

Thermo Retec  
W.O. No. N9-10-181-7255

Bechtel Hanford Inc.  
SDG H0588

Case Narrative

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RECEIVED  
MAR 20 2000

## 1.0 GENERAL

### EDMC

Bechtel Hanford Inc. (BHI) Sample Delivery Group H0588 was composed of three 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. Results were transmitted to BHI via facsimile on January 12, 2000. This data report replaces the data report sent to BHI on January 18, 2000.

## 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. The Total Uranium results were reported on November 27, 1999 via facsimile.

### 2.4 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses. BHI requested sample B0WMX1 (7255-01) be analyzed for Isotopic Uranium on January 11, 2000.

### 2.5 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

### 2.6 Americium-241 Analyses

Sample B0WMX3 (7255-03) had a yield of 7%, below the acceptable lower protocol limit of 20%. The sample was reworked, but the yield (3%) on the rework was not improved. The sample was reanalyzed with new QC samples. The sample results for the reanalysis of sample B0WMX3 and its associated QC are reported in this data report. No other problems were encountered during the course of the analyses.

### 2.7 Gamma Spec Analyses

No problems were encountered during the course of the analyses.



**TMA/RICHMOND**  
 SAMPLE DELIVERY GROUP H0588

SDG 7255  
 Contact Melissa C. Mannion

**SAMPLE SUMMARY**

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB		CHAIN OF CUSTODY	COLLECTED
				SAMPLE ID	SAF NO		
B0WMX1	200 B Pond	SOLID		N910181-01	B99-078	B99-78-144	10/20/99 09:07
B0WMX2	200 B Pond	SOLID		N910181-02	B99-078	B99-78-144	10/20/99 09:12
B0WMX3	200 B Pond	SOLID		N910181-03	B99-078	B99-78-144	10/20/99 09:30
Method Blank		SOLID		N910181-05	B99-078		
Method Blank		SOLID		N910181-08	B99-078		
Method Blank		SOLID		N910181-11	B99-078		
Lab Control Sample		SOLID		N910181-04	B99-078		
Lab Control Sample		SOLID		N910181-07	B99-078		
Lab Control Sample		SOLID		N910181-10	B99-078		
Duplicate (N910181-01)	200 B Pond	SOLID		N910181-06	B99-078		10/20/99 09:07
Duplicate (N910181-01)	200 B Pond	SOLID		N910181-09	B99-078		10/20/99 09:07
Duplicate (N910181-03)	200 B Pond	SOLID		N910181-12	B99-078		10/20/99 09:30

SAMPLE SUMMARY

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Lab id TMANC  
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

SDG 7255  
 Contact Melissa C. Mannion

QC SUMMARY

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

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
7255	B99-78-144	BOWMX1	SOLID	90.4			10/22/99	2	N910181-01	7255-001
		BOWMX2	SOLID	95.5			10/22/99	2	N910181-02	7255-002
		BOWMX3	SOLID	94.8			10/22/99	2	N910181-03	7255-003
		Method Blank	SOLID						N910181-05	7255-005
		Method Blank	SOLID						N910181-08	7255-008
		Method Blank	SOLID						N910181-11	7255-011
		Lab Control Sample	SOLID						N910181-04	7255-004
		Lab Control Sample	SOLID						N910181-07	7255-007
		Lab Control Sample	SOLID						N910181-10	7255-010
		Duplicate (N910181-01)	SOLID				10/22/99	2	N910181-06	7255-006
		Duplicate (N910181-01)	SOLID				10/22/99	2	N910181-09	7255-009
		Duplicate (N910181-03)	SOLID				10/22/99	2	N910181-12	7255-012

QC SUMMARY

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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

SDG 7255  
 Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED			QUALI- FIERS	
			BATCH	2σ %	CLIENT	MORE	RE BLANK		LCS
<b>Alpha Spectroscopy</b>									
AM	SOLID	Americium 241 in Soil	6904-166	5.0	3		2	2	2/2
PU	SOLID	Plutonium, Isotopic in Solids	6904-166	5.0	3		1	1	1/1
TH	SOLID	Thorium, Isotopic in Soil	6904-166	5.0	3		1	1	1/1
U	SOLID	Uranium, Isotopic in Soil	6904-166	5.0	1		1	1	1/1
<b>Beta Counting</b>									
SR	SOLID	Total Strontium in Soil	6904-166	10.0	3		1	1	1/1
<b>Gamma Spectroscopy</b>									
GAM	SOLID	Gamma Scan	6904-166	15.0	3	•	1	1	1/1
<b>Kinetic Phosphorimetry</b>									
U_T	SOLID	Uranium, Total in Soil	6904-166	9.0	3		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  
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**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0588

**WORK SUMMARY**

SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	SUP-							
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
B0WMX1		N910181-01	7255-001	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
200 B Pond	SOLID	10/20/99	7255-001	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
B99-78-144	B99-078	10/22/99	7255-001	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-001	SR		12/16/99	01/12/00	MCM	Total Strontium in Soil	
			7255-001	TH		01/04/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-001	U		01/16/00	01/18/00	MCM	Uranium, Isotopic in Soil	
			7255-001	U_T		11/08/99	01/12/00	MCM	Uranium, Total in Soil	
B0WMX2		N910181-02	7255-002	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
200 B Pond	SOLID	10/20/99	7255-002	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
B99-78-144	B99-078	10/22/99	7255-002	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-002	SR		12/20/99	01/12/00	MCM	Total Strontium in Soil	
			7255-002	TH		01/03/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-002	U_T		11/08/99	01/12/00	MCM	Uranium, Total in Soil	
B0WMX3		N910181-03	7255-003	AM	A1	01/23/00	01/28/00	MCM	Americium 241 in Soil	
200 B Pond	SOLID	10/20/99	7255-003	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
B99-78-144	B99-078	10/22/99	7255-003	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-003	SR		12/16/99	01/12/00	MCM	Total Strontium in Soil	
			7255-003	TH		01/03/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-003	U_T		11/08/99	01/12/00	MCM	Uranium, Total in Soil	
Method Blank		N910181-05	7255-005	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
	SOLID		7255-005	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
	B99-078		7255-005	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-005	SR		12/13/99	01/12/00	MCM	Total Strontium in Soil	
			7255-005	TH		01/03/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-005	U		01/16/00	01/18/00	MCM	Uranium, Isotopic in Soil	
Method Blank		N910181-08	7255-008	U_T		12/08/99	01/12/00	MCM	Uranium, Total in Soil	
	SOLID									
	B99-078									
Method Blank		N910181-11	7255-011	AM		01/23/00	01/28/00	MCM	Americium 241 in Soil	
	SOLID									
	B99-078									

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**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0588

SDG 7255  
 Contact Melissa C. Mannion

**WORK SUMMARY, cont.**

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	SUP-							
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
Lab Control Sample		N910181-04	7255-004	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
	SOLID		7255-004	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
	B99-078		7255-004	PU		12/14/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-004	SR		12/13/99	01/12/00	MCM	Total Strontium in Soil	
			7255-004	TH		01/03/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-004	U		01/16/00	01/18/00	MCM	Uranium, Isotopic in Soil	
Lab Control Sample		N910181-07	7255-007	U_T		11/08/99	01/12/00	MCM	Uranium, Total in Soil	
	SOLID									
	B99-078									
Lab Control Sample		N910181-10	7255-010	AM		01/25/00	01/28/00	MCM	Americium 241 in Soil	
	SOLID									
	B99-078									
Duplicate (N910181-01)		N910181-06	7255-006	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
200 B Pond	SOLID	10/20/99	7255-006	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
	B99-078	10/22/99	7255-006	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-006	SR		12/13/99	01/12/00	MCM	Total Strontium in Soil	
			7255-006	TH		01/12/00	01/18/00	MCM	Thorium, Isotopic in Soil	
			7255-006	U		01/16/00	01/18/00	MCM	Uranium, Isotopic in Soil	
Duplicate (N910181-01)		N910181-09	7255-009	U_T		11/08/99	01/12/00	MCM	Uranium, Total in Soil	
200 B Pond	SOLID	10/20/99								
	B99-078	10/22/99								
Duplicate (N910181-03)		N910181-12	7255-012	AM		01/23/00	01/28/00	MCM	Americium 241 in Soil	
200 B Pond	SOLID	10/20/99								
	B99-078	10/22/99								

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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

SDG 7255  
 Contact Melissa C. Mannion

WORK SUMMARY, cont.

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

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	3			2	2	2	9
GAM	B99-078	Gamma Scan	GAMMAHI	3			1	1	1	6
PU	B99-078	Plutonium, Isotopic in Solids	PUPLATE	3			1	1	1	6
SR	B99-078	Total Strontium in Soil	SRTOTAL	3			1	1	1	6
TH	B99-078	Thorium, Isotopic in Soil	THPLATE	3			1	1	1	6
U	B99-078	Uranium, Isotopic in Soil	UPLATE	1			1	1	1	4
U_T	B99-078	Uranium, Total in Soil	UKPA	3			1	1	1	6
<b>TOTALS</b>				<b>19</b>			<b>8</b>	<b>8</b>	<b>8</b>	<b>43</b>

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 Protocol Hanford  
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 Form DVD-CWS  
 Version 3.06  
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**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0588**

N910181-05

Method Blank

**METHOD BLANK**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-05</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7255-005</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-078</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233	U-233/234	-0.006	0.011	0.026	1.0	U	U
Uranium 235	15117-96-1	-0.003	0.007	0.016	1.0	U	U
Uranium 238	U-238	0.001	0.006	0.011	1.0	U	U
Plutonium 238	13981-16-3	-0.004	0.016	0.037	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.016	0.037	1.0	U	PU
Americium 241	14596-10-2	0	0.021	0.051	1.0	U	AM
Total Strontium	SR-RAD	-0.096	0.14	0.19	1.0	U	SR
Thorium 228	14274-82-9	-0.075	0.11	0.29	1.0	U	TH
Thorium 230	14269-63-7	0.056	0.15	0.18	1.0	U	TH
Thorium 232	TH-232	0.019	0.037	0.14	1.0	U	TH
Potassium 40	13966-00-2	U		0.26		U	GAM
Cobalt 60	10198-40-0	U		0.016	0.050	U	GAM
Cesium 137	10045-97-3	U		0.016	0.10	U	GAM
Europium 152	14683-23-9	U		0.036	0.10	U	GAM
Europium 154	15585-10-1	U		0.039	0.10	U	GAM
Europium 155	14391-16-3	U		0.047	0.10	U	GAM
Radium 226	13982-63-3	U		0.028	0.10	U	GAM
Radium 228	15262-20-1	U		0.062	0.20	U	GAM
Thorium 228	14274-82-9	U		0.022		U	GAM
Thorium 232	TH-232	U		0.062		U	GAM
Americium 241	14596-10-2	U		0.12		U	GAM
Uranium 238	U-238	U		2.0		U	GAM
Uranium 235	15117-96-1	U		0.060		U	GAM

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

QC-BLANK 32637

**METHOD BLANKS**

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-DS  
Version 3.06  
Report date 01/28/00

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0588

N910181-08

Method Blank

METHOD BLANK

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-08</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7255-008</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-078</u>	

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	-0.002	0.002	0.004	1.0	U	U_T

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

QC-BLANK 32306
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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>01/28/00</u>

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0588

N910181-11

Method Blank

METHOD BLANK

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	<u>SDG H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-11</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7255-011</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B99-078</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Americium 241	14596-10-2	0	0.014	0.028	1.0	U	AM

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

QC-BLANK 33169

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>01/28/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

N910181-04

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	<u>SDG H0588</u>
Contact <u>Melissa C. Mannion</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-04</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7255-004</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-078</u>	

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
Uranium 233	4.61	0.20	0.093	1.0		U	4.64	0.19	99	88-112	80-120
Uranium 235	3.68	0.18	0.010	1.0		U	3.77	0.15	98	88-112	80-120
Uranium 238	4.81	0.21	0.087	1.0		U	5.04	0.20	95	89-111	80-120
Plutonium 238	9.83	0.57	0.045	1.0		PU	10.0	0.40	98	87-113	80-120
Plutonium 239/240	10.2	0.59	0.027	1.0		PU	10.6	0.42	96	87-113	80-120
Americium 241	7.85	0.63	0.034	1.0		AM	9.58	0.38	<u>82</u>	87-113	80-120
Total Strontium	10.9	0.36	0.16	1.0		SR	11.3	0.45	96	84-116	
Thorium 228	-0.063	0.13	0.27	1.0	U	TH					
Thorium 230	20.9	1.6	0.19	1.0		TH	20.4	0.82	102	85-115	
Thorium 232	0.031	0.063	0.12	1.0	U	TH					
Potassium 40	U		0.11		U	GAM					
Cobalt 60	0.372	0.027	0.010	0.050		GAM	0.412	0.016	90	77-123	80-120
Cesium 137	0.421	0.025	0.018	0.10		GAM	0.432	0.017	97	76-124	80-120
Europium 152	U		0.036	0.10	U	GAM					
Europium 154	U		0.033	0.10	U	GAM					
Europium 155	U		0.023	0.10	U	GAM					
Radium 226	U		0.024	0.10	U	GAM					
Radium 228	U		0.066	0.20	U	GAM					
Thorium 228	U		0.017		U	GAM					
Thorium 232	U		0.066		U	GAM					
Americium 241	U		0.024		U	GAM					
Uranium 238	U		2.1		U	GAM					
Uranium 235	U		0.036		U	GAM					

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

QC-LCS 32636

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>01/28/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

N910181-07

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	<u>SDG H0588</u>
Contact <u>Melissa C. Mannion</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-07</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7255-007</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-078</u>	

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	RBC %	3σ LMITS (TOTAL)	PROTOCOL LIMITS
Total Uranium (ug/g)	34.6	4.2	0.041	1.0		U_T	37.2	1.5	93	78-122	80-120

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

QC-LCS 32305
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LAB CONTROL SAMPLES

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>01/28/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

N910181-10

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	<u>SDG H0588</u>
Contact <u>Melissa C. Mannion</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-10</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7255-010</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-078</u>	

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
Americium 241	9.10	1.3	0.19	1.0		AM	9.58	0.38	95	78-122	80-120

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

QC-LCS 33168
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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>01/28/00</u>

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0588

N910181-06

BOWMX1

**DUPLICATE**

SDG <u>7255</u> Contact <u>Melissa C. Mannion</u> Lab sample id <u>N910181-06</u> Dept sample id <u>7255-006</u>	Client/Case no <u>Hanford</u> SDG <u>H0588</u> Case no <u>TRB-SBB-207925</u> Lab sample id <u>N910181-01</u> ORIGINAL Dept sample id <u>7255-001</u> Received <u>10/22/99</u> % solids <u>90.4</u>
DUPLICATE	ORIGINAL
Lab sample id <u>N910181-06</u> Dept sample id <u>7255-006</u>	Lab sample id <u>N910181-01</u> Dept sample id <u>7255-001</u> Received <u>10/22/99</u> % solids <u>90.4</u>
Client sample id <u>BOWMX1</u> Location/Matrix <u>200 B Pond</u> SOLID	Client sample id <u>BOWMX1</u> Location/Matrix <u>200 B Pond</u> SOLID Collected <u>10/20/99 09:07</u> Custody/SAF No <u>B99-78-144</u> <u>B99-078</u>

ANALYTE	DUPLICATE		MDA	RDL	QUALI- FIERS	TEST	ORIGINAL		MDA	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
	pCi/g	2σ ERR (COUNT)					pCi/g	pCi/g					
Uranium 233	0.638	0.061	0.024	1.0	J	U	0.567	0.054	0.014	J	12	23	
Uranium 235	0.033	0.014	0.011	1.0	J	U	0.036	0.014	0.011	J	9	87	
Uranium 238	0.585	0.056	0.013	1.0	J	U	0.559	0.054	0.014	J	5	23	
Plutonium 238	0	0.014	0.038	1.0	U	PU	-0.004	0.014	0.039	U	-	-	
Plutonium 239/240	0.044	0.028	0.026	1.0	J	PU	0.085	0.036	0.027	J	64	107	
Americium 241	0.077	0.037	0.035	1.0	J	AM	0.075	0.040	0.044	J	3	108	
Total Strontium	9.85	0.54	0.24	1.0		SR	9.79	0.53	0.22		1	24	
Thorium 228	0.468	0.22	0.26	1.0	J	TH	0.562	0.22	0.24	J	18	91	
Thorium 230	0.860	0.25	0.21	1.0	J	TH	0.498	0.19	0.19	J	53	70	
Thorium 232	0.568	0.19	0.12	1.0	J	TH	0.581	0.17	0.091	J	2	67	
Potassium 40	14.8	0.88	0.27			GAM	15.0	0.90	0.45		1	34	
Cobalt 60	U		0.029	0.050	U	GAM	U		0.056	U	-	-	
Cesium 137	203	0.50	0.11	0.10		GAM	188	0.70	0.17		8	32	
Europium 152	U		0.37	0.10	U	GAM	U		0.65	U	-	-	
Europium 154	U		0.099	0.10	U	GAM	U		0.17	U	-	-	
Europium 155	U		0.23	0.10	U	GAM	U		0.38	U	-	-	
Radium 226	0.696	0.11	0.14	0.10		GAM	0.762	0.23	0.28		9	61	
Radium 228	0.873	0.13	0.13	0.20		GAM	0.906	0.22	0.22		4	54	
Thorium 228	0.820	0.14	0.19			GAM	0.902	0.24	0.31		10	58	
Thorium 232	0.873	0.13	0.13			GAM	0.906	0.22	0.22		4	54	
Americium 241	U		0.11		U	GAM	U		0.22	U	-	-	
Uranium 238	U		3.4		U	GAM	U		5.8	U	-	-	
Uranium 235	U		0.40		U	GAM	U		0.62	U	-	-	

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

QC-DUP#1 32638

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-DUP  
 Version 3.06  
 Report date 01/28/00

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0588

N910181-09

BOWMX1

**DUPLICATE**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Case no <u>TRB-SBB-207925</u>	
<b>DUPLICATE</b>	<b>ORIGINAL</b>	
Lab sample id <u>N910181-09</u>	Lab sample id <u>N910181-01</u>	Client sample id <u>BOWMX1</u>
Dept sample id <u>7255-009</u>	Dept sample id <u>7255-001</u>	Location/Matrix <u>200 B Pond</u> <u>SOLID</u>
	Received <u>10/22/99</u>	Collected <u>10/20/99 09:07</u>
	% solids <u>90.4</u>	Custody/SAP No <u>B99-78-144</u> <u>B99-078</u>

ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI-	ORIGINAL	2σ ERR	MDA	QUALI-	RPD	3σ	PROT
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS	pCi/g	(COUNT)	pCi/g	FIERS	%	TOT	LIMIT
Total Uranium (ug/g)	1.05	0.12	0.004	1.0	U_T	1.04	0.12	0.004		1	31	

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

QC-DUP#1 32307

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>01/28/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

N910181-12

B0WMX3

DUPLICATE

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	<u>SDG H0588</u>
Contact <u>Melissa C. Mannion</u>	Case no <u>TRB-SBB-207925</u>	
<b>DUPLICATE</b>	<b>ORIGINAL</b>	
Lab sample id <u>N910181-12</u>	Lab sample id <u>N910181-03</u>	Client sample id <u>B0WMX3</u>
Dept sample id <u>7255-012</u>	Dept sample id <u>7255-003</u>	Location/Matrix <u>200 B Pond</u>
	Received <u>10/22/99</u>	<u>SOLID</u>
	% solids <u>94.8</u>	Collected <u>10/20/99 09:30</u>
		Custody/SAF No <u>B99-78-144</u> <u>B99-078</u>

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
Americium 241	0.011	0.022	0.034	1.0	U	AM	0.028	0.022	0.031	U	-		

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

QC-DUP#3A1 33170

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>01/28/00</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0588**

N910181-01

B0WMX1

**DATA SHEET**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-01</u>	Client sample id <u>B0WMX1</u>	
Dept sample id <u>7255-001</u>	Location/Matrix <u>200 B Pond</u>	<u>SOLID</u>
Received <u>10/22/99</u>	Collected <u>10/20/99 09:07</u>	
% solids <u>90.4</u>	Custody/SAF No <u>B99-78-144</u>	<u>B99-078</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233	U-233/234	0.567	0.054	0.014	1.0	J	U
Uranium 235	15117-96-1	0.036	0.014	0.011	1.0	J	U
Uranium 238	U-238	0.559	0.054	0.014	1.0	J	U
Total Uranium (ug/g)	7440-61-1	1.04	0.12	0.004	1.0		U_T
Plutonium 238	13981-16-3	-0.004	0.014	0.039	1.0	U	PU
Plutonium 239/240	PU-239/240	0.085	0.036	0.027	1.0	J	PU
Americium 241	14596-10-2	0.075	0.040	0.044	1.0	J	AM
Total Strontium	SR-RAD	9.79	0.53	0.22	1.0		SR
Thorium 228	14274-82-9	0.562	0.22	0.24	1.0	J	TH
Thorium 230	14269-63-7	0.498	0.19	0.19	1.0	J	TH
Thorium 232	TH-232	0.581	0.17	0.091	1.0	J	TH
Potassium 40	13966-00-2	15.0	0.90	0.45			GAM
Cobalt 60	10198-40-0	U		<u>0.056</u>	0.050	U	GAM
Cesium 137	10045-97-3	188	0.70	<u>0.17</u>	0.10		GAM
Europium 152	14683-23-9	U		<u>0.65</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.17</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.38</u>	0.10	U	GAM
Radium 226	13982-63-3	0.762	0.23	<u>0.28</u>	0.10		GAM
Radium 228	15262-20-1	0.906	0.22	<u>0.22</u>	0.20		GAM
Thorium 228	14274-82-9	0.902	0.24	0.31			GAM
Thorium 232	TH-232	0.906	0.22	0.22			GAM
Americium 241	14596-10-2	U		0.22		U	GAM
Uranium 238	U-238	U		5.8		U	GAM
Uranium 235	15117-96-1	U		0.62		U	GAM

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

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>01/28/00</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0588**

N910181-02

BOWMX2

**DATA SHEET**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-02</u>	Client sample id <u>BOWMX2</u>	
Dept sample id <u>7255-002</u>	Location/Matrix <u>200 B Pond</u>	<u>SOLID</u>
Received <u>10/22/99</u>	Collected <u>10/20/99 09:12</u>	
‡ solids <u>95.5</u>	Custody/SAF No <u>B99-78-144</u>	<u>B99-078</u>

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	0.589	0.068	0.004	1.0	J	U_T
Plutonium 238	13981-16-3	-0.004	0.023	0.046	1.0	U	PU
Plutonium 239/240	PU-239/240	0.015	0.023	0.036	1.0	U	PU
Americium 241	14596-10-2	0.021	0.032	0.041	1.0	U	AM
Total Strontium	SR-RAD	0.524	0.099	0.11	1.0	J	SR
Thorium 228	14274-82-9	0.669	0.28	0.32	1.0	J	TH
Thorium 230	14269-63-7	0.548	0.24	0.22	1.0	J	TH
Thorium 232	TH-232	0.548	0.20	0.15	1.0	J	TH
Potassium 40	13966-00-2	14.4	0.88	0.44			GAM
Cobalt 60	10198-40-0	U		0.040	0.050	U	GAM
Cesium 137	10045-97-3	31.7	0.29	<u>0.11</u>	0.10		GAM
Europium 152	14683-23-9	U		<u>0.29</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.13</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.21</u>	0.10	U	GAM
Radium 226	13982-63-3	0.645	0.14	<u>0.17</u>	0.10		GAM
Radium 228	15262-20-1	0.904	0.17	0.17	0.20		GAM
Thorium 228	14274-82-9	1.10	0.15	0.17			GAM
Thorium 232	TH-232	0.904	0.17	0.17			GAM
Americium 241	14596-10-2	U		0.29		U	GAM
Uranium 238	U-238	U		4.8		U	GAM
Uranium 235	15117-96-1	U		0.31		U	GAM

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

DATA SHEETS

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SUMMARY DATA SECTION

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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>01/28/00</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0588**

N910181-03

BOWMX3

**DATA SHEET**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-03</u>	Client sample id <u>BOWMX3</u>	
Dept sample id <u>7255-003</u>	Location/Matrix <u>200 B Pond</u>	<u>SOLID</u>
Received <u>10/22/99</u>	Collected <u>10/20/99 09:30</u>	
% solids <u>94.8</u>	Custody/SAF No <u>B99-78-144</u>	<u>B99-078</u>

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	0.654	0.076	0.004	1.0	J	U_T
Plutonium 238	13981-16-3	0.004	0.017	0.041	1.0	U	PU
Plutonium 239/240	PU-239/240	0.013	0.017	0.033	1.0	U	PU
Americium 241	14596-10-2	0.028	0.022	0.031	1.0	U	AM
Total Strontium	SR-RAD	0.727	0.13	0.15	1.0	J	SR
Thorium 228	14274-82-9	0.468	0.24	0.30	1.0	J	TH
Thorium 230	14269-63-7	0.570	0.21	0.18	1.0	J	TH
Thorium 232	TH-232	0.435	0.15	0.11	1.0	J	TH
Potassium 40	13966-00-2	13.8	0.53	0.22			GAM
Cobalt 60	10198-40-0	U		0.022	0.050	U	GAM
Cesium 137	10045-97-3	20.2	0.14	0.041	0.10		GAM
Europium 152	14683-23-9	U		<u>0.13</u>	0.10	U	GAM
Europium 154	15585-10-1	U		0.079	0.10	U	GAM
Europium 155	14391-16-3	U		0.097	0.10	U	GAM
Radium 226	13982-63-3	0.561	0.064	0.070	0.10		GAM
Radium 228	15262-20-1	0.872	0.096	0.090	0.20		GAM
Thorium 228	14274-82-9	0.767	0.048	0.064			GAM
Thorium 232	TH-232	0.872	0.096	0.090			GAM
Americium 241	14596-10-2	U		0.12		U	GAM
Uranium 238	U-238	U		2.9		U	GAM
Uranium 235	15117-96-1	U		0.15		U	GAM

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

DATA SHEETS

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SUMMARY DATA SECTION

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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>01/28/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

METHOD SUMMARY

AMERICIUM 241 IN SOIL  
ALPHA SPECTROSCOPY

Test AM Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Americium 241
Preparation batch 6904-166				
BOWMX1	N910181-01	7255-001		0.075 J
BOWMX2	N910181-02	7255-002		U
BOWMX3	N910181-03	A1 7255-003		U
BLK (QC ID=32637)	N910181-05	7255-005		U
BLK (QC ID=33169)	N910181-11	7255-011		U
LCS (QC ID=32636)	N910181-04	7255-004		LOW
LCS (QC ID=33168)	N910181-10	7255-010		ok
Duplicate (N910181-01)	N910181-06	7255-006		ok J
Duplicate (N910181-03)	N910181-12	7255-012		- 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	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 166															
BOWMX1	N910181-01			0.044	0.500			79		762			56	12/15/99	12/15 SS-008
BOWMX2	N910181-02			0.041	0.500			59		760			56	12/15/99	12/15 SS-009
BOWMX3	N910181-03	A1		0.031	0.500			56		1625			95	01/22/00	01/23 SS-001
BLK (QC ID=32637)	N910181-05			0.051	0.500			58		760				12/15/99	12/15 SS-011
BLK (QC ID=33169)	N910181-11			0.028	0.500			68		1625				01/22/00	01/23 SS-015
LCS (QC ID=32636)	N910181-04			0.034	0.500			68		762				12/15/99	12/15 SS-005
LCS (QC ID=33168)	N910181-10			0.19	0.500			75		2078				01/22/00	01/25 SS-051
Duplicate (N910181-01) (QC ID=32638)	N910181-06			0.035	0.500			85		760			56	12/15/99	12/15 SS-012
Duplicate (N910181-03) (QC ID=33170)	N910181-12			0.034	0.500			55		1625			95	01/22/00	01/23 SS-016
Nominal values and limits from method 1.0 0.500 20-105 700 100 180															

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 01/28/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

Test AM Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

METHOD SUMMARY, cont.

AMERICIUM 241 IN SOIL  
ALPHA SPECTROSCOPY

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

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	<u>0.054</u> ± <u>0.10</u>
FOR 9 SAMPLES	YIELD	<u>67</u> ± <u>22</u>

Lab id	<u>TMANC</u>
Protocol	<u>Hanford</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-CMS</u>
Version	<u>3.06</u>
Report date	<u>01/28/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

Test PU Matrix SOLID  
 SDG 7255  
 Contact Melissa C. Mannion

METHOD SUMMARY  
 PLUTONIUM, ISOTOPIC IN SOLIDS  
 ALPHA SPECTROSCOPY

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Plutonium 238 PLANCHET	Plutonium 239/240
Preparation batch 6904-166					
BOWMX1	N910181-01			7255-001 U	0.085 J
BOWMX2	N910181-02			7255-002 U	U
BOWMX3	N910181-03			7255-003 U	U
BLK (QC ID=32637)	N910181-05			7255-005 U	U
LCS (QC ID=32636)	N910181-04			7255-004 ok	ok
Duplicate (N910181-01)	N910181-06			7255-006 - U	ok J
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	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 166															
BOWMX1	N910181-01			0.039	0.500			89		760			56	12/14/99	12/15 SS-013
BOWMX2	N910181-02			0.046	0.500			82		760			56	12/14/99	12/15 SS-014
BOWMX3	N910181-03			0.041	0.500			75		760			56	12/14/99	12/15 SS-015
BLK (QC ID=32637)	N910181-05			0.037	0.500			81		760				12/14/99	12/15 SS-016
LCS (QC ID=32636)	N910181-04			0.045	0.500			100		1066				12/14/99	12/14 SS-044
Duplicate (N910181-01)	N910181-06			0.038	0.500			97		726			56	12/14/99	12/15 SS-058
(QC ID=32638)															
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 <u>0.041</u> ± <u>0.007</u>
FOR 6 SAMPLES	YIELD <u>87</u> ± <u>20</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test TH Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Thorium 228	Thorium 230	Thorium 232
Preparation batch 6904-166							
BOWMX1	N910181-01	7255-001			0.562 J	0.498 J	0.581 J
BOWMX2	N910181-02	7255-002			0.669 J	0.548 J	0.548 J
BOWMX3	N910181-03	7255-003			0.468 J	0.570 J	0.435 J
BLK (QC ID=32637)	N910181-05	7255-005			U	U	U
LCS (QC ID=32636)	N910181-04	7255-004			No data U	ok	No data U
Duplicate (N910181-01)	N910181-06	7255-006			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 %	EPF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 166															
BOWMX1	N910181-01			0.24	0.250			58	665				76	12/30/99	01/04 SS-032
BOWMX2	N910181-02			0.32	0.250			55	431				75	12/30/99	01/03 SS-032
BOWMX3	N910181-03			0.30	0.250			72	431				75	12/30/99	01/03 SS-033
BLK (QC ID=32637)	N910181-05			0.29	0.250			59	442					12/18/99	01/03 SS-027
LCS (QC ID=32636)	N910181-04			0.27	0.250			69	431					12/18/99	01/03 SS-034
Duplicate (N910181-01)	N910181-06			0.26	0.250			55	573				84	12/30/99	01/12 SS-027
(QC ID=32638)															
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	<u>0.28</u>	±	<u>0.058</u>
FOR 6 SAMPLES	YIELD	<u>61</u>	±	<u>15</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

METHOD SUMMARY

URANIUM, ISOTOPIIC IN SOIL  
ALPHA SPECTROSCOPY

Test U Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX PLANCHET	1: Uranium			2: Uranium			3: Uranium			RESULT RATIOS (%)				
			233	235	238	1+3	2σ	2+3	2σ							
Preparation batch 6904-166																
B0WMX1	N910181-01	7255-001	0.567 J	0.036 J	0.559 J	101	14	6	3							
BLK (QC ID=32637)	N910181-05	7255-005	U	U	U											
LCS (QC ID=32636)	N910181-04	7255-004	ok	ok	ok											
Duplicate (N910181-01)	N910181-06	7255-006	ok J	ok J	ok J	109	15	6	2							
Nominal values and limits from method			RDLs (pCi/g)	1.0	1.0	1.0	100	4								
200 Area Source Chara.- 200-CW-1 OU						Averages	105	6								

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL-		
													PREPARED	YZED DETECTOR	
Preparation batch 6904-166													2σ prep error	5.0 %	Reference Lab Notebook 6904 pg. 166
B0WMX1	N910181-01		0.014	1.00			101	1049			88	01/13/00	01/16	SS-027	
BLK (QC ID=32637)	N910181-05		0.026	1.00			77	1048				01/14/00	01/16	SS-031	
LCS (QC ID=32636)	N910181-04		0.093	1.00			102	1049				01/14/00	01/16	SS-029	
Duplicate (N910181-01)	N910181-06		0.024	1.00			92	1048			88	01/13/00	01/16	SS-032	
(QC ID=32638)															
Nominal values and limits from method			1.0	1.00			30-105	150	100	180					

PROCEDURES	REFERENCE	UPLATE
EP-060		Soil Preparation, rev 0
EP-070		Soil Dissolution, rev 0
EP-910		Uranium Purification, rev 0
EP-008		Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	<u>0.039 ± 0.072</u>
FOR 4 SAMPLES	YIELD	<u>93 ± 23</u>

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 01/28/00

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0588

**METHOD SUMMARY**

TOTAL STRONTIUM IN SOIL  
BETA COUNTING

Test SR Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Total Strontium
Preparation batch 6904-166				
BOWMX1	N910181-01		7255-001	9.79
BOWMX2	N910181-02		7255-002	0.524 J
BOWMX3	N910181-03		7255-003	0.727 J
BLK (QC ID=32637)	N910181-05		7255-005	U
LCS (QC ID=32636)	N910181-04		7255-004	ok
Duplicate (N910181-01)	N910181-06		7255-006	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 FIX	SUF- pCi/g	MAX MDA	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 10.0 % Reference Lab Notebook 6904 pg. 166															
BOWMX1	N910181-01		0.22	1.00				99	400	57	12/14/99	12/16	GRB-221		
BOWMX2	N910181-02		0.11	1.00				102	200	61	12/14/99	12/20	GRB-230		
BOWMX3	N910181-03		0.15	1.00				98	200	57	12/14/99	12/16	GRB-231		
BLK (QC ID=32637)	N910181-05		0.19	1.00				82	400		12/10/99	12/13	GRB-201		
LCS (QC ID=32636)	N910181-04		0.16	1.00				90	400		12/13/99	12/13	GRB-224		
Duplicate (N910181-01)	N910181-06		0.24	1.00				94	400	54	12/10/99	12/13	GRB-202		
	(QC ID=32638)														

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	MDA	0.18	±	0.096
FOR 6 SAMPLES	YIELD	94	±	15

Lab id	<u>TMANC</u>
Protocol	<u>Hanford</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-CMS</u>
Version	<u>3.06</u>
Report date	<u>01/28/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID  
 SDG 7255  
 Contact Melissa C. Mannion

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUP- FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6904-166						
BOWMX1	N910181-01	7255-001			U	188
BOWMX2	N910181-02	7255-002			U	31.7
BOWMX3	N910181-03	7255-003			U	20.2
BLK (QC ID=32637)	N910181-05	7255-005			U	U
LCS (QC ID=32636)	N910181-04	7255-004			ok	ok
Duplicate (N910181-01)	N910181-06	7255-006			- U	ok
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	SUP- FIX	MAX pCi/g	MDA	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 15.0 % Reference Lab Notebook 6904 pg. 166																
BOWMX1	N910181-01			0.15		597					212			49	11/29/99	12/08 02,01,00
BOWMX2	N910181-02			0.12		570					213			49	11/28/99	12/08 02,03,00
BOWMX3	N910181-03			0.067		633					213			49	11/28/99	12/08 02,04,00
BLK (QC ID=32637)	N910181-05			0.029		597					206				11/27/99	12/08 MB,05,00
LCS (QC ID=32636)	N910181-04			0.036		597					206				11/27/99	12/08 01,04,00
Duplicate (N910181-01)	N910181-06			0.075		597					204			49	11/18/99	12/08 MB,07,00
(QC ID=32638)																
Nominal values and limits from method				0.050		597					100				180	

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

AVERAGES ± 2 SD MDA 0.080 ± 0.095  
 FOR 6 SAMPLES YIELD \_\_\_\_\_ ± \_\_\_\_\_

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 01/28/00

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0588

Test U T Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

**METHOD SUMMARY**  
URANIUM, TOTAL IN SOIL  
KINETIC PHOSPHORIMETRY

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Total Uranium
Preparation batch 6904-166				
BOWMX1	N910181-01	7255-001		1.04
BOWMX2	N910181-02	7255-002		0.589 J
BOWMX3	N910181-03	7255-003		0.654 J
BLK (QC ID=32306)	N910181-08	7255-008		U
LCS (QC ID=32305)	N910181-07	7255-007		ok
Duplicate (N910181-01)	N910181-09	7255-009		ok

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	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 9.0 % Reference Lab Notebook 6904 pg. 166																
BOWMX1	N910181-01			0.004	0.0500								19	11/05/99	11/08	KPA-001
BOWMX2	N910181-02			0.004	0.0500								19	11/05/99	11/08	KPA-001
BOWMX3	N910181-03			0.004	0.0500								19	11/05/99	11/08	KPA-001
BLK (QC ID=32306)	N910181-08			0.004	0.0500								12/05/99	12/08		KPA-001
LCS (QC ID=32305)	N910181-07			0.041	0.0500								11/05/99	11/08		KPA-001
Duplicate (N910181-01)	N910181-09			0.004	0.0500								19	11/05/99	11/08	KPA-001
	(QC ID=32307)															

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 <u>0.010</u> ± <u>0.030</u>
FOR 6 SAMPLES	YIELD _____ ± _____

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 01/28/00

<b>Bechtel Hanford Inc.</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>				B99-078-144		Page 1 of 1	
Collector Bowers/Trice		Company Contact Chris Cearlock		Telephone No. 372-9574		Project Coordinator TRENT, SJ		Price Code 8N	
Project Designation 200 Area Source characterization - 200-CW-1 OU		Sampling Location 200 B pond.		SAF No. B99-078		Data Turnaround <b>45 Days</b>			
Ice Chest No. <i>Shipping van 96.006</i>		Field Logbook No. EL-1511		Method of Shipment FED EX					
Shipped To TMA/RECRA B78 10-20-99 TMA		Offsite Property No. <i>A000001</i>		Bill of Lading/Air Bill No. <i>42357953 0874</i>					
				COA <i>B20CW1 471C</i>					

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	None			
	Type of Container	aG	aG	aG	aG	aG	aG	aG			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage	Volume	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL			

SAMPLE ANALYSIS				Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.		
-----------------	--	--	--	------------------	---	------------------	---------------------------------------	--	---------------------------------------	---------------------------------------	--	--

Sample No.	Matrix *	Sample Date	Sample Time									
BOW MX1	Soil	10/20/99	0907	X						X		BOW8C2
BOW MX2	Soil	10/20/99	0912	X						X		BOW8C2
BOW MX3	Soil	10/20/99	0930	X						X		BOW8C2

CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS See chain of custody comments on SAF B99-078.				Matrix *	
Relinquished By	Date/Time	Received By	Date/Time			(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196 (2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010 (3) 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				Soil Water Vapor Other Solid Other Liquid	
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	Disposal Method	Disposed By								Date/Time	

1 PM  
1974  
17  
15  
10  
10/20/99  
238

Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: Berchtel Hanford Date/Time received 10-22-99 10:00

CoC No. B99-078-144, B99-005-062

Container I.D. No. 96-006 Requested TAT (Days) <sup>15</sup>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: 12

7. Number of containers per sample: \_\_\_\_\_ (Or see CoC ✓)

8. Paperwork agrees with samples? Yes [] No [ ]

9. Samples have: Tape [] Hazard labels [ ] Rad labels [] Appropriate sample labels []

10. Samples are: In good condition [] Leaking [ ] Broken Container [ ] Missing [ ]

11. Describe any anomalies: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

14. Received by J.P. Corso Date: 10-22-99 Time: 10:00

LOGIN

TNU W.O. No. \_\_\_\_\_ Group No. \_\_\_\_\_ Client W.O. No. \_\_\_\_\_

PROGRAM MANAGER

Sample holding times exceeded? Yes [ ] No [ ]

Client Notified: Name \_\_\_\_\_ Date/time \_\_\_\_\_



## 1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H0588 was composed of three 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. Most of the results were transmitted to BHI via facsimile on January 12, 2000. This hard copy is a complete data report for SDG H0588.

## 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. The Total Uranium results were reported on November 27, 1999 via facsimile.

### 2.4 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses. BHI requested sample B0WMX1 (7255-01) be analyzed for Isotopic Uranium on January 11, 2000.

### 2.5 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

### 2.6 Americium-241 Analyses

Sample B0WMX3 (7255-03) had a yield of 7%, below the acceptable lower protocol limit of 20%. The sample was reworked and recounted by the lab, but the yield (3%) on the rework was not improved. The original sample data has been reported. Thermo Retec is reanalyzing sample B0WMX3. No other problems were encountered during the course of the analyses.

### 2.7 Gamma Spec Analyses

No problems were encountered during the course of the analyses.

**TMA/RICHMOND**  
 SAMPLE DELIVERY GROUP H0588

SDG 7255  
 Contact Melissa C. Mannion

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

**SAMPLE SUMMARY**

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
BOWMX1	200 B Pond	SOLID		N910181-01	B99-078	B99-78-144	10/20/99 09:07
BOWMX2	200 B Pond	SOLID		N910181-02	B99-078	B99-78-144	10/20/99 09:12
BOWMX3	200 B Pond	SOLID		N910181-03	B99-078	B99-78-144	10/20/99 09:30
Method Blank		SOLID		N910181-05	B99-078		
Method Blank		SOLID		N910181-08	B99-078		
Lab Control Sample		SOLID		N910181-04	B99-078		
Lab Control Sample		SOLID		N910181-07	B99-078		
Duplicate (N910181-01)	200 B Pond	SOLID		N910181-06	B99-078		10/20/99 09:07
Duplicate (N910181-01)	200 B Pond	SOLID		N910181-09	B99-078		10/20/99 09:07

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 01/18/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

SDG 7255  
 Contact Melissa C. Mannion

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

QC SUMMARY

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
7255	B99-78-144	B0WMX1	SOLID	90.4			10/22/99 2	N910181-01	7255-001
		B0WMX2	SOLID	95.5			10/22/99 2	N910181-02	7255-002
		B0WMX3	SOLID	94.8			10/22/99 2	N910181-03	7255-003
		Method Blank	SOLID					N910181-05	7255-005
		Method Blank	SOLID					N910181-08	7255-008
		Lab Control Sample	SOLID					N910181-04	7255-004
		Lab Control Sample	SOLID					N910181-07	7255-007
		Duplicate (N910181-01)	SOLID				10/22/99 2	N910181-06	7255-006
		Duplicate (N910181-01)	SOLID				10/22/99 2	N910181-09	7255-009

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-QS  
 Version 3.06  
 Report date 01/18/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

SDG 7255  
 Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

TEST MATRIX	METHOD	PREPARATION ERROR BATCH	2σ %	PLANCHETS ANALYZED			QUALI- FIERS	
				CLIENT	MORE	RE BLANK		
<b>Alpha Spectroscopy</b>								
AM	SOLID	Americium 241 in Soil	6904-166	5.0	3	1	1	1/1
PU	SOLID	Plutonium, Isotopic in Solids	6904-166	5.0	3	1	1	1/1
TH	SOLID	Thorium, Isotopic in Soil	6904-166	5.0	3	1	1	1/1
U	SOLID	Uranium, Isotopic in Soil	6904-166	5.0	1	1	1	1/1
<b>Beta Counting</b>								
SR	SOLID	Total Strontium in Soil	6904-166	10.0	3	1	1	1/1
<b>Gamma Spectroscopy</b>								
GAM	SOLID	Gamma Scan	6904-166	15.0	3	1	1	1/1
<b>Kinetic Phosphorimetry</b>								
U_T	SOLID	Uranium, Total in Soil	6904-166	9.0	3	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 01/18/00

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0588

SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

**WORK SUMMARY**

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	SUF-							
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
BOWMX1		N910181-01	7255-001	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
200 B Pond	SOLID	10/20/99	7255-001	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
B99-78-144	B99-078	10/22/99	7255-001	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-001	SR		12/16/99	01/12/00	MCM	Total Strontium in Soil	
			7255-001	TH		01/04/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-001	U		01/16/00	01/18/00	MCM	Uranium, Isotopic in Soil	
			7255-001	U_T		11/08/99	01/12/00	MCM	Uranium, Total in Soil	
BOWMX2		N910181-02	7255-002	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
200 B Pond	SOLID	10/20/99	7255-002	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
B99-78-144	B99-078	10/22/99	7255-002	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-002	SR		12/20/99	01/12/00	MCM	Total Strontium in Soil	
			7255-002	TH		01/03/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-002	U_T		11/08/99	01/12/00	MCM	Uranium, Total in Soil	
BOWMX3		N910181-03	7255-003	AM		12/15/99	01/18/00	NJV	Americium 241 in Soil	
200 B Pond	SOLID	10/20/99	7255-003	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
B99-78-144	B99-078	10/22/99	7255-003	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-003	SR		12/16/99	01/12/00	MCM	Total Strontium in Soil	
			7255-003	TH		01/03/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-003	U_T		11/08/99	01/12/00	MCM	Uranium, Total in Soil	
Method Blank		N910181-05	7255-005	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
	SOLID		7255-005	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
	B99-078		7255-005	PU		12/15/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-005	SR		12/13/99	01/12/00	MCM	Total Strontium in Soil	
			7255-005	TH		01/03/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-005	U		01/16/00	01/18/00	MCM	Uranium, Isotopic in Soil	
Method Blank		N910181-08	7255-008	U_T		12/08/99	01/12/00	MCM	Uranium, Total in Soil	
	SOLID									
	B99-078									
Lab Control Sample		N910181-04	7255-004	AM		12/15/99	01/12/00	MCM	Americium 241 in Soil	
	SOLID		7255-004	GAM		12/08/99	01/12/00	MCM	Gamma Scan	
	B99-078		7255-004	PU		12/14/99	01/12/00	MCM	Plutonium, Isotopic in Solids	
			7255-004	SR		12/13/99	01/12/00	MCM	Total Strontium in Soil	
			7255-004	TH		01/03/00	01/12/00	MCM	Thorium, Isotopic in Soil	
			7255-004	U		01/16/00	01/18/00	MCM	Uranium, Isotopic in Soil	

WORK SUMMARY

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Lab id TMANC  
Protocol Hanford  
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Version 3.06  
Report date 01/18/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

WORK SUMMARY, cont.

CLIENT SAMPLE ID	LAB SAMPLE ID	MATRIX	COLLECTED	PLANCHET	TEST	SUP-	FIX	ANALYZED	REVIEWED	BY	METHOD
LOCATION	SAF No	RECEIVED	TEST	TEST	TEST	TEST	TEST	TEST	TEST	TEST	TEST
Lab Control Sample	N910181-07	7255-007	U_T				11/08/99	01/12/00	MCM		Uranium, Total in Soil
	SOLID										
	B99-078										
Duplicate (N910181-01)	N910181-06	7255-006	AM				12/15/99	01/12/00	MCM		Americium 241 in Soil
200 B Pond	SOLID	10/20/99	GAM				12/08/99	01/12/00	MCM		Gamma Scan
	B99-078	10/22/99	PU				12/15/99	01/12/00	MCM		Plutonium, Isotopic in Solids
			SR				12/13/99	01/12/00	MCM		Total Strontium in Soil
			TH				01/12/00	01/18/00	MCM		Thorium, Isotopic in Soil
			U				01/16/00	01/18/00	MCM		Uranium, Isotopic in Soil
Duplicate (N910181-01)	N910181-09	7255-009	U_T				11/08/99	01/12/00	MCM		Uranium, Total in Soil
200 B Pond	SOLID	10/20/99									
	B99-078	10/22/99									

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	3			1	1	1		6
GAM	B99-078	Gamma Scan	GAMMAHI	3			1	1	1		6
PU	B99-078	Plutonium, Isotopic in Solids	PUPLATE	3			1	1	1		6
SR	B99-078	Total Strontium in Soil	SRTOTAL	3			1	1	1		6
TH	B99-078	Thorium, Isotopic in Soil	THPLATE	3			1	1	1		6
U	B99-078	Uranium, Isotopic in Soil	UPLATE	1			1	1	1		4
U_T	B99-078	Uranium, Total in Soil	UKPA	3			1	1	1		6
TOTALS				19			7	7	7		40

WORK SUMMARY

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Lab id TMANC  
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**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0588**

N910181-05

Method Blank

**METHOD BLANK**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-05</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7255-005</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-078</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233	U-233/234	-0.006	0.011	0.026	1.0	U	U
Uranium 235	15117-96-1	-0.003	0.007	0.016	1.0	U	U
Uranium 238	U-238	0.001	0.006	0.011	1.0	U	U
Plutonium 238	13981-16-3	-0.004	0.016	0.037	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.016	0.037	1.0	U	PU
Americium 241	14596-10-2	0	0.021	0.051	1.0	U	AM
Total Strontium	SR-RAD	-0.096	0.14	0.19	1.0	U	SR
Thorium 228	14274-82-9	-0.075	0.11	0.29	1.0	U	TH
Thorium 230	14269-63-7	0.056	0.15	0.18	1.0	U	TH
Thorium 232	TH-232	0.019	0.037	0.14	1.0	U	TH
Potassium 40	13966-00-2	U		0.91		U	GAM
Cobalt 60	10198-40-0	U		<u>0.054</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.056	0.10	U	GAM
Europium 152	14683-23-9	U		<u>0.13</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.14</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.16</u>	0.10	U	GAM
Radium 226	13982-63-3	U		0.099	0.10	U	GAM
Radium 228	15262-20-1	U		<u>0.22</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		0.076		U	GAM
Thorium 232	TH-232	U		0.22		U	GAM
Americium 241	14596-10-2	U		0.42		U	GAM
Uranium 238	U-238	U		7.0		U	GAM
Uranium 235	15117-96-1	U		0.21		U	GAM

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

QC-BLANK 32637

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Protocol Hanford  
Version Ver 1.0  
Form DVD-DS  
Version 3.06  
Report date 01/18/00

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0588

N910181-08

Method Blank

METHOD BLANK

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-08</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7255-008</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B99-078</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Total Uranium (ug/g)	7440-61-1	-0.002	0.002	0.004	1.0	U	U_T

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

QC-BLANK 32306

METHOD BLANKS

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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>01/18/00</u>

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0588

N910181-04

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7255</u> Contact <u>Melissa C. Mannion</u>  Lab sample id <u>N910181-04</u> Dept sample id <u>7255-004</u>	Client/Case no <u>Hanford</u> <u>SDG H0588</u> Case no <u>TRB-SBB-207925</u>  Client sample id <u>Lab Control Sample</u> Material/Matrix _____ <u>SOLID</u> SAF No <u>B99-078</u>
---	--

ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ LMTS	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS TEST		pCi/g	pCi/g	%	(TOTAL)
Uranium 233	4.61	0.20	0.093	1.0	U	4.64	0.19	99	88-112	80-120
Uranium 235	3.68	0.18	0.010	1.0	U	3.77	0.15	98	88-112	80-120
Uranium 238	4.81	0.21	0.087	1.0	U	5.04	0.20	95	89-111	80-120
Plutonium 238	9.83	0.57	0.045	1.0	PU	10.0	0.40	98	87-113	80-120
Plutonium 239/240	10.2	0.59	0.027	1.0	PU	10.6	0.42	96	87-113	80-120
Americium 241	7.85	0.63	0.034	1.0	AM	9.58	0.38	<u>82</u>	87-113	80-120
Total Strontium	10.9	0.36	0.16	1.0	SR	11.3	0.45	96	84-116	
Thorium 228	-0.063	0.13	0.27	1.0	U TH					
Thorium 230	20.9	1.6	0.19	1.0	TH	20.4	0.82	102	85-115	
Thorium 232	0.031	0.063	0.12	1.0	U TH					
Cobalt 60	1.30	0.093	0.034	0.050	GAM	1.44	0.058	90	77-123	80-120
Cesium 137	1.47	0.088	0.062	0.10	GAM	1.51	0.060	97	76-124	80-120

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

QC-LCS 32636

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>01/18/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

N910181-07

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	<u>SDG H0588</u>
Contact <u>Melissa C. Mannion</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-07</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7255-007</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-078</u>	

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)	34.6	4.2	0.041	1.0	U_T	37.2	1.5	93	78-122	80-120

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

QC-LCS 32305
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LAB CONTROL SAMPLES

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>01/18/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

N910181-06

B0WMX1

DUPLICATE

SDG <u>7255</u>		Client/Case no <u>Hanford</u>	<u>SDG H0588</u>
Contact <u>Melissa C. Mannion</u>		Case no <u>TRB-SBB-207925</u>	
<b>DUPLICATE</b>	<b>ORIGINAL</b>		
Lab sample id <u>N910181-06</u>	Lab sample id <u>N910181-01</u>	Client sample id <u>B0WMX1</u>	
Dept sample id <u>7255-006</u>	Dept sample id <u>7255-001</u>	Location/Matrix <u>200 B Pond</u>	<u>SOLID</u>
	Received <u>10/22/99</u>	Collected <u>10/20/99 09:07</u>	
	% solids <u>90.4</u>	Custody/SAF No <u>B99-78-144</u>	<u>B99-078</u>

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
Uranium 233	0.638	0.061	0.024	1.0	J	U	0.567	0.054	0.014	J	12	23	
Uranium 235	0.033	0.014	0.011	1.0	J	U	0.036	0.014	0.011	J	9	87	
Uranium 238	0.585	0.056	0.013	1.0	J	U	0.559	0.054	0.014	J	5	23	
Plutonium 238	0	0.014	0.038	1.0	U	PU	-0.004	0.014	0.039	U	-	-	
Plutonium 239/240	0.044	0.028	0.026	1.0	J	PU	0.085	0.036	0.027	J	64	107	
Americium 241	0.077	0.037	0.035	1.0	J	AM	0.075	0.040	0.044	J	3	108	
Total Strontium	9.85	0.54	0.24	1.0		SR	9.79	0.53	0.22		1	24	
Thorium 228	0.468	0.22	0.26	1.0	J	TH	0.562	0.22	0.24	J	18	91	
Thorium 230	0.860	0.25	0.21	1.0	J	TH	0.498	0.19	0.19	J	53	70	
Thorium 232	0.568	0.19	0.12	1.0	J	TH	0.581	0.17	0.091	J	2	67	
Potassium 40	14.8	0.88	0.27			GAM	15.0	0.90	0.45		1	34	
Cobalt 60	U		0.029	0.050	U	GAM	U		0.056	U	-	-	
Cesium 137	203	0.50	0.11	0.10		GAM	188	0.70	0.17		8	32	
Europium 152	U		0.37	0.10	U	GAM	U		0.65	U	-	-	
Europium 154	U		0.099	0.10	U	GAM	U		0.17	U	-	-	
Europium 155	U		0.23	0.10	U	GAM	U		0.38	U	-	-	
Radium 226	0.696	0.11	0.14	0.10		GAM	0.762	0.23	0.28		9	61	
Radium 228	0.873	0.13	0.13	0.20		GAM	0.906	0.22	0.22		4	54	
Thorium 228	0.820	0.14	0.19			GAM	0.902	0.24	0.31		10	58	
Thorium 232	0.873	0.13	0.13			GAM	0.906	0.22	0.22		4	54	
Americium 241	U		0.11		U	GAM	U		0.22	U	-	-	
Uranium 238	U		3.4		U	GAM	U		5.8	U	-	-	
Uranium 235	U		0.40		U	GAM	U		0.62	U	-	-	

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

QC-DUP#1 32638

Lab id	<u>TMANC</u>
Protocol	<u>Hanford</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-DUP</u>
Version	<u>3.06</u>
Report date	<u>01/18/00</u>

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0588

N910181-09

B0WMX1

**DUPLICATE**

SDG <u>7255</u>		Client/Case no <u>Hanford</u> <u>SDG H0588</u>
Contact <u>Melissa C. Mannion</u>		Case no <u>TRB-SBB-207925</u>
<b>DUPLICATE</b>	<b>ORIGINAL</b>	
Lab sample id <u>N910181-09</u>	Lab sample id <u>N910181-01</u>	Client sample id <u>B0WMX1</u>
Dept sample id <u>7255-009</u>	Dept sample id <u>7255-001</u>	Location/Matrix <u>200 B Pond</u> <u>SOLID</u>
	Received <u>10/22/99</u>	Collected <u>10/20/99 09:07</u>
	% solids <u>90.4</u>	Custody/SAF No <u>B99-78-144</u> <u>B99-078</u>

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)	1.05	0.12	0.004	1.0		U_T	1.04	0.12	0.004		1	31	

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

QC-DUP#1 32307

DUPLICATES

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**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0588**

N910181-01

BOWMX1

**DATA SHEET**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-01</u>	Client sample id <u>BOWMX1</u>	
Dept sample id <u>7255-001</u>	Location/Matrix <u>200 B Pond</u>	<u>SOLID</u>
Received <u>10/22/99</u>	Collected <u>10/20/99 09:07</u>	
% solids <u>90.4</u>	Custody/SAF No <u>B99-78-144</u>	<u>B99-078</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233	U-233/234	0.567	0.054	0.014	1.0	J	U
Uranium 235	15117-96-1	0.036	0.014	0.011	1.0	J	U
Uranium 238	U-238	0.559	0.054	0.014	1.0	J	U
Total Uranium (ug/g)	7440-61-1	1.04	0.12	0.004	1.0		U_T
Plutonium 238	13981-16-3	-0.004	0.014	0.039	1.0	U	PU
Plutonium 239/240	PU-239/240	0.085	0.036	0.027	1.0	J	PU
Americium 241	14596-10-2	0.075	0.040	0.044	1.0	J	AM
Total Strontium	SR-RAD	9.79	0.53	0.22	1.0		SR
Thorium 228	14274-82-9	0.562	0.22	0.24	1.0	J	TH
Thorium 230	14269-63-7	0.498	0.19	0.19	1.0	J	TH
Thorium 232	TH-232	0.581	0.17	0.091	1.0	J	TH
Potassium 40	13966-00-2	15.0	0.90	0.45			GAM
Cobalt 60	10198-40-0	U		<u>0.056</u>	0.050	U	GAM
Cesium 137	10045-97-3	188	0.70	<u>0.17</u>	0.10		GAM
Europium 152	14683-23-9	U		<u>0.65</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.17</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.38</u>	0.10	U	GAM
Radium 226	13982-63-3	0.762	0.23	<u>0.28</u>	0.10		GAM
Radium 228	15262-20-1	0.906	0.22	<u>0.22</u>	0.20		GAM
Thorium 228	14274-82-9	0.902	0.24	0.31			GAM
Thorium 232	TH-232	0.906	0.22	0.22			GAM
Americium 241	14596-10-2	U		0.22		U	GAM
Uranium 238	U-238	U		5.8		U	GAM
Uranium 235	15117-96-1	U		0.62		U	GAM

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

DATA SHEETS

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SUMMARY DATA SECTION

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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>01/18/00</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0588**

N910181-02

BOWMX2

**DATA SHEET**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-02</u>	Client sample id <u>BOWMX2</u>	
Dept sample id <u>7255-002</u>	Location/Matrix <u>200 B Pond</u>	<u>SOLID</u>
Received <u>10/22/99</u>	Collected <u>10/20/99 09:12</u>	
% solids <u>95.5</u>	Custody/SAF No <u>B99-78-144</u>	<u>B99-078</u>

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	0.589	0.068	0.004	1.0	J	U_T
Plutonium 238	13981-16-3	-0.004	0.023	0.046	1.0	U	PU
Plutonium 239/240	PU-239/240	0.015	0.023	0.036	1.0	U	PU
Americium 241	14596-10-2	0.021	0.032	0.041	1.0	U	AM
Total Strontium	SR-RAD	0.524	0.099	0.11	1.0	J	SR
Thorium 228	14274-82-9	0.669	0.28	0.32	1.0	J	TH
Thorium 230	14269-63-7	0.548	0.24	0.22	1.0	J	TH
Thorium 232	TH-232	0.548	0.20	0.15	1.0	J	TH
Potassium 40	13966-00-2	14.4	0.88	0.44			GAM
Cobalt 60	10198-40-0	U		0.040	0.050	U	GAM
Cesium 137	10045-97-3	31.7	0.29	<u>0.11</u>	0.10		GAM
Europium 152	14683-23-9	U		<u>0.29</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.13</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.21</u>	0.10	U	GAM
Radium 226	13982-63-3	0.645	0.14	<u>0.17</u>	0.10		GAM
Radium 228	15262-20-1	0.904	0.17	0.17	0.20		GAM
Thorium 228	14274-82-9	1.10	0.15	0.17			GAM
Thorium 232	TH-232	0.904	0.17	0.17			GAM
Americium 241	14596-10-2	U		0.29		U	GAM
Uranium 238	U-238	U		4.8		U	GAM
Uranium 235	15117-96-1	U		0.31		U	GAM

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

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>01/18/00</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0588**

N910181-03

BOWMX3

**DATA SHEET**

SDG <u>7255</u>	Client/Case no <u>Hanford</u>	SDG <u>H0588</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N910181-03</u>	Client sample id <u>BOWMX3</u>	
Dept sample id <u>7255-003</u>	Location/Matrix <u>200 B Pond</u>	<u>SOLID</u>
Received <u>10/22/99</u>	Collected <u>10/20/99 09:30</u>	
% solids <u>94.8</u>	Custody/SAF No <u>B99-78-144</u>	<u>B99-078</u>

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	0.654	0.076	0.004	1.0	J	U_T
Plutonium 238	13981-16-3	0.004	0.017	0.041	1.0	U	PU
Plutonium 239/240	PU-239/240	0.013	0.017	0.033	1.0	U	PU
Americium 241	14596-10-2	-0.046	0.28	0.56	1.0	U	AM
Total Strontium	SR-RAD	0.727	0.13	0.15	1.0	J	SR
Thorium 228	14274-82-9	0.468	0.24	0.30	1.0	J	TH
Thorium 230	14269-63-7	0.570	0.21	0.18	1.0	J	TH
Thorium 232	TH-232	0.435	0.15	0.11	1.0	J	TH
Potassium 40	13966-00-2	13.8	0.53	0.22			GAM
Cobalt 60	10198-40-0	U		0.022	0.050	U	GAM
Cesium 137	10045-97-3	20.2	0.14	0.041	0.10		GAM
Europium 152	14683-23-9	U		<u>0.13</u>	0.10	U	GAM
Europium 154	15585-10-1	U		0.079	0.10	U	GAM
Europium 155	14391-16-3	U		0.097	0.10	U	GAM
Radium 226	13982-63-3	0.561	0.064	0.070	0.10		GAM
Radium 228	15262-20-1	0.872	0.096	0.090	0.20		GAM
Thorium 228	14274-82-9	0.767	0.048	0.064			GAM
Thorium 232	TH-232	0.872	0.096	0.090			GAM
Americium 241	14596-10-2	U		0.12		U	GAM
Uranium 238	U-238	U		2.9		U	GAM
Uranium 235	15117-96-1	U		0.15		U	GAM

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

DATA SHEETS

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Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>01/18/00</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

METHOD SUMMARY

AMERICIUM 241 IN SOIL  
ALPHA SPECTROSCOPY

Test AM Matrix SOLID

SDG 7255

Contact Melissa C. Mannion

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Americium 241
Preparation batch 6904-166					
BOWMX1	N910181-01	7255-001			0.075 J
BOWMX2	N910181-02	7255-002			U
BOWMX3	N910181-03	7255-003			U
BLK (QC ID=32637)	N910181-05	7255-005			U
LCS (QC ID=32636)	N910181-04	7255-004			<u>LOW</u>
Duplicate (N910181-01)	N910181-06	7255-006			ok J

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	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 166															
BOWMX1	N910181-01			0.044	0.500			79		762			56	12/15/99	12/15 SS-008
BOWMX2	N910181-02			0.041	0.500			59		760			56	12/15/99	12/15 SS-009
BOWMX3	N910181-03			0.56	0.500			<u>7</u>		760			56	12/15/99	12/15 SS-010
BLK (QC ID=32637)	N910181-05			0.051	0.500			58		760				12/15/99	12/15 SS-011
LCS (QC ID=32636)	N910181-04			0.034	0.500			68		762				12/15/99	12/15 SS-005
Duplicate (N910181-01)	N910181-06			0.035	0.500			85		760			56	12/15/99	12/15 SS-012
															(QC ID=32638)
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 <u>0.13</u> ± <u>0.42</u>
FOR 6 SAMPLES	YIELD <u>59</u> ± <u>56</u>

METHOD SUMMARIES

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS  
ALPHA SPECTROSCOPY

Test PU Matrix SOLID

SDG 7255

Contact Melissa C. Mannion

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Plutonium 238	Plutonium 239/240
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Preparation batch 6904-166

BOWMX1	N910181-01	7255-001		U	0.085 J
BOWMX2	N910181-02	7255-002		U	U
BOWMX3	N910181-03	7255-003		U	U
BLK (QC ID=32637)	N910181-05	7255-005		U	U
LCS (QC ID=32636)	N910181-04	7255-004		ok	ok
Duplicate (N910181-01)	N910181-06	7255-006		- U	ok J

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 pCi/g	MDA g	ALIQ	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
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Preparation batch 6904-166 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 166

BOWMX1	N910181-01	0.039	0.500	89	760	56	12/14/99	12/15	SS-013
BOWMX2	N910181-02	0.046	0.500	82	760	56	12/14/99	12/15	SS-014
BOWMX3	N910181-03	0.041	0.500	75	760	56	12/14/99	12/15	SS-015
BLK (QC ID=32637)	N910181-05	0.037	0.500	81	760	12/14/99	12/15	SS-016	
LCS (QC ID=32636)	N910181-04	0.045	0.500	100	1066	12/14/99	12/14	SS-044	
Duplicate (N910181-01)	N910181-06	0.038	0.500	97	726	56	12/14/99	12/15	SS-058

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 <u>0.041 ± 0.007</u>
FOR 6 SAMPLES	YIELD <u>87 ± 20</u>

METHOD SUMMARIES

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 01/18/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

Test TH Matrix SOLID  
 SDG 7255  
 Contact Melissa C. Mannion

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0588

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL  
 ALPHA SPECTROSCOPY

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Thorium 228	Thorium 230	Thorium 232	
Preparation batch 6904-166							
B0WMX1	N910181-01	7255-001		0.562 J	0.498 J	0.581 J	
B0WMX2	N910181-02	7255-002		0.669 J	0.548 J	0.548 J	
B0WMX3	N910181-03	7255-003		0.468 J	0.570 J	0.435 J	
BLK (QC ID=32637)	N910181-05	7255-005		U	U	U	
LCS (QC ID=32636)	N910181-04	7255-004		No data U	ok	No data U	
Duplicate (N910181-01)	N910181-06	7255-006		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 FIX	SUF- pCi/g	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 166																
B0WMX1	N910181-01			0.24	0.250			58	665				76	12/30/99	01/04	SS-032
B0WMX2	N910181-02			0.32	0.250			55	431				75	12/30/99	01/03	SS-032
B0WMX3	N910181-03			0.30	0.250			72	431				75	12/30/99	01/03	SS-033
BLK (QC ID=32637)	N910181-05			0.29	0.250			59	442					12/18/99	01/03	SS-027
LCS (QC ID=32636)	N910181-04			0.27	0.250			69	431					12/18/99	01/03	SS-034
Duplicate (N910181-01)	N910181-06			0.26	0.250			55	573				84	12/30/99	01/12	SS-027
(QC ID=32638)																
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	0.28 ± 0.058
FOR 6 SAMPLES	YIELD	61 ± 15

METHOD SUMMARIES

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Lab id TMANC  
 Protocol Hanford  
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**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0588

**METHOD SUMMARY**

URANIUM, ISOTOPIC IN SOIL  
ALPHA SPECTROSCOPY

Test U Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX PLANCHET	1: Uranium	2: Uranium	3: Uranium	RESULT RATIOS (%)				
			233	235	238	1+3	2σ	2+3	2σ	
Preparation batch 6904-166										
BOWMX1	N910181-01	7255-001	0.567 J	0.036 J	0.559 J	101	14	6	3	
BLK (QC ID=32637)	N910181-05	7255-005	U	U	U					
LCS (QC ID=32636)	N910181-04	7255-004	ok	ok	ok					
Duplicate (N910181-01)	N910181-06	7255-006	ok J	ok J	ok J	109	15	6	2	
Nominal values and limits from method			RDLs (pCi/g)	1.0	1.0	1.0	100		4	
200 Area Source Chara.- 200-CW-1 OU						Averages 105			6	

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL-				
													PREPARED	YZED	DETECTOR		
Preparation batch 6904-166														2σ prep error 5.0 %		Reference Lab Notebook 6904 pg. 166	
BOWMX1	N910181-01		0.014	1.00			101	1049				88	01/13/00	01/16	SS-027		
BLK (QC ID=32637)	N910181-05		0.026	1.00			77	1048					01/14/00	01/16	SS-031		
LCS (QC ID=32636)	N910181-04		0.093	1.00			102	1049					01/14/00	01/16	SS-029		
Duplicate (N910181-01)	N910181-06		0.024	1.00			92	1048				88	01/13/00	01/16	SS-032		
(QC ID=32638)																	
Nominal values and limits from method			1.0	1.00			30-105	150	100		180						

PROCEDURES	REFERENCE	UPLATE
EP-060		Soil Preparation, rev 0
EP-070		Soil Dissolution, rev 0
EP-910		Uranium Purification, rev 0
EP-008		Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	<u>0.039</u> ± <u>0.072</u>
FOR 4 SAMPLES	YIELD	<u>93</u> ± <u>23</u>

METHOD SUMMARIES

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Lab id TMANC  
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

METHOD SUMMARY

TOTAL STRONTIUM IN SOIL  
BETA COUNTING

Test SR Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Total Strontium
Preparation batch 6904-166				
B0WMX1	N910181-01	7255-001		9.79
B0WMX2	N910181-02	7255-002		0.524 J
B0WMX3	N910181-03	7255-003		0.727 J
BLK (QC ID=32637)	N910181-05	7255-005		U
LCS (QC ID=32636)	N910181-04	7255-004		ok
Duplicate (N910181-01)	N910181-06	7255-006		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 pCi/g	MDA g	ALIQ	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 10.0 % Reference Lab Notebook 6904 pg. 166																	
B0WMX1	N910181-01			0.22	1.00				99		400			57	12/14/99	12/16	GRB-221
B0WMX2	N910181-02			0.11	1.00				102		200			61	12/14/99	12/20	GRB-230
B0WMX3	N910181-03			0.15	1.00				98		200			57	12/14/99	12/16	GRB-231
BLK (QC ID=32637)	N910181-05			0.19	1.00				82		400				12/10/99	12/13	GRB-201
LCS (QC ID=32636)	N910181-04			0.16	1.00				90		400				12/13/99	12/13	GRB-224
Duplicate (N910181-01)	N910181-06			0.24	1.00				94		400			54	12/10/99	12/13	GRB-202
																	(QC ID=32638)

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	MDA	0.18 ± 0.096
FOR 6 SAMPLES	YIELD	94 ± 15

METHOD SUMMARIES

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Lab id TMANC  
Protocol Hanford  
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Form DVD-CMS  
Version 3.06  
Report date 01/18/00

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0588

Test GAM Matrix SOLID  
SDG 7255  
Contact Melissa C. Mannion

**METHOD SUMMARY**  
GAMMA SCAN  
GAMMA SPECTROSCOPY

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0588

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6904-166						
BOWMX1	N910181-01	7255-001			U	188
BOWMX2	N910181-02	7255-002			U	31.7
BOWMX3	N910181-03	7255-003			U	20.2
BLK (QC ID=32637)	N910181-05	7255-005			U	U
LCS (QC ID=32636)	N910181-04	7255-004			ok	ok
Duplicate (N910181-01)	N910181-06	7255-006			- U	ok
Nominal values and limits from method						
200 Area Source Chara.- 200-CW-1 OU		RDLs (pCi/g)			0.050	0.10

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	BPF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 15.0 % Reference Lab Notebook 6904 pg. 166															
BOWMX1	N910181-01			<u>0.15</u>	597					212			49	11/29/99	02,01,00
BOWMX2	N910181-02			<u>0.12</u>	570					213			49	11/28/99	02,03,00
BOWMX3	N910181-03			<u>0.067</u>	633					213			49	11/28/99	02,04,00
BLK (QC ID=32637)	N910181-05			<u>0.10</u>	171					206				11/28/99	MB,05,00
LCS (QC ID=32636)	N910181-04			0.034	171					206				11/28/99	01,04,00
Duplicate (N910181-01)	N910181-06			<u>0.075</u>	597					204			49	11/18/99	MB,07,00
(QC ID=32638)															
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 MDA 0.091 ± 0.082  
FOR 6 SAMPLES YIELD \_\_\_\_\_ ± \_\_\_\_\_

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 01/18/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0588

METHOD SUMMARY

URANIUM, TOTAL IN SOIL  
KINETIC PHOSPHORIMETRY

Test U T Matrix SOLID

SDG 7255

Contact Melissa C. Mannion

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0588

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Total Uranium
Preparation batch 6904-166				
BOWMX1	N910181-01	7255-001		1.04
BOWMX2	N910181-02	7255-002		0.589 J
BOWMX3	N910181-03	7255-003		0.654 J
BLK (QC ID=32306)	N910181-08	7255-008		U
LCS (QC ID=32305)	N910181-07	7255-007		ok
Duplicate (N910181-01)	N910181-09	7255-009		ok

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	ANAL- YZED	DETECTOR
Preparation batch 6904-166 2σ prep error 9.0 % Reference Lab Notebook 6904 pg. 166															
BOWMX1	N910181-01			0.004	0.0500								19	11/05/99	11/08 KPA-001
BOWMX2	N910181-02			0.004	0.0500								19	11/05/99	11/08 KPA-001
BOWMX3	N910181-03			0.004	0.0500								19	11/05/99	11/08 KPA-001
BLK (QC ID=32306)	N910181-08			0.004	0.0500								12/05/99	12/08	KPA-001
LCS (QC ID=32305)	N910181-07			0.041	0.0500								11/05/99	11/08	KPA-001
Duplicate (N910181-01)	N910181-09			0.004	0.0500								19	11/05/99	11/08 KPA-001
	(QC ID=32307)														

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 0.010 ± 0.030  
FOR 6 SAMPLES YIELD \_\_\_\_\_ ± \_\_\_\_\_

METHOD SUMMARIES

Page 7

SUMMARY DATA SECTION

Page 23

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 01/18/00

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-078-144		Page 1 of 1	
Collector Bowers/Trice		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.		SAF No. B99-078					
Ice Chest No. SHIPPING VAN 96.006		Field Logbook No. EL-1511		Method of Shipment FED EX					
Shipped To TMA/REGRA B78 10-20-99 TMA		Offsite Property No. A000001		Bill of Lading/Air Bill No. 42357953 0874					
				COA B20CW1 671C					

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG
	No. of Container(s)	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL	

SAMPLE ANALYSIS				Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.
PM	Sample No.	Matrix *	Sample Date	Sample Time						
974	BOW MX1	Soil	10/20/99	0907	X					X
7	BOW MX2	Soil	10/20/99	0912	X					X
10/20/99	BOW MX3	Soil	10/20/99	0930	X					X
238										

CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS See chain of custody comments on SAF B99-078.				Matrix * Soil Water Vapor Other Solid Other Liquid	
Relinquished By	Date/Time	Received By	Date/Time								
<i>[Signature]</i>	10/20/99 1230	Ref 3A	10/20/99 1230								
Relinquished By	Date/Time	Received By	Date/Time								
REF 3A	10-21-99/0830	R. Thoman/Rikki Thoman	10-21-99 0850								
Relinquished By	Date/Time	Received By	Date/Time								
R. Thoman/Rikki Thoman	10-21-99 1430	FED EX	10-21-99								
Relinquished By	Date/Time	Received By	Date/Time								
Fed Ex	10-22-99 10:00	<i>[Signature]</i>	10-22-99								
LABORATORY SECTION	Received By	Title								Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By								Date/Time	

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: Berchtel Hanford Date/Time received 10-22-99 10:00

CoC No. B99-078-144, B99-005-062

Container I.D. No. 96-006 Requested TAT (Days) 15 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: 12

7. Number of containers per sample: \_\_\_\_\_ (Or see CoC ✓)

8. Paperwork agrees with samples? Yes [] No [ ]

9. Samples have: Tape [] Hazard labels [ ] Rad labels [] Appropriate sample labels []

10. Samples are: In good condition [] Leaking [ ] Broken Container [ ] Missing [ ]

11. Describe any anomalies: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

14. Received by J.P. Cross Date: 10-22-99 Time: 10:00

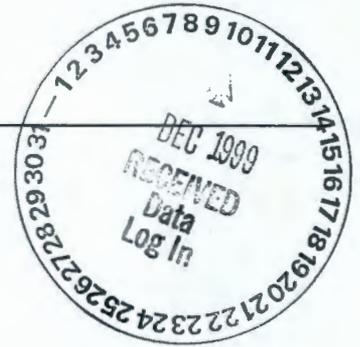
LOGIN

TNU W.O. No. \_\_\_\_\_ Group No. \_\_\_\_\_ Client W.O. No. \_\_\_\_\_

PROGRAM MANAGER

Sample holding times exceeded? Yes [ ] No [ ]

Client Notified: Name \_\_\_\_\_ Date/time \_\_\_\_\_



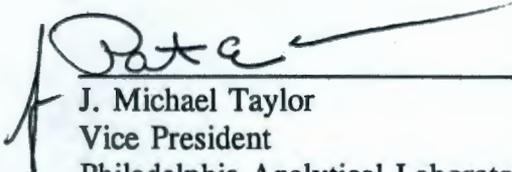
**Recra LabNet Philadelphia  
Analytical Report**

**Client :** TNU-HANFORD B99-078  
**RFW# :** 9910L475  
**SDG# :** H0588  
**SAF# :** B99-078

**W.O. # :** 10985-001-001-9999-00  
**Date Received:** 10-22-99

**INORGANIC CASE NARRATIVE**

1. This narrative covers the analyses of 3 soil samples.
2. The samples were prepared and analyzed in accordance with the methods indicated 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 blanks were within 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 with the exception of Nitrate Nitrite which was above the control limits and may be attributed to a low spike level.
8. The replicate analyses were within the 20% RPD control limit.
9. Results for solid samples are reported on a dry weight basis.

  
\_\_\_\_\_  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

12-6-99  
Date

njp\110-475

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.

# Recra LabNet Philadelphia

## WET CHEMISTRY METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

	<u>ASTM</u>	<u>SW846</u>	<u>OTHER</u>
% Ash	___ D2216-80		
% Moisture	___ D2216-80		___ ILMO4.0 (e)
% Solids	___		✓ ILMO4.0 (e)
% Volatile Solids	___ 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 Prparation Leach		___ 1312	
Paint Filter		9095A	
Other: Nitrate Nitrite	Method:	EPA 350.1 <sup>12-2-99</sup> 353.2	
Other: Ammonia	Method	EPA 350.3	

Chloride, Fluoride, Nitrate }  
Nitrite, Phosphate, Sulfate } EPA 300.0

**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 12/06/99

CLIENT: TNU-HANFORD B99-078  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BOWMX1	% Solids	88.8	%	0.01	1.0
		Chloride by IC	11.9	MG/KG	1.4	1.0
		Fluoride by IC	2.8	u MG/KG	2.8	1.0
		Nitrite by IC	1.4	u MG/KG	1.4	1.0
		Nitrate by IC	150	MG/KG	14	10
		Cyanide, Total	0.56	u MG/KG	0.56	1.0
		Phosphate by IC	2.4	MG/KG	1.4	1.0
		Chromium VI	0.45	u MG/KG	0.45	1.0
		Sulfate by IC	269	MG/KG	14.1	10.0
		Nitrate Nitrite	33.8	MG/KG	2.2	10.0
		Ammonia, as N	2.5	MG/KG	1.4	1.0
		pH	7.6	SOIL PH	0.01	1.0
		Sulfide	4.1	MG/KG	2.3	1.0
-002	BOWMX2	% Solids	92.8	%	0.01	1.0
		Chloride by IC	5.3	MG/KG	1.3	1.0
		Fluoride by IC	2.7	u MG/KG	2.7	1.0
		Nitrite by IC	1.3	u MG/KG	1.3	1.0
		Nitrate by IC	52	MG/KG	6.7	5.0
		Cyanide, Total	0.54	u MG/KG	0.54	1.0
		Phosphate by IC	4.3	MG/KG	1.3	1.0
		Chromium VI	0.43	u MG/KG	0.43	1.0
		Sulfate by IC	82.8	MG/KG	6.7	5.0
		Nitrate Nitrite	13.8	MG/KG	1.0	5.0
		Ammonia, as N	1.3	u MG/KG	1.3	1.0
		pH	8.4	SOIL PH	0.01	1.0
		Sulfide	4.0	MG/KG	2.2	1.0
-003	BOWMX3	% Solids	93.0	%	0.01	1.0
		Chloride by IC	3.9	MG/KG	1.3	1.0
		Fluoride by IC	2.7	u MG/KG	2.7	1.0
		Nitrite by IC	1.3	u MG/KG	1.3	1.0
		Nitrate by IC	39	MG/KG	1.3	1.0
		Cyanide, Total	0.54	u MG/KG	0.54	1.0
		Phosphate by IC	2.8	MG/KG	1.3	1.0
		Chromium VI	0.43	u MG/KG	0.43	1.0
		Sulfate by IC	60.8	MG/KG	6.7	5.0
		Nitrate Nitrite	8.4	MG/KG	0.20	1.0
		Ammonia, as N	1.3	u MG/KG	1.3	1.0
		pH	8.6	SOIL PH	0.01	1.0

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 12/06/99

CLIENT: TNU-HANFORD B99-078  
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	BOWMX3	Sulfide	2.2	u MG/KG	2.2	1.0

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/06/99

CLIENT: TNU-HANFORD B99-078  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
BLANK10	99LIC097-MB1	Chloride by IC	1.2	u MG/KG	1.2	1.0
		Fluoride by IC	2.5	u MG/KG	2.5	1.0
		Nitrite by IC	1.2	u MG/KG	1.2	1.0
		Nitrate by IC	1.2	u MG/KG	1.2	1.0
		Phosphate by IC	1.2	u MG/KG	1.2	1.0
		Sulfate by IC	1.2	u MG/KG	1.2	1.0
BLANK10	99LIC098-MB1	Chloride by IC	1.2	u MG/KG	1.2	1.0
		Fluoride by IC	2.5	u MG/KG	2.5	1.0
		Nitrite by IC	1.2	u MG/KG	1.2	1.0
		Nitrate by IC	1.2	u MG/KG	1.2	1.0
		Phosphate by IC	1.2	u MG/KG	1.2	1.0
		Sulfate by IC	1.2	u MG/KG	1.2	1.0
BLANK1	99LC122-MB1	Cyanide, Total	0.50	u MG/KG	0.50	1.0
BLANK10	99LVI079-MB1	Chromium VI	0.40	u MG/KG	0.40	1.0
BLANK10	99LN3054-MB1	Nitrate Nitrite	0.20	u MG/KG	0.20	1.0
BLANK10	99LAM043-MB1	Ammonia, as N	1.2	u MG/KG	1.2	1.0
BLANK10	99LSD062-MB1	Sulfide	2.0	u MG/KG	2.0	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 12/06/99

CLIENT: TNU-HANFORD B99-078  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	BOWMX1	Chloride by IC	39.7	11.9	28.2	98.6	1.0
		Fluoride by IC	60.2	1.5	56.3	104.2	1.0
		Nitrite by IC	27	1.4 u	28	97.6	1.0
		Nitrate by IC	710	150	560	99.1	20
		Cyanide, Total	5.9	0.56u	5.6	104.8	1.0
		Phosphate by IC	29.3	2.4	28.2	95.6	1.0
		Sulfate by IC	830	269	563	99.5	20.0
		Nitrate Nitrite	42.2	33.8	5.6	150.0*	10.0
		Ammonia, as N	87.9	2.5	86.0	99.3	1.0
-003	BOWMX3	Soluble Chromium VI	4.6	0.14	4.3	103.6	1.0
		Sulfide	385	0.0	423	91.0	1.0
BLANK10	99LIC097-MB1	Chloride by IC	23.8	1.2 u	25.0	95.1	1.0
		Fluoride by IC	52.4	2.5 u	50.0	104.8	1.0
		Nitrite by IC	24	1.2 u	25	96.8	1.0
		Nitrate by IC	24	1.2 u	25	97.3	1.0
		Phosphate by IC	25.6	1.2 u	25.0	102.3	1.0
		Sulfate by IC	23.9	1.2 u	25.0	95.6	1.0
BLANK10	99LIC098-MB1	Chloride by IC	23.5	1.2 u	25.0	94.0	1.0
		Fluoride by IC	48.7	2.5 u	50.0	97.3	1.0
		Nitrite by IC	24	1.2 u	25	96.1	1.0
		Nitrate by IC	24	1.2 u	25	94.6	1.0
		Phosphate by IC	25.3	1.2 u	25.0	101.2	1.0
		Sulfate by IC	23.9	1.2 u	25.0	95.5	1.0
BLANK10	99LVI079-MB1	Soluble Chromium VI	4.2	0.40u	4.0	105.6	1.0
		Insoluble Chromium VI	1120	0.40u	1160	96.2	100
BLANK10	99LN3054-MB1	Nitrate Nitrite	5.0	0.20u	5.0	99.6	1.0
		Nitrate Nitrite MSD	4.8	0.20u	5.0	97.0	1.0
BLANK10	99LAM043-MB1	Ammonia, as N	50.0	1.2 u	50.0	100	1.0
		Ammonia, as N MSD	48.0	1.2 u	50.0	96.0	1.0
BLANK10	99LSD062-MB1	Sulfide	10.0	2.0 u	10.0	100	1.0

Recra LabNet - Lionville

INORGANICS DUPLICATE SPIKE REPORT 12/06/99

CLIENT: TNU-HANFORD B99-078  
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	SPIKE#1		SPIKE#2	
			%RECOV	%RECOV	%RECOV	%DIFF
BLANK10	99LN3054-MB1	Nitrate Nitrite	99.6	97.0	2.6	
BLANK10	99LAM043-MB1	Ammonia, as N	100	96.0	4.1	

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 12/06/99

CLIENT: TNU-HANFORD B99-078  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE RPD		
-001REP	BOWMX1	% Solids	88.8	89.7	1.1	1.0
		Chloride by IC	11.9	12.9	7.5	1.0
		Fluoride by IC	2.8 u	2.8 u	NC	1.0
		Nitrite by IC	1.4 u	1.4 u	NC	1.0
		Nitrate by IC	150	160	8.8	10
		Cyanide, Total	0.56u	0.56u	NC	1.0
		Phosphate by IC	2.4	2.5	3.7	1.0
		Sulfate by IC	269	280	3.8	10.0
		Nitrate Nitrite	33.8	33.7	0.47	10.0
		Ammonia, as N	2.5	2.4	6.0	1.0
		pH	7.6	7.6	0.0	1.0
-003REP	BOWMX3	Chromium VI	0.43u	0.43u	NC	1.0
		Sulfide	2.2 u	2.2 u	NC	1.0

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 12/06/99

CLIENT: TNU-HANFORD B99-078  
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	99LC122-LC1	Cyanide, Total LCS	1.6	2.0	MG/KG	82.3
LCS2	99LC122-LC2	Cyanide, Total LCS	9.3	10	MG/KG	93.2

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0WMX1						
% SOLIDS	001	S	99LSS142	10/20/99	10/26/99	10/27/99
% SOLIDS	001 REP	S	99LSS142	10/20/99	10/26/99	10/27/99
CHLORIDE BY IC	001	S	99LIC097	10/20/99	11/16/99	11/16/99
CHLORIDE BY IC	001 REP	S	99LIC097	10/20/99	11/16/99	11/16/99
CHLORIDE BY IC	001 MS	S	99LIC098	10/20/99	11/17/99	11/17/99
FLUORIDE BY IC	001	S	99LIC097	10/20/99	11/16/99	11/16/99
FLUORIDE BY IC	001 REP	S	99LIC097	10/20/99	11/16/99	11/16/99
FLUORIDE BY IC	001 MS	S	99LIC098	10/20/99	11/17/99	11/17/99
NITRITE BY IC	001	S	99LIC097	10/20/99	11/16/99	11/16/99
NITRITE BY IC	001 REP	S	99LIC097	10/20/99	11/16/99	11/16/99
NITRITE BY IC	001 MS	S	99LIC098	10/20/99	11/17/99	11/17/99
NITRATE BY IC	001	S	99LIC098	10/20/99	11/17/99	11/17/99
NITRATE BY IC	001 REP	S	99LIC098	10/20/99	11/17/99	11/17/99
NITRATE BY IC	001 MS	S	99LIC098	10/20/99	11/17/99	11/17/99
TOTAL CYANIDE	001	S	99LC122	10/20/99	11/01/99	11/01/99
TOTAL CYANIDE	001 REP	S	99LC122	10/20/99	11/01/99	11/01/99
TOTAL CYANIDE	001 MS	S	99LC122	10/20/99	11/01/99	11/01/99
PHOSPHATE BY IC	001	S	99LIC097	10/20/99	11/16/99	11/16/99
PHOSPHATE BY IC	001 REP	S	99LIC097	10/20/99	11/16/99	11/16/99
PHOSPHATE BY IC	001 MS	S	99LIC098	10/20/99	11/17/99	11/17/99
CHROMIUM VI	001	S	99LVI079	10/20/99	11/02/99	11/02/99
SULFATE BY IC	001	S	99LIC098	10/20/99	11/17/99	11/17/99
SULFATE BY IC	001 REP	S	99LIC098	10/20/99	11/17/99	11/17/99
SULFATE BY IC	001 MS	S	99LIC098	10/20/99	11/17/99	11/17/99
NITRATE NITRITE	001	S	99LN3054	10/20/99	11/09/99	11/11/99
NITRATE NITRITE	001 REP	S	99LN3054	10/20/99	11/09/99	11/11/99
NITRATE NITRITE	001 MS	S	99LN3054	10/20/99	11/09/99	11/11/99
AMMONIA	001	S	99LAM043	10/20/99	11/08/99	11/08/99
AMMONIA	001 REP	S	99LAM043	10/20/99	11/08/99	11/08/99
AMMONIA	001 MS	S	99LAM043	10/20/99	11/08/99	11/08/99
PH	001	S	99LPH116	10/20/99	10/27/99	10/27/99
PH	001 REP	S	99LPH116	10/20/99	10/27/99	10/27/99
SULFIDE	001	S	99LSD062	10/20/99	10/26/99	10/26/99

B0WMX2

% SOLIDS	002	S	99LSS142	10/20/99	10/26/99	10/27/99
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Recra LabNet - Lionville Laboratory  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNU-HANFORD B99-078

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CHLORIDE BY IC	002	S	99LIC097	10/20/99	11/16/99	11/16/99
FLUORIDE BY IC	002	S	99LIC097	10/20/99	11/16/99	11/16/99
NITRITE BY IC	002	S	99LIC097	10/20/99	11/16/99	11/16/99
NITRATE BY IC	002	S	99LIC098	10/20/99	11/17/99	11/17/99
TOTAL CYANIDE	002	S	99LC122	10/20/99	11/01/99	11/01/99
PHOSPHATE BY IC	002	S	99LIC097	10/20/99	11/16/99	11/16/99
CHROMIUM VI	002	S	99LVI079	10/20/99	11/02/99	11/02/99
SULFATE BY IC	002	S	99LIC098	10/20/99	11/17/99	11/17/99
NITRATE NITRITE	002	S	99LN3054	10/20/99	11/09/99	11/11/99
AMMONIA	002	S	99LAM043	10/20/99	11/08/99	11/08/99
PH	002	S	99LPH116	10/20/99	10/27/99	10/27/99
SULFIDE	002	S	99LSD062	10/20/99	10/26/99	10/26/99

BOWMX3

% SOLIDS	003	S	99LSS142	10/20/99	10/26/99	10/27/99
CHLORIDE BY IC	003	S	99LIC097	10/20/99	11/16/99	11/16/99
FLUORIDE BY IC	003	S	99LIC097	10/20/99	11/16/99	11/16/99
NITRITE BY IC	003	S	99LIC097	10/20/99	11/16/99	11/16/99
NITRATE BY IC	003	S	99LIC097	10/20/99	11/16/99	11/16/99
TOTAL CYANIDE	003	S	99LC122	10/20/99	11/01/99	11/01/99
PHOSPHATE BY IC	003	S	99LIC097	10/20/99	11/16/99	11/16/99
CHROMIUM VI	003	S	99LVI079	10/20/99	11/02/99	11/02/99
CHROMIUM VI	003 REP	S	99LVI079	10/20/99	11/02/99	11/02/99
CHROMIUM VI	003 MS	S	99LVI079	10/20/99	11/02/99	11/02/99
SULFATE BY IC	003	S	99LIC098	10/20/99	11/17/99	11/17/99
NITRATE NITRITE	003	S	99LN3054	10/20/99	11/09/99	11/11/99
AMMONIA	003	S	99LAM043	10/20/99	11/08/99	11/08/99
PH	003	S	99LPH116	10/20/99	10/27/99	10/27/99
SULFIDE	003	S	99LSD062	10/20/99	10/26/99	10/26/99
SULFIDE	003 REP	S	99LSD062	10/20/99	10/26/99	10/26/99
SULFIDE	003 MS	S	99LSD062	10/20/99	10/26/99	10/26/99

LAB QC:

CHLORIDE BY IC	MB1	S	99LIC097	N/A	11/16/99	11/16/99
CHLORIDE BY IC	MB1 BS	S	99LIC097	N/A	11/16/99	11/16/99
CHLORIDE BY IC	MB1	S	99LIC098	N/A	11/17/99	11/17/99

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CHLORIDE BY IC	MB1 BS	S	99LIC098	N/A	11/17/99	11/17/99
FLUORIDE BY IC	MB1	S	99LIC097	N/A	11/16/99	11/16/99
FLUORIDE BY IC	MB1 BS	S	99LIC097	N/A	11/16/99	11/16/99
FLUORIDE BY IC	MB1	S	99LIC098	N/A	11/17/99	11/17/99
FLUORIDE BY IC	MB1 BS	S	99LIC098	N/A	11/17/99	11/17/99
NITRITE BY IC	MB1	S	99LIC097	N/A	11/16/99	11/16/99
NITRITE BY IC	MB1 BS	S	99LIC097	N/A	11/16/99	11/16/99
NITRATE BY IC	MB1	S	99LIC097	N/A	11/16/99	11/16/99
NITRATE BY IC	MB1 BS	S	99LIC097	N/A	11/16/99	11/16/99
NITRITE BY IC	MB1	S	99LIC098	N/A	11/17/99	11/17/99
NITRITE BY IC	MB1 BS	S	99LIC098	N/A	11/17/99	11/17/99
NITRATE BY IC	MB1	S	99LIC098	N/A	11/17/99	11/17/99
NITRATE BY IC	MB1 BS	S	99LIC098	N/A	11/17/99	11/17/99
TOTAL CYANIDE	LC1 L	S	99LC122	N/A	11/01/99	11/01/99
TOTAL CYANIDE	LC2 L	S	99LC122	N/A	11/01/99	11/01/99
TOTAL CYANIDE	MB1	S	99LC122	N/A	11/01/99	11/01/99
PHOSPHATE BY IC	MB1	S	99LIC097	N/A	11/16/99	11/16/99
PHOSPHATE BY IC	MB1 BS	S	99LIC097	N/A	11/16/99	11/16/99
PHOSPHATE BY IC	MB1	S	99LIC098	N/A	11/17/99	11/17/99
PHOSPHATE BY IC	MB1 BS	S	99LIC098	N/A	11/17/99	11/17/99
CHROMIUM VI	MB1	S	99LVI079	N/A	11/02/99	11/02/99
CHROMIUM VI	MB1 BS	S	99LVI079	N/A	11/02/99	11/02/99
CHROMIUM VI	MB1 BSD	S	99LVI079	N/A	11/02/99	11/02/99
SULFATE BY IC	MB1	S	99LIC098	N/A	11/17/99	11/17/99
SULFATE BY IC	MB1 BS	S	99LIC098	N/A	11/17/99	11/17/99
NITRATE NITRITE	MB1	S	99LN3054	N/A	11/09/99	11/11/99
NITRATE NITRITE	MB1 BS	S	99LN3054	N/A	11/09/99	11/11/99
NITRATE NITRITE	MB1 BSD	S	99LN3054	N/A	11/09/99	11/11/99
AMMONIA	MB1	S	99LAM043	N/A	11/08/99	11/08/99
AMMONIA	MB1 BS	S	99LAM043	N/A	11/08/99	11/08/99
AMMONIA	MB1 BSD	S	99LAM043	N/A	11/08/99	11/08/99
SULFIDE	MB1	S	99LSD062	N/A	10/26/99	10/26/99
SULFIDE	MB1 BS	S	99LSD062	N/A	10/26/99	10/26/99



Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-078-144		Page 1 of 1	
Collector Bowers/Trice		Company Contact Chris Cearlock		Telephone No. 372-9574		Project Coordinator TRENT, SJ		Price Code 8N	
Project Designation 200 Area Source characterization - 200-CW-1 OU		Sampling Location 200 B pond.		SAF No. B99-078		Data Turnaround <b>45 Days</b>			
Ice Chest No. ERC46033		Field Logbook No. EL-1511		Method of Shipment FEDEX					
Shipped To FMA/RECR 020 10-20-99 REZRA		Offsite Property No. A 000 003		Bill of Lading/Air Bill No. 42357953 0896					
				COA B20 CW1 671C					

015

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	None			
	Type of Container	aG	aG	aG	aG	aG	aG	aG			
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1			
	Volume	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL			
SAMPLE ANALYSIS	Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.				
Sample No.	Matrix *	Sample Date	Sample Time								
BOW MX1	Soil	10/20/99	0907		X	X	X	X	X		BOW8C2
BOW MX2	Soil	10/20/99	0912		X	X	X	X	X		BOW8C2
BOW MX3	Soil	10/20/99	0930		X	X	X	X	X		BOW8C2

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
Relinquished By Catherine Aug 10/20/99 1230	Received By Ref 3A 10/20/99 1230	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) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196 (2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010 (3) 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	Soil Water Vapor Other Solid Other Liquid
Relinquished By Ref 3A 10-20-99/0900	Received By RIKKI THORAN 10-21-99 0900		
Relinquished By RIKKI THORAN 10-21-99/1430	Received By FEDEX		
Relinquished By Fed Ex 10/22/99 0930	Received By 10-22-99 0930		
LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

PM  
797  
236

Temp 5.3



**Recra LabNet Philadelphia  
Analytical Report**

**Client :** TNU-HANFORD B99-078  
**RFW# :** 9910L475  
**SDG/SAF# :** H0588/B99-078

**W.O.# :** 10985-001-001-9999-00  
**Date Received:** 10-22-99

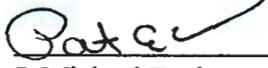
**METALS CASE NARRATIVE**

1. This narrative covers the analyses of 3 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. All cooler temperatures have 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 meaningful concentration levels, due to high concentrations of the following analytes:

<u>Sample ID</u>	<u>Element</u>	<u>PDS Concentration (ppb)</u>	<u>PDS % Recovery</u>
BOWMX1	Antimony	100	99.0

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 16 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.

  
\_\_\_\_\_  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

mld/m10-475

11-17-95  
Date



# METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this

Recra Lot#: 9910L475

Leaching Procedure: 1310 1311 1312 Other: \_\_\_\_\_

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

Metals Digestion Methods:   3005A   3010A   3015   3020A   ~~3050A~~   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> <sup>5</sup>	<u>200.7</u> <u>204.2</u>			<u>99</u>
Arsenic	<u>6010B</u> <u>7060A</u> <sup>5</sup>	<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> <sup>1</sup>	<u>200.7</u> <sup>1</sup>		<u>1620</u>	<u>99</u>
Boron	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Cadmium	<u>6010B</u> <u>7131A</u> <sup>5</sup>	<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> <sup>5</sup>	<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> <sup>5</sup>	<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> <sup>5</sup>	<u>200.7</u> <u>239.2</u>	<u>3113B</u>		<u>99</u>
Lithium	<u>6010B</u> <u>7430</u> <sup>4</sup>	<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> <sup>3</sup> <u>7471A</u> <sup>3</sup>	<u>245.1</u> <sup>2</sup> <u>245.5</u> <sup>2</sup>			<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> <sup>4</sup>	<u>200.7</u> <u>258.1</u> <sup>4</sup>			<u>99</u>
Rare Earths	<u>6010B</u> <sup>1</sup>	<u>200.7</u> <sup>1</sup>		<u>1620</u>	<u>99</u>
Selenium	<u>6010B</u> <u>7740</u> <sup>5</sup>	<u>200.7</u> <u>270.2</u>	<u>3113B</u>		<u>99</u>
Silicon	<u>6010B</u> <sup>1</sup>	<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> <sup>5</sup>	<u>200.7</u> <u>272.2</u>			<u>99</u>
Sodium	<u>6010B</u> <u>7770</u> <sup>4</sup>	<u>200.7</u> <u>273.1</u> <sup>4</sup>			<u>99</u>
Strontium	<u>6010B</u>	<u>200.7</u>			<u>99</u>
Thallium	<u>6010B</u> <u>7841</u> <sup>5</sup>	<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> <sup>1</sup>	<u>200.7</u> <sup>1</sup>		<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> <sup>1</sup>	<u>200.7</u> <sup>1</sup>		<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.

\* = 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 11/16/99

CLIENT: TNU-HANFORD B99-078  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING	DILUTION
					LIMIT	FACTOR
-001	B0WMX1	Silver, Total	0.79	MG/KG	0.08	1.0
		Arsenic, Total	5.0	MG/KG	0.28	1.0
		Barium, Total	65.7	MG/KG	0.02	1.0
		Beryllium, Total	0.30	MG/KG	0.03	1.0
		Cadmium, Total	0.21	MG/KG	0.04	1.0
		Chromium, Total	9.6	MG/KG	0.07	1.0
		Copper, Total	12.8	MG/KG	0.05	1.0
		Mercury, Total	0.16	MG/KG	0.02	1.0
		Nickel, Total	9.4	MG/KG	0.11	1.0
		Lead, Total	15.3	MG/KG	0.22	1.0
		Antimony, Total	0.22 u	MG/KG	0.22	1.0
		Selenium, Total	0.51	MG/KG	0.43	1.0
		Thallium, Total	1.3	MG/KG	0.45	1.0
		Vanadium, Total	51.3	MG/KG	0.06	1.0
		Zinc, Total	86.6	MG/KG	0.05	1.0
-002	B0WMX2	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	7.8	MG/KG	0.29	1.0
		Barium, Total	79.9	MG/KG	0.02	1.0
		Beryllium, Total	0.32	MG/KG	0.03	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	8.8	MG/KG	0.07	1.0
		Copper, Total	14.1	MG/KG	0.05	1.0
		Mercury, Total	0.03	MG/KG	0.02	1.0
		Nickel, Total	10.1	MG/KG	0.11	1.0
		Lead, Total	79.9	MG/KG	0.22	1.0
		Antimony, Total	0.22 u	MG/KG	0.22	1.0
		Selenium, Total	0.86	MG/KG	0.44	1.0
		Thallium, Total	1.4	MG/KG	0.46	1.0
		Vanadium, Total	58.6	MG/KG	0.06	1.0
		Zinc, Total	59.7	MG/KG	0.05	1.0

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/16/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9910L475

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING	DILUTION
					LIMIT	FACTOR
-003	B0WMX3	Silver, Total	0.06 u	MG/KG	0.06	1.0
		Arsenic, Total	6.0	MG/KG	0.20	1.0
		Barium, Total	72.5	MG/KG	0.02	1.0
		Beryllium, Total	0.28	MG/KG	0.02	1.0
		Cadmium, Total	0.1	MG/KG	0.03	1.0
		Chromium, Total	8.4	MG/KG	0.05	1.0
		Copper, Total	13.2	MG/KG	0.04	1.0
		Mercury, Total	0.02	MG/KG	0.02	1.0
		Nickel, Total	8.9	MG/KG	0.08	1.0
		Lead, Total	7.3	MG/KG	0.16	1.0
		Antimony, Total	0.16 u	MG/KG	0.16	1.0
		Selenium, Total	0.90	MG/KG	0.31	1.0
		Thallium, Total	1.3	MG/KG	0.32	1.0
		Vanadium, Total	53.2	MG/KG	0.05	1.0
		Zinc, Total	52.2	MG/KG	0.04	1.0

INORGANICS METHOD BLANK DATA SUMMARY PAGE 11/16/99

CLIENT: TNU-HANFORD B99-078  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9910L475

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
BLANK1	99L0740-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	0.05	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	99C0318-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 11/16/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9910L475

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

SAMPLE	SITE ID	ANALYTE	SPIKED	INITIAL	SPIKED	%RECOV	DILUTION
			SAMPLE	RESULT	AMOUNT		FACTOR (SPK)
-001	BOWMX1	Silver, Total	5.2	0.79	5.1	86.5	1.0
		Arsenic, Total	198	5.0	203	94.9	1.0
		Barium, Total	244	65.7	203	87.6	1.0
		Beryllium, Total	4.6	0.30	5.1	84.3	1.0
		Cadmium, Total	4.9	0.21	5.1	92.0	1.0
		Chromium, Total	30.7	9.6	20.3	103.9	1.0
		Copper, Total	35.2	12.8	25.4	88.2	1.0
		Mercury, Total	0.38	0.16	0.18	120.3	1.0
		Nickel, Total	57.3	9.4	50.7	94.5	1.0
		Lead, Total	63.2	15.3	50.7	94.5	1.0
		Antimony, Total	19.7	0.22u	50.7	38.9	1.0
		Selenium, Total	194	0.51	203	95.2	1.0
		Thallium, Total	194	1.3	203	94.7	1.0
		Vanadium, Total	102	51.3	50.7	100.2	1.0
		Zinc, Total	131	86.6	50.7	86.8	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 11/16/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9910L475

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

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION
			RESULT	REPLICATE	RPD	FACTOR (REP)
-001REP	B0WMX1	Silver, Total	0.79	0.82	3.1	1.0
		Arsenic, Total	5.0	6.1	19.8	1.0
		Barium, Total	65.7	71.0	7.8	1.0
		Beryllium, Total	0.30	0.30	0.63	1.0
		Cadmium, Total	0.21	0.22	7.4	1.0
		Chromium, Total	9.6	11.4	17.1	1.0
		Copper, Total	12.8	14.2	10.4	1.0
		Mercury, Total	0.16	0.13	16.6	1.0
		Nickel, Total	9.4	9.8	4.2	1.0
		Lead, Total	15.3	21.1	31.9	1.0
		Antimony, Total	0.22u	0.22u	NC	1.0
		Selenium, Total	0.51	1.0	65.4	1.0
		Thallium, Total	1.3	1.1	16.7	1.0
		Vanadium, Total	51.3	52.7	2.7	1.0
		Zinc, Total	86.6	94.9	9.1	1.0

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INORGANICS LABORATORY CONTROL STANDARDS REPORT 11/16/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9910L475

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

SAMPLE	SITE ID	ANALYTE	SPIKED	SPIKED	UNITS	%RECOV
			SAMPLE	AMOUNT		
LCS1	99L0740-LC1	Silver, LCS	48.1	50.0	MG/KG	96.2
		Arsenic, LCS	960	1000	MG/KG	96.0
		Barium, LCS	488	500	MG/KG	97.6
		Beryllium, LCS	24.4	25.0	MG/KG	97.5
		Cadmium, LCS	24.4	25.0	MG/KG	97.6
		Chromium, LCS	49.8	50.0	MG/KG	99.6
		Copper, LCS	122	125	MG/KG	97.8
		Nickel, LCS	195	200	MG/KG	97.4
		Lead, LCS	244	250	MG/KG	97.4
		Antimony, LCS	288	300	MG/KG	96.0
		Selenium, LCS	931	1000	MG/KG	93.1
		Thallium, LCS	978	1000	MG/KG	97.8
		Vanadium, LCS	253	250	MG/KG	101.2
		Zinc, LCS	95.5	100	MG/KG	95.5
LCS1	99C0318-LC1	Mercury, LCS	1.0	1.0	MG/KG	104.3

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOWMK1						
SILVER, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
SILVER, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99
SILVER, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99
ARSENIC, TOTAL	001	S	99L0740	10/20/99	10/30/99	11/01/99
ARSENIC, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	11/01/99
ARSENIC, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	11/01/99
BARIUM, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
BARIUM, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99
BARIUM, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99
BERYLLIUM, TOTAL	001	S	99L0740	10/20/99	10/30/99	11/01/99
BERYLLIUM, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	11/01/99
BERYLLIUM, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	11/01/99
CADMIUM, TOTAL	001	S	99L0740	10/20/99	10/30/99	11/01/99
CADMIUM, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	11/01/99
CADMIUM, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	11/01/99
CHROMIUM, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
CHROMIUM, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99
CHROMIUM, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99
COPPER, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
COPPER, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99
COPPER, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99
MERCURY, TOTAL	001	S	99C0318	10/20/99	10/28/99	10/29/99
MERCURY, TOTAL	001 REP	S	99C0318	10/20/99	10/28/99	10/29/99
MERCURY, TOTAL	001 MS	S	99C0318	10/20/99	10/28/99	10/29/99
NICKEL, TOTAL	001	S	99L0740	10/20/99	10/30/99	11/01/99
NICKEL, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	11/01/99
NICKEL, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	11/01/99
LEAD, TOTAL	001	S	99L0740	10/20/99	10/30/99	11/01/99
LEAD, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	11/01/99
LEAD, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	11/01/99
ANTIMONY, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
ANTIMONY, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99
ANTIMONY, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99
SELENIUM, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
SELENIUM, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SELENIUM, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99
THALLIUM, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
THALLIUM, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99
THALLIUM, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99
VANADIUM, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
VANADIUM, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99
VANADIUM, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99
ZINC, TOTAL	001	S	99L0740	10/20/99	10/30/99	10/31/99
ZINC, TOTAL	001 REP	S	99L0740	10/20/99	10/30/99	10/31/99
ZINC, TOTAL	001 MS	S	99L0740	10/20/99	10/30/99	10/31/99

B0WMX2

SILVER, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99
ARSENIC, TOTAL	002	S	99L0740	10/20/99	10/30/99	11/01/99
BARIUM, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99
BERYLLIUM, TOTAL	002	S	99L0740	10/20/99	10/30/99	11/01/99
CADMIUM, TOTAL	002	S	99L0740	10/20/99	10/30/99	11/01/99
CHROMIUM, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99
COPPER, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99
MERCURY, TOTAL	002	S	99C0318	10/20/99	10/28/99	10/29/99
NICKEL, TOTAL	002	S	99L0740	10/20/99	10/30/99	11/01/99
LEAD, TOTAL	002	S	99L0740	10/20/99	10/30/99	11/01/99
ANTIMONY, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99
SELENIUM, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99
THALLIUM, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99
VANADIUM, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99
ZINC, TOTAL	002	S	99L0740	10/20/99	10/30/99	10/31/99

B0WMX3

SILVER, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99
ARSENIC, TOTAL	003	S	99L0740	10/20/99	10/30/99	11/03/99
BARIUM, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99
BERYLLIUM, TOTAL	003	S	99L0740	10/20/99	10/30/99	11/01/99
CADMIUM, TOTAL	003	S	99L0740	10/20/99	10/30/99	11/03/99
CHROMIUM, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99
COPPER, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY, TOTAL	003	S	99C0318	10/20/99	10/28/99	10/29/99
NICKEL, TOTAL	003	S	99L0740	10/20/99	10/30/99	11/03/99
LEAD, TOTAL	003	S	99L0740	10/20/99	10/30/99	11/03/99
ANTIMONY, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99
SELENIUM, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99
THALLIUM, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99
VANADIUM, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99
ZINC, TOTAL	003	S	99L0740	10/20/99	10/30/99	10/31/99

LAB QC:

SILVER LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
SILVER, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
ARSENIC LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
ARSENIC, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
BARIUM LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
BARIUM, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
BERYLLIUM LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
BERYLLIUM, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
CADMIUM LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
CADMIUM, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
CHROMIUM LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
CHROMIUM, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
COPPER LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
COPPER, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
MERCURY LABORATORY	LC1 BS	S	99C0318	N/A	10/28/99	10/29/99
MERCURY, TOTAL	MB1	S	99C0318	N/A	10/28/99	10/29/99
NICKEL LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
NICKEL, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
LEAD LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
LEAD, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
ANTIMONY LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
ANTIMONY, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
SELENIUM LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
SELENIUM, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
THALLIUM LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
THALLIUM, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
VANADIUM LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
VANADIUM, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99
ZINC LABORATORY	LC1 BS	S	99L0740	N/A	10/30/99	10/31/99
ZINC, TOTAL	MB1	S	99L0740	N/A	10/30/99	10/31/99



extra

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-078-144	Page 1 of 1
Collector Bowers/Trice		Company Contact Chris Cearlock		Telephone No. 372-9574		Project Coordinator TRENT, SJ	
Project Designation 200 Area Source characterization - 200-CW-1 OU		Sampling Location 200 B pond.		SAF No. B99-078		Price Code 8N Data Turnaround 45 Days	
Ice Chest No. ERC 96 033		Field Logbook No. EL-1511		Method of Shipment FED EX			
Shipped To FMA/RECRE 8/20/10-20-99 REZRA		Offsite Property No. A 000 003		Bill of Lading/Air Bill No. 42357953 0896 COA B20 CW1 071C			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation		None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	None			
	Type of Container		aG	aG	aG	aG	aG	aG	aG			
	No. of Container(s)		1	1	1	1	1	1	1			
Special Handling and/or Storage	Volume		60mL	250mL	250mL	500mL	500mL	1000mL	1000mL			
SAMPLE ANALYSIS			Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.			
Sample No.	Matrix *	Sample Date	Sample Time									
BOW MX1	Soil	10/20/99	0907		X	X	X	X	X			BOW8C2
BOW MX2	Soil	10/20/99	0912		X	X	X	X	X			BOW8C2
BOW MX3	Soil	10/20/99	0930		X	X	X	X	X			BOW8C2

CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS See chain of custody comments on SAF B99-078.				Matrix *	
Relinquished By Catherine Anco Date/Time 10/20/99 1230	Received By Ref 3A Date/Time 10/20/99 1230		(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196		Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082		See item (2) in Special Instructions.		See item (3) in Special Instructions.		Soil
Relinquished By Ref 3A Date/Time 10-20-99/0900	Received By RIKKI THORAN Date/Time 10-21-99 0900		(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010		See item (2) in Special Instructions.		See item (3) in Special Instructions.				Water
Relinquished By Rikki Thoran Date/Time 10-21-99/1430	Received By FED EX Date/Time 10-21-99/1430		(3) 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								Vapor
Relinquished By Fed Ex Date/Time 10/22/99 0930	Received By Katherine Date/Time 10-22-99 0930										Other Solid
LABORATORY SECTION	Received By	Title				Date/Time					
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time					

2M  
797  
852  
10-20-99  
236

076

10/25/99

**Recra LabNet Philadelphia  
Analytical Report**

**Client:** TNU HANFORD B99-078

**RFW #:** 9910L475

**SDG/SAF#:** H0588/B99-078

**W.O. #:** 10985-001-001-9999-00

**Date Received:** 10-22-99

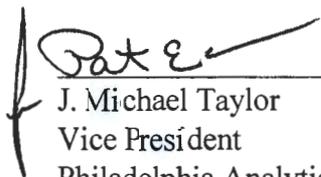
**GC SCAN**

The set of samples consisted of three (3) soil samples collected on 10-20-99.

The samples and their associated QC samples were prepared on 10-25-99 and analyzed by methodology based on EPA Method 8015B for Ethanol and 1-Propanol on 10-30-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding time for analysis was met.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. Surrogates were not used for this analysis.
6. All blank spike recoveries were within advisory control limits of 50%-150%.
7. All matrix spike recoveries were outside advisory control limits of 50%-150%. The extracts were originally analyzed on a different GC system on 10-27-99 with recoveries of 118% and 107% for the MS and MSD, respectively. The data from this original analysis were rejected because there was a laboratory contaminant which interfered with the measurement of Ethanol. It should be noted that the samples were spiked with a non-target analyte (Methanol) which was not affected the way 1-Propanol was during the time between the first and second analyses. A copy of the Sample Discrepancy Report (SDR) has been enclosed in the data package.

  
\_\_\_\_\_  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

r:\share\lc\gcscan\10-475.doc

11-15-99  
Date



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 7 pages.

001

## GLOSSARY OF OGCS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates spiked compound.

Recra LabNet Philadelphia Sample Discrepancy Report (SDR) SDR #:

99LCP56

Initiator: C. Schnell  
 Date: 11/2/99  
 Client: TNU - Hayward

RFW Batch: 9910L420 001-004  
 Samples: 9910L453 001-007  
 Method: 9910L475 001-003  
SW846/MCAWW/CLP/

Parameter: OGCSE  
 Matrix: Seal  
 Prep Batch: \_\_\_\_\_

**1. Reason for SDR**

a. COC Discrepancy  Tech Profile Error  Client Request  Sampler Error on C-O-C  
 Transcription Error  Wrong Test Code  Other \_\_\_\_\_

b. General Discrepancy  
 Missing Sample/Extract  Container Broken  Wrong Sample Pulled  Label ID's Illegible  
 Hold Time Exceeded  Insufficient Sample  Preservation Wrong  Received Past Hold  
 Improper Bottle Type  Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: \_\_\_\_\_

c. QC Problem (Include all relevant specific results; attach data if necessary)

1- propand recoveries low in matrix spikes.

**2. Known or Probable Causes(s)**

Sample extracts were originally analyzed on the day of preparation with acceptable 1-propand recovery but the data was rejected due to the presence of a laboratory contaminant which interfered with another target analyte (Ethanol). Re-analysis one week later yielded reduced 1-propand recoveries.

**3. Discussion and Proposed Action** Other Description: Options =

Re-log  
 Entire Batch  
 Following Samples: \_\_\_\_\_  
 Re-leach  
 Re-extract  
 Re-digest  
 Revise EDD  
 Change Test Code to \_\_\_\_\_  
 Place On/Take Off Hold (circle)

1. Report 1-propand from the first GC run on 10/26/99 and Ethanol from second GC run on 10/30/99, with the constraint that LMS can handle only one analysis date. Narrate analysis dates.  
 2. Re-extract and reanalyze.  
 3. Report all from 2nd run and narrate 1-propand results from first run.

**4. Project Manager Instructions...** signature/date: [Signature] 11/2/99

Concur with Proposed Action option 3  
 Disagree with Proposed Action; See Instruction  
 Include in Case Narrative  
 Client Contacted:  
 Date/Person \_\_\_\_\_  
 Add  
 Cancel

**5. Final Action...** signature/date: [Signature] Other Explanation:

Verified re-[log][leach][extract][digest][analysis] (circle)  
 Included in Case Narrative  
 Hard Copy COC Revised  
 Electronic COC Revised  
 EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
<u>2</u>	<input checked="" type="checkbox"/> Initiator	—	Metals: Doughty
	<input checked="" type="checkbox"/> Lab Manager: M. Taylor	—	Inorganic: Perrone
<u>I</u>	<input checked="" type="checkbox"/> Project Mgr: Stone/Carey/Schrenkel/Johnson	—	GC/LC: Schnell
	<input checked="" type="checkbox"/> Section Mgr: Wesson/Daniels	—	MS: LeMin/Taylor
<u>H</u>	<input checked="" type="checkbox"/> QA (file): Racioppi	—	Log-in: Toder
<u>2</u>	<input type="checkbox"/> Data Management: Feldman	—	Admin: Soos
—	<input type="checkbox"/> Sample Prep: Schnell/Doughty/Kauffman	—	Other: _____

Recra LabNet - Lionville Laboratory

GC SCAN

Report Date: 11/04/99 16:06

RFW Batch Number: 9910L475

Client: TNU-HANFORD B99-078

Work Order: 10985-001-001-9999-00

Page: 1

Sample Information	Cust ID:	B0WMX1	B0WMX1	B0WMX1	B0WMX2	B0WMX3	BLK
	RFW#:	001	001 MS	001 MSD	002	003	99LLC163-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg

004

	fl	fl	fl	fl	fl	fl	fl
n-Propyl Alcohol	5.5 U	10 * %	14 * %	5.5 U	5.5 U	5.0 U	5.0 U
Ethanol	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	5.0 U	5.0 U

Cust ID: BLK BS

Sample Information	RFW#:	99LLC163-MB1
	Matrix:	SOIL
	D.F.:	1.00
	Units:	mg/kg

	fl	fl	fl	fl	fl	fl
n-Propyl Alcohol	121 %					
Ethanol	5.0 U					

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.  
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of Advisory limits.

*epal/bs*

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOWMX1	001	S	99LLC163	10/20/99	10/25/99	10/30/99
BOWMX1	001 MS	S	99LLC163	10/20/99	10/25/99	10/30/99
BOWMX1	001 MSD	S	99LLC163	10/20/99	10/25/99	10/30/99
BOWMX2	002	S	99LLC163	10/20/99	10/25/99	10/30/99
BOWMX3	003	S	99LLC163	10/20/99	10/25/99	10/30/99

LAB QC:

BLK	MB1	S	99LLC163	N/A	10/25/99	10/30/99
BLK	MB1 BS	S	99LLC163	N/A	10/25/99	10/30/99

*Handwritten signature*  
10/18/99



<b>Bechtel Hanford Inc.</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>			B99-078-144	Page 1 of 1	
Collector Bowers/Trice		Company Contact Chris Cearlock		Telephone No. 372-9574	Project Coordinator TRENT, SJ	Price Code 8N	Data Turnaround 45 Days-00
Project Designation 200 Area Source characterization - 200-CW-1 OU		Sampling Location 200 B pond.		SAF No. B99-078			00
Ice Chest No. ERC 46033		Field Logbook No. EL-1511		Method of Shipment FED EX			
Shipped To FMA/RECRA 070 10-20-99 RECRA		Offsite Property No. A 000003		Bill of Lading/Air Bill No. 42357953 0896			
				COA B20 CW1 671C			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None			
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG			
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1	1			
	Volume	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL				
<b>SAMPLE ANALYSIS</b>		Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.				
Sample No.	Matrix *	Sample Date	Sample Time									
BOW MX1	Soil	10/20/99	0907		X	X	X	X	X			BOW8C2
BOW MX2	Soil	10/20/99	0912		X	X	X	X	X			BOW8C2
BOW MX3	Soil	10/20/99	0930		X	X	X	X	X			BOW8C2

<b>CHAIN OF POSSESSION</b>		<b>Sign/Print Names</b>			<b>SPECIAL INSTRUCTIONS</b> See chain of custody comments on SAF B99-078.				<b>Matrix *</b> Soil Water Vapor Other Solid Other Liquid	
Relinquished By Catherine Auer	Date/Time 10/20/99 1230	Received By Ref 3A	Date/Time 10/20/99 1230	(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196 (2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010 (3) 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						
Relinquished By Ref 3A	Date/Time 10/20/99/0900	Received By RIKKI THORAN	Date/Time 10/21/99 0900							
Relinquished By Rikki Thoran	Date/Time 10/21/99/1430	Received By FED EX	Date/Time 10/21/99 1430							
Relinquished By Fed Ex	Date/Time 10/22/99 0930	Received By H. Hennings	Date/Time 10/22/99 0930							
<b>LABORATORY SECTION</b>	Received By	Title						Date/Time		
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method	Disposed By				Date/Time				

PM  
797  
052  
10-20-99  
236

Handwritten signature/initials

**Recra LabNet Philadelphia  
Analytical Report**

**Client :** TNU-HANFORD B99-078  
**RFW# :** 9910L475  
**SDG/SAF#:** H0588/B99-078

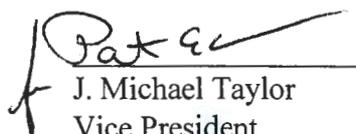
**W.O #:** 10985-001-001-9999-00  
**Date Received:** 10-22-99

**DIESEL RANGE ORGANICS**

The set of samples consisted of three (3) soil samples collected on 10-20-99.

The sample and its associated QC samples were prepared on 10-25-99 and analyzed by methodology based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 11-13,16,17-99. The analysis met the intent of method WTPH-D.

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis were met.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.

  
J. Michael Taylor  
Vice President

Philadelphia Analytical Laboratory

R:\SHARE\LC\GCSCAN\10-475d.doc

11-22-99  
Date



## GLOSSARY OF DIESEL DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates spiked compound.

Recra LabNet - Lionville Laboratory

DIESEL RANGE ORGANICS BY GC

Report Date: 11/18/99 08:52

RFW Batch Number: 9910L475

Client: TNU-HANFORD B99-078

Work Order: 10985-001-001-9999-00

Page: 1

30

	Cust ID:	BOWMX1	BOWMX1	BOWMX1	BOWMX2	BOWMX3	BLK
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	99LE1294-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Surrogate:	p-Terphenyl	83 %	83 %	90 %	54 %	53 %	74 %
		-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----
Diesel Range Organics		4.5 U	76 %	84 %	4.3 U	4.3 U	4.0 U

	Cust ID:	BLK BS
Sample Information	RFW#:	99LE1294-MB1
	Matrix:	SOIL
	D.F.:	1.00
	Units:	mg/kg
Surrogate:	p-Terphenyl	77 %
		-----fl-----
Diesel Range Organics		96 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of Advisory limits.

*Handwritten signature/initials*

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOWMX1	001	S	99LE1294	10/20/99	10/25/99	11/17/99
BOWMX1	001 MS	S	99LE1294	10/20/99	10/25/99	11/17/99
BOWMX1	001 MSD	S	99LE1294	10/20/99	10/25/99	11/17/99
BOWMX2	002	S	99LE1294	10/20/99	10/25/99	11/13/99
BOWMX3	003	S	99LE1294	10/20/99	10/25/99	11/13/99

LAB QC:

BLK	MB1	S	99LE1294	N/A	10/25/99	11/16/99
BLK	MB1 BS	S	99LE1294	N/A	10/25/99	11/16/99

*Callahan*



extra

Bechtel Hanford Inc.		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>				B99-078-144	Page 1 of 1
Collector Bowers/Trice		Company Contact Chris Cearlock		Telephone No. 372-9574		Project Coordinator TRENT, SJ	
Project Designation 200 Area Source characterization - 200-CW-1 OU		Sampling Location 200 B pond		SAF No. B99-078		Price Code 8N Data Turnaround <b>45 Days</b>	
Ice Chest No. <b>ERC 46 033</b>		Field Logbook No. EL-1511		Method of Shipment FED EX			
Shipped To FMA/RECRA 070 10 20 99 REZRA		Offsite Property No. <b>A 000 003</b>		Bill of Lading/Air Bill No. <b>42357953 0896</b>			
				COA <b>B20 CW1 071C</b>			

06

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	None			
	Type of Container	aG	aG	aG	aG	aG	aG	aG			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage	Volume	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL			

SAMPLE ANALYSIS				Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.		
-----------------	--	--	--	------------------	---	------------------	---------------------------------------	--	---------------------------------------	---------------------------------------	--	--

PM  
7:47  
10:55  
10:16  
236

Sample No.	Matrix *	Sample Date	Sample Time								
BOW MX1	Soil	10/20/99	0907	X	X	X	X	X			BOW8C2
BOW MX2	Soil	10/20/99	0912	X	X	X	X	X			BOW8C2
BOW MX3	Soil	10/20/99	0930	X	X	X	X	X			BOW8C2

CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS See chain of custody comments on SAF B99-078.				Matrix * Soil Water Vapor Other Solid Other Liquid	
Relinquished By <i>Catherine</i>	Date/Time 10/20/99 1230	Received By <i>Ref 3A</i>	Date/Time 10/20/99 1230	(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196 (2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010 (3) 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							
Relinquished By <i>Ref 3A</i>	Date/Time 10.20.99/0900	Received By <i>RIKKE THORAN</i>	Date/Time 10.21.99 0900								
Relinquished By <i>Rikke Thoran</i>	Date/Time 10.21.99/1430	Received By <i>FED EX</i>	Date/Time								
Relinquished By <i>Fed Ex</i>	Date/Time 10/22/99 0930	Received By <i>V. Hernandez</i>	Date/Time 10.22.99 0930								
LABORATORY SECTION	Received By									Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method					Disposed By				Date/Time	

See 15.2

**Recra LabNet Philadelphia  
Analytical Report**

**Client:** TNU-HANFORD B99-078  
**RFW#:** 9910L475  
**SDG/SAF#:** H0588/B99-078

**W.O.#:** 10985-001-001-9999-00  
**Date Received:** 10-22-99

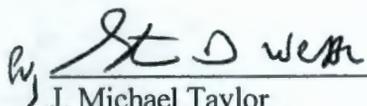
**PCB**

The set of samples consisted of three (3) soil samples collected on 10-20-99.

The samples and their associated QC samples were extracted on 10-28-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 11-12,13-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. One (1) of eight (8) surrogate recoveries were outside QC limits; however, the surrogate recovery acceptance criteria were met (i.e., no more than one outlier per sample).
6. The blank spike recovery was within acceptance criteria.
7. Matrix spike recoveries were unobtainable due to the high concentration of analytes.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
\_\_\_\_\_  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

pefr:\group\data\pest\10L-475.pcb

11-22-99  
Date



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 7 pages.

GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



GLOSSARY OF PESTICIDE/PCB DATA

- P** = This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.



Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 11/16/99 17:46

RFW Batch Number: 9910L475

Client: TNU-HANFORD B99-078

Work Order: 10985001001 Page: 1

04

Sample Information	Cust ID:	BOWMX1	BOWMX1	BOWMX1	BOWMX2	BOWMX3	PBLKYI
	RFW#:	001	001 MS	001 MSD	002	003	99LE1310-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	5.00	5.00	5.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	D %	D %	D %	115 %	118 %	110 %
	Decachlorobiphenyl	D %	D %	D %	117 %	126 * %	81 %
		-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----
Aroclor-1016		190 U	190 U	190 U	36 U	36 U	33 U
Aroclor-1221		380 U	380 U	380 U	72 U	72 U	67 U
Aroclor-1232		190 U	190 U	190 U	36 U	36 U	33 U
Aroclor-1242		190 U	190 U	190 U	36 U	36 U	33 U
Aroclor-1248		190 U	190 U	190 U	36 U	36 U	33 U
Aroclor-1254		190 U	D %	D %	36 U	36 U	33 U
Aroclor-1260		440	510	450	110	120	33 U

Cust ID: PBLKYI BS

Sample Information RFW#: 99LE1310-MB1  
 Matrix: SOIL  
 D.F.: 1.00  
 Units: UG/KG

Surrogate:	Tetrachloro-m-xylene	112 %	
	Decachlorobiphenyl	88 %	
		-----fl-----	-----fl-----
Aroclor-1016		33 U	
Aroclor-1221		67 U	
Aroclor-1232		33 U	
Aroclor-1242		33 U	
Aroclor-1248		33 U	
Aroclor-1254		103 %	
Aroclor-1260		33 U	

gnd  
11-17-99

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOWMX1	001	S	99LE1310	10/20/99	10/28/99	11/13/99
BOWMX1	001 MS	S	99LE1310	10/20/99	10/28/99	11/13/99
BOWMX1	001 MSD	S	99LE1310	10/20/99	10/28/99	11/13/99
BOWMX2	002	S	99LE1310	10/20/99	10/28/99	11/12/99
BOWMX3	003	S	99LE1310	10/20/99	10/28/99	11/13/99

LAB QC:

PBLKYI	MB1	S	99LE1310	N/A	10/28/99	11/12/99
PBLKYI	MB1 BS	S	99LE1310	N/A	10/28/99	11/12/99

*aw*  
11-17-99



99106475

A11

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

④ metals

90

Client <u>TNU-HANFORD B99-078</u>	Refrigerator # <u>1 2</u>
Est. Final Proj. Sampling Date _____	#/Type Container
Project # <u>10985-001-001-9999-00</u>	Liquid _____
Project Contact/Phone # _____	Solid <u>IAG IAG</u> — <u>I IAG IAG IAG</u>
RECRA Project Manager <u>OJ</u>	Volume
QC <u>Spec</u> Del <u>std</u> TAT <u>30 days</u>	Liquid _____
Date Rec'd <u>10/22/99</u> Date Due <u>11/21/99</u>	Solid <u>250 500</u> — <u>I 250 500 1LT</u>
Account # _____	Preservatives _____
	ANALYSES REQUESTED →
	ORGANIC
	VOA BNA PEST PCB TPH Metals PH INORG IC ANIONS

MATRIX CODES: S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum DL - Drum L - EP/TCLP Leachate WI - Wipe X - Other F - Fish	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	RECRA LabNet Use Only													
			MS	MSD				VOA	BNA	PEST	PCB	TPH	Metals	PH	INORG	IC	ANIONS				
	001	BOW MX1			S	10/20/99	0907	1	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	002	1 2			L	1	0912	1	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	003	1 3			L	1	0930	1	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

11/3/99  
SB and TL added to all metals samples per client

Special Instructions:  
Ref # B99-078

DATE/REVISIONS:  
met ① = As, Ba, Be, Cd, Cr, Cu, Pb, Ni,  
2. Se, Ag, V, Zn, Hg  
Ang ③ = IN3N2, ICCL, ICFL, IC504, ICN02,  
4. ICN03, ICPO4, ISFD, INH3N, ICR6  
5. \_\_\_\_\_  
6. Run matrix QC

COMPOSITE WASTE

RECRA LabNet Use Only	
Samples were: 1) Shipped <input checked="" type="checkbox"/> or Hand Delivered	COC Tape was: 1) Present on Outer Package <input checked="" type="checkbox"/> or N
Airbill <u>Spec Lab</u>	2) Unbroken on Outer Package <input checked="" type="checkbox"/> or N
2) Ambient or <u>Chilled</u>	3) Present on Sample <input checked="" type="checkbox"/> or N
3) Received in Good Condition <input checked="" type="checkbox"/> or N	4) Unbroken on Sample <input checked="" type="checkbox"/> or N
4) Labels Indicate Property Preserved <input checked="" type="checkbox"/> or N	COC Record Present Upon Sample Rec't <input checked="" type="checkbox"/> or N
5) Received Within Holding Times <input checked="" type="checkbox"/> or N	Cooler Temp. <u>5.3</u> °C

Relinquished by	Received by	Date	Time
<u>[Signature]</u>	<u>[Signature]</u>	<u>10/22/99</u>	<u>0930</u>

Relinquished by	Received by	Date	Time
	<b>ORIGINAL</b>		
	<b>REWRITTEN</b>		

Discrepancies Between Samples Labels and COC Record? Y or  N  
 NOTES:  
4235 7953 0896

extra

Collector Bowers/Trice	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ	Price Code 8N	Data Turnaround <b>45 Days</b> C
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location 200 B pond.	SAF No. B99-078			
Ice Chest No. <b>ERC 46 033</b>	Field Logbook No. EL-1511	Method of Shipment FED EX			
Shipped To FMA/RECREA 023 10-20-99 REZRA	Offsite Property No. <b>A 000003</b>	Bill of Lading/Air Bill No. <b>42357953 0896</b> COA B20 CWI 071C			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	None				
	Type of Container	aG	aG	aG	aG	aG	aG	aG				
	No. of Container(s)	1	1	1	1	1	1	1				
	Volume	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL				
Special Handling and/or Storage												

SAMPLE ANALYSIS	Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.				
-----------------	------------------	---	------------------	---------------------------------------	--	---------------------------------------	---------------------------------------	--	--	--	--

P/A  
717  
10/20/99  
236

Sample No.	Matrix *	Sample Date	Sample Time	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	None	None	None
BOW MX1	Soil	10/20/99	0907		X	X	X	X	X			
BOW MX2	Soil	10/20/99	0912		X	X	X	X	X			
BOW MX3	Soil	10/20/99	0930		X	X	X	X	X			

BOW8C2  
BOW8C2  
BOW8C2

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
See chain of custody comments on SAF B99-078.		<p>(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196</p> <p>(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010</p> <p>(3) 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</p>	Soil Water Vapor Other Solid Other Liquid
Relinquished By <i>Catherine</i> 1230 Date/Time 10/20/99	Received By <i>Ref 3A</i> 1230 Date/Time 10/20/99		
Relinquished By <i>Ref 3A</i> 2100 Date/Time 10-20-99/0900	Received By <i>RIKKITHORAN</i> Date/Time 10-21-99 0900		
Relinquished By <i>Rikkithoran</i> Date/Time 10-21-99/1430	Received By <i>FED EX</i> Date/Time 10-22-99 0930		
Relinquished By <i>Fed Ex</i> Date/Time 10/22/99 0930	Received By <i>H. Hennings</i> Date/Time 10-22-99 0930		
LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

See 252

**Recra LabNet Philadelphia  
Analytical Report  
\*\*REVISION\*\***

**Client :** TNU-HANFORD B99-078  
**RFW # :** 9910L475  
**SDG/SAF #:** H0588/B99-078

**W.O. #:** 10985-001-001-9999-00  
**Date Received:** 10-22-99

**SEMIVOLATILE**

This narrative was corrected to add the TIC search for Tributylphosphate.

Three (3) soil samples were collected on 10-20-99.

The samples and their associated QC samples were extracted on 10-28-99 and analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8270B for TCL Semivolatile target compounds on 11-03-99.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding times for extraction and analysis were met.
3. Non-target compounds were detected in the samples.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The samples were spectrally searched for Butylated Hydroxytoluene and Tributylphosphate; however, they were not identified in the samples.



J. Michael Taylor  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

01-17-00  
Date

som\group\data\bna\tnu10475.doc

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 14 pages.

## GLOSSARY OF BNA DATA

### DATA QUALIFIERS

- U** = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J** = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D** = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I** = Interference.
- NQ** = Result qualitatively confirmed but not able to quantify.
- A** = Indicates that a TIC is a suspected aldol-condensation product.
- N** = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X** = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y** = Additional qualifiers used as required are explained in the case narrative.



## GLOSSARY OF BNA DATA

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP, Z** = Indicates Spiked Compound.



Recra LabNet - Lionville Laboratory

Semivolatiles by GC/MS, HSL List

Report Date: 11/22/99 15:01

04

RFW Batch Number: 9910L475

Client: TNU-HANFORD B99-078

Work Order: 10985001001

Page: 1a

Cust ID:	BOWMX1	BOWMX1	BOWMX1	BOWMX2	BOWMX3	SBLKFK	
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	99LE1313-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate	Nitrobenzene-d5	77 %	66 %	68 %	73 %	74 %	71 %
Recovery	2-Fluorobiphenyl	85 %	73 %	77 %	79 %	81 %	78 %
	Terphenyl-d14	88 %	73 %	76 %	80 %	77 %	77 %
	Phenol-d5	66 %	58 %	58 %	58 %	64 %	56 %
	2-Fluorophenol	70 %	62 %	62 %	65 %	69 %	59 %
	2,4,6-Tribromophenol	74 %	72 %	79 %	66 %	68 %	62 %
-----f1-----f1-----f1-----f1-----f1-----f1-----f1							
Phenol		380 U	60 %	56 %	360 U	350 U	330 U
bis(2-Chloroethyl) ether		380 U	370 U	380 U	360 U	350 U	330 U
2-Chlorophenol		380 U	67 %	63 %	360 U	350 U	330 U
1,3-Dichlorobenzene		380 U	370 U	380 U	360 U	350 U	330 U
1,4-Dichlorobenzene		380 U	67 %	66 %	360 U	350 U	330 U
1,2-Dichlorobenzene		380 U	370 U	380 U	360 U	350 U	330 U
2-Methylphenol		380 U	370 U	380 U	360 U	350 U	330 U
2,2'-oxybis(1-Chloropropane)		380 U	370 U	380 U	360 U	350 U	330 U
4-Methylphenol		380 U	370 U	380 U	360 U	350 U	330 U
N-Nitroso-di-n-propylamine		380 U	68 %	69 %	360 U	350 U	330 U
Hexachloroethane		380 U	370 U	380 U	360 U	350 U	330 U
Nitrobenzene		380 U	370 U	380 U	360 U	350 U	330 U
Isophorone		380 U	370 U	380 U	360 U	350 U	330 U
2-Nitrophenol		380 U	370 U	380 U	360 U	350 U	330 U
2,4-Dimethylphenol		380 U	370 U	380 U	360 U	350 U	330 U
bis(2-Chloroethoxy) methane		380 U	370 U	380 U	360 U	350 U	330 U
2,4-Dichlorophenol		380 U	370 U	380 U	360 U	350 U	330 U
1,2,4-Trichlorobenzene		380 U	76 %	76 %	360 U	350 U	330 U
Naphthalene		380 U	370 U	380 U	360 U	350 U	330 U
4-Chloroaniline		380 U	370 U	380 U	360 U	350 U	330 U
Hexachlorobutadiene		380 U	370 U	380 U	360 U	350 U	330 U
4-Chloro-3-methylphenol		380 U	67 %	63 %	360 U	350 U	330 U
2-Methylnaphthalene		380 U	370 U	380 U	360 U	350 U	330 U
Hexachlorocyclopentadiene		380 U	370 U	380 U	360 U	350 U	330 U
2,4,6-Trichlorophenol		380 U	370 U	380 U	360 U	350 U	330 U
2,4,5-Trichlorophenol		960 U	940 U	940 U	900 U	880 U	840 U

\*= Outside of EPA CLP QC limits.

	Cust ID:	BOWMX1	BOWMX1	BOWMX1	BOWMX2	BOWMX3	SBLKFK
RFW#:	001	001 MS	001 MSD	002	003	99LE1313-MB1	
2-Chloronaphthalene	380 U	370 U	380 U	360 U	350 U	330 U	U
2-Nitroaniline	960 U	940 U	940 U	900 U	880 U	840 U	U
Dimethylphthalate	380 U	370 U	380 U	360 U	350 U	330 U	U
Acenaphthylene	380 U	370 U	380 U	360 U	350 U	330 U	U
2,6-Dinitrotoluene	380 U	370 U	380 U	360 U	350 U	330 U	U
3-Nitroaniline	960 U	940 U	940 U	900 U	880 U	840 U	U
Acenaphthene	380 U	75 %	75 %	360 U	350 U	330 U	U
2,4-Dinitrophenol	960 U	940 U	940 U	900 U	880 U	840 U	U
4-Nitrophenol	960 U	74 %	71 %	900 U	880 U	840 U	U
Dibenzofuran	380 U	370 U	380 U	360 U	350 U	330 U	U
2,4-Dinitrotoluene	380 U	71 %	69 %	360 U	350 U	330 U	U
Diethylphthalate	380 U	370 U	380 U	360 U	350 U	330 U	U
4-Chlorophenyl-phenylether	380 U	370 U	380 U	360 U	350 U	330 U	U
Fluorene	380 U	370 U	380 U	360 U	350 U	330 U	U
4-Nitroaniline	960 U	940 U	940 U	900 U	880 U	840 U	U
4,6-Dinitro-2-methylphenol	960 U	940 U	940 U	900 U	880 U	840 U	U
N-Nitrosodiphenylamine (1)	380 U	370 U	380 U	360 U	350 U	330 U	U
4-Bromophenyl-phenylether	380 U	370 U	380 U	360 U	350 U	330 U	U
Hexachlorobenzene	380 U	370 U	380 U	360 U	350 U	330 U	U
Pentachlorophenol	960 U	79 %	78 %	900 U	880 U	840 U	U
Phenanthrene	21 J	28 J	36 J	360 U	28 J	330 U	U
Anthracene	380 U	370 U	380 U	360 U	350 U	330 U	U
Carbazole	380 U	370 U	380 U	360 U	350 U	330 U	U
Di-n-butylphthalate	39 J	28 J	380 U	360 U	350 U	330 U	U
Fluoranthene	64 J	81 J	170 J	360 U	79 J	330 U	U
Pyrene	73 J	77 %	81 %	360 U	75 J	330 U	U
Butylbenzylphthalate	380 U	370 U	380 U	360 U	350 U	330 U	U
3,3'-Dichlorobenzidine	380 U	370 U	380 U	360 U	350 U	330 U	U
Benzo(a)anthracene	26 J	30 J	81 J	360 U	30 J	330 U	U
Chrysene	49 J	57 J	130 J	360 U	51 J	330 U	U
bis(2-Ethylhexyl)phthalate	380 U	50 J	26 J	360 U	23 J	330 U	U
Di-n-octyl phthalate	380 U	370 U	380 U	360 U	350 U	330 U	U
Benzo(b)fluoranthene	41 J	48 J	91 J	360 U	40 J	330 U	U
Benzo(k)fluoranthene	38 J	51 J	110 J	360 U	44 J	330 U	U
Benzo(a)pyrene	37 J	51 J	110 J	360 U	45 J	330 U	U
Indeno(1,2,3-cd)pyrene	29 J	42 J	68 J	360 U	26 J	330 U	U
Dibenz(a,h)anthracene	380 U	370 U	19 J	360 U	350 U	330 U	U
Benzo(g,h,i)perylene	36 J	49 J	65 J	360 U	29 J	330 U	U

(1) - Cannot be separated from Diphenylamine. \*= Outside of EPA CLP QC limits.

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B0WMX1

Lab Name: Recra.LabNet                      Work Order: 10985001001

Client: TNU-HANFORD B99-078

Matrix: (soil/water) SOIL    Lab Sample ID: 99101475-001

Sample wt/vol: 29.3                      (g/mL) G    Lab File ID: D110307

Level:        (low/med) LOW    Date Received: 10/22/99

% Moisture: 11        decanted: (Y/N)        Date Extracted: 10/28/99

Concentrated Extract Volume: 1000 (uL)    Date Analyzed: 11/03/99

Injection Volume: 2.0 (uL)    Dilution Factor: 1.00

GPC Cleanup:    (Y/N) N    pH:       

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

Number TICs found: 7

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	8.00	100	JB
2.	ALDOL CONDENSATE	8.54	300	JA
3.	UNKNOWN	20.80	200	J
4.	HEXADECANOIC ACID	21.24	80	J
5.	UNKNOWN	24.57	200	J
6.	UNKNOWN	24.62	200	J
7.	ALKANE	28.57	200	J

1F  
 SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
 TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B0WMX2

Lab Name: Recra.LabNet Work Order: 10985001001

Client: TNU-HANFORD B99-078

Matrix: (soil/water) SOIL Lab Sample ID: 9910L475-002

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D110310

Level: (low/med) LOW Date Received: 10/22/99

% Moisture: 7 decanted: (Y/N) \_\_ Date Extracted: 10/28/99

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 11/03/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

Number TICs found: 6

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	7.99	100	JB
2.	ALDOL CONDENSATE	8.54	100	JA
3.	ALDOL CONDENSATE	9.33	100	JA
4.	PHTHALATE	20.79	90	J
5.	ALKANE	28.60	100	J
6.	ALKANE	32.07	90	J

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

BOWMX3

Lab Name: Recra.LabNet Work Order: 10985001001

Client: TNU-HANFORD B99-078

Matrix: (soil/water) SOIL

Lab Sample ID: 9910L475-003

Sample wt/vol: 30.3 (g/mL) G

Lab File ID: D110311

Level: (low/med) LOW

Date Received: 10/22/99

% Moisture: 7 decanted: (Y/N) \_\_

Date Extracted: 10/28/99

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 11/03/99

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_

CONCENTRATION UNITS:

Number TICs found: 6

(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	7.99	90	JB
2.	ALDOL CONDENSATE	8.54	200	JA
3.	ALDOL CONDENSATE	9.32	70	JA
4.	UNKNOWN	10.47	80	J
5.	UNKNOWN	24.57	100	J
6.	ALKANE	28.57	70	J

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOWMX1	001	S	99LE1313	10/20/99	10/28/99	11/03/99
BOWMX1	001 MS	S	99LE1313	10/20/99	10/28/99	11/03/99
BOWMX1	001 MSD	S	99LE1313	10/20/99	10/28/99	11/03/99
BOWMX2	002	S	99LE1313	10/20/99	10/28/99	11/03/99
BOWMX3	003	S	99LE1313	10/20/99	10/28/99	11/03/99

LAB QC:

SBLKFK	MB1	S	99LE1313	N/A	10/28/99	11/03/99
SBLKFK	MB1 BS	S	99LE1313	N/A	10/28/99	11/03/99

9910L475

**A11**

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client <u>TNU-HANFORD B99-078</u>	Refrigerator # <u>1 2</u>
Est. Final Proj. Sampling Date _____	#/Type Container
Project # <u>10985-001-001-9999-00</u>	Liquid _____
Project Contact/Phone # _____	Solid <u>IAG IAG</u> <u>IAG IAG IAG</u>
RECRA Project Manager <u>OJ</u>	Volume
QC <u>Spec</u> Del <u>std</u> TAT <u>30 days</u>	Liquid _____
Date Rec'd <u>10/22/99</u> Date Due <u>11/21/99</u>	Solid <u>250 250</u> <u>250 250 1LT</u>
Account # _____	Preservatives _____
	ANALYSES REQUESTED
	ORGANIC
	VOA BNA PCBs PPH HCB
	PH
	INORG
	Metal CN Anions

MATRIX CODES: S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum Solids DL - Drum Liquids L - EP/TCLP Leachate WI - Wipe X - Other F - Fish	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	RECRA LabNet Use Only														
			MS	MSD				02024H	05050	06025H	06025H	07025H	07025H	IPH	MULTO	ICNTO	DBS					
	001	BOW MX1			S	10/20/99	0907															
	002	↓ 2			L	↓	0912															
	003	↓ 3			L	↓	0930															

Special Instructions: Lab # B99-078

DATE/REVISIONS:

met ① = As, Ba, Be, Cd, Cr, Cu, Pb, Ni,

2. Se, Ag, V, Zn, Hg

Ang ③ = IN3N2, ICCL, ICFL, IC504, ICND2,

4. ICND3, ICP04, ISFD, INH3N, ICR6

5. \_\_\_\_\_

6. Run matrix QC

RECRA LabNet Use Only

Samples were:  
1) Shipped  or Hand Delivered \_\_\_\_\_

Airbill # Self

2) Ambient or Chilled

3) Received in Good Condition  or N \_\_\_\_\_

4) Labels Indicate Properly Preserved  or N \_\_\_\_\_

5) Received Within Holding Times  or N \_\_\_\_\_

COC Tape was:  
1) Present on Outer Package  or N \_\_\_\_\_

2) Unbroken on Outer Package  or N \_\_\_\_\_

3) Present on Sample  or N \_\_\_\_\_

4) Unbroken on Sample  or N \_\_\_\_\_

COC Record Present Upon Sample Rec't  or N \_\_\_\_\_

Cooler Temp. 5.3

Relinquished by <u>[Signature]</u>	Received by <u>[Signature]</u>	Date <u>10/22/99</u>	Time <u>0930</u>	Relinquished by _____	Received by _____	Date _____	Time _____
				<b>ORIGINAL REWRITTEN</b>			
				Discrepancies Between Samples Labels and COC Record? Y or <u>N</u>			
				NOTES: <u>4235 7953 0896</u>			

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			B99-078-144	Page 1 of 1
Collector Bowers/Trice	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	SAF No. B99-078				
Ice Chest No. ERC 96033	Field Logbook No. EL-1511	Method of Shipment FED EX				
Shipped To FMA/RECREA 020 10-20-99 REZRA	Offsite Property No. A 000003	Bill of Lading/Air Bill No. 42357953 0896				
COA B20 CW1 671C						

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	None			
	Type of Container	aG	aG	aG	aG	aG	aG	aG			
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1			
	Volume	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL			

SAMPLE ANALYSIS				Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.
Sample No.	Matrix *	Sample Date	Sample Time							
BOW MX1	Soil	10/20/99	0907		X	X	X	X	X	
BOW MX2	Soil	10/20/99	0912		X	X	X	X	X	
BOW MX3	Soil	10/20/99	0930		X	X	X	X	X	

CHAIN OF POSSESSION		Sign/Print Names			SPECIAL INSTRUCTIONS See chain of custody comments on SAF B99-078.					Matrix *	
Relinquished By	Date/Time	Received By	Date/Time	(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196 (2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010 (3) 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					Soil Water Vapor Other Solid Other Liquid		
Catherine Angus	10/20/99 1230	Red 3A	10/20/99 1230								
Relinquished By	Date/Time	Received By	Date/Time								
Ref 3A	10/20/99/0900	Rikki Thoren	10/21/99 0900								
Relinquished By	Date/Time	Received By	Date/Time								
Rikki Thoren	10/21/99/1430	FED EX									
Relinquished By	Date/Time	Received By	Date/Time								
Fed Ex	10/22/99 0930	V. Hernandez	10/22/99 0930								
LABORATORY SECTION	Received By	Title								Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method			Disposed By					Date/Time		

2M  
797  
852  
10-20-99  
136

14

Handwritten signature/initials

**Recra LabNet Philadelphia Analytical Report**

Client : TNU-HANFORD B99-078  
RFW # : 9910L475  
SDG/SAF #: H0588/B99-078

W.O. #: 10985-001-001-9999-00  
Date Received: 10-22-99

**GC/MS VOLATILE**

Three (3) soil samples were collected on 10-20-99.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 10-31-99 and 11-01-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding time for analysis was met.
3. Non-target compounds were not detected in the samples.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blanks contained the common laboratory contaminants Methylene Chloride and/or Acetone at levels less than 2x the CRQL. The method blank 99LVH505-MB1 also contained the target compound 2-Hexanone at a level less than the CRQL.



*J. Michael Taylor*  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

*12-08-99*  
Date

som\group\data\voa\tnu10475.doc

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.

## GLOSSARY OF VOA DATA

### DATA QUALIFIERS

- U** = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J** = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D** = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I** = Interference.
- NQ** = Result qualitatively confirmed but not able to quantify.
- N** = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs) where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X** = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y** = Additional qualifiers used as required are explained in the case narrative.



## GLOSSARY OF VOA DATA

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP, Z** = Indicates Spiked Compound.



Recra LabNet - Lionville Laboratory

Volatiles by GC/MS, HSL List

Report Date: 12/06/99 20:54

04

RFW Batch Number: 9910L475

Client: TNU-HANFORD B99-078

Work Order: 10985001001 Page: 1a

Sample Information	Cust ID:	BOWMX1	BOWMX2	BOWMX3	BOWMX3	BOWMX3	BOWMX3	VBLKAE
	RFW#:	001	002	003	003 MS	003 MSD	99LVH503-MB1	
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
	D.F.:	1.06	1.00	0.926	0.909	0.926	1.00	
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	
Surrogate	Toluene-d8	106 %	99 %	98 %	102 %	102 %	99 %	
Recovery	Bromofluorobenzene	86 %	87 %	92 %	95 %	88 %	96 %	
	1,2-Dichloroethane-d4	108 %	99 %	99 %	104 %	105 %	99 %	
		-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----	
	Chloromethane	12 U	11 U	10 U	10 U	10 U	10 U	
	Bromomethane	12 U	11 U	10 U	10 U	10 U	10 U	
	Vinyl Chloride	12 U	11 U	10 U	10 U	10 U	10 U	
	Chloroethane	12 U	11 U	10 U	10 U	10 U	10 U	
	Methylene Chloride	11 B	6 B	6 B	6 B	8 B	6	
	Acetone	12 U	11 U	10 U	10 U	10 U	10 U	
	Carbon Disulfide	6 U	6 U	5 U	5 U	5 U	5 U	
	1,1-Dichloroethene	6 U	6 U	5 U	94 %	88 %	5 U	
	1,1-Dichloroethane	6 U	6 U	5 U	5 U	5 U	5 U	
	1,2-Dichloroethene (total)	6 U	6 U	5 U	5 U	5 U	5 U	
	Chloroform	6 U	6 U	5 U	5 U	5 U	5 U	
	1,2-Dichloroethane	6 U	6 U	5 U	5 U	5 U	5 U	
	2-Butanone	12 U	11 U	10 U	10 U	10 U	10 U	
	1,1,1-Trichloroethane	6 U	6 U	5 U	5 U	5 U	5 U	
	Carbon Tetrachloride	6 U	6 U	5 U	5 U	5 U	5 U	
	Bromodichloromethane	6 U	6 U	5 U	5 U	5 U	5 U	
	1,2-Dichloropropane	6 U	6 U	5 U	5 U	5 U	5 U	
	cis-1,3-Dichloropropene	6 U	6 U	5 U	5 U	5 U	5 U	
	Trichloroethene	6 U	6 U	5 U	97 %	93 %	5 U	
	Dibromochloromethane	6 U	6 U	5 U	5 U	5 U	5 U	
	1,1,2-Trichloroethane	6 U	6 U	5 U	5 U	5 U	5 U	
	Benzene	6 U	6 U	5 U	102 %	102 %	5 U	
	Trans-1,3-Dichloropropene	6 U	6 U	5 U	5 U	5 U	5 U	
	Bromoform	6 U	6 U	5 U	5 U	5 U	5 U	
	4-Methyl-2-pentanone	12 U	11 U	10 U	10 U	10 U	10 U	
	2-Hexanone	12 U	11 U	10 U	10 U	10 U	10 U	
	Tetrachloroethene	6 U	6 U	5 U	5 U	5 U	5 U	
	1,1,2,2-Tetrachloroethane	6 U	6 U	5 U	5 U	5 U	5 U	
	Toluene	6 U	6 U	5 U	104 %	104 %	5 U	

\*= Outside of EPA CLP QC limits.

Cust ID:	BOWMX1	BOWMX2	BOWMX3	BOWMX3	BOWMX3	VBLKAE
RFW#:	001	002	003	003 M\$	003 MSD	99LVH503-MB1

Chlorobenzene_____	6 U	6 U	5 U	104 %	100 %	5 U
Ethylbenzene_____	6 U	6 U	5 U	5 U	5 U	5 U
Styrene_____	6 U	6 U	5 U	5 U	5 U	5 U
Xylène (total)_____	6 U	6 U	5 U	5 U	5 U	5 U

\*= Outside of EPA CLP QC limits.

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

DATE RECEIVED: 10/22/99

RFW LOT # :9910L475

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOWMK1	001	S	99LVH503	10/20/99	N/A	10/31/99
BOWMK2	002	S	99LVH503	10/20/99	N/A	10/31/99
BOWMK3	003	S	99LVH503	10/20/99	N/A	10/31/99
BOWMK3	003 MS	S	99LVH505	10/20/99	N/A	11/01/99
BOWMK3	003 MSD	S	99LVH505	10/20/99	N/A	11/01/99

LAB QC:

VBLKAE	MB1	S	99LVH503	N/A	N/A	10/31/99
VBLKAI	MB1	S	99LVH505	N/A	N/A	11/01/99
VBLKAI	MB1 BS	S	99LVH505	N/A	N/A	11/01/99

*aw*  
12-07-99

9910L475

A11

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

(9) metals

Client <u>TNU-HANFORD B99-078</u>	Refrigerator # <u>1 2</u>
Est. Final Proj. Sampling Date _____	#/Type Container
Project # <u>10985-001-001-9999-00</u>	Liquid _____
Project Contact/Phone # _____	Solid <u>IAG IAG</u> — <u>I</u> <u>IAG</u> <u>IAG-I</u> <u>IAG</u>
RECRA Project Manager <u>OJ</u>	Volume
QC <u>Apec</u> Del <u>std</u> TAT <u>30 days</u>	Liquid _____
Date Rec'd <u>10/22/99</u> Date Due <u>11/21/99</u>	Solid <u>250</u> <u>250</u> — <u>I</u> <u>250</u> <u>500-I</u> <u>1LT</u>
Account # _____	Preservatives _____
	ANALYSES REQUESTED →
	ORGANIC
	VOA BNA PCB PCP TPH Metals
	PH INORG IC
	TC Metal CN Anions

MATRIX CODES: S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum DL - Drum L - EP/TCLP Leachate WI - Wipe X - Other F - Fish	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	RECRA LabNet Use Only													
			MS	MSD				02024H	05050	0635H	07	0705	0705	IPH	MUTO	ICNTO	0705				
	001	BOW MX1			S	10/20/99	0907	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	002	I 2			I	I	0912	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	003	I 3			I	I	0930	1	1	1	1	1	1	1	1	1	1	1	1	1	1

11/3/99  
SB and TL added to all metals samples per client

Special Instructions:  
Lab # B99-078

**COMPOSITE WASTE**

DATE/REVISIONS:  
Met (1) = As, Ba, Be, Cd, Cr, Cu, Pb, Ni,  
2. Se, Ag, V, Zn, Hg  
Ang (1) = IN3N2, ICCL, ICFL, IC504, ICN02,  
4. ICN03, ICPO4, ISFD, INH3N, ICR6  
5. \_\_\_\_\_  
6. Run matrix QC

RECRA LabNet Use Only	
Samples were: 1) Shipped <input checked="" type="checkbox"/> or Hand Delivered	COC Tape was: 1) Present on Outer Package <input checked="" type="checkbox"/> or N
Airbill # <u>Self</u>	2) Unbroken on Outer Package <input checked="" type="checkbox"/> or N
2) Ambient or <u>Chilled</u>	3) Present on Sample <input checked="" type="checkbox"/> or N
3) Received in Good Condition <input checked="" type="checkbox"/> or N	4) Unbroken on Sample <input checked="" type="checkbox"/> or N
4) Labels Indicate Property Preserved <input checked="" type="checkbox"/> or N	COC Record Present Upon Sample Rec't <input checked="" type="checkbox"/> or N
5) Received Within Holding Times <input checked="" type="checkbox"/> or N	Cooler Temp. <u>5.3</u> °C

Relinquished by	Received by	Date	Time
<u>[Signature]</u>	<u>[Signature]</u>	<u>10/22/99</u>	<u>0930</u>

Relinquished by	Received by	Date	Time
	<b>ORIGINAL</b>		
	<b>REWRITTEN</b>		

Discrepancies Between Samples Labels and COC Record? Y or  N

NOTES:  
4235 7953 0896

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-078-144	Page 1 of 1
Collector Bowers/Trice		Company Contact Chris Cearlock		Telephone No. 372-9574		Project Coordinator TRENT, SJ	
Project Designation 200 Area Source characterization - 200-CW-1 OU		Sampling Location 200 B pond		SAF No. B99-078		Price Code 8N Data Turnaround 45 Days	
Ice Chest No. ERC 416 033		Field Logbook No. EL-1511		Method of Shipment FED EX			
Shipped To FMA/RECRA 070 10-20-99 REZRA		Offsite Property No. A 000 003		Bill of Lading/Air Bill No. 42357953 0896			
				COA B20 CW1 671C			

10

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1	1
	Volume	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL	
SAMPLE ANALYSIS		Isotopic Uranium	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	See item (1) in Special Instructions.	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (2) in Special Instructions.	See item (3) in Special Instructions.	
Sample No.	Matrix *	Sample Date	Sample Time						
BOW MX1	Soil	10/20/99	0907		X	X	X	X	X
BOW MX2	Soil	10/20/99	0912		X	X	X	X	X
BOW MX3	Soil	10/20/99	0930		X	X	X	X	X

PM  
797  
12:52  
10-20-99  
236

BOW 8C2  
BOW 8C2  
BOW 8C2

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS See chain of custody comments on SAF B99-078.				Matrix *
Relinquished By Catherine Auro	Date/Time 10/20/99 1230	Received By Ref 3A	Date/Time 10/20/99 1230	(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196 (2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010 (3) 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				Soil Water Vapor Other Solid Other Liquid
Relinquished By Ref 3A	Date/Time 10-20-99/0900	Received By RIKKT Hovren	Date/Time 10-21-99 0900					
Relinquished By RIKKT Hovren	Date/Time 10-21-99/1430	Received By FEDEX	Date/Time 10-21-99 0930					
Relinquished By Fed Ex	Date/Time 10/22/99 0930	Received By V. Hennings	Date/Time 10-22-99 0930					
LABORATORY SECTION	Received By	Title		Disposed By				Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method		Disposed By				Date/Time	

Hand 5-3