



EBERLINE
SERVICES

0076524

February 7, 2008

Mr. Steve Trent
Fluor Hanford Inc.
1200 Jadwin Avenue
Richland, WA 99352



Reference: **P.O. #630**
Eberline Services R7-12-079-7026, SDG H3611

Dear Mr. Trent:

Enclosed is the data report for one water sample designated under SAF No. F07-080 received at Eberline Services on December 12, 2007. 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/njv

Enclosure: Data Package

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EDMC

Analytical Services
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1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H3611 was composed of one water sample designated under SAF No. F07-080 with a Project Designation of: 200-BP-5 OU Characterization for N Well-QC Sampling.

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 Carbon-14 Analysis

The C-14 recovery for the QC LCS was 72%, less than the lower control limit of 80%. No other problems were encountered during the course of the analyses.

2.2 Iodine-129 Analysis

No problems were encountered during the course of the analyses.

2.3 Isotopic Thorium Analysis

The DER for the duplicate analysis was 3.5. No other problems were encountered during the course of the analyses.

3.0 Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."



Melissa C. Mannion
Senior Program Manager

02/07/08

Date

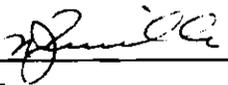
EBRLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3611

SDG 7026
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG_H3611

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Prepared by _____

Reviewed by _____

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 02/06/08

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3611

SDG 7026
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG_H3611

ABOUT THE DATA SUMMARY SECTION

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

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

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

PREPARATION BATCH SUMMARY

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

WORK SUMMARY

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

METHOD BLANKS

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

LAB CONTROL SAMPLES

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

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 02/06/08

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EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3611

SDG 7026
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford
Contract No. 630
Case no SDG_H3611

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

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

MATRIX SPIKES

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

DATA SHEETS

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

METHOD SUMMARIES

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

REPORT GUIDES

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

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 02/06/08

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

SDG 7026
 Contact Melissa C. Mannion

LAB SAMPLE SUMMARY

Client Hanford
 Contract No. 630
 Case no SDG H3611

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
R712079-01	B1PN69	C5861, I-EB-10	WATER		F07-080	F07-080-001	12/10/07 07:15
R712079-02	Lab Control Sample		WATER		F07-080		
R712079-03	Method Blank		WATER		F07-080		
R712079-04	Duplicate (R712079-01)	C5861, I-EB-10	WATER		F07-080		12/10/07 07:15
R712079-05	Spike (R712079-01)	C5861, I-EB-10	WATER		F07-080		12/10/07 07:15

LAB SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRINE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-LS
 Version 3.06
 Report date 02/06/08

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

SDG 7026
 Contact Melissa C. Mannion

QC SUMMARY

Client Hanford
 Contract No. 630
 Case no SDG H3611

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
7026	F07-080-001	B1PN69	WATER		4.02 L		12/12/07	2	R712079-01	7026-001
		Method Blank	WATER						R712079-03	7026-003
		Lab Control Sample	WATER						R712079-02	7026-002
		Duplicate (R712079-01)	WATER		4.02 L		12/12/07	2	R712079-04	7026-004
		Spike (R712079-01)	WATER		4.02 L		12/12/07	2	R712079-05	7026-005

QC SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-QS
 Version 3.06
 Report date 02/06/08

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

SDG 7026
 Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford
 Contract No. 630
 Case no SDG H3611

TEST	MATRIX	METHOD	PREPARATION ERROR			PLANCHETS ANALYZED				QUALI-
			BATCH	2σ %	CLIENT MORE	RE BLANK	LCS	DUP/ORIG	MS/ORIG	
Alpha Spectroscopy										
TH	WATER	Thorium, Isotopic in Water	6130-199	5.0	1	1	1	1/1		
Gamma Spectroscopy										
I	WATER	Iodine 129 in Water	6130-199	5.0	1	1	1	1/1		
Liquid Scintillation Counting										
C	WATER	Carbon 14 in Water	6130-199	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.

Lab id EBRINE
 Protocol Hanford
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 Form DVD-PBS
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 Report date 02/06/08

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

SDG 7026
Contact Melissa C. Mannion

LAB WORK SUMMARY

Client Hanford
Contract No. 630
Case no SDG H3611

LAB SAMPLE	CLIENT SAMPLE ID					SUF-				
COLLECTED	LOCATION		MATRIX		TEST	FIX	ANALYZED	REVIEWED	BY	METHOD
RECEIVED	CUSTODY	SAF No		PLANCHET						
R712079-01	B1PN69			7026-001	C		01/25/08	01/31/08	BW	Carbon 14 in Water
12/10/07	C5861, I-EB-10		WATER	7026-001	I		01/16/08	01/21/08	BW	Iodine 129 in Water
12/12/07	F07-080-001	F07-080		7026-001	TH		01/24/08	01/24/08	BW	Thorium, Isotopic in Water
R712079-02	Lab Control Sample			7026-002	C		01/25/08	01/31/08	BW	Carbon 14 in Water
			WATER	7026-002	I		01/17/08	01/21/08	BW	Iodine 129 in Water
		F07-080		7026-002	TH		01/24/08	01/24/08	BW	Thorium, Isotopic in Water
R712079-03	Method Blank			7026-003	C		01/25/08	01/31/08	BW	Carbon 14 in Water
			WATER	7026-003	I		01/18/08	01/21/08	BW	Iodine 129 in Water
		F07-080		7026-003	TH		01/24/08	01/24/08	BW	Thorium, Isotopic in Water
R712079-04	Duplicate (R712079-01)			7026-004	C		01/25/08	01/31/08	BW	Carbon 14 in Water
12/10/07	C5861, I-EB-10		WATER	7026-004	I		01/18/08	01/21/08	BW	Iodine 129 in Water
12/12/07		F07-080		7026-004	TH		01/24/08	01/24/08	BW	Thorium, Isotopic in Water
R712079-05	Spike (R712079-01)			7026-005	C		01/25/08	01/31/08	BW	Carbon 14 in Water
12/10/07	C5861, I-EB-10		WATER							
12/12/07		F07-080								

COUNTS OF TESTS BY SAMPLE TYPE											
TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
C	F07-080	Carbon 14 in Water	C14_CHEM_LSC	1			1	1	1	1	5
I	F07-080	Iodine 129 in Water	I129_SEP_LEPS_GS	1			1	1	1		4
TH	F07-080	Thorium, Isotopic in Water	THISO_IE_PLATE_AEA	1			1	1	1		4
TOTALS				3			3	3	3	1	13

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LWS
Version 3.06
Report date 02/06/08

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EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3611

7026-003

Method Blank

METHOD BLANK

SDG <u>7026</u>	Client/Case no <u>Hanford</u>	<u>SDG_H3611</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R712079-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7026-003</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>F07-080</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Carbon 14	14762-75-5	-15.2	31	41.7	200	U	C
Thorium 228	14274-82-9	-0.036	0.073	0.174		U	TH
Thorium 230	14269-63-7	0.073	0.11	0.139	1.00	U	TH
Thorium 232	TH-232	0	0.036	0.139	1.00	U	TH
Iodine 129	15046-84-1	0.305	0.60	1.35	5.00	U	I

200BP5 OU Charactrztn NWell-QC Sampl

QC-BLANK 64138

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>02/06/08</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

7026-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7026</u>	Client/Case no <u>Hanford</u> SDG <u>H3611</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>
Lab sample id <u>R712079-02</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id <u>7026-002</u>	Material/Matrix <u>WATER</u>
	SAF No <u>F07-080</u>

ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ	LIMITS	PROTOCOL
	pCi/L	(COUNT)	pCi/L	pCi/L	FIERS TEST		pCi/L	pCi/L	†	(TOTAL)	LIMITS
Carbon 14	5720	200	113	200	C	7970	320	<u>72</u>	87-113	80-120	
Thorium 230	16.2	1.6	0.154	1.00	TH	18.2	0.73	89	84-116	80-120	
Iodine 129	252	3.1	3.66	5.00	I	232	9.3	109	90-110	80-120	

200BPS OU Characterztr. NWell-QC Sampl

QC-LCS #64137

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>02/06/08</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

7026-004

B1PN69

DUPLICATE

SDG <u>7026</u>	Client/Case no <u>Hanford</u>	<u>SDG H3611</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>R712079-04</u>	Lab sample id <u>R712079-01</u>	Client sample id <u>B1PN69</u>
Dept sample id <u>7026-004</u>	Dept sample id <u>7026-001</u>	Location/Matrix <u>C5861, I-EE-10</u> <u>WATER</u>
	Received <u>12/12/07</u>	Collected/Volume <u>12/10/07 07:15</u> <u>4.02 L</u>
		Custody/SAF No <u>F07-080-001</u> <u>F07-080</u>

ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI-	ORIGINAL	2σ ERR	MDA	QUALI-	RPD	3σ	DER
	pCi/L	(COUNT)	pCi/L	pCi/L	FIERS		TEST	pCi/L	(COUNT)	pCi/L	FIERS	%
Carbon 14	4.38	39	41.7	200	U	C	6.10	31	42.1	U	-	0.1
Thorium 228	-0.069	0.069	0.213		U	TH	0.023	0.091	0.218	U	-	1.6
Thorium 230	0.104	0.10	0.132	1.00	U	TH	-0.091	0.046	0.174	U	-	<u>3.5</u>
Thorium 232	0	0.035	0.132	1.00	U	TH	0	0.045	0.174	U	-	0
Iodine 129	0.790	0.69	1.54	5.00	U	I	-0.336	1.1	2.39	U	-	1.7

200BF5 OU Charactrzttn NWell-QC Sampl

QC-DUP#1 64139

DUPLICATES

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Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>02/06/08</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

7026-005

B1PN69

MATRIX SPIKE

SDG <u>7026</u>	Client/Case no <u>Hanford</u>	SDG <u>H3611</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R712079-05</u>	Lab sample id <u>R712079-01</u>	Client sample id <u>B1PN69</u>
Dept sample id <u>7026-005</u>	Dept sample id <u>7026-001</u>	Location/Matrix <u>C5861, I-EE-10</u> <u>WATER</u>
	Received <u>12/12/07</u>	Collected/Volume <u>12/10/07 07:15</u> <u>4.02 L</u>
		Custody/SAF No <u>F07-080-001</u> <u>F07-080</u>

ANALYTE	SPIKE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (COUNT)	REC % (TOTAL)	3σ IMTS LIMITS	PROTOCOL
Carbon 14	19200	460	177	200	X	C	23900	960	6.10	31	80	86-114	60-140

200BP5 OU Characterztn NWell-QC Sampl

QC-MS#1 64140

MATRIX SPIKES

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Form <u>DVD-MS</u>
Version <u>3.06</u>
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EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3611

7026-001

B1PN69

D A T A S H E E T

SDG <u>7026</u>	Client/Case no <u>Hanford</u>	SDG <u>H3611</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R712079-01</u>	Client sample id <u>B1PN69</u>	
Dept sample id <u>7026-001</u>	Location/Matrix <u>C5861, I-EB-10</u>	<u>WATER</u>
Received <u>12/12/07</u>	Collected/Volume <u>12/10/07 07:15</u>	<u>4.02 L</u>
	Custody/SAF No <u>F07-080-001</u>	<u>F07-080</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Carbon 14	14762-75-5	6.10	31	42.1	200	U	C
Thorium 228	14274-82-9	0.023	0.091	0.218		U	TH
Thorium 230	14269-63-7	<u>-0.091</u>	0.046	0.174	1.00	U	TH
Thorium 232	TH-232	0	0.045	0.174	1.00	U	TH
Iodine 129	15046-84-1	-0.336	1.1	2.39	5.00	U	I

200BP5 OU Charactrzttn NWell-QC Sampl

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>02/06/08</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

Test TH Matrix WATER
SDG 7026
Contact Melissa C. Mannion

LAB METHOD SUMMARY

THORIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H3611

RESULTS

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

Preparation batch 6130-199

R712079-01	7026-001	B1PN69	U
R712079-02	7026-002	Lab Control Sample	ok
R712079-03	7026-003	Method Blank	U
R712079-04	7026-004	Duplicate (R712079-01)	<u>OUT</u> U

Nominal values and limits from method RDLs (pCi/L) 1.00
200BPS OU Characterztn NWell-QC Sampl

METHOD PERFORMANCE

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

Preparation batch 6130-199		2σ prep error 5.0 %	Reference Lab Notebook #6130		pg. 199									
R712079-01	B1PN69	0.174	0.500			82	158		45	01/24/08	01/24	SS-063		
R712079-02	Lab Control Sample	0.154	0.500			90	158			01/24/08	01/24	SS-064		
R712079-03	Method Blank	0.139	0.500			92	158			01/24/08	01/24	SS-065		
R712079-04	Duplicate (R712079-01)	0.132	0.500			84	161		45	01/24/08	01/24	SS-061		

Nominal values and limits from method 1.00 0.500 20-110 150 100 180

PROCEDURES	REFERENCE	THISO_IE_PLATE_AEA
SPP-062		Sample Aliquoting, rev 0
SPP-040		Environmentl Water Dissolution, rev 0
CP-900		Thorium in Water and Dissolved Solid Samples by Extraction Chromatography, rev 1
CP-008		Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD	MDA	0.150 ± 0.037
FOR 4 SAMPLES	YIELD	87 ± 10

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Version Ver 1.0
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Version 3.06
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

Test I Matrix WATER
 SDG 7026
 Contact Melissa C. Mannion

LAB METHOD SUMMARY

IODINE 129 IN WATER
 GAMMA SPECTROSCOPY

Client Hanford
 Contract No. 630
 Contract SDG H3611

RESULTS

LAB RAW SUP-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Iodine 129

Preparation batch 6130-199

R712079-01	7026-001	B1PN69	U
R712079-02	7026-002	Lab Control Sample	ok
R712079-03	7026-003	Method Blank	U
R712079-04	7026-004	Duplicate (R712079-01)	U

Nominal values and limits from method RDLs (pCi/L) 5.00
 200BPS OU Characterztn NWell-QC Sampl

METHOD PERFORMANCE

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

Preparation batch 6130-199 2σ prep error 5.0 % Reference Lab Notebook #6130 pg. 199

R712079-01	B1PN69		2.39	0.500			74	819			37	01/15/08 01/16 XSPEC-002
R712079-02	Lab Control Sample		3.66	0.500			88	604				01/15/08 01/17 XSPEC-004
R712079-03	Method Blank		1.35	0.500			88	1038				01/15/08 01/18 XSPEC-004
R712079-04	Duplicate (R712079-01)		1.54	0.500			83	1038			39	01/15/08 01/18 XSPEC-002

Nominal values and limits from method 5.00 0.500 20-105 300 100 180

PROCEDURES	REFERENCE	I129_SEP_LEPS_GS
	SPP-062	Sample Aliquoting, rev 0
	CP-531	Iodine-129, 131 in Water, Large Aliquots, rev 1

AVERAGES ± 2 SD	MDA	<u>2.24</u> ± <u>2.10</u>
FOR 4 SAMPLES	YIELD	<u>83</u> ± <u>13</u>

METHOD SUMMARIES

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SUMMARY DATA SECTION

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 Version 3.06
 Report date 02/06/08

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3611

LAB METHOD SUMMARY

CARBON 14 IN WATER

LIQUID SCINTILLATION COUNTING

Test C Matrix WATER
 SDG 7026
 Contact Melissa C. Mannion

Client Hanford
 Contract No. 630
 Contract SDG H3611

RESULTS

LAB RAW SUF-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Carbon 14

Preparation batch 6130-199

R712079-01	7026-001	B1PN69	U
R712079-02	7026-002	Lab Control Sample	<u>LOW</u>
R712079-03	7026-003	Method Blank	U
R712079-04	7026-004	Duplicate (R712079-01)	- U
R712079-05	7026-005	Spike (R712079-01)	<u>LOW</u> X

Nominal values and limits from method RDLs (pCi/L) 200
 200BPS DU Charactrzttn NWell-QC Sampl

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 6130-199 2σ prep error 10.0 % Reference Lab Notebook #6130 pg. 199

R712079-01	B1PN69	42.1	0.0300	100	100	46	01/25/08	01/25	LSC-004
R712079-02	Lab Control Sample	113	0.0300	100	<u>14</u>		01/25/08	01/25	LSC-004
R712079-03	Method Blank	41.7	0.0300	100	100		01/25/08	01/25	LSC-004
R712079-04	Duplicate (R712079-01)	41.7	0.0300	100	100	46	01/25/08	01/25	LSC-004
R712079-05	Spike (R712079-01)	177	<u>0.0200</u>	100	<u>12</u>	46	01/25/08	01/25	LSC-004

Nominal values and limits from method 200 0.0300 50 180

PROCEDURES REFERENCE C14_CHEM_LSC
 CP-241 Carbon-14 in Aqueous Samples, rev 6

AVERAGES ± 2 SD MDA 83.1 ± 122
 FOR 5 SAMPLES YIELD 100 ± 0

Lab id EBERLINE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 02/06/08

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3611

SDG 7026
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
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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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SDG 7026
Contact Melissa C. Mannion

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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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SAMPLE DELIVERY GROUP H3611

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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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Fluor Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F07-080-001

PAGE 1 OF 1

COLLECTOR

NCO Sampler

Jalen Patterson

COMPANY CONTACT

Trent, SJ

TELEPHONE NO.

373-5869

PROJECT COORDINATOR

TRENT, SJ

PRICE CODE

7N

DATA TURNAROUND

45 Days / 45 Days

SAMPLING LOCATION

C5861, I-EB-10

PROJECT DESIGNATION

200-BP-5 OU Characterization for N Well - QC Sampling

SAF NO.

F07-080

ICE CHEST NO.

GW0-06-2

FIELD LOGBOOK NO.

COA

METHOD OF SHIPMENT

GOVERNMENT VEHICLE

123270ES10

SHIPPED TO

Eberline Services

OFFSITE PROPERTY NO.

N/A

H3611 (7026)

BILL OF LADING/AIR BILL NO.

N/A

7992-3701 2115

MATRIX*

A=Air
DL=Drum
L=Liquids
DS=Drum
S=Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS

PRESERVATION

None

None

HNO3 to pH <2

TYPE OF CONTAINER

G/P

G/P

G/P

NO. OF CONTAINER(S)

1

1

1

VOLUME

125ml

1000ml

1000ml

SPECIAL HANDLING AND/OR STORAGE

SAMPLE ANALYSIS

Carbon-14;

Iodine-129;

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME						
B1PN69	WATER	12-10-07	0715	✓	✓	✓			
	LOT #'S			027210	027210	027210			
				025886					

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

R.D. Silva / R.D. Silva - 12-10-07 0750

M0745 Fridge 1 12-10-07 0750

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RELINQUISHED BY/REMOVED FROM

DATE/TIME

MO 745 Ref #1 12-11-07 1200

D. E. PARCHEN *Dewey* 12-11-07 1200

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

D. E. PARCHEN *Dewey* 12-11-07 1200

Fed EX

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

RELINQUISHED BY/REMOVED FROM

DATE/TIME



RICHMOND, CA LABORATORY
SAMPLE RECEIPT CHECKLIST

JK 12/12/07

Client: F. HANFORD City RICHLAND State WA
 Date/Time received 12/12/07 04:30 CoC No. FD7-080-001
 Container I.D. No. GND-06-2 Requested TAT (Days) 45 P.C. 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 6 (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 HNO3
 13. Describe any anomalies _____
 14. Was P.M. notified of any anomalies? Yes [] No [] Date _____
 15. Inspected by JK Date 12/12/07 Time 12:30

Customer Sample No.	Beta/Gamma com	Ion Chamber mR/hr	Wide	Customer Sample No.	Beta/Gamma com	Ion Chamber mR/hr	Wide
BIPN69	260						

Ion Chamber Ser. No. _____ Calibration date _____
 Alpha Meter Ser. No. _____ Calibration date _____
 Beta/Gamma Meter Ser. No. 100482 Calibration date 09 MAY 07

00000034