Thermo Nutech
W.O. No. N8-07-020-7481, SDG H0161

Bechtel Hanford Inc.
P.O. TRB-SBB-207925

Case Narrative

1.0 GENERAL

Thermo Nutech Sample Delivery Group H0161 is comprised of five solid samples designated under SAF No. B98-095 with a Project Designation of : 105F & 105DR ISS Project-Other Solid

The samples were received as stated on the Chain-of-Custody documents.

DEC 1998
RECEIVED
EDMC

2.0 ANALYSIS NOTES

2.1 Gross Alpha/Gross Beta Analyses

No problems were encountered with the analyses.

2.2 Nickel-63 Analyses

The relative percent difference in the results between the duplicate and the original analysis was 80%, greater than the 45% 3σ limit. The difference in the results is most probably due to inhomogeneity of the nickel-63 activity in the respective 0.5g aliquots analyzed.

2.3 Strontium-90 Analyses

No problems were encountered with the analyses.

2.4 Isotopic Uranium Analyses

The relative percent difference in the U-235 results between the duplicate and the original analysis was 51%, greater than the 32% 3σ limit. All sample MDA's were less than the RDL.

2.5 Isotopic Plutonium Analyses

No problems were encountered with the analyses. Some MDA's were slightly greater than the RDL.

2.6 Americium-241 Analyses

No problems were encountered with the analyses.

2.7 Gamma Scan Analyses

Insufficient sample masses were received to aliquot the target 750g required to meet the RDL, as a result most RDL's were exceeded.

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0161

SDG	7481
Contact	N. Joseph Verville

Client	Hanford
Contract	TRB-SBB-207925
Case no	SDG_H0161

SUMMARY DATA SECTION

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Prepared by

Reviewed by

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-TOC
Version	3.06
Report date	10/21/98

SDG 7481
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

ABOUT THE DATA SUMMARY SECTION

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

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

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

PREPARATION BATCH SUMMARY

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

WORK SUMMARY

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

METHOD BLANKS

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

LAB CONTROL SAMPLES

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

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/21/98

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

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

MATRIX SPIKES

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

DATA SHEETS

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

METHOD SUMMARIES

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

REPORT GUIDES

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

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SAMPLE DELIVERY GROUP H0161

SAMPLE SUMMARY

SDG 7481
Contact N. Joseph Verville

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B0PBB1	105F	SOLID		N807020-01	B98-095	B98-095-21	07/02/98 12:41
B0PBB2	105F	SOLID		N807020-02	B98-095	B98-095-21	07/02/18 12:41
B0PBB3	105F	SOLID		N807020-03	B98-095	B98-095-21	07/02/98 12:53
B0PBB4	105F	SOLID		N807020-04	B98-095	B98-085-22	07/02/98 13:15
B0PBB5	105F	SOLID		N807020-05	B98-095	B98-095-22	07/02/98 13:30
Method Blank		SOLID		N807020-07	B98-095		
Lab Control Sample		SOLID		N807020-06	B98-095		
Duplicate (N807020-01)	105F	SOLID		N807020-08	B98-095		07/02/98 12:41
Duplicate (N807020-02)	105F	SOLID		N807020-09	B98-095		07/02/18 12:41

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 10/21/98

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SAMPLE DELIVERY GROUP H0161

QC SUMMARY

SDG 7481
Contact N. Joseph Verville

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	DAYS SINCE COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7481	B98-085-22	B0PBB4	SOLID				07/07/98	5	N807020-04	7481-004
	B98-095-21	B0PBB1	SOLID				07/07/98	5	N807020-01	7481-001
		B0PBB2	SOLID				07/07/98		N807020-02	7481-002
		B0PBB3	SOLID				07/07/98	5	N807020-03	7481-003
	B98-095-22	B0PBB5	SOLID				07/07/98	5	N807020-05	7481-005
		Method Blank	SOLID						N807020-07	7481-007
		Lab Control Sample	SOLID						N807020-06	7481-006
		Duplicate (N807020-01)	SOLID				07/07/98	5	N807020-08	7481-008
		Duplicate (N807020-02)	SOLID				07/07/98		N807020-09	7481-009

Lab id TMANC
Protocol Hanford
Version Ver 1.0
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SAMPLE DELIVERY GROUP H0161

SDG 7481
Contact N. Joseph Verville

PREP BATCH SUMMARY

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

TEST	MATRIX	METHOD	PREPARATION ERROR BATCH	2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Alpha Spectroscopy												
AM	SOLID	Americium 241 in Soil	2785-090	5.0	5			1	1	1/1		
PU	SOLID	Plutonium, Isotopic in Solids	2785-090	5.0	5			1	1	1/1		
U	SOLID	Uranium, Isotopic in Soil	2785-090	5.0	5			1	1	1/1		
Beta Counting												
SR	SOLID	Strontium Total in Solids	2785-090	10.0	5			1	1	1/1		
Gas Proportional Counting												
80A	SOLID	Gross Alpha in Soil	2785-090	20.0	5			1	1	1/1		
80B	SOLID	Gross Beta in Soil	2785-090	15.0	5			1	1	1/1		
Gamma Spectroscopy												
GAM	SOLID	Gamma Scan	2785-090	15.0	5			1	1	1/1		
Liquid Scintillation Counting												
NI_L	SOLID	Nickel 63 in Soil	2785-090	10.0	5			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 10/21/98

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SAMPLE DELIVERY GROUP H0161

WORK SUMMARY

SDG 7481
Contact N. Joseph Verville

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B0PBB1			N807020-01	7481-001	80A/80		07/20/98	07/24/98	NJV	Gross Alpha in Soil
105F		SOLID	07/02/98	7481-001	80B/80		07/20/98	07/24/98	NJV	Gross Beta in Soil
B98-095-21	B98-095		07/07/98	7481-001	AM		07/23/98	07/24/98	NJV	Americium 241 in Soil
				7481-001	GAM		07/14/98	07/27/98	NJV	Gamma Scan
				7481-001	NI_L		07/26/98	07/30/98	NJV	Nickel 63 in Soil
				7481-001	PU		07/23/98	07/24/98	NJV	Plutonium, Isotopic in Solids
				7481-001	SR		07/20/98	07/27/98	NJV	Strontium Total in Solids
				7481-001	U		07/16/98	07/24/98	NJV	Uranium, Isotopic in Soil
B0PBB2			N807020-02	7481-002	80A/80		07/20/98	07/24/98	NJV	Gross Alpha in Soil
105F		SOLID	07/02/18	7481-002	80B/80		07/20/98	07/24/98	NJV	Gross Beta in Soil
B98-095-21	B98-095		07/07/98	7481-002	AM		07/23/98	07/24/98	NJV	Americium 241 in Soil
				7481-002	GAM		07/14/98	07/27/98	NJV	Gamma Scan
				7481-002	NI_L		07/26/98	07/30/98	NJV	Nickel 63 in Soil
				7481-002	PU		07/23/98	07/24/98	NJV	Plutonium, Isotopic in Solids
				7481-002	SR		07/20/98	07/27/98	NJV	Strontium Total in Solids
				7481-002	U		07/16/98	07/24/98	NJV	Uranium, Isotopic in Soil
B0PBB3			N807020-03	7481-003	80A/80		07/20/98	07/24/98	NJV	Gross Alpha in Soil
105F		SOLID	07/02/98	7481-003	80B/80		07/20/98	07/24/98	NJV	Gross Beta in Soil
B98-095-21	B98-095		07/07/98	7481-003	AM		07/23/98	07/24/98	NJV	Americium 241 in Soil
				7481-003	GAM		07/14/98	07/27/98	NJV	Gamma Scan
				7481-003	NI_L		07/26/98	07/30/98	NJV	Nickel 63 in Soil
				7481-003	PU		07/23/98	07/24/98	NJV	Plutonium, Isotopic in Solids
				7481-003	SR		07/20/98	07/27/98	NJV	Strontium Total in Solids
				7481-003	U		07/16/98	07/24/98	NJV	Uranium, Isotopic in Soil
B0PBB4			N807020-04	7481-004	80A/80		07/20/98	07/24/98	NJV	Gross Alpha in Soil
105F		SOLID	07/02/98	7481-004	80B/80		07/20/98	07/24/98	NJV	Gross Beta in Soil
B98-085-22	B98-095		07/07/98	7481-004	AM		07/23/98	07/24/98	NJV	Americium 241 in Soil
				7481-004	GAM		07/14/98	07/27/98	NJV	Gamma Scan
				7481-004	NI_L		07/26/98	07/30/98	NJV	Nickel 63 in Soil
				7481-004	PU		07/23/98	07/24/98	NJV	Plutonium, Isotopic in Solids
				7481-004	SR		07/20/98	07/27/98	NJV	Strontium Total in Solids
				7481-004	U		07/17/98	07/24/98	NJV	Uranium, Isotopic in Soil

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

SDG 7481
Contact N. Joseph Verville

WORK SUMMARY, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

CLIENT SAMPLE ID LOCATION CUSTODY	SAF No	MATRIX	LAB SAMPLE ID COLLECTED RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B0PBB5			N807020-05	7481-005	80A/80		07/20/98	07/24/98	NJV	Gross Alpha in Soil
105F		SOLID	07/02/98	7481-005	80B/80		07/20/98	07/24/98	NJV	Gross Beta in Soil
B98-095-22	B98-095		07/07/98	7481-005	AM		07/23/98	07/24/98	NJV	Americium 241 in Soil
				7481-005	GAM		07/15/98	07/27/98	NJV	Gamma Scan
				7481-005	NI_L		07/26/98	07/30/98	NJV	Nickel 63 in Soil
				7481-005	PU		07/23/98	07/24/98	NJV	Plutonium, Isotopic in Solids
				7481-005	SR		07/20/98	07/27/98	NJV	Strontium Total in Solids
				7481-005	U		07/16/98	07/24/98	NJV	Uranium, Isotopic in Soil
Method Blank			N807020-07	7481-007	80A/80		07/20/98	07/24/98	NJV	Gross Alpha in Soil
		SOLID		7481-007	80B/80		07/20/98	07/24/98	NJV	Gross Beta in Soil
	B98-095			7481-007	AM		07/23/98	07/24/98	NJV	Americium 241 in Soil
				7481-007	GAM		07/15/98	07/27/98	NJV	Gamma Scan
				7481-007	NI_L		07/26/98	07/30/98	NJV	Nickel 63 in Soil
				7481-007	PU		07/23/98	07/24/98	NJV	Plutonium, Isotopic in Solids
				7481-007	SR		07/20/98	07/27/98	NJV	Strontium Total in Solids
				7481-007	U		07/16/98	07/24/98	NJV	Uranium, Isotopic in Soil
Lab Control Sample			N807020-06	7481-006	80A/80		07/20/98	07/24/98	NJV	Gross Alpha in Soil
		SOLID		7481-006	80B/80		07/20/98	07/24/98	NJV	Gross Beta in Soil
	B98-095			7481-006	AM		07/23/98	07/24/98	NJV	Americium 241 in Soil
				7481-006	GAM		07/15/98	07/27/98	NJV	Gamma Scan
				7481-006	NI_L		07/26/98	07/30/98	NJV	Nickel 63 in Soil
				7481-006	PU		07/23/98	07/24/98	NJV	Plutonium, Isotopic in Solids
				7481-006	SR		07/20/98	07/27/98	NJV	Strontium Total in Solids
				7481-006	U		07/16/98	07/24/98	NJV	Uranium, Isotopic in Soil
Duplicate (N807020-01)			N807020-08	7481-008	80A/80		07/20/98	07/24/98	NJV	Gross Alpha in Soil
105F		SOLID	07/02/98	7481-008	80B/80		07/20/98	07/24/98	NJV	Gross Beta in Soil
	B98-095		07/07/98	7481-008	AM		07/23/98	07/24/98	NJV	Americium 241 in Soil
				7481-008	PU		07/23/98	07/24/98	NJV	Plutonium, Isotopic in Solids
Duplicate (N807020-02)			N807020-09	7481-009	GAM		07/16/98	07/27/98	NJV	Gamma Scan
105F		SOLID	07/02/18	7481-009	NI_L		07/26/98	07/30/98	NJV	Nickel 63 in Soil
	B98-095		07/07/98	7481-009	SR		07/20/98	07/27/98	NJV	Strontium Total in Solids
				7481-009	U		07/16/98	07/24/98	NJV	Uranium, Isotopic in Soil

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

SDG 7481
Contact N. Joseph Verville

WORK SUMMARY, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
80A/80	B98-095	Gross Alpha in Soil	EPA900.0	5			1	1	1	8
80B/80	B98-095	Gross Beta in Soil	EPA900.0	5			1	1	1	8
AM	B98-095	Americium 241 in Soil	AM/CMPLATE	5			1	1	1	8
GAM	B98-095	Gamma Scan	GAMMAHI	5			1	1	1	8
NI_L	B98-095	Nickel 63 in Soil	NI63LSC	5			1	1	1	8
PU	B98-095	Plutonium, Isotopic in Solids	PUPLATE	5			1	1	1	8
SR	B98-095	Strontium Total in Solids	SR-RAD	5			1	1	1	8
U	B98-095	Uranium, Isotopic in Soil	UPLATE	5			1	1	1	8
TOTALS				40			8	8	8	64

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

N807020-07

METHOD BLANK

Method Blank

SDG 7481 Client/Case no Hanford SDG H0161
Contact N. Joseph Verville Case no TRB-SBB-207925

Lab sample id N807020-07 Client sample id Method Blank
Dept sample id 7481-007 Material/Matrix SOLID
SAF No B98-095

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	-0.11	1.2	2.9	10	U	80A
Gross Beta	12587-47-2	-2.1	3.2	5.9	10	U	80B
Uranium 233/234	U-233/234	0	0.004	0.015	0.30	U	U
Uranium 235	15117-96-1	0.002	0.005	0.018	0.30	U	U
Uranium 238	U-238	0	0.004	0.015	0.30	U	U
Plutonium 238	13981-16-3	0	0.016	0.038	0.050	U	PU
Plutonium 239/240	PU-239/240	0	0.008	0.030	0.050	U	PU
Americium 241	14596-10-2	0	0.012	0.023	0.050	U	AM
Strontium Total	SR-RAD	-0.088	0.14	0.20	1.0	U	SR
Nickel 63	13981-37-8	-1.2	2.5	4.4	20	U	NI_L
GAMMA SCAN ANALYTES		U					
Potassium 40	13966-00-2	U		0.094		U	GAM
Cobalt 60	10198-40-0	U		0.010	0.050	U	GAM
Cesium 137	10045-97-3	U		0.009	0.050	U	GAM
Europium 152	14683-23-9	U		0.019	0.10	U	GAM
Europium 154	15585-10-1	U		0.033	0.10	U	GAM
Europium 155	14391-16-3	U		0.012	0.10	U	GAM

QC-BLANK 28651

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 10/21/98

N807020-06

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7481
Contact N. Joseph Verville

Client/Case no Hanford SDG H0161
Case no TRB-SBB-207925

Lab sample id N807020-06
Dept sample id 7481-006

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B98-095

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
Gross Alpha	210	16	3.4	10		80A	202	8.1	104	66-134	80-120
Gross Beta	200	11	7.5	10		80B	198	7.9	101	75-125	80-120
Uranium 233/234	4.6	0.27	0.13	0.30		U	4.75	0.19	97	87-113	80-120
Uranium 235	3.8	0.24	0.017	0.30		U	3.89	0.16	98	87-113	80-120
Uranium 238	4.9	0.28	0.12	0.30		U	4.90	0.20	100	87-113	80-120
Plutonium 238	4.9	0.51	0.040	0.050		PU	5.06	0.20	97	82-118	80-120
Plutonium 239/240	4.9	0.51	0.035	0.050		PU	5.29	0.21	93	83-117	80-120
Americium 241	4.2	0.35	0.019	0.050		AM	4.80	0.19	88	86-114	80-120
Strontium Total	9.6	0.38	0.20	1.0		SR	9.00	0.36	107	82-118	
Nickel 63	140	7.2	4.6	20		NI_L	135	5.4	104	81-119	
GAMMA SCAN ANALYTES	U										
Cobalt 60	0.28	0.023	0.012	0.050		GAM	0.281	0.011	100	74-126	80-120
Cesium 137	0.36	0.022	0.015	0.050		GAM	0.353	0.014	102	74-126	80-120

QC-LCS 28650

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

N807020-08

DUPLICATE

B0PBB1

SDG 7481

Contact N. Joseph Verville

Client/Case no Hanford SDG H0161

Case no TRB-SBB-207925

DUPLICATE		ORIGINAL	
Lab sample id	N807020-08	Lab sample id	N807020-01
Dept sample id	7481-008	Dept sample id	7481-001
		Received	07/07/98

Client sample id B0PBB1

Location/Matrix 105F SOLID

Collected 07/02/98 12:41

Custody/SAF No B98-095-21 B98-095

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 PROT TOT LIMIT
Gross Alpha	6.7	3.4	3.0	10	J	80A	6.9	3.6	3.7	J	3	137
Gross Beta	87	7.2	6.3	10		80B	80	7.5	7.6		8	37
Plutonium 238	0.042	0.032	0.040	0.050	J	PU	0.029	0.030	0.056	U	37	166
Plutonium 239/240	0.94	0.17	0.040	0.050		PU	1.1	0.22	0.056		16	43
Americium 241	0.18	0.053	0.025	0.050		AM	0.16	0.047	0.031		12	64

QC-DUP#1 28652

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 10/21/98

N807020-09

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

DUPLICATE

B0PBB2

SDG 7481
Contact N. Joseph Verville

Client/Case no Hanford SDG H0161
Case no TRB-SBB-207925

DUPLICATE		ORIGINAL			
Lab sample id	N807020-09	Lab sample id	N807020-02	Client sample id	B0PBB2
Dept sample id	7481-009	Dept sample id	7481-002	Location/Matrix	105F SOLID
		Received	07/07/98	Collected	07/02/18 12:41
				Custody/SAF No	B98-095-21 B98-095

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 PROT TOT LIMIT
Uranium 233/234	0.32	0.052	0.019	0.30		U	0.54	0.070	0.024		51	32
Uranium 235	0.012	0.014	0.018	0.30	U	U	0.031	0.019	0.018	J	88	165
Uranium 238	0.35	0.056	0.015	0.30		U	0.44	0.062	0.019		23	34
Strontium Total	16	0.73	0.28	1.0		SR	16	0.73	0.26		0	24
Nickel 63	15	4.0	5.6	20	J	NI_L	35	5.1	5.9		80	45
GAMMA SCAN ANALYTES	U						U					
Potassium 40	10	1.5	1.1			GAM	10	1.1	0.76		0	43
Cobalt 60	1.1	0.15	0.12	0.050		GAM	1.0	0.12	0.087		10	43
Cesium 137	30	0.47	0.20	0.050		GAM	29	0.36	0.17		3	32
Europium 152	8.2	0.54	0.58	0.10		GAM	8.1	0.42	0.46		1	34
Europium 154	1.1	0.38	0.37	0.10		GAM	1.1	0.30	0.26		0	74
Europium 155	U		0.34	0.10	U	GAM	U		0.30	U	-	
Radium 226	0.52	0.26	0.30	0.10		GAM	0.56	0.23	0.27		7	102
Radium 228	0.64	0.54	0.62	0.20		GAM	0.47	0.37	0.45		31	180
Thorium 228	0.64	0.17	0.23			GAM	0.58	0.13	0.17		10	62
Thorium 232	0.64	0.54	0.62			GAM	0.47	0.37	0.45		31	180

QC-DUP#2 28653

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

N807020-01

B0PBB1

DATA SHEET

SDG 7481 Client/Case no Hanford SDG H0161
Contact N. Joseph Verville Case no TRB-SBB-207925

Lab sample id N807020-01 Client sample id B0PBB1
Dept sample id 7481-001 Location/Matrix 105F SOLID
Received 07/07/98 Collected 07/02/98 12:41
Custody/SAF No B98-095-21 B98-095

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	6.9	3.6	3.7	10	J	80A
Gross Beta	12587-47-2	80	7.5	7.6	10		80B
Uranium 233/234	U-233/234	0.50	0.076	0.025	0.30		U
Uranium 235	15117-96-1	0.028	0.019	0.024	0.30	J	U
Uranium 238	U-238	0.49	0.076	0.025	0.30		U
Plutonium 238	13981-16-3	0.029	0.030	0.056	0.050	U	PU
Plutonium 239/240	PU-239/240	1.1	0.22	0.056	0.050		PU
Americium 241	14596-10-2	0.16	0.047	0.031	0.050		AM
Strontium Total	SR-RAD	21	1.2	0.37	1.0		SR
Nickel 63	13981-37-8	25	5.1	6.6	20		NI_L
GAMMA SCAN ANALYTES		U					
Potassium 40	13966-00-2	10	1.2	0.73			GAM
Cobalt 60	10198-40-0	0.97	0.12	0.095	0.050		GAM
Cesium 137	10045-97-3	30	0.38	0.15	0.050		GAM
Europium 152	14683-23-9	7.0	0.48	0.51	0.10		GAM
Europium 154	15585-10-1	0.93	0.26	0.27	0.10		GAM
Europium 155	14391-16-3	U		0.28	0.10	U	GAM
Radium 226	13982-63-3	0.38	0.15	0.19	0.10		GAM
Radium 228	15262-20-1	0.75	0.43	0.49	0.20		GAM
Thorium 228	14274-82-9	0.51	0.14	0.19			GAM
Thorium 232	7440-29-1	0.75	0.43	0.49			GAM

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

N807020-02

B0PBB2

DATA SHEET

SDG 7481 Client/Case no Hanford SDG H0161
Contact N. Joseph Verville Case no TRB-SBB-207925

Lab sample id N807020-02 Client sample id B0PBB2
Dept sample id 7481-002 Location/Matrix 105F SOLID
Received 07/07/98 Collected 07/02/18 12:41
Custody/SAF No B98-095-21 B98-095

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	5.1	3.1	3.1	10	J	80A
Gross Beta	12587-47-2	82	6.9	5.9	10		80B
Uranium 233/234	U-233/234	0.54	0.070	0.024	0.30		U
Uranium 235	15117-96-1	0.031	0.019	0.018	0.30	J	U
Uranium 238	U-238	0.44	0.062	0.019	0.30		U
Plutonium 238	13981-16-3	0.011	0.022	0.035	0.050	U	PU
Plutonium 239/240	PU-239/240	0.72	0.12	0.028	0.050		PU
Americium 241	14596-10-2	0.15	0.050	0.038	0.050		AM
Strontium Total	SR-RAD	16	0.73	0.26	1.0		SR
Nickel 63	13981-37-8	35	5.1	5.9	20		NI_L
GAMMA SCAN ANALYTES		U					
Potassium 40	13966-00-2	10	1.1	0.76			GAM
Cobalt 60	10198-40-0	1.0	0.12	0.087	0.050		GAM
Cesium 137	10045-97-3	29	0.36	0.17	0.050		GAM
Europium 152	14683-23-9	8.1	0.42	0.46	0.10		GAM
Europium 154	15585-10-1	1.1	0.30	0.26	0.10		GAM
Europium 155	14391-16-3	U		0.30	0.10	U	GAM
Radium 226	13982-63-3	0.56	0.23	0.27	0.10		GAM
Radium 228	15262-20-1	0.47	0.37	0.45	0.20		GAM
Thorium 228	14274-82-9	0.58	0.13	0.17			GAM
Thorium 232	7440-29-1	0.47	0.37	0.45			GAM

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

N807020-03

B0PBB3

DATA SHEET

SDG 7481 Client/Case no Hanford SDG H0161
Contact N. Joseph Verville Case no TRB-SBB-207925

Lab sample id N807020-03 Client sample id B0PBB3
Dept sample id 7481-003 Location/Matrix 105F SOLID
Received 07/07/98 Collected 07/02/98 12:53
Custody/SAF No B98-095-21 B98-095

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	2.8	1.8	2.1	10	J	80A
Gross Beta	12587-47-2	10	4.1	6.1	10		80B
Uranium 233/234	U-233/234	0.18	0.039	0.021	0.30	J	U
Uranium 235	15117-96-1	0.009	0.014	0.018	0.30	U	U
Uranium 238	U-238	0.18	0.039	0.015	0.30	J	U
Plutonium 238	13981-16-3	0.038	0.038	0.072	0.050	U	PU
Plutonium 239/240	PU-239/240	0.019	0.038	0.072	0.050	U	PU
Americium 241	14596-10-2	0	0.016	0.031	0.050	U	AM
Strontium Total	SR-RAD	-0.052	0.14	0.19	1.0	U	SR
Nickel 63	13981-37-8	-0.86	2.6	4.5	20	U	NI_L
GAMMA SCAN ANALYTES		U					
Potassium 40	13966-00-2	4.8	0.35	0.18			GAM
Cobalt 60	10198-40-0	U		0.018	0.050	U	GAM
Cesium 137	10045-97-3	U		0.016	0.050	U	GAM
Europium 152	14683-23-9	U		0.041	0.10	U	GAM
Europium 154	15585-10-1	U		0.051	0.10	U	GAM
Europium 155	14391-16-3	U		0.040	0.10	U	GAM
Radium 226	13982-63-3	0.11	0.031	0.032	0.10		GAM
Radium 228	15262-20-1	0.17	0.074	0.073	0.20	J	GAM
Thorium 228	14274-82-9	0.14	0.021	0.019			GAM
Thorium 232	7440-29-1	0.17	0.074	0.073			GAM

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

N807020-04

DATA SHEET

B0PBB4

SDG 7481 Client/Case no Hanford SDG H0161
Contact N. Joseph Verville Case no TRB-SBB-207925

Lab sample id N807020-04 Client sample id B0PBB4
Dept sample id 7481-004 Location/Matrix 105F SOLID
Received 07/07/98 Collected 07/02/98 13:15
Custody/SAF No B98-085-22 B98-095

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	7.0	3.9	4.2	10	J	80A
Gross Beta	12587-47-2	140	8.5	5.8	10		80B
Uranium 233/234	U-233/234	0.41	0.070	0.027	0.30		U
Uranium 235	15117-96-1	0.048	0.027	0.026	0.30	J	U
Uranium 238	U-238	0.52	0.083	0.022	0.30		U
Plutonium 238	13981-16-3	0.056	0.041	0.048	0.050		PU
Plutonium 239/240	PU-239/240	1.8	0.27	0.039	0.050		PU
Americium 241	14596-10-2	0.31	0.066	0.022	0.050		AM
Strontium Total	SR-RAD	43	1.8	0.40	1.0		SR
Nickel 63	13981-37-8	67	6.5	6.3	20		NI_L
GAMMA SCAN ANALYTES		U					
Potassium 40	13966-00-2	9.9	1.2	0.79			GAM
Cobalt 60	10198-40-0	1.4	0.15	0.11	0.050		GAM
Cesium 137	10045-97-3	50	0.50	0.19	0.050		GAM
Europium 152	14683-23-9	10	0.54	0.59	0.10		GAM
Europium 154	15585-10-1	1.3	0.40	0.37	0.10		GAM
Europium 155	14391-16-3	U		0.34	0.10	U	GAM
Radium 226	13982-63-3	0.45	0.24	0.28	0.10		GAM
Radium 228	15262-20-1	0.58	0.52	0.58	0.20		GAM
Thorium 228	14274-82-9	0.46	0.17	0.24			GAM
Thorium 232	7440-29-1	0.58	0.52	0.58			GAM

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

N807020-05

B0PBB5

DATA SHEET

SDG 7481 Client/Case no Hanford SDG H0161
Contact N. Joseph Verville Case no TRB-SBB-207925

Lab sample id N807020-05 Client sample id B0PBB5
Dept sample id 7481-005 Location/Matrix 105F SOLID
Received 07/07/98 Collected 07/02/98 13:30
Custody/SAF No B98-095-22 B98-095

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	6.9	3.6	3.6	10	J	80A
Gross Beta	12587-47-2	81	7.3	7.1	10		80B
Uranium 233/234	U-233/234	0.50	0.064	0.018	0.30		U
Uranium 235	15117-96-1	0.026	0.019	0.018	0.30	J	U
Uranium 238	U-238	0.47	0.064	0.015	0.30		U
Plutonium 238	13981-16-3	0.004	0.018	0.043	0.050	U	PU
Plutonium 239/240	PU-239/240	0.80	0.14	0.034	0.050		PU
Americium 241	14596-10-2	0.16	0.053	0.028	0.050		AM
Strontium Total	SR-RAD	22	1.0	0.37	1.0		SR
Nickel 63	13981-37-8	43	5.5	6.0	20		NI_L
GAMMA SCAN ANALYTES		U					
Potassium 40	13966-00-2	10	0.71	0.37			GAM
Cobalt 60	10198-40-0	0.70	0.067	0.050	0.050		GAM
Cesium 137	10045-97-3	25	0.24	0.091	0.050		GAM
Europium 152	14683-23-9	5.5	0.29	0.31	0.10		GAM
Europium 154	15585-10-1	0.60	0.14	0.16	0.10		GAM
Europium 155	14391-16-3	U		0.21	0.10	U	GAM
Radium 226	13982-63-3	0.33	0.13	0.16	0.10		GAM
Thorium 228	14274-82-9	0.53	0.078	0.11			GAM

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test AM	Matrix SOLID
SDG 7481	
Contact N. Joseph Verville	

METHOD SUMMARY

AMERICIUM 241 IN SOIL

ALPHA SPECTROSCOPY

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0161	

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Americium 241
Preparation batch 2785-090					
B0PBB1	N807020-01			7481-001	0.16
B0PBB2	N807020-02			7481-002	0.15
B0PBB3	N807020-03			7481-003	U
B0PBB4	N807020-04			7481-004	0.31
B0PBB5	N807020-05			7481-005	0.16
BLK (QC ID=28651)	N807020-07			7481-007	U
LCS (QC ID=28650)	N807020-06			7481-006	ok
Duplicate (N807020-01)	N807020-08			7481-008	ok
Nominal values and limits from method				RDLs (pCi/g)	0.050

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 2785-090	2σ prep error 5.0 %			Reference Lab Notebook #2785 pg. 90												
B0PBB1	N807020-01			0.031	1.00			62		562			21	07/23/98	07/23	SS-048
B0PBB2	N807020-02			0.038	1.00			60		562				07/23/98	07/23	SS-050
B0PBB3	N807020-03			0.031	1.00			52		552			21	07/23/98	07/23	SS-055
B0PBB4	N807020-04			0.022	1.00			74		552			21	07/23/98	07/23	SS-056
B0PBB5	N807020-05			0.028	1.00			57		552			21	07/23/98	07/23	SS-058
BLK (QC ID=28651)	N807020-07			0.023	1.00			67		552				07/23/98	07/23	SS-060
LCS (QC ID=28650)	N807020-06			0.019	1.00			82		552				07/23/98	07/23	SS-059
Duplicate (N807020-01) (QC ID=28652)	N807020-08			0.025	1.00			64		552			21	07/23/98	07/23	SS-061
Nominal values and limits from method				0.050	1.00			20-105		700	100		180			

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test AM	Matrix SOLID
SDG 7481	
Contact N. Joseph Verville	

METHOD SUMMARY, cont.

AMERICIUM 241 IN SOIL

ALPHA SPECTROSCOPY

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0161	

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

AVERAGES ± 2 SD	MDA	0.027	±	0.012
FOR 8 SAMPLES	YIELD	65	±	19

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test PU Matrix SOLID
SDG 7481
Contact N. Joseph Verville

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Plutonium 238		Plutonium 239/240
Preparation batch 2785-090							
B0PBB1	N807020-01			7481-001	U		1.1
B0PBB2	N807020-02			7481-002	U		0.72
B0PBB3	N807020-03			7481-003	U		U
B0PBB4	N807020-04			7481-004	0.056		1.8
B0PBB5	N807020-05			7481-005	U		0.80
BLK (QC ID=28651)	N807020-07			7481-007	U		U
LCS (QC ID=28650)	N807020-06			7481-006	ok		ok
Duplicate (N807020-01)	N807020-08			7481-008	ok	J	ok
Nominal values and limits from method				RDLs (pCi/g)	0.050		0.050

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2785-090	2σ prep error 5.0 %			Reference Lab	Notebook #2785 pg. 90											
B0PBB1	N807020-01			0.056	1.00			40		403			21	07/23/98	07/23	SS-035
B0PBB2	N807020-02			0.035	1.00			82		403				07/23/98	07/23	SS-036
B0PBB3	N807020-03			0.072	1.00			22					21	07/23/98	07/23	ASPEC
B0PBB4	N807020-04			0.048	1.00			59		403			21	07/23/98	07/23	SS-038
B0PBB5	N807020-05			0.043	1.00			64		404			21	07/23/98	07/23	SS-043
BLK (QC ID=28651)	N807020-07			0.038	1.00			71		403				07/23/98	07/23	SS-048
LCS (QC ID=28650)	N807020-06			0.040	1.00			78		404				07/23/98	07/23	SS-044
Duplicate (N807020-01) (QC ID=28652)	N807020-08			0.040	1.00			55		403			21	07/23/98	07/23	SS-049
Nominal values and limits from method				0.050	0.100			20-105		10	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test PU	Matrix SOLID
SDG 7481	
Contact N. Joseph Verville	

METHOD SUMMARY, cont.

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0161	

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	0.046	±	0.024
FOR 8 SAMPLES	YIELD	59	±	40

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test U Matrix SOLID
SDG 7481
Contact N. Joseph Verville

Client Hanford
Contract TRB-SBB-237925
Case no SDG H0161

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%) 1÷3	2σ	2÷3	2σ
Preparation batch 2785-090											
B0PBB1	N807020-01			7481-001	0.50	0.028 J	0.49	102	22	6	4
B0PBB2	N807020-02			7481-002	0.54	0.031 J	0.44	123	24	7	4
B0PBB3	N807020-03			7481-003	0.18 J	U	0.18 J	100	31	5	8
B0PBB4	N807020-04			7481-004	0.41	0.048 J	0.52	79	18	9	3
B0PBB5	N807020-05			7481-005	0.50	0.026 J	0.47	106	20	6	4
BLK (QC ID=28651)	N807020-07			7481-007	U	U	U				
LCS (QC ID=28650)	N807020-06			7481-006	ok	ok	ok				
Duplicate (N807020-02)	N807020-09			7481-009	OUT	ok U	ok	91	21	3	4
Nominal values and limits from method				RDLs (pCi/g)	0.30	0.30	0.30	100		4	
							Averages	100		6	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2785-090	2σ prep error 5.0 %			Reference Lab Notebook #2785 pg. 90												
B0PBB1	N807020-01			0.025	1.00			73		634			14	07/16/98	07/16	SS-035
B0PBB2	N807020-02			0.024	1.00			94		634				07/16/98	07/16	SS-036
B0PBB3	N807020-03			0.021	1.00			100		634			14	07/16/98	07/16	SS-038
B0PBB4	N807020-04			0.027	1.00			89		457			15	07/16/98	07/17	SS-049
B0PBB5	N807020-05			0.018	1.00			93		634			14	07/16/98	07/16	SS-045
BLK (QC ID=28651)	N807020-07			0.018	1.00			95		634				07/16/98	07/16	SS-049
LCS (QC ID=28650)	N807020-06			0.13	1.00			96		634				07/16/98	07/16	SS-048
Duplicate (N807020-02) (QC ID=28653)	N807020-09			0.019	1.00			95		634				07/16/98	07/16	SS-050
Nominal values and limits from method				0.30	0.500			30-105		150	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test	U
Matrix	SOLID
SDG	7481
Contact	N. Joseph Verville

METHOD SUMMARY, cont.

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client	Hanford
Contract	TRB-SBB-207925
Case no	SDG H0161

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	0.035	±	0.077
FOR 8 SAMPLES	YIELD	92	±	16

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test SR	Matrix SOLID
SDG 7481	
Contact N. Joseph Verville	

METHOD SUMMARY

STRONTIUM TOTAL IN SOLIDS

BETA COUNTING

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0161	

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Strontium Total
Preparation batch 2785-090					
B0PBB1	N807020-01			7481-001	21
B0PBB2	N807020-02			7481-002	16
B0PBB3	N807020-03			7481-003	U
B0PBB4	N807020-04			7481-004	43
B0PBB5	N807020-05			7481-005	22
BLK (QC ID=28651)	N807020-07			7481-007	U
LCS (QC ID=28650)	N807020-06			7481-006	ok
Duplicate (N807020-02)	N807020-09			7481-009	ok
Nominal values and limits from method				RDLs (pCi/g)	1.0

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2785-090 - 2σ prep error 10.0 % Reference Lab Notebook #2785 pg. 90																
B0PBB1	N807020-01			0.37	1.00			88		400			18	07/20/98	07/20	GRB-201
B0PBB2	N807020-02			0.26	1.00			81		400				07/20/98	07/20	GRB-202
B0PBB3	N807020-03			0.19	1.00			83		400			18	07/20/98	07/20	GRB-203
B0PBB4	N807020-04			0.40	1.00			84		400			18	07/20/98	07/20	GRB-204
B0PBB5	N807020-05			0.37	1.00			87		400			18	07/20/98	07/20	GRB-205
BLK (QC ID=28651)	N807020 07			0.20	1.00			84		400				07/20/98	07/20	GRB-207
LCS (QC ID=28650)	N807020-06			0.20	1.00			87		200				07/20/98	07/20	GRB-205
Duplicate (N807020-02) (QC ID=28653)	N807020-09			0.28	1.00			71		400				07/20/98	07/20	GRB-208
Nominal values and limits from method				1.0	1.00			20-105		150			180			

PROCEDURES	REFERENCE	SR-RAD
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-500	Strontium-89,90 - Purification, rev 0

AVERAGES ± 2 SD	MDA	0.28	± 0.17
FOR 8 SAMPLES	YIELD	83	± 11

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test 80A	Matrix SOLID
SDG 7481	
Contact N. Joseph Verville	

METHOD SUMMARY

GROSS ALPHA IN SOIL

GAS PROPORTIONAL COUNTING

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0161	

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	1: Gross Alpha		2: Sum, Alpha Emitters	RESULT RATIO (%) 2÷1	2σ
Preparation batch 2785-090									
B0PBB1	N807020-01	80		7481-001	6.9	J	5.6	81	81
B0PBB2	N807020-02	80		7481-002	5.1	J	4.9	96	76
B0PBB3	N807020-03	80		7481-003	2.8	J	1.2	43	70
B0PBB4	N807020-04	80		7481-004	7.0	J	6.3	90	87
B0PBB5	N807020-05	80		7481-005	6.9	J	2.9	42	33
BLK (QC ID=28651)	N807020-07	80		7481-007	U				
LCS (QC ID=28650)	N807020-06	80		7481-006	ok				
Duplicate (N807020-01)	N807020-08	80		7481-008	ok	J	1.2	18	14

Nominal values and limits from method RDLs (pCi/g) 10

Average 62

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2785-090	2σ prep error 20.0 %			Reference Lab			Notebook #2785 pg. 90									
B0PBB1	N807020-01	80		3.7	0.100			46		100			18	07/16/98	07/20	GRB-110
B0PBB2	N807020-02	80		3.1	0.100			44		100				07/16/98	07/20	GRB-111
B0PBB3	N807020-03	80		2.1	0.100			4		100			18	07/16/98	07/20	GRB-112
B0PBB4	N807020-04	80		4.2	0.100			45		100			18	07/16/98	07/20	GRB-115
B0PBB5	N807020-05	80		3.6	0.100			45		100			18	07/16/98	07/20	GRB-116
BLK (QC ID=28651)	N807020-07	80		2.9	0.100			36		100				07/16/98	07/20	GRB-111
LCS (QC ID=28650)	N807020-06	80		3.4	0.100			37		100				07/16/98	07/20	GRB-110
Duplicate (N807020-01) (QC ID=28652)	N807020-08	80		3.0	0.100			46		100			18	07/16/98	07/20	GRB-112
Nominal values and limits from method				10	0.100			5-150		100			180			

Lab id TMANC	
Protocol Hanford	
Version Ver 1.0	
Form DVD-CMS	
Version 3.06	
Report date 10/21/98	

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test 80A	Matrix SOLID
SDG 7481	
Contact N. Joseph Verville	

METHOD SUMMARY, cont.

GROSS ALPHA IN SOIL

GAS PROPORTIONAL COUNTING

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0161	

PROCEDURES	REFERENCE	EPA900.0
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-170	Preparation of Solids for Gross Alpha and Gross Beta Counting, rev 1

AVERAGES ± 2 SD	MDA	3.2	±	1.3
FOR 8 SAMPLES	RESIDUE	38	±	29

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test 80B	Matrix SOLID
SDG 7481	
Contact N. Joseph Verville	

METHOD SUMMARY

GROSS BETA IN SOIL

GAS PROPORTIONAL COUNTING

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0161	

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	1: Gross Beta	2: Sum, Beta Emitters	RESULT RATIO (%) 2÷1	2σ
Preparation batch 2785-090								
B0PBB1	N807020-01	80		7481-001	80	51	64	72
B0PBB2	N807020-02	80		7481-002	82	51	63	70
B0PBB3	N807020-03	80		7481-003	10	5.4	54	48
B0PBB4	N807020-04	80		7481-004	140	75	53	42
B0PBB5	N807020-05	80		7481-005	81	43	53	71
BLK (QC ID=28651)	N807020-07	80		7481-007	U			
LCS (QC ID=28650)	N807020-06	80		7481-006	ok			
Duplicate (N807020-01)	N807020-08	80		7481-008	ok			
Nominal values and limits from method				RDLs (pCi/g)	10			
						Average	57	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2785-090	2σ prep error 15.0 %				Reference Lab			Notebook #2785 pg. 90								
B0PBB1	N807020-01	80		7.6	0.100			46		100			18	07/16/98	07/20	GRB-110
B0PBB2	N807020-02	80		5.9	0.100			44		100				07/16/98	07/20	GRB-111
B0PBB3	N807020-03	80		6.1	0.100			4		100			18	07/16/98	07/20	GRB-112
B0PBB4	N807020-04	80		5.8	0.100			45		100			18	07/16/98	07/20	GRB-115
B0PBB5	N807020-05	80		7.1	0.100			45		100			18	07/16/98	07/20	GRB-116
BLK (QC ID=28651)	N807020-07	80		5.9	0.100			36		100				07/16/98	07/20	GRB-111
LCS (QC ID=28650)	N807020-06	80		7.5	0.100			37		100				07/16/98	07/20	GRB-110
Duplicate (N807020-01) (QC ID=28652)	N807020-08	80		6.3	0.100			46		100			18	07/16/98	07/20	GRB-112
Nominal values and limits from method				10	0.100			5-150		100			180			

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test 80B Matrix SOLID	
SDG 7481	
Contact N. Joseph Verville	

METHOD SUMMARY, cont.

GROSS BETA IN SOIL

GAS PROPORTIONAL COUNTING

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG H0161	

PROCEDURES	REFERENCE	EPA900.0
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-170	Preparation of Solids for Gross Alpha and Gross Beta Counting, rev 1

AVERAGES ± 2 SD	MDA	6.5	±	1.5
FOR 8 SAMPLES	RESIDUE	38	±	29

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test GAM Matrix SOLID	Client Hanford
SDG 7481	Contract TRB-SBB-207925
Contact N. Joseph Verville	Case no SDG H0161

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 2785-090						
B0PBB1	N807020-01			7481-001	0.97	30
B0PBB2	N807020-02			7481-002	1.0	29
B0PBB3	N807020-03			7481-003	U	U
B0PBB4	N807020-04			7481-004	1.4	50
B0PBB5	N807020-05			7481-005	0.70	25
BLK (QC ID=28651)	N807020-07			7481-007	U	U
LCS (QC ID=28650)	N807020-06			7481-006	ok	ok
Duplicate (N807020-02)	N807020-09			7481-009	ok	ok
Nominal values and limits from method				RDLs (pCi/g)	0.050	0.050

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 2785-090	2σ prep error 15.0 %			Reference Lab	Notebook #2785 pg. 90											
B0PBB1	N807020-01			0.42	113					602			12	07/14/98	07/14	JR,01,00
B0PBB2	N807020-02			0.30	112					602				07/14/98	07/14	JR,03,00
B0PBB3	N807020-03			0.040	191					602			12	07/14/98	07/14	JR,04,00
B0PBB4	N807020-04			0.48	105					615			12	07/14/98	07/14	JR,01,00
B0PBB5	N807020-05			0.24	139					405			13	07/14/98	07/15	JR,04,00
BLK (QC ID=28651)	N807020-07			0.017	750					604				07/14/98	07/15	JR,01,00
LCS (QC ID=28650)	N807020-06			0.015	750					407				07/14/98	07/15	JR,03,00
Duplicate (N807020-02) (QC ID=28653)	N807020-09			0.52	112					413				07/14/98	07/16	JR,01,00
Nominal values and limits from method				0.050	750					100			180			

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

AVERAGES + 2 SD FOR 8 SAMPLES	MDA	0.25 + 0.42
	YIELD	+

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

Test NI L Matrix SOLID	Client Hanford
SDG 7481	Contract TRB-SBB-207925
Contact N. Joseph Verville	Case no SDG H0161

METHOD SUMMARY

NICKEL 63 IN SOIL

LIQUID SCINTILLATION COUNTING

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Nickel 63
Preparation batch 2785-090					
B0PBB1	N807020-01			7481-001	25
B0PBB2	N807020-02			7481-002	35
B0PBB3	N807020-03			7481-003	U
B0PBB4	N807020-04			7481-004	67
B0PBB5	N807020-05			7481-005	43
BLK (QC ID=28651)	N807020-07			7481-007	U
LCS (QC ID=28650)	N807020-06			7481-006	ok
Duplicate (N807020-02)	N807020-09			7481-009	OUT J
Nominal values and limits from method				RDLs (pCi/g)	20

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 2785-090	2σ prep error 10.0 % Reference Lab Notebook #2785 pg. 90															
B0PBB1	N807020-01			6.6	0.500					25			24	07/24/98	07/26	LSC-005
B0PBB2	N807020-02			5.9	0.500					25				07/24/98	07/26	LSC-005
B0PBB3	N807020-03			4.5	0.500					25			24	07/24/98	07/26	LSC-005
B0PBB4	N807020-04			6.3	0.500					25			24	07/24/98	07/26	LSC-005
B0PBB5	N807020-05			6.0	0.500					25			24	07/24/98	07/26	LSC-005
BLK (QC ID=28651)	N807020-07			4.4	0.500					25				07/24/98	07/26	LSC-005
LCS (QC ID=28650)	N807020-06			4.6	0.500					25				07/24/98	07/26	LSC-005
Duplicate (N807020-02) (QC ID=28653)	N807020-09			5.6	0.500					25				07/24/98	07/26	LSC-005
Nominal values and limits from method				20	0.500					10			180			

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

AVERAGES ± 2 SD FOR 8 SAMPLES	MDA	5.5 ± 1.7
	YIELD	___ ± ___

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	10/21/98

SDG 7481
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

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.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/21/98

SDG 7481
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

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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Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/21/98

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0161

SDG 7481
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

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.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/21/98

SDG 7481
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0161

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).

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
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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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GUIDE, cont.

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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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Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/21/98

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Contact N. Joseph Verville

REPORT GUIDE

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Contract TRB-SBB-207925
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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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Contact N. Joseph Verville

REPORT GUIDE

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MATRIX SPIKE

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

The following notes apply to this report:

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

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

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

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

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

* The first, computed limits for the recovery reflect:

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

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

  2. The error of ADDED.

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

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

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MATRIX SPIKE

for the recovery.

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

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

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METHOD SUMMARY

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

The following notes apply to this report:

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

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

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

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

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

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

* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.

* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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METHOD SUMMARY

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

* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.

* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

  MDAs are underlined if greater than the printed RDL.

* Aliquots are underlined if less than the nominal value specified for the method.

* Prepareation 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.

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

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.

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-095-21	Page 1 of 1

Collector R Fahlberg	**Company Contact** D Bryant	**Telephone No.** 373-7251	**Project Coordinator** TRENT, SJ	**Data Turnaround** 15 Days
Project Designation 105F & 105DR ISS Project - Other Solid	**Sampling Location** 105F		**SAF No.** B98-095	
Ice Chest No.	**Field Logbook No.** EL 1309-2		**Method of Shipment**	
Shipped To TMA/WESTON	**Offsite Property No.**		**Bill of Lading/Air Bill No.**	
Waste Designation Client determined no waste codes associated with this project.			COA R10FDR29W0	

POSSIBLE SAMPLE HAZARDS/REMARKS

SDG# H0161

Special Handling and/or Storage

Preservation	None	None	None	None	None	None	None		None	
Type of Container	aG	aG	aG	aG	aG	aG	aG	P	aG	
No. of Container(s)	0	0	0	0	0	0	0	1	1	
Volume	120mL	120mL	120mL	120mL	120mL	120mL	120mL	20mL	120mL	
SAMPLE ANALYSIS	Americium-241	Gross Alpha	Gross Beta	Isotopic Plutonium	Isotopic Uranium	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	See item (1) in Special Instructions	
Sample No. / **Matrix *** / **Sample Date** / **Sample Time**										
B0PBB1 / Other Solid / 7-2-98 / 1241	X	X	X	X	X	X	X	X	X	B0PBB3
B0PBB2 / Other Solid / 7-2-98 / 1241	X	X	X	X	X	X	X	X	X	B0PBB
B0PBB3 / Other Solid / 7-2-98 / 1255	X	X	X	X	X	X	X	X	X	B0PBB

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By	Date/Time	Received By	Date/Time
Renee Nielson R. Nielson	7/6/98 0930	Fed Ex	
		Alex Kelleston	7.7.98 10:40

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

Note: total contents of sample contained in one 120ml bottle.

Matrix *

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

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-095-22	Page 1 of 1

Collector R Fahlberg	**Company Contact** D Bryant	**Telephone No.** 373-7251	**Project Coordinator** TRENT, SJ	**Data Turnaround** 15 Days
Project Designation 105F & 105DR ISS Project - Other Solid	**Sampling Location** 105F		**SAF No.** B98-095	
Ice Chest No.	**Field Logbook No.** EL 1309-2		**Method of Shipment**	
Shipped To TMA/WESTON	**Offsite Property No.**		**Bill of Lading/Air Bill No.** RJN 7/6/98	
Waste Designation Client determined no waste codes associated with this project.			**COA** R105FDR29W0	

POSSIBLE SAMPLE HAZARDS/REMARKS

S DG# H161

Special Handling and/or Storage

Preservation	None	None	None	None	None	None	None		None	
Type of Container	aG	aG	aG	aG	aG	aG	aG	P	aG	
No. of Container(s)	0	0	0	0	0	0	0	1	1	
Volume	120mL	120mL	120mL	120mL	120mL	120mL	120mL	20mL	120mL	
SAMPLE ANALYSIS	Americium-241	Gross Alpha	Gross Beta	Isotopic Plutonium	Isotopic Uranium	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	See item (1) in Special Instructions	

Sample No.	Matrix *	Sample Date	Sample Time										
B0PBB4	Other Solid	7-2-98	1315	X	X	X	X	X	X	X	X	X	B0PBC0
B0PBB5	Other Solid	7-2-98	1330	X	X	X	X	X	X	X	X	X	B0PBC1
~~B0PBB6~~	~~Other Solid~~	RJN 7/6/98											

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: R. Nielson	Date/Time: R. Nielson 7/6/98 0930	Received By: FedEx	Date/Time
Relinquished By	Date/Time	Received By: Alex Kelleston	Date/Time: 7-7-98 10:40
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

Note: total contents of sample contained in one 120 ml bottle.

Matrix *

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

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

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 7.7.98 10:30 S.G.#: B-98-095-22, B98-095-21 ~~BOPBB1, BOPBB2~~, BOPBB3

Work Order Number: A980020 SAF #: BOPBB4, BOPBB5

Shipping Container ID: 47 Chain of Custody # B98-095-22 B98-095-21

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

8. Samples have:
   - ____ tape
   - ✓ custody seals
   - ____ hazard labels
   - ✓ appropriate sample labels

9. Samples are:
   - ✓ in good condition
   - ____ broken
   - ____ leaking
   - ____ have air bubbles

10. Where any anomalies identified in sample receipt? Yes [ ] No [✓]
11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: Alex Kelewhow TNU Date: 7.7.98

Telephoned To: _____ On _____ By _____

US DOE %
FLUOR DANIEL HANFORD CO, INC.
2355 STEVENS DRIVE/1163 BLDG.
RICHLAND WA 99352
(509)376-5098

SHIP DATE: 06JUL98
ACC# 188288189

ACTUAL WGT: 14 LBS MAN-WT

TO: THERMO NUTECH (510)235-2633
THERMO NUTECH RICHMOND LABORATORIES
2030 WRIGHT AVE

RICHMOND CA 94804-0040

4235 7951 3389 FedEx. BILL THIRD PARTY

4235 7951 3389

REF: r10fdr29w0 A980020

PRIORITY OVERNIGHT TUE

CAD# 0053292 06JUL98

Deliver by:
07JUL98

TRK# 4235 7951 3389 Form 0201

OAK AA

94804 -CA-US WA JEMA

PART # 147923 FORMAT # 077 RIT 09/97

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NO. (To be obtained from PROPERTY MANAGEMENT)
BHI		A98

PART I - TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit

The following items are to be shipped from ☐ Contractor ☐ Vendor

Routing ☐ Prepaid ☐ Collect

Shipped to / Company / Address / City / State / Zip Code / Country	Off-site Custodian On-site Custodian — Payroll No.

Qty.	Property No.	Description (include Manufacture Name, Model, Serial No.)	Acquisition Cost
1	14 ICS	Sample # BOPBB1, BOPBB2, BOPBB3, BOPBB4, BOPBB5 COOLER #47 Polycoler Containing [illegible] Samples Bubble wrapped [illegible] Packing [illegible]	N/A

☐ Classified ☑ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the off-site use of this property

- ☑ Required for Project Work. List Project No. 105E & 105DL 155
- ☐ Business Trip
- ☐ Off-site Assignment
- ☐ Shipment to Subcontractor. List Subcontract No. Bill of Lading # 4235795133 89
- ☐ Other (Please specify)

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.

RM Clearance for Public Release	RM Survey No.	Date

Location of and Contact for Property (Name/Phone No./Bldg./Area)

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
7/6/98	R105FD0 R105FD0	

Originated By	Date	Authorized By	Date

Property Representative Signature	Date	Property Management Approval	Date

PART II - TO BE COMPLETED BY SHIPPING

Authorized Shipping Signature	Date

DISTRIBUTION (AFTER FINAL SIGNATURES)

White - Property Management Yellow - Shipping Green - Accounts Payable Pink - Originator Goldenrod - Property Management

54-3000-479 (01/94)