

Thermo Nutech  
W.O. No. N9-08-036-7170

**RECEIVED**  
JAN 27 2000  
**EDMC**

Bechtel Hanford Inc.  
SDG H0483

**Case Narrative**

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**1.0 GENERAL**

Bechtel Hanford Inc. Sample Delivery Group H0483 is composed of three solid samples designated under SAF No. B99-076 with a Project Designation of : 105-DR FSB-Concrete.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklist. The results were transmitted to BHI via facsimile on August 25, 1999.

**2.0 ANALYSIS NOTES**

**2.1 Technetium-99 Analyses**

The RPD for the duplicate analysis was 59%, greater than the 3 sigma total of 51%. Positive Tc99 was detected in all the samples.

**2.2 Total Strontium Analyses**

All sample MDA's were greater than the RDL however all samples contained strontium activity much greater than the RDL and MDA. The blank sample indicated slight cross contamination.

**2.3 Isotopic Uranium Analyses**

No problems were encountered during the course of the analyses.

**2.4 Tritium Analyses**

No problems were encountered during the course of the analyses.

**2.5 Gamma Spec Analyses**

No problems were encountered during the course of the analyses.

**2.6 Isotopic Plutonium Analyses**

No problems were encountered during the course of the analyses. Some Pu-239 activity was being counted in the ROI for the tracer Pu242 resulting in a apparently high tracer yield. The integration bounds for Pu239 were changed slightly in order to remove the Pu239 counts from the Pu242 ROI and the data recalculated. All data, except for the LCS and blank, was recalculated.

**2.7 Americium-241 Analyses**

No problems were encountered during the course of the analyses. Due to an unclear definition between the Am243 tracer peak and the Am241 peak in the alpha spectra of the samples the integration limits for Am241 were changed slightly to remove some of the Am243 counts and the data recalculated. All data, except for the LCS and blank, was recalculated.

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Data  
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**2.8 Carbon-14 Analyses**

The C14 recovery LCS for the initial analysis was unsatisfactory. A reanalysis was performed with an acceptable LCS recovery, however the RPD for duplicate analysis was 47%, greater than the 3 sigma total of 23%. Sample inhomogeneity is most likely the cause of the difference in the results.

**2.9 Nickel-63 Analyses**

No problems were encountered during the course of the analyses.

TMA/RICHMOND  
 SAMPLE DELIVERY GROUP H0483

SAMPLE SUMMARY

SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB		CHAIN OF		COLLECTED
				SAMPLE ID	SAF NO	CUSTODY		
B0W3Y9	105 DR	SOLID		N908036-01	B99-076	B99-076-05		08/04/99 09:35
B0W400	105 DR	SOLID		N908036-02	B99-076	B99-076-05		08/04/99 09:25
B0W401	105 DR	SOLID		N908036-03	B99-076	B99-076-05		08/04/99 09:09
Method Blank		SOLID		N908036-05	B99-076			
Method Blank		SOLID		N908036-08	B99-076			
Lab Control Sample		SOLID		N908036-04	B99-076			
Lab Control Sample		SOLID		N908036-07	B99-076			
Duplicate (N908036-01)	105 DR	SOLID		N908036-06	B99-076			08/04/99 09:35
Duplicate (N908036-01)	105 DR	SOLID		N908036-09	B99-076			08/04/99 09:35

SAMPLE SUMMARY

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Lab id TMANC  
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 Version Ver 1.0  
 Form DVD-CS  
 Version 3.06  
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TMA/RICHMOND  
 SAMPLE DELIVERY GROUP H0483

SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

QC SUMMARY

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
7170	B99-076-05	BOW3Y9	SOLID				08/06/99	2	N908036-01	7170-001
		BOW400	SOLID				08/06/99	2	N908036-02	7170-002
		BOW401	SOLID				08/06/99	2	N908036-03	7170-003
		Method Blank	SOLID						N908036-05	7170-005
		Method Blank	SOLID						N908036-08	7170-008
		Lab Control Sample	SOLID						N908036-04	7170-004
		Lab Control Sample	SOLID						N908036-07	7170-007
		Duplicate (N908036-01)	SOLID				08/06/99	2	N908036-06	7170-006
		Duplicate (N908036-01)	SOLID				08/06/99	2	N908036-09	7170-009

Lab id TMANC  
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**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0483

SDG 7170  
Contact L.A. Johnson

**PREP BATCH SUMMARY**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

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	6893-046	5.0	3			1	1	1/1
PU	SOLID	Plutonium, Isotopic in Solids	6893-046	5.0	3			1	1	1/1
U	SOLID	Uranium, Isotopic in Soil	6893-046	5.0	3			1	1	1/1
<b>Beta Counting</b>										
SR	SOLID	Total Strontium in Soil	6893-046	10.0	3			1	1	1/1
TC	SOLID	Technetium 99 in Soil	6893-046	10.0	3			1	1	1/1
<b>Gamma Spectroscopy</b>										
GAM	SOLID	Gamma Scan	6893-046	15.0	3			1	1	1/1
<b>Liquid Scintillation Counting</b>										
C	SOLID	Carbon 14 in Soil	6893-046	10.0	3			1	1	1/1
H	SOLID	Tritium in Soil	6893-046	10.0	3			1	1	1/1
NI_L	SOLID	Nickel 63 in Soil	6893-046	10.0	3			1	1	1/1

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

Lab id TMANC  
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**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0483

SDG 7170  
Contact L.A. Johnson

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

**WORK SUMMARY**

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED		TEST	SUF-					
CUSTODY	SAF No	RECEIVED	PLANCHET		FIX	ANALYZED	REVIEWED	BY	METHOD	
B0W3Y9		N908036-01	7170-001	AM		08/19/99	08/25/99	NJV	Americium 241 in Soil	
105 DR	SOLID	08/04/99	7170-001	C	A1	08/20/99	08/25/99	NJV	Carbon 14 in Soil	
B99-076-05	B99-076	08/06/99	7170-001	GAM		08/17/99	08/24/99	NJV	Gamma Scan	
			7170-001	H		08/14/99	08/23/99	NJV	Tritium in Soil	
			7170-001	NI_L		08/13/99	08/25/99	NJV	Nickel 63 in Soil	
			7170-001	PU		08/21/99	08/25/99	NJV	Plutonium, Isotopic in Solids	
			7170-001	SR		08/16/99	08/24/99	NJV	Total Strontium in Soil	
			7170-001	TC		08/23/99	08/25/99	NJV	Technetium 99 in Soil	
			7170-001	U		08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil	
B0W400		N908036-02	7170-002	AM		08/19/99	08/25/99	NJV	Americium 241 in Soil	
105 DR	SOLID	08/04/99	7170-002	C	A1	08/21/99	08/25/99	NJV	Carbon 14 in Soil	
B99-076-05	B99-076	08/06/99	7170-002	GAM		08/17/99	08/24/99	NJV	Gamma Scan	
			7170-002	H		08/14/99	08/23/99	NJV	Tritium in Soil	
			7170-002	NI_L		08/13/99	08/25/99	NJV	Nickel 63 in Soil	
			7170-002	PU		08/18/99	08/25/99	NJV	Plutonium, Isotopic in Solids	
			7170-002	SR		08/16/99	08/24/99	NJV	Total Strontium in Soil	
			7170-002	TC		08/23/99	08/25/99	NJV	Technetium 99 in Soil	
			7170-002	U		08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil	
B0W401		N908036-03	7170-003	AM		08/21/99	08/25/99	NJV	Americium 241 in Soil	
105 DR	SOLID	08/04/99	7170-003	C	A1	08/21/99	08/25/99	NJV	Carbon 14 in Soil	
B99-076-05	B99-076	08/06/99	7170-003	GAM		08/17/99	08/24/99	NJV	Gamma Scan	
			7170-003	H		08/15/99	08/23/99	NJV	Tritium in Soil	
			7170-003	NI_L		08/13/99	08/25/99	NJV	Nickel 63 in Soil	
			7170-003	PU		08/18/99	08/25/99	NJV	Plutonium, Isotopic in Solids	
			7170-003	SR		08/16/99	08/24/99	NJV	Total Strontium in Soil	
			7170-003	TC		08/23/99	08/25/99	NJV	Technetium 99 in Soil	
			7170-003	U		08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil	
Method Blank		N908036-05	7170-005	AM		08/17/99	08/25/99	NJV	Americium 241 in Soil	
	SOLID		7170-005	GAM		08/18/99	08/24/99	NJV	Gamma Scan	
	B99-076		7170-005	H		08/15/99	08/23/99	NJV	Tritium in Soil	
			7170-005	NI_L		08/13/99	08/25/99	NJV	Nickel 63 in Soil	
			7170-005	PU		08/17/99	08/25/99	NJV	Plutonium, Isotopic in Solids	
			7170-005	SR		08/16/99	08/24/99	NJV	Total Strontium in Soil	
			7170-005	TC		08/21/99	08/25/99	NJV	Technetium 99 in Soil	
			7170-005	U		08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil	

WORK SUMMARY

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CWS  
Version 3.06  
Report date 08/25/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

WORK SUMMARY, cont.

SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

CLIENT SAMPLE ID	LAB SAMPLE ID	MATRIX	COLLECTED	SUF-	REVIEWED	BY	METHOD
LOCATION	RECEIVED	PLANCHET	TEST	FIX	ANALYZED		
CUSTODY	SAF No						
Method Blank	N908036-08		7170-008	C	08/20/99	08/25/99	NJV Carbon 14 in Soil
		SOLID					
	B99-076						
Lab Control Sample	N908036-04		7170-004	AM	08/17/99	08/25/99	NJV Americium 241 in Soil
		SOLID	7170-004	GAM	08/18/99	08/24/99	NJV Gamma Scan
	B99-076		7170-004	H	08/15/99	08/23/99	NJV Tritium in Soil
			7170-004	NI_L	08/13/99	08/25/99	NJV Nickel 63 in Soil
			7170-004	PU	08/17/99	08/25/99	NJV Plutonium, Isotopic in Solids
			7170-004	SR	08/16/99	08/24/99	NJV Total Strontium in Soil
			7170-004	TC	08/20/99	08/25/99	NJV Technetium 99 in Soil
			7170-004	U	08/13/99	08/24/99	NJV Uranium, Isotopic in Soil
Lab Control Sample	N908036-07		7170-007	C	08/21/99	08/25/99	NJV Carbon 14 in Soil
		SOLID					
	B99-076						
Duplicate (N908036-01)	N908036-06		7170-006	AM	08/22/99	08/25/99	NJV Americium 241 in Soil
105 DR		SOLID	08/04/99	GAM	08/18/99	08/24/99	NJV Gamma Scan
	B99-076		08/06/99	H	08/15/99	08/23/99	NJV Tritium in Soil
			7170-006	NI_L	08/13/99	08/25/99	NJV Nickel 63 in Soil
			7170-006	PU	08/21/99	08/25/99	NJV Plutonium, Isotopic in Solids
			7170-006	SR	08/16/99	08/24/99	NJV Total Strontium in Soil
			7170-006	TC	08/20/99	08/25/99	NJV Technetium 99 in Soil
			7170-006	U	08/13/99	08/24/99	NJV Uranium, Isotopic in Soil
Duplicate (N908036-01)	N908036-09		7170-009	C	08/20/99	08/25/99	NJV Carbon 14 in Soil
105 DR		SOLID	08/04/99				
	B99-076		08/06/99				

Lab id TMANC  
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

WORK SUMMARY, cont.

SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

COUNTS OF TESTS BY SAMPLE TYPE											
TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
AM	B99-076	Americium 241 in Soil	AM/CMPLATE	3			1	1	1		6
C	B99-076	Carbon 14 in Soil	C14COXLSC	3			1	1	1		6
GAM	B99-076	Gamma Scan	GAMMAHI	3			1	1	1		6
H	B99-076	Tritium in Soil	EPA906.0	3			1	1	1		6
NI_L	B99-076	Nickel 63 in Soil	NI63LSC	3			1	1	1		6
PU	B99-076	Plutonium, Isotopic in Solids	PUPLATE	3			1	1	1		6
SR	B99-076	Total Strontium in Soil		3			1	1	1		6
TC	B99-076	Technetium 99 in Soil	TC99TRLSC	3			1	1	1		6
U	B99-076	Uranium, Isotopic in Soil	UPLATE	3			1	1	1		6
<b>TOTALS</b>				27			9	9	9		54

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CWS  
 Version 3.06  
 Report date 08/25/99

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0483**

N908036-05

Method Blank

**METHOD BLANK**

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0483</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-05</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7170-005</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-076</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-0.003	0.052	0.088	400	U	H
Technetium 99	14133-76-7	0.012	0.46	0.87	15	U	TC
Uranium 233/234	U-233/234	0.031	0.041	0.078	1.0	U	U
Uranium 235	15117-96-1	0	0.025	0.095	1.0	U	U
Uranium 238	U-238	0	0.020	0.078	1.0	U	U
Plutonium 238	13981-16-3	0.009	0.018	0.029	1.0	U	PU
Plutonium 239/240	PU-239/240	0.006	0.012	0.029	1.0	U	PU
Nickel 63	13981-37-8	0.565	1.1	1.8	30	U	NI_L
Americium 241	14596-10-2	0.004	0.024	0.039	1.0	U	AM
Total Strontium	SR-RAD	<u>0.264</u>	0.13	0.19	1.0	J	SR
Potassium 40	13966-00-2	U		0.96		U	GAM
Cobalt 60	10198-40-0	U		<u>0.054</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.067	0.10	U	GAM
Europium 152	14683-23-9	U		<u>0.14</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.19</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.15</u>	0.10	U	GAM
Radium 226	13982-63-3	U		0.097	0.10	U	GAM
Radium 228	15262-20-1	U		<u>0.27</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		0.085		U	GAM
Thorium 232	TH-232	U		0.27		U	GAM
Americium 241	14596-10-2	U		0.17		U	GAM
Uranium 238	U-238	U		6.4		U	GAM
Uranium 235	15117-96-1	U		0.20		U	GAM

105-DR FSB - Concrete

QC-BLANK 31522

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>08/25/99</u>

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0483

N908036-08

Method Blank

METHOD BLANK

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0483</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-08</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7170-008</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-076</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Carbon 14	14762-75-5	0.664	2.5	4.2	50	U	C

105-DR FSB - Concrete

QC-BLANK 31627
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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>08/25/99</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

N908036-04

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0483</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-04</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7170-004</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-076</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
Tritium	7.21	0.17	0.088	400	J	H	7.34	0.29	98	84-116	80-120
Technetium 99	41.8	1.4	0.66	15		TC	43.6	1.7	96	84-116	80-120
Uranium 233/234	4.82	0.58	0.28	1.0		U	4.83	0.19	100	80-120	80-120
Uranium 235	4.22	0.53	0.073	1.0		U	3.92	0.16	108	77-123	80-120
Uranium 238	4.85	0.58	0.27	1.0		U	5.24	0.21	93	81-119	80-120
Plutonium 238	11.3	0.89	0.033	1.0		PU	12.6	0.50	90	86-114	80-120
Plutonium 239/240	12.1	0.95	0.033	1.0		PU	13.2	0.53	92	86-114	80-120
Nickel 63	137	4.6	2.9	30		NI_L	134	5.4	102	83-117	
Americium 241	10.3	0.87	0.043	1.0		AM	11.5	0.46	90	86-114	80-120
Total Strontium	13.1	0.83	0.58	1.0		SR	12.5	0.50	105	80-120	
Cobalt 60	3.63	0.25	<u>0.14</u>	0.050		GAM	3.94	0.16	92	76-124	80-120
Cesium 137	4.00	0.19	<u>0.12</u>	0.10		GAM	4.21	0.17	95	77-123	80-120

105-DR FSB - Concrete

QC-LCS 31521
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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>08/25/99</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

N908036-07

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0483</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-07</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7170-007</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-076</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 LMDS (TOTAL)	PROTOCOL LIMITS
Carbon 14	9130	180	31	50	C	10300	410	89	85-115	

105-DR FSB - Concrete

QC-LCS 31626
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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>08/25/99</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

N908036-06

B0W3Y9

DUPLICATE

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0483</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>N908036-06</u>	Lab sample id <u>N908036-01</u>	Client sample id <u>B0W3Y9</u>
Dept sample id <u>7170-006</u>	Dept sample id <u>7170-001</u>	Location/Matrix <u>105 DR</u> <u>SOLID</u>
	Received <u>08/06/99</u>	Collected <u>08/04/99 09:35</u>
		Custody/SAF No <u>B99-076-05</u> <u>B99-076</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
Tritium	4.63	0.19	0.15	400	J	H	4.56	0.19	0.15	J	2	23	
Technetium 99	1.14	0.19	0.29	15	J	TC	0.620	0.19	0.39	J	<u>59</u>	51	
Uranium 233/234	1.24	0.23	0.076	1.0		U	1.34	0.22	0.068		8	38	
Uranium 235	0.086	0.058	0.073	1.0	J	U	0.077	0.052	0.066	J	11	144	
Uranium 238	1.23	0.23	0.061	1.0		U	1.20	0.21	0.054		2	40	
Plutonium 238	5.24	0.49	0.037	1.0		PU	4.99	1.3	0.32		5	42	
Plutonium 239/240	227	16	0.060	1.0		PU	232	47	0.45		2	34	
Nickel 63	7790	78	6.7	30		NI_L	7580	76	6.3		3	21	
Americium 241	76.1	12	0.29	1.0		AM	75.5	5.4	0.042		1	28	
Total Strontium	2720	89	<u>4.3</u>	1.0		SR	2710	100	<u>7.6</u>		0	22	
Potassium 40	U		21		U	GAM	U		6.4	U	-		
Cobalt 60	284	5.6	<u>3.1</u>	0.050		GAM	281	2.0	<u>0.99</u>		1	32	
Cesium 137	8090	20	<u>6.6</u>	0.10		GAM	7790	7.0	<u>2.5</u>		4	32	
Europium 152	959	20	<u>22</u>	0.10		GAM	987	7.3	<u>8.0</u>		3	32	
Europium 154	242	12	<u>10</u>	0.10		GAM	226	4.1	<u>3.3</u>		7	33	
Europium 155	U		<u>15</u>	0.10	U	GAM	13.4	2.6	<u>3.8</u>		11	164	
Radium 226	U		<u>8.6</u>	0.10	U	GAM	U		<u>3.1</u>	U	-		
Radium 228	U		<u>16</u>	0.20	U	GAM	U		<u>6.1</u>	U	-		
Thorium 228	U		7.3		U	GAM	U		2.9	U	-		
Thorium 232	U		16		U	GAM	U		6.1	U	-		
Americium 241	87.9	12	16			GAM	108	1.8	2.3		21	37	
Uranium 238	U		610		U	GAM	U		260	U	-		
Uranium 235	U		18		U	GAM	U		6.0	U	-		

105-DR FSB - Concrete

QC-DUP#1 31523

DUPLICATES

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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>08/25/99</u>

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0483

N908036-09

B0W3Y9

**DUPLICATE**

SDG <u>7170</u>		Client/Case no <u>Hanford</u>	<u>SDG-H0483</u>
Contact <u>L.A. Johnson</u>		Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL		
Lab sample id <u>N908036-09</u>	Lab sample id <u>N908036-01</u>	Client sample id <u>B0W3Y9</u>	
Dept sample id <u>7170-009</u>	Dept sample id <u>7170-001</u>	Location/Matrix <u>105 DR</u>	<u>SOLID</u>
	Received <u>08/06/99</u>	Collected <u>08/04/99 09:35</u>	
		Custody/SAP No <u>B99-076-05</u>	<u>B99-076</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 LIMIT	PROT LIMIT
Carbon 14	160	5.2	4.4	50	C		259	6.4	4.6		<u>47</u>	23	

105-DR FSB - Concrete

QC-DUP#1 31628

DUPLICATES

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SUMMARY DATA SECTION

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 08/25/99

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0483**

N908036-01

B0W3Y9

**DATA SHEET**

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG-H0483
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-01</u>	Client sample id <u>B0W3Y9</u>	
Dept sample id <u>7170-001</u>	Location/Matrix <u>105 DR</u>	<u>SOLID</u>
Received <u>08/06/99</u>	Collected <u>08/04/99 09:35</u>	
	Custody/SAF No <u>B99-076-05</u>	<u>B99-076</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	4.56	0.19	0.15	400	J	H
Carbon 14	14762-75-5	259	6.4	4.6	50		C
Technetium 99	14133-76-7	0.620	0.19	0.39	15	J	TC
Uranium 233/234	U-233/234	1.34	0.22	0.068	1.0		U
Uranium 235	15117-96-1	0.077	0.052	0.066	1.0	J	U
Uranium 238	U-238	1.20	0.21	0.054	1.0		U
Plutonium 238	13981-16-3	4.99	1.3	0.32	1.0		PU
Plutonium 239/240	PU-239/240	232	47	0.45	1.0		PU
Nickel 63	13981-37-8	7580	76	6.3	30		NI_L
Americium 241	14596-10-2	75.5	5.4	0.042	1.0		AM
Total Strontium	SR-RAD	2710	100	7.6	1.0		SR
Potassium 40	13966-00-2	U		6.4		U	GAM
Cobalt 60	10198-40-0	281	2.0	0.99	0.050		GAM
Cesium 137	10045-97-3	7790	7.0	2.5	0.10		GAM
Europium 152	14683-23-9	987	7.3	8.0	0.10		GAM
Europium 154	15585-10-1	226	4.1	3.3	0.10		GAM
Europium 155	14391-16-3	13.4	2.6	3.8	0.10		GAM
Radium 226	13982-63-3	U		3.1	0.10	U	GAM
Radium 228	15262-20-1	U		6.1	0.20	U	GAM
Thorium 228	14274-82-9	U		2.9		U	GAM
Thorium 232	TH-232	U		6.1		U	GAM
Americium 241	14596-10-2	108	1.8	2.3			GAM
Uranium 238	U-238	U		260		U	GAM
Uranium 235	15117-96-1	U		6.0		U	GAM

105-DR FSB - Concrete

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>08/25/99</u>

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0483

N908036-02

B0W400

DATA SHEET

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG-H0483
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-02</u>	Client sample id <u>B0W400</u>	
Dept sample id <u>7170-002</u>	Location/Matrix <u>105 DR</u>	<u>SOLID</u>
Received <u>08/06/99</u>	Collected <u>08/04/99 09:25</u>	
	Custody/SAF No <u>B99-076-05</u>	<u>B99-076</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	5.97	0.14	0.072	400	J	H
Carbon 14	14762-75-5	174	5.5	4.6	50		C
Technetium 99	14133-76-7	1.06	0.30	0.39	15	J	TC
Uranium 233/234	U-233/234	2.24	0.32	0.074	1.0		U
Uranium 235	15117-96-1	0.207	0.096	0.072	1.0	J	U
Uranium 238	U-238	1.86	0.29	0.074	1.0		U
Plutonium 238	13981-16-3	2.58	0.26	0.031	1.0		PU
Plutonium 239/240	PU-239/240	163	11	0.049	1.0		PU
Nickel 63	13981-37-8	4680	47	5.4	30		NI_L
Americium 241	14596-10-2	50.7	3.4	0.044	1.0		AM
Total Strontium	SR-RAD	4700	130	<u>8.6</u>	1.0		SR
Potassium 40	13966-00-2	U		5.7		U	GAM
Cobalt 60	10198-40-0	193	1.8	<u>0.93</u>	0.050		GAM
Cesium 137	10045-97-3	11000	10	<u>3.5</u>	0.10		GAM
Europium 152	14683-23-9	548	8.5	<u>10</u>	0.10		GAM
Europium 154	15585-10-1	113	3.4	<u>3.1</u>	0.10		GAM
Europium 155	14391-16-3	9.43	3.6	<u>5.6</u>	0.10		GAM
Radium 226	13982-63-3	U		<u>4.1</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>5.2</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		3.7		U	GAM
Thorium 232	TH-232	U		5.2		U	GAM
Americium 241	14596-10-2	100	5.3	7.6			GAM
Uranium 238	U-238	U		150		U	GAM
Uranium 235	15117-96-1	U		7.6		U	GAM

105-DR FSB - Concrete

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
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Version <u>3.06</u>
Report date <u>08/25/99</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0483**

N908036-03

B0W401

**DATA SHEET**

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG-H0483
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-03</u>	Client sample id <u>B0W401</u>	
Dept sample id <u>7170-003</u>	Location/Matrix <u>105 DR</u>	<u>SOLID</u>
Received <u>08/06/99</u>	Collected <u>08/04/99 09:09</u>	
	Custody/SAF No <u>B99-076-05</u>	<u>B99-076</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	6.46	0.15	0.073	400	J	H
Carbon 14	14762-75-5	3300	67	16	50		C
Technetium 99	14133-76-7	1.94	0.28	0.44	15	J	TC
Uranium 233/234	U-233/234	1.70	0.26	0.079	1.0		U
Uranium 235	15117-96-1	0.139	0.070	0.067	1.0	J	U
Uranium 238	U-238	2.61	0.34	0.069	1.0		U
Plutonium 238	13981-16-3	6.83	0.58	0.041	1.0		PU
Plutonium 239/240	PU-239/240	187	13	0.047	1.0		PU
Nickel 63	13981-37-8	10000	100	7.2	30		NI_L
Americium 241	14596-10-2	71.8	16	0.40	1.0		AM
Total Strontium	SR-RAD	3280	120	<u>11</u>	1.0		SR
Potassium 40	13966-00-2	U		6.5		U	GAM
Cobalt 60	10198-40-0	720	2.3	<u>1.1</u>	0.050		GAM
Cesium 137	10045-97-3	7540	5.0	<u>1.9</u>	0.10		GAM
Europium 152	14683-23-9	1280	6.0	<u>5.9</u>	0.10		GAM
Europium 154	15585-10-1	302	3.8	<u>3.3</u>	0.10		GAM
Europium 155	14391-16-3	12.4	1.8	<u>3.0</u>	0.10		GAM
Radium 226	13982-63-3	U		<u>2.5</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>5.5</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		1.9		U	GAM
Thorium 232	TH-232	U		5.5		U	GAM
Americium 241	14596-10-2	50.2	2.4	3.6			GAM
Uranium 238	U-238	U		200		U	GAM
Uranium 235	15117-96-1	U		4.8		U	GAM

105-DR FSB - Concrete

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>08/25/99</u>

TMA/RICHMOND  
 SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY  
 AMERICIUM 241 IN SOIL  
 ALPHA SPECTROSCOPY

Test AM Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Americium 241
Preparation batch 6893-046					
B0W3Y9	N908036-01	7170-001			75.5
B0W400	N908036-02	7170-002			50.7
B0W401	N908036-03	7170-003			71.8
BLK (QC ID=31522)	N908036-05	7170-005			U
LCS (QC ID=31521)	N908036-04	7170-004			ok
Duplicate (N908036-01)	N908036-06	7170-006			ok

Nominal values and limits from method RDLs (pCi/g) 1.0  
 105-DR FSB - Concrete

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- PREPARED	YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.046																
B0W3Y9	N908036-01			0.042	0.500			70	890	15	08/17/99	08/19	SS-052			
B0W400	N908036-02			0.044	0.500			94	890	15	08/17/99	08/19	SS-053			
B0W401	N908036-03			0.40	0.500			<u>10</u>	725	17	08/17/99	08/21	SS-053			
BLK (QC ID=31522)	N908036-05			0.039	0.500			81	751		08/17/99	08/17	SS-015			
LCS (QC ID=31521)	N908036-04			0.043	0.500			89	<u>454</u>		08/17/99	08/17	SS-055			
Duplicate (N908036-01)	N908036-06			0.29	0.500			89	1220	18	08/17/99	08/22	SS-051			
(QC ID=31523)																
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>0.14</u> ± <u>0.32</u>
FOR 6 SAMPLES	YIELD <u>72</u> ± <u>63</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

Test PU Matrix SOLID  
SDG 7170  
Contact L.A. Johnson

METHOD SUMMARY  
PLUTONIUM, ISOTOPIC IN SOLIDS  
ALPHA SPECTROSCOPY

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 6893-046						
BOW3Y9	N908036-01			7170-001	4.99	232
BOW400	N908036-02			7170-002	2.58	163
BOW401	N908036-03			7170-003	6.83	187
BLK (QC ID=31522)	N908036-05			7170-005	U	U
LCS (QC ID=31521)	N908036-04			7170-004	ok	ok
Duplicate (N908036-01)	N908036-06			7170-006	ok	ok
Nominal values and limits from method		RDLs (pCi/g)			1.0	1.0
105-DR FSB - Concrete						

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- PREPARED	YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.046																
BOW3Y9	N908036-01			0.45	0.500			98		725			17	08/17/99	08/21	SS-051
BOW400	N908036-02			0.049	0.500			95		887			14	08/17/99	08/18	SS-052
BOW401	N908036-03			0.047	0.500			101		887			14	08/17/99	08/18	SS-053
BLK (QC ID=31522)	N908036-05			0.029	0.500			84		947				08/17/99	08/17	SS-001
LCS (QC ID=31521)	N908036-04			0.033	0.500			103		502				08/17/99	08/17	SS-055
Duplicate (N908036-01)	N908036-06			0.060	0.500			96		725			17	08/17/99	08/21	SS-052
(QC ID=31523)																
Nominal values and limits from method				1.0	0.500			20-105		10	100		180			

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

AVERAGES ± 2 SD	MDA	0.11	±	0.33
FOR 6 SAMPLES	YIELD	96	±	13

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 08/25/99

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0483

**METHOD SUMMARY**  
URANIUM, ISOTOPIC IN SOIL  
ALPHA SPECTROSCOPY

Test U Matrix SOLID  
SDG 7170  
Contact L.A. Johnson

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	1: Uranium	2: Uranium	3: Uranium	RESULT RATIOS (%)						
					233/234	235	238	1+3	2σ	2+3	2σ			
Preparation batch 6893-046														
B0W3Y9	N908036-01			7170-001	1.34	0.077 J	1.20	112	27	6	4			
B0W400	N908036-02			7170-002	2.24	0.207 J	1.86	120	25	<u>11</u>	5			
B0W401	N908036-03			7170-003	1.70	0.139 J	2.61	<u>65</u>	13	5	3			
BLK (QC ID=31522)	N908036-05			7170-005	U	U	U							
LCS (QC ID=31521)	N908036-04			7170-004	ok	ok	ok							
Duplicate (N908036-01)	N908036-06			7170-006	ok	ok J	ok	101	27	7	5			
Nominal values and limits from method					RDLs (pCi/g)	1.0	1.0	1.0	100		4			
105-DR FSB - Concrete								Averages	100		7			

**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-		
														PREPARED	YZED	DETECTOR
Preparation batch 6893-046    2σ prep error 5.0 %    Reference Lab Notebook 6893 pg.046																
B0W3Y9	N908036-01			0.068	1.00			98	171				9	08/13/99	08/13	SS-031
B0W400	N908036-02			0.074	1.00			87	171				9	08/13/99	08/13	SS-032
B0W401	N908036-03			0.079	1.00			97	171				9	08/13/99	08/13	SS-033
BLK (QC ID=31522)	N908036-05			0.095	1.00			69	171					08/13/99	08/13	SS-035
LCS (QC ID=31521)	N908036-04			0.28	1.00			86	171					08/13/99	08/13	SS-034
Duplicate (N908036-01)	N908036-06			0.076	1.00			88	171				9	08/13/99	08/13	SS-036
(QC ID=31523)																
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>0.11</u>	±	<u>0.17</u>
FOR 6 SAMPLES	YIELD	<u>88</u>	±	<u>21</u>

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 08/25/99

TMA/RICHMOND  
 SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY  
 TOTAL STRONTIUM IN SOIL  
 BETA COUNTING

Test SR Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Total Strontium
Preparation batch 6893-046				
B0W3Y9	N908036-01		7170-001	2710
B0W400	N908036-02		7170-002	4700
B0W401	N908036-03		7170-003	3280
BLK (QC ID=31522)	N908036-05		7170-005	<u>0.264</u> J
LCS (QC ID=31521)	N908036-04		7170-004	ok
Duplicate (N908036-01)	N908036-06		7170-006	ok
Nominal values and limits from method		RDLs (pCi/g)	1.0	
105-DR FSB - Concrete				

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 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046															
B0W3Y9	N908036-01		<u>7.6</u>	1.00			86	400			12	08/12/99	08/16	GRB-220	
B0W400	N908036-02		<u>8.6</u>	1.00			89	400			12	08/12/99	08/16	GRB-229	
B0W401	N908036-03		<u>11</u>	1.00			88	400			12	08/12/99	08/16	GRB-230	
BLK (QC ID=31522)	N908036-05		0.19	1.00			78	200				08/12/99	08/16	GRB-220	
LCS (QC ID=31521)	N908036-04		0.58	1.00			77	200				08/12/99	08/16	GRB-219	
Duplicate (N908036-01)	N908036-06		<u>4.3</u>	1.00			92	400			12	08/12/99	08/16	GRB-205	
(QC ID=31523)															
Nominal values and limits from method			1.0	1.00				100			180				

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

AVERAGES ± 2 SD MDA 5.4 ± 8.9  
 FOR 6 SAMPLES YIELD 85 ± 12

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 08/25/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

TECHNETIUM 99 IN SOIL

BETA COUNTING

Test TC Matrix SOLID  
SDG 7170  
Contact L.A. Johnson

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Technetium 99
Preparation batch 6893-046					
B0W3Y9	N908036-01			7170-001	0.620 J
B0W400	N908036-02			7170-002	1.06 J
B0W401	N908036-03			7170-003	1.94 J
BLK (QC ID=31522)	N908036-05			7170-005	U
LCS (QC ID=31521)	N908036-04			7170-004	ok
Duplicate (N908036-01)	N908036-06			7170-006	<u>GUT</u> J
Nominal values and limits from method		RDls (pCi/g)		15	
105-DR FSB - Concrete					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQUOT g	PREP FAC	DILUTION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046																
B0W3Y9	N908036-01			0.39	1.00			62		200			19	08/17/99	08/23	GRB-202
B0W400	N908036-02			0.39	1.00			62		200			19	08/17/99	08/23	GRB-203
B0W401	N908036-03			0.44	1.00			58		200			19	08/17/99	08/23	GRB-204
BLK (QC ID=31522)	N908036-05			0.87	1.00			40		101				08/17/99	08/21	GRB-228
LCS (QC ID=31521)	N908036-04			0.66	1.00			52		101				08/17/99	08/20	GRB-203
Duplicate (N908036-01)	N908036-06			0.29	1.00			80		200			16	08/17/99	08/20	GRB-205
(QC ID=31523)																
Nominal values and limits from method				15	1.00			20-105		50			180			

PROCEDURES	REFERENCE	TC99TRLSC
EP-060	Soil Preparation, rev 0	
EP-020	Sample Leach For Technetium-99, rev 0	
EP-540	Technetium-99 Purification, rev 0	

AVERAGES ± 2 SD	MDA	0.51	±	0.43
FOR 6 SAMPLES	YIELD	59	±	26

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 08/25/99

TMA/RICHMOND  
 SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6893-046					
B0W3Y9	N908036-01		7170-001	281	7790
B0W400	N908036-02		7170-002	193	11000
B0W401	N908036-03		7170-003	720	7540
BLK (QC ID=31522)	N908036-05		7170-005	U	U
LCS (QC ID=31521)	N908036-04		7170-004	ok	ok
Duplicate (N908036-01)	N908036-06		7170-006	ok	ok

Nominal values and limits from method RDLs (pCi/g) 0.050 0.10  
 105-DR FSB - Concrete

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 6893-046 2σ prep error 15.0 % Reference Lab Notebook 6893 pg.046															
B0W3Y9	N908036-01		<u>4.9</u>	81.6					401		13	08/11/99	08/17	PD,01,00	
B0W400	N908036-02		<u>3.9</u>	<u>57.2</u>					400		13	08/11/99	08/17	PD,03,00	
B0W401	N908036-03		<u>4.4</u>	<u>53.8</u>					388		13	08/11/99	08/17	PD,04,00	
BLK (QC ID=31522)	N908036-05		<u>0.12</u>	67.5					425			08/11/99	08/18	PD,03,00	
LCS (QC ID=31521)	N908036-04		<u>0.14</u>	67.5					425			08/11/99	08/18	PD,01,00	
Duplicate (N908036-01)	N908036-06		<u>14</u>	81.6					<u>22</u>		14	08/11/99	08/18	PD,04,00	
(QC ID=31523)															

Nominal values and limits from method 0.050 67.5 100 180

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

AVERAGES ± 2 SD	MDA <u>4.6</u> ± <u>10</u>
FOR 6 SAMPLES	YIELD _____ ± _____

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 08/25/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

CARBON 14 IN SOIL

LIQUID SCINTILLATION COUNTING

Test C\_\_\_\_\_ Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUP- FIX	PLANCHET	Carbon 14
Preparation batch 6893-046					
B0W3Y9	N908036-01	A1		7170-001	259
B0W400	N908036-02	A1		7170-002	174
B0W401	N908036-03	A1		7170-003	3300
BLK (QC ID=31627)	N908036-08			7170-008	U
LCS (QC ID=31626)	N908036-07			7170-007	ok
Duplicate (N908036-01)	N908036-09			7170-009	<u>OUT</u>
Nominal values and limits from method		RDLs (pCi/g)		50	
105-DR FSB - Concrete					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUP- 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 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046															
B0W3Y9	N908036-01	A1		4.6	<u>0.203</u>			100	100				16	08/20/99	08/20 LSC-004
B0W400	N908036-02	A1		4.6	<u>0.200</u>			100	100				17	08/20/99	08/21 LSC-004
B0W401	N908036-03	A1		16	<u>0.209</u>			100	<u>9</u>				17	08/20/99	08/21 LSC-004
BLK (QC ID=31627)	N908036-08			4.2	0.220			100	100					08/20/99	08/20 LSC-004
LCS (QC ID=31626)	N908036-07			31	0.220			100	<u>3</u>					08/20/99	08/21 LSC-004
Duplicate (N908036-01)	N908036-09			4.4	<u>0.207</u>			100	100				16	08/20/99	08/20 LSC-004
(QC ID=31628)															
Nominal values and limits from method				50	0.220			25					180		

PROCEDURES REFERENCE C14COXLSC  
 EP-060 Soil Preparation, rev 0  
 EP-251 Tritium / Carbon-14 Oxidation, rev 0

AVERAGES ± 2 SD MDA 11 ± 22  
 FOR 6 SAMPLES YIELD 100 ± 0

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 08/25/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

TRITIUM IN SOIL

LIQUID SCINTILLATION COUNTING

Test H        Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUP- PLANCHET	Tritium
Preparation batch 6893-046				
B0W3Y9	N908036-01		7170-001	4.56 J
B0W400	N908036-02		7170-002	5.97 J
B0W401	N908036-03		7170-003	6.46 J
BLK (QC ID=31522)	N908036-05		7170-005	U
LCS (QC ID=31521)	N908036-04		7170-004	ok J
Duplicate (N908036-01)	N908036-06		7170-006	ok J
Nominal values and limits from method RDLs (pCi/g) 400				
105-DR FSB - Concrete				

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUP- 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 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046															
B0W3Y9	N908036-01		0.15	<u>10.1</u>			100		120		10	08/13/99	08/14		LSC-007
B0W400	N908036-02		0.072	20.3			100		120		10	08/13/99	08/14		LSC-007
B0W401	N908036-03		0.073	20.2			100		120		11	08/13/99	08/15		LSC-007
BLK (QC ID=31522)	N908036-05		0.088	16.9			100		120			08/13/99	08/15		LSC-007
LCS (QC ID=31521)	N908036-04		0.088	16.9			100		120			08/13/99	08/15		LSC-007
Duplicate (N908036-01)	N908036-06		0.15	<u>10.1</u>			100		120		11	08/13/99	08/15		LSC-007
(QC ID=31523)															
Nominal values and limits from method 400 16.9 25 180															

PROCEDURES REFERENCE EPA906.0  
 EP-060 Soil Preparation, rev 0  
 EP-211 Tritium in Solid Samples by Azeotropic Distillation, rev 0

AVERAGES ± 2 SD MDA 0.10 ± 0.073  
 FOR 6 SAMPLES YIELD 100 ± 0

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
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 Report date 08/25/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

NICKEL 63 IN SOIL

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Nickel 63
Preparation batch 6893-046				
BOW3Y9	N908036-01	7170-001		7580
BOW400	N908036-02	7170-002		4680
BOW401	N908036-03	7170-003		10000
BLK (QC ID=31522)	N908036-05	7170-005		U
LCS (QC ID=31521)	N908036-04	7170-004		ok
Duplicate (N908036-01)	N908036-06	7170-006		ok
Nominal values and limits from method				
105-DR FSB - Concrete			RDLs (pCi/g)	30

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046																
BOW3Y9	N908036-01		6.3	0.500				75		13			9	08/12/99	08/13	LSC-005
BOW400	N908036-02		5.4	0.500				59		28			9	08/12/99	08/13	LSC-005
BOW401	N908036-03		7.2	0.500				78		<u>9</u>			9	08/12/99	08/13	LSC-005
BLK (QC ID=31522)	N908036-05		1.8	0.500				89		100				08/12/99	08/13	LSC-005
LCS (QC ID=31521)	N908036-04		2.9	0.500				59		100				08/12/99	08/13	LSC-005
Duplicate (N908036-01)	N908036-06		6.7	0.500				70		14			9	08/12/99	08/13	LSC-005
(QC ID=31523)																
Nominal values and limits from method																
			30	0.500						10			180			

PROCEDURES REFERENCE NI63LSC  
 EP-060 Soil Preparation, rev 0  
 EP-431 Nickel-63 Purification, rev 0

AVERAGES ± 2 SD MDA 5.0 ± 4.4  
 FOR 6 SAMPLES YIELD 72 ± 23

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 Protocol Hanford  
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TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0483

SDG 7170  
Contact L.A. Johnson

REPORT GUIDE

Client Hanford  
Contract TRB-SBB-207925  
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SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

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SAMPLE DELIVERY GROUP H0483

SDG 7170  
Contact L.A. Johnson

REPORT GUIDE

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Contract TRB-SBB-207925  
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PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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SAMPLE DELIVERY GROUP H0483

SDG 7170  
Contact L.A. Johnson

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WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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REPORT GUIDE

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DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

- U The RESULT is less than the MDA (Minimum Detectable Activity).

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SAMPLE DELIVERY GROUP H0483

SDG 7170  
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GUIDE, cont.

Client Hanford  
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DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.
- Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.
- For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.
- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- \* An MDA is underlined if it is bigger than its RDL.

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0483

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GUIDE, cont.

Client Hanford  
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DATA SHEET

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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SDG 7170  
Contact L.A. Johnson

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LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of RESULT, including that introduced by rounding the result prior to printing.  
  
If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of ADDED.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

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SDG 7170  
Contact L.A. Johnson

REPORT GUIDE

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:
  1. A fixed percentage specified in the protocol.

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 08/25/99

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0483

SDG 7170  
Contact L.A. Johnson

GUIDE, cont.

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DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- \* The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- \* The second limits are protocol defined upper and lower QC limits

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GUIDE, cont.

MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- \* The recovery is underlined (out of spec) if it is outside either of these ranges.

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Version 3.06  
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REPORT GUIDE

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Contract TRB-SBB-207925  
Case no SDG-H0483

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- \* Aliquots are underlined if less than the nominal value specified for the method.
- \* Preparation factors are underlined if greater than the nominal value specified for the method.
- \* Dilution factors are underlined if greater than the nominal value specified for the method.
- \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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METHOD SUMMARY

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			B99-076-05	Page 1 of 1
Collector Fahlberg/Nielson	Company Contact J Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ	Price Code	9K	Data Turnaround
Project Designation 105-DR FSB - Concrete	Sampling Location 105 DR	SAF No. B99-076	15 Days			
Ice Chest No. ERC 99-002	Field Logbook No. EL 1281	Method of Shipment Fed Ex				
Shipped To TMA/RECR R. F. 8.2.99	Offsite Property No. NA	Bill of Lading/Air Bill No. NA				
			COA	R105D4-2870		

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None																		
	Type of Container	aG																		
	No. of Container(s)	1																		
Special Handling and/or Storage	Volume	120mL																		
SAMPLE ANALYSIS		See item (1) in Special Instructions.																		
Sample No.	Matrix *	Sample Date	Sample Time																	
✓ B0W3Y9	Other Solid	8.4.99	0935	X																
✓ B0W400	Other Solid	8.4.99	0925	X																
✓ B0W401	Other Solid	8.4.99	0909	X																

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS										Matrix *	
Relinquished By R. Fahlberg	Date/Time 8.4.99 14:00	Received By R. Fahlberg	Date/Time 8.4.99 14:00	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; Technetium-99; Nickel-63; Carbon-14; Tritium - H3										Soil Water Vapor Other Solid Other Liquid	
Relinquished By R. Fahlberg	Date/Time 8.5.99 08:00	Received By R. Fahlberg	Date/Time 8.5.99 08:00												
Relinquished By R. Fahlberg	Date/Time 8.5.99 14:00	Received By Fed Ex	Date/Time 8/5-99												
Relinquished By Fed Ex	Date/Time 8-6-99 11:30	Received By TNU M. Goldenberg	Date/Time 8-6-99 11:30												
LABORATORY SECTION	Received By	Title										Date/Time			
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By										Date/Time			

# Thermo NUtech - Richmond

## SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT			
Client: <u>Beebeel Hanford Inc</u>	Date/Time received <u>8-6-99 11:30</u>		
CoC No. <u>B 99-076-05</u>			
Container I.D. No. _____	Requested TAT (Days) <u>15</u>	P.O. Received Yes [ ] No [ <input checked="" type="checkbox"/> ]	
INSPECTION			
1. Custody seals on shipping container intact?	Yes [ <input checked="" type="checkbox"/> ]	No [ ]	N/A [ ]
2. Custody seals on shipping container dated & signed?	Yes [ <input checked="" type="checkbox"/> ]	No [ ]	N/A [ ]
3. Custody seals on sample containers intact?	Yes [ <input checked="" type="checkbox"/> ]	No [ ]	N/A [ ]
4. Custody seals on sample containers dated & signed?	Yes [ <input checked="" type="checkbox"/> ]	No [ ]	N/A [ ]
5. Cooler Temperature: _____	Packing material is:	Wet [ ]	Dry [ <input checked="" type="checkbox"/> ]
6. Number of samples in shipping container:	<u>3</u>		
7. Number of containers per sample: _____	(Or see CoC _____)		
8. Paperwork agrees with samples?	Yes [ <input checked="" type="checkbox"/> ]	No [ ]	
9. Samples have: Tape [ ] Hazard labels [ ] Rad labels [ <input checked="" type="checkbox"/> ]	Appropriate sample labels [ <input checked="" type="checkbox"/> ]		
10. Samples are: In good condition [ <input checked="" type="checkbox"/> ]	Leaking [ ]	Broken Container [ ]	Missing [ ]
11. Describe any anomalies:	_____		
_____			
_____			
_____			
13. Was P.M. notified of any anomalies?	Yes [ ]	No [ ]	Date _____
14. Received by <u>M. Goldschberg</u>	Date: <u>8-6-99</u>	Time: <u>11:30</u>	
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. SHIP FROM U.S. DEPT. OF ENERGY C/O  
 Company Bechtel Hanford Inc.  
 Address 3729 Building 300-Area  
 City, State, Zip Richland, WA 99352  
 Contact David St. John  
 Phone 509-372-9588

**RADIOACTIVE SHIPMENT RECORD** 106604<sup>3</sup>  
Page 1 of 2

Ship  Prepaid  Collect 4.  
 Via  Motor  Air Psgr  UPS  
 Rail  Air Cargo  Site Carrier

SHIPMENT AUTHORIZATION NUMBER

2. SHIP TO  
 Company Thermo Retech  
 Address 2030 Wright Avenue  
 City, State, Zip Richmond, CA 94804-0040  
 Attention Larry Johnson  
 Phone 510-235-2633

Markings Applied 6.  
 Radioactive - LSA   
 Radioactive - SCO   
 Type A   
 Type B with trefoil   
 LSA Description 8.  
 LSA-I   
 LSA-II   
 LSA-III   
 SCO-I   
 SCO-II

For Normal Form only 7.  
 Identify  
 Physical Form  Liquid  Gas  
 Solid ground concrete  
 Chemical Form  Elemental  
 Metal  Nitrate  
 Oxide  Mixture  
 Other

5. HM Proper Shipping Name: \_\_\_\_\_ Radioactive Material, \_\_\_\_\_

<input type="checkbox"/>	excepted package - empty packaging	7	UN2910
<input type="checkbox"/>	excepted package - instruments or articles	7	UN2910
<input checked="" type="checkbox"/>	excepted package - limited quantity of material	7	UN2910
<input type="checkbox"/>	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910
<input type="checkbox"/>	Special Form, n.o.s.	7	UN2974
<input type="checkbox"/>	Low Specific Activity, n.o.s.	7	UN2912
<input type="checkbox"/>	n.o.s.	7	UN2982
<input type="checkbox"/>	Fissile, n.o.s.	7	UN2918
<input type="checkbox"/>	Surface Contaminated Object	7	UN2913

EMERGENCY RESPONSE: 9.  
 Telephone 1-888-766-0711  
 Emergency Response Guide(s) 161

Labels Applied 10.  
 Empty   
 Radioactive White - I   
 Radioactive Yellow - II   
 Radioactive Yellow - III   
 Subsidiary Hazard

Highway Route Controlled Quantity   
 Exclusive Use Shipment with instructions   
 Placards Applied   
 If Rail Specify: \_\_\_\_\_  
 Fissile Excepted, Grams \_\_\_\_\_   
 Excepted Package Statement

B99-076 Samples BOW3Y9, BOW400, BOW401

Warning -- Fissile Material Controlled Shipment. Do Not Load More Than N/A Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.

11.	No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package	Gr. Wt. Kg.
	1	poly cooler strong tight	ERC99002	Tape		Cs-137, Sr-90, Eu-152, Co-60	N/A	1.05x10 <sup>6</sup>	4 Kg
<p>Sample containers wrapped in bubble wrap and double bagged, packed in cushioning material. Total this shipment 3-120ml jars, 540 SMS</p> <p>(Shipper may describe package in detail on one of the unused lines above) TOTALS <u>N/A</u> 1.05x10<sup>6</sup> 4kg</p>									

12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Certifier's Signature David St. John On behalf of DOE-RL Date 8/5/99 Organization ERC-AFS Complete Cost Code (Inc. End Function) R105 D4 2860

13. Surface Dose Rate of Package  <0.005 or \_\_\_\_\_ mSv/hr  
 Dose Rate @ 1 Meter from Surface of Package  <0.005 or \_\_\_\_\_ mSv/hr  
 Additional Data and Instructions (inc. Readings on Internal Packaging) \_\_\_\_\_  
 Signature [Signature] Radiation Monitoring

Smears of Outer Container  <0.41 Bq (22 dpm) β γ /cm<sup>2</sup>  
 <0.04 Bq (2.2 dpm) α /cm<sup>2</sup>  
 <Tbl. 2-2 HSRCM Onsite Limits

TRUCK LOAD OR EXCLUSIVE USE  
 Surface  <2 mSv/hr (200 mrem/hr)  
 @ 2 meters  <0.1 mSv/hr (10 mrem/hr)  
 @ Cab or sleeper  <0.02 mSv/hr (2 mrem/hr) (Using N+β γ)

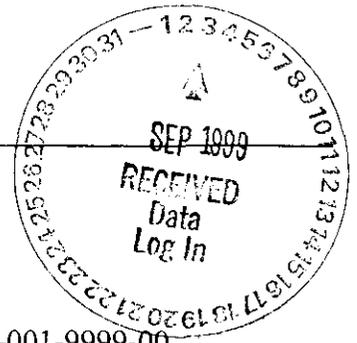
Bldg. 3728 Survey No. FF12-99-N99 Date 8-5-99

14. TRANSPORTER DRIVER SIGNATURE [Signature] RECEIVER RECEIVER SIGNATURE \_\_\_\_\_ Date \_\_\_\_\_

15. OFFSITE AUTHORIZATION  
 Shipment has been inspected and verified to be in compliance with DOT regulations  
 Authorized Signature [Signature] Printed Name Keith R. Smith Date 8-5-99

16. AUTHORIZATION FOR SHIPMENT  
 AIR TRANSPORT CERTIFICATION  N/A CARGO AIRCRAFT  Cargo Aircraft Only Labels Applied  Ltd Qty <3 T.I. PASSENGER AIRCRAFT  Research/Medical Diagnosis  Human Medical Research Pkg. Dimensions (cm) N/A

17. OFFSITE AUTHORIZATION  
 Tracking No. MBH-3632 Date Shipped 8/5/99 Routing FED-X ETA 8/6/99  
 Surveyed By [Signature] Date 8-5-99 Approved for Shipment Offsite [Signature] Date 8/5/99



**Recra LabNet Philadelphia  
Analytical Report**

**Client:** TNU-HANFORD B99-076  
**RFW#:** 9908L636  
**SDG/SAF#:** H0483/B99-076

**W.O.#:** 10985-001-001-9999-00  
**Date Received:** 08-06-99

**PCB**

The set of samples consisted of two (2) solid samples collected on 08-04-99.

The samples and their associated QC samples were extracted on 08-10-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 08-11,12-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclor 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 and sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. One (1) of six (6) obtainable 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 high concentration of analytes and the dilution required for analysis.
8. Sample BOW3Y6 and its QC samples required ten-fold instrument dilutions due to high concentrations of target analytes. Reporting limits have been adjusted to reflect the necessary dilutions.
9. All initial calibrations associated with this data set were within acceptance criteria.

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 8 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.





Recra LabNet - Lionville Laboratory  
 PCB ANALYTICAL DATA PACKAGE FOR  
 TNU-HANFORD B99-076

DATE RECEIVED: 08/06/99

RFW LOT # :9908L636

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BOW3Y6	001	SO	99LE0927	08/04/99	08/10/99	08/12/99
BOW3Y6	001 MS	SO	99LE0927	08/04/99	08/10/99	08/12/99
BOW3Y6	001 MSD	SO	99LE0927	08/04/99	08/10/99	08/12/99
BOW3Y7	002	SO	99LE0927	08/04/99	08/10/99	08/12/99

LAB QC:

PBLKQT	MB1	S	99LE0927	N/A	08/10/99	08/11/99
PBLKQT	MB1 BS	S	99LE0927	N/A	08/10/99	08/11/99

*9/08-1799*

ALL



# Custody Transfer Record/Lab Work Request

RECRA LabNet Use Only  
 9908L636

Client <u>TNU-Hanford B99-076</u>	Refrigerator #	5	5
Est. Final Proj. Sampling Date	#/Type Container	Liquid	
Project # <u>10985-001-001-9499-00</u>		Solid	1g
Project Contact/Phone #	Volume	Liquid	1g
RECRA Project Manager <u>OT</u>		Solid	1g
QC <u>APAC</u> Del <u>ATL</u> TAT <u>15 day</u>	Preservatives		
Date Rec'd <u>8/6/99</u> Date Due <u>8/21/99</u>	ANALYSES REQUESTED	ORGANIC	INORG
Account #		VOA	Metal
		BNA	N
		Pes/PCB	
		Herb	

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				ORGANIC					INORG										
								VOA	BNA	Pes/PCB	Herb	Metal	N										
	<u>001</u>	<u>BOW346</u>			<u>SO</u>	<u>8/1/99</u>	<u>0945</u>																
	<u>002</u>	<u>d 7</u>			<u>d</u>	<u>d</u>	<u>0955</u>																

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:  
Self # B99-076

**COMPOSITE WASTE**

DATE/REVISIONS:

1. Run matrix QC

2. MTC = Pb + Hg

3. \_\_\_\_\_

4. \_\_\_\_\_

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

6. \* 4019644720-4.40C

RECRA LabNet Use Only

Samples were: 1) Shipped <input checked="" type="checkbox"/> or Hand Delivered _____ Airbill # <u>*</u>	COC Tape was: 1) Present on Outer Package <input checked="" type="checkbox"/> or N 2) Unbroken on Outer Package <input checked="" type="checkbox"/> or N 3) Present on Sample <input checked="" type="checkbox"/> or N 4) Unbroken on Sample <input checked="" type="checkbox"/> or N COC Record Present Upon Sample Rec't <input checked="" type="checkbox"/> or N
2) Ambient or Chilled <input checked="" type="checkbox"/>	
3) Received in Good Condition <input checked="" type="checkbox"/> or N	
4) Labels Indicate Properly Preserved <input checked="" type="checkbox"/> or N	
5) Received Within Holding Times <input checked="" type="checkbox"/> or N	

Discrepancies Between Samples Labels and COC Record?  Y or  N

NOTES

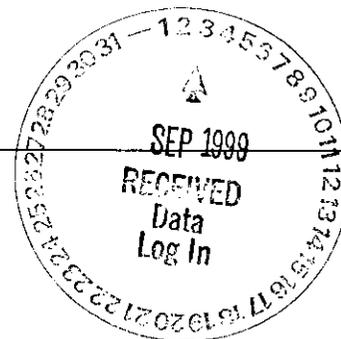
Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
<u>FedEx</u>	<u>[Signature]</u>	<u>8/6/99</u>	<u>0930</u>		<b>ORIGINAL REWRITTEN</b>		

Collector Fahlberg/Nielson	Company Contact J Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ	Price Code <b>9K</b>	Data Turnaround <b>15 Days</b>
Project Designation 105-DR FSB - Concrete	Sampling Location 105 DR	Field Logbook No. EL 1281	SAF No. B99-076	<span style="font-size: 2em; border: 1px solid black; border-radius: 50%; padding: 5px;">036</span>	
Ice Chest No. <b>ERC 99-005</b>	Offsite Property No. <b>NA</b>	Method of Shipment Fed Ex	Bill of Lading/Air Bill No. <b>NA</b>		
Shipped To <b>TMA/RECRA</b> <b>REF 8.2.99</b>			COA <b>R105D42870</b>		

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None								
	Type of Container	aG	aG								
	No. of Container(s)	1	1								
Special Handling and/or Storage	Volume	60mL	60mL								
SAMPLE ANALYSIS		PCBs - 8080	ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV)								
Sample No.	Matrix *	Sample Date	Sample Time								
B0W3Y6	Other Solid	8-4-99	0945	X	X						B0W3Y4
B0W3Y7	Other Solid	8-4-99	0955	X	X						B0W3Y5

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
Relinquished By <i>R. Fahlberg</i> / <i>R. Fahlberg</i>	Date/Time 8.4.99 1400	Received By <i>Ref 1-C</i>	Date/Time 8-4-99 1400
Relinquished By <i>R. Fahlberg</i> / <i>Ref 1-C</i>	Date/Time 8.5.99 0800	Received By <i>R. Fahlberg</i> / <i>R. Fahlberg</i>	Date/Time 8.5.99 0800
Relinquished By <i>R. Fahlberg</i> / <i>R. Fahlberg</i>	Date/Time 8.5.99 1400	Received By <i>Fed Ex</i>	Date/Time
Relinquished By <i>Delley</i>	Date/Time	Received By <i>Y. Nelson</i>	Date/Time 8/6/99 0930

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



**Recra LabNet Philadelphia  
Analytical Report**

**Client :** TNU-HANFORD B99-076  
**RFW# :** 9908L636  
**SDG/SAF# :** H0483/B99-076

**W.O.# :** 10985-001-001-9999-00  
**Date Received:** 08-06-99

**METALS CASE NARRATIVE**

1. This narrative covers the analyses of 2 solid samples.
2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary. Five fold dilutions were performed for Lead due to the sample matrix.
3. All analyses were performed within the required holding times.
4. The cooler temperature has been recorded on the Chain of Custody.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits.
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) recoveries for both analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.
11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury. A PDS was prepared at the following concentration:

<u>Sample ID</u>	<u>Element</u>	<u>PDS Concentration (ppb)</u>	<u>PDS % Recovery</u>
B0W3Y6	Lead	200	105.2

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 12 pages.

12. The duplicate analysis for Mercury was 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/m08-636

8-12-99  
Date



# METALS METHOD GLOSSARY

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

Recra Lot#: 9908L636

Leaching Procedure:    1310    1311    1312    Other:                   

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

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

## Metals Analysis Methods

	SW846	EPA	STD MTD	EPA OSWR	USA THAMA
Aluminum	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Antimony	<u>  </u> 6010B <u>  </u> 7041 <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 204.2		<u>  </u> 99
Arsenic	<u>  </u> 6010B <u>  </u> 7060A <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 206.2	<u>  </u> 3113B	<u>  </u> 99
Barium	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Beryllium	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Bismuth	<u>  </u> 6010B <sup>1</sup>	<u>  </u> 200.7 <sup>1</sup>		<u>  </u> 1620	<u>  </u> 99
Boron	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Cadmium	<u>  </u> 6010B <u>  </u> 7131A <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 213.2		<u>  </u> 99
Calcium	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Chromium	<u>  </u> 6010B <u>  </u> 7191 <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 218.2		<u>  </u> SS17
Cobalt	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Copper	<u>  </u> 6010B <u>  </u> 7211 <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 220.2		<u>  </u> 99
Iron	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Lead	<input checked="" type="checkbox"/> 6010B <u>  </u> 7421 <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 239.2	<u>  </u> 3113B	<u>  </u> 99
Lithium	<u>  </u> 6010B <u>  </u> 7430 <sup>4</sup>	<u>  </u> 200.7		<u>  </u> 1620	<u>  </u> 99
Magnesium	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Manganese	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Mercury	<u>  </u> 7470A <sup>3</sup> <input checked="" type="checkbox"/> 7471A <sup>3</sup>	<u>  </u> 245.1 <sup>2</sup>	<u>  </u> 245.5 <sup>2</sup>		<u>  </u> 99
Molybdenum	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Nickel	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Potassium	<u>  </u> 6010B <u>  </u> 7610 <sup>4</sup>	<u>  </u> 200.7	<u>  </u> 258.1 <sup>4</sup>		<u>  </u> 99
Rare Earths	<u>  </u> 6010B <sup>1</sup>	<u>  </u> 200.7 <sup>1</sup>		<u>  </u> 1620	<u>  </u> 99
Selenium	<u>  </u> 6010B <u>  </u> 7740 <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 270.2	<u>  </u> 3113B	<u>  </u> 99
Silicon	<u>  </u> 6010B <sup>1</sup>	<u>  </u> 200.7		<u>  </u> 1620	<u>  </u> 99
Silica	<u>  </u> 6010B	<u>  </u> 200.7		<u>  </u> 1620	<u>  </u> 99
Silver	<u>  </u> 6010B <u>  </u> 7761 <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 272.2		<u>  </u> 99
Sodium	<u>  </u> 6010B <u>  </u> 7770 <sup>4</sup>	<u>  </u> 200.7	<u>  </u> 273.1 <sup>4</sup>		<u>  </u> 99
Strontium	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Thallium	<u>  </u> 6010B <u>  </u> 7841 <sup>5</sup>	<u>  </u> 200.7	<u>  </u> 279.2 <u>  </u> 200.9		<u>  </u> 99
Tin	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Titanium	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Uranium	<u>  </u> 6010B <sup>1</sup>	<u>  </u> 200.7 <sup>1</sup>		<u>  </u> 1620	<u>  </u> 99
Vanadium	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Zinc	<u>  </u> 6010B	<u>  </u> 200.7			<u>  </u> 99
Zirconium	<u>  </u> 6010B <sup>1</sup>	<u>  </u> 200.7 <sup>1</sup>		<u>  </u> 1620	<u>  </u> 99

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 08/12/99

CLIENT: TNU-HANFORD B99-076  
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9908L636

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING	DILUTION
					LIMIT	FACTOR
-001	B0W3Y6	Mercury, Total	1.0	MG/KG	0.03	1.0
		Lead, Total	51.7	MG/KG	1.4	5.0
-002	B0W3Y7	Mercury, Total	0.35	MG/KG	0.02	1.0
		Lead, Total	33.3	MG/KG	1.1	5.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 08/12/99

CLIENT: TNU-HANFORD B99-076

RECRA LOT #: 9908L636

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99C0230-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0
BLANK1	99L0538-MB1	Lead, Total	0.21 u	MG/KG	0.21	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 08/12/99

CLIENT: TNU-HANFORD B99-076

RECRA LOT #: 9908L636

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

SAMPLE	SITE ID	ANALYTE	SPIKED	INITIAL	SPIKED		DILUTION
			SAMPLE	RESULT	AMOUNT	%RECOV	
-001	BOW3Y6	Mercury, Total	1.5	1.0	0.26	208.1	1.0
		Lead, Total	94.1	51.7	69.8	60.7	5.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 08/12/99

CLIENT: TNU-HANFORD B99-076

RECRA LOT #: 9908L636

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-001REP	BOW3Y6	Mercury, Total	1.0	0.78	26.1	1.0
		Lead, Total	51.7	62.3	18.6	5.0

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 08/12/99

CLIENT: TNU-HANFORD B99-076

RECRA LOT #: 9908L636

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

SAMPLE	SITE ID	ANALYTE	SPIKED		UNITS	%RECOV
			SAMPLE	AMOUNT		
LCS1	99C0230-LC1	Mercury, LCS	1.1	1.0	MG/KG	107.8
LCS1	99L0538-LC1	Lead, LCS	247	250	MG/KG	98.8

Recra LabNet - Lionville Laboratory  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNU-HANFORD B99-076

DATE RECEIVED: 08/06/99

RFW LOT # :9908L636

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
---------------------	-------	-----	--------	------------	-----------	----------

BOW3Y6

MERCURY, TOTAL	001	SO	99C0230	08/04/99	08/11/99	08/12/99
MERCURY, TOTAL	001 REP	SO	99C0230	08/04/99	08/11/99	08/12/99
MERCURY, TOTAL	001 MS	SO	99C0230	08/04/99	08/11/99	08/12/99
LEAD, TOTAL	001	SO	99L0538	08/04/99	08/09/99	08/11/99
LEAD, TOTAL	001 REP	SO	99L0538	08/04/99	08/09/99	08/11/99
LEAD, TOTAL	001 MS	SO	99L0538	08/04/99	08/09/99	08/11/99

BOW3Y7

MERCURY, TOTAL	002	SO	99C0230	08/04/99	08/11/99	08/12/99
LEAD, TOTAL	002	SO	99L0538	08/04/99	08/09/99	08/11/99

LAB QC:

MERCURY LABORATORY	LC1 BS	S	99C0230	N/A	08/11/99	08/12/99
MERCURY, TOTAL	MB1	S	99C0230	N/A	08/11/99	08/12/99
LEAD LABORATORY	LC1 BS	S	99L0538	N/A	08/09/99	08/11/99
LEAD, TOTAL	MB1	S	99L0538	N/A	08/09/99	08/11/99



Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-076-04	Page 1 of 1	
Collector Fahlberg/Nielson		Company Contact J Adler		Telephone No. 373-4316		Project Coordinator TRENT, SJ	Price Code <b>9K</b>	Data Turnaround <b>15 Days</b>
Project Designation 105-DR FSB - Concrete		Sampling Location 105 DR		SAF No. B99-076		<b>036</b>		
Ice Chest No. <b>ERC 99-005</b>		Field Logbook No. EL 1281		Method of Shipment Fed Ex				
Shipped To TMA/RECRA <b>8.2.99</b>		Offsite Property No. <b>NA</b>		Bill of Lading/Air Bill No. <b>NA</b>		COA <b>R105D42870</b>		

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None								
	Type of Container	aG	aG								
	No. of Container(s)	1	1								
Special Handling and/or Storage	Volume	60mL	60mL								
SAMPLE ANALYSIS		PCBs - 8080	ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV)								
Sample No.	Matrix *	Sample Date	Sample Time								
B0W3Y6	Other Solid	8-4-99	0945	X	X						B0W3Y4
B0W3Y7	Other Solid	8-4-99	0955	X	X						B0W3Y5

CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By		Date/Time		Received By		Date/Time					
R. Fahlberg / R. Fahlberg		8-4-99 1400		Ref 1-C		8-4-99 1400					
Relinquished By		Date/Time		Received By		Date/Time					
R. Fahlberg / Ref 1-C		8-5-99 0800		R. Fahlberg / R. Fahlberg		8-5-99 0800					
Relinquished By		Date/Time		Received By		Date/Time					
R. Fahlberg / R. Fahlberg		8-5-99 1400		Fed Ex							
Relinquished By		Date/Time		Received By		Date/Time					
Delivered				J. Nelson		9/6/99 0930					
LABORATORY SECTION		Received By				Title				Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method				Disposed By				Date/Time	

012

H048 S. TRB-SBB-207925

**Thermo Nutech**

2030 Wright Avenue  
P.O. Box 4040  
Richmond, CA 94804



*Smart Solutions. Positive Outcomes.*

November 29, 1999

Ms. Joan Kessner  
3190 George Washington Way  
Richland, WA 99352  
MSIN: H9-03

(800) 841-5487 Phone  
(510) 235-2633 Phone  
(510) 235-0438 Fax  
www.thermoretec.com

Reference: P.O. #TRB-SBB-207925  
Thermo Nutech N9-08-036-7170, SDG H0483 (REVISED)

Dear Ms. Kessner:

Enclosed is a revised data report for three solid samples designated under SAF No. B99-076 received at Thermo Nutech on August 6, 1999. The samples were analyzed according to the accompanying chain-of-custody document. This revised report incorporates barium-133 data that was omitted from the original report.

Please call if you have any questions concerning this report.

Sincerely,

N. Joseph Verville  
Senior Program Manager



NJV/kcj

Enclosure: Report

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

SAMPLE SUMMARY

SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B0W3Y9	105 DR	SOLID		N908036-01	B99-076	B99-076-05	08/04/99 09:35
B0W400	105 DR	SOLID		N908036-02	B99-076	B99-076-05	08/04/99 09:25
B0W401	105 DR	SOLID		N908036-03	B99-076	B99-076-05	08/04/99 09:09
Method Blank		SOLID		N908036-05	B99-076		
Method Blank		SOLID		N908036-08	B99-076		
Lab Control Sample		SOLID		N908036-04	B99-076		
Lab Control Sample		SOLID		N908036-07	B99-076		
Duplicate (N908036-01)	105 DR	SOLID		N908036-06	B99-076		08/04/99 09:35
Duplicate (N908036-01)	105 DR	SOLID		N908036-09	B99-076		08/04/99 09:35

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CS  
 Version 3.06  
 Report date 10/07/99

**TMA/RICHMOND**  
 SAMPLE DELIVERY GROUP H0483

SDG 7170  
 Contact L.A. Johnson

**QC SUMMARY**

Client Hanford  
 Contract TRB-SBE-207925  
 Case no SDG-H0483

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7170	B99-076-05	B0W3Y9	SOLID				08/06/99	2	N908036-01	7170-001
		B0W400	SOLID				08/06/99	2	N908036-02	7170-002
		B0W401	SOLID				08/06/99	2	N908036-03	7170-003
		Method Blank	SOLID						N908036-05	7170-005
		Method Blank	SOLID						N908036-08	7170-008
		Lab Control Sample	SOLID						N908036-04	7170-004
		Lab Control Sample	SOLID						N908036-07	7170-007
		Duplicate (N908036-01)	SOLID				08/06/99	2	N908036-06	7170-006
		Duplicate (N908036-01)	SOLID				08/06/99	2	N908036-09	7170-009

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-QS  
 Version 3.06  
 Report date 10/07/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

SDG 7170  
 Contact L.A. Johnson

PREP BATCH SUMMARY

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

TEST	MATRIX	METHOD	PREPARATION ERROR			PLANCHETS ANALYZED				QUALI- FIERS
			BATCH	2σ %	CLIENT MORE	RE	BLANK	LCS	DUP/ORIG MS/ORIG	
Alpha Spectroscopy										
AM	SOLID	Americium 241 in Soil	6893-046	5.0	3		1	1	1/1	
PU	SOLID	Plutonium, Isotopic in Solids	6893-046	5.0	3		1	1	1/1	
U	SOLID	Uranium, Isotopic in Soil	6893-046	5.0	3		1	1	1/1	
Beta Counting										
SR	SOLID	Total Strontium in Soil	6893-046	10.0	3		1	1	1/1	
TC	SOLID	Technetium 99 in Soil	6893-046	10.0	3		1	1	1/1	
Gamma Spectroscopy										
GAM	SOLID	Gamma Scan	6893-046	15.0	3		1	1	1/1	X
Liquid Scintillation Counting										
C	SOLID	Carbon 14 in Soil	6893-046	10.0	3		1	1	1/1	
H	SOLID	Tritium in Soil	6893-046	10.0	3		1	1	1/1	
NI_L	SOLID	Nickel 63 in Soil	6893-046	10.0	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 10/07/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

WORK SUMMARY

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED		SUP-						
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
B0W3Y9		N908036-01	7170-001	AM		08/19/99	08/25/99	NJV	Americium 241 in Soil	
105 DR	SOLID	08/04/99	7170-001	C	A1	08/20/99	08/25/99	NJV	Carbon 14 in Soil	
B99-076-05	B99-076	08/06/99	7170-001	GAM		08/17/99	08/24/99	NJV	Gamma Scan	
			7170-001	H		08/14/99	08/23/99	NJV	Tritium in Soil	
			7170-001	NI_L		08/13/99	08/25/99	NJV	Nickel 63 in Soil	
			7170-001	PU		08/21/99	08/25/99	NJV	Plutonium, Isotopic in Solids	
			7170-001	SR		08/16/99	08/24/99	NJV	Total Strontium in Soil	
			7170-001	TC		08/23/99	08/25/99	NJV	Technetium 99 in Soil	
			7170-001	U		08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil	
B0W400		N908036-02	7170-002	AM		08/19/99	08/25/99	NJV	Americium 241 in Soil	
105 DR	SOLID	08/04/99	7170-002	C	A1	08/21/99	08/25/99	NJV	Carbon 14 in Soil	
B99-076-05	B99-076	08/06/99	7170-002	GAM		08/17/99	08/24/99	NJV	Gamma Scan	
			7170-002	H		08/14/99	08/23/99	NJV	Tritium in Soil	
			7170-002	NI_L		08/13/99	08/25/99	NJV	Nickel 63 in Soil	
			7170-002	PU		08/18/99	08/25/99	NJV	Plutonium, Isotopic in Solids	
			7170-002	SR		08/16/99	08/24/99	NJV	Total Strontium in Soil	
			7170-002	TC		08/23/99	08/25/99	NJV	Technetium 99 in Soil	
			7170-002	U		08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil	
B0W401		N908036-03	7170-003	AM		08/21/99	08/25/99	NJV	Americium 241 in Soil	
105 DR	SOLID	08/04/99	7170-003	C	A1	08/21/99	08/25/99	NJV	Carbon 14 in Soil	
B99-076-05	B99-076	08/06/99	7170-003	GAM		08/17/99	08/24/99	NJV	Gamma Scan	
			7170-003	H		08/15/99	08/23/99	NJV	Tritium in Soil	
			7170-003	NI_L		08/13/99	08/25/99	NJV	Nickel 63 in Soil	
			7170-003	PU		08/18/99	08/25/99	NJV	Plutonium, Isotopic in Solids	
			7170-003	SR		08/16/99	08/24/99	NJV	Total Strontium in Soil	
			7170-003	TC		08/23/99	08/25/99	NJV	Technetium 99 in Soil	
			7170-003	U		08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil	
Method Blank		N908036-05	7170-005	AM		08/17/99	08/25/99	NJV	Americium 241 in Soil	
	SOLID		7170-005	GAM		08/18/99	08/24/99	NJV	Gamma Scan	
	B99-076		7170-005	H		08/15/99	08/23/99	NJV	Tritium in Soil	
			7170-005	NI_L		08/13/99	08/25/99	NJV	Nickel 63 in Soil	
			7170-005	PU		08/17/99	08/25/99	NJV	Plutonium, Isotopic in Solids	
			7170-005	SR		08/16/99	08/24/99	NJV	Total Strontium in Soil	
			7170-005	TC		08/21/99	08/25/99	NJV	Technetium 99 in Soil	
			7170-005	U		08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil	

WORK SUMMARY

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Lab id TMANC  
 Protocol Hanford  
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 Form DVD-CWS  
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

WORK SUMMARY, cont.

SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

CLIENT SAMPLE ID	MATRIX	LAB SAMPLE ID	COLLECTED	SUF-	ANALYZED	REVIEWED	BY	METHOD
LOCATION	SAF No	RECEIVED	PLANCHET	TEST	FIX			
Method Blank		N908036-08	7170-008	C	08/20/99	08/25/99	NJV	Carbon 14 in Soil
	SOLID							
	B99-076							
Lab Control Sample		N908036-04	7170-004	AM	08/17/99	08/25/99	NJV	Americium 241 in Soil
	SOLID		7170-004	GAM	08/18/99	08/24/99	NJV	Gamma Scan
	B99-076		7170-004	H	08/15/99	08/23/99	NJV	Tritium in Soil
			7170-004	NI_L	08/13/99	08/25/99	NJV	Nickel 63 in Soil
			7170-004	PU	08/17/99	08/25/99	NJV	Plutonium, Isotopic in Solids
			7170-004	SR	08/16/99	08/24/99	NJV	Total Strontium in Soil
			7170-004	TC	08/20/99	08/25/99	NJV	Technetium 99 in Soil
			7170-004	U	08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil
Lab Control Sample		N908036-07	7170-007	C	08/21/99	08/25/99	NJV	Carbon 14 in Soil
	SOLID							
	B99-076							
Duplicate (N908036-01)		N908036-06	7170-006	AM	08/22/99	08/25/99	NJV	Americium 241 in Soil
105 DR	SOLID	08/04/99	7170-006	GAM	08/18/99	08/24/99	NJV	Gamma Scan
	B99-076	08/06/99	7170-006	H	08/15/99	08/23/99	NJV	Tritium in Soil
			7170-006	NI_L	08/13/99	08/25/99	NJV	Nickel 63 in Soil
			7170-006	PU	08/21/99	08/25/99	NJV	Plutonium, Isotopic in Solids
			7170-006	SR	08/16/99	08/24/99	NJV	Total Strontium in Soil
			7170-006	TC	08/20/99	08/25/99	NJV	Technetium 99 in Soil
			7170-006	U	08/13/99	08/24/99	NJV	Uranium, Isotopic in Soil
Duplicate (N908036-01)		N908036-09	7170-009	C	08/20/99	08/25/99	NJV	Carbon 14 in Soil
105 DR	SOLID	08/04/99						
	B99-076	08/06/99						

WORK SUMMARY

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Lab id TMANC  
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

WORK SUMMARY, cont.

SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
AM	B99-076	Americium 241 in Soil	AM/CMPLATE	3			1	1	1		6
C	B99-076	Carbon 14 in Soil	C14COXLSC	3			1	1	1		6
GAM	B99-076	Gamma Scan	GAMMAHI	3			1	1	1		6
H	B99-076	Tritium in Soil	EPA906.0	3			1	1	1		6
NI_L	B99-076	Nickel 63 in Soil	NI63LSC	3			1	1	1		6
PU	B99-076	Plutonium, Isotopic in Solids	PUPLATE	3			1	1	1		6
SR	B99-076	Total Strontium in Soil	SRTOTAL	3			1	1	1		6
TC	B99-076	Technetium 99 in Soil	TC99TRLSC	3			1	1	1		6
U	B99-076	Uranium, Isotopic in Soil	UPLATE	3			1	1	1		6
TOTALS				27			9	9	9		54

WORK SUMMARY

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Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
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 Version 3.06  
 Report date 10/07/99

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0483**

N908036-05

Method Blank

**METHOD BLANK**

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG-H0483
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-05</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7170-005</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-076</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-0.003	0.052	0.088	400	U	H
Technetium 99	14133-76-7	0.012	0.46	0.87	15	U	TC
Uranium 233/234	U-233/234	0.031	0.041	0.078	1.0	U	U
Uranium 235	15117-96-1	0	0.025	0.095	1.0	U	U
Uranium 238	U-238	0	0.020	0.078	1.0	U	U
Plutonium 238	13981-16-3	0.009	0.018	0.029	1.0	U	PU
Plutonium 239/240	PU-239/240	0.006	0.012	0.029	1.0	U	PU
Nickel 63	13981-37-8	0.565	1.1	1.8	30	U	NI_L
Americium 241	14596-10-2	0.004	0.024	0.039	1.0	U	AM
Total Strontium	SR-RAD	<u>0.264</u>	0.13	0.19	1.0	J	SR
Potassium 40	13966-00-2	U		0.96		U	GAM
Barium 133	13981-41-4	U		4.2		UX	GAM
Cobalt 60	10198-40-0	U		<u>0.054</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.067	0.10	U	GAM
Europium 152	14683-23-9	U		<u>0.14</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.19</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.15</u>	0.10	U	GAM
Radium 226	13982-63-3	U		0.097	0.10	U	GAM
Radium 228	15262-20-1	U		<u>0.27</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		0.085		U	GAM
Thorium 232	TH-232	U		0.27		U	GAM
Americium 241	14596-10-2	U		0.17		U	GAM
Uranium 238	U-238	U		6.4		U	GAM
Uranium 235	15117-96-1	U		0.20		U	GAM

105-DR FSB - Concrete

QC-BLANK 31522

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>10/07/99</u>

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0483

N908036-08

Method Blank

METHOD BLANK

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0483</u>
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-08</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7170-008</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B99-076</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Carbon 14	14762-75-5	0.664	2.5	4.2	50	U	C

105-DR FSB - Concrete

QC-BLANK 31627
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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>10/07/99</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

N908036-04

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0483</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-04</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7170-004</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-076</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 LMITS (TOTAL)	PROTOCOL LIMITS
Tritium	7.21	0.17	0.088	400	J	H	7.34	0.29	98	84-116	80-120
Technetium 99	41.8	1.4	0.66	15		TC	43.6	1.7	96	84-116	80-120
Uranium 233/234	4.82	0.58	0.28	1.0		U	4.83	0.19	100	80-120	80-120
Uranium 235	4.22	0.53	0.073	1.0		U	3.92	0.16	108	77-123	80-120
Uranium 238	4.85	0.58	0.27	1.0		U	5.24	0.21	93	81-119	80-120
Plutonium 238	11.3	0.89	0.033	1.0		PU	12.6	0.50	90	86-114	80-120
Plutonium 239/240	12.1	0.95	0.033	1.0		PU	13.2	0.53	92	86-114	80-120
Nickel 63	137	4.6	2.9	30		NI_L	134	5.4	102	83-117	
Americium 241	10.3	0.87	0.043	1.0		AM	11.5	0.46	90	86-114	80-120
Total Strontium	13.1	0.83	0.58	1.0		SR	12.5	0.50	105	80-120	
Barium 133	U		6.6		UX	GAM					
Cobalt 60	3.63	0.25	<u>0.14</u>	0.050		GAM	3.94	0.16	92	76-124	80-120
Cesium 137	4.00	0.19	<u>0.12</u>	0.10		GAM	4.21	0.17	95	77-123	80-120

105-DR FSB - Concrete

QC-LCS 31521

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>10/07/99</u>



**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0483

N908036-06

B0W3Y9

**DUPLICATE**

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG-H0483
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>N908036-06</u>	Lab sample id <u>N908036-01</u>	Client sample id <u>B0W3Y9</u>
Dept sample id <u>7170-006</u>	Dept sample id <u>7170-001</u>	Location/Matrix <u>105 DR</u> <u>SOLID</u>
	Received <u>08/06/99</u>	Collected <u>08/04/99 09:35</u>
		Custody/SAF No <u>B99-076-05</u> <u>B99-076</u>

ANALYTE	DUPLICATE		MDA	RDL	QUALI-	ORIGINAL	2σ ERR		MDA	QUALI-	RPD	3σ	PROT
	pCi/g	(COUNT)					pCi/g	(COUNT)					
Tritium	4.63	0.19	0.15	400	J	H	4.56	0.19	0.15	J	2	23	
Technetium 99	1.14	0.19	0.29	15	J	TC	0.620	0.19	0.39	J	<u>59</u>	51	
Uranium 233/234	1.24	0.23	0.076	1.0		U	1.34	0.22	0.068		8	38	
Uranium 235	0.086	0.058	0.073	1.0	J	U	0.077	0.052	0.066	J	11	144	
Uranium 238	1.23	0.23	0.061	1.0		U	1.20	0.21	0.054		2	40	
Plutonium 238	5.24	0.49	0.037	1.0		PU	4.99	1.3	0.32		5	42	
Plutonium 239/240	227	16	0.060	1.0		PU	232	47	0.45		2	34	
Nickel 63	7790	78	6.7	30		NI_L	7580	76	6.3		3	21	
Americium 241	76.1	12	0.29	1.0		AM	75.5	5.4	0.042		1	28	
Total Strontium	2720	89	<u>4.3</u>	1.0		SR	2710	100	<u>7.6</u>		0	22	
Potassium 40	U		21		U	GAM	U		6.4	U	-		
Barium 133	U		7.0		UX	GAM	U		2.6	UX	-		
Cobalt 60	284	5.6	<u>3.1</u>	0.050		GAM	281	2.0	<u>0.99</u>		1	32	
Cesium 137	8090	20	<u>6.6</u>	0.10		GAM	7790	7.0	<u>2.5</u>		4	32	
Europium 152	959	20	<u>22</u>	0.10		GAM	987	7.3	<u>8.0</u>		3	32	
Europium 154	242	12	<u>10</u>	0.10		GAM	226	4.1	<u>3.3</u>		7	33	
Europium 155	U		<u>15</u>	0.10	U	GAM	13.4	2.6	<u>3.8</u>		11	164	
Radium 226	U		<u>8.6</u>	0.10	U	GAM	U		<u>3.1</u>	U	-		
Radium 228	U		<u>16</u>	0.20	U	GAM	U		<u>6.1</u>	U	-		
Thorium 228	U		7.3		U	GAM	U		2.9	U	-		
Thorium 232	U		16		U	GAM	U		6.1	U	-		
Americium 241	87.9	12	16			GAM	108	1.8	2.3		21	37	
Uranium 238	U		610		U	GAM	U		260	U	-		
Uranium 235	U		18		U	GAM	U		6.0	U	-		

105-DR FSB - Concrete

QC-DUP#1 31523

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>10/07/99</u>

**TMA / RICHMOND**  
SAMPLE DELIVERY GROUP H0483

N908036-09

B0W3Y9

**DUPLICATE**

SDG <u>7170</u>		Client/Case no <u>Hanford</u>	SDG-H0483
Contact <u>L.A. Johnson</u>		Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL		
Lab sample id <u>N908036-09</u>	Lab sample id <u>N908036-01</u>	Client sample id <u>B0W3Y9</u>	
Dept sample id <u>7170-009</u>	Dept sample id <u>7170-001</u>	Location/Matrix <u>105 DR</u>	<u>SOLID</u>
	Received <u>08/06/99</u>	Collected <u>08/04/99 09:35</u>	
		Custody/SAF No <u>B99-076-05</u>	<u>B99-076</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
Carbon 14	160	5.2	4.4	50		C	259	6.4	4.6		<u>47</u>	23	

105-DR FSB - Concrete

QC-DUP#1 31628

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 10/07/99

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0483**

N908036-01

B0W3Y9

**DATA SHEET**

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG <u>H0483</u>
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-01</u>	Client sample id <u>B0W3Y9</u>	
Dept sample id <u>7170-001</u>	Location/Matrix <u>105 DR</u>	<u>SOLID</u>
Received <u>08/06/99</u>	Collected <u>08/04/99 09:35</u>	
	Custody/SAF No <u>B99-076-05</u>	<u>B99-076</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	4.56	0.19	0.15	400	J	H
Carbon 14	14762-75-5	259	6.4	4.6	50		C
Technetium 99	14133-76-7	0.620	0.19	0.39	15	J	TC
Uranium 233/234	U-233/234	1.34	0.22	0.068	1.0		U
Uranium 235	15117-96-1	0.077	0.052	0.066	1.0	J	U
Uranium 238	U-238	1.20	0.21	0.054	1.0		U
Plutonium 238	13981-16-3	4.99	1.3	0.32	1.0		PU
Plutonium 239/240	PU-239/240	232	47	0.45	1.0		PU
Nickel 63	13981-37-8	7580	76	6.3	30		NI_L
Americium 241	14596-10-2	75.5	5.4	0.042	1.0		AM
Total Strontium	SR-RAD	2710	100	7.6	1.0		SR
Potassium 40	13966-00-2	U		6.4		U	GAM
Barium 133	13981-41-4	U		2.6		UX	GAM
Cobalt 60	10198-40-0	281	2.0	0.99	0.050		GAM
Cesium 137	10045-97-3	7790	7.0	2.5	0.10		GAM
Europium 152	14683-23-9	987	7.3	8.0	0.10		GAM
Europium 154	15585-10-1	226	4.1	3.3	0.10		GAM
Europium 155	14391-16-3	13.4	2.6	3.8	0.10		GAM
Radium 226	13982-63-3	U		3.1	0.10	U	GAM
Radium 228	15262-20-1	U		6.1	0.20	U	GAM
Thorium 228	14274-82-9	U		2.9		U	GAM
Thorium 232	TH-232	U		6.1		U	GAM
Americium 241	14596-10-2	108	1.8	2.3			GAM
Uranium 238	U-238	U		260		U	GAM
Uranium 235	15117-96-1	U		6.0		U	GAM

105-DR FSB - Concrete

DATA SHEETS  
Page 1  
SUMMARY DATA SECTION  
Page 15

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>10/07/99</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0483**

N908036-02

B0W400

**DATA SHEET**

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0483</u>
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-02</u>	Client sample id <u>B0W400</u>	
Dept sample id <u>7170-002</u>	Location/Matrix <u>105 DR</u>	<u>SOLID</u>
Received <u>08/06/99</u>	Collected <u>08/04/99 09:25</u>	
	Custody/SAF No <u>B99-076-05</u>	<u>B99-076</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	5.97	0.14	0.072	400	J	H
Carbon 14	14762-75-5	174	5.5	4.6	50		C
Technetium 99	14133-76-7	1.06	0.30	0.39	15	J	TC
Uranium 233/234	U-233/234	2.24	0.32	0.074	1.0		U
Uranium 235	15117-96-1	0.207	0.096	0.072	1.0	J	U
Uranium 238	U-238	1.86	0.29	0.074	1.0		U
Plutonium 238	13981-16-3	2.58	0.26	0.031	1.0		PU
Plutonium 239/240	PU-239/240	163	11	0.049	1.0		PU
Nickel 63	13981-37-8	4680	47	5.4	30		NI_L
Americium 241	14596-10-2	50.7	3.4	0.044	1.0		AM
Total Strontium	SR-RAD	4700	130	8.6	1.0		SR
Potassium 40	13966-00-2	U		5.7		U	GAM
Barium 133	13981-41-4	U		3.5		UX	GAM
Cobalt 60	10198-40-0	193	1.8	0.93	0.050		GAM
Cesium 137	10045-97-3	11000	10	3.5	0.10		GAM
Europium 152	14683-23-9	548	8.5	10	0.10		GAM
Europium 154	15585-10-1	113	3.4	3.1	0.10		GAM
Europium 155	14391-16-3	9.43	3.6	5.6	0.10		GAM
Radium 226	13982-63-3	U		4.1	0.10	U	GAM
Radium 228	15262-20-1	U		5.2	0.20	U	GAM
Thorium 228	14274-82-9	U		3.7		U	GAM
Thorium 232	TH-232	U		5.2		U	GAM
Americium 241	14596-10-2	100	5.3	7.6			GAM
Uranium 238	U-238	U		150		U	GAM
Uranium 235	15117-96-1	U		7.6		U	GAM

105-DR FSB - Concrete

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>10/07/99</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0483**

N908036-03

B0W401

**DATA SHEET**

SDG <u>7170</u>	Client/Case no <u>Hanford</u>	SDG-H0483
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N908036-03</u>	Client sample id <u>B0W401</u>	
Dept sample id <u>7170-003</u>	Location/Matrix <u>105 DR</u>	<u>SOLID</u>
Received <u>08/06/99</u>	Collected <u>08/04/99 09:09</u>	
	Custody/SAF No <u>B99-076-05</u>	<u>B99-076</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	6.46	0.15	0.073	400	J	H
Carbon 14	14762-75-5	3300	67	16	50		C
Technetium 99	14133-76-7	1.94	0.28	0.44	15	J	TC
Uranium 233/234	U-233/234	1.70	0.26	0.079	1.0		U
Uranium 235	15117-96-1	0.139	0.070	0.067	1.0	J	U
Uranium 238	U-238	2.61	0.34	0.069	1.0		U
Plutonium 238	13981-16-3	6.83	0.58	0.041	1.0		PU
Plutonium 239/240	PU-239/240	187	13	0.047	1.0		PU
Nickel 63	13981-37-8	10000	100	7.2	30		NI_L
Americium 241	14596-10-2	71.8	16	0.40	1.0		AM
Total Strontium	SR-RAD	3280	120	<u>11</u>	1.0		SR
Potassium 40	13966-00-2	U		6.5		U	GAM
Barium 133	13981-41-4	U		1.9		UX	GAM
Cobalt 60	10198-40-0	720	2.3	<u>1.1</u>	0.050		GAM
Cesium 137	10045-97-3	7540	5.0	<u>1.9</u>	0.10		GAM
Europium 152	14683-23-9	1280	6.0	<u>5.9</u>	0.10		GAM
Europium 154	15585-10-1	302	3.8	<u>3.3</u>	0.10		GAM
Europium 155	14391-16-3	12.4	1.8	<u>3.0</u>	0.10		GAM
Radium 226	13982-63-3	U		<u>2.5</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>5.5</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		1.9		U	GAM
Thorium 232	TH-232	U		5.5		U	GAM
Americium 241	14596-10-2	50.2	2.4	3.6			GAM
Uranium 238	U-238	U		200		U	GAM
Uranium 235	15117-96-1	U		4.8		U	GAM

105-DR FSB - Concrete

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>10/07/99</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

Test AM Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

METHOD SUMMARY

AMERICIUM 241 IN SOIL

ALPHA SPECTROSCOPY

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Americium 241
Preparation batch 6893-046					
B0W3Y9	N908036-01	7170-001			75.5
B0W400	N908036-02	7170-002			50.7
B0W401	N908036-03	7170-003			71.8
BLK (QC ID=31522)	N908036-05	7170-005			U
LCS (QC ID=31521)	N908036-04	7170-004			ok
Duplicate (N908036-01)	N908036-06	7170-006			ok
Nominal values and limits from method					
105-DR FSB - Concrete		RDLs (pCi/g)			1.0

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 6893-046 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.046															
B0W3Y9	N908036-01			0.042	0.500			70	890				15	08/17/99	08/19 SS-052
B0W400	N908036-02			0.044	0.500			94	890				15	08/17/99	08/19 SS-053
B0W401	N908036-03			0.40	0.500			<u>10</u>	725				17	08/17/99	08/21 SS-053
BLK (QC ID=31522)	N908036-05			0.039	0.500			81	751					08/17/99	08/17 SS-015
LCS (QC ID=31521)	N908036-04			0.043	0.500			89	<u>454</u>					08/17/99	08/17 SS-055
Duplicate (N908036-01)	N908036-06			0.29	0.500			89	1220				18	08/17/99	08/22 SS-051
(QC ID=31523)															
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>0.14</u>	±	<u>0.32</u>
FOR 6 SAMPLES	YIELD	<u>72</u>	±	<u>63</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

Test PU Matrix SOLID  
SDG 7170  
Contact L.A. Johnson

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 6893-046						
B0W3Y9	N908036-01	7170-001			4.99	232
B0W400	N908036-02	7170-002			2.58	163
B0W401	N908036-03	7170-003			6.83	187
BLK (QC ID=31522)	N908036-05	7170-005			U	U
LCS (QC ID=31521)	N908036-04	7170-004			ok	ok
Duplicate (N908036-01)	N908036-06	7170-006			ok	ok

Nominal values and limits from method RDLs (pCi/g) 1.0 1.0  
105-DR FSB - Concrete

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX pCi/g	MDA	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.046																	
B0W3Y9	N908036-01			0.45	0.500				98	725				17	08/17/99	08/21	SS-051
B0W400	N908036-02			0.049	0.500				95	887				14	08/17/99	08/18	SS-052
B0W401	N908036-03			0.047	0.500				101	887				14	08/17/99	08/18	SS-053
BLK (QC ID=31522)	N908036-05			0.029	0.500				84	947					08/17/99	08/17	SS-001
LCS (QC ID=31521)	N908036-04			0.033	0.500				103	502					08/17/99	08/17	SS-055
Duplicate (N908036-01)	N908036-06			0.060	0.500				96	725				17	08/17/99	08/21	SS-052
(QC ID=31523)																	
Nominal values and limits from method				1.0	0.500				20-105		10	100		180			

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

AVERAGES ± 2 SD	MDA	0.11	±	0.33
FOR 6 SAMPLES	YIELD	96	±	13

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL  
ALPHA SPECTROSCOPY

Test U Matrix SOLID  
SDG 7170  
Contact L.A. Johnson

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX PLANCHET	1: Uranium			2: Uranium			3: Uranium			RESULT RATIOS (%)				
			233/234	235	238	1+3	2σ	2+3	2σ							
Preparation batch 6893-046																
BOW3Y9	N908036-01	7170-001	1.34	0.077 J	1.20	112	27	6	4							
BOW400	N908036-02	7170-002	2.24	0.207 J	1.86	120	25	11	5							
BOW401	N908036-03	7170-003	1.70	0.139 J	2.61	65	13	5	3							
BLK (QC ID=31522)	N908036-05	7170-005	U	U	U											
LCS (QC ID=31521)	N908036-04	7170-004	ok	ok	ok											
Duplicate (N908036-01)	N908036-06	7170-006	ok	ok J	ok	101	27	7	5							
Nominal values and limits from method			RDLs (pCi/g)	1.0	1.0	1.0	100		4							
105-DR FSB - Concrete						Averages 100			7							

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 6893-046													2σ prep error 5.0 %	Reference Lab Notebook 6893 pg.046		
BOW3Y9	N908036-01		0.068	1.00			98	171			9	08/13/99	08/13	SS-031		
BOW400	N908036-02		0.074	1.00			87	171			9	08/13/99	08/13	SS-032		
BOW401	N908036-03		0.079	1.00			97	171			9	08/13/99	08/13	SS-033		
BLK (QC ID=31522)	N908036-05		0.095	1.00			69	171				08/13/99	08/13	SS-035		
LCS (QC ID=31521)	N908036-04		0.28	1.00			86	171				08/13/99	08/13	SS-034		
Duplicate (N908036-01)	N908036-06		0.076	1.00			88	171			9	08/13/99	08/13	SS-036		
(QC ID=31523)																
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	0.11 ± 0.17
FOR 6 SAMPLES	YIELD	88 ± 21

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 10/07/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

TOTAL STRONTIUM IN SOIL

BETA COUNTING

Test SR Matrix SOLID  
SDG 7170  
Contact L.A. Johnson

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Total Strontium
Preparation batch 6893-046					
B0W3Y9	N908036-01			7170-001	2710
B0W400	N908036-02			7170-002	4700
B0W401	N908036-03			7170-003	3280
BLK (QC ID=31522)	N908036-05			7170-005	0.264 J
LCS (QC ID=31521)	N908036-04			7170-004	ok
Duplicate (N908036-01)	N908036-06			7170-006	ok

Nominal values and limits from method RDLs (pCi/g) 1.0  
105-DR FSB - Concrete

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX pCi/g	MDA	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046																	
B0W3Y9	N908036-01			7.6		1.00			86		400			12	08/12/99	08/16	GRB-220
B0W400	N908036-02			8.6		1.00			89		400			12	08/12/99	08/16	GRB-229
B0W401	N908036-03			11		1.00			88		400			12	08/12/99	08/16	GRB-230
BLK (QC ID=31522)	N908036-05			0.19		1.00			78		200				08/12/99	08/16	GRB-220
LCS (QC ID=31521)	N908036-04			0.58		1.00			77		200				08/12/99	08/16	GRB-219
Duplicate (N908036-01)	N908036-06			4.3		1.00			92		400			12	08/12/99	08/16	GRB-205
(QC ID=31523)																	

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 5.4 ± 8.9  
FOR 6 SAMPLES YIELD 85 ± 12

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 10/07/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

TECHNETIUM 99 IN SOIL  
BETA COUNTING

Test TC Matrix SOLID  
SDG 7170  
Contact L.A. Johnson

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Technetium 99 PLANCHET
Preparation batch 6893-046				
BOW3Y9	N908036-01			7170-001 0.620 J
BOW400	N908036-02			7170-002 1.06 J
BOW401	N908036-03			7170-003 1.94 J
BLK (QC ID=31522)	N908036-05			7170-005 U
LCS (QC ID=31521)	N908036-04			7170-004 ok
Duplicate (N908036-01)	N908036-06			7170-006 <u>OUT</u> J

Nominal values and limits from method RDLs (pCi/g) 15  
105-DR FSB - Concrete

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- PREPARED	YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046																
BOW3Y9	N908036-01			0.39	1.00			62	200				19	08/17/99	08/23	GRB-202
BOW400	N908036-02			0.39	1.00			62	200				19	08/17/99	08/23	GRB-203
BOW401	N908036-03			0.44	1.00			58	200				19	08/17/99	08/23	GRB-204
BLK (QC ID=31522)	N908036-05			0.87	1.00			40	101					08/17/99	08/21	GRB-228
LCS (QC ID=31521)	N908036-04			0.66	1.00			52	101					08/17/99	08/20	GRB-203
Duplicate (N908036-01)	N908036-06			0.29	1.00			80	200				16	08/17/99	08/20	GRB-205
(QC ID=31523)																

Nominal values and limits from method 15 1.00 20-105 50 180

PROCEDURES	REFERENCE	TC99TRLSC
EP-060	Soil Preparation, rev 0	
EP-020	Sample Leach For Technetium-99, rev 0	
EP-540	Technetium-99 Purification, rev 0	

AVERAGES ± 2 SD	MDA	0.51 ± 0.43
FOR 6 SAMPLES	YIELD	59 ± 26

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 10/07/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6893-046						
B0W3Y9	N908036-01	7170-001			281	7790
B0W400	N908036-02	7170-002			193	11000
B0W401	N908036-03	7170-003			720	7540
BLK (QC ID=31522)	N908036-05	7170-005			U	U
LCS (QC ID=31521)	N908036-04	7170-004			ok	ok
Duplicate (N908036-01)	N908036-06	7170-006			ok	ok

Nominal values and limits from method RDLs (pCi/g) 0.050 0.10  
 105-DR FSB - Concrete

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- PREPARED	YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 15.0 % Reference Lab Notebook 6893 pg.046																	
B0W3Y9	N908036-01			<u>4.9</u>	<u>81.6</u>						401			13	08/11/99	08/17	PD,01,00
B0W400	N908036-02			<u>3.9</u>	<u>57.2</u>						400			13	08/11/99	08/17	PD,03,00
B0W401	N908036-03			<u>4.4</u>	<u>63.8</u>						388			13	08/11/99	08/17	PD,04,00
BLK (QC ID=31522)	N908036-05			<u>0.12</u>	<u>67.5</u>						425				08/11/99	08/18	PD,03,00
LCS (QC ID=31521)	N908036-04			<u>0.14</u>	<u>67.5</u>						425				08/11/99	08/18	PD,01,00
Duplicate (N908036-01)	N908036-06			<u>14</u>	<u>81.6</u>						<u>22</u>			14	08/11/99	08/18	PD,04,00
(QC ID=31523)																	

Nominal values and limits from method 0.050 892 100 180

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

AVERAGES ± 2 SD	MDA <u>4.6</u> ± <u>10</u>
FOR 6 SAMPLES	YIELD _____ ± _____

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>10/07/99</u>

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

CARBON 14 IN SOIL

LIQUID SCINTILLATION COUNTING

Test C Matrix SOLID  
SDG 7170  
Contact L.A. Johnson

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Carbon 14
Preparation batch 6893-046					
B0W3Y9	N908036-01	A1		7170-001	259
B0W400	N908036-02	A1		7170-002	174
B0W401	N908036-03	A1		7170-003	3300
BLK (QC ID=31627)	N908036-08			7170-008	U
LCS (QC ID=31626)	N908036-07			7170-007	ok
Duplicate (N908036-01)	N908036-09			7170-009	OUT

Nominal values and limits from method RDLs (pCi/g) 50  
105-DR FSB - Concrete

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046																
B0W3Y9	N908036-01	A1		4.6	0.203			100	100				16	08/20/99	08/20	LSC-004
B0W400	N908036-02	A1		4.6	0.200			100	100				17	08/20/99	08/21	LSC-004
B0W401	N908036-03	A1		16	0.209			100	9				17	08/20/99	08/21	LSC-004
BLK (QC ID=31627)	N908036-08			4.2	0.220			100	100					08/20/99	08/20	LSC-004
LCS (QC ID=31626)	N908036-07			31	0.220			100	3					08/20/99	08/21	LSC-004
Duplicate (N908036-01) (QC ID=31628)	N908036-09			4.4	0.207			100	100				16	08/20/99	08/20	LSC-004

Nominal values and limits from method 50 0.220 25 180

PROCEDURES REFERENCE C14COXLSC  
EP-060 Soil Preparation, rev 0  
EP-251 Tritium / Carbon-14 Oxidation, rev 0

AVERAGES ± 2 SD MDA 11 ± 22  
FOR 6 SAMPLES YIELD 100 ± 0

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Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 10/07/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

TRITIUM IN SOIL

LIQUID SCINTILLATION COUNTING

Test H        Matrix SOLID  
 SDG 7170  
 Contact L.A. Johnson

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG-H0483

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Tritium
Preparation batch 6893-046					
B0W3Y9	N908036-01	7170-001			4.56 J
B0W400	N908036-02	7170-002			5.97 J
B0W401	N908036-03	7170-003			6.46 J
BLK (QC ID=31522)	N908036-05	7170-005			U
LCS (QC ID=31521)	N908036-04	7170-004			ok J
Duplicate (N908036-01)	N908036-06	7170-006			ok J
Nominal values and limits from method					
105-DR FSB - Concrete				RDLs (pCi/g)	400

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046																
B0W3Y9	N908036-01			0.15	<u>10.1</u>			100		120			10	08/13/99	08/14	LSC-007
B0W400	N908036-02			0.072	<u>20.3</u>			100		120			10	08/13/99	08/14	LSC-007
B0W401	N908036-03			0.073	<u>20.2</u>			100		120			11	08/13/99	08/15	LSC-007
BLK (QC ID=31522)	N908036-05			0.088	<u>16.9</u>			100		120				08/13/99	08/15	LSC-007
LCS (QC ID=31521)	N908036-04			0.088	<u>16.9</u>			100		120				08/13/99	08/15	LSC-007
Duplicate (N908036-01)	N908036-06			0.15	<u>10.1</u>			100		120			11	08/13/99	08/15	LSC-007
(QC ID=31523)																
Nominal values and limits from method				400	20.4					25			180			

PROCEDURES REFERENCE EPA906.0  
 EP-060 Soil Preparation, rev 0  
 EP-211 Tritium in Solid Samples by Azeotropic Distillation, rev 0

AVERAGES ± 2 SD MDA 0.10 ± 0.073  
 FOR 6 SAMPLES YIELD 100 ± 0

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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0483

METHOD SUMMARY

NICKEL 63 IN SOIL

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID

SDG 7170

Contact L.A. Johnson

Client Hanford

Contract TRB-SBB-207925

Case no SDG-H0483

RESULTS

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

Preparation batch 6893-046

BOW3Y9	N908036-01	7170-001		7580	
BOW400	N908036-02	7170-002		4680	
BOW401	N908036-03	7170-003		10000	
BLK (QC ID=31522)	N908036-05	7170-005		U	
LCS (QC ID=31521)	N908036-04	7170-004		ok	
Duplicate (N908036-01)	N908036-06	7170-006		ok	

Nominal values and limits from method RDLs (pCi/g) 30

105-DR FSB - Concrete

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

Preparation batch 6893-046 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.046

BOW3Y9	N908036-01			6.3	0.500			75		13			9	08/12/99	08/13	LSC-005
BOW400	N908036-02			5.4	0.500			59		28			9	08/12/99	08/13	LSC-005
BOW401	N908036-03			7.2	0.500			78		<u>9</u>			9	08/12/99	08/13	LSC-005
BLK (QC ID=31522)	N908036-05			1.8	0.500			89		100				08/12/99	08/13	LSC-005
LCS (QC ID=31521)	N908036-04			2.9	0.500			59		100				08/12/99	08/13	LSC-005
Duplicate (N908036-01)	N908036-06			6.7	0.500			70		14			9	08/12/99	08/13	LSC-005
(QC ID=31523)																

Nominal values and limits from method 30 0.500 10 180

PROCEDURES	REFERENCE	N163LSC
	EP-060	Soil Preparation, rev 0
	EP-431	Nickel-63 Purification, rev 0

AVERAGES ± 2 SD	MDA	<u>5.0</u>	±	<u>4.4</u>
FOR 6 SAMPLES	YIELD	<u>72</u>	±	<u>23</u>

METHOD SUMMARIES

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SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

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PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

- U The RESULT is less than the MDA (Minimum Detectable Activity).

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DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

\* An MDA is underlined if it is bigger than its RDL.

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DATA SHEET

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of RESULT, including that introduced by rounding the result prior to printing.  
  
If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of ADDED.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

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DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:

1. A fixed percentage specified in the protocol.

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DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- \* The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- \* The second limits are protocol defined upper and lower QC limits

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MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

\* The recovery is underlined (out of spec) if it is outside either of these ranges.

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METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- \* Aliquots are underlined if less than the nominal value specified for the method.
- \* Preparation factors are underlined if greater than the nominal value specified for the method.
- \* Dilution factors are underlined if greater than the nominal value specified for the method.
- \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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METHOD SUMMARY

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/07/99

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0483

SDG 7170  
Contact L.A. Johnson

GUIDE, cont.

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG-H0483

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id TMANC  
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Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT			
Client:	<u>Beechtel Hanford Inc</u>	Date/Time received	<u>8-6-99 11:30</u>
CoC No.	<u>B 99-076-05</u>		
Container I.D. No.	Requested TAT (Days)	<u>15</u>	P.O. Received Yes [ ] No [ <input checked="" type="checkbox"/> ]
INSPECTION			
1.	Custody seals on shipping container intact?	Yes [ <input checked="" type="checkbox"/> ]	No [ ] N/A [ ]
2.	Custody seals on shipping container dated & signed?	Yes [ <input checked="" type="checkbox"/> ]	No [ ] N/A [ ]
3.	Custody seals on sample containers intact?	Yes [ <input checked="" type="checkbox"/> ]	No [ ] N/A [ ]
4.	Custody seals on sample containers dated & signed?	Yes [ <input checked="" type="checkbox"/> ]	No [ ] N/A [ ]
5.	Cooler Temperature: _____	Packing material is:	Wet [ ] Dry [ <input checked="" type="checkbox"/> ]
6.	Number of samples in shipping container:	<u>3</u>	
7.	Number of containers per sample:	<u>1</u>	(Or see CoC _____)
8.	Paperwork agrees with samples?	Yes [ <input checked="" type="checkbox"/> ]	No [ ]
9.	Samples have:	Tape [ ] Hazard labels [ ] Rad labels [ <input checked="" type="checkbox"/> ]	Appropriate sample labels [ <input checked="" type="checkbox"/> ]
10.	Samples are:	In good condition [ <input checked="" type="checkbox"/> ]	Leaking [ ] Broken Container [ ] Missing [ ]
11.	Describe any anomalies: _____ _____ _____		
13.	Was P.M. notified of any anomalies?	Yes [ ] No [ ]	Date _____
14.	Received by	<u>M. Goldschberg</u>	Date: <u>8-6-99</u> Time: <u>11:30</u>
LOGIN			
TNU W.O. No.	Group No.	Client W.O. No.	
PROGRAM MANAGER			
Sample holding times exceeded?	Yes [ ]	No [ ]	
Client Notified: Name	Date/time		

Collector Fahlberg/Nielson	Company Contact J Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ	Price Code <b>9K</b>	Data Turnaround <b>15 Days</b>
Project Designation 105-DR FSB - Concrete	Sampling Location 105 DR	SAF No. B99-076			
Ice Chest No. <b>ERC 99-002</b>	Field Logbook No. EL 1281	Method of Shipment Fed Ex			
Shipped To TMA/RECRA <b>R. F. 8.2.99</b>	Offsite Property No. <b>NA</b>	Bill of Lading/Air Bill No. <b>NA</b>			

COA **R105D4-2870**

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None											
	Type of Container	aG											
	No. of Container(s)	1											
Special Handling and/or Storage	Volume	120mL											
SAMPLE ANALYSIS			See item (1) in Special Instructions.										
Sample No.	Matrix *	Sample Date	Sample Time										
✓ BOW3Y9	Other Solid	8.4.99	0935	X						M.G	ppm 1400	BOW 46	
✓ BOW400	Other Solid	8.4.99	0925	X							ppm 1500	BOW 47	
✓ BOW401	Other Solid	8.4.99	0909	X							ppm 1700	BOW 48	
											<del>ppm 1700</del>		

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By <i>R. Fahlberg</i>	Date/Time 8.4.99 14:00	Received By <i>R. F. 1-C</i>	Date/Time 8.4.99 14:00	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 - Total Sr; Technetium-99; Nickel-63; Carbon-14; Tritium - H3				Soil Water Vapor Other Solid Other Liquid	
Relinquished By <i>R. F. 1-C</i>	Date/Time 8.5.99 08:00	Received By <i>R. Fahlberg / T. Fahlberg</i>	Date/Time 8.5.99 08:00						
Relinquished By <i>R. Fahlberg</i>	Date/Time 8.5.99 14:00	Received By <i>Fed Ex</i>	Date/Time 8/5-99						
Relinquished By <i>Fed Ex</i>	Date/Time 8-6-99 11:30	Received By <i>TNU M. Goldenberg</i>	Date/Time 8-6-99 11:30						
LABORATORY SECTION	Received By	Title						Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method			Disposed By				Date/Time	

1. SHIP FROM U.S. DEPT. OF ENERGY C/O

Company Bechtel Hanford Inc.  
 Address 3729 Building 300-Area  
 City, State, Zip Richland, WA 99352  
 Contact David St. John  
 Phone 509-372-9588

**RADIOACTIVE SHIPMENT RECORD** **106604**  
Page 1 of 2

Ship  Prepaid  Collect

Via  Motor  Air Psgr  UPS  
 Rail  Air Cargo  Site Carrier

SHIPMENT AUTHORIZATION NUMBER

2. SHIP TO

Company Thermo Retech  
 Address 2030 Wright Avenue  
 City, State, Zip Richmond, CA 94804-0040  
 Attention Larry Johnson  
 Phone 510-235-2633

Markings Applied 6.  
 Radioactive - LSA  
 Radioactive - SCO  
 Type A  
 Type B with trefoil

LSA Description 8.  
 LSA-I  
 LSA-II  
 LSA-III  
 SCO-I  
 SCO-II

For Normal Form only 7.  
 Identify  
 Physical Form  Liquid  Gas  
 Solid Ground Concrete  
 Chemical Form  Elemental  
 Metal  Nitrate  
 Oxide  Mixture  
 Other

5. HM Proper Shipping Name: \_\_\_\_\_ Radioactive Material:

<input type="checkbox"/>	excepted package - empty packaging	7	UN2910
<input type="checkbox"/>	excepted package - instruments or articles	7	UN2910
<input checked="" type="checkbox"/>	excepted package - limited quantity of material	7	UN2910
<input type="checkbox"/>	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910
<input type="checkbox"/>	Special Form, n.o.s.	7	UN2974
<input type="checkbox"/>	Low Specific Activity, n.o.s.	7	UN2912
<input type="checkbox"/>	n.o.s.	7	UN2982
<input type="checkbox"/>	Fissile, n.o.s.	7	UN2918
<input type="checkbox"/>	Surface Contaminated Object	7	UN2913

EMERGENCY RESPONSE 9.  
 Telephone 1-888-766-0711  
 Emergency Response Guide(s) 161

Labels Applied 10.  
 Empty  
 Radioactive White - I  
 Radioactive Yellow - II  
 Radioactive Yellow - III  
 Subsidiary Hazard

Highway Route Controlled Quantity   
 Exclusive Use Shipment   
 with instructions  
 Placards Applied   
 If Rail Specify:  
 Fissile Excepted, Grams   
 Excepted Package Statement

Warning -- Fissile Material Controlled Shipment. Do Not Load More Than NA Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.

11.	No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package	Gr. Wt. Kg.
	1	poly cooler strong tight	ERC99002	Tape	CS-137, Sr-90, Eu-152, Co-60	NA	1.05x10 <sup>6</sup>	4 Kg	
Sample containers wrapped in bubble wrap and double bagged, packed in cushioning material. Total this shipment 3-120ml jars, 540 SMS									
(Shipper may describe package in detail on one of the unused lines above)								TOTALS	NA 1.05x10 <sup>6</sup> 4kg

12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Certifier's Signature David St. John On behalf of DOE-RL Date 8/5/99 Organization ERC-AFS Complete Cost Code (Inc. End. Function) R105 D4 2850

13. Surface Dose Rate of Package  <0.005 or \_\_\_\_\_ mSv/hr  
 <0.5 or \_\_\_\_\_ mrem/hr (N+ß Y)

Dose Rate @ 1 Meter from Surface of Package  <0.005 or \_\_\_\_\_ mSv/hr  
 <0.5 or \_\_\_\_\_ mrem/hr (N+ß Y)

Smears of Outer Container  
 <0.41 Bq (22 dpm) ß Y /cm<sup>2</sup>  
 <0.04 Bq (2.2 dpm) α /cm<sup>2</sup>  
 <Tbl. 2-2 HSRM Onsite Limits

TRUCK LOAD OR EXCLUSIVE USE  
 Surface  <2 mSv/hr (200 mrem/hr)  
 @ 2 meters  <0.1 mSv/hr (10 mrem/hr)  
 @ Cab  <0.02 mSv/hr (2 mrem/hr) (Using N+ß Y)

Signature [Signature] Bldg. 3728 Survey No. FF12-99-1199 Date 8-5-99

14. TRANSPORTER DRIVER SIGNATURE Robert F. [Signature] RECEIVER SIGNATURE \_\_\_\_\_ Date \_\_\_\_\_

15. OFFSITE AUTHORIZATION  
 Shipment has been inspected and verified to be in compliance with DOT regulations  
 Authorized Signature [Signature] Printed Name Keith R. Smith Date 8-5-99

16. AUTHORIZATION FOR SHIPMENT  
 AIR TRANSPORT CERTIFICATION  N/A CARGO AIRCRAFT  Cargo Aircraft Only Labels Applied  Ltd Qty  <3 T.I. PASSENGER AIRCRAFT  Research/Medical Diagnosis  Human Medical Research Pkg. Dimensions (cm) NA

17. OFFSITE AUTHORIZATION  
 Tracking No. MBH 3632 Date Shipped 8/5/99 Routing FED-X ETA 8/6/99  
 Surveyed By [Signature] Date 8-5-99 Approved for Shipment Offsite [Signature] Date 8/5/99