QC-DUP#1 54692

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

R510015-05

B1F304

MATRIX SPIKE

SDG <u>7309</u>	Client/Case no <u>Hanford</u>	SDG <u>H3364</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R510015-05</u>	Lab sample id <u>R510015-01</u>	Client sample id <u>B1F304</u>
Dept sample id <u>7309-005</u>	Dept sample id <u>7309-001</u>	Location/Matrix <u>Hanford Site</u> <u>WATER</u>
	Received <u>10/05/05</u>	Collected/Volume <u>10/04/05 10:11</u> <u>6.02 L</u>
		Custody/SAF No <u>I06-001-104</u> <u>I06-001</u>

ANALYTE	SPIKE pCi/L	2σ ERR (COUNT)	TPE	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (COUNT)	REC % (TOTAL)	3σ LIMITS	PROTOCOL LIMITS
Tritium	18000	350	1800	180	400	X	H	18200	730	165	110	98	84-116	60-140

CERCLA 100KR4IAM(1)/(2)100NR2IAMISRM

QC-MS#1 54693

MATRIX SPIKES

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EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3364

R510015-01

B1F304

DATA SHEET

SDG <u>7309</u>	Client/Case no <u>Hanford</u>	SDG <u>H3364</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
Lab sample id <u>R510015-01</u>	Client sample id <u>B1F304</u>	
Dept sample id <u>7309-001</u>	Location/Matrix <u>Hanford Site</u>	<u>WATER</u>
Received <u>10/05/05</u>	Collected/Volume <u>10/04/05 10:11</u>	<u>6.02 L</u>
	Custody/SAF No <u>I06-001-104</u>	<u>I06-001</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	TPE	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	0.361	0.82	0.82	1.5	3.0	U	88A
Gross Beta	12587-47-2	19.2	2.0	3.5	2.0	4.0		82B
Tritium	10028-17-8	165	110	110	180	400	U	H
Cobalt 58	13981-38-9	U			12		U	GAM
Iron 59	14596-12-4	U			32		U	GAM
Cobalt 60	10198-40-0	U			10	25	U	GAM
Potassium 40	13966-00-2	U			150		U	GAM
Ruthenium 106	13967-48-1	U			82		U	GAM
Antimony 125	14234-35-6	U			23		U	GAM
Cesium 137	10045-97-3	U			9.8	15	U	GAM
Radium 226	13982-63-3	U			17		U	GAM
Radium 228	15262-20-1	U			40		U	GAM
Europium 152	14683-23-9	U			23	50	U	GAM
Europium 154	15585-10-1	U			29	50	U	GAM
Europium 155	14391-16-3	U			23	50	U	GAM
Thorium 228	14274-82-9	U			13		U	GAM
Thorium 232	TH-232	U			40		U	GAM
Uranium 235	15117-96-1	U			33		U	GAM
Uranium 238	U-238	U			1000		U	GAM
Americium 241	14596-10-2	U			32		U	GAM

CERCLA 100KR4IAM(1)/(2)100NR2IAMISRM

DATA SHEETS

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

Test 82B Matrix WATER
SDG 7309
Contact Melissa C. Mannion

METHOD SUMMARY

GROSS BETA IN WATER
GAS PROPORTIONAL COUNTING

Client Hanford
Contract No. 630
Contract SDG H3364

RESULTS

Table with columns: CLIENT SAMPLE ID, LAB SAMPLE ID, RAW TEST, SUP-FIX, PLANCHET, 1: Gross Beta, 2: Sum, Beta Emitters, RESULT RATIO (%). Includes rows for Preparation batch 7148-055, Method Blank, Lab Control Sample, Duplicate, and Nominal values.

METHOD PERFORMANCE

Table with columns: CLIENT SAMPLE ID, LAB SAMPLE ID, RAW TEST, SUP-FIX, MDA, ALIQ, PREP, DILU, RESID, EFF, COUNT, FWHM, DRIFT, DAYS, ANAL- YZED, DETECTOR. Includes rows for Preparation batch 7148-055, Method Blank, Lab Control Sample, Duplicate, and Nominal values.

PROCEDURES REFERENCE BETA_GPC
CP-121 Gross Alpha and Gross Beta in Drinking Water, rev 1

AVERAGES ± 2 SD MDA 1.9 ± 0.23
FOR 4 SAMPLES RESIDUE 70 ± 26

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/22/05

NOVEMBER 28, 2005

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

Test 88A Matrix WATER
SDG 7309
Contact Melissa C. Mannion

METHOD SUMMARY

GROSS ALPHA IN WATER
GAS PROPORTIONAL COUNTING

Client Hanford
Contract No. 630
Contract SDG H3364

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Gross Alpha
Preparation batch 7148-055					
B1F304	R510015-01	88		7309-001	U
Method Blank	R510015-03	88		7309-003	U
Lab Control Sample	R510015-02	88		7309-002	ok
Duplicate (R510015-01)	R510015-04	88		7309-004	- U

Nominal values and limits from method RDLs (pCi/L) 3.0
CERCLA 100KR4IAM(1)/(2)100NR2IAMISRM

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7148-055 2σ prep error 20.0 % Reference Lab Notebook #7148, pg. 053																
B1F304	R510015-01	88		1.5	0.300			79		100			45	11/10/05	11/18	GRB-105
Method Blank	R510015-03	88		1.3	0.300			57		100				11/10/05	11/18	GRB-107
Lab Control Sample	R510015-02	88		1.0	0.300			60		100				11/10/05	11/18	GRB-106
Duplicate (R510015-01)	R510015-04	88		1.3	0.300			83		100			45	11/10/05	11/18	GRB-108

Nominal values and limits from method 3.0 0.300 5-250 100 180

PROCEDURES REFERENCE ALPHA_GPC
CP-120 Gross Alpha and Gross Beta in Water, rev 6

AVERAGES ± 2 SD MDA 1.3 ± 0.41
FOR 4 SAMPLES RESIDUE 70 ± 26

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/22/05

NOVEMBER 28, 2005

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3364

Client Hanford

Contract No. 630

Contract SDG H3364

Test GAM Matrix WATER

SDG 7309

Contact Melissa C. Mannion

METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

RESULTS

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

Preparation batch 7148-055

B1F304	R510015-01	7309-001		U	U
Method Blank	R510015-03	7309-003		U	U
Lab Control Sample	R510015-02	7309-002		ok	ok
Duplicate (R510015-01)	R510015-04	7309-004		- U	- U

Nominal values and limits from method RDLs (pCi/L) 25 15

CERCLA 100KR4IAM(1)/(2)100NR2IAMISRM

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	---------------	--------------	------------	-----	--------	----------	------------	---------	-------	-----------	----------	-----------	-----------	----------------	------	----------

Preparation batch 7148-055 2σ prep error 15.0 % Reference Lab Notebook #7148, pg. 053

B1F304	R510015-01		<u>44</u>	0.500						873			36	10/24/05	11/09	01,03,00
Method Blank	R510015-03		<u>130</u>	0.500						301				10/24/05	11/17	01,02,00
Lab Control Sample	R510015-02		<u>25</u>	0.500						301				10/24/05	11/17	MB,07,00
Duplicate (R510015-01)	R510015-04		<u>62</u>	0.500						300			44	10/24/05	11/17	01,04,00

Nominal values and limits from method 15 0.500 100 180

PROCEDURES REFERENCE GAMMA_GS
 CP-100 Ge(Li) Preparation for Commercial Samples, rev 7

AVERAGES ± 2 SD MDA 65 ± 91
 FOR 4 SAMPLES YIELD _____ ± _____

METHOD SUMMARIES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3364

Test H Matrix WATER
SDG 7309
Contact Melissa C. Mannion

METHOD SUMMARY
TRITIUM IN WATER
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 630
Contract SDG H3364

RESULTS

Table with columns: CLIENT SAMPLE ID, LAB SAMPLE ID, RAW TEST FIX, SUF- PLANCHET, Tritium. Includes preparation batch 7148-055 and nominal values from method.

METHOD PERFORMANCE

Table with columns: CLIENT SAMPLE ID, LAB SAMPLE ID, RAW TEST FIX, MDA pCi/L, ALIQ L, PREP FAC, DILU TION, YIELD %, EFF %, COUNT min, FWHM keV, DRIFT KeV, DAYS HELD, ANAL- PREPARED, YZED, DETECTOR. Includes preparation batch 7148-055 and nominal values from method.

PROCEDURES REFERENCE TRITIUM_DIST_LSC
CP-210 Tritium in Water Samples by Distillation, rev 8

AVERAGES ± 2 SD MDA 790 ± 1700
FOR 5 SAMPLES YIELD 48 ± 95

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/22/05

NOVEMBER 28, 2005

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG H3364

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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SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG_H3364

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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SAMPLE DELIVERY GROUP H3364

SDG 7309
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG_H3364

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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SDG 7309
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REPORT GUIDE

Client Hanford
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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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SAMPLE DELIVERY GROUP H3364

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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.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 11/22/05

NOVEMBER 28, 2005

PNNL **C.O.C. # 106-001-104** Page 1 of 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector: **K.J. YOUNG** Telephone No. **509-376-5056** MSIN **FAX**

SAF No. **106-001** Contact/Requester **Dot Stewart** **H3367 (7309)** Purchase Order/Charge Code **7912-2647-6277**

Project Title **CERCLA 100KR41AM(1)(2) 100 NR21AM ISRM** Sampling Origin **Hanford Site** Ice Chest No. **DES-1005 Temp.**

Shipped To (Lab) **Eberline Services** Method of Shipment **Govt. Truck** Bill of Lading/Air Bill No. **12**

Protocol **CERCLA** Priority: **45 Days** Offsite Property No.

POSSIBLE SAMPLE HAZARDS/REMARKS **SPECIAL INSTRUCTIONS** Hold Time Total Activity Exemption: Yes No

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B1F304		W	10/4/05	1011	1x1000-mL P	906.0_H3_LSC: Tritium (1)	None
B1F304		W			1x20-mL P	Activity Scan	None
B1F304		W			2x1000-mL G/P	Gross Alpha	HNO3 to pH <2
B1F304		W			2x1000-mL G/P	Gross Beta	HNO3 to pH <2
B1F304		W			1x1000-mL G/P	Gamma Spectroscopy	HNO3 to pH <2

Relinquished By: **K.J. YOUNG** Print **Don Young** Sign **Don Young** Date/Time **10/4/05 1400** Received By **FEDEX** Sign Date/Time

Relinquished By: **FED EX** Print Sign Date/Time **10/05/05 9:30** Received By **FEW** Sign Date/Time **10/05/05 9:30**

Relinquished By: Print Sign Date/Time Received By Sign Date/Time

Relinquished By: Print Sign Date/Time Received By Sign Date/Time

FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process) **Disposed By** Date/Time

Matrix *
 S = Soil DS = Dnm Solid
 SE = Sediment DI = Dnm Limit
 SO = Solid T = Tissue
 SI = Sludge W = Wine
 W = Water L = Liquid
 O = Oil V = Vegetation
 A = Air X = Other



SAMPLE RECEIPT CHECKLIST

Client: PNNL City: MICHLAND State: WA

Date/Time received: 10/05/05 9:30 CoC No.: 106-001-104

Container I.D. No.: AFS 1005 Requested TAT (Days): 45 P.D. Received Yes [] No []

INSPECTION

- 1 Custody seals on shipping container intact? Yes No N/A
- 2 Custody seals on shipping container dated & signed? Yes No N/A
- 3 Custody seals on sample containers intact? Yes No N/A
- 4 Custody seals on sample containers dated & signed? Yes No N/A
- 5 Packing material is: Wet Dry
- 6 Number of samples in shipping container: 1 Sample Matrix: W
- 7 Number of containers per sample: 7 (Or see CoC _____)
- 8 Samples are in correct container Yes No
- 9 Paperwork agrees with samples? Yes No
- 10 Samples have: Tape Hazard labels Rad labels Appropriate sample labels
- 11 Samples are: in good condition Leaking Broken Container Missing
- 12 Samples are: Preserved Not preserved pH: 1/7 Preservative _____
- 13 Describe any anomalies: _____
- 14 Was P.M. notified of any anomalies? Yes No Date _____
- 15 Inspected by: MEW Date: 10/05/05 Time: 13:00

Customer Sample No.	com	mR/hr	Wide	Customer Sample No.	com	mR/hr	Wide

Ion Chamber Ser. No. _____ Calibration date: _____
 Alpha Meter Ser. No. _____ Calibration date: _____
 Beta/Gamma Meter Ser. No. _____ Calibration date: _____