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October 20, 1999

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

Reference: P.O. #TRB-SBB-207925
Thermo Nutech N9-10-043-7742, SDG H0558-475 *Days*

10/25/99

Dear Ms. Kessner:

Enclosed is a revised data package for the above referenced BHI SDG. The previous data package indicated a soil matrix but reported results as pCi/mL. The results are not changed just the reporting unit, the correct unit is pCi/g.

Please call if you have any questions concerning this report.

Sincerely,

N. Joseph Verville
Senior Program Manager

NJV/kcj

Enclosure: Data Packag



ORIGINAL *Dayes*

SDR # B99-051

Revision #: 0

Date Initiated: 07/23/99

SAMPLE DISPOSITION RECORD

SAF: B99-076
OU: 100-DR-1/100-FR-1
Project ID: 105F/105DR
Task ID: 3
Sampling Event: 105-DR Phase III Sampling and Analysis

Laboratory: TMA/RECRA

Task Manager: R.S. Day

Sampling Information:
Number of Samples: 5
ID Numbers: B0W0X9, B0W0Y3, B0W0Y0, B0W0Y2, B0W0Y1
Matrix: Other Solid
Collection Date: 07/19/99 – 07/20/99

Issue Background:

Class: Project Data Use General Laboratory Direction Validation Direction Sample Management Direction

Type: Chain of Custody Problem

Description: Samples Arrived at Laboratory With No Chain of Custody Documentation

Disposition:

Description: Chains of custody for the listed samples were not packed with the appropriate bottle sets. As a result, bottle sets for samples B0W0X9 and B0W0Y0 arrived at the Recra Laboratory with no accompanying chain of custody. Bottle sets for samples B0W0Y1, B0W0Y2, and B0W0Y3 arrived at the TMA Laboratory with no accompanying chain of custody. The project requested that analyses affected by the chain of custody problem be cancelled, and that the Fuel Storage Basin cement be resampled. In addition, a lessons learned session was conducted to determine the causative factors associated with this chain of custody problem.

Justification: The intended use of the data associated with these samples requires clear demonstration that chain of custody was maintained. Analyses affected by the chain of custody problem were cancelled per Sample Disposition Record B99-052.

Approval Signatures:

S. J. Trent *[Signature]* 9/2/99
Project Coordinator (Print/Sign Name) Date

R.S. Day *[Signature]* 9-18-99
Task Manager (Print/Sign Name) Date

ORIGINAL *Daynes*

SDR # B99-052
Revision #: 0
Date Initiated: 07/23/99

SAMPLE DISPOSITION RECORD

SAF: B99-076
OU: 100-DR-1/100-FR-1
Project ID: 105F/105DR
Task ID: 3
Sampling Event: 105-DR Phase III Sampling and Analysis

Laboratory: TMA/RECRA

Task Manager: R.S. Day

Sampling Information:
Number of Samples: 5
ID Numbers: B0W0X9, B0W0Y3, B0W0Y0, B0W0Y2, B0W0Y1
Matrix: Other Solid
Collection Date: 07/19/99 – 07/20/99

Issue Background:

Class: Project Data Use General Laboratory Direction Validation Direction Sample Management Direction

Type: Cancellation of Analyses

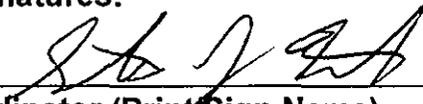
Description: Cancellation of Analyses Due to Chain of Custody Problem

Disposition:

Description: Due to a chain of custody problem (Sample Disposition Record B99-051), all chemical analyses associated with samples B0W0X9 and B0W0Y0 were cancelled. For the same reason, all radiochemical analyses associated with samples B0W0Y1, B0W0Y2, and B0W0Y3 were cancelled.

Justification: Because of the chain of custody problem, data generated from the impacted analyses would not have met the data quality objectives of the project.

Approval Signatures:

S. J. Trent		9/2/99
Project Coordinator (Print/Sign Name)		Date
R.S. Day		9-19-99
Task Manager (Print/Sign Name)		Date

ORIGINAL - *Day*

SDR # B99-053
Revision #: 0
Date Initiated: 08/27/99

SAMPLE DISPOSITION RECORD

SAF: B99-076
OU: 100-DR-1/100-FR-1
Project ID: 105F/105DR
Task ID: 3
Sampling Event: 105-DR Phase III Sampling and Analysis

Laboratory: TMA/RECRA

Task Manager: R.S. Day

Sampling Information:
Number of Samples: 5
ID Numbers: B0W0X9, B0W0Y0, B0W0Y9, B0W400, B0W401
Matrix: Other Solid
Collection Date: 07/19/99 – 08/04/99

Issue Background:

Class: Project Data Use General Laboratory Direction Validation Direction Sample Management Direction

Type: Addition of Analyses

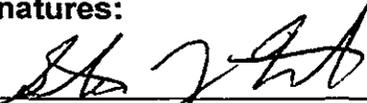
Description: Addition of Ba-133

Disposition:

Description: The project requested that the Laboratory report Ba-133 results in the final data packages for the listed samples.

Justification: Ba-133 was a contaminant of concern but had not been included on the Sample Authorization Form. Ba-133 will be reported as part of the gamma energy analysis results.

Approval Signatures:

S. J. Trent		9/2/99
Project Coordinator (Print/Sign Name)		Date
R.S. Day		9-14-99
Task Manager (Print/Sign Name)		Date

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0475 is composed of two solid samples designated under SAF No. B99-076 with a Project Designation of : 105-DR FSB-Concrete.

The sample was 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 19, 1999.

2.0 ANALYSIS NOTES

2.1 Gamma Scan Analyses

No problems were encountered during the course of the analyses.

2.2 Total Strontium Analyses

The RPD in the duplicate result and the original was 28%, greater than the 3 sigma total limit of 22%. The blank sample indicated slight cross contamination from the high activity of the samples.

2.3 Americium-241 Analyses

No problems were encountered during the course of the analyses although all client samples, the duplicate and the LCS sample were recounted.

2.4 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses although all client samples and the duplicate were recounted.

2.5 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.6 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses, although sample BOWOX9 was recounted.

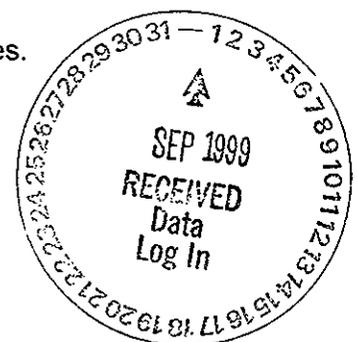
2.7 Carbon-14 Analyses

The RPD in the duplicate result and the original was 23%, slightly greater than the 3 sigma total limit of 22%.

2.8 Tritium Analyses

No problems were encountered during the course of the analyses.

2.9 Technetium-99 Analyses



The RPD in the duplicate result and the original was 59%, slightly greater than the 3sigma total limit of 58%.

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0475

SDG 7166
 Contact L.A. Johnson

SAMPLE SUMMARY

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
BOW0X9	105-DR	SOLID		N907145-01	B99-076	B99-076-01	07/19/99 10:15
BOW0Y0	105-DR	SOLID		N907145-02	B99-076	B99-076-01	07/19/99 10:45
Method Blank		SOLID		N907145-04	B99-076		
Method Blank		SOLID		N907145-07	B99-076		
Lab Control Sample		SOLID		N907145-03	B99-076		
Lab Control Sample		SOLID		N907145-06	B99-076		
Duplicate (N907145-01)	105-DR	SOLID		N907145-05	B99-076		07/19/99 10:15
Duplicate (N907145-01)	105-DR	SOLID		N907145-08	B99-076		07/19/99 10:15

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

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

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0475

SDG 7166
 Contact L.A. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

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
7166	B99-076-01	B0W0X9	SOLID	100.0			07/23/99	4	N907145-01	7166-001
		B0W0Y0	SOLID	100.0			07/23/99	4	N907145-02	7166-002
		Method Blank	SOLID						N907145-04	7166-004
		Method Blank	SOLID						N907145-07	7166-007
		Lab Control Sample	SOLID						N907145-03	7166-003
		Lab Control Sample	SOLID						N907145-06	7166-006
		Duplicate (N907145-01)	SOLID				07/23/99	4	N907145-05	7166-005
		Duplicate (N907145-01)	SOLID				07/23/99	4	N907145-08	7166-008

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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0475

PREP BATCH SUMMARY

SDG 7166
 Contact L.A. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Alpha Spectroscopy										
AM	SOLID	Americium 241 in Soil	6893-036	5.0	2			1	1	1/1
PU	SOLID	Plutonium, Isotopic in Solids	6893-036	5.0	2			1	1	1/1
U	SOLID	Uranium, Isotopic in Soil	6893-036	5.0	2			1	1	1/1
Beta Counting										
SR	SOLID	Total Strontium in Soil	6893-036	10.0	2			1	1	1/1
TC	SOLID	Technetium 99 in Soil	6893-036	10.0	2			1	1	1/1
Gamma Spectroscopy										
GAM	SOLID	Gamma Scan	6893-036	15.0	2			1	1	1/1 X
Liquid Scintillation Counting										
C	SOLID	Carbon 14 in Soil	6893-036	10.0	2			1	1	1/1
H	SOLID	Tritium in Soil	6893-036	10.0	2			1	1	1/1
NI_L	SOLID	Nickel 63 in Soil	6893-036	10.0	2			1	1	1/1

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

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

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0475

SDG 7166
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0475

WORK SUMMARY

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	SUF-							
CUSTODY	SAF No	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
B0W0X9		N907145-01	7166-001	AM		08/06/99	08/19/99	NJV	Americium 241 in Soil	
105-DR	SOLID	07/19/99	7166-001	C	A1	08/16/99	08/19/99	NJV	Carbon 14 in Soil	
B99-076-01	B99-076	07/23/99	7166-001	GAM		08/06/99	08/19/99	NJV	Gamma Scan	
			7166-001	H		08/05/99	08/19/99	NJV	Tritium in Soil	
			7166-001	NI_L		08/02/99	08/19/99	NJV	Nickel 63 in Soil	
			7166-001	PU		08/09/99	08/19/99	NJV	Plutonium, Isotopic in Solids	
			7166-001	SR		08/03/99	08/19/99	NJV	Total Strontium in Soil	
			7166-001	TC		08/13/99	08/19/99	NJV	Technetium 99 in Soil	
			7166-001	U		08/04/99	08/19/99	NJV	Uranium, Isotopic in Soil	
B0W0Y0		N907145-02	7166-002	AM		08/10/99	08/19/99	NJV	Americium 241 in Soil	
105-DR	SOLID	07/19/99	7166-002	C	A1	08/16/99	08/19/99	NJV	Carbon 14 in Soil	
B99-076-01	B99-076	07/23/99	7166-002	GAM		08/06/99	08/19/99	NJV	Gamma Scan	
			7166-002	H		08/05/99	08/19/99	NJV	Tritium in Soil	
			7166-002	NI_L		08/02/99	08/19/99	NJV	Nickel 63 in Soil	
			7166-002	PU		08/11/99	08/19/99	NJV	Plutonium, Isotopic in Solids	
			7166-002	SR		08/03/99	08/19/99	NJV	Total Strontium in Soil	
			7166-002	TC		08/13/99	08/19/99	NJV	Technetium 99 in Soil	
			7166-002	U		08/03/99	08/19/99	NJV	Uranium, Isotopic in Soil	
Method Blank		N907145-04	7166-004	AM		08/07/99	08/19/99	NJV	Americium 241 in Soil	
	SOLID		7166-004	GAM		08/06/99	08/19/99	NJV	Gamma Scan	
	B99-076		7166-004	H		08/05/99	08/19/99	NJV	Tritium in Soil	
			7166-004	NI_L		08/02/99	08/19/99	NJV	Nickel 63 in Soil	
			7166-004	PU		08/04/99	08/19/99	NJV	Plutonium, Isotopic in Solids	
			7166-004	SR		08/03/99	08/19/99	NJV	Total Strontium in Soil	
			7166-004	TC		08/16/99	08/19/99	NJV	Technetium 99 in Soil	
			7166-004	U		08/03/99	08/19/99	NJV	Uranium, Isotopic in Soil	
Method Blank		N907145-07	7166-007	C		08/16/99	08/19/99	NJV	Carbon 14 in Soil	
	SOLID									
	B99-076									

Lab id TMANC
Protocol Hanford
Version Ver 1.0
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TMA/RICHMOND
SAMPLE DELIVERY GROUP H0475

WORK SUMMARY, cont.

SDG 7166
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0475

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD	
CUSTODY	SAF No	RECEIVED			FIX					
Lab Control Sample		N907145-03	7166-003	AM		08/12/99	08/19/99	NJV	Americium 241 in Soil	
	SOLID		7166-003	GAM		08/06/99	08/19/99	NJV	Gamma Scan	
	B99-076		7166-003	H		08/05/99	08/19/99	NJV	Tritium in Soil	
			7166-003	NI_L		08/02/99	08/19/99	NJV	Nickel 63 in Soil	
			7166-003	PU		08/04/99	08/19/99	NJV	Plutonium, Isotopic in Solids	
			7166-003	SR		08/03/99	08/19/99	NJV	Total Strontium in Soil	
			7166-003	TC		08/13/99	08/19/99	NJV	Technetium 99 in Soil	
			7166-003	U		08/03/99	08/19/99	NJV	Uranium, Isotopic in Soil	
Lab Control Sample		N907145-06	7166-006	C		08/16/99	08/19/99	NJV	Carbon 14 in Soil	
	SOLID									
	B99-076									
Duplicate (N907145-01)		N907145-05	7166-005	AM		08/12/99	08/19/99	NJV	Americium 241 in Soil	
105-DR	SOLID	07/19/99	7166-005	GAM		08/07/99	08/19/99	NJV	Gamma Scan	
	B99-076	07/23/99	7166-005	H		08/05/99	08/19/99	NJV	Tritium in Soil	
			7166-005	NI_L		08/02/99	08/19/99	NJV	Nickel 63 in Soil	
			7166-005	PU		08/09/99	08/19/99	NJV	Plutonium, Isotopic in Solids	
			7166-005	SR		08/03/99	08/19/99	NJV	Total Strontium in Soil	
			7166-005	TC		08/16/99	08/19/99	NJV	Technetium 99 in Soil	
			7166-005	U		08/03/99	08/19/99	NJV	Uranium, Isotopic in Soil	
Duplicate (N907145-01)		N907145-08	7166-008	C		08/16/99	08/19/99	NJV	Carbon 14 in Soil	
105-DR	SOLID	07/19/99								
	B99-076	07/23/99								

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

SAMPLE DELIVERY GROUP H0475

WORK SUMMARY, cont.

SDG 7166
 Contact L.A. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

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	2			1	1	1		5
C	B99-076	Carbon 14 in Soil	C14COXLSC	2			1	1	1		5
GAM	B99-076	Gamma Scan	GAMMAHI	2			1	1	1		5
H	B99-076	Tritium in Soil	EPA906.0	2			1	1	1		5
NI_L	B99-076	Nickel 63 in Soil	NI63LSC	2			1	1	1		5
PU	B99-076	Plutonium, Isotopic in Solids	PUPLATE	2			1	1	1		5
SR	B99-076	Total Strontium in Soil	SRTOTAL	2			1	1	1		5
TC	B99-076	Technetium 99 in Soil	TC99TRLSC	2			1	1	1		5
U	B99-076	Uranium, Isotopic in Soil	UPLATE	2			1	1	1		5
TOTALS				18			9	9	9		45

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-CWS
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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0475

N907145-04

Method Blank

METHOD BLANK

SDG <u>7166</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0475</u>
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N907145-04</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7166-004</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	0.006	0.051	0.086	400	U	H
Technetium 99	14133-76-7	0.497	0.31	0.70	15	U	TC
Uranium 233/234	U-233/234	0.010	0.019	0.073	1.0	U	U
Uranium 235	15117-96-1	0	0.023	0.088	1.0	U	U
Uranium 238	U-238	0.010	0.019	0.073	1.0	U	U
Plutonium 238	13981-16-3	0	0.031	0.064	1.0	U	PU
Plutonium 239/240	PU-239/240	<u>0.089</u>	0.053	0.058	1.0	J	PU
Nickel 63	13981-37-8	<u>-3.38</u>	2.1	4.1	30	U	NI_L
Americium 241	14596-10-2	0.008	0.016	0.030	1.0	U	AM
Total Strontium	SR-RAD	<u>0.248</u>	0.14	0.18	1.0	J	SR
Potassium 40	13966-00-2	U		0.95		U	GAM
Barium 133	13981-41-4	U		0.057		UX	GAM
Cobalt 60	10198-40-0	U		<u>0.061</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.059	0.10	U	GAM
Europium 152	14683-23-9	U		<u>0.16</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.17</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.14</u>	0.10	U	GAM
Radium 226	13982-63-3	U		<u>0.11</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>0.38</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		0.081		U	GAM
Thorium 232	TH-232	U		0.38		U	GAM
Americium 241	14596-10-2	U		0.17		U	GAM
Uranium 238	U-238	U		6.6		U	GAM
Uranium 235	15117-96-1	U		0.18		U	GAM

105-DR FSB-Concrete

QC-BLANK 31424

METHOD BLANKS

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SUMMARY DATA SECTION

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

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0475

N907145-07

Method Blank

METHOD BLANK

SDG <u>7166</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0475</u>
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N907145-07</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7166-007</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B99-076</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Carbon 14	14762-75-5	1.95	2.7	4.5	50	U	C

105-DR FSB-Concrete

QC-BLANK 31578

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 H0475

N907145-03

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7166</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0475</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N907145-03</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7166-003</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
Tritium	4.58	0.15	0.086	400	J	H	4.93	0.20	93	84-116	80-120
Technetium 99	67.0	2.1	0.66	15		TC	68.4	2.7	98	84-116	80-120
Uranium 233/234	3.76	0.45	0.23	1.0		U	4.64	0.19	<u>81</u>	83-117	80-120
Uranium 235	3.12	0.40	0.065	1.0		U	3.77	0.15	83	82-118	80-120
Uranium 238	4.17	0.48	0.22	1.0		U	5.04	0.20	83	83-117	80-120
Plutonium 238	9.73	0.89	0.054	1.0		PU	10.0	0.40	97	84-116	80-120
Plutonium 239/240	10.2	0.92	0.054	1.0	B	PU	10.6	0.42	96	84-116	80-120
Nickel 63	128	4.3	2.8	30		NI_L	134	5.4	96	84-116	
Americium 241	18.8	1.3	0.034	1.0		AM	19.2	0.77	98	86-114	80-120
Total Strontium	13.2	1.1	0.89	1.0		SR	11.4	0.46	116	77-123	
Cobalt 60	3.95	0.21	<u>0.099</u>	0.050		GAM	4.10	0.16	96	76-124	80-120
Cesium 137	3.70	0.17	<u>0.12</u>	0.10		GAM	3.72	0.15	99	76-124	80-120

105-DR FSB-Concrete

QC-LCS 31423

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>

LAB CONTROL SAMPLES

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SUMMARY DATA SECTION

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TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0475

N907145-06

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7166</u> Contact <u>L.A. Johnson</u> Lab sample id <u>N907145-06</u> Dept sample id <u>7166-006</u>	Client/Case no <u>Hanford</u> <u>SDG-H0475</u> Case no <u>TRB-SBB-207925</u> Client sample id <u>Lab Control Sample</u> Material/Matrix _____ <u>SOLID</u> SAF No <u>B99-076</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	10400	100	13	50	C	10800	430	96	84-116	

105-DR FSB-Concrete

QC-LCS 31577

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

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0475

N907145-05

BOWOX9

DUPLICATE

SDG <u>7166</u>		Client/Case no <u>Hanford</u>	SDG-H0475
Contact <u>L.A. Johnson</u>		Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL		
Lab sample id <u>N907145-05</u>	Lab sample id <u>N907145-01</u>	Client sample id <u>BOWOX9</u>	
Dept sample id <u>7166-005</u>	Dept sample id <u>7166-001</u>	Location/Matrix <u>105-DR</u>	<u>SOLID</u>
	Received <u>07/23/99</u>	Collected <u>07/19/99 10:15</u>	
	% solids <u>100.0</u>	Custody/SAP No <u>B99-076-01</u>	<u>B99-076</u>

ANALYTE	DUPLICATE		MDA	RDL	QUALI-	TEST	ORIGINAL		MDA	QUALI-	RPD	3σ	PROT
	pCi/g	2σ ERR (COUNT)					pCi/g	pCi/g					
Tritium	7.52	0.19	0.085	400	J	H	6.23	0.17	0.087	J	19	22	
Technetium 99	2.51	0.48	0.84	15	J	TC	1.37	0.51	0.88	J	<u>59</u>	58	
Uranium 233/234	3.33	0.41	0.093	1.0		U	3.10	0.33	0.080		7	27	
Uranium 235	0.282	0.11	0.070	1.0	J	U	0.321	0.091	0.048	J	13	72	
Uranium 238	2.90	0.38	0.083	1.0		U	3.19	0.34	0.075		10	27	
Plutonium 238	5.32	0.44	0.029	1.0		PU	5.77	0.50	0.031		8	21	
Plutonium 239/240	358	23	0.029	1.0	B	PU	358	24	0.050	B	0	18	
Nickel 63	5330	53	5.4	30		NI_L	5360	54	5.3		1	21	
Americium 241	49.8	4.0	0.050	1.0		AM	54.7	11	0.34		9	35	
Total Strontium	5970	150	<u>8.8</u>	1.0		SR	4500	9.0	0.27		<u>28</u>	22	
Potassium 40	U		7.2			GAM	U		7.3	U	-		
Barium 133	U		2.6		UX	GAM	U		2.6	UX	-		
Cobalt 60	323	2.5	<u>1.0</u>	0.050		GAM	323	2.5	<u>1.1</u>		0	32	
Cesium 137	5070	7.0	<u>2.5</u>	0.10		GAM	5070	7.0	<u>2.5</u>		0	32	
Europium 152	801	7.0	<u>7.7</u>	0.10		GAM	806	6.4	<u>7.1</u>		1	32	
Europium 154	108	4.2	<u>3.7</u>	0.10		GAM	105	3.9	<u>3.4</u>		3	33	
Europium 155	5.03	2.2	<u>3.5</u>	0.10		GAM	4.38	2.9	<u>4.0</u>		14	120	
Radium 226	U		<u>3.2</u>	0.10	U	GAM	U		<u>3.2</u>	U	-		
Radium 228	U		<u>7.3</u>	0.20	U	GAM	U		<u>7.2</u>	U	-		
Thorium 228	U		2.4		U	GAM	U		2.8	U	-		
Thorium 232	U		7.3		U	GAM	U		7.2	U	-		
Americium 241	60.2	1.8	2.4			GAM	60.0	1.6	2.2		0	32	
Uranium 238	U		260		U	GAM	U		250	U	-		
Uranium 235	U		5.9		U	GAM	U		5.8	U	-		

105-DR FSB-Concrete

QC-DUP#1 31425

DUPLICATES

Page 1

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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>10/07/99</u>

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0475

N907145-08

B0W0X9

DUPLICATE

SDG <u>7166</u>	Client/Case no <u>Hanford</u>	SDG-H0475
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>N907145-08</u>	Lab sample id <u>N907145-01</u>	Client sample id <u>B0W0X9</u>
Dept sample id <u>7166-008</u>	Dept sample id <u>7166-001</u>	Location/Matrix <u>105-DR</u> <u>SOLID</u>
	Received <u>07/23/99</u>	Collected <u>07/19/99 10:15</u>
	% solids <u>100.0</u>	Custody/SAF No <u>B99-076-01</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	678	9.8	4.5	50		C	540	8.6	4.4		.23	22	

105-DR FSB-Concrete

QC-DUP#1 31579

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 H0475

N907145-01

B0W0X9

DATA SHEET

SDG <u>7166</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0475</u>
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N907145-01</u>	Client sample id <u>B0W0X9</u>	
Dept sample id <u>7166-001</u>	Location/Matrix <u>105-DR</u>	<u>SOLID</u>
Received <u>07/23/99</u>	Collected <u>07/19/99 10:15</u>	
% solids <u>100.0</u>	Custody/SAF No <u>B99-076-01</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	6.23	0.17	0.087	400	J	H
Carbon 14	14762-75-5	540	8.6	4.4	50		C
Technetium 99	14133-76-7	1.37	0.51	0.88	15	J	TC
Uranium 233/234	U-233/234	3.10	0.33	0.080	1.0		U
Uranium 235	15117-96-1	0.321	0.091	0.048	1.0	J	U
Uranium 238	U-238	3.19	0.34	0.075	1.0		U
Plutonium 238	13981-16-3	5.77	0.50	0.031	1.0		PU
Plutonium 239/240	PU-239/240	358	24	0.050	1.0	B	PU
Nickel 63	13981-37-8	5360	54	5.3	30		NI_L
Americium 241	14596-10-2	54.7	11	0.34	1.0		AM
Total Strontium	SR-RAD	4500	9.0	0.27	1.0		SR
Potassium 40	13966-00-2	U		7.3		U	GAM
Barium 133	13981-41-4	U		2.6		UX	GAM
Cobalt 60	10198-40-0	323	2.5	<u>1.1</u>	0.050		GAM
Cesium 137	10045-97-3	5070	7.0	<u>2.5</u>	0.10		GAM
Europium 152	14683-23-9	806	6.4	<u>7.1</u>	0.10		GAM
Europium 154	15585-10-1	105	3.9	<u>3.4</u>	0.10		GAM
Europium 155	14391-16-3	4.38	2.9	<u>4.0</u>	0.10		GAM
Radium 226	13982-63-3	U		<u>3.2</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>7.2</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		2.8		U	GAM
Thorium 232	TH-232	U		7.2		U	GAM
Americium 241	14596-10-2	60.0	1.6	2.2			GAM
Uranium 238	U-238	U		250		U	GAM
Uranium 235	15117-96-1	U		5.8		U	GAM

105-DR FSB-Concrete

DATA SHEETS

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
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Report date <u>10/07/99</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0475

N907145-02

BOWOYO

DATA SHEET

SDG <u>7166</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0475</u>
Contact <u>L.A. Johnson</u>	Contract <u>TRB-SBB-207925</u>	
Lab sample id <u>N907145-02</u>	Client sample id <u>BOWOYO</u>	
Dept sample id <u>7166-002</u>	Location/Matrix <u>105-DR</u>	<u>SOLID</u>
Received <u>07/23/99</u>	Collected <u>07/19/99 10:45</u>	
% solids <u>100.0</u>	Custody/SAF No <u>B99-076-01</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	8.09	0.19	0.085	400	J	H
Carbon 14	14762-75-5	961	12	5.0	50		C
Technetium 99	14133-76-7	0.438	0.35	0.66	15	U	TC
Uranium 233/234	U-233/234	1.37	0.22	0.054	1.0		U
Uranium 235	15117-96-1	0.059	0.051	0.065	1.0	U	U
Uranium 238	U-238	1.21	0.20	0.054	1.0		U
Plutonium 238	13981-16-3	6.63	0.52	0.063	1.0		PU
Plutonium 239/240	PU-239/240	240	15	0.027	1.0	B	PU
Nickel 63	13981-37-8	11900	120	8.1	30		NI_L
Americium 241	14596-10-2	72.0	14	0.30	1.0		AM
Total Strontium	SR-RAD	1980	4.7	0.17	1.0	B	SR
Potassium 40	13966-00-2	U		11		U	GAM
Barium 133	13981-41-4	U		3.0		UX	GAM
Cobalt 60	10198-40-0	596	3.3	<u>1.8</u>	0.050		GAM
Cesium 137	10045-97-3	5140	7.0	<u>2.6</u>	0.10		GAM
Europium 152	14683-23-9	2810	10	<u>9.7</u>	0.10		GAM
Europium 154	15585-10-1	518	7.1	<u>6.2</u>	0.10		GAM
Europium 155	14391-16-3	21.5	4.3	<u>6.3</u>	0.10		GAM
Radium 226	13982-63-3	U		<u>4.7</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>9.9</u>	0.20	U	GAM
Thorium 228	14274-82-9	U		3.3		U	GAM
Thorium 232	TH-232	U		9.9		U	GAM
Americium 241	14596-10-2	119	5.5	7.5			GAM
Uranium 238	U-238	U		340		U	GAM
Uranium 235	15117-96-1	U		7.0		U	GAM

105-DR FSB-Concrete

DATA SHEETS

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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 H0475

METHOD SUMMARY
 AMERICIUM 241 IN SOIL
 ALPHA SPECTROSCOPY

Test AM Matrix SOLID
 SDG 7166
 Contact L.A. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Americium 241
Preparation batch 6893-036				
BOWOX9	N907145-01	7166-001		54.7
BOWOY0	N907145-02	7166-002		72.0
BLK (QC ID=31424)	N907145-04	7166-004		U
LCS (QC ID=31423)	N907145-03	7166-003		ok
Duplicate (N907145-01)	N907145-05	7166-005		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 PAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6893-036 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.036															
BOWOX9	N907145-01			0.34	0.500			81		864			18	08/06/99	08/06 SS-038
BOWOY0	N907145-02			0.30	0.500			89		699			22	08/06/99	08/10 SS-047
BLK (QC ID=31424)	N907145-04			0.030	0.500			82		766				08/06/99	08/07 SS-001
LCS (QC ID=31423)	N907145-03			0.034	0.500			86		884				08/06/99	08/12 SS-052
Duplicate (N907145-01)	N907145-05			0.050	0.500			67		884			24	08/06/99	08/12 SS-053
(QC ID=31425)															
Nominal values and limits from method															
				1.0	0.500			20-105		700	100		180		

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

AVERAGES ± 2 SD	MDA	0.15 ± 0.31
FOR 5 SAMPLES	YIELD	81 ± 17

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

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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 H0475

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Test PU Matrix SOLID
SDG 7166
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0475

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Plutonium 238	Plutonium 239/240
Preparation batch 6893-036					
B0W0X9	N907145-01		7166-001	5.77	358
B0W0Y0	N907145-02		7166-002	6.63	240
BLK (QC ID=31424)	N907145-04		7166-004	U	0.089 J
LCS (QC ID=31423)	N907145-03		7166-003	ok	ok
Duplicate (N907145-01)	N907145-05		7166-005	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- YZED	DETECTOR
Preparation batch 6893-036 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.036															
B0W0X9	N907145-01			0.050	0.500			77		1078			21	08/04/99	08/09 SS-052
B0W0Y0	N907145-02			0.063	0.500			98		668			23	08/04/99	08/11 SS-032
BLK (QC ID=31424)	N907145-04			0.064	0.500			74		620				08/04/99	08/04 SS-009
LCS (QC ID=31423)	N907145-03			0.054	0.500			75		520				08/04/99	08/04 SS-055
Duplicate (N907145-01)	N907145-05			0.029	0.500			96		1084			21	08/04/99	08/09 SS-053
	(QC ID=31425)														

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 0.052 ± 0.028
FOR 5 SAMPLES	YIELD 84 ± 24

METHOD SUMMARIES

Page 2

SUMMARY DATA SECTION

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

SAMPLE DELIVERY GROUP H0475

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test U Matrix SOLID

SDG 7166

Contact L.A. Johnson

Client Hanford

Contract TRB-SBB-207925

Case no SDG-H0475

RESULTS

CLIENT SAMPLE ID	LAB	RAW	SUF-	1: Uranium			2: Uranium			3: Uranium			RESULT RATIOS (%)			
	SAMPLE ID	TEST	FIX	PLANCHET	233/234	235	238	233/234	235	238	1+3	2σ	2+3	2σ		
Preparation batch 6893-036																
BOWOX9	N907145-01			7166-001	3.10	0.321 J	3.19				97	15	10	3		
BOWOY0	N907145-02			7166-002	1.37	U	1.21				113	26	5	4		
BLK (QC ID=31424)	N907145-04			7166-004	U	U	U									
LCS (QC ID=31423)	N907145-03			7166-003	LOW	ok	ok									
Duplicate (N907145-01)	N907145-05			7166-005	ok	ok	J	ok			115	21	10	4		
Nominal values and limits from method				RDLs (pCi/g)	1.0	1.0	1.0				100			4		
105-DR FSB-Concrete											Averages 108			8		

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB	RAW	SUF-	MAX MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
	SAMPLE ID	TEST	FIX	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 6893-036 2σ prep error 5.0 % Reference Lab Notebook 6893 pg.036																
BOWOX9	N907145-01			0.080	1.00			102		217			16	08/03/99	08/04	SS-031
BOWOY0	N907145-02			0.065	1.00			102		160			15	08/03/99	08/03	SS-032
BLK (QC ID=31424)	N907145-04			0.088	1.00			75		160				08/03/99	08/03	SS-034
LCS (QC ID=31423)	N907145-03			0.23	1.00			104		160				08/03/99	08/03	SS-033
Duplicate (N907145-01)	N907145-05			0.093	1.00			99		160			15	08/03/99	08/03	SS-035
(QC ID=31425)																
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 ± 0.13
FOR 5 SAMPLES	YIELD	96 ± 24

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 10/07/99

TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0475

Test SR Matrix SOLID
 SDG 7166
 Contact L.A. Johnson

METHOD SUMMARY
 TOTAL STRONTIUM IN SOIL
 BETA COUNTING

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Total Strontium
Preparation batch 6893-036				
BOWOX9	N907145-01		7166-001	4500
BOWOY0	N907145-02		7166-002	1980
BLK (QC ID=31424)	N907145-04		7166-004	<u>0.248</u> J
LCS (QC ID=31423)	N907145-03		7166-003	ok
Duplicate (N907145-01)	N907145-05		7166-005	<u>OUT</u>

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 %	BFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 6893-036 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.036															
BOWOX9	N907145-01		0.27	1.00			56	400			15	08/03/99	08/03	GRB-217	
BOWOY0	N907145-02		0.17	1.00			91	400			15	08/03/99	08/03	GRB-218	
BLK (QC ID=31424)	N907145-04		0.18	1.00			82	400				08/03/99	08/03	GRB-220	
LCS (QC ID=31423)	N907145-03		0.89	1.00			31	200				08/03/99	08/03	GRB-220	
Duplicate (N907145-01) (QC ID=31425)	N907145-05		<u>8.8</u>	1.00			88	400			15	08/03/99	08/03	GRB-229	

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	<u>2.1</u> ± <u>7.6</u>
FOR 5 SAMPLES	YIELD	<u>70</u> ± <u>51</u>

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 Protocol Hanford
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 Form DVD-CMS
 Version 3.06
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TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0475

Test TC Matrix SOLID
 SDG 7166
 Contact L.A. Johnson

METHOD SUMMARY
 TECHNETIUM 99 IN SOIL
 BETA COUNTING

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Technetium 99 PLANCHET
Preparation batch 6893-036				
BOWOX9	N907145-01	7166-001		1.37 J
BOWOY0	N907145-02	7166-002		U
BLK (QC ID=31424)	N907145-04	7166-004		U
LCS (QC ID=31423)	N907145-03	7166-003		ok
Duplicate (N907145-01)	N907145-05	7166-005		<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 %	FWHM min keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 6893-036 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.036														
BOWOX9	N907145-01			0.88	1.00			40	101			25	08/10/99	08/13 GRB-217
BOWOY0	N907145-02			0.66	1.03			51	101			25	08/10/99	08/13 GRB-218
BLK (QC ID=31424)	N907145-04			0.70	1.02			48	101				08/10/99	08/16 GRB-218
LCS (QC ID=31423)	N907145-03			0.66	1.02			52	101				08/10/99	08/13 GRB-219
Duplicate (N907145-01)	N907145-05			0.84	1.00			42	101			28	08/10/99	08/16 GRB-219
	(QC ID=31425)													

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 <u>0.75</u> ± <u>0.21</u>
FOR 5 SAMPLES	YIELD <u>47</u> ± <u>11</u>

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

Test GAM Matrix SOLID
 SDG 7166
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METHOD SUMMARY
 GAMMA SCAN
 GAMMA SPECTROSCOPY

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6893-036						
BOWOX9	N907145-01	7166-001		323		5070
BOWOY0	N907145-02	7166-002		596		5140
BLK (QC ID=31424)	N907145-04	7166-004		U		U
LCS (QC ID=31423)	N907145-03	7166-003		ok		ok
Duplicate (N907145-01)	N907145-05	7166-005		ok		ok
Nominal values and limits from method						
105-DR FSB-Concrete				RDLs (pCi/g)	0.050	0.10

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR	
Preparation batch 6893-036 2σ prep error 15.0 % Reference Lab Notebook 6893 pg.036																	
BOWOX9	N907145-01	6.2		52.4						417			18	07/27/99	08/06	PD,01,00	
BOWOY0	N907145-02	9.5		51.9						409			18	07/27/99	08/06	PD,03,00	
BLK (QC ID=31424)	N907145-04	0.11		52.2						777				07/27/99	08/06	PD,03,00	
LCS (QC ID=31423)	N907145-03	0.099		52.2						778				07/27/99	08/06	PD,01,00	
Duplicate (N907145-01)	N907145-05	6.1		52.4						402			19	07/27/99	08/07	PD,01,00	
(QC ID=31425)																	
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>4.4</u> ± <u>8.3</u>
FOR 5 SAMPLES	YIELD _____ ± _____

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 Protocol Hanford
 Version Ver 1.0
 Form DVD-CMS
 Version 3.06
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TMA/RICHMOND
 SAMPLE DELIVERY GROUP H0475

Test C Matrix SOLID
 SDG 7166
 Contact L.A. Johnson

METHOD SUMMARY
 CARBON 14 IN SOIL
 LIQUID SCINTILLATION COUNTING

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Carbon 14
Preparation batch 6893-036					
BOWOX9	N907145-01	A1		7166-001	540
BOWOY0	N907145-02	A1		7166-002	961
BLK (QC ID=31578)	N907145-07			7166-007	U
LCS (QC ID=31577)	N907145-06			7166-006	ok
Duplicate (N907145-01)	N907145-08			7166-008	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	ANAL- YZED	DETECTOR
Preparation batch 6893-036 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.036															
BOWOX9	N907145-01	A1		4.4	0.209			100	100				28	08/14/99	08/16 LSC-007
BOWOY0	N907145-02	A1		5.0	0.210			100	100				28	08/15/99	08/16 LSC-007
BLK (QC ID=31578)	N907145-07			4.5	0.210			100	100					08/14/99	08/16 LSC-007
LCS (QC ID=31577)	N907145-06			13	0.210			100	12					08/14/99	08/16 LSC-007
Duplicate (N907145-01) (QC ID=31579)	N907145-08			4.5	0.217			100	100				28	08/14/99	08/16 LSC-007

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 6.3 ± 7.5
 FOR 5 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0475

METHOD SUMMARY

TRITIUM IN SOIL

LIQUID SCINTILLATION COUNTING

Test H Matrix SOLID
 SDG 7166
 Contact L.A. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
Preparation batch 6893-036				
BOWOX9	N907145-01	7166-001		6.23 J
BOWOY0	N907145-02	7166-002		8.09 J
BLK (QC ID=31424)	N907145-04	7166-004		U
LCS (QC ID=31423)	N907145-03	7166-003		ok J
Duplicate (N907145-01)	N907145-05	7166-005		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	SUF- 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 6893-036 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.036															
BOWOX9	N907145-01		0.087	20.0				100		120		17	08/03/99	08/05	LSC-005
BOWOY0	N907145-02		0.085	20.4				100		120		17	08/03/99	08/05	LSC-005
BLK (QC ID=31424)	N907145-04		0.086	20.2				100		120			08/03/99	08/05	LSC-005
LCS (QC ID=31423)	N907145-03		0.086	20.2				100		120			08/03/99	08/05	LSC-005
Duplicate (N907145-01)	N907145-05		0.085	20.1				100		120		17	08/03/99	08/05	LSC-005
(QC ID=31425)															

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 0.086 ± 0.002
 FOR 5 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0475

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG-H0475

Test NI L Matrix SOLID
 SDG 7166
 Contact L.A. Johnson

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 6893-036					
BOWOX9	N907145-01			7166-001	5360
BOWOY0	N907145-02			7166-002	11900
BLK (QC ID=31424)	N907145-04			7166-004	U
LCS (QC ID=31423)	N907145-03			7166-003	ok
Duplicate (N907145-01)	N907145-05			7166-005	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 6893-036 2σ prep error 10.0 % Reference Lab Notebook 6893 pg.036																	
BOWOX9	N907145-01			5.3	0.500			87		16			14	07/30/99	08/02	LSC-005	
BOWOY0	N907145-02			8.1	0.500			88		7			14	07/30/99	08/02	LSC-005	
BLK (QC ID=31424)	N907145-04			4.1	0.500			45		100				07/30/99	08/02	LSC-005	
LCS (QC ID=31423)	N907145-03			2.8	0.500			65		100				07/30/99	08/02	LSC-005	
Duplicate (N907145-01)	N907145-05			5.4	0.500			82		17			14	07/30/99	08/02	LSC-005	
(QC ID=31425)																	
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	5.1	±	3.9
FOR 5 SAMPLES	YIELD	73	±	37

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SAMPLE DELIVERY GROUP H0475

SDG 7166
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRE-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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SDG 7166
Contact L.A. Johnson

REPORT GUIDE

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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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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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GUIDE, cont.

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Case no SDG-H0475

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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Contract TRB-SBB-207925
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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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REPORT GUIDE

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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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Client Hanford
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REPORT GUIDE

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

SDG 7166
Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0475

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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GUIDE, cont.

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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SUMMARY DATA SECTION

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GUIDE, cont.

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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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Collector Fahlberg/Porter	Company Contact J Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ	Price Code 9K	Data Turnaround 15 Days
Project Designation 105-DR FSB - Concrete	Sampling Location 105-DR	SAF No. B99-076			
Ice Chest No. ERC 99-005	Field Logbook No. EL 1281	Method of Shipment Fed Ex			
Shipped To TMA/RECRA RS 7-19-99	Offsite Property No.	Bill of Lading/Air Bill No.			
			COA R105D4 2870		

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	None							
	Type of Container	aG	aG	aG							
	No. of Container(s)	1	1	1							
	Special Handling and/or Storage	Volume	60mL	60mL	120mL						

SAMPLE ANALYSIS		PCBs - 8080	ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV)	See item (1) in Special Instructions.							
-----------------	--	-------------	---	---------------------------------------	--	--	--	--	--	--	--

Sample No.	Matrix *	Sample Date	Sample Time								
✓ BOW0X9	Other Solid	7-19-99	1015								
✓ BOW0Y0	Other Solid	7-19-99	1045								
BOW0Y1	Other Solid										
BOW0Y2	Other Solid										
BOW0Y3	Other Solid										

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By	Date/Time	Received By	Date/Time
<i>R. Fahlberg</i>	7-19-99 1700	<i>R. Fahlberg</i>	7-19-99 1700
Relinquished By	Date/Time	Received By	Date/Time
<i>R. Fahlberg</i>	7-22-99 0800	<i>R. Fahlberg</i>	7-22-99 0800
Relinquished By	Date/Time	Received By	Date/Time
<i>R. Fahlberg</i>	7-23-99 10:00	<i>Fed Ex</i>	7-23-99 10:00

SPECIAL INSTRUCTIONS
(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

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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/D
 Company Bechtel Hanford, Inc
 Address 3728 Building 300-Area
 City, State, Zip Richland, WA 99352
 Contact David St. John
 Phone 509-372-9588

RADIOACTIVE SHIPMENT RECORD **106602**
 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 Rotech
 Address 2030 Wright Avenue
 City, State, Zip Richmond, CA 94804-0040
 Attention Orlette Johnson, Larry
 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
 Labels Applied 10:
 Empty
 Radioactive White - I
 Radioactive Yellow - II
 Radioactive Yellow - III
 Subsidiary Hazard
 For Normal Form only Identify 7.
 Physical Form: Liquid Gas
 Solid Ground Concrete
 Chemical Form: 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 1-888-766-0771
 Emergency Response Guide(s) 161
 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 N/A Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels. TBq

11.	No. Pkg.	Model/Package	COC/Spec	Serial No.	Seal No.	Isotopes	Tl	Bq/Package	Gr/Wt: Kg
	1	only color strongtight	ERC-99-005	Tag	2s-137, Sr-90	N/A	1.8x10 ⁶	4.5kg	
sample containers wrapped in bubble wrap and double bagged packed in cushioning material. Total this shipment 5-120ml vials, 900gms total (Shipper may describe package in detail on one of the unused lines above) TOTALS <u>N/A</u> <u>1.8x10⁶</u> <u>4.5kg</u>									

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 7/22/99 Organization ERC-AFS Complete Cost Code (Inc. End Function) R105D4 2870

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 /cm²
 <0.04 Bq (2.2 dpm) α /cm²
 <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) or sleeper (Using N+ß+Y)
 Signature - Radiation Monitoring [Signature] Bldg. 3728 Survey No. FF/2 99-1122 Date 7-22-99

14. TRANSPORTER
 Vehicle Number 63-25371 DRIVER SIGNATURE [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 7-22-99

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) _____

17. OFFSITE AUTHORIZATION
 Tracking No. KMBH-70014 Date Shipped 7-22-99 Routing FEDEX ETA 7-23-99
 Surveyed By [Signature] Date 7/22/99 Approved for Shipment Offsite [Signature] Date 7-22-99

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT			
Client: <u>Beechtel Hanford Inc</u>	Date/Time received <u>7-23-99 10:00</u>		
CoC No. <u>B99-076-01 (2p)</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>42</u>		
7. Number of containers per sample:	<u>1</u>	(Or see CoC <input checked="" type="checkbox"/>)	
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 [<input checked="" type="checkbox"/>]			
11. Describe any anomalies:	<u>On CoC B99-076-01</u> <u>Samples ID BOW0X9 and BOW0Y0 60 mL</u> <u>Volume we have not received</u> <u>We received sample's ID BOW0Y3 - 120 mL,</u> <u>BOW0Y2 - 120 mL, BOW0Y1 - 120 mL that</u> <u>have not include in CoC</u>		
13. Was P.M. notified of any anomalies?	Yes [<input checked="" type="checkbox"/>]	No []	Date <u>7-23-99</u>
14. Received by <u>M. Goldenberg</u>	Date: <u>7-23-99</u>	Time: <u>10:00</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 _____		