H0667-TMA/RECRA

0052662

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H0667 was composed of two solid (soil) samples designated under SAF No. B99-078 with a Project Designation of: 200 Area Source Characterization – 200-CW-1 OU.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Thermo Retec Sample Receipt Checklist. The results were transmitted to BHI via facsimile on January 17, 2000.

RECEIVED
FEB 28 2000
EDMC

2.0 ANALYSIS NOTES

2.1 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.2 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.3 Total Uranium Analyses

No problems were encountered during the course of the analyses. BHI did not request any of the samples be analyzed for Isotopic Uranium after reporting the Total Uranium results on January 13, 2000 via facsimile.

2.4 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.5 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.6 Gamma Spec Analyses

No problems were encountered during the course of the analyses.

JAN 2000
RECEIVED
Data
Log

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

SAMPLE SUMMARY

SDG 7309
Contact Melissa C. Mannion

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0667

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B0WN21	B8757	SOLID		N912055-01	B99-078	B99-078-150	12/02/99 10:00
B0WN22	B8757	SOLID		N912055-02	B99-078	B99-078-150	12/02/99 10:15
Method Blank		SOLID		N912055-04	B99-078		
Lab Control Sample		SOLID		N912055-03	B99-078		
Duplicate (N912055-01)	B8757	SOLID		N912055-05	B99-078		12/02/99 10:00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

QC SUMMARY

SDG 7309
Contact Melissa C. Mannion

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0667

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	DAYS SINCE COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7309	B99-078-150	B0WN21	SOLID	96.5			12/04/99	2	N912055-01	7309-001
		B0WN22	SOLID	96.6			12/04/99	2	N912055-02	7309-002
		Method Blank	SOLID						N912055-04	7309-004
		Lab Control Sample	SOLID						N912055-03	7309-003
		Duplicate (N912055-01)	SOLID				12/04/99	2	N912055-05	7309-005

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

SDG 7309
Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0667

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Alpha Spectroscopy												
AM	SOLID	Americium 241 in Soil	6909-146	5.0	2			1	1	1/1		
PU	SOLID	Plutonium, Isotopic in Solids	6909-146	5.0	2			1	1	1/1		
TH	SOLID	Thorium, Isotopic in Soil	6909-146	5.0	2			1	1	1/1		
Beta Counting												
SR	SOLID	Total Strontium in Soil	6909-146	10.0	2			1	1	1/1		
Gamma Spectroscopy												
GAM	SOLID	Gamma Scan	6909-146	15.0	2			1	1	1/1		
Kinetic Phosphorimetry												
U_T	SOLID	Uranium, Total in Soil	6909-146	9.0	2			1	1	1/1		

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

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

WORK SUMMARY

SDG 7309
Contact Melissa C. Mannion

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0667

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B0WN21			N912055-01	7309-001	AM		01/09/00	01/15/00	MCM	Americium 241 in Soil
B8757		SOLID	12/02/99	7309-001	GAM		12/23/99	01/15/00	MCM	Gamma Scan
B99-078-150	B99-078		12/04/99	7309-001	PU		01/06/00	01/15/00	MCM	Plutonium, Isotopic in Solids
				7309-001	SR		01/10/00	01/15/00	MCM	Total Strontium in Soil
				7309-001	TH		01/13/00	01/15/00	MCM	Thorium, Isotopic in Soil
				7309-001	U_T		01/12/00	01/15/00	MCM	Uranium, Total in Soil
B0WN22			N912055-02	7309-002	AM		01/10/00	01/15/00	MCM	Americium 241 in Soil
B8757		SOLID	12/02/99	7309-002	GAM		12/23/99	01/15/00	MCM	Gamma Scan
B99-078-150	B99-078		12/04/99	7309-002	PU		01/07/00	01/15/00	MCM	Plutonium, Isotopic in Solids
				7309-002	SR		01/10/00	01/15/00	MCM	Total Strontium in Soil
				7309-002	TH		01/13/00	01/15/00	MCM	Thorium, Isotopic in Soil
				7309-002	U_T		01/12/00	01/15/00	MCM	Uranium, Total in Soil
Method Blank			N912055-04	7309-004	AM		01/10/00	01/15/00	MCM	Americium 241 in Soil
		SOLID		7309-004	GAM		12/23/99	01/15/00	MCM	Gamma Scan
	B99-078			7309-004	PU		01/07/00	01/15/00	MCM	Plutonium, Isotopic in Solids
				7309-004	SR		01/11/00	01/15/00	MCM	Total Strontium in Soil
				7309-004	TH		01/14/00	01/15/00	MCM	Thorium, Isotopic in Soil
				7309-004	U_T		01/12/00	01/15/00	MCM	Uranium, Total in Soil
Lab Control Sample			N912055-03	7309-003	AM		01/08/00	01/15/00	MCM	Americium 241 in Soil
		SOLID		7309-003	GAM		12/23/99	01/15/00	MCM	Gamma Scan
	B99-078			7309-003	PU		01/07/00	01/15/00	MCM	Plutonium, Isotopic in Solids
				7309-003	SR		01/11/00	01/15/00	MCM	Total Strontium in Soil
				7309-003	TH		01/14/00	01/15/00	MCM	Thorium, Isotopic in Soil
				7309-003	U_T		01/12/00	01/15/00	MCM	Uranium, Total in Soil
Duplicate (N912055-01)			N912055-05	7309-005	AM		01/10/00	01/15/00	MCM	Americium 241 in Soil
B8757		SOLID	12/02/99	7309-005	GAM		12/27/99	01/15/00	MCM	Gamma Scan
	B99-078		12/04/99	7309-005	PU		01/07/00	01/15/00	MCM	Plutonium, Isotopic in Solids
				7309-005	SR		01/10/00	01/15/00	MCM	Total Strontium in Soil
				7309-005	TH		01/13/00	01/15/00	MCM	Thorium, Isotopic in Soil
				7309-005	U_T		01/12/00	01/15/00	MCM	Uranium, Total in Soil

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

SDG 7309
Contact Melissa C. Mannion

WORK SUMMARY, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0667

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
AM	B99-078	Americium 241 in Soil	AM/CMPLATE	2			1	1	1	5
GAM	B99-078	Gamma Scan	GAMMAHI	2			1	1	1	5
PU	B99-078	Plutonium, Isotopic in Solids	PUPLATE	2			1	1	1	5
SR	B99-078	Total Strontium in Soil	SRTOTAL	2			1	1	1	5
TH	B99-078	Thorium, Isotopic in Soil	THPLATE	2			1	1	1	5
U_T	B99-078	Uranium, Total in Soil	UKPA	2			1	1	1	5
TOTALS				12			6	6	6	30

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 01/17/00

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0667

N912055-04 Method Blank

METHOD BLANK

SDG	7309	Client/Case no	Hanford	SDG	H0667
Contact	Melissa C. Mannion	Contract	TRB-SBB-207925		
Lab sample id	N912055-04	Client sample id	Method Blank		
Dept sample id	7309-004	Material/Matrix			SOLID
		SAF No	B99-078		

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Uranium (ug/g)	7440-61-1	0	0.001	0.002	1.0	U	U_T
Plutonium 238	13981-16-3	-0.011	0.011	0.051	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.005	0.011	0.040	1.0	U	PU
Americium 241	14596-10-2	-0.022	0.045	0.10	1.0	U	AM
Total Strontium	SR90	-0.064	0.15	0.21	1.0	U	SR
Thorium 228	14274-82-9	0.019	0.095	0.18	1.0	U	TH
Thorium 230	14269-63-7	0.209	0.13	0.18	1.0	J	TH
Thorium 232	TH-232	-0.010	0.038	0.091	1.0	U	TH
Potassium 40	13966-00-2	U		2.7		U	GAM
Cobalt 60	10198-40-0	U		0.099	0.050	U	GAM
Cesium 137	10045-97-3	U		0.089	0.10	U	GAM
Europium 152	14683-23-9	U		0.22	0.10	U	GAM
Europium 154	15585-10-1	U		0.27	0.10	U	GAM
Europium 155	14391-16-3	U		0.17	0.10	U	GAM
Radium 226	13982-63-3	U		0.18	0.10	U	GAM
Radium 228	15262-20-1	U		0.41	0.20	U	GAM
Thorium 228	14274-82-9	U		0.17		U	GAM
Thorium 232	TH-232	U		0.41		U	GAM
Americium 241	14596-10-2	U		0.067		U	GAM
Uranium 238	U-238	U		9.4		U	GAM
Uranium 235	15117-96-1	U		0.27		U	GAM

200 Area Source Chara. - 200-CW-1 OU

QC-BLANK #32880

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

N912055-03 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7309
Contact Melissa C. Mannion

Client/Case no Hanford SDG H0667
Case no TRB-SBB-207925

Lab sample id N912055-03
Dept sample id 7309-003

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B99-078

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Total Uranium (ug/g)	34.2	4.2	0.021	1.0		U_T	33.0	1.3	104	76-124	80-120
Plutonium 238	10.3	0.67	0.027	1.0		PU	11.3	0.45	91	87-113	80-120
Plutonium 239/240	10.8	0.70	0.046	1.0		PU	11.9	0.48	91	87-113	80-120
Americium 241	9.38	0.58	0.084	1.0		AM	9.58	0.38	98	87-113	80-120
Total Strontium	11.4	0.58	0.28	1.0		SR	11.2	0.45	102	82-118	
Thorium 228	0.036	0.12	0.21	1.0	U	TH					
Thorium 230	19.8	1.3	0.21	1.0		TH	20.4	0.82	97	87-113	
Thorium 232	0.036	0.071	0.13	1.0	U	TH					
Cobalt 60	1.33	0.20	0.096	0.050		GAM	1.43	0.057	93	70-130	80-120
Cesium 137	1.43	0.19	0.13	0.10		GAM	1.50	0.060	95	71-129	80-120

200 Area Source Chara. - 200-CW-1 OU

QC-LCS #32879

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

N912055-05 B0WN21

DUPLICATE

SDG 7309 Client/Case no Hanford SDG H0667

Contact Melissa C. Mannion Case no TRB-SBB-207925

DUPLICATE	ORIGINAL	
Lab sample id N912055-05	Lab sample id N912055-01	Client sample id B0WN21
Dept sample id 7309-005	Dept sample id 7309-001	Location/Matrix B8757 SOLID
	Received 12/04/99	Collected 12/02/99 10:00
	% solids 96.5	Custody/SAF No B99-078-150 B99-078

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Total Uranium (ug/g)	0.414	0.049	0.002	1.0	J	U_T	0.416	0.049	0.002	J	0	32	
Plutonium 238	-0.011	0.023	0.051	1.0	U	PU	0	0.026	0.057	U	-		
Plutonium 239/240	-0.015	0.023	0.054	1.0	U	PU	0	0.034	0.065	U	-		
Americium 241	-0.039	0.065	0.13	1.0	U	AM	0.010	0.030	0.048	U	-		
Total Strontium	38.2	0.68	0.17	1.0		SR	39.3	0.73	0.19		3	22	
Thorium 228	0.425	0.16	0.18	1.0	J	TH	0.441	0.17	0.21	J	4	82	
Thorium 230	0.493	0.19	0.15	1.0	JB	TH	0.678	0.20	0.19	JB	32	72	
Thorium 232	0.321	0.12	0.088	1.0	J	TH	0.248	0.11	0.10	J	26	87	
Potassium 40	10.3	1.1	0.65			GAM	10.2	1.1	0.48		1	39	
Cobalt 60	U		0.057	0.050	U	GAM	U		0.053	U	-		
Cesium 137	U		0.046	0.10	U	GAM	U		0.052	U	-		
Europium 152	U		0.12	0.10	U	GAM	U		0.14	U	-		
Europium 154	U		0.16	0.10	U	GAM	U		0.16	U	-		
Europium 155	U		0.14	0.10	U	GAM	U		0.15	U	-		
Radium 226	0.304	0.087	0.086	0.10		GAM	0.418	0.10	0.096		32	64	
Radium 228	0.496	0.24	0.24	0.20		GAM	0.508	0.23	0.23		2	104	
Thorium 228	0.444	0.079	0.092			GAM	0.453	0.061	0.062		2	46	
Thorium 232	0.496	0.24	0.24			GAM	0.508	0.23	0.23		2	104	
Americium 241	U		0.15		U	GAM	U		0.15	U	-		
Uranium 238	U		6.8		U	GAM	U		5.9	U	-		
Uranium 235	U		0.21		U	GAM	U		0.22	U	-		

200 Area Source Chara. - 200-CW-1 OU

QC-DUP#1 32881

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

N912055-01 B0WN21

DATA SHEET

SDG	7309	Client/Case no	Hanford SDG H0667
Contact	Melissa C. Mannion	Contract	TRB-SBB-207925
Lab sample id	N912055-01	Client sample id	B0WN21
Dept sample id	7309-001	Location/Matrix	B8757 SOLID
Received	12/04/99	Collected	12/02/99 10:00
% solids	96.5	Custody/SAF No	B99-078-150 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Uranium (ug/g)	7440-61-1	0.416	0.049	0.002	1.0	J	U_T
Plutonium 238	13981-16-3	0	0.026	0.057	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.034	0.065	1.0	U	PU
Americium 241	14596-10-2	0.010	0.030	0.048	1.0	U	AM
Total Strontium	SR90	39.3	0.73	0.19	1.0		SR
Thorium 228	14274-82-9	0.441	0.17	0.21	1.0	J	TH
Thorium 230	14269-63-7	0.678	0.20	0.19	1.0	JB	TH
Thorium 232	TH-232	0.248	0.11	0.10	1.0	J	TH
Potassium 40	13966-00-2	10.2	1.1	0.48			GAM
Cobalt 60	10198-40-0	U		0.053	0.050	U	GAM
Cesium 137	10045-97-3	U		0.052	0.10	U	GAM
Europium 152	14683-23-9	U		0.14	0.10	U	GAM
Europium 154	15585-10-1	U		0.16	0.10	U	GAM
Europium 155	14391-16-3	U		0.15	0.10	U	GAM
Radium 226	13982-63-3	0.418	0.10	0.096	0.10		GAM
Radium 228	15262-20-1	0.508	0.23	0.23	0.20		GAM
Thorium 228	14274-82-9	0.453	0.061	0.062			GAM
Thorium 232	TH-232	0.508	0.23	0.23			GAM
Americium 241	14596-10-2	U		0.15		U	GAM
Uranium 238	U-238	U		5.9		U	GAM
Uranium 235	15117-96-1	U		0.22		U	GAM

200 Area Source Chara. - 200-CW-1 OU

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

N912055-02 B0WN22

DATA SHEET

SDG	7309	Client/Case no	Hanford SDG H0667
Contact	Melissa C. Mannion	Contract	TRB-SBB-207925
Lab sample id	N912055-02	Client sample id	B0WN22
Dept sample id	7309-002	Location/Matrix	B8757 SOLID
Received	12/04/99	Collected	12/02/99 10:15
% solids	96.6	Custody/SAF No	B99-078-150 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Uranium (ug/g)	7440-61-1	0.595	0.070	0.002	1.0	J	U_T
Plutonium 238	13981-16-3	0.009	0.035	0.064	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.013	0.035	0.072	1.0	U	PU
Americium 241	14596-10-2	-0.027	0.071	0.16	1.0	U	AM
Total Strontium	SR90	28.4	0.61	0.18	1.0		SR
Thorium 228	14274-82-9	0.476	0.15	0.16	1.0	J	TH
Thorium 230	14269-63-7	0.619	0.19	0.17	1.0	JB	TH
Thorium 232	TH-232	0.676	0.15	0.073	1.0	J	TH
Potassium 40	13966-00-2	10.8	2.8	0.99			GAM
Cobalt 60	10198-40-0	U		0.093	0.050	U	GAM
Cesium 137	10045-97-3	0.211	0.094	0.12	0.10		GAM
Europium 152	14683-23-9	U		0.24	0.10	U	GAM
Europium 154	15585-10-1	U		0.27	0.10	U	GAM
Europium 155	14391-16-3	U		0.21	0.10	U	GAM
Radium 226	13982-63-3	0.221	0.18	0.19	0.10		GAM
Radium 228	15262-20-1	0.588	0.41	0.41	0.20		GAM
Thorium 228	14274-82-9	0.401	0.13	0.16			GAM
Thorium 232	TH-232	0.588	0.41	0.41			GAM
Americium 241	14596-10-2	U		0.10		U	GAM
Uranium 238	U-238	U		23		U	GAM
Uranium 235	15117-96-1	U		0.31		U	GAM

200 Area Source Chara. - 200-CW-1 OU

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

Test AM	Matrix SOLID
SDG 7309	
Contact Melissa C. Mannion	

METHOD SUMMARY

AMERICIUM 241 IN SOIL

ALPHA SPECTROSCOPY

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0667	

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Americium 241	
Preparation batch 6909-146						
B0WN21	N912055-01			7309-001	U	
B0WN22	N912055-02			7309-002	U	
BLK (QC ID=32880)	N912055-04			7309-004	U	
LCS (QC ID=32879)	N912055-03			7309-003	ok	
Duplicate (N912055-01)	N912055-05			7309-005	-	U

Nominal values and limits from method RDLs (pCi/g) 1.0

200 Area Source Chara. - 200-CW-1 OU

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6909-146	2σ prep error 5.0 %				Reference Lab Notebook 6909 pg. 146											
B0WN21	N912055-01			0.048	0.500			50		1008			38	01/05/00	01/09	SS-016
B0WN22	N912055-02			0.16	0.500			36		711			39	01/05/00	01/10	SS-034
BLK (QC ID=32880)	N912055-04			0.10	0.500			60		711				01/08/00	01/10	SS-036
LCS (QC ID=32879)	N912055-03			0.084	0.500			76		1063				01/08/00	01/08	SS-040
Duplicate (N912055-01) (QC ID=32881)	N912055-05			0.13	0.500			54		711			39	01/05/00	01/10	SS-038
Nominal values and limits from method				1.0	0.500			20-105		700	100		180			

PROCEDURES	REFERENCE	AM/CMPLATE
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-940	Plutonium Purification, rev 0
	EP-960	Americium-Curium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	0.10	± 0.086
FOR 5 SAMPLES	YIELD	55	± 29

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

Test	PU
Matrix	SOLID
SDG	7309
Contact	Melissa C. Mannion

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Client	Hanford
Contract	TRB-SBB-207925
Case no	SDG H0667

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Plutonium 238		Plutonium 239/240	
Preparation batch 6909-146								
B0WN21	N912055-01			7309-001	U		U	
B0WN22	N912055-02			7309-002	U		U	
BLK (QC ID=32880)	N912055-04			7309-004	U		U	
LCS (QC ID=32879)	N912055-03			7309-003	ok		ok	
Duplicate (N912055-01)	N912055-05			7309-005	-	U	-	U
Nominal values and limits from method				RDLs (pCi/g)	1.0		1.0	
200 Area Source Chara. - 200-CW-1 OU								

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6909-146	2σ prep error 5.0 %			Reference Lab Notebook 6909 pg. 146												
B0WN21	N912055-01			0.065	0.500			70		806			35	01/06/00	01/06	SS-014
B0WN22	N912055-02			0.072	0.500			61		896			36	01/06/00	01/07	SS-014
BLK (QC ID=32880)	N912055-04			0.051	0.500			53		896				01/07/00	01/07	SS-016
LCS (QC ID=32879)	N912055-03			0.046	0.500			95		853				01/07/00	01/07	SS-058
Duplicate (N912055-01) (QC ID=32881)	N912055-05			0.054	0.500			71		870			36	01/06/00	01/07	SS-059
Nominal values and limits from method				1.0	0.500			20-105		10	100		180			

PROCEDURES	REFERENCE	PUPLATE
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-940	Plutonium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	0.058	± 0.021
FOR 5 SAMPLES	YIELD	70	± 32

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

Test	TH
Matrix	SOLID
SDG	7309
Contact	Melissa C. Mannion

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client	Hanford
Contract	TRB-SBB-207925
Case no	SDG H0667

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Thorium 228	Thorium 230	Thorium 232
Preparation batch 6909-146							
B0WN21	N912055-01			7309-001	0.441 J	0.678 J	0.248 J
B0WN22	N912055-02			7309-002	0.476 J	0.619 J	0.676 J
BLK (QC ID=32880)	N912055-04			7309-004	U	0.209 J	U
LCS (QC ID=32879)	N912055-03			7309-003	No data U	ok	No data U
Duplicate (N912055-01)	N912055-05			7309-005	ok J	ok J	ok J
Nominal values and limits from method				RDLs (pCi/g)	1.0	1.0	1.0
200 Area Source Chara. - 200-CW-1 OU							

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6909-146	2σ prep error 5.0 %			Reference Lab Notebook 6909 pg. 146												
B0WN21	N912055-01			0.21	0.250			70		626			42	01/07/00	01/13	SS-033
B0WN22	N912055-02			0.17	0.250			77		626			42	01/07/00	01/13	SS-034
BLK (QC ID=32880)	N912055-04			0.18	0.250			81		626				01/14/00	01/14	SS-036
LCS (QC ID=32879)	N912055-03			0.21	0.250			65		626				01/14/00	01/14	SS-035
Duplicate (N912055-01) (QC ID=32881)	N912055-05			0.18	0.250			69		626			42	01/07/00	01/13	SS-038
Nominal values and limits from method				1.0	0.250			20-105		200			180			

PROCEDURES	REFERENCE	THPLATE
	EP-000	Data Entry and Document Preparation, rev 0
	EP-001	Q.C. Preparation, rev 0
	EP-003	Tracing, rev 0
	EP-008	Heavy Elements Electroplating, rev 0
	EP-070	Soil Dissolution, rev 0
	RP-901	Thorium Purification - Small Aliquot, rev 0

AVERAGES ± 2 SD	MDA	0.19	± 0.037
FOR 5 SAMPLES	YIELD	72	± 13

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

Test SR	Matrix SOLID
SDG 7309	
Contact Melissa C. Mannion	

METHOD SUMMARY

TOTAL STRONTIUM IN SOIL

BETA COUNTING

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0667	

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Total Strontium
Preparation batch 6909-146					
B0WN21	N912055-01			7309-001	39.3
B0WN22	N912055-02			7309-002	28.4
BLK (QC ID=32880)	N912055-04			7309-004	U
LCS (QC ID=32879)	N912055-03			7309-003	ok
Duplicate (N912055-01)	N912055-05			7309-005	ok

Nominal values and limits from method *RDLs (pCi/g)* *1.0*

200 Area Source Chara. - 200-CW-1 OU

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6909-146	2σ prep error 10.0 % Reference Lab Notebook 6909 pg. 146															
B0WN21	N912055-01			0.19	1.00			81		400			39	01/07/00	01/10	GRB-218
B0WN22	N912055-02			0.18	1.00			88		400			39	01/07/00	01/10	GRB-219
BLK (QC ID=32880)	N912055-04			0.21	1.00			79		400				01/11/00	01/11	GRB-221
LCS (QC ID=32879)	N912055-03			0.28	1.00			81		400				01/11/00	01/11	GRB-220
Duplicate (N912055-01) (QC ID=32881)	N912055-05			0.17	1.00			91		400			39	01/07/00	01/10	GRB-222
Nominal values and limits from method				1.0	1.00					100			180			

PROCEDURES	REFERENCE	SRTOTAL
	RP-500	Strontium - Initial Separation, rev 0
	RP-519	Strontium-89,90 Demounting and Yttrium Purification, rev 0

AVERAGES ± 2 SD FOR 5 SAMPLES				
MDA	0.21	±	0.088
YIELD	84	±	10

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

Test GAM Matrix SOLID	Client Hanford
SDG 7309	Contract TRB-SBB-207925
Contact Melissa C. Mannion	Case no SDG H0667

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Cobalt 60		Cesium 137	
Preparation batch 6909-146								
B0WN21	N912055-01			7309-001	U		U	
B0WN22	N912055-02			7309-002	U		0.211	
BLK (QC ID=32880)	N912055-04			7309-004	U		U	
LCS (QC ID=32879)	N912055-03			7309-003	ok		ok	
Duplicate (N912055-01)	N912055-05			7309-005	-	U	-	U
Nominal values and limits from method				RDLs (pCi/g)	0.050		0.10	
200 Area Source Chara. - 200-CW-1 OU								

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6909-146	2σ prep error 15.0 % Reference Lab Notebook 6909 pg. 146															
B0WN21	N912055-01			0.14	190					119			21	12/21/99	12/23	JR,04,00
B0WN22	N912055-02			0.24	178					118			21	12/21/99	12/23	JR,07,00
BLK (QC ID=32880)	N912055-04			0.18	171					118				12/21/99	12/23	JR,07,00
LCS (QC ID=32879)	N912055-03			0.096	171					118				12/21/99	12/23	JR,01,00
Duplicate (N912055-01) (QC ID=32881)	N912055-05			0.15	190					128			25	12/21/99	12/27	JR,04,00
Nominal values and limits from method				0.050	171					100			180			

PROCEDURES	REFERENCE	GAMMAHI
	EP-060	Soil Preparation, rev 0
	EP-100	Ge(Li) Preparation for Environmental Samples, rev 0

AVERAGES ± 2 SD FOR 5 SAMPLES			
MDA	0.16	±	0.11
YIELD		±	

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	01/17/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0667

Test U T	Matrix SOLID
SDG 7309	
Contact Melissa C. Mannion	

METHOD SUMMARY

URANIUM, TOTAL IN SOIL

KINETIC PHOSPHORIMETRY

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0667	

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Total Uranium
Preparation batch 6909-146					
B0WN21	N912055-01			7309-001	0.416 J
B0WN22	N912055-02			7309-002	0.595 J
BLK (QC ID=32880)	N912055-04			7309-004	U
LCS (QC ID=32879)	N912055-03			7309-003	ok
Duplicate (N912055-01)	N912055-05			7309-005	ok J

Nominal values and limits from method RDLs (ug/g) 1.0

200 Area Source Chara. - 200-CW-1 OU

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA ug/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6909-146 2σ prep error 9.0 % Reference Lab Notebook 6909 pg. 146																
B0WN21	N912055-01			0.002	0.0500								41	01/12/00	01/12	KPA-001
B0WN22	N912055-02			0.002	0.0500								41	01/12/00	01/12	KPA-001
BLK (QC ID=32880)	N912055-04			0.002	0.0500									01/12/00	01/12	KPA-001
LCS (QC ID=32879)	N912055-03			0.021	0.0500									01/12/00	01/12	KPA-001
Duplicate (N912055-01) (QC ID=32881)	N912055-05			0.002	0.0500								41	01/12/00	01/12	KPA-001
Nominal values and limits from method				1.0	0.0500								180			

PROCEDURES	REFERENCE	UKPA
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-044	Preparation of Total Uranium by Kinetic Phosphorimetry, rev 1
	EP-928	Total Uranium by Kinetic Phosphorimetry, rev 0

AVERAGES ± 2 SD	MDA 0.006	± 0.017
FOR 5 SAMPLES	YIELD	±

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	01/17/00

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-150	Page 1 of 1

Collector: Bowers/Trice / Cearlock	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: ~~200 B pond~~ B8757	SAF No.: B99-078	Air Quality ☐
Ice Chest No.: ERC 99 021	Field Logbook No.: EL-1511-1 — COA: B20CW1671C	Method of Shipment: Fed Ex	
Shipped To: TMA/~~RECRA~~	Offsite Property No.: A00056	Bill of Lading/Air Bill No.: 42357953 2513	

DJD 12-2-99

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	None									
Type of Container	aG	aG									
No. of Container(s)	1	1									
Volume	250mL	250mL									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time									
✓RAT 12-2-99 ~~BOX N21~~ BOWN21	Soil	12/2/99	1000		X				RAT 12-2-99 ~~BOX N27~~ BOWN27			
✓RAT 12-2-99 ~~BOX N22~~ BOWN22	Soil	12/2/99	1015		X				RAT 12-2-99 ~~BOX N27~~ BOWN27			

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By	Sign/Print Names	Date/Time
Relinquished By	[signature]	12-2-99/1155	Received By	Doug Bowers [signature]	12-2-99/1155
Relinquished By	Doug Bowers [signature]	12-2-99/1530	Received By	RAT 1A	12-2-99/1530
Relinquished By	RAT 1A	12-3-99/0700	Received By	R. Thoren	12-3-99/0700
Relinquished By	R. Thoren	12-3-99/1430	Received By	FEDEX	12-3-99
Relinquished By	FedEx	12-4-99 11:00	Received By	MVM Goldenberg	12-4-99 11:00
Relinquished By			Received By		

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Copper, Nickel, Thallium, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: Bechtel Hanford Inc Date/Time received 12-4-99 11:00

CoC No. B99-078-151, 150 → MAX(M - Sample (Moist

Container I.D. No. _____ Requested TAT (Days) 45 P.O. Received Yes [ ] No [✓]

INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [✓] No [ ] N/A [ ]
4. Custody seals on sample containers dated & signed? Yes [✓] No [ ] N/A [ ]
5. Cooler Temperature: _____ Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: ~~3~~ 2 one bottle went to
7. Number of containers per sample: ~~2~~ (Or see CoC ✓) Margin
8. Paperwork agrees with samples? Yes [✓] No [ ]
9. Samples have: Tape [ ] Hazard labels [ ] Rad labels [✓] Appropriate sample labels [✓]
10. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
11. Describe any anomalies: _____

13. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date _____
14. Received by M. Goldenberg Date: 12-4-99 Time: 11:00

LOGIN

TNU W.O. No. _____ Group No. _____ Client W.O. No. _____

PROGRAM MANAGER

Sample holding times exceeded? Yes [ ] No [ ]

Client Notified: Name _____ Date/time _____

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

JAN 2000
RECEIVED
Data
Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9912L926
SDG/SAF# : H0667/B99-078

W.O.# : 10985-001-001-9999-00
Date Received: 12-04-99

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

2. The samples were 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 (80-120% for Mercury).

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) 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 laboratory 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 PDS was prepared at the following level:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
BOWN21	Antimony	100	98.9

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 15 pages.

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

1-24-00
Date

mld/m12-926

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 9912L926

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	__6010B		__200.7				__99
Antimony	✓6010B	__7041 [5]	__200.7	__204.2			__99
Arsenic	✓6010B	__7060A [5]	__200.7	__206.2	__3113B		__99
Barium	✓6010B		__200.7				__99
Beryllium	✓6010B		__200.7				__99
Bismuth	__6010B [1]		__200.7 [1]			__1620	__99
Boron	__6010B		__200.7				__99
Cadmium	✓6010B	__7131A [5]	__200.7	__213.2			__99
Calcium	__6010B		__200.7				__99
Chromium	✓6010B	__7191 [5]	__200.7	__218.2			__SS17
Cobalt	__6010B		__200.7				__99
Copper	✓6010B	__7211 [5]	__200.7	__220.2			__99
Iron	__6010B		__200.7				__99
Lead	✓6010B	__7421 [5]	__200.7	__239.2	__3113B		__99
Lithium	__6010B	__7430 [4]	__200.7			__1620	__99
Magnesium	__6010B		__200.7				__99
Manganese	__6010B		__200.7				__99
Mercury	__7470A [3]	✓7471A [3]	__245.1 [2]	__245.5 [2]			__99
Molybdenum	__6010B		__200.7				__99
Nickel	✓6010B		__200.7				__99
Potassium	__6010B	__7610 [4]	__200.7	__258.1 [4]			__99
Rare Earths	__6010B [1]		__200.7 [1]			__1620	__99
Selenium	✓6010B	__7740 [5]	__200.7	__270.2	__3113B		__99
Silicon	__6010B [1]		__200.7			__1620	__99
Silica	__6010B		__200.7			__1620	__99
Silver	✓6010B	__7761 [5]	__200.7	__272.2			__99
Sodium	__6010B	__7770 [4]	__200.7	__273.1 [4]			__99
Strontium	__6010B		__200.7				__99
Thallium	✓6010B	__7841 [5]	__200.7	__279.2__200.9			__99
Tin	__6010B		__200.7				__99
Titanium	__6010B		__200.7				__99
Uranium	__6010B [1]		__200.7 [1]			__1620	__99
Vanadium	✓6010B		__200.7				__99
Zinc	✓6010B		__200.7				__99
Zirconium	__6010B [1]		__200.7 [1]			__1620	__99

Other:_____ Method:_____

L-WI-033/M-11/99

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
LCS = Laboratory Control Sample.
NC = Not calculated.

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/N-10/96

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 01/24/00

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0WN21	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	2.0	MG/KG	0.27	1.0
		Barium, Total	59.5	MG/KG	0.02	1.0
		Beryllium, Total	0.21	MG/KG	0.03	1.0
		Cadmium, Total	0.22	MG/KG	0.04	1.0
		Chromium, Total	8.7	MG/KG	0.07	1.0
		Copper, Total	10.4	MG/KG	0.05	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	12.2	MG/KG	0.10	1.0
		Lead, Total	2.6	MG/KG	0.21	1.0
		Antimony, Total	0.21 u	MG/KG	0.21	1.0
		Selenium, Total	1.3	MG/KG	0.41	1.0
		Thallium, Total	0.43 u	MG/KG	0.43	1.0
		Vanadium, Total	36.1	MG/KG	0.06	1.0
		Zinc, Total	31.6	MG/KG	0.05	1.0

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 01/24/00

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	B0WN22	Silver, Total	0.06 u	MG/KG	0.06	1.0
		Arsenic, Total	1.8	MG/KG	0.21	1.0
		Barium, Total	72.0	MG/KG	0.02	1.0
		Beryllium, Total	0.24	MG/KG	0.02	1.0
		Cadmium, Total	0.28	MG/KG	0.03	1.0
		Chromium, Total	17.9	MG/KG	0.06	1.0
		Copper, Total	12.3	MG/KG	0.04	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	11.8	MG/KG	0.08	1.0
		Lead, Total	2.9	MG/KG	0.17	1.0
		Antimony, Total	0.17 u	MG/KG	0.17	1.0
		Selenium, Total	1.2	MG/KG	0.32	1.0
		Thallium, Total	0.37	MG/KG	0.34	1.0
		Vanadium, Total	46.6	MG/KG	0.05	1.0
		Zinc, Total	34.2	MG/KG	0.04	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/24/00

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L0876-MB1	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	0.27 u	MG/KG	0.27	1.0
		Barium, Total	0.02 u	MG/KG	0.02	1.0
		Beryllium, Total	0.03 u	MG/KG	0.03	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.07 u	MG/KG	0.07	1.0
		Copper, Total	0.05 u	MG/KG	0.05	1.0
		Nickel, Total	0.10 u	MG/KG	0.10	1.0
		Lead, Total	0.21 u	MG/KG	0.21	1.0
		Antimony, Total	0.21 u	MG/KG	0.21	1.0
		Selenium, Total	0.41 u	MG/KG	0.41	1.0
		Thallium, Total	0.43 u	MG/KG	0.43	1.0
		Vanadium, Total	0.06 u	MG/KG	0.06	1.0
		Zinc, Total	0.05 u	MG/KG	0.05	1.0
BLANK1	99C0396-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 01/24/00

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B0WN21	Silver, Total	4.5	0.08u	4.8	93.8	1.0
		Arsenic, Total	175	2.0	194	89.1	1.0
		Barium, Total	226	59.5	194	85.9	1.0
		Beryllium, Total	4.4	0.21	4.8	87.2	1.0
		Cadmium, Total	4.6	0.22	4.8	91.2	1.0
		Chromium, Total	26.9	8.7	19.4	93.8	1.0
		Copper, Total	34.4	10.4	24.2	99.2	1.0
		Mercury, Total	0.17	0.02u	0.17	97.7	1.0
		Nickel, Total	50.7	12.2	48.4	79.5	1.0
		Lead, Total	46.4	2.6	48.4	90.5	1.0
		Antimony, Total	29.3	0.21u	48.4	60.5	1.0
		Selenium, Total	166	1.3	194	85.2	1.0
		Thallium, Total	181	0.43u	194	93.2	1.0
		Vanadium, Total	80.6	36.1	48.4	91.9	1.0
		Zinc, Total	70.3	31.6	48.4	80.0	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 01/24/00

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0WN21	Silver, Total	0.08u	0.07u	NC	1.0
		Arsenic, Total	2.0	1.5	28.6	1.0
		Barium, Total	59.5	50.3	16.8	1.0
		Beryllium, Total	0.21	0.20	6.0	1.0
		Cadmium, Total	0.22	0.23	2.7	1.0
		Chromium, Total	8.7	15.6	56.8	1.0
		Copper, Total	10.4	10.8	3.8	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Nickel, Total	12.2	10.5	15.0	1.0
		Lead, Total	2.6	2.3	12.2	1.0
		Antimony, Total	0.21u	0.19u	NC	1.0
		Selenium, Total	1.3	1.1	16.7	1.0
		Thallium, Total	0.43u	0.39u	NC	1.0
		Vanadium, Total	36.1	32.9	9.3	1.0
		Zinc, Total	31.6	27.8	12.8	1.0

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 01/24/00

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	99L0876-LC1	Silver, LCS	49.3	50.0	MG/KG	98.6
		Arsenic, LCS	945	1000	MG/KG	94.5
		Barium, LCS	491	500	MG/KG	98.2
		Beryllium, LCS	23.5	25.0	MG/KG	94.0
		Cadmium, LCS	24.2	25.0	MG/KG	96.8
		Chromium, LCS	49.8	50.0	MG/KG	99.6
		Copper, LCS	123	125	MG/KG	98.3
		Nickel, LCS	193	200	MG/KG	96.3
		Lead, LCS	241	250	MG/KG	96.5
		Antimony, LCS	288	300	MG/KG	96.0
		Selenium, LCS	918	1000	MG/KG	91.8
		Thallium, LCS	987	1000	MG/KG	98.7
		Vanadium, LCS	255	250	MG/KG	101.9
		Zinc, LCS	95.5	100	MG/KG	95.5
LCS1	99C0396-LC1	Mercury, LCS	0.90	1.0	MG/KG	90.1

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 12/04/99 RFW LOT # :9912L926

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0WN21						
SILVER, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
SILVER, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
SILVER, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
ARSENIC, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
ARSENIC, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
ARSENIC, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
BARIUM, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
BARIUM, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
BARIUM, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
BERYLLIUM, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/14/00
BERYLLIUM, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/14/00
BERYLLIUM, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/14/00
CADMIUM, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
CADMIUM, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
CADMIUM, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
CHROMIUM, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
CHROMIUM, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
CHROMIUM, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
COPPER, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
COPPER, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
COPPER, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
MERCURY, TOTAL	001	S	99C0396	12/02/99	12/21/99	12/22/99
MERCURY, TOTAL	001 REP	S	99C0396	12/02/99	12/21/99	12/22/99
MERCURY, TOTAL	001 MS	S	99C0396	12/02/99	12/21/99	12/22/99
NICKEL, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
NICKEL, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
NICKEL, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
LEAD, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
LEAD, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
LEAD, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
ANTIMONY, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
ANTIMONY, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
ANTIMONY, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
SELENIUM, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
SELENIUM, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 12/04/99 RFW LOT # :9912L926

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SELENIUM, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
THALLIUM, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
THALLIUM, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
THALLIUM, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
VANADIUM, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
VANADIUM, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
VANADIUM, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
ZINC, TOTAL	001	S	99L0876	12/02/99	01/10/00	01/13/00
ZINC, TOTAL	001 REP	S	99L0876	12/02/99	01/10/00	01/13/00
ZINC, TOTAL	001 MS	S	99L0876	12/02/99	01/10/00	01/13/00
B0WN22						
SILVER, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
ARSENIC, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
BARIUM, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
BERYLLIUM, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/14/00
CADMIUM, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
CHROMIUM, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
COPPER, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
MERCURY, TOTAL	002	S	99C0396	12/02/99	12/21/99	12/22/99
NICKEL, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
LEAD, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
ANTIMONY, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
SELENIUM, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
THALLIUM, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
VANADIUM, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00
ZINC, TOTAL	002	S	99L0876	12/02/99	01/10/00	01/13/00

LAB QC:

SILVER LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
SILVER, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
ARSENIC LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
ARSENIC, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
BARIUM LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
BARIUM, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
BERYLLIUM LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/14/00

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 12/04/99 RFW LOT # :9912L926

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BERYLLIUM, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/14/00
CADMIUM LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
CADMIUM, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
CHROMIUM LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
CHROMIUM, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
COPPER LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
COPPER, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
MERCURY LABORATORY	LC1 BS	S	99C0396	N/A	12/21/99	12/22/99
MERCURY, TOTAL	MB1	S	99C0396	N/A	12/21/99	12/22/99
NICKEL LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
NICKEL, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
LEAD LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
LEAD, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
ANTIMONY LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
ANTIMONY, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
SELENIUM LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
SELENIUM, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
THALLIUM LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
THALLIUM, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
VANADIUM LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
VANADIUM, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00
ZINC LABORATORY	LC1 BS	S	99L0876	N/A	01/10/00	01/12/00
ZINC, TOTAL	MB1	S	99L0876	N/A	01/10/00	01/12/00

RECRA LabNet Use Only

99126926

Custody Transfer Record/Lab Work Request

Page 1 of 1

All

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

Client: INU-Hanford B99-078

Est. Final Proj. Sampling Date:

Project #: 10985-001-001-9999-00

Project Contact/Phone #:

RECRA Project Manager: OJ

QC: Spec Del: std TAT: 30 day

Date Rec'd: 12/4/99 Date Due: 1/3/00

Account #:

Refrigerator #								3-1								
#/Type Container	Liquid															
	Solid							1g-1								
Volume	Liquid															
	Solid							250-1								
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb				Metal	CN						
		RECRA LabNet Use Only														
								KR6	*							

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
E - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	KR6	*
001	BØWN21			S	12/2/99	1000	✓	✓
002	BØWN22			S	12/2/99	1015	✓	✓

Special Instructions:

saf# B99-078

COMPOSITE WASTE

DATE/REVISIONS:

1. * As, Ba, Cd, Cr, Pb, Se, Ag, Sb,
2. Be, Cu, Ni, Tl, V, Zn, Hg.
3.
4.
5.
6. Run matrix QC

RECRA LabNet Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___

Airbill # *

2) Ambient or Chilled

3) Received in Good Condition (Y) or N

4) Labels Indicate Properly Preserved (Y) or N

5) Received Within Holding Times (Y) or N

COC Tape was: 1) Present on Outer Package (Y) or N

2) Unbroken on Outer Package (Y) or N

3) Present on Sample (Y) or N

4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Cooler Temp. 4.3 °C

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES: * 42357953 24465

Relinquished by	Received by	Date	Time
FedEx	Jenson	12/4/99	1000
		12/4/99	

Relinquished by	Received by	Date	Time
ORIGINAL			
REWRITTEN			

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		
Collector: Bowers/Trice / Cearlock	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: ~~200-B pond~~ B8757	SAF No.: B99-078	Air Quality ☐
Ice Chest No.: SML 443	Field Logbook No.: EL-1511-1 — COA: B20CW1671C	Method of Shipment: Fed Ex	
Shipped To: ~~TMA~~/RECRA	Offsite Property No.: A000055	Bill of Lading/Air Bill No.: 42357953 2465	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	None									
Type of Container	aG	aG									
No. of Container(s)	1	1									
Volume	250mL	250mL									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time										
~~BOX N21~~ BOWN21	Soil	12/2/99	1000	X				RAT 12-02-99	~~BOXN27~~	BOWN27			
~~BOXN22~~ BOWN22	Soil	12/2/99	1015	X					~~BOXN27~~	BOWN27			
RAT 12-02-99								RAT 12-02-99					

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By	Sign/Print Names	Date/Time
Relinquished By	Chris Cearlock	12/2/99 1155	Received By	Doug Bowers	12-2-99/1155
Relinquished By	Doug Bowers	12-2-99/1530	Received By	R of 1A	12-2-99/1530
Relinquished By	R of 1A	12-3-99/0700	Received By	R. Thoren	12-3-99/0700
Relinquished By	R. Thoren	12-3-99/1430	Received By	FED EX	
Relinquished By	FedEx		Received By	Johnson	12/4/99 1000
Relinquished By			Received By		

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Antimony, Beryllium, Copper, Nickel, Thallium, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

RECRA LabNet
a division of Recra Environmental, Inc.
Virtual Laboratories Everywhere

JAN 2000
RECEIVED
Data
Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9912L926
SDG# : H0667
SAF# : B99-078

W.O. # : 10985-001-001-9999-00
Date Received: 12-04-99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

2. The samples were 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.

4. The cooler temperature was recorded on the chain-of-custody.

5. The method blank for Chromium VI was within method criteria.

6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.

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. Results for solid samples are reported on a dry weight basis.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

1-24-00
Date

njp\i12-926

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 10 pages.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610)-280-3000 • Fax (610) 280-3041

Recra LabNet Philadelphia

WET CHEMISTRY
METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

	ASTM	SW846	OTHER
% Ash	__ D2216-80		
% Moisture	__ D2216-80		__ ILMO4.0 (e)
% Solids	✓ D2216-80		__ ILMO4.0 (e)
% Volatile Soilids	__ D2216-80		
ASTM Extraction in Water	__ D3987-81/85		
BTU	__ D240-87		
CEC		__ 9081	__ c
Chromium VI		✓ 3060A/7196A	
Corrosivity __ by coupon __ by pH		__ 1110(mod) __ 9045C	
Cyanide, Total		__ 9010B	__ ILMO4.0 (e)
Cyanide, Reactive		__ Section 7.3	
Halides, Extractable Organic		__ 9020B	__ EPA 600/4/84-008
Halides, Total		__ 9020B	__ EPA 600/4/84-008
EP Toxicity		__ 1310A	
Flash Point		__ 1010	
Ignitability		__ 1010	
Oil & Grease		__ 9071A	
Carbon, Total Organic		__ 9060	__ Lloyd Kahn (mod)
Oxygne Bomb Prep for Anions	__ D240-87(mod)	__ 5050	
Petroleum Hydrocarbons, Total Recoverable		__ 9071	__ EPA 418.1
pH, Soil		__ 9045C	
Sulfide, Reactive		__ Section 7.3	
Sulfide		__ 9030B(mod)	
Specific Gravity	__ D1429-76C/	__ D5057-90	
Sulfur, Total		__ 9056	
Synthetic Prpearation Leach		__ 1312	
Paint Filter		9095A	

Other: **Method:**

Other: **Method**

Recra LabNet Philadelphia
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.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 12/21/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0WN21	% Solids	96.4	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-002	B0WN22	% Solids	95.9	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/21/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	99LVI088-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 12/21/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	B0WN22	Soluble Chromium VI	3.9	0.42u	4.2	91.7	1.0
		Insoluble Chromium VI	1140	0.42u	1180	96.8	100
BLANK10	99LVI088-MB1	Soluble Chromium VI	4.0	0.40u	4.0	99.8	1.0
		Insoluble Chromium VI	1090	0.40u	1160	93.8	100

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 12/21/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9912L926

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0WN21	% Solids	96.4	96.4	0.052	1.0
-002REP	B0WN22	Chromium VI	0.42u	0.42u	NC	1.0

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 12/04/99 RFW LOT # :9912L926

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0WN21						
% SOLIDS	001	S	99L%S162	12/02/99	12/09/99	12/10/99
% SOLIDS	001 REP	S	99L%S162	12/02/99	12/09/99	12/10/99
CHROMIUM VI	001	S	99LVI088	12/02/99	12/13/99	12/14/99
B0WN22						
% SOLIDS	002	S	99L%S162	12/02/99	12/09/99	12/10/99
CHROMIUM VI	002	S	99LVI088	12/02/99	12/13/99	12/14/99
CHROMIUM VI	002 REP	S	99LVI088	12/02/99	12/13/99	12/14/99
CHROMIUM VI	002 MS	S	99LVI088	12/02/99	12/13/99	12/14/99
CHROMIUM VI	002 MSD	S	99LVI088	12/02/99	12/13/99	12/14/99

LAB QC:

CHROMIUM VI	MB1	S	99LVI088	N/A	12/13/99	12/14/99
CHROMIUM VI	MB1 BS	S	99LVI088	N/A	12/13/99	12/14/99
CHROMIUM VI	MB1 BSD	S	99LVI088	N/A	12/13/99	12/14/99

RECRA LabNet Use Only

99121926

Custody Transfer Record/Lab Work Request

Page 1 of 1

A11

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

Client: TNU-Hanford B99-078

Est. Final Proj. Sampling Date:

Project #: 10985-001-001-9999-00

Project Contact/Phone #:

RECRA Project Manager: OJ

QC: Spec Del: std TAT: 30 day

Date Rec'd: 12/4/99 Date Due: 1/3/00

Account #:

Refrigerator #								3-1									
#/Type Container	Liquid																
	Solid							1g-1									
Volume	Liquid																
	Solid							250-1									
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb				Metal	CN							
		RECRA LabNet Use Only															
								CR6	*								

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
TL - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	CR6	*
001	BØWN21			S	12/2/99	1000	✓	✓
002	BØWN22			S	12/2/99	1015	✓	✓

Special Instructions:

saf# B99-078

COMPOSITE WASTE

DATE/REVISIONS:

1. * As, Ba, Cd, Cr, Pb, Se, Ag, Sb,
2. Be, Cu, Ni, Tl, V, Zn, Hg.
3.
4.
5.
6. Run matrix QC

RECRA LabNet Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___

Airbill # *

2) Ambient or Chilled

3) Received in Good Condition (Y) or N

4) Labels Indicate Properly Preserved (Y) or N

5) Received Within Holding Times (Y) or N

COC Tape was: 1) Present on Outer Package (Y) or N

2) Unbroken on Outer Package (Y) or N

3) Present on Sample (Y) or N

4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Cooler Temp. 4.3 °C

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES: * 42357953 2465

Relinquished by	Received by	Date	Time
FedEx	Jenson	12/4/99	1000
		12/4/99	

Relinquished by	Received by	Date	Time
ORIGINAL			
REWRITTEN			

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B99-078-150
Collector: Bowers/Trice / Cearlock	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: ~~200 B pond~~ B8757	SAF No.: B99-078	Air Quality ☐
Ice Chest No.: SML 443	Field Logbook No.: EL-1511-1 — COA: B20CW1671C	Method of Shipment: Fed Ex	
Shipped To: ~~TMA~~/RECRA	Offsite Property No.: A000055	Bill of Lading/Air Bill No.: 42357953 2465	

BJB 12-2-99

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS

Preservation				Cool 4C	None								
Type of Container				aG	aG								
No. of Container(s)				1	1								
Volume				250mL	250mL								
SAMPLE ANALYSIS				See item (1) in Special Instructions.	See item (2) in Special Instructions								
Sample No.	Matrix *	Sample Date	Sample Time										
~~BOXN21~~ BOWN21	Soil	12/2/99	1000	X					RAT 12-2-99	~~BOXN27~~	BOWN27		
~~BOXN22~~ BOWN22	Soil	12/2/99	1015	X						~~BOXN27~~	BOWN27		
RAT 12-02-99									RAT 12-02-99				

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By: Chris Cearlock	12/2/99 1155	Received By: Doug Bowers	12-2-99/1155
Relinquished By: Doug Bowers	12-2-99/1530	Received By: RJ 1A	12-2-99/1530
Relinquished By: RJ 1A	12-3-99/0700	Received By: R. Thoren	12-3-99/0700
Relinquished By: R. Thoren	12-3-99/1430	Received By: FEDEX	
Relinquished By: FedEx		Received By: Johnson	12/4/99 1000
Relinquished By:		Received By:	

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Copper, Nickel, Thallium, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)