

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1597 was composed of one water sample designated under SAF No. B00-056 with a Project Designation of: 100-NR-1TSD Sites R. A. Sampling – Water.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on November 30, December 3 and 4, 2001.

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

No problems were encountered during the course of the analyses.

2.2 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.5 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.6 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.7 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.8 Gross Alpha and Beta 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 Mannion
Melissa C. Mannion
Program Manager

12/14/01
Date

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

SAMPLE SUMMARY

SDG 7155

Contact Melissa C. Mannion

Client Hanford

Contract No. 630

Case no SDG H1597

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B13F50	116-N-3, Decon Pad Sump	WATER		R111131-01	B00-056	B00-056-025	11/13/01 09:10
Method Blank		WATER		R111131-03	B00-056		
Lab Control Sample		WATER		R111131-02	B00-056		
Duplicate (R111131-01)	116-N-3, Decon Pad Sump	WATER		R111131-04	B00-056		11/13/01 09:10
Spike (R111131-01)	116-N-3, Decon Pad Sump	WATER		R111131-05	B00-056		11/13/01 09:10

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

QC SUMMARY

SDG 7155

Contact Melissa C. Mannion

Client Hanford

Contract No. 630

Case no SDG H1597

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
7155	B00-056-025	B13F50	WATER		2.27 L		11/16/01	3	R111131-01	7155-001
		Method Blank	WATER						R111131-03	7155-003
		Lab Control Sample	WATER						R111131-02	7155-002
		Duplicate (R111131-01)	WATER		2.27 L		11/16/01	3	R111131-04	7155-004
		Spike (R111131-01)	WATER		2.27 L		11/16/01	3	R111131-05	7155-005

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

SDG 7155

Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford

Contract No. 630

Case no SDG H1597

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED		QUALI-					
			BATCH	2σ %	CLIENT	MORE		RE	BLANK	LCS	DUP/ORIG	MS/ORIG
Alpha Spectroscopy												
AM	WATER	Americium 241 in Water	7018-010	5.0	1			1	1	1/1		
PU	WATER	Plutonium, Isotopic in Water	7018-010	5.0	1			1	1	1/1		
U	WATER	Uranium, Isotopic in Water	7018-010	5.0	1			1	1	1/1		
Beta Counting												
SR	WATER	Total Strontium in Water	7018-010	10.0	1			1	1	1/1		
Gas Proportional Counting												
93A	WATER	Gross Alpha in Water	7018-010	20.0	1			1	1	1/1		
93B	WATER	Gross Beta in Water	7018-010	15.0	1			1	1	1/1		
Gamma Scan												
GAM	WATER	Gamma Emitters	7018-010	15.0	1			1	1	1/1		
Liquid Scintillation Counting												
H	WATER	Tritium in Water	7018-010	10.0	1			1	1	1/1	1/1	X
NI_L	WATER	Nickel-63 in Liquid	7018-010	10.0	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.

PREP BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 5

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

SDG 7155

Contact Melissa C. Mannion

WORK SUMMARY

Client Hanford

Contract No. 630

Case no SDG H1597

CLIENT SAMPLE ID		LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD		
CUSTODY	SAF No	RECEIVED			FIX						
B13F50		R111131-01	7155-001	93A/93		12/04/01	12/04/01	MCM	Gross Alpha in Water		
116-N-3, Decon Pad Sump	WATER	11/13/01	7155-001	93B/93		11/30/01	12/03/01	MCM	Gross Beta in Water		
B00-056-025	B00-056	11/16/01	7155-001	AM		11/30/01	12/03/01	MCM	Americium 241 in Water		
			7155-001	GAM		12/03/01	12/03/01	MCM	Gamma Emitters		
			7155-001	H		11/27/01	11/30/01	MCM	Tritium in Water		
			7155-001	NI_L		11/27/01	11/30/01	MCM	Nickel-63 in Liquid		
			7155-001	PU		11/30/01	12/03/01	MCM	Plutonium, Isotopic in Water		
			7155-001	SR		11/26/01	11/30/01	MCM	Total Strontium in Water		
			7155-001	U		11/24/01	11/30/01	MCM	Uranium, Isotopic in Water		
Method Blank		R111131-03	7155-003	93A/93		11/30/01	12/04/01	MCM	Gross Alpha in Water		
	WATER		7155-003	93B/93		11/30/01	12/03/01	MCM	Gross Beta in Water		
	B00-056		7155-003	AM		11/30/01	12/03/01	MCM	Americium 241 in Water		
			7155-003	GAM		11/29/01	12/03/01	MCM	Gamma Emitters		
			7155-003	H		11/28/01	11/30/01	MCM	Tritium in Water		
			7155-003	NI_L		11/27/01	11/30/01	MCM	Nickel-63 in Liquid		
			7155-003	PU		11/30/01	12/03/01	MCM	Plutonium, Isotopic in Water		
			7155-003	SR		11/26/01	11/30/01	MCM	Total Strontium in Water		
			7155-003	U		11/24/01	11/30/01	MCM	Uranium, Isotopic in Water		
Lab Control Sample		R111131-02	7155-002	93A/93		12/04/01	12/04/01	MCM	Gross Alpha in Water		
	WATER		7155-002	93B/93		11/30/01	12/03/01	MCM	Gross Beta in Water		
	B00-056		7155-002	AM		11/30/01	12/03/01	MCM	Americium 241 in Water		
			7155-002	GAM		12/03/01	12/03/01	MCM	Gamma Emitters		
			7155-002	H		11/27/01	11/30/01	MCM	Tritium in Water		
			7155-002	NI_L		11/27/01	11/30/01	MCM	Nickel-63 in Liquid		
			7155-002	PU		11/30/01	12/03/01	MCM	Plutonium, Isotopic in Water		
			7155-002	SR		11/26/01	11/30/01	MCM	Total Strontium in Water		
			7155-002	U		11/24/01	11/30/01	MCM	Uranium, Isotopic in Water		
Duplicate (R111131-01)		R111131-04	7155-004	93A/93		12/04/01	12/04/01	MCM	Gross Alpha in Water		
116-N-3, Decon Pad Sump	WATER	11/13/01	7155-004	93B/93		11/30/01	12/03/01	MCM	Gross Beta in Water		
B00-056		11/16/01	7155-004	AM		11/30/01	12/03/01	MCM	Americium 241 in Water		
			7155-004	GAM		11/29/01	12/03/01	MCM	Gamma Emitters		
			7155-004	H		11/28/01	11/30/01	MCM	Tritium in Water		
			7155-004	NI_L		11/27/01	11/30/01	MCM	Nickel-63 in Liquid		
			7155-004	PU		11/30/01	12/03/01	MCM	Plutonium, Isotopic in Water		
			7155-004	SR		11/26/01	11/30/01	MCM	Total Strontium in Water		
			7155-004	U		11/24/01	11/30/01	MCM	Uranium, Isotopic in Water		

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 6

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

WORK SUMMARY, cont.

SDG 7155

Contact Melissa C. Mannion

Client Hanford

Contract No. 630

Case no SDG H1597

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED		SUF-						
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
Spike (R111131-01)		R111131-05	7155-005	H		11/28/01	11/30/01	MCM	Tritium in Water	
116-N-3, Decon Pad Sump	WATER	11/13/01								
	B00-056	11/16/01								

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
AM	B00-056	Americium 241 in Water	AMCMISO_1E_PLATE_AEA	1			1	1	1		4
GAM	B00-056	Gamma Emitters	GAMMA_GS	1			1	1	1		4
H	B00-056	Tritium in Water	906.0_H3_LSC	1			1	1	1	1	5
NI_L	B00-056	Nickel-63 in Liquid	NI63_LSC	1			1	1	1		4
PU	B00-056	Plutonium, Isotopic in Water	PUISO_PLATE_AEA	1			1	1	1		4
SR	B00-056	Total Strontium in Water	SRTOT_SEP_PRECIP_GPC	1			1	1	1		4
U	B00-056	Uranium, Isotopic in Water	UIISO_PLATE_AEA	1			1	1	1		4
TOTALS				9			9	9	9	1	37

WORK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 7

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 12/04/01

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H1597

R111131-03

Method Blank

METHOD BLANK

SDG <u>7155</u>	Client/Case no <u>Hanford</u>	SDG <u>H1597</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R111131-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7155-003</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	-0.006	1.4	2.8	3.0	U	93A
Gross Beta	12587-47-2	-1.41	3.2	5.7	4.0	U	93B
Tritium	10028-17-8	-8.16	12	21	400	U	H
Nickel 63	13981-37-8	-4.90	5.3	9.3	15	U	NI_L
Total Strontium	SR-RAD	0.877	1.1	2.1	2.0	U	SR
Americium 241	14596-10-2	0.366	0.44	0.70	1.0	U	AM
Uranium 233	U-233/234	0.093	0.19	0.71	1.0	U	U
Uranium 235	15117-96-1	0.225	0.23	0.86	1.0	U	U
Uranium 238	U-238	0	0.19	0.71	1.0	U	U
Plutonium 238	13981-16-3	0.078	0.16	0.59	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.16	0.59	1.0	U	PU
Potassium 40	13966-00-2	U		290		U	GAM
Cobalt 60	10198-40-0	U		21	25	U	GAM
Cesium 137	10045-97-3	U		18	15	U	GAM
Radium 226	13982-63-3	U		32		U	GAM
Radium 228	15262-20-1	U		72		U	GAM
Europium 152	14683-23-9	U		44	50	U	GAM
Europium 154	15585-10-1	U		67	50	U	GAM
Europium 155	14391-16-3	U		42	50	U	GAM
Thorium 228	14274-82-9	U		23		U	GAM
Thorium 232	TH-232	U		72		U	GAM
Uranium 235	15117-96-1	U		58		U	GAM
Uranium 238	U-238	U		2400		U	GAM
Americium 241	14596-10-2	U		55		U	GAM

100-NR-1 TSD Sites R.A. Sampling-H2O

QC-BLANK #40334

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

R111131-02

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7155</u> Contact <u>Melissa C. Mannion</u> Lab sample id <u>R111131-02</u> Dept sample id <u>7155-002</u>	Client/Case no <u>Hanford</u> <u>SDG H1597</u> Case no <u>No. 630</u> Client sample id <u>Lab Control Sample</u> Material/Matrix <u>WATER</u> SAF No <u>800-056</u>
---	---

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	206	15	<u>3.4</u>	3.0		93A	201	8.0	102	67-133	70-130
Gross Beta	224	11	<u>6.4</u>	4.0		93B	223	8.9	100	75-125	70-130
Tritium	233	19	22	400	J	H	235	9.4	99	80-120	80-120
Nickel 63	1100	21	9.1	15		NI_L	1160	46	95	84-116	80-120
Total Strontium	152	5.8	1.7	2.0		SR	145	5.8	105	82-118	80-120
Americium 241	98.6	6.9	0.48	1.0		AM	95.6	3.8	103	85-115	80-120
Uranium 233	90.5	8.0	<u>3.9</u>	1.0		U	92.9	3.7	97	84-116	80-120
Uranium 235	76.3	7.2	0.80	1.0		U	75.5	3.0	101	83-117	80-120
Uranium 238	99.2	8.4	<u>3.7</u>	1.0		U	101	4.0	98	84-116	80-120
Plutonium 238	123	8.9	0.55	1.0		PU	124	5.0	99	86-114	80-120
Plutonium 239/240	138	9.8	0.55	1.0		PU	132	5.3	104	85-115	80-120
Cobalt 60	455	34	24	25		GAM	412	16	110	72-128	80-120
Cesium 137	522	28	<u>22</u>	15		GAM	480	19	109	73-127	80-120

100-NR-1 TSD Sites R.A. Sampling-H2O

QC-LCS #40333

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

R111131-04

B13F50

DUPLICATE

SDG <u>7155</u>		Client/Case no <u>Hanford</u> SDG <u>H1597</u>	
Contact <u>Melissa C. Mannion</u>		Case no <u>No. 630</u>	
DUPLICATE		ORIGINAL	
Lab sample id <u>R111131-04</u>	Lab sample id <u>R111131-01</u>	Client sample id <u>B13F50</u>	
Dept sample id <u>7155-004</u>	Dept sample id <u>7155-001</u>	Location/Matrix <u>116-N-3, Decon Pad Sump WATER</u>	
	Received <u>11/16/01</u>	Collected/Volume <u>11/13/01 09:10</u> <u>2.27 L</u>	
		Custody/SAF No <u>B00-056-025</u> <u>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 PROT TOT LIMIT
Gross Alpha	3.43	2.7	<u>3.7</u>	3.0	U	93A	-0.434	2.1	<u>4.4</u>	U	-	
Gross Beta	3530	40	<u>7.1</u>	4.0		93B	3550	40	<u>5.5</u>		1	32
Tritium	-26.5	130	220	400	U	H	-11.0	130	220	U	-	
Nickel 63	6.57	5.6	9.1	15	U	NI_L	6.66	5.6	9.1	U	-	
Total Strontium	1840	23	<u>2.4</u>	2.0		SR	1830	25	<u>2.5</u>		1	21
Americium 241	0.133	0.53	0.82	1.0	U	AM	0.347	0.42	0.53	U	-	
Uranium 233	0.858	0.57	0.73	1.0	J	U	0.610	0.52	0.67	U	34	158
Uranium 235	0.115	0.23	0.88	1.0	U	U	0.106	0.21	0.81	U	-	
Uranium 238	0.476	0.38	0.73	1.0	U	U	0.261	0.35	0.67	U	-	
Plutonium 238	0.064	0.26	0.49	1.0	U	PU	0	0.16	0.63	U	-	
Plutonium 239/240	0.580	0.39	0.49	1.0	J	PU	0.739	0.49	0.63	J	24	143
Potassium 40	U		130		U	GAM	U		290	U	-	
Cobalt 60	31.1	20	18	25		GAM	49.1	16	15		45	101
Cesium 137	16.6	13	15	15		GAM	33.4	13	13		67	115
Radium 226	U		19		U	GAM	U		27	U	-	
Radium 228	U		47		U	GAM	U		65	U	-	
Europium 152	U		25	50	U	GAM	U		38	U	-	
Europium 154	U		34	50	U	GAM	U		43	U	-	
Europium 155	U		14	50	U	GAM	U		45	U	-	
Thorium 228	U		11		U	GAM	U		20	U	-	
Thorium 232	U		47		U	GAM	U		65	U	-	
Uranium 235	U		23		U	GAM	U		50	U	-	
Uranium 238	U		1500		U	GAM	U		1700	U	-	
Americium 241	U		10		U	GAM	U		100	U	-	

100-NR-1 TSD Sites R.A. Sampling-H2O

QC-DUP#1 40335

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

R111131-05

B13F50

MATRIX SPIKE

SDG <u>7155</u>	Client/Case no <u>Hanford</u>	SDG <u>H1597</u>
Contact <u>Melissa C. Mannion</u>	Case no <u>No. 630</u>	
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R111131-05</u>	Lab sample id <u>R111131-01</u>	Client sample id <u>B13F50</u>
Dept sample id <u>7155-005</u>	Dept sample id <u>7155-001</u>	Location/Matrix <u>116-N-3, Decon Pad Sump WATER</u>
	Received <u>11/16/01</u>	Collected/Volume <u>11/13/01 09:10 2.27 L</u>
		Custody/SAF No <u>B00-056-025</u> <u>B00-056</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 3σ % (TOTAL)	LMTS LIMITS	PROTOCOL
Tritium	29800	530	220	400	X	H	31400	1300	-11.0	130	95	84-116 60-140	

100-NR-1 TSD Sites R.A. Sampling-H2O

QC-MS#1 40336

MATRIX SPIKES

Page 1

SUMMARY DATA SECTION

Page 11

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-MS</u>
Version <u>3.06</u>
Report date <u>12/04/01</u>

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H1597

R111131-01

B13F50

DATA SHEET

SDG <u>7155</u>	Client/Case no <u>Hanford</u>	SDG <u>H1597</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R111131-01</u>	Client sample id <u>B13F50</u>	
Dept sample id <u>7155-001</u>	Location/Matrix <u>116-N-3, Decon Pad Sump</u>	<u>WATER</u>
Received <u>11/16/01</u>	Collected/Volume <u>11/13/01 09:10</u>	<u>2.27 L</u>
	Custody/SAF No <u>B00-056-025</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	-0.434	2.1	4.4	3.0	U	93A
Gross Beta	12587-47-2	3550	40	5.5	4.0		93B
Tritium	10028-17-8	-11.0	130	220	400	U	H
Nickel 63	13981-37-8	6.66	5.6	9.1	15	U	NI_L
Total Strontium	SR-RAD	1830	25	2.5	2.0		SR
Americium 241	14596-10-2	0.347	0.42	0.53	1.0	U	AM
Uranium 233	U-233/234	0.610	0.52	0.67	1.0	U	U
Uranium 235	15117-96-1	0.106	0.21	0.81	1.0	U	U
Uranium 238	U-238	0.261	0.35	0.67	1.0	U	U
Plutonium 238	13981-16-3	0	0.16	0.63	1.0	U	PU
Plutonium 239/240	PU-239/240	0.739	0.49	0.63	1.0	J	PU
Potassium 40	13966-00-2	U		290		U	GAM
Cobalt 60	10198-40-0	49.1	16	15	25		GAM
Cesium 137	10045-97-3	33.4	13	13	15		GAM
Radium 226	13982-63-3	U		27		U	GAM
Radium 228	15262-20-1	U		65		U	GAM
Europium 152	14683-23-9	U		38	50	U	GAM
Europium 154	15585-10-1	U		43	50	U	GAM
Europium 155	14391-16-3	U		45	50	U	GAM
Thorium 228	14274-82-9	U		20		U	GAM
Thorium 232	TH-232	U		65		U	GAM
Uranium 235	15117-96-1	U		50		U	GAM
Uranium 238	U-238	U		1700		U	GAM
Americium 241	14596-10-2	U		100		U	GAM

100-NR-1 TSD Sites R.A. Sampling-H2O

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>12/04/01</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

METHOD SUMMARY

AMERICIUM 241 IN WATER

ALPHA SPECTROSCOPY

Test AM Matrix WATER
SDG 7155
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H1597

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Americium 241
			PLANCHET	
Preparation batch 7018-010				
B13F50	R111131-01		7155-001	U
BLK (QC ID=40334)	R111131-03		7155-003	U
LCS (QC ID=40333)	R111131-02		7155-002	ok
Duplicate (R111131-01)	R111131-04		7155-004	- U

Nominal values and limits from method RDLs (pCi/L) 1.0
100-NR-1 TSD Sites R.A. Sampling-H2O

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7018-010 2σ prep error 5.0 % Reference Lab Notebook 7018 pg. 010																
B13F50	R111131-01			0.53	0.100			89		201			17	11/29/01	11/30	SS-031
BLK (QC ID=40334)	R111131-03			0.70	0.100			80		201				11/29/01	11/30	SS-033
LCS (QC ID=40333)	R111131-02			0.48	0.100			93		201				11/29/01	11/30	SS-032
Duplicate (R111131-01) (QC ID=40335)	R111131-04			0.82	0.100			85		201			17	11/29/01	11/30	SS-041
Nominal values and limits from method				1.0	0.100			20-105		100	100		180			

PROCEDURES REFERENCE AMCMISO IE_PLATE_AEA
CP-040 Environmental Water Dissolution, rev 4
CP-940 Plutonium Separation and Purification, rev 3
CP-960 Americium-Curium Purification, Large Aliquot, rev 4
CP-008 Heavy Element Electroplating, rev 6

AVERAGES ± 2 SD MDA 0.63 ± 0.31
FOR 4 SAMPLES YIELD 87 ± 11

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 13

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

Test PU Matrix WATER
SDG 7155
Contact Melissa C. Mannion

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1597

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Plutonium 238	Plutonium 239/240
			PLANCHET		
Preparation batch 7018-010					
B13F50	R111131-01		7155-001	U	0.739 J
BLK (QC ID=40334)	R111131-03		7155-003	U	U
LCS (QC ID=40333)	R111131-02		7155-002	ok	ok
Duplicate (R111131-01)	R111131-04		7155-004	- U	ok J

Nominal values and limits from method RDLs (pCi/L) 1.0 1.0
100-NR-1 TSD Sites R.A. Sampling-H20

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7018-010 2σ prep error 5.0 % Reference Lab Notebook 7018 pg. 010																
B13F50	R111131-01			0.63	0.100			67	202				17	11/29/01	11/30	SS-043
BLK (QC ID=40334)	R111131-03			0.59	0.100			74	203					11/29/01	11/30	SS-047
LCS (QC ID=40333)	R111131-02			0.55	0.100			79	202					11/29/01	11/30	SS-044
Duplicate (R111131-01) (QC ID=40335)	R111131-04			0.49	0.100			87	203				17	11/29/01	11/30	SS-048
Nominal values and limits from method				1.0	0.100			20-105	100	100		180				

PROCEDURES REFERENCE PUIISO_PLATE_AEA
CP-040 Environmental Water Dissolution, rev 4
CP-940 Plutonium Separation and Purification, rev 3
CP-008 Heavy Element Electroplating, rev 6

AVERAGES ± 2 SD MDA 0.56 ± 0.12
FOR 4 SAMPLES YIELD 77 ± 17

METHOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 14

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

METHOD SUMMARY

URANIUM, ISOTOPIC IN WATER
ALPHA SPECTROSCOPY

Test U Matrix WATER
SDG 7155
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H1597

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	1: Uranium 233	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%)			
								1÷3	2σ	2÷3	2σ
Preparation batch 7018-010											
B13F50	R111131-01			7155-001	U	U	U				
BLK (QC ID=40334)	R111131-03			7155-003	U	U	U				
LCS (QC ID=40333)	R111131-02			7155-002	ok	*ok	ok				
Duplicate (R111131-01)	R111131-04			7155-004	ok J	- U	- U				
Nominal values and limits from method				RDs (pCi/L)	1.0	1.0	1.0	100		4	
100-NR-1 TSD Sites R.A. Sampling-H2O								Averages			

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7018-010 2σ prep error 5.0 % Reference Lab Notebook 7018 pg. 010																
B13F50	R111131-01			0.81	0.100			104		136			11	11/24/01	11/24	SS-031
BLK (QC ID=40334)	R111131-03			0.86	0.100			94		136			11/24/01	11/24	SS-033	
LCS (QC ID=40333)	R111131-02			3.9	0.100			99		136			11/24/01	11/24	SS-032	
Duplicate (R111131-01)	R111131-04			0.88	0.100			65		136			11	11/24/01	11/24	SS-041
(QC ID=40335)																
Nominal values and limits from method				1.0	0.100			30-105		100	100	180				

PROCEDURES REFERENCE UIISO_PLATE_AEA
CP-040 Environmental Water Dissolution, rev 4
CP-910 Uranium Purification, rev 2
CP-008 Heavy Element Electroplating, rev 6

AVERAGES ± 2 SD MDA 1.6 ± 3.1
FOR 4 SAMPLES YIELD 90 ± 35

METHOD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 15

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

Test SR Matrix WATER
SDG 7155
Contact Melissa C. Mannion

METHOD SUMMARY

TOTAL STRONTIUM IN WATER
BETA COUNTING

Client Hanford
Contract No. 630
Contract SDG H1597

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Total Strontium
Preparation batch 7018-010				
B13F50	R111131-01		7155-001	1830
BLK (QC ID=40334)	R111131-03		7155-003	U
LCS (QC ID=40333)	R111131-02		7155-002	ok
Duplicate (R111131-01)	R111131-04		7155-004	ok

Nominal values and limits from method RDLs (pCi/L) 2.0
100-NR-1 TSD Sites R.A. Sampling-H2O

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7018-010 2σ prep error 10.0 % Reference Lab Notebook 7018 pg. 010																
B13F50	R111131-01		2.5	0.150				76	100				13	11/26/01	11/26	GRB-205
BLK (QC ID=40334)	R111131-03		2.1	0.150				73	100					11/26/01	11/26	GRB-222
LCS (QC ID=40333)	R111131-02		1.7	0.150				81	100					11/26/01	11/26	GRB-217
Duplicate (R111131-01) (QC ID=40335)	R111131-04		2.4	0.150				89	100				13	11/26/01	11/26	GRB-208
Nominal values and limits from method			2.0	0.150				100				180				

PROCEDURES REFERENCE SRTOT_SEP_PRECIP_GPC
CP-501 Strontium in Water Samples, rev 2

AVERAGES ± 2 SD MDA 2.2 ± 0.72
FOR 4 SAMPLES YIELD 80 ± 14

METHOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 16

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

METHOD SUMMARY

GROSS ALPHA IN WATER
GAS PROPORTIONAL COUNTING

Test 93A Matrix WATER
SDG 7155
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H1597

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Gross Alpha
Preparation batch 7018-010				
B13F50	R111131-01	93	7155-001	U
BLK (QC ID=40334)	R111131-03	93	7155-003	U
LCS (QC ID=40333)	R111131-02	93	7155-002	ok
Duplicate (R111131-01)	R111131-04	93	7155-004	- U

Nominal values and limits from method RDLs (pCi/L) 3.0
100-NR-1 TSD Sites R.A. Sampling-H2O

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7018-010 2σ prep error 20.0 % Reference Lab Notebook 7018 pg. 010																
B13F50	R111131-01	93	4.4	0.100				46	100				21	11/30/01	12/04	GRB-113
BLK (QC ID=40334)	R111131-03	93	2.8	0.100				24	100					11/30/01	11/30	GRB-109
LCS (QC ID=40333)	R111131-02	93	3.4	0.100				23	100					11/30/01	12/04	GRB-115
Duplicate (R111131-01) (QC ID=40335)	R111131-04	93	3.7	0.100				46	100				21	11/30/01	12/04	GRB-114
Nominal values and limits from method			3.0	0.100				5-250	100			180				

PROCEDURES REFERENCE 900.0_ALPHABETA_GPC
CP-060 Soil Preparation, rev 3
CP-070 Soil Dissolution, < 1.0g Aliquot, rev 4
CP-170 Soil Preparation for Direct Gross Alpha and Gross Beta Counting, rev 3

AVERAGES ± 2 SD MDA 3.6 ± 1.3
FOR 4 SAMPLES RESIDUE 35 ± 26

METHOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 17

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

METHOD SUMMARY

GROSS BETA IN WATER
GAS PROPORTIONAL COUNTING

Test 93B Matrix WATER
SDG 7155
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H1597

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Gross Beta
Preparation batch 7018-010					
B13F50	R111131-01	93		7155-001	3550
BLK (QC ID=40334)	R111131-03	93		7155-003	U
LCS (QC ID=40333)	R111131-02	93		7155-002	ok
Duplicate (R111131-01)	R111131-04	93		7155-004	ok

Nominal values and limits from method RDLs (pCi/L) 4.0
100-NR-1 TSD Sites R.A. Sampling-H2O

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	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7018-010 2σ prep error 15.0 % Reference Lab Notebook 7018 pg. 010																
B13F50	R111131-01	93		<u>5.5</u>	0.100			46	100				17	11/30/01	11/30	GRB-101
BLK (QC ID=40334)	R111131-03	93		<u>5.7</u>	0.100			24	100					11/30/01	11/30	GRB-109
LCS (QC ID=40333)	R111131-02	93		<u>6.4</u>	0.100			23	100					11/30/01	11/30	GRB-102
Duplicate (R111131-01)	R111131-04	93		<u>7.1</u>	0.100			46	100				17	11/30/01	11/30	GRB-110
(QC ID=40335)																
Nominal values and limits from method				4.0	0.100			5-250	100			180				

PROCEDURES REFERENCE 900.0_ALPHABETA_GPC
CP-060 Soil Preparation, rev 3
CP-070 Soil Dissolution, < 1.0g Aliquot, rev 4
CP-170 Soil Preparation for Direct Gross Alpha and Gross Beta Counting, rev 3

AVERAGES ± 2 SD MDA 6.2 ± 1.5
FOR 4 SAMPLES RESIDUE 35 ± 26

METHOD SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 18

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

Test GAM Matrix WATER

SDG 7155

Contact Melissa C. Mannion

METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Client Hanford

Contract No. 630

Contract SDG H1597

RESULTS

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

Preparation batch 7018-010

B13F50	R111131-01	7155-001	49.1	33.4
BLK (QC ID=40334)	R111131-03	7155-003	U	U
LCS (QC ID=40333)	R111131-02	7155-002	ok	ok
Duplicate (R111131-01)	R111131-04	7155-004	ok	ok

Nominal values and limits from method	RDLs (pCi/L)	25	15
100-NR-1 YSD Sites R.A. Sampling-H20			

METHOD PERFORMANCE

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

Preparation batch 7018-010 2σ prep error 15.0 % Reference Lab Notebook 7018 pg. 010

B13F50	R111131-01	13	0.500	302	20	11/26/01	12/03	MB,05,00
BLK (QC ID=40334)	R111131-03	18	0.500	304	11/26/01	11/29	01,03,00	
LCS (QC ID=40333)	R111131-02	22	0.500	302	11/26/01	12/03	MB,07,00	
Duplicate (R111131-01)	R111131-04	15	0.500	750	16	11/26/01	11/29	01,01,00
(QC ID=40335)								

Nominal values and limits from method	15	0.500	100	180
---------------------------------------	----	-------	-----	-----

PROCEDURES	REFERENCE	GAMMA_GS
	CP-100	Ge(Li) Preparation for Commercial Samples, rev 3

AVERAGES ± 2 SD	MDA	17	±	7.8
FOR 4 SAMPLES	YIELD		±	

METHOD SUMMARIES

Page 7

SUMMARY DATA SECTION

Page 19

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

METHOD SUMMARY

TRITIUM IN WATER
LIQUID SCINTILLATION COUNTING

Test H Matrix WATER
SDG 7155
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H1597

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
Preparation batch 7018-010				
B13F50	R111131-01	7155-001	U	
BLK (QC ID=40334)	R111131-03	7155-003	U	
LCS (QC ID=40333)	R111131-02	7155-002	ok	J
Duplicate (R111131-01)	R111131-04	7155-004	-	U
Spike (R111131-01)	R111131-05	7155-005	ok	X

Nominal values and limits from method RDLs (pCi/L) 400
100-NR-1 TSD Sites R.A. Sampling-H2O

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 7018-010 2σ prep error 10.0 % Reference Lab Notebook 7018 pg. 010																
B13F50	R111131-01		220	0.0100				100	100			14	11/27/01	11/27		LSC-004
BLK (QC ID=40334)	R111131-03		21	1.00				10	100				11/27/01	11/28		LSC-004
LCS (QC ID=40333)	R111131-02		22	1.00				10	100				11/27/01	11/27		LSC-004
Duplicate (R111131-01)	R111131-04		220	0.0100				100	100			15	11/27/01	11/28		LSC-004
(QC ID=40335)																
Spike (R111131-01)	R111131-05		220	0.0300				33	100			15	11/27/01	11/28		LSC-004
(QC ID=40336)																

Nominal values and limits from method 400 0.0100 25 180

PROCEDURES REFERENCE 906.0_H3_LSC
CP-210 Tritium in Water Samples by Distillation, rev 5

AVERAGES ± 2 SD MDA 140 ± 220
FOR 5 SAMPLES YIELD 51 ± 92

METHOD SUMMARIES

Page 8

SUMMARY DATA SECTION

Page 20

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/04/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1597

Test NI L Matrix WATER

SDG 7155

Contact Melissa C. Mannion

METHOD SUMMARY

NICKEL-63 IN LIQUID

LIQUID SCINTILLATION COUNTING

Client Hanford

Contract No. 630

Contract SDG H1597

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Nickel 63
------------------	------------------	-----------------	------------------	-----------

Preparation batch 7018-010

B13F50	R111131-01	7155-001	U
BLK (QC ID=40334)	R111131-03	7155-003	U
LCS (QC ID=40333)	R111131-02	7155-002	ok
Duplicate (R111131-01)	R111131-04	7155-004	- U

Nominal values and limits from method RDLs (pCi/L) 15
100-NR-1 TSD Sites R.A. Sampling-H2O

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 PREPARED	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	-----	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	-----------------------	---------------	----------

Preparation batch 7018-010 2σ prep error 10.0 % Reference Lab Notebook 7018 pg. 010

B13F50	R111131-01	9.1	0.100	96	100	14	11/27/01	11/27	LSC-005
BLK (QC ID=40334)	R111131-03	9.3	0.100	95	100	11/27/01	11/27	LSC-005	
LCS (QC ID=40333)	R111131-02	9.1	0.100	96	100	11/27/01	11/27	LSC-005	
Duplicate (R111131-01)	R111131-04	9.1	0.100	96	100	14	11/27/01	11/27	LSC-005
(QC ID=40335)									

Nominal values and limits from method 15 0.100 50 180

PROCEDURES	REFERENCE	NI63_LSC
RP-070	Sample Dissolution - HF Method, rev 0	
RP-431	Nickel-63 Purification, rev 0	

AVERAGES ± 2 SD	MDA	9.2 ± 0.20
FOR 4 SAMPLES	YIELD	96 ± 1

METHOD SUMMARIES

Page 9

SUMMARY DATA SECTION

Page 21

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 12/04/01

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						B00-056-025	Page 1 of 1
Collector R.B. Kerkow	Company Contact R.B. Kerkow	Telephone No. 372-2187	Project Coordinator TRENT, SI			Price Code 7L	Data Turnaround 21 days		
Project Designation 100-NR-1 TSD Sites R.A. Sampling - Water	Sampling Location 116-N-3, Decon Pad Sump	H1597 (7155)	SAF No. B00-056			Air Quality ☐			
Ice Chest No. ERC 99-030	Field Logbook No. EL-1524-I	COA R132SN2600	Method of Shipment FEDEX						
Shipped To THANEGRAK H-6-01	Offsite Property No. A020058054	Bill of Lading/Air Bill No. 42357954-9026							
POSSIBLE SAMPLE HAZARDS/REMARKS Potentially Radioactive TIE TO B13F49 Special Handling and/or Storage			Preservation	Name	Name	Cust #C	IDSO4 to pH ≤ Cool <C	IDSO4 to pH ≤	IDNO3 to pH ≤
			Type of Container	P	P	P	G	G	P
			No. of Container(s)	1	1	1	1	1	1
			Volume	50ml	125ml	125ml	250ml	250ml	IL
SAMPLE ANALYSES			pH (Water) - 9419	Tellurium - EB	K Arsenic - 300.8 (Chrom, White, Soluble)	NO3/NH4 - 353	See Item (1) in Special Instructions	See Item (2) in Special Instructions	
Sample No.	Matrix *	Sample Date	Sample Time						
B13F50	WATER	11-13-01	0910	X	X	X	X	X	X
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *	
Requisitioned By RB KERKOW		Date/Time 11-13-01		Received By RT Thore		Date/Time 11-13-01		(1) ICP Metals - 6010A (TAL) (Barium, Cadmium, Chromium, Silver); ICP Metals - 6010A (Add-on) (Arsenic, Boron, Selenium); Mercury - 7420 (GA) - RF H-6-01 (2) Gross Alpha; Gross Beta; Gamma Spectroscopy (Water) (Caesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Isotopic Phosphorus; Americium-241; Strontium-89,94 - Total Sr; Nickel-63; Isotopic Uranium	
Requisitioned By Removed from file		Date/Time 11-14-01		Received By E. H. Hays		Date/Time 11-15-01		Samples stored in Ref.#1B at the 3728 Shipping Facility on 11/15/01. Collector not available to relinquish samples on 11/15/01 for shipment.	
Requisitioned By FOU Express		Date/Time 11-16-01		Received By C. J. Martins		Date/Time 11-16-01		RT 114-D	
Requisitioned By		Date/Time		Received By		Date/Time			
Requisitioned By		Date/Time		Received By		Date/Time			
LABORATORY SECTION		Received By		Title		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			

BH-E-011 (10/99)

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT			
Client:	Bechtel Hanford Inc.	Date/Time received	11-16-01 9:30 AM
CoC No.	B00 - 056 - 025		
Container I.D. No.	ERC 99-030	Requested TAT (Days)	21 P.O. Received Yes [] No [x]
INSPECTION			
1.	Custody seals on shipping container intact?	Yes [x] No []	N/A []
2.	Custody seals on shipping container dated & signed?	Yes [x] No []	N/A []
3.	Custody seals on sample containers intact?	Yes [x] No []	N/A []
4.	Custody seals on sample containers dated & signed?	Yes [x] No []	N/A []
5.	Cooler Temperature: _____	Packing material is:	Wet [] Dry [x]
6.	Number of samples in shipping container: 1 Sample		
7.	Number of containers per sample: Check (Or see CoC _____)		
8.	Paperwork agrees with samples?	Yes [x] No []	
9.	Samples have: Tape [] Hazard labels [] Rad labels [] Appropriate sample labels [x]		
10.	Samples are: In good condition [x] Leaking [] Broken Container [] Missing []		
11.	Describe any anomalies: _____		
13.	Was P.M. notified of any anomalies? Yes [] No [] Date _____		
14.	Received by: Elvie S. Mestas Date: 11-16-01 Time: 9:30 AM		

Customer Sample No.	cpm	mr/hr	Customer Sample No.	Cpm	mr/hr

Ion Chamber Ser. No. _____ Calibration date _____

Survey Meter Ser No. _____ Calibration date _____



Analytical Report

Client: TNU-HANFORD B00-056
LVL#: 0111L372
SDG/SAF#: H1597/B00-056

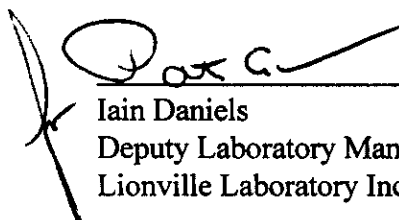
W.O.#: 11343-606-001-9999-00
Date Received: 11-16-01

METALS CASE NARRATIVE

1. This narrative covers the analysis of 1 water sample.
2. The sample was prepared and analyzed in accordance with methods checked on the attached glossary.
3. All analyses were performed within the required holding times.
4. The cooler temperature has been recorded on the Chain of Custody.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits with the exception of Mercury CCVs (less than 120%). There should be no significant impact to the data as all samples were non-detect.
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
8. All ICP Interference Check Standards were within control limits.
9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.
10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.
11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury.
12. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 13 pages.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.


Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated
gmb/ml1-372

12-04-01
Date

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Lot#: 011 L372

Leaching Procedure: 1310 1311 1312 Other:

CLP Metals Digestion and Analysis Methods: ILM03.0 ILM04.0

Metals Digestion Methods: 3005A 3010A 3015 3020A 3050B 3051 200.7 SS17
Other:

Metals Analysis Methods

	SW846	EPA	STD MTD	EPA OSWR	USATHAMA
Aluminum	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Antimony	<u>6010B</u> <u>7041</u> ^s	<u>200.7</u> <u>204.2</u>			<u>99</u>
Arsenic	<u>6010B</u> <u>7060A</u> ^s	<u>200.7</u> <u>206.2</u>	<u>3113B</u>		<u>99</u>
Barium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Beryllium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Bismuth	<u>6010B</u> ⁱ	<u>200.7</u> ⁱ		<u>1620</u>	<u>99</u>
Boron	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Cadmium	<u>6010B</u> <u>7131A</u> ^s	<u>200.7</u> <u>213.2</u>			<u>99</u>
Calcium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Chromium	<u>6010B</u> <u>7191</u> ^s	<u>200.7</u> <u>218.2</u>			<u>SS17</u>
Cobalt	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Copper	<u>6010B</u> <u>7211</u> ^s	<u>200.7</u> <u>220.2</u>			<u>99</u>
Iron	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Lead	<u>6010B</u> <u>7421</u> ^s	<u>200.7</u> <u>239.2</u>	<u>3113B</u>		<u>99</u>
Lithium	<u>6010B</u> <u>7430</u> ^s	<u>200.7</u>		<u>1620</u>	<u>99</u>
Magnesium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Manganese	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Mercury	<u>7470A</u> ^s <u>7471A</u> ^s	<u>245.1</u> ^s <u>245.5</u> ^s			<u>99</u>
Molybdenum	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Nickel	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Potassium	<u>6010B</u> <u>7610</u> ^s	<u>200.7</u> <u>258.1</u> ^s			<u>99</u>
Rare Earths	<u>6010B</u> ⁱ	<u>200.7</u> ⁱ		<u>1620</u>	<u>99</u>
Selenium	<u>6010B</u> <u>7740</u> ^s	<u>200.7</u> <u>270.2</u>	<u>3113B</u>		<u>99</u>
Silicon	<u>6010B</u> ⁱ	<u>200.7</u>		<u>1620</u>	<u>99</u>
Silica	<u>6010B</u>	<u>200.7</u>		<u>1620</u>	<u>99</u>
Silver	<u>6010B</u> <u>7761</u> ^s	<u>200.7</u> <u>272.2</u>			<u>99</u>
Sodium	<u>6010B</u> <u>7770</u> ^s	<u>200.7</u> <u>273.1</u> ^s			<u>99</u>
Strontium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Thallium	<u>6010B</u> <u>7841</u> ^s	<u>200.7</u> <u>279.2</u> <u>200.9</u>			<u>99</u>
Tin	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Titanium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Uranium	<u>6010B</u> ⁱ	<u>200.7</u> ⁱ		<u>1620</u>	<u>99</u>
Vanadium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Zinc	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Zirconium	<u>6010B</u> ⁱ	<u>200.7</u> ⁱ		<u>1620</u>	<u>99</u>

Other: _____

Method: _____

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- B = Indicates that the parameter was between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

Q QUALIFIERS

- E = The reported value is estimated because of the presence of interference.
- M = Duplicate injection precision not met.
- N = *Spiked sample recovery not within control limits.*
- S = The reported value was determined by the Method of Standard Additions (MSA).
- W = Post Digestion spike for Furnace AA analysis is out of control limits (85 -115 %), while sample absorbance is less than 50% of spike absorbance.
- * = Duplicate analysis not within control limits.
- + = Correlation coefficient for the MSA is less than 0.995.

ABBREVIATIONS

- PB = Method or Preparation Blank.
- S = Matrix Spike.
- T = Matrix Spike Duplicate.
- R or D = Sample Replicate

ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).
4. Flame AA.
5. Graphite Furnace AA.

RFW 21-21L-033/O-01/97

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 11/30/01

CLIENT: TNUHANFORD B00-056 H1597

LVL LOT #: 0111L372

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
-001	B13F50	Silver, Total	0.60 u	UG/L	0.60	1.0
		Arsenic, Total	8.9	UG/L	3.2	1.0
		Barium, Total	76.4	UG/L	0.10	1.0
		Cadmium, Total	0.30 u	UG/L	0.30	1.0
		Chromium, Total	5.4	UG/L	0.60	1.0
		Mercury, Total	0.10 u	UG/L	0.10	1.0
		Lead, Total	12.0	UG/L	1.9	1.0
		Selenium, Total	2.2 u	UG/L	2.2	1.0

CLIENT: INDIANAPOLIS 800-056 H1597
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 01111372

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	0110759-MB1	Silver, Total	0.60 u	ug/L	0.60	1.0
BLANK1		Arsenic, Total	3.2 u	ug/L	3.2	1.0
BLANK1		Barium, Total	0.22	ug/L	0.10	1.0
BLANK1		Cadmium, Total	0.30 u	ug/L	0.30	1.0
BLANK1		Chromium, Total	0.96	ug/L	0.60	1.0
BLANK1		Lead, Total	1.9 u	ug/L	1.9	1.0
BLANK1		Selenium, Total	2.2 u	ug/L	2.2	1.0
BLANK1	01C0375-MB1	Mercury, Total	0.10 u	ug/L	0.10	1.0
BLANK2	01C0375-MB2	Mercury, TCLP Leachate	0.10 u	ug/L	0.10	1.0
BLANK3	01C0375-MB3	Mercury, TCLP Leachate	0.10 u	ug/L	0.10	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 11/30/01

CLIENT: TNUHANFORD B00-056 H1597

LVL LOT #: 0111L372

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-----	-----	-----	-----	-----	-----	-----	-----
-001	B13P50	Silver, Total	47.5	0.60u	50.0	95.0	1.0
		Arsenic, Total	1910	8.9	2000	94.8	1.0
		Barium, Total	1950	76.4	2000	93.7	1.0
		Cadmium, Total	46.2	0.30u	50.0	92.4	1.0
		Chromium, Total	190	5.4	200	92.4	1.0
		Mercury, Total	0.34	0.10u	1.0	33.9	1.0
		Lead, Total	465	12.0	500	90.6	1.0
		Selenium, Total	1880	2.2 u	2000	94.0	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 11/30/01

CLIENT: TNUHANFORD B00-056 H1597

LVL LOT #: 0111L372

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
*****	*****	*****	*****	*****	*****	*****
-001REP	B13P50	Silver, Total	0.60u	0.60u	NC	1.0
		Arsenic, Total	8.9	7.2	21.1	1.0
		Barium, Total	76.4	78.8	3.1	1.0
		Cadmium, Total	0.30u	0.30u	NC	1.0
		Chromium, Total	5.4	5.4	0.00	1.0
		Mercury, Total	0.10u	0.10u	NC	1.0
		Lead, Total	12.0	11.5	4.3	1.0
		Selenium, Total	2.2 u	2.2 u	NC	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 11/30/01

CLIENT: TNUHANFORD B00-056 H1597
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0111L372

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
-----	-----	-----	-----	-----	-----	-----
LCS1	01L0759-LC1	Silver, LCS	455	500	UG/L	91.0
		Arsenic, LCS	9790	10000	UG/L	97.9
		Barium, LCS	4830	5000	UG/L	96.7
		Cadmium, LCS	248	250	UG/L	99.4
		Chromium, LCS	498	500	UG/L	99.6
		Lead, LCS	2470	2500	UG/L	98.8
		Selenium, LCS	9880	10000	UG/L	98.8
LCS1	01C0375-LC1	Mercury, LCS	5.4	5.0	UG/L	108.9

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Discrepancies Between
Samples Labels and
COC Record? Y or N

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B00-056-025		Page 1 of 1						
Collector R.B. Kerkow		Company Contact R.B. Kerkow		Telephone No. 372-2187		Project Coordinator TRENT, SJ		Price Code 7L Data Turnaround						
Project Designation 100-NR-1, TSD Sites R. A. Sampling - Water		Sampling Location 116-N-3, Decon Pad Sump		SAF No. B00-056		Air Quality ☐		21 days						
Ice Chest No. ERC99-054		Field Logbook No. EL-1524-1		COA R1325N2600		Method of Shipment FED EX								
Shipped To TMA/RECRA RKH-6-01		Offsite Property No. A020050051		Bill of Lading/Air Bill No. 42357464-9037										
POSSIBLE SAMPLE HAZARDS/REMARKS Potentially Radioactive TICTO B13F49 Special Handling and/or Storage			Preservation		None	None	Cool 4C	H2SO4 to pH < 2 Cool 4C	HNO3 to pH < 2	HNO3 to pH < 2				
			Type of Container		P	P	P	G	G	P				
			No. of Container(s)		1	1	1	1	1	2				
			Volume		125mL	120mL	125mL	350mL 500mL	350mL 500mL	1L				
SAMPLE ANALYSIS			pH (Water) - 9040		Tridium - H3	IC Anions - 300.0 (Nitrate, Nitrite, Sulfate)	NO2/NO3 - 353.1	See Item (1) in Special Instructions.	See Item (2) in Special Instructions.					
			TSD TSS											
Sample No.		Matrix *		Sample Date		Sample Time								
B13F50		WATER		11-13-01		0910		X			X			
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix * S-Goli SR-Sediment SO-Solid S-Sludge W-Water O-Oil A-Air DS-Dry Solid DL-Dry Liquid T-Tissue Wt-Wipe L-Liquid V-Vegetation X-Other						
Relinquished By RB Kerkow		Date/Time 11/15		Sign/Print Names		Date/Time 11/15								
RB Kerkow		11-13-01		REF 10, 3728		11-13-01								
Relinquished By REMOVED FROM PROJECT		Date/Time 11-13-01		Received By R. K. Thoren		Date/Time 11-14-01								
R. K. Thoren		11-13-01		Received By		Date/Time 11-15-01								
Relinquished By		Date/Time		Received By		Date/Time		Add: TSD, TSS Samples stored in Ref. #1B at the 3728 Shipping Facility on 11/13/01. Collector not available to relinquish samples on 11/14/01 for shipment. 11-15-01 RT 11-14-01						
Relinquished By		Date/Time		Received By		Date/Time								
Relinquished By		Date/Time		Received By		Date/Time								
Relinquished By		Date/Time		Received By		Date/Time								
LABORATORY SECTION		Received By		Title				Date/Time						
FINAL SAMPLE DISPOSITION		Disposition Method		Disposed By				Date/Time						
		W												



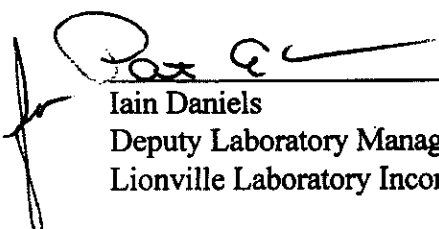
Analytical Report

Client: TNU-HANFORD B00-056 H1597
LVL#: 0111L372

W.O.#: 11343-606-001-9999-00
Date Received: 11-16-01

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 water sample.
2. The sample was prepared and analyzed in accordance with the methods checked on the attached glossary.
3. Sample holding times as required by the method and/or contract were met for Sulfate and Nitrate Nitrite, however, pH, Nitrate and Nitrite were received past hold and Total Dissolved Solids and Total Suspended Solids were analyzed past hold.
4. The cooler temperature was recorded on the chain of custody.
5. The method blanks were within the method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS were within the 20% Relative Percent Difference (RPD) control limit.
7. The matrix spike recoveries were within the 75-125% control limits.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.
9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.


Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

11-63-01
Date

njp011-372

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.

Lionville Laboratory Incorporated

WET CHEMISTRY

METHODS GLOSSARY FOR WATER SAMPLE ANALYSIS

	<u>EPA /600</u>	<u>SW846</u>	<u>OTHER</u>
Acidity	305.1		
___ Alkalinity ___ Bicarbonate ___ Carbonate	310.1		
BOD	405.1		___ 5210B (b)
Ion Chromatography:			
___ Bromide ___ Chloride ___ Fluoride	300.0	___ 9056	
___ Nitrate ___ Nitrite ___ Phosphate	300.0	___ 9056	
___ Sulfate ___ Formate ___ Acetate ___ Oxalate	300.0	___ 9056	
Chloride	325.2	___ 9251	
Chlorine, Residual	330.5 (mod)		
Cyanide, Amenable to Chlorination	335.2	___ 9010B	
Cyanide, Total	335.2	___ 9010B ___ 9014	___ ILMO4.0 (e)
Cyanide, Weak Acid Dissociable			___ 412 (a) ___ 4500CN-I (b)
COD	410.4(mod)		___ 5220C (b)
Color	110.2		
Corrosivity by Coupon		___ 1110(mod)	
Chromium VI		___ 7196A	___ 3500Cr-D (b)
Fluoride	340.2		___ 4500-FC
Hardness, Calcium	215.2		
Hardness, Total	130.2		
Iodide			___ ASTM D19P202 (1)
Surfactant	425.1		
___ Nitrate-Nitrite ___ Nitrate ___ Nitrite	353.2		
Ammonia	350.3		
Total ___ Kjeldahl ___ Organic Nitrogen	351.3		
Total ___ Organic ___ Inorganic Carbon	415.1	___ 9060	
Oil & Grease	413.1	___ 9070	
___ pH ___ pH; paper	150.1	___ 9040B ___ 9041A	
Petroleum Hydrocarbons, Total Recoverable	418.1		
Phenol	420.1	___ 420.2 ___ 9065 ___ 9066	
___ Ortho ___ Total Phosphate	365.2		___ 4500-P B ___ C
Salinity			___ 210A (a) ___ 2520 (b)
Settleable Solids	160.5		
Sulfide	376.1	___ 9030B/9034 (acid soluble)	
Reactive ___ Cyanide ___ Sulfide		___ Section 7.3 (___ 9014 ___ 9030B)	
Silica	370.1		
Sulfite	377.1		
Sulfate	375.4	___ 9038	
Specific Conductance	120.1	___ 9050A	
Specific Gravity			___ D5057-90 ___ 213E (a)
Synthetic/Precipitation/Leach			
Total ___ Dissolved ___ Suspended ___ Solids	160 ___ 1 ___ 1312 ___ 2 ___ 3		
Total Organic Halides	450.1	___ 9020B	
Turbidity	180.1		
Volatile Solids:			
___ Total ___ Dissolved ___ Suspended	160.4		
Other:		Method:	

Lionville Laboratory Incorporated

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

- MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LC = Laboratory Control Sample.
NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.
2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).
3. Test Methods for Evaluating Solid Waste (USEPA SW-846).
 - a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).
 - b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).
 - c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).
 - d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).
 - e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.
 - f. Code of Federal Regulations.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 11/29/01

CLIENT: TNUHANFORD B00-056 H1597
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0111L372

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B13F50	Nitrite by IC	0.25 u	MG/L	0.25	1.0
		Nitrate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	28.3	MG/L	1.2	5.0
		Nitrate Nitrite	0.23	MG/L	0.020	1.0
		pH	7.4	PH UNIT	0.01	1.0
		Total Dissolved Solids	614	MG/L	10.0	1.0
		Total Suspended Solids	48.0	MG/L	10.0	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 11/29/01

CLIENT: TNUHANFORD B00-056 H1597
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0111L372

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
BLANK10	01LIC77-MB1	Nitrite by IC	0.25 u	MG/L	0.25	1.0
		Nitrate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	0.25 u	MG/L	0.25	1.0
BLANK10	01LN3063-MB1	Nitrate Nitrite	0.020u	MG/L	0.020	1.0
BLANK10	01LSA179-MB1	Total Dissolved Solids	5.00 u	MG/L	5.00	1.0
BLANK10	01LSS179-MB1	Total Suspended Solids	5.00 u	MG/L	5.00	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 11/29/01

CLIENT: TNUHANFORD B00-056 H1597
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0111L372

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-----	-----	-----	-----	-----	-----	-----	-----
-001	B13F50	Nitrite by IC	9.82	0.25u	10.0	98.2	2.0
		Nitrate by IC	9.81	0.25u	10.0	98.1	2.0
		Sulfate by IC	78.5	28.3	50.0	100.4	10.0
		Nitrate Nitrite	0.67	0.23	0.50	89.2	1.0
BLANK10	01LICC77-MB1	Nitrite by IC	4.98	0.25u	5.00	99.7	1.0
		Nitrate by IC	4.94	0.25u	5.00	98.9	1.0
		Sulfate by IC	4.9	0.25u	5.0	97.4	1.0
BLANK10	01LN3063-MB1	Nitrate Nitrite	0.49	0.02u	0.50	98.2	1.0
BLANK10	01LSA179-MB1	Total Dissolved Solids	103	5.00u	100	103.0	1.0
		Total Dissolved Solids	119	5.00u	100	119.0	1.0
BLANK10	01LSS179-MB1	Total Suspended Solids	87.7	5.00u	100	87.7	1.0
		Total Suspended Solids	100	5.00u	100	100.3	1.0

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 11/29/01

CLIENT: TNUHANFORD B00-056 H1597
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0111L372

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	01LSA179-MB1	Total Dissolved Solids	103.0	119.0	14.4
BLANK10	01LSS179-MB1	Total Suspended Solids	87.7	100.3	13.4

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 11/29/01

CLIENT: TNUHANFORD B00-056 H1597
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0111L372

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
*****	*****	*****	*****	*****	*****	*****
-001REP	B13F50	Nitrite by IC	0.25u	0.25u	NC	1.0
		Nitrate by IC	0.25u	0.25u	NC	1.0
		Sulfate by IC	28.3	28.5	0.43	5.0
		Nitrate Nitrite	0.23	0.25	8.4	1.0
		pH	7.4	7.4	0.0	1.0
		Total Dissolved Solids	614	532	14.3	1.0
		Total Suspended Solids	48.0	40.4	17.2	1.0

01112372

Custody Transfer Record/Lab Work Request Page 1 of 1

Page 1 of 1



VLI
FLORENCE LABORATORY IN

Q

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS[illegible]

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B00-056-025		Page 1 of 1		
Collector R.B. Kerkow		Company Contact R.B. Kerkow		Telephone No. 372-2187		Project Coordinator TRENT, SJ		Price Code 7L Data Turnaround		
Project Designation 100-NR-1, TSD Sites R. A. Sampling - Water		Sampling Location 116-N-3, Decon Pad Sump		SAF No. B00-056		Air Quality ☐		21 days		
Ice Chest No. ERC99-004		Field Logbook No. EL-1524-1		COA R1325N2600		Method of Shipment FED EX				
Shipped To TMD/RECRA RK 11-6-01		Offsite Property No. A020050051		Bill of Lading/Air Bill No. 42357964-9037						
POSSIBLE SAMPLE HAZARDS/REMARKS Potentially Radioactive TIC TO B13F49 Special Handling and/or Storage			Preservation	None	None	Cool 4C	H2SO4 to pH < Cool 4C	HNO3 to pH < 2	HNO3 to pH < 2	
			Type of Container	P	P	P	G	G	P	
			No. of Container(s)	1	1	1	1	1	2	
			Volume	125mL	120mL	125mL	260mL 500mL	260mL 500mL	1L	
SAMPLE ANALYSIS			pH (Water) - 9040 TSD TSS	Tritium - HD	IC Anions - 300.0 (Nitrate, Nitrite, Sulfate)	NO2/NO3 - 353.1	See item (1) in Special Instructions.	See item (2) in Special Instructions.		
Sample No.	Matrix *	Sample Date	Sample Time							
B13F50	WATER	11-13-01	0910	X	N	X	X	X		
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS					Matrix * S=Soil SS=Soil/Sediment SD=Soil/Sediment S=Sludge W=Water O=Oil A=Air DS=Dry Solid DL=Dry Liquid T=Time W=Wipe L=Liquid V=Vegetation X=Other	
Relinquished By R.B. Kerkow Date/Time 11/13/01		Received By R. J. Thoren Date/Time 11/13/01		Lab COA: R1325N2F00 (1) ICP Metals - 6010A (TAL) (Barium, Cadmium, Chromium, Silver); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium); Mercury - 7470 - (CV) (2) 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 Cr, Nickel-63; Isotopic Uranium - BK 11-6-01 ADD: TSD, TSS Samples stored in Ref. #1B at the 3728 Shipping Facility on 11/13/01. Collector not available to relinquish samples on 11/14/01 for shipment. 11-15-01 RT 11-14-01						
Relinquished By R. J. Thoren Date/Time 11/14/01		Received By R. J. Thoren Date/Time 11/14/01								
Relinquished By Fed Ex Date/Time 11/16/01 0935		Received By Rich Heenan Date/Time 11/16/01 0935								
Relinquished By Date/Time		Received By Date/Time								
LABORATORY SECTION		Received By		Title		Date/Time				
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By			Date/Time			

February 12, 1999

Figure 1. Sample Check-in List

Date/Time Received: 11/16/01 1030SDG#: 0111L 372

Work Order Number: _____

SAF# B00-056Shipping Container ID: ERC-99-054Chain of Custody # B00-056-025

1. Custody Seals on shipping container intact? Yes ☒ No ☐
2. Custody Seals dated and signed? Yes ☒ No ☐
3. Chain-of-Custody record present? Yes ☒ No ☐
4. Cooler temperature 3.3
5. Vermiculite/packing materials is Wet ☐ Dry ☒
6. Number of samples in shipping container: 4
7. Sample holding times exceeded? Yes ☒ No ☐

8. Samples have:
- | | |
|-----------------------------|---|
| <u> </u> tape | <u> </u> hazard labels |
| <u> </u> custody seals | <u> </u> appropriate sample labels |

9. Samples are:
- | | |
|---------------------------------|--------------------------------|
| <u> </u> in good condition | <u> </u> leaking |
| <u> </u> broken | <u> </u> have air bubbles |

10. Were any anomalies identified in sample receipt? Yes ☐ No ☒

11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: Levinville Laboratory Incorporated Date: 11/16/01

Telephoned to: _____ On _____ By _____