RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
B09340-TMA-623 (923-E418, Filename B09340.RAD)

9417227.302

MEMORANDUM

MAR 1994
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TO: 200-UP-2 Project QA Record March 29, 1994

FR: Susan Winter, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09340-TMA-623 (923-E418, Filename B09340.RAD)

9413225.1323

INTRODUCTION

This memo presents the results of data validation on data package B09340-TMA-623 prepared by the Thermo Analytical (TMA) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09337	09/15/93	SOIL	SEE NOTE 1
B09339	09/13/93	SOIL	
B09340	09/15/93	SOIL	
B09341	09/13/93	SOIL	
B09344	09/15/93	SOIL	
B09345	09/16/93	SOIL	
B09346	09/16/93	SOIL	
B09349	09/16/93	SOIL	
B09350	09/17/93	SOIL	
B09351	09/17/93	SOIL	
B09352	09/17/93	SOIL	
B09353	09/17/93	SOIL	
B09354	09/17/93	SOIL	

Note 1. All samples were analyzed for gross alpha, gross beta, selenium-79, strontium-90, technetium-99,iodine-129, isotopic uranium, total uranium, neptunium-237, plutonium-238, plutonium-239/140, americium-241, curium-244, and gamma spectroscopy.

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Data validation was conducted in accordance with the WHC statement of work (WHC 1993a) and validation procedures (WHC 1993b). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met with the exception of the deficiencies identified below.

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Sample Result Verification. All sample results were supported in the raw data.

Detection Limits. Detection limit goals were met for all sample results as specified in the reference analytical method with the exception of the following:

ANALYTE	SAMPLE	MDA (pCi/g)	RDL (pCi/g)
TECHNETIUM-99	B09337	0.9	0.5
TECHNETIUM-99	B09339 B09349	1	0.5
TECHNETIUM-99	B09353	0.7	0.5
IODINE-129	B09344	3	2
NEPTUNIUM-237	B09346	0.9	0.2
IRON-59	B09337	0.09	0.05
IRON-59	B09339 B09340 B09341 B09345 B09349 B09351 B09352 B09354	0.1	0.05
IRON-59	B09344 B09346	0.2	0.05
IRON-59	B09350	0.06	0.05
COBALT-58	B09344	0.06	0.05
COBALT-60	B09354	0.06	0.05
AMERICIUM-241	B09341	0.07	0.05
CURIUM-244	B09341	0.07	0.05

Completeness. The data package was complete for all requested analyses. A total of thirteen samples were validated in this data package with a total of 455 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data.

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Laboratory Blanks

- Technetium-99 was detected in the associated laboratory blank. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

Chemical and Tracer Yield

- Technetium-99 chemical yield for samples B09337, B09339, B09341, B09349, and B09353 were unacceptable. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

- Neptunium-237 yield for samples B09344, B09346, B09349, B09350, B09351, laboratory control sample, and the blank were unacceptable. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

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REFERENCES

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

WHC 1993b, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 1, 1993. Westinghouse Hanford Company, Richland, Washington.

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

U - Indicates the constituent was analyzed for, but was not detected at a concentration above the minimum detectable activity (MDA). The concentration reported is the MDA corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and was not detected at a concentration above the MDA. Due to a quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample MDA. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as estimated due to a quality control deficiency identified during data validation. The associated data should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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DATA QUALIFICATION SUMMARY

SDG: B09340-TMA-623	VALIDATOR:	DATE: March 28, 1994	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
TECHNETIUM-99	J	B09339 B09340 B09341 B09345 B09346 B09349 B09350 B09351 B09353 B09354 B09337 DUP	PRESENT IN BLANK
TECHNETIUM-99	J - DETECTS UJ - NONDETECTS	B09337 B09339 B09341 B09349 B09353	CHEMICAL YIELD %R < 30% BUT > 10%
NEPTUNIUM-237	J - DETECTS UJ - NONDETECTS	B09344 B09346 B09349 B09350 LCS (7247-017) BLANK (7247-018)	TRACER YIELD %R < 20% BUT > 5%

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: B09340-TMA-623

	Sample#	B09346		B09349		B09350		B09351		B09352		B09353	
	Date	9-16-93		9-16-93		9-17-93		9-17-93		9-17-93		9-17-93	
	Location	299-W19-97		299-W19-95		299-W19-97		299-W19-97		299-W19-97		299-W19-97	
	Depth	130.00 - 132.50		165.00 - 167.50		---		146.00 - 148.50		146.00 - 148.50		---	
	Type	---		---		EQTBLK		---		DUPLICATE		FLDBLK	
	Comments	---		---		---		---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	pCi/g	7.000		6.000	U	5.500		5.000	U	8.500		4.000	U
GROSS BETA	pCi/g	17.000		3200.000		47.000		21.000		20.000		6.000	U
SELENIUM-79	pCi/g	2.000	U	2.000	U	2.000	U	5.500		3.000	U	3.000	U
STRONTIUM-90	pCi/g	0.700	U	0.800	U	0.700	U	0.700	U	0.900	U	0.700	U
TECHNETIUM-99	pCi/g	3.100	J	3.400	J	0.400	J	2.300	J	0.300	U	0.770	J
IODINE-129	pCi/g	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U
URANIUM-233/234	pCi/g	0.600		2.400		0.200	U	0.440		0.500		0.200	U
URANIUM-235	pCi/g	0.100	U	0.100	U	0.200	U	0.200	U	0.100	U	0.200	U
URANIUM-238	pCi/g	0.650		2.200		0.100	U	0.620		0.460		0.200	U
TOTAL URANIUM	UG/G	1.200		5.600		0.170		1.300		1.300		0.180	
NEPTUNIUM-237	pCi/g	0.900	UJ	0.057	J	0.050	UJ	0.060	U	0.070	U	0.100	U
PLUTONIUM-238	pCi/g	0.020	U	0.020	U	0.030	U	0.020	U	0.020	U	0.020	U
PLUTONIUM-239/240	pCi/g	0.020	U	0.020	U	0.030	U	0.020	U	0.020	U	0.020	U
AMERICIUM-241	pCi/g	0.020	U	0.020	U	0.010	U	0.020	U	0.020	U	0.020	U
CURIUM-244	pCi/g	0.010	U	0.020	U	0.020	U	0.030	U	0.010	U	0.020	U
SODIUM-22	pCi/g	0.060	U	0.050	U	0.020	U	0.050	U	0.050	U	0.020	U
POTASSIUM-40	pCi/g	15.000		7.100		0.480		15.000		15.000		0.390	
MANGANESE-54	pCi/g	0.050	U	0.040	U	0.020	U	0.050	U	0.040	U	0.020	U
IRON-59	pCi/g	0.200	U	0.100	U	0.060	U	0.100	U	0.100	U	0.040	U
COBALT-58	pCi/g	0.050	U	0.050	U	0.020	U	0.050	U	0.050	U	0.020	U
COBALT-60	pCi/g	0.050	U	0.050	U	0.020	U	0.050	U	0.040	U	0.020	U
NIOBIUM-94	pCi/g	0.040	U	0.040	U	0.020	U	0.040	U	0.040	U	0.010	U
RUTHENIUM-103	pCi/g	0.060	U	0.060	U	0.030	U	0.050	U	0.050	U	0.030	U
RUTHENIUM-106	pCi/g	0.400	U	0.400	U	0.200	U	0.400	U	0.300	U	0.200	U
TIN-113	pCi/g	0.050	U	0.060	U	0.030	U	0.050	U	0.050	U	0.030	U
CESIUM-134	pCi/g	0.070	U	0.080	U	0.020	U	0.100	U	0.060	U	0.030	U
CESIUM-137	pCi/g	0.050	U	0.050	U	0.020	U	0.040	U	0.040	U	0.020	U
CERIUM-144	pCi/g	0.200	U	0.300	U	0.100	U	0.200	U	0.200	U	0.090	U
EUROPIUM-152	pCi/g	0.100	U	0.100	U	0.040	U	0.090	U	0.080	U	0.040	U
EUROPIUM-154	pCi/g	0.070	U	0.060	U	0.030	U	0.060	U	0.060	U	0.030	U
EUROPIUM-155	pCi/g	0.100	U	0.100	U	0.060	U	0.100	U	0.100	U	0.050	U
RADIUM-226	pCi/g	0.580		0.470		0.063		0.460		0.530		0.099	
RADIUM-228	pCi/g	0.970		0.660		0.088		0.970		0.780		0.130	
THORIUM-228	pCi/g	0.900		0.680		0.130		0.750		0.760		0.150	
THORIUM-232	pCi/g	0.970		0.660		0.088		0.970		0.780		0.130	

Verified
3/29/94

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Validated Data Summary, Data Package: B09340-TMA-623

	Samp#	B09337		B09339		B09340		B09341		B09344		B09345	
	Date	9-15-93		9-13-93		9-15-93		9-13-93		9-15-93		9-16-93	
	Location	299-W19-95		299-W19-97		299-W19-95		299-W19-97		299-W19-95		299-W19-95	
	Depth	90.25 - 92.25		70.00 - 72.50		105.00 - 107.50		101.00 - 103.30		120.00 - 122.50		140.00 - 142.50	
	Type	---		---		---		---		---		---	
	Comments	---		---		---		---		---		---	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	pCi/g	9.000		7.800		5.000	U	8.200		6.100		4.600	
GROSS BETA	pCi/g	15.000		18.000		1500.000		19.000		17.000		17.000	
SELENIUM-79	pCi/g	3.000	U	3.000	U	2.000	U	3.000	U	3.000	U	3.000	U
STRONTIUM-90	pCi/g	0.500	U	0.600	U	0.700	U	0.700	U	0.700	U	0.700	U
TECHNETIUM-99	pCi/g	0.900	UJ	5.700	J	2.300	J	3.200	J	0.300	U	1.800	J
IODINE-129	pCi/g	2.000	U	2.000	U	2.000	U	2.000	U	3.000	U	2.000	U
URANIUM-233/234	pCi/g	0.580		0.410		0.610		0.320		0.650		0.660	
URANIUM-235	pCi/g	0.100	U	0.200	U	0.100	U	0.200	U	0.100	U	0.100	U
URANIUM-238	pCi/g	0.360		0.620		0.580		0.420		0.570		0.670	
TOTAL URANIUM	UG/G	1.200		1.100		1.300		1.200		1.500		1.800	
NEPTUNIUM-237	pCi/g	0.030	U	0.030	U	0.020	U	0.031		0.020	UJ	0.008	U
PLUTONIUM-238	pCi/g	0.050	U	0.030	U	0.020	U	0.030	U	0.020	U	0.020	U
PLUTONIUM-239/240	pCi/g	0.020	U	0.020	U	0.020	U	0.030	U	0.020	U	0.020	U
AMERICIUM-241	pCi/g	0.040	U	0.040	U	0.050	U	0.070	U	0.020	U	0.030	U
CURIUM-244	pCi/g	0.040	U	0.030	U	0.050	U	0.070	U	0.020	U	0.030	U
SODIUM-22	pCi/g	0.030	U	0.040	U	0.040	U	0.050	U	0.060	U	0.050	U
POTASSIUM-40	pCi/g	11.000		14.000		17.000		15.000		15.000		16.000	
MANGANESE-54	pCi/g	0.030	U	0.030	U	0.030	U	0.040	U	0.050	U	0.050	U
IRON-59	pCi/g	0.090	U	0.100	U	0.100	U	0.100	U	0.200	U	0.100	U
COBALT-58	pCi/g	0.030	U	0.040	U	0.040	U	0.050	U	0.060	U	0.050	U
COBALT-60	pCi/g	0.030	U	0.030	U	0.030	U	0.050	U	0.050	U	0.050	U
NIOBIUM-94	pCi/g	0.020	U	0.030	U	0.030	U	0.040	U	0.050	U	0.040	U
RUTHENIUM-103	pCi/g	0.030	U	0.040	U	0.040	U	0.060	U	0.060	U	0.060	U
RUTHENIUM-106	pCi/g	0.200	U	0.300	U	0.300	U	0.400	U	0.400	U	0.400	U
TIN-113	pCi/g	0.030	U	0.040	U	0.040	U	0.060	U	0.070	U	0.050	U
CESIUM-134	pCi/g	0.030	U	0.040	U	0.040	U	0.050	U	0.060	U	0.060	U
CESIUM-137	pCi/g	0.030	U	0.030	U	0.030	U	0.040	U	0.050	U	0.050	U
CERIUM-144	pCi/g	0.200	U	0.200	U	0.200	U	0.300	U	0.300	U	0.200	U
EUROPIUM-152	pCi/g	0.060	U	0.060	U	0.070	U	0.100	U	0.100	U	0.100	U
EUROPIUM-154	pCi/g	0.040	U	0.040	U	0.050	U	0.070	U	0.070	U	0.060	U
EUROPIUM-155	pCi/g	0.090	U	0.080	U	0.090	U	0.200	U	0.100	U	0.100	U
RADIUM-226	pCi/g	0.440		0.450		0.420		0.480		0.680		0.530	
RADIUM-228	pCi/g	0.510		0.680		0.870		0.680		1.000		0.760	
THORIUM-228	pCi/g	0.550		0.620		1.100		0.640		1.400		0.890	
THORIUM-232	pCi/g	0.510		0.680		0.870		0.680		1.000		0.760	

Verified
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Validated Data Summary, Data Package: B09340-TMA-623

	Samp#	B09354	
	Date	9-17-93	
	Location	299-W19-97	
	Depth	156.00 - 158.50	
	Type	---	
	Comments	---	
Parameter	Units	Result	Q
GROSS ALPHA	pCi/g	14.000	
GROSS BETA	pCi/g	18.000	
SELENIUM-79	pCi/g	3.000	U
STRONTIUM-90	pCi/g	0.800	U
TECHNETIUM-99	pCi/g	2.600	J
IODINE-129	pCi/g	2.000	U
URANIUM-233/234	pCi/g	0.600	
URANIUM-235	pCi/g	0.100	U
URANIUM-238	pCi/g	0.760	
TOTAL URANIUM	UG/G	2.000	
NEPTUNIUM-237	pCi/g	0.050	U
PLUTONIUM-238	pCi/g	0.020	U
PLUTONIUM-239/240	pCi/g	0.030	U
AMERICIUM-241	pCi/g	0.040	U
CURIUM-244	pCi/g	0.040	U
SODIUM-22	pCi/g	0.060	U
POTASSIUM-40	pCi/g	14.000	
MANGANESE-54	pCi/g	0.050	U
IRON-59	pCi/g	0.100	U
COBALT-58	pCi/g	0.050	U
COBALT-60	pCi/g	0.060	U
NIOBIUM-94	pCi/g	0.040	U
RUTHENIUM-103	pCi/g	0.060	U
RUTHENIUM-106	pCi/g	0.400	U
TIN-113	pCi/g	0.060	U
CESIUM-134	pCi/g	0.060	U
CESIUM-137	pCi/g	0.050	U
CERIUM-144	pCi/g	0.300	U
EUROPIUM-152	pCi/g	0.100	U
EUROPIUM-154	pCi/g	0.080	U
EUROPIUM-155	pCi/g	0.150	
RADIUM-226	pCi/g	0.770	
RADIUM-228	pCi/g	0.970	
THORIUM-228	pCi/g	1.100	
THORIUM-232	pCi/g	0.970	

Verified
[illegible] 3/29/94

299-W19-95

N309076-01

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

B09337

90.25-92.25'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-01	Client sample id	B09337
Dept sample id	7247-001	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/15/93
% moisture	3.7	Chain of custody id	EFL-1091

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ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	9.0	4.5	4	10	~~J~~	80A
Gross Beta	Beta	15	4.1	5	10		80B
Selenium 79	15758-45-9	0.87	1.8	3	10	U	SE
Strontium 90	10098-97-2	0	1.3	0.5	1	U	Y
Technetium 99	14133-76-7	0.12	0.32	0.9	0.5	~~U~~ UJ	TC
Iodine 129	15046-84-1	-0.21	0.77	2	2	U	I
Uranium 233/234		0.58	0.19	0.1	0.3		U
Uranium 235	15117-96-1	0.030	0.061	0.1	0.3	U	U
Uranium 238		0.36	0.13	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.2	0.20	0.03	0.1	~~*~~	U_T
Neptunium 237	13994-20-2	0.008	0.016	0.03	0.2	U	NP
Plutonium 238	13981-16-3	-0.013	0.019	0.05	0.05	U	PU
Plutonium 239/240		0.006	0.013	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.018	0.04	0.05	U	TP
Curium 244	13981-15-2	-0.002	0.018	0.04	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.03		U	GAM
Potassium 40	13966-00-2	11	0.65				GAM
Manganese 54	13966-31-9	U		0.03		U	GAM
Iron 59	14596-12-4	U		0.09	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.03	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.03	0.05	U	GAM
Niobium 94	14681-63-1	U		0.02		U	GAM
Ruthenium 103	13968-53-1	U		0.03		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Tin 113	13966-06-8	U		0.03		U	GAM
Cesium 134	13967-70-9	U		0.03		U	GAM
Cesium 137	10045-97-3	U		0.03	0.05	U	GAM

Verified
3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-95

N309076-01

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09337

90.25-92.25'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-01	Client sample id	B09337
Dept sample id	7247-001	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/15/93
% moisture	3.7	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.06	0.1	U	GAM
Europium 154	15585-10-1	U		0.04	0.1	U	GAM
Europium 155	14391-16-3	U		0.09	0.1	U	GAM
Radium 226	13982-63-3	0.44	0.058				GAM
Radium 228	15262-20-1	0.51	0.11				GAM
Thorium 228	14274-82-9	0.55	0.035				GAM
Thorium 232	7440-29-1	0.51	0.11				GAM

9413225.1335

Verified
3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

N309076-02

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

299-W19-97

B09339

70-72.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-02	Client sample id	B09339
Dept sample id	7247-002	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/13/93
% moisture	3.1	Chain of custody id	EFL-1091

9413225.1336

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	7.8	4.3	4	10	~~J~~	80A
Gross Beta	Beta	18	4.3	5	10		80B
Selenium 79	15758-45-9	-1.8	1.7	3	10	U	SE
Strontium 90	10098-97-2	0.13	0.18	0.6	1	U	Y
Technetium 99	14133-76-7	5.7	0.69	1	0.5	~~B~~ J	TC
Iodine 129	15046-84-1	0.17	0.79	2	2	U	I
Uranium 233/234		0.41	0.22	0.2	0.3		U
Uranium 235	15117-96-1	0	0.052	0.2	0.3	U	U
Uranium 238		0.62	0.23	0.2	0.3		U
Total Uranium (ug/g)	7440-61-1	1.1	0.20	0.03	0.1	~~*~~	U_T
Neptunium 237	13994-20-2	0.006	0.018	0.03	0.2	U	NP
Plutonium 238	13981-16-3	0.012	0.018	0.03	0.05	U	PU
Plutonium 239/240		0.003	0.012	0.02	0.05	U	PU
Americium 241	14596-10-2	0.006	0.022	0.04	0.05	U	TP
Curium 244	13981-15-2	-0.011	0.011	0.03	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.04		U	GAM
Potassium 40	13966-00-2	14	0.73				GAM
Manganese 54	13966-31-9	U		0.03		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.04	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.03	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		U	GAM
Ruthenium 103	13968-53-1	U		0.04		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.04		U	GAM
Cesium 134	13967-70-9	U		0.04		U	GAM
Cesium 137	10045-97-3	U		0.03	0.05	U	GAM

Verified
3/29/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-97

N309076-02

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09339

70-72.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-02	Client sample id	B09339
Dept sample id	7247-002	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/13/93
% moisture	3.1	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.06	0.1	U	GAM
Europium 154	15585-10-1	U		0.04	0.1	U	GAM
Europium 155	14391-16-3	U		0.08	0.1	U	GAM
Radium 226	13982-63-3	0.45	0.061				GAM
Radium 228	15262-20-1	0.68	0.13				GAM
Thorium 228	14274-82-9	0.62	0.038				GAM
Thorium 232	7440-29-1	0.68	0.13				GAM

9413225.1337

Verified
3/22/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

N309076-03

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

299-W19-95

B09340

105-107.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-03	Client sample id	B09340
Dept sample id	7247-003	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/15/93
% moisture	3.7	Chain of custody id	EFL-1091

9413225.1338

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	-21	4.3	5	10	U	80A
Gross Beta	Beta	1500	25	5	10		80B
Selenium 79	15758-45-9	0.58	1.5	2	10	U	SE
Strontium 90	10098-97-2	-0.35	0.79	0.7	1	U	Y
Technetium 99	14133-76-7	2.3	0.24	0.4	0.5	~~B~~ S	TC
Iodine 129	15046-84-1	-0.29	0.88	2	2	U	I
Uranium 233/234		0.61	0.22	0.1	0.3		U
Uranium 235	15117-96-1	0.053	0.071	0.1	0.3	U	U
Uranium 238		0.58	0.19	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.3	0.22	0.03	0.1	*	U_T
Neptunium 237	13994-20-2	0.008	0.011	0.02	0.2	U	NP
Plutonium 238	13981-16-3	0	0.004	0.02	0.05	U	PU
Plutonium 239/240		-0.004	0.004	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.003	0.025	0.05	0.05	U	TP
Curium 244	13981-15-2	-0.010	0.021	0.05	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.04		U	GAM
Potassium 40	13966-00-2	17	0.76				GAM
Manganese 54	13966-31-9	U		0.03		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.04	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.03	0.05	U	GAM
Niobium 94	14681-63-1	U		0.03		U	GAM
Ruthenium 103	13968-53-1	U		0.04		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.04		U	GAM
Cesium 134	13967-70-9	U		0.04		U	GAM
Cesium 137	10045-97-3	U		0.03	0.05	U	GAM

Verified

7/22/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-95

N309076-03

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09340

105-107.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-03	Client sample id	B09340
Dept sample id	7247-003	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/15/93
% moisture	3.7	Chain of custody id	EFL-1091

9413225.1339

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.07	0.1	U	GAM
Europium 154	15585-10-1	U		0.05	0.1	U	GAM
Europium 155	14391-16-3	U		0.09	0.1	U	GAM
Radium 226	13982-63-3	0.42	0.059				GAM
Radium 228	15262-20-1	0.87	0.14				GAM
Thorium 228	14274-82-9	1.1	0.071				GAM
Thorium 232	7440-29-1	0.87	0.14				GAM

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

N309076-04

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

299-W19-97

B09341

101-103.3'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-04	Client sample id	B09341
Dept sample id	7247-004	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/13/93
% moisture	6.3	Chain of custody id	EFL-1091

9413225.1340

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	8.2	4.0	4	10	~~J~~	80A
Gross Beta	Beta	19	4.3	5	10		80B
Selenium 79	15758-45-9	1.8	1.7	3	10	U	SE
Strontium 90	10098-97-2	-0.24	1.6	0.7	1	U	Y
Technetium 99	14133-76-7	3.2	0.48	0.2	0.5	~~B~~ J	TC
Iodine 129	15046-84-1	-0.17	0.72	2	2	U	I
Uranium 233/234		0.32	0.16	0.2	0.3		U
Uranium 235	15117-96-1	-0.024	0.048	0.2	0.3	U	U
Uranium 238		0.42	0.21	0.2	0.3		U
Total Uranium (ug/g)	7440-61-1	1.2	0.20	0.03	0.1	~~*~~	U_T
Neptunium 237	13994-20-2	0.031	0.026	0.03	0.2	~~J~~	NP
Plutonium 238	13981-16-3	0.008	0.017	0.03	0.05	U	PU
Plutonium 239/240		-0.003	0.017	0.03	0.05	U	PU
Americium 241	14596-10-2	0	0.017	0.07	0.05	U	TP
Curium 244	13981-15-2	0	0.018	0.07	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	15	1.0				GAM
Manganese 54	13966-31-9	U		0.04		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.06		U	GAM
Cesium 134	13967-70-9	U		0.05		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-97

N309076-04

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09341

101-103.3'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-04	Client sample id	B09341
Dept sample id	7247-004	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/13/93
% moisture	6.3	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.3		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Europium 155	14391-16-3	U		0.2	0.1	U	GAM
Radium 226	13982-63-3	0.48	0.084				GAM
Radium 228	15262-20-1	0.68	0.19				GAM
Thorium 228	14274-82-9	0.64	0.053				GAM
Thorium 232	7440-29-1	0.68	0.19				GAM

9413225.1341

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

N309076-05

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

299-W19-95

B09344

120-122.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-05	Client sample id	B09344
Dept sample id	7247-005	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/15/93
% moisture	7.0	Chain of custody id	EFL-1091

9413225.1342

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	6.1	3.9	4	10	~~J~~	80A
Gross Beta	Beta	17	4.2	5	10		80B
Selenium 79	15758-45-9	0.089	1.5	3	10	U	SE
Strontium 90	10098-97-2	-0.10	0.59	0.7	1	U	Y
Technetium 99	14133-76-7	0.25	0.29	0.3	0.5	U	TC
Iodine 129	15046-84-1	-0.73	1.1	3	2	U	I
Uranium 233/234		0.65	0.24	0.2	0.3		U
Uranium 235	15117-96-1	0.039	0.039	0.1	0.3	U	U
Uranium 238		0.57	0.20	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.5	0.27	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0.013	0.013	0.02	0.2	~~U~~ U	NP
Plutonium 238	13981-16-3	0.009	0.012	0.02	0.05	U	PU
Plutonium 239/240		0.009	0.012	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.008	0.02	0.05	U	TP
Curium 244	13981-15-2	0	0.008	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.06		U	GAM
Potassium 40	13966-00-2	15	1.0				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.2	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.06	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Niobium 94	14681-63-1	U		0.05		U	GAM
Ruthenium 103	13968-53-1	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.07		U	GAM
Cesium 134	13967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

Verified

3/22/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-95

N309076-05

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09344

120-122.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-05	Client sample id	B09344
Dept sample id	7247-005	Location/Matrix	200-UP-2 SOLID
Received	09/17/93	Collected	09/15/93
% moisture	7.0	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.3		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.68	0.11				GAM
Radium 228	15262-20-1	1.0	0.22				GAM
Thorium 228	14274-82-9	1.4	0.11				GAM
Thorium 232	7440-29-1	1.0	0.22				GAM

9413225.1343

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-95

N309076-06

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

B09345

140-142.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-06	Client sample id	B09345
Dept sample id	7247-006	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/16/93
% moisture	4.8	Chain of custody id	EFL-1091

9413225.1344

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	4.6	3.7	4	10	~~J~~	80A
Gross Beta	Beta	17	4.2	5	10		80B
Selenium 79	15758-45-9	1.1	1.7	3	10	U	SE
Strontium 90	10098-97-2	-0.39	1.9	0.7	1	U	Y
Technetium 99	14133-76-7	1.8	0.27	0.4	0.5	~~B~~ J	TC
Iodine 129	15046-84-1	-0.11	0.93	2	2	U	I
Uranium 233/234		0.66	0.22	0.1	0.3		U
Uranium 235	15117-96-1	0.072	0.073	0.1	0.3	U	U
Uranium 238		0.67	0.22	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.8	0.31	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0	0.005	0.008	0.2	U	NP
Plutonium 238	13981-16-3	0.005	0.009	0.02	0.05	U	PU
Plutonium 239/240		0.005	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	0.003	0.007	0.03	0.05	U	TP
Curium 244	13981-15-2	0.007	0.007	0.03	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	16	1.0				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.05		U	GAM
Cesium 134	13967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

Verified

3/23/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-95

N309076-06

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09345

140-142.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-06	Client sample id	B09345
Dept sample id	7247-006	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/16/93
% moisture	4.8	Chain of custody id	EFL-1091

9413225.1345

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.53	0.090				GAM
Radium 228	15262-20-1	0.76	0.17				GAM
Thorium 228	14274-82-9	0.89	0.059				GAM
Thorium 232	7440-29-1	0.76	0.17				GAM

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

N309076-07

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

299-W19-97

B09346

130-132.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-07	Client sample id	B09346
Dept sample id	7247-007	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/16/93
% moisture	7.0	Chain of custody id	EFL-1091

9413225.1346

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	7.0	4.1	4	10	~~J~~	80A
Gross Beta	Beta	17	4.3	5	10		80B
Selenium 79	15758-45-9	-1.7	1.1	2	10	U	SE
Strontium 90	10098-97-2	-0.34	1.8	0.7	1	U	Y
Technetium 99	14133-76-7	3.1	0.27	0.4	0.5	~~B~~ J	TC
Iodine 129	15046-84-1	0.16	0.75	2	2	U	I
Uranium 233/234		0.60	0.20	0.1	0.3		U
Uranium 235	15117-96-1	0.014	0.058	0.1	0.3	U	U
Uranium 238		0.65	0.18	0.09	0.3		U
Total Uranium (ug/g)	7440-61-1	1.2	0.21	0.03	0.1	~~*~~	U_T
Neptunium 237	13994-20-2	0.032	0.048	0.9	0.2	~~U~~ UJ	NP
Plutonium 238	13981-16-3	-0.004	0.008	0.02	0.05	U	PU
Plutonium 239/240		-0.006	0.008	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.002	0.008	0.02	0.05	U	TP
Curium 244	13981-15-2	0.006	0.008	0.01	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.06		U	GAM
Potassium 40	13966-00-2	15	1.1				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.2	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.05		U	GAM
Cesium 134	13967-70-9	U		0.07		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.28
Report date 01/14/94

2/23/94

299-W19-97

N309076-07

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09346

130-132.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-07	Client sample id	B09346
Dept sample id	7247-007	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/16/93
% moisture	7.0	Chain of custody id	EFL-1091

9413225.1347

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.07	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.58	0.10				GAM
Radium 228	15262-20-1	0.97	0.21				GAM
Thorium 228	14274-82-9	0.90	0.068				GAM
Thorium 232	7440-29-1	0.97	0.21				GAM

Verified

3/22/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-95

N309076-08

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

B09349

165-167.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-08	Client sample id	B09349
Dept sample id	7247-008	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/16/93
% moisture	16.2	Chain of custody id	EFL-1091

9413225.1348

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	-60	6.0	6	10	U	80A
Gross Beta	Beta	3200	38	5	10		80B
Selenium 79	15758-45-9	-2.5	0.71	2	10	U	SE
Strontium 90	10098-97-2	-0.080	0.21	0.8	1	U	Y
Technetium 99	14133-76-7	3.4	0.47	1	0.5	~~B~~ J	TC
Iodine 129	15046-84-1	-0.033	0.67	2	2	U	I
Uranium 233/234		2.4	0.43	0.09	0.3		U
Uranium 235	15117-96-1	0.060	0.060	0.1	0.3	U	U
Uranium 238		2.2	0.40	0.09	0.3		U
Total Uranium (ug/g)	7440-61-1	5.6	0.99	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0.057	0.043	0.02	0.2	~~J~~ J	NP
Plutonium 238	13981-16-3	0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.005	0.005	0.02	0.05	U	TP
Curium 244	13981-15-2	0.002	0.009	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	7.1	0.82				GAM
Manganese 54	13966-31-9	U		0.04		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.06		U	GAM
Cesium 134	13967-70-9	U		0.08		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

Verified

3/22/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-95

N309076-08

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09349

165-167.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-08	Client sample id	B09349
Dept sample id	7247-008	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/16/93
% moisture	16.2	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.3		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.47	0.096				GAM
Radium 228	15262-20-1	0.66	0.23				GAM
Thorium 228	14274-82-9	0.68	0.059				GAM
Thorium 232	7440-29-1	0.66	0.23				GAM

9413225.1349

Verified

3/22/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-97

N309076-09

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

B09350

Equipment Blank

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-09	Client sample id	B09350
Dept sample id	7247-009	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	0.2	Chain of custody id	EFL-1091

9413225.1350

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	5.5	3.9	4	10	~~J~~	80A
Gross Beta	Beta	47	5.5	5	10		80B
Selenium 79	15758-45-9	-2.0	0.82	2	10	U	SE
Strontium 90	10098-97-2	0.029	0.17	0.7	1	U	Y
Technetium 99	14133-76-7	0.40	0.11	0.3	0.5	~~BJ~~ J	TC
Iodine 129	15046-84-1	-0.11	0.67	2	2	U	I
Uranium 233/234		0.018	0.073	0.2	0.3	U	U
Uranium 235	15117-96-1	0	0.044	0.2	0.3	U	U
Uranium 238		0.073	0.073	0.1	0.3	U	U
Total Uranium (ug/g)	7440-61-1	0.17	0.030	0.003	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0.007	0.027	0.05	0.2	~~U~~ UJ	NP
Plutonium 238	13981-16-3	0.004	0.014	0.03	0.05	U	PU
Plutonium 239/240		0	0.014	0.03	0.05	U	PU
Americium 241	14596-10-2	0.004	0.008	0.01	0.05	U	TP
Curium 244	13981-15-2	0.002	0.008	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.02		U	GAM
Potassium 40	13966-00-2	0.48	0.17				GAM
Manganese 54	13966-31-9	U		0.02		U	GAM
Iron 59	14596-12-4	U		0.06	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.02	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Niobium 94	14681-63-1	U		0.02		U	GAM
Ruthenium 103	13968-53-1	U		0.03		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Tin 113	13966-06-8	U		0.03		U	GAM
Cesium 134	13967-70-9	U		0.02		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-97

N309076-09

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09350

Equipment Blank

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-09	Client sample id	B09350
Dept sample id	7247-009	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	0.2	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.1		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Europium 155	14391-16-3	U		0.06	0.1	U	GAM
Radium 226	13982-63-3	0.063	0.040				GAM
Radium 228	15262-20-1	0.088	0.081				GAM
Thorium 228	14274-82-9	0.13	0.027				GAM
Thorium 232	7440-29-1	0.088	0.081				GAM

9413225.1351

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-97

N309076-10

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

B09351

146-148.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-10	Client sample id	B09351
Dept sample id	7247-010	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	6.3	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	4.7	4.1	5	10	U	80A
Gross Beta	Beta	21	4.4	5	10		80B
Selenium 79	15758-45-9	5.5	2.3	5	10	~~BJ~~	SE
Strontium 90	10098-97-2	0.16	0.21	0.7	1	U	Y
Technetium 99	14133-76-7	2.3	0.32	0.3	0.5	~~B~~ J	TC
Iodine 129	15046-84-1	-0.098	0.69	2	2	U	I
Uranium 233/234		0.44	0.18	0.1	0.3		U
Uranium 235	15117-96-1	0.064	0.086	0.2	0.3	U	U
Uranium 238		0.62	0.22	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.3	0.23	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	-0.017	0.025	0.06	0.2	U	NP
Plutonium 238	13981-16-3	0	0.006	0.02	0.05	U	PU
Plutonium 239/240		0	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	0.005	0.010	0.02	0.05	U	TP
Curium 244	13981-15-2	0	0.015	0.03	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	15	1.0				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.05	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.05		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.05		U	GAM
Cesium 134	13967-70-9	U		0.1		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

9413225.1352

299-W19-97

N309076-10

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09351

146-148.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-10	Client sample id	B09351
Dept sample id	7247-010	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	6.3	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.09	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.46	0.087				GAM
Radium 228	15262-20-1	0.97	0.16				GAM
Thorium 228	14274-82-9	0.75	0.055				GAM
Thorium 232	7440-29-1	0.97	0.16				GAM

9413225.1353

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.28
Report date 01/14/94

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299-W19-97

N309076-11

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

B09352

146-148.5'
Field Duplicate

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-11	Client sample id	B09352
Dept sample id	7247-011	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	6.2	Chain of custody id	EFL-1091

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	Alpha	8.5	3.1	3	10	~~J~~	80A
Gross Beta	Beta	20	3.0	4	10		80B
Selenium 79	15758-45-9	0.65	1.2	3	10	U	SE
Strontium 90	10098-97-2	0.25	0.40	0.9	1	U	Y
Technetium 99	14133-76-7	0.23	0.10	0.3	0.5	U	TC
Iodine 129	15046-84-1	0.77	0.78	2	2	U	I
Uranium 233/234		0.50	0.18	0.1	0.3		U
Uranium 235	15117-96-1	0.034	0.035	0.1	0.3	U	U
Uranium 238		0.46	0.18	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.3	0.23	0.03	0.1	~~*~~	U_T
Neptunium 237	13994-20-2	0.023	0.037	0.07	0.2	U	NP
Plutonium 238	13981-16-3	0.003	0.012	0.02	0.05	U	PU
Plutonium 239/240		-0.003	0.006	0.02	0.05	U	PU
Americium 241	14596-10-2	-0.006	0.008	0.02	0.05	U	TP
Curium 244	13981-15-2	0.004	0.008	0.01	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.05		U	GAM
Potassium 40	13966-00-2	15	1.0				GAM
Manganese 54	13966-31-9	U		0.04		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.04	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.05		U	GAM
Ruthenium 106	13967-48-1	U		0.3		U	GAM
Tin 113	13966-06-8	U		0.05		U	GAM
Cesium 134	13967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.04	0.05	U	GAM

9413225.1354

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.28
Report date 01/14/94

3/28/94

299-W19-97

N309076-11

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09352

146-148.5'
Field Duplicate

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-11	Client sample id	B09352
Dept sample id	7247-011	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	6.2	Chain of custody id	EFL-1091

9413225.1355

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.2		U	GAM
Europium 152	14683-23-9	U		0.08	0.1	U	GAM
Europium 154	15585-10-1	U		0.06	0.1	U	GAM
Europium 155	14391-16-3	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.53	0.080				GAM
Radium 228	15262-20-1	0.78	0.21				GAM
Thorium 228	14274-82-9	0.76	0.053				GAM
Thorium 232	7440-29-1	0.78	0.21				GAM

Verified

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

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N309076-12

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

B09353

Field Blank

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-12	Client sample id	B09353
Dept sample id	7247-012	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	19.9	Chain of custody id	EFL-1091

9413225.1356

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	Alpha	1.8	2.7	4	10	U	80A
Gross Beta	Beta	1.1	3.5	6	10	U	80B
Selenium 79	15758-45-9	1.2	1.1	3	10	U	SE
Strontium 90	10098-97-2	0.011	0.17	0.7	1	U	Y
Technetium 99	14133-76-7	0.77	0.28	0.7	0.5	~~B~~ J	TC
Iodine 129	15046-84-1	-0.29	0.72	2	2	U	I
Uranium 233/234		0.14	0.13	0.2	0.3	U	U
Uranium 235	15117-96-1	0	0.050	0.2	0.3	U	U
Uranium 238		0.082	0.083	0.2	0.3	U	U
Total Uranium (ug/g)	7440-61-1	0.18	0.030	0.003	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0	0.064	0.1	0.2	U	NP
Plutonium 238	13981-16-3	0.005	0.011	0.02	0.05	U	PU
Plutonium 239/240		0	0.005	0.02	0.05	U	PU
Americium 241	14596-10-2	0	0.008	0.02	0.05	U	TP
Curium 244	13981-15-2	0	0.008	0.02	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.02		U	GAM
Potassium 40	13966-00-2	0.39	0.17				GAM
Manganese 54	13966-31-9	U		0.02		U	GAM
Iron 59	14596-12-4	U		0.04	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.02	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.02	0.05	U	GAM
Niobium 94	14681-63-1	U		0.01		U	GAM
Ruthenium 103	13968-53-1	U		0.03		U	GAM
Ruthenium 106	13967-48-1	U		0.2		U	GAM
Tin 113	13966-06-8	U		0.03		U	GAM
Cesium 134	13967-70-9	U		0.03		U	GAM
Cesium 137	10045-97-3	U		0.02	0.05	U	GAM

Verified

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

52

299-W19-97

N309076-12

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09353

Field Blank

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-12	Client sample id	B09353
Dept sample id	7247-012	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	19.9	Chain of custody id	EFL-1091

9413225.1357

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.09		U	GAM
Europium 152	14683-23-9	U		0.04	0.1	U	GAM
Europium 154	15585-10-1	U		0.03	0.1	U	GAM
Europium 155	14391-16-3	U		0.05	0.1	U	GAM
Radium 226	13982-63-3	0.099	0.038				GAM
Radium 228	15262-20-1	0.13	0.066				GAM
Thorium 228	14274-82-9	0.15	0.037				GAM
Thorium 232	7440-29-1	0.13	0.066				GAM

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

N309076-13

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET

299-W19-97

B09354

156-158.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-13	Client sample id	B09354
Dept sample id	7247-013	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	15.3	Chain of custody id	EFL-1091

9413225.1358

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS Q	TEST
Gross Alpha	Alpha	14	5.8	6	10		80A
Gross Beta	Beta	18	4.3	5	10		80B
Selenium 79	15758-45-9	0.68	1.7	3	10	U	SE
Strontium 90	10098-97-2	0.16	0.66	0.8	1	U	Y
Technetium 99	14133-76-7	2.6	0.26	0.4	0.5	~~B~~ S	TC
Iodine 129	15046-84-1	0.026	0.69	2	2	U	I
Uranium 233/234		0.60	0.19	0.1	0.3		U
Uranium 235	15117-96-1	0.091	0.061	0.1	0.3	U	U
Uranium 238		0.76	0.22	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	2.0	0.34	0.03	0.1	~~X~~	U_T
Neptunium 237	13994-20-2	0.006	0.030	0.05	0.2	U	NP
Plutonium 238	13981-16-3	-0.003	0.006	0.02	0.05	U	PU
Plutonium 239/240		0.006	0.012	0.03	0.05	U	PU
Americium 241	14596-10-2	0	0.023	0.04	0.05	U	TP
Curium 244	13981-15-2	-0.012	0.019	0.04	0.05	U	TP
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		0.06		U	GAM
Potassium 40	13966-00-2	14	1.1				GAM
Manganese 54	13966-31-9	U		0.05		U	GAM
Iron 59	14596-12-4	U		0.1	0.05	U	GAM
Cobalt 58	13981-38-9	U		0.05	0.05	U	GAM
Cobalt 60	10198-40-0	U		0.06	0.05	U	GAM
Niobium 94	14681-63-1	U		0.04		U	GAM
Ruthenium 103	13968-53-1	U		0.06		U	GAM
Ruthenium 106	13967-48-1	U		0.4		U	GAM
Tin 113	13966-06-8	U		0.06		U	GAM
Cesium 134	13967-70-9	U		0.06		U	GAM
Cesium 137	10045-97-3	U		0.05	0.05	U	GAM

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

299-W19-97

N309076-13

TMA NORCAL
REPORTING GROUP 7247

DATA SHEET, cont

B09354

156-158.5'

SDG	7247	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309076-13	Client sample id	B09354
Dept sample id	7247-013	Location/Matrix	200-UP-2 SOLID
Received	09/21/93	Collected	09/17/93
% moisture	15.3	Chain of custody id	EFL-1091

9413225.1359

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Cerium 144	14762-78-8	U		0.3		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.08	0.1	U	GAM
Europium 155	14391-16-3	0.15	0.12		0.1		GAM
Radium 226	13982-63-3	0.77	0.11				GAM
Radium 228	15262-20-1	0.97	0.23				GAM
Thorium 228	14274-82-9	1.1	0.067				GAM
Thorium 232	7440-29-1	0.97	0.23				GAM

Verified

3/28/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.28
Report date	01/14/94

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9H3225.1360

TMA/Norcal

Report N3-09-076-7247
Sample Delivery Group 7247

Westinghouse Hanford Company
P.O. MBH-SVV-069262

Case Narrative

January 14, 1994

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7247 is comprised of the thirteen soil samples from location 200-UP-2, delivered under Field Log Book #EFL-1091. Chain-of-Custody numbers were not provided.

One 1000 mL plastic bottle containing each sample was received for analysis. There were inadequate volumes received to meet gamma scan RDL's for samples BO9345, BO9349, and the duplicate of sample BO9337.

2.0 ANALYSIS NOTES

2.1 Gross Alpha Analyses

No problems were encountered by the laboratory in the analyses.

2.2 Gross Beta Analyses

No problems were encountered by the laboratory in the analyses.

2.3 Selenium-79 Analyses

The blank contained activity greater than the MDA but less than the RDL. The MDA of the duplicate of sample BO9337 is higher than the RDL due to quenching which resulted in a low scintillation counting efficiency.

2.4 Strontium-90 Analyses

No problems were encountered by the laboratory in the analyses.

2.5 Technetium-99 Analyses

The reagent blank contained activity above the RDL which is probably due to molybdenum-99 contamination in the technetium tracer. This may have contributed to activity in the samples at the same level. The MDA's of samples BO9337, BO9339, BO9349, and BO9353 are higher than the RDL due to low chemical yields.

2.6 Iodine-129 Analyses

The recovery of iodine-159 in the laboratory control sample is 83% which is outside the 3 σ protocol limits but within the (80-100)% contract limits. The MDA of sample BO9344 slightly exceeds the RDL because of a relatively low chemical yield.

TMA/Norcal
Report N3-09-076-7247
Sample Delivery Group 7247

Westinghouse Hanford Company
P.O. MBH-SVV-069262

Case Narrative

January 14, 1994

2.0 ANALYSIS NOTES (con't.)

2.7 **Neptunium-237 Analyses**
Low recoveries were obtained throughout the entire set. Samples BO9344, BO9346, BO9349, and BO9350 had yields below 20% and were reanalyzed and yields were still low. The cause could not be determined for the poor yields. The MDA of neptunium planchet for sample BO9346 is higher than the RDL due to a low chemical yield. The majority of the samples were counted for less than the nominal count time of 100 minutes. MDA's met the RDL despite the reduced count time.

2.8 **Total Uranium Analyses**
No problems were encountered by the laboratory in the analyses.

2.9 **Isotopic Uranium Analyses**
The count time for sample BO9351 was less than the nominal count time of 150 minutes. The MDA met the RDL despite this.

3.0 **Isotopic Plutonium Analyses**
No problems were encountered by the laboratory in the analyses.

3.1 **Americium-241/Curium-244 Analyses**
The QC associated with the original analysis failed and the samples were reanalysed Low recoveries were observed throughout this batch, and the samples were again reanalyzed. Satisfactory results were obtained. Upon the second reanalysis. Sample BO9341 and the duplicate of sample BO9337 have MDA's which exceed the RDL due to their relatively low chemical yields (21% and 22%) respectively. Samples BO9341, BO9344, BO9345, BO9346, BO9349, BO9350, BO9351, BO9352, and BO9353 were counted for less than the nominal count time of 700 minutes.

3.2 **Gamma Scan Analyses**
The MDA's of several gamma nuclides for the duplicate analyses of sample B09337 are higher than the RDL's due to the smaller than nominal aliquot available for analysis. The MDA of iron-59 for all the samples is higher than the RDL due to the short half-life of iron-59.

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-15-93

Ice Chest No.: SML 319

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 253695 6191

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09340

- 1,250ml P:CLP;TAL Metals,Hg,Ti
- 1,250ml Gs:VOA CLP
- 1,250ml aG:Semi-VOA CLP
- 1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
- 1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
- 1,125ml G:Cyanide CLP
- 1,125ml GW:Kerosene (8015M)
- 1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

2) B09344

- 1,250ml P:CLP;TAL Metals,Hg,Ti
- 1,250ml Gs:VOA CLP
- 1,250ml aG:Semi-VOA CLP
- 1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
- 1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
- 1,125ml G:Cyanide CLP
- 1,125ml GW:Kerosene (8015M)
- 1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

3) HLR 9-16-93 B09337

- ~~1,250ml~~ ~~1,250ml~~ P:CLP;TAL Metals,Hg,Ti
- 1,250ml Gs:VOA CLP * 2,120ML
- 1,250ml aG:Semi-VOA CLP
- 1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
- 1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
- 1,125ml G:Cyanide CLP
- 1,125ml GW:Kerosene (8015M)
- 1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

[] Field Transfer of Custody — Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1050 Lorene E. Rogers 9-16-93	H. MARCISZ TMA/NCRCAL	9-17-93 11:30
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

~~0 98~~

041

9413225.1363

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-13-93

Ice Chest No.: SML 365

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: 253 695 6191

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED.

Sample Identification

1) B09339

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml GW:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

9413225.1364

2) B09341

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml GW:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

3)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml GW:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

KER 9-16-93

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
1050 9-16-93	H. NARCISO TMA/NORCAL	9/17/93 11:30
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

~~0102~~ 0042

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS — Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2 — Collection Date: 9-16-93

Ice Chest No.: SML 41 — Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: — Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09345

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

2) B09349

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

3)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

BR 9-16-93

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
9-20-93 Loren E. Rogers 1205	H. NARCIS TMA/NORCAL	9-21-93 12:35
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

~~010~~ 043

9413225.1365

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS — Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2 — Collection Date: 9-16-93

Ice Chest No.: SML 283 — Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: — Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09346

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

2)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

SER 9-16-93

3)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
9-20-93 1205 Loren E. Rogers	H. Hardcastle TMA/NORCAL	9-21-93 12:35
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

~~0106~~ 0044

9413225.1366

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS — Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2 — Collection Date: 9-17-93

Ice Chest No.: SML 372 — Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.: — Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09350 EB

- 1,250ml P:CLP;TAL Metals,Hg,Ti
- 1,250ml Gs:VOA CLP
- 1,250ml aG:Semi-VOA CLP
- 1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
- 1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
- 1,125ml G:Cyanide CLP
- 1,125ml Gw:Kerosene (8015M)
- 1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

2) B09351

- 1,250ml P:CLP;TAL Metals,Hg,Ti
- 1,250ml Gs:VOA CLP
- 1,250ml aG:Semi-VOA CLP
- 1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
- 1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
- 1,125ml G:Cyanide CLP
- 1,125ml Gw:Kerosene (8015M)
- 1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

3) B09352

- 1,250ml P:CLP;TAL Metals,Hg,Ti
- 1,250ml Gs:VOA CLP
- 1,250ml aG:Semi-VOA CLP
- 1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
- 1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
- 1,125ml G:Cyanide CLP
- 1,125ml Gw:Kerosene (8015M)
- 1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
9-20-93 1205	H. NARCISO TMA/NORCAL	9-21-93 12:35
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

~~0108~~ 0045

9413225.1367

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator: L E ROGERS

Company Contact: L E ROGERS

Telephone: 376-7690

Project Designation/Sampling Locations: 200-UP-2

Collection Date: 9-17-93

Ice Chest No.: SML283

Field Logbook No.: EFL-1091

Bill of Lading/Airbill No.:

Offsite Property No.:

Method of Shipment: OVERNIGHT AIR SERVICE

Shipped to: TMA

Possible Sample Hazards/Remarks: Keep samples at 4C (SOIL) NONE NOTED

Sample Identification

1) B09353

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

2) B09354

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

3)

1,250ml P:CLP;TAL Metals,Hg,Ti
1,250ml Gs:VOA CLP
1,250ml aG:Semi-VOA CLP
1,125ml G:Anions F,Cl,SO4 (EPA 300.0)
1,125ml P/G:Anions NO2,NO3 (EPA 353.2)
1,125ml G:Cyanide CLP
1,125ml Gw:Kerosene (8015M)
1,1000ml P/G:Gross alpha/beta (EP-10), Gamma Spec to include,Cs-134,Cs-137,Co-60,Eu-152, Eu-154,Eu-155,K-40,Ru-106,Na-22 (RC-30), Total Uranium (EA-01C) U-235,U-234,U-238 (EP-70, EP-71, EP-5) Np-237,(RC-101A, RC-622, EP-5) Pu-238,Pu-239/240 (EP-80, EP-81, EP-5) I-129 (RC-25, RC-605) Sr-90 (RC-306, RC-303, RC-309, RC-304) Tc-99 (RC-24, RC-604) Am-241,Cm-244 (EP-80, EP-90, EP-91, EP-92, EP-93, EP-5) Se-79

JER 9-17-93

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
9-20-93 1205	H. NARCUS TMA/NORCAL	9-21-93 12:35
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

~~0110~~ 046

9413225.1368

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9413225.369

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-2		DATA PACKAGE: BC9340-TMA-623
VALIDATOR: [illegible]	LAB: TMA	DATE: 03/10/94
CASE:		SDG: BC9340-TMA-623

ANALYSES PERFORMED

☒ Gross Alpha/Beta	☒ Strontium-90	☒ Technetium-99	☒ Alpha Spectroscopy *	☒ Gamma Spectroscopy	* Pu, Am, Cm, U
☒ Total Uranium	☐ Radium-22	☐ Tritium	☒ Neptunium-237		

SAMPLES/MATRIX Soils

BC9337	BC9345	BC9352
BC9339	BC9346	BC9353
BC9340	BC9349	BC9354
BC9341	BC9350	
BC9344	BC9351	

1. Completeness . . . . . ☐ N/A

Technical verification forms present? . . . . . (Yes) No N/A

Comments: _____

2. Initial Calibration . . . . . ☐ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes (No) N/A

Initial calibration acceptable? . . . . . (Yes) No N/A

Standards NIST traceable? . . . . . (Yes) No N/A

Standards Expired? . . . . . Yes (No) N/A

Comments: Initial calibration was performed more than one year prior to sample analysis for iodine, gamma spec, and gross alpha beta analyses. No qualification is required.

9413225.1370

3. Continuing Calibration . . . . . ☐ N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A
Calibration check acceptable? . . . . . Yes No N/A
Calibration check standards NIST traceable? . . . . . Yes No N/A
Calibration check standards expired? . . . . . Yes No N/A

Comments: the SF control limits of 0.9 to 1.1 were used for the LBG detectors 1-9 since the ~~[illegible]~~ control limits were not provided in the data pkg. The limits of 0.9-1.1 were statistically determined as one standard deviation from the mean. No qualification was required.

4. Blanks . . . . . ☐ N/A

Method blank analyzed? . . . . . Yes No N/A
Method blank results acceptable? . . . . . Yes No N/A
Analytes detected in method blank? . . . . . Yes No N/A
Field blank(s) analyzed? . . . . . Yes No N/A
Field blank results acceptable? . . . . . Yes No N/A
Analytes detected in field blank(s)? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

5. Matrix Spikes . . . . . ☒ N/A

Matrix spike analyzed? . . . . . Yes No N/A
Spike recoveries acceptable? . . . . . Yes No N/A
Spike source traceable? . . . . . Yes No N/A
Spike source expired? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

9413225.1371

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed? . . . . . Yes No N/A
LCS recoveries acceptable? . . . . . Yes No N/A
LCS traceable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added? . . . . . Yes No N/A
Chemical recovery acceptable? . . . . . Yes No N/A
Chemical carrier traceable? . . . . . Yes No N/A
Chemical carrier expired? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . Yes No N/A
RPD Values Acceptable? . . . . . Yes No N/A 3/29/94
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: ~~All duplicate results~~ 3/29/94

9413225.1372

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed? . . . . . Yes No N/A

Field duplicate RPD values acceptable? . . . . . Yes No N/A 3/29/94

Field split sample(s) analyzed? . . . . . Yes No N/A

Field split RPD values acceptable? . . . . . Yes No N/A

Performance audit sample(s) analyzed? . . . . . Yes No N/A

Performance audit sample results acceptable? . . . . . Yes No N/A

Comments: Sample B-9352 was identified as a field duplicate of B-9351. All field duplicate results are acceptable with the exception of technetium-99. A field duplicate result summary is attached to this checklist.

10. Holding Times

Are sample holding times acceptable? . . . . . Yes No N/A

Comments:

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses? . . . . . Yes No N/A

Results supported in raw data? . . . . . Yes No N/A

Results Acceptable? . . . . . Yes No N/A

Transcription/Calculation errors? . . . . . Yes No N/A

MDA's meet required detection limits? . . . . . Yes No N/A

Transcription/calculation errors? . . . . . Yes No N/A

Comments: See last page of comments for MDA > RDL. The calculated MDA values for iodine-129 and neptunium sample B-9348 did not verify the reported result. However, no qualification was required since the reported result is supported in the raw data. The associated MDA calculations have been requested from the laboratory, however, have not been provided to date.

9413225.1373

051

Comments: The ~~m~~ reagent (method) blank contains Se-79 at 5.30 pCi/g and Tc-99 at 1.5 pCi/g. All assoc results ~~for~~ Se-79 are nondetects and therefore do not require qualification. However, the assoc. Tc-99 positive results less than 5 x the blank concentration (7.5 pCi/g) have been qualified as estimated (J).

Sample B09350 was defined as an equipment blank and contains the following:

Gross alpha	5.5 pCi/g
Gross beta	47 pCi/g
Technetium-99	0.40 pCi/g
Total Uranium	0.17 pCi/g
Potassium-40	0.48 pCi/g
Radium-226	0.063 pCi/g
Radium-228	0.088 pCi/g
Thorium-228	0.13 pCi/g
Thorium-232	0.088 pCi/g

Sample B09353 was identified as a Field Blank. ~~and~~ All results were nondetects with the exception of the following:

Technetium-99	0.77 pCi/g
Total Uranium	0.18 pCi/g
Potassium-40	0.39 pCi/g
Radium-226	0.099 pCi/g
Radium-228	0.13 pCi/g
Thorium-228	0.15 pCi/g
Thorium-232	0.13 pCi/g

9413225.1374

Comments: All chemical and tracer recoveries are acceptable with the exception of the following:

Radionuclide (Parameter)	Sample ID	Yield	Qualifier
Neptunium-237	B09344	18.4%	UJ
	B09346	14%	UJ
	B09349	17%	J
	B09350	19%	UJ
	~~B09353~~	~~22%~~	~~UJ~~ 3/25/94
	~~Blank (7247-015)~~	~~21%~~	~~UJ~~ 3/25/94
	LCS (7247-017)	13%	J
	Blank (7247-018)	13%	UJ
Technetium-99	B09337	15%	UJ
	B09339	16%	J
	B09341	27%	J
	B09349	17%	J
	B09353	24%	J

The laboratory reported "J", "B" and/or "X" qualifiers to several of the associated sample results. These qualifiers have been crossed off the laboratory result forms for clarification purposes and are not considered appropriate for radiochemistry validation.

[signature] 4/22/94

Revised [signature] 4/22/94

9413225.1375

Comments:

The MDA values did not exceed the RDLs with the exception of the following:

Analyte	Sample ID	MDA	RDL
Tc-99	B09337	0.9	0.5
	B09339	1	0.5
	B09349	1	0.5
I-129	B09344	3	2
Np-237	B09346	0.9	0.2
Fe-59	B09337	0.09	0.05
	B09339	0.1	0.05
	B09340	0.1	0.05
	B09341	0.1	0.05
	B09344	0.2	0.05
	B09345	0.1	0.05
	B09346	0.2	0.05
	B09349	0.1	0.05
	B09350	0.06	0.05
	B09351	0.1	0.05
	B09352	0.1	0.05
	B09354	0.1	0.05
Co-58	B09344	0.06	0.05
Co-60	B09354	0.06	0.05
Am-241	B09341	0.07	0.05
Cm-244	B09341	0.07	0.05
Tc-99	B09353	0.7	0.5

3/29/94

9413225.1376

TMA NORCAL

REPORTING GROUP 7247

SDG 7247
Contact Dinkar Kharkar

WORK SUMMARY

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	#Days ~~REVIEWED~~ BY	METHOD
B09337		N309076-01	7247-001	80A/80		10/27/93	42	Gross Alpha in Soil
200-UP-2	SOLID	09/15/93	7247-001	80B/80		10/27/93	42	Gross Beta in Soil
EFL-1091		09/17/93	7247-001	GAM		10/12/93	27	Gamma Scan
			7247-001	I		11/16/93	62	Iodine 129 in Soil
			7247-001	NP		11/11/93	57	Neptunium in Soil
			7247-001	PU		11/08/93	54	Plutonium, Isotopic in Soil
			7247-001	SE		11/20/93	66	Selenium 79 in Soil
			7247-001	TC		01/07/94	114	Technetium 99 in Soil
			7247-001	TP	A2R1	01/05/94	112	Americium 241/Curium in Solids
			7247-001	U		11/11/93	57	Uranium, Isotopic in Soil
			7247-001	U_T		11/10/93	56	Uranium, Total in Soil
			7247-001	Y		11/05/93	51	Strontium 90 in Soil
B09339		N309076-02	7247-002	80A/80		10/27/93	~~29~~ ~~38~~ 44	Gross Alpha in Soil
200-UP-2	SOLID	09/13/93	7247-002	80B/80		10/27/93	~~29~~ ~~38~~ 44	Gross Beta in Soil
EFL-1091		09/17/93	7247-002	GAM		10/12/93	29	Gamma Scan
			7247-002	I		12/09/93	87	Iodine 129 in Soil
			7247-002	NP		11/11/93	59	Neptunium in Soil
			7247-002	PU		11/08/93	56	Plutonium, Isotopic in Soil
			7247-002	SE		11/20/93	68	Selenium 79 in Soil
			7247-002	TC		10/21/93	38	Technetium 99 in Soil
			7247-002	TP	A2R1	01/05/94	114	Americium 241/Curium in Solids
			7247-002	U		12/02/93	80	Uranium, Isotopic in Soil
			7247-002	U_T		11/10/93	58	Uranium, Total in Soil
			7247-002	Y		11/05/93	53	Strontium 90 in Soil
B09340		N309076-03	7247-003	80A/80		10/27/93	42	Gross Alpha in Soil
200-UP-2	SOLID	09/15/93	7247-003	80B/80		10/27/93	42	Gross Beta in Soil
EFL-1091		09/17/93	7247-003	GAM		10/12/93	27	Gamma Scan
			7247-003	I		12/11/93	87	Iodine 129 in Soil
			7247-003	NP		11/11/93	57	Neptunium in Soil
			7247-003	PU		11/09/93	~~56~~ 55	Plutonium, Isotopic in Soil
			7247-003	SE		11/20/93	66	Selenium 79 in Soil
			7247-003	TC		10/21/93	36	Technetium 99 in Soil
			7247-003	TP	A2R1	01/05/94	112	Americium 241/Curium in Solids
			7247-003	U		11/11/93	57	Uranium, Isotopic in Soil
			7247-003	U_T		11/10/93	56	Uranium, Total in Soil
			7247-003	Y		11/05/93	51	Strontium 90 in Soil

3/22/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-CWS
Version 2.28
Report date 01/14/94

9413225.1377

TMA NORCAL

REPORTING GROUP 7247

SDG 7247
Contact Dinkar Kharkar

WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	# Days ~~REVIEWED~~ BY 3/28/94	METHOD
B09341		N309076-04	7247-004	80A/80		10/27/93	44	Gross Alpha in Soil
200-UP-2	SOLID	09/13/93	7247-004	80B/80		10/27/93	44	Gross Beta in Soil
EFL-1091		09/17/93	7247-004	GAM		10/12/93	29	Gamma Scan
			7247-004	I		12/10/93	88	Iodine 129 in Soil
			7247-004	NP		11/11/93	59	Neptunium in Soil
			7247-004	PU		11/09/93	57	Plutonium, Isotopic in Soil
			7247-004	SE		11/20/93	68	Selenium 79 in Soil
			7247-004	TC		10/25/93	42	Technetium 99 in Soil
			7247-004	TP	A2	12/23/93	101	Americium 241/Curium in Solids
			7247-004	U		11/11/93	59	Uranium, Isotopic in Soil
			7247-004	U_T		11/10/93	58	Uranium, Total in Soil
			7247-004	Y		11/05/93	53	Strontium 90 in Soil
B09344		N309076-05	7247-005	80A/80		10/27/93	42	Gross Alpha in Soil
200-UP-2	SOLID	09/15/93	7247-005	80B/80		10/27/93	42	Gross Beta in Soil
EFL-1091		09/17/93	7247-005	GAM		10/12/93	27	Gamma Scan
			7247-005	I		11/17/93	63	Iodine 129 in Soil
			7247-005	NP	A1	12/08/93	84	Neptunium in Soil
			7247-005	PU		11/09/93	55	Plutonium, Isotopic in Soil
			7247-005	SE		11/20/93	66	Selenium 79 in Soil
			7247-005	TC		11/09/93	55	Technetium 99 in Soil
			7247-005	TP	A2	12/23/93	99	Americium 241/Curium in Solids
			7247-005	U		11/11/93	57	Uranium, Isotopic in Soil
			7247-005	U_T		11/10/93	56	Uranium, Total in Soil
			7247-005	Y		11/05/93	51	Strontium 90 in Soil
B09345		N309076-06	7247-006	80A/80		10/27/93	41	Gross Alpha in Soil
200-UP-2	SOLID	09/16/93	7247-006	80B/80		10/27/93	41	Gross Beta in Soil
EFL-1091		09/21/93	7247-006	GAM		10/12/93	35	Gamma Scan
			7247-006	I		12/13/93	88	Iodine 129 in Soil
			7247-006	NP		11/13/93	58	Neptunium in Soil
			7247-006	PU		11/09/93	54	Plutonium, Isotopic in Soil
			7247-006	SE		11/20/93	65	Selenium 79 in Soil
			7247-006	TC		10/20/93	34	Technetium 99 in Soil
			7247-006	TP	A2	12/23/93	98	Americium 241/Curium in Solids
			7247-006	U		11/11/93	56	Uranium, Isotopic in Soil
			7247-006	U_T		11/10/93	55	Uranium, Total in Soil
			7247-006	Y		11/05/93	50	Strontium 90 in Soil

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WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	# Days ~~REVIEWED~~ 03/28/94	BY	METHOD
B09346		N309076-07	7247-007	80A/80		10/27/93	41		Gross Alpha in Soil
200-UP-2	SOLID	09/16/93	7247-007	80B/80		10/27/93	41		Gross Beta in Soil
EFL-1091		09/21/93	7247-007	GAM		10/12/93	26		Gamma Scan
			7247-007	I		12/13/93	88		Iodine 129 in Soil
			7247-007	NP	A1	12/08/93	83		Neptunium in Soil
			7247-007	PU		11/09/93	54		Plutonium, Isotopic in Soil
			7247-007	SE		11/21/93	66		Selenium 79 in Soil
			7247-007	TC		10/21/93	35		Technetium 99 in Soil
			7247-007	TP	A2	12/23/93	98		Americium 241/Curium in Solids
			7247-007	U		11/11/93	56		Uranium, Isotopic in Soil
			7247-007	U_T		11/10/93	55		Uranium, Total in Soil
			7247-007	Y		11/05/93	50		Strontium 90 in Soil
B09349		N309076-08	7247-008	80A/80		10/27/93	41		Gross Alpha in Soil
200-UP-2	SOLID	09/16/93	7247-008	80B/80		10/27/93	41		Gross Beta in Soil
EFL-1091		09/21/93	7247-008	GAM		10/12/93	26		Gamma Scan
			7247-008	I		12/10/93	85		Iodine 129 in Soil
			7247-008	NP	A1	12/08/93	83		Neptunium in Soil
			7247-008	PU		11/09/93	54		Plutonium, Isotopic in Soil
			7247-008	SE		11/21/93	66		Selenium 79 in Soil
			7247-008	TC		10/21/93	35		Technetium 99 in Soil
			7247-008	TP	A2	12/23/93	98		Americium 241/Curium in Solids
			7247-008	U		11/11/93	56		Uranium, Isotopic in Soil
			7247-008	U_T		11/10/93	55		Uranium, Total in Soil
			7247-008	Y		11/05/93	50		Strontium 90 in Soil
B09350		N309076-09	7247-009	80A/80		10/27/93	40		Gross Alpha in Soil
200-UP-2	SOLID	09/17/93	7247-009	80B/80		10/27/93	40		Gross Beta in Soil
EFL-1091		09/21/93	7247-009	GAM		10/12/93	25		Gamma Scan
			7247-009	I		11/17/93	61		Iodine 129 in Soil
			7247-009	NP	A1	12/08/93	82		Neptunium in Soil
			7247-009	PU		11/09/93	53		Plutonium, Isotopic in Soil
			7247-009	SE		11/21/93	65		Selenium 79 in Soil
			7247-009	TC		10/19/93	32		Technetium 99 in Soil
			7247-009	TP	A2	12/23/93	97		Americium 241/Curium in Solids
			7247-009	U		11/11/93	55		Uranium, Isotopic in Soil
			7247-009	U_T		11/10/93	54		Uranium, Total in Soil
			7247-009	Y		11/05/93	49		Strontium 90 in Soil

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WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	# Days ~~REVIEWED~~ BY 3/28/94	METHOD
B09351		N309076-10	7247-010	80A/80		10/27/93	40	Gross Alpha in Soil
200-UP-2	SOLID	09/17/93	7247-010	80B/80		10/27/93	40	Gross Beta in Soil
EFL-1091		09/21/93	7247-010	GAM		10/12/93	25	Gamma Scan
			7247-010	I		11/19/93	63	Iodine 129 in Soil
			7247-010	NP		11/18/93	62	Neptunium in Soil
			7247-010	PU		11/09/93	53	Plutonium, Isotopic in Soil
			7247-010	SE		11/21/93	65	Selenium 79 in Soil
			7247-010	TC		10/19/93	32	Technetium 99 in Soil
			7247-010	TP	A2	12/23/93	97	Americium 241/Curium in Solids
			7247-010	U		11/12/93	56	Uranium, Isotopic in Soil
			7247-010	U_T		11/10/93	54	Uranium, Total in Soil
			7247-010	Y		11/05/93	49	Strontium 90 in Soil
B09352		N309076-11	7247-011	80A/80		10/28/93	41	Gross Alpha in Soil
200-UP-2	SOLID	09/17/93	7247-011	80B/80		10/28/93	41	Gross Beta in Soil
EFL-1091		09/21/93	7247-011	GAM		10/12/93	25	Gamma Scan
			7247-011	I		11/17/93	61	Iodine 129 in Soil
			7247-011	NP		11/18/93	62	Neptunium in Soil
			7247-011	PU		11/09/93	53	Plutonium, Isotopic in Soil
			7247-011	SE		11/21/93	65	Selenium 79 in Soil
			7247-011	TC		10/19/93	32	Technetium 99 in Soil
			7247-011	TP	A2	12/23/93	97	Americium 241/Curium in Solids
			7247-011	U		11/11/93	55	Uranium, Isotopic in Soil
			7247-011	U_T		11/10/93	54	Uranium, Total in Soil
			7247-011	Y		11/05/93	49	Strontium 90 in Soil
B09353		N309076-12	7247-012	80A/80		10/29/93	42	Gross Alpha in Soil
200-UP-2	SOLID	09/17/93	7247-012	80B/80		10/29/93	42	Gross Beta in Soil
EFL-1091		09/21/93	7247-012	GAM		10/12/93	25	Gamma Scan
			7247-012	I		12/10/93	84	Iodine 129 in Soil
			7247-012	NP		11/18/93	62	Neptunium in Soil
			7247-012	PU		11/09/93	53	Plutonium, Isotopic in Soil
			7247-012	SE		11/21/93	65	Selenium 79 in Soil
			7247-012	TC		10/21/93	34	Technetium 99 in Soil
			7247-012	TP	A2	12/23/93	97	Americium 241/Curium in Solids
			7247-012	U		11/11/93	55	Uranium, Isotopic in Soil
			7247-012	U_T		11/10/93	54	Uranium, Total in Soil
			7247-012	Y		11/05/93	49	Strontium 90 in Soil

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WORK SUMMARY, cont.

Client Westinghouse Hanford
Contract MBH-SVV-069262

CLIENT SAMPLE ID / LOCATION / CUSTODY	MATRIX / SAS NO	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	# Days ~~REVIEWED~~ BY 3/28/94	METHOD
B09354		N309076-13	7247-013	80A/80		10/28/93	41	Gross Alpha in Soil
200-UP-2	SOLID	09/17/93	7247-013	80B/80		10/28/93	41	Gross Beta in Soil
EFL-1091		09/21/93	7247-013	GAM		10/12/93	25	Gamma Scan
			7247-013	I		11/17/93	61	Iodine 129 in Soil
			7247-013	NP		11/18/93	62	Neptunium in Soil
			7247-013	PU		11/09/93	53	Plutonium, Isotopic in Soil
			7247-013	SE		11/21/93	65	Selenium 79 in Soil
			7247-013	TC		10/21/93	34	Technetium 99 in Soil
			7247-013	TP	A2	12/28/93	102	Americium 241/Curium in Solids
			7247-013	U		11/11/93	55	Uranium, Isotopic in Soil
			7247-013	U_T		11/10/93	54	Uranium, Total in Soil
			7247-013	Y		11/05/93	49	Strontium 90 in Soil
Reagent Blank		N309076-15	7247-015	80A/80		10/28/93		Gross Alpha in Soil
	SOLID		7247-015	80B/80		10/28/93		Gross Beta in Soil
			7247-015	GAM		10/12/93		Gamma Scan
			7247-015	I		11/17/93		Iodine 129 in Soil
			7247-015	NP		11/11/93		Neptunium in Soil
			7247-015	PU		11/10/93		Plutonium, Isotopic in Soil
			7247-015	SE		11/21/93		Selenium 79 in Soil
			7247-015	TC		10/22/93		Technetium 99 in Soil
			7247-015	U		11/11/93		Uranium, Isotopic in Soil
			7247-015	U_T		11/10/93		Uranium, Total in Soil
			7247-015	Y		11/05/93		Strontium 90 in Soil
Reagent Blank	SOLID	N309076-18	7247-018	NP		12/08/93		Neptunium in Soil
Reagent Blank	SOLID	N309076-26	7247-026	TP		12/28/93		Americium 241/Curium in Solids

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Protocol WHC-HASM
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FIELD DUPLICATE PRECISION CALCULATION WORKSHEET 16-Mar-94 SDG B09340-TMA-623

FILENAME: B09340FD.WK1

SDG NO.: B09340-TMA-623

SAMPLE ID: B09351
DUPLICATE SAMPLE ID: B09352

SAMPLE LOCATION: 299-W19-97 146'-148.5'

PARAMETER	RDL	SAMPLE RESULT	DUPLICATE RESULT	RPD
GROSS ALPHA	10	0	8.5	200
GROSS BETA	10	21	20	5
SELENIUM-79	10	5.5	0	200
TECHNETIUM-99	0.5	2.3	0	200
URANIUM-233/23	0.3	0.44	0.5	13
URANIUM-238	0.3	0.62	0.46	30
TOTAL URANIUM	0.1	1.3	1.3	0
POTASSIUM-40	not specified	15	15	0
RADIUM-226	not specified	0.46	0.53	14
RADIUM-228	not specified	0.97	0.78	22
THORIUM-228	not specified	0.75	0.76	1
THORIUM-232	not specified	0.97	0.78	22

BLANK AND SAMPLE DATA SUMMARY

SDG: B09340-TMA-623	VALIDATOR: [illegible]	DATE: 03/10/94	PAGE 1 OF 1
COMMENTS: Radiochemistry			

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
Reagent Blank	Selenium-79	5.3	J		pCi/g	26.5		None	None
Reagent Blank	Technetium-99	1.5			pCi/g	7.5		B09339	J
								B09340	J
								B09341	J
								B09345	J
								B09346	J
								B09349	J
								B09350	J
								B09351	J
								B09353	J
								B09354	J

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Gross Alpha/Beta

Sample ID:	B09337	B09339	B09340	B09341	B09344	B09345	B09346	B09349	B09350	B09351	B09352	B09353	B09354	LCS	BLANK	B09337 DUP
Aliquot:	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Detector:	101	102	103	104	115	101	102	103	104	115	104	110	111	112	113	115
Count time:	100	100	100	100	100	100	100	100	100	100	200	100	100	100	100	100
Alpha Counts:	36	31	33	31	30	23	29	45	23	24	67	13	48	327	7	29
Alpha cpm:	0.36	0.31	0.33	0.31	0.30	0.23	0.29	0.45	0.23	0.24	0.34	0.13	0.48	3.27	0.07	0.29
Alpha, Bkgd:	0.082	0.074	0.084	0.055	0.095	0.082	0.074	0.084	0.055	0.095	0.074	0.069	0.099	0.038	0.079	0.106
Alpha, Xtalk:	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Alpha, Eff:	0.135	0.131	0.135	0.135	0.144	0.135	0.132	0.109	0.122	0.128	0.132	0.15	0.117	0.093	0.093	0.123
Alpha Result Calc.:	9.00	7.78	-19.62	8.15	6.11	4.62	7.04	-58.53	5.50	4.68	8.53	1.81	14.28	151.24	-0.43	6.47
Alpha Result Rptd.:	9.02	7.76	-20.70	8.17	6.09	4.58	7.05	-60.10	5.47	4.67	8.51	1.81	14.20	150.00	-0.45	6.48
Alpha MDA Calc.:	4.45	4.36	4.51	3.65	4.49	4.45	4.33	5.58	4.04	5.05	4.33	3.68	5.65	4.40	6.34	5.56
Alpha MDA Rptd.:	4.48	4.35	4.53	3.66	4.49	4.45	4.33	5.61	4.03	5.05	3.07	3.69	5.63	4.00	6.00	5.55
Beta Counts:	252	286	14001	290	278	272	283	29780	543	313	594	144	285	2040	115	234
Beta cpm:	2.52	2.86	140.01	2.90	2.78	2.72	2.83	297.80	5.43	3.13	2.97	1.44	2.85	20.40	1.15	2.34
Bkgd:	1.094	1.158	1.17	1.049	1.097	1.094	1.158	1.17	1.049	1.097	1.062	1.323	1.082	1.186	1.167	1.092
Xtalk:	0.269	0.272	0.269	0.269	0.264	0.269	0.271	0.286	0.277	0.274	0.271	0.26	0.28	0.306	0.306	0.277
Eff:	0.42	0.419	0.42	0.42	0.421	0.42	0.419	0.415	0.417	0.419	0.419	0.422	0.416	0.409	0.409	0.418
Beta Result Calc.:	14.49	17.61	1488.35	19.12	17.43	17.01	17.34	3218.55	46.80	21.43	19.75	1.08	17.99	200.70	-0.16	12.90
Beta Result Rptd:	14.50	17.60	1491.00	19.10	17.50	17.00	17.40	3228.00	46.80	21.50	19.80	1.08	18.00	200.00	-0.16	12.90
Beta MDA Calc:	5.23	5.39	5.41	5.12	5.22	5.23	5.39	5.47	5.16	5.25	3.65	5.72	5.25	5.59	5.54	5.25
Beta MDA rptd:	5.23	5.39	5.41	5.12	5.22	5.23	5.39	5.48	5.15	5.25	3.65	5.72	5.24	6.00	6.00	5.25

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Strontium 90

Sample ID:	B09337	B09339	B09340	B09341	B09344	B09345	B09346	B09349	B09350	B09351	B09352	B09353	B09354	LCS	BLANK	B09337 DUP
Detector:	GRB 207	GRB 208	GRB 203	GRB 210	GRB 205	GRB 206	GRB 207	GRB 208	GRB 209	GRB 210	GRB 202	GRB 211	GRB 213	GRB 209	GRB 215	GRB 216
Bkg:	0.4434	0.5344	0.4501	0 4277	0.3844	0.469	0.4394	0.5392	0.4696	0.4277	0.4475	0.4599	0.4682	0.4696	0.4044	0.4307
Count Time:	100	100	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Y90 cpm:	0	-0.1449	-0.354	-0.251	-0.105	-0.397	-0.349	-0.096	0.029	0.157	0.234	0.011	0.151	10.195	0.038	-0.1729
Elapsed Time, days:	50.442	52.442	50.442	52.442	50.442	49.442	49.442	49.442	48.442	48.442	48.442	49.442	48.442	0	0	50.442
Lambda:	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05	6.86E-05
Decay:	0.9965	0.9964	0.9965	0.9964	0.9965	0.9966	0.9966	0.9966	0.9967	0.9967	0.9967	0.9966	0.9967	1.0000	1.0000	0.9965
Yield:	0.8333	0.787	0.8481	0.869	0.8528	0.8616	0.8562	0.8508	0.8461	0.8071	0.7923	0.8501	0.7843	0.8159	0.8152	0.7991
PPT. corr.:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Aliquot:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Product:	0.8304	0.7842	0.8452	0.8659	0.8499	0.8587	0.8533	0.8479	0.8433	0.8044	0.7897	0.8472	0.7817	0.8159	0.8152	0.7963
C-zero:	0.0000	-0.1848	-0.4189	-0.2899	-0.1236	-0.4623	-0.4090	-0.1132	0.0344	0.1952	0.2963	0.0130	0.1932	12.4954	0.0466	-0.2171
P-Factor:	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859	1.859
Result, calc.:	0.00	-0.15	-0.35	-0.24	-0.10	-0.39	-0.34	-0.09	0.03	0.16	0.25	0.01	0.16	10.46	0.04	-0.18
Result, rptd.:	0.00	-0.13	-0.35	-0.24	-0.10	-0.39	-0.34	-0.08	0.03	0.16	0.25	0.01	0.16	10.46	0.04	-0.15
MDA, calc.:	0.48	0.50	0 86	0.85	0.79	0.89	0.85	0.94	0.87	0.79	0.80	0.87	0.81	0.84	0.78	0.79
MDA, rptd.:	0.50	0.58	0.73	0 69	0.68	0.73	0.71	0.78	0.74	0.75	0.89	0.73	0.80	0.61	0.72	0.76

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Technetium 99

Sample ID:	B09337	B09339	B09340	B09341	B09344	B09345	B09346	B09349	B09350	B09351	B09352	B09353	B09354	LCS	BLANK	B09337 DUP
Detector:	LBG 9	LBG 1	LBG 3	LBG 1	LBG 11	LBG 13	LBG 4	LBG 9	LBG 10	LBG 13	LBG 14	LBG 13	LBG 14	LBG 4	LBG 12	LBG 11
Net, cpm:	0.04	1.75	1.62	1.61	0.22	1.41	2.94	1.12	0.53	2.29	0.29	0.36	2.41	16.36	1.13	0.26
Days:	114.735	37.755	34.688	42.682	41.868	33.814	34.755	34.755	32.888	32.888	32.888	34.83	33.83	0	0	117.768
Lambda:	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09
Decay:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Yield:	0.1542	0.1574	0.365	0.2658	0.4521	0.3936	0.5063	0.1686	0.6845	0.5211	0.6438	0.2391	0.4884	0.5157	0.3937	0.49
Aliquot:	2.03	2.05	2.34	2.01	2.04	2.06	2	2.04	2.02	2.02	2.02	2.04	2.03	2	2	2.03
P-Factor:	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
Count, time:	184.2	108.2	108.2	972.9	165.8	101.8	108.2	108.2	128.9	128.9	128.9	108.2	108.2	125.9	109.6	910.8
Bkg., cpm:	0.54	0.48	0.43	0.49	0.63	0.45	0.54	0.54	0.54	0.45	0.48	0.44	0.48	0.978	0.53	0.5
Result, calc.:	0.13	5.72	2.00	3.18	0.25	1.83	3.06	3.43	0.40	2.29	0.24	0.78	2.56	16.72	1.51	0.28
Result, rptd.:	0.12	5.72	2.31	3.17	0.25	1.83	3.06	3.44	0.40	2.29	0.23	0.77	2.57	16.72	1.52	0.28
MDA, calc.:	0.85	1.01	0.36	0.21	0.33	0.40	0.34	1.01	0.23	0.28	0.23	0.64	0.33	0.42	0.43	0.12
MDA, rptd.:	0.91	1.10	0.44	0.21	0.35	0.45	0.36	1.09	0.25	0.30	0.25	0.71	0.37	0.32	0.46	0.12

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Selenium 79

Sample ID:	B09337	B09339	B09340	B09341	B09344	B09345	B09346	B09349	B09350	B09351	B09352	B09353	B09354	BLANK	B09377 DUP
Detector, LSC:	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Count time:	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Detector Eff:	0.522	0.624	0.6	0.567	0.632	0.661	0.7	0.732	0.674	0.394	0.564	0.501	0.568	0.52	0.017
Sample Counts:	1913	1724	1901	1988	1860	1931	1681	1571.5	1661.5	2111.5	1916	1960.5	1902	2195.5	1253
Sample cpm:	12.75	11.49	12.67	13.25	12.40	12.87	11.21	10.48	11.08	14.08	12.77	13.07	12.68	14.64	8.35
Bkgd cpm:	12.35	12.35	12.35	12.35	12.35	12.35	12.45	12.45	12.45	12.45	12.45	12.45	12.35	12.45	8.2
Yield:	0.7908	0.6778	0.8301	0.776	0.7515	0.6434	0.8939	0.9578	0.8988	0.6768	0.776	0.9185	0.7613	0.7073	0.7308
Decay Corr:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Aliquot:	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.51	0.5	0.5	0.5	0.51
Result calc:	0.88	-1.82	0.58	1.85	0.09	1.11	-1.79	-2.54	-2.04	5.50	0.65	1.21	0.69	5.36	10.90
Result rptd:	0.87	-1.83	0.58	1.84	0.09	1.10	-1.71	-2.53	-2.00	5.48	0.65	1.22	0.68	5.33	10.74
MDA calc:	2.92	2.85	2.42	2.74	2.54	2.83	1.93	1.73	2.00	4.54	2.71	2.63	2.79	3.29	77.46
MDA rptd:	2.96	2.88	2.45	2.77	2.57	2.87	1.85	1.75	1.98	4.60	2.74	2.66	2.82	3.33	77.56

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Neptunium

Sample ID	B09337	B09339	B09340	B09341	B09344	B09345	B09346	B09349	B09350	B09351	B09352	B09353	B09354	LCS	BLANK	B09337 DUP	LCS	BLANK
Detector:	SS-52	SS-53	SS-54	SS-57	SS-52	SS-44	SS-53	SS-54	SS-57	SS-25	SS-26	SS-24	SS-3	SS-43	SS-58	SS-50	SS-58	SS-61
Np239 cpm:	20.33	26.16	29.7	19.81	13.14	30.24	10.28	11.89	13.64	24.17	24.13	15.7	38.32	21.17	15.11	20.01	9.1	9.01
Inst. eff.:	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721
Am243 added:	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08	99.08
Yield:	0.2846	0.3662	0.4158	0.2773	0.1839	0.4233	0.1439	0.1664	0.1909	0.3383	0.3378	0.2198	0.5364	0.2963	0.2115	0.2801	0.1274	0.1261
Aliquot:	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Count time:	1039.52	1039.52	1039.52	1039.52	1001.97	1037.02	1001.97	1001.97	1001.97	1011.18	1011.18	1011.18	1011.18	1239.87	1039.52	1037.02	1001.97	1001.97
Np237 gross counts:	3	5	4	8	2	0	7	8	2	2	12	12	12	865	2	2	435	2
Np237 bkgd counts:	1	3	1	1	0	0	3	0	1	6	7	12	10	1	4	4	1	1
Np237 aspec. eff:	0.38	0.386	0.374	0.358	0.38	0.397	0.388	0.376	0.354	0.312	0.283	0.319	0.276	0.39	0.373	0.355	0.368	0.413
Np237 result calc.:	0.01	0.01	0.01	0.03	0.01	0.00	0.03	0.06	0.01	-0.02	0.02	0.00	0.01	2.72	-0.01	-0.01	4.16	0.01
Np237 result rptd.:	0.01	0.01	0.01	0.03	0.01	0.00	0.03	0.06	0.01	-0.02	0.02	0.00	0.01	2.72	-0.01	-0.01	4.16	0.01
Np237 MDA calc.:	0.03	0.02	0.02	0.03	0.05	0.02	0.06	0.06	0.05	0.05	0.06	0.10	0.04	0.02	0.05	0.04	0.07	0.07
Np237 MDA rptd.:	0.03	0.03	0.02	0.03	0.02	0.01	0.87	0.02	0.05	0.06	0.07	0.12	0.05	0.02	0.07	0.05	0.07	0.07

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Iodine-129

Sample ID:	B09337	B09339	B09340	B09341	B09344	B09345	B09346	B09349	B09350	B09351	B09352	B09353	B09354	LCS	BLANK	B09337 DUP
Detector:	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 14	XSPEC 15	XSPEC 14	XSPEC 14	XSPEC 15	XSPEC 15	XSPEC 14
Count Time:	406.85	366.08	497.58	552.57	446.12	525.8	736.95	419.37	452.97	441.88	452.92	459.17	412.6	412.7	446.28	400.1
Gross cpm:	0.618	0.667	0.578	0.61	0.591	0.723	0.612	0.585	0.563	0.557	0.795	0.617	0.617	8.82	0.735	0.66
Bkg cpm:	0.701	0.607	0.664	0.665	0.786	0.753	0.568	0.598	0.604	0.593	0.516	0.732	0.608	0.843	0.92	0.634
Blank cpm:	-0.053	-0.08	-0.08	-0.08	-0.053	-0.088	-0.088	-0.08	-0.053	-0.053	-0.186	-0.08	-0.053	-0.186	-0.186	-0.053
Net cpm:	-0.083	0.06	-0.086	-0.055	-0.195	-0.03	0.044	-0.013	-0.041	-0.036	0.279	-0.115	0.009	7.977	-0.185	0.026
Lambda:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Corr. Days:	62.503	87.805	87.081	88.063	63.069	88.457	88.826	85.456	61.385	63.327	61.385	85.751	61.702	0	0	64.329
Decay:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Yield:	0.7992	0.7125	0.6171	0.6624	0.5521	0.5585	0.5569	0.803	0.7432	0.7549	0.7992	0.804	0.7607	0.8493	0.8263	0.5867
Aliquot:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PPT. Corr.:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Product:	7.99E-01	7.13E-01	6.17E-01	6.62E-01	5.52E-01	5.58E-01	5.57E-01	8.03E-01	7.43E-01	7.55E-01	7.99E-01	8.04E-01	7.61E-01	8.49E-01	8.26E-01	5.87E-01
P-factor:	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
Result Calc.:	-0.21	0.17	-0.29	-0.17	-0.73	-0.11	0.16	-0.03	-0.11	-0.10	0.72	-0.29	0.02	19.33	-0.46	0.09
Result Rptd.:	-0.21	0.17	-0.29	-0.17	-0.73	-0.11	0.16	-0.03	-0.11	-0.10	0.77	-0.29	0.03	20.60	-0.49	0.09
MDA Calc.:	0.50	0.55	0.57	0.50	0.73	0.65	0.48	0.45	0.47	0.47	0.41	0.48	0.48	0.51	0.53	0.65
MDA Rptd.:	1.75	1.77	2.00	1.64	2.50	2.11	1.70	1.53	1.52	1.57	1.78	1.64	1.55	1.95	2.17	2.12

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Plutonium 238/239

Sample ID:	B09337	B09339	B09340	B09341	B09344	B09345	B09346	B09349	B09350	B09351	B09352	B09353	B09354	LCS	BLANK	B09337 DUP
Detector:	SS-49	SS-50	SS-52	SS-53	SS-54	SS-57	SS-58	SS-60	SS-61	SS-62	SS-63	SS-64	SS-65	SS-66	SS-57	SS-58
Count time:	730.63	730.63	863.57	863.57	863.57	863.57	863.57	863.57	863.57	863.57	863.57	863.57	863.57	863.57	721.23	721.23
GMT, count:	313.089	313.089	314.031	314.031	314.031	314.031	314.031	314.031	314.031	314.031	314.031	314.031	314.031	314.031	314.808	314.808
Zero time:	258.292	258.292	258.292	258.292	258.292	259.292	259.292	259.292	260.292	260.292	260.292	259.292	260.292	314.031	314.808	258.292
Corr, tracer dpm:	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.88	4.86	4.86	4.86	4.86	4.86	4.86	4.86
Bkgd, count time:	2553.13	2553.13	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47	2390.47
Net, tracer counts:	685	727	1012	778	760	942	1033	892	620	767	731	800	728	516	377	727
Detector Eff:	0.3655	0.3549	0.3802	0.4812	0.3741	0.3575	0.3732	0.3801	0.4155	0.4067	0.4353	0.4109	0.4114	0.4133	0.3575	0.3732
Yield:	0.5278	0.5769	0.6342	0.3852	0.4841	0.6278	0.6595	0.5592	0.3555	0.4494	0.4001	0.4639	0.4216	0.2975	0.3009	0.5558
Pu239, gross counts:	3	2	0	3	3	2	0	1	2	0	0	1	4	228	1	1
Pu239, bkgd counts:	1	1	2	4	0	0	3	1	2	0	1	1	2	2	0	3
Pu-239, Lambda:	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08
Pu239 decay:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Pu238, gross counts:	3	6	1	6	3	3	1	1	3	1	2	3	0	0	1	2
Pu238, bkgd counts:	7	2	1	3	0	1	3	0	2	1	1	1	1	3	1	3
Pu-238, Lambda:	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05
Pu238 decay:	0.9988	0.9988	0.9988	0.9987	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	1.0000	1.0000	0.9988
Aliquot:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pu239, Result calc.:	0.006	0.003	-0.004	-0.003	0.009	0.005	-0.006	0.000	0.000	0.000	-0.003	0.000	0.006	0.959	0.006	-0.006
Pu239, Result rptd:	0.006	0.003	-0.004	-0.003	0.009	0.005	-0.006	0.000	0.000	0.000	-0.003	0.000	0.006	0.958	0.006	-0.006
Pu239, MDA calc.:	0.025	0.023	0.017	0.026	0.022	0.018	0.017	0.019	0.027	0.022	0.023	0.021	0.023	0.033	0.045	0.024
Pu239, MDA rptd.:	0.024	0.023	0.021	0.035	0.022	0.018	0.023	0.019	0.034	0.022	0.023	0.021	0.029	0.041	0.044	0.033
Pu238, Result calc.:	-0.013	0.012	0.000	0.008	0.009	0.005	-0.004	0.002	0.004	0.000	0.003	0.005	-0.003	-0.013	0.000	-0.003
Pu238, Result rptd.:	-0.013	0.012	0.000	0.008	0.009	0.005	-0.004	0.002	0.004	0.000	0.003	0.005	-0.003	-0.013	0.000	-0.003
Pu238, MDA calc.:	0.039	0.023	0.017	0.023	0.022	0.018	0.017	0.019	0.027	0.022	0.023	0.021	0.023	0.034	0.045	0.024
Pu238, MDA rptd:	0.049	0.029	0.017	0.031	0.022	0.018	0.023	0.019	0.034	0.022	0.023	0.021	0.023	0.047	0.004	0.033

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Uranium 233/4/5/8

Sample ID:	B09337	B09339	B09340	B09341	B09344	B09345	B09346	B09349	B09350	B09351	B09352	B09353	B09354	LCS	BLANK	B09337 DUP
Detector:	SS-3	SS-21	SS-19	SS-20	SS-21	SS-23	SS-24	SS-25	SS-26	SS-20	SS-19	SS-20	SS-23	SS-24	SS-25	SS-26
Sample count time:	171.25	151.23	171.25	171.25	171.25	171.25	171.25	171.25	171.25	135.73	166.13	166.13	166.13	166.13	166.13	166.13
GMT count:	315.835	337.104	315.835	315.835	315.835	315.835	315.835	315.835	315.835	317.151	315.958	315.958	315.958	315.958	315.958	315.958
Zero time:	258.292	256.292	258.292	256.292	258.292	259.292	259.292	259.292	260.292	260.292	260.292	259.292	260.292	315.958	315.958	258.292
Corr. tracer dpm:	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49
Bkgd count time:	2394.98	2559.45	2394.98	2394.98	2394.98	2394.98	2394.25	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98	2394.98
Net tracer counts:	376	219	324	238	296	316	394	381	259	267	332	229	378	431	283	347
Detector eff.:	0.2779	0.2476	0.2628	0.2666	0.2483	0.3117	0.3205	0.3069	0.281	0.2685	0.2628	0.2666	0.3117	0.3205	0.3069	0.281
Yield:	0.7539	0.5583	0.687	0.4974	0.6642	0.565	0.685	0.6919	0.5135	0.6992	0.7256	0.4934	0.6967	0.7724	0.5297	0.7092
U-238, gross counts:	29	29	40	21	36	45	54	177	4	35	32	4	62	357	1	30
U-238, bkgd counts:	0	0	0	0	0	0	0	0	0	0	0	0	1	21	0	0
U-238, Lambda:	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13	4.23E-13
U-238, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
U-235, gross counts:	3	0	3	0	2	4	2	4	0	3	2	1	6	208	1	1
U-235, bkgd counts:	1	0	0	1	0	0	1	0	0	0	0	1	0	1	0	0
U-235, Lambda:	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12	2.67E-12
U-235, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
U-235, branch ratio:	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826	0.826
U-233/4, gross counts:	49	20	45	18	43	46	54	193	3	26	38	9	51	325	5	56
U-233/4, bkgd counts:	3	1	3	2	2	2	4	2	2	1	3	2	3	27	1	3
U-233/4, Lambda:	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08
U-233/4, Decay corr:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Aliquot:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
U-238, result calc.:	0.36	0.62	0.58	0.42	0.57	0.67	0.65	2.19	0.07	0.62	0.46	0.08	0.76	3.68	0.02	0.41
U-238, result rptd:	0.36	0.62	0.58	0.42	0.57	0.67	0.65	2.19	0.07	0.62	0.46	0.62	0.76	3.68	0.02	0.41
U-238 MDA calc.:	0.10	0.17	0.11	0.15	0.12	0.11	0.09	0.10	0.14	0.14	0.11	0.16	0.10	0.23	0.13	0.10
U-238, MDA rptd.:	0.10	0.17	0.11	0.15	0.12	0.11	0.09	0.09	0.14	0.14	0.11	0.16	0.10	0.27	0.13	0.10
U-235, result calc.:	0.03	0.00	0.05	-0.02	0.04	0.07	0.01	0.06	0.00	0.06	0.03	0.00	0.09	2.74	0.02	0.02
U-235, result rptd.:	0.03	0.00	0.05	-0.02	0.04	0.07	0.01	0.06	0.00	0.06	0.03	0.00	0.09	2.75	0.20	0.02
U-235, MDA calc.:	0.12	0.20	0.14	0.18	0.15	0.14	0.11	0.12	0.17	0.16	0.13	0.19	0.12	0.10	0.15	0.13
U-235, MDA rptd.:	0.12	0.20	0.14	0.18	0.15	0.14	0.11	0.12	0.17	0.16	0.13	0.19	0.12	0.10	0.15	0.13
U-233/4, result calc.:	0.58	0.41	0.61	0.32	0.65	0.66	0.60	2.37	0.02	0.44	0.50	0.14	0.60	3.26	0.07	0.72
U-233/4, result rptd.:	0.58	0.41	0.61	0.32	0.65	0.66	0.60	2.37	0.02	0.44	0.50	0.14	0.60	3.26	0.07	0.72
U-233/4, MDA calc.:	0.10	0.17	0.12	0.15	0.12	0.11	0.11	0.10	0.14	0.14	0.11	0.16	0.10	0.27	0.13	0.11
U-233/4, MDA rptd.:	0.12	0.17	0.14	0.19	0.15	0.14	0.13	0.09	0.18	0.14	0.14	0.20	0.12	0.29	0.13	0.13

SAMPLE RESULT VERIFICATION, DATA PACKAGE B09355-TMA-615

B09340-TMA-623
Total Uranium

Standard	Intensity	Sample ID	Intens.	ug/L Calc.	ug/L Rptd	Amount of Smpl	Prep. Volume	Dilution	Calc Result	Rptd Rslt
0.049	550	B09337	12381	1.299	1.44546	0.25	0.02	10	1.16	1.16
0.156	1616	B09339	12230	1.283	1.42749	0.25	0.02	10	1.14	1.14
0.521	4752	B09340	14064	1.476	1.59388	0.25	0.02	10	1.28	1.28
0.976	9299	B09341	12719	1.334	1.44925	0.25	0.02	10	1.16	1.16
2.603	24306	B09344	16432	1.724	1.90677	0.25	0.02	10	1.53	1.53
4.881	44539	B09345	18611	1.953	2.19699	0.25	0.02	10	1.76	1.76
16.27	138416	B09346	13166	1.381	1.52099	0.25	0.02	10	1.22	1.22
Slope:	1.0E-04	B09349	57334	6.016	7.02795	0.25	0.02	10	5.62	5.62
		B09350	19517	2.048	2.16774	0.25	0.02	10	1.73	1.73
		B09351	14262	1.496	1.65985	0.25	0.02	10	1.33	1.33
		B09352	13864	1.455	1.63809	0.25	0.02	10	1.31	1.31
		B09353	19606	2.057	2.19145	0.25	0.02	1	0.18	0.18
		B09354	21081	2.212	2.43793	0.25	0.02	10	1.95	1.95
		LCS	14774	1.550	1.59504	0.25	0.02	10	1.28	1.28
		BLANK	-441	-0.046	0.036	0.25	0.02	1	0.003	0.003
		B09337 DUP	11946	1.253	1.42544	0.25	0.02	10	1.14	1.14

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