START 9613471.1340

B07925-TMA-392

0045058

TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P. O. Box 4040
Richmond, CA 94804-0040
(510) 235-2633 Fax No. (510) 235-0438

FEB 1993 RECEIVED SDLA

February 19, 1993

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N2-11-150-7125

Ms. Briana Colley
Westinghouse Hanford Company
2355 Stevens Drive
MSIN H4-23
345 Hills Street/3000 Area
Richland, WA 99352

Dear Ms. Colley:

Enclosed on the Summary Data Section are the ^{90}Sr, ^{3}H, and gamma scan results for the vegetation samples from 100A Location we received 13 November 1992. The QA/QC results are also given in the Summary Data Section. The Summary Data Section is numbered pages 1 to 42, and the appendices are numbered pages 42 to 283.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

Dinkar P. Kharkar, Ph.D.
Manager, Nuclear Programs

DPK/jv

Enclosures: Section 1 and 2
Appendices

SEP 1996 RECEIVED EDMC

SDG 7125 Contact Dinkar P. Kharkar	Client Westinghouse Hanford Contract MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

The result of the vegetation samples from Location 100A(TMA/Norcal Group 7125) are reported herein. TMA/Norcal Group 7125 is comprised of the twelve samples listed on the Chain-of-Custody documents and is identified as samples 1 through 12.

1.1 CHAINS-OF-CUSTODY

This report includes data from samples delivered under Chain-of-Custody documents Field Logbook No. WHC-N-444-1.

1.2 SAMPLE VOLUME

Ziplock bags containing the samples were received for the analyses.

1.3 MISSING SAMPLES

All samples were accounted for in an undamaged condition.

1.4 HOLDING TIMES

Samples were collected on 10/29/92 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control, a blank, and a replicate. All original analyses were performed with QC samples 7125-13, 14, 15.

The QC samples were prepared and labelled by the quality control officer. Copies of The QC notebook pages are included in the data package.

2.1 LABORATORY CONTROL SAMPLES

The LCS recoveries of all the nuclides were good and the MDA's of all the analytes meet the RDL requirements.

SDG 7125 Contact Dinkar P. Kharkar	Client Westinghouse Hanford Contract MBH-SVV-069262

CASE NARRATIVE

2.2 BLANKS

MDA's for all the analyses meet the RDL requirements.

2.3 REPLICATES

The relative percent difference between the replicate and the original were 47% and 35% for ^{90}Sr and ^{3}H respectively. The ^{90}Sr and ^{3}H data looked good and nothing abnormal was found. The MDA's for gamma nuclides were higher than the RDL due to the small sample aliquot available for analysis.

3.0 ANALYTICAL NOTES

3.1 Tritium Analysis: The average MDA for fifteen analyses was (0.1 ± 0.07) pCi/g. Positive concentration above the RDL was found in samples 7125-1, 2, 3, 4, 11, and 12. The rest of the samples had concentrations below the RDL.

3.2 Strontium-90 Analysis: The average yield for fifteen analyses was (77 ± 16)%. The lowest yield was 50% and the highest was 84%. The average MDA was (0.8 ± 0.2) pCi/g. Positive ^{90}Sr concentration above the RDL was found in samples 7125-1, 2, 3, 4, 5, and 10. The rest of the samples had concentrations below the RDL.

3.3 Gamma Scan Analyses: Gamma scan analysis did not find positive concentration of gamma nuclides in any of the samples. All sample MDA's were above the RDL due to small aliquots available for analysis.

N211150-01

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07925

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-01	Client sample id	B07925
Dept sample id	7125-001	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	67.8	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	9.9	1.5	0.8	2		Y
Tritium	10028-17-8	3.0	0.17	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		8		U	GAM
Iron 59		U		3	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.6	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		6		U	GAM
Cesium 134	17967-70-9	U		0.6		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.8		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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N211150-02

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07926

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-02	Client sample id	B07926
Dept sample id	7125-002	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	79.5	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	23	1.9	0.7	2		Y
Tritium	10028-17-8	1.2	0.14	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		10		U	GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		40		U	GAM
Cobalt 60	10198-40-0	U		0.7	0.05	U	GAM
Zinc 65	17982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		6		U	GAM
Cesium 134	17967-70-9	U		0.7		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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N211150-03

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07927

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-03	Client sample id	B07927
Dept sample id	7125-003	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	66.9	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	13	0.83	0.8	2		Y
Tritium	10028-17-8	1.0	0.12	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	5.4	3.1				GAM
Iron 59		U		3	0.05	U	GAM
Chromium 51	14392-02-0	U		20		U	GAM
Cobalt 60	10198-40-0	U		0.4	0.05	U	GAM
Zinc 65	17982-39-3	U		0.8		U	GAM
Ruthenium 106	13967-48-1	U		3		U	GAM
Cesium 134	17967-70-9	U		0.4		U	GAM
Cesium 137	10045-97-3	U		0.3	0.05	U	GAM
Europium 152	14683-23-9	U		0.7	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-67-7	U		0.7		U	GAM
Thorium 228	14274-82-9	U		0.7		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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N211150-04

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07928

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-04	Client sample id	B07928
Dept sample id	7125-004	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	55.6	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	7.1	1.2	0.8	2		Y
Tritium	10028-17-8	3.8	0.16	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		10		U	GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		40		U	GAM
Cobalt 60	10198-40-0	U		0.6	0.05	U	GAM
Zinc 65	17982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		7		U	GAM
Cesium 134	17967-70-9	U		0.7		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

N211150-05

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07929

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-05	Client sample id	B07929
Dept sample id	7125-005	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	49.6	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	43	3.0	0.7	2		Y
Tritium	10028-17-8	0.39	0.075	0.09	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	9.8	8.5				GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		40		U	GAM
Cobalt 60	10198-40-0	U		0.9	0.05	U	GAM
Zinc 65	17982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		7		U	GAM
Cesium 134	17967-70-9	U		0.8		U	GAM
Cesium 137	10045-97-3	U		0.7	0.05	U	GAM
Europium 152	14683-23-9	U		1	0.1	U	GAM
Europium 154	15585-10-1	U		0.8	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		1		U	GAM
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

N211150-06

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07930

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-06	Client sample id	B07930
Dept sample id	7125-006	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	58.0	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	-0.37	1.5	0.8	2	U	Y
Tritium	10028-17-8	0.34	0.074	0.09	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	4.6	3.6				GAM
Iron 59		U		4	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.4	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	17967-70-9	U		0.5		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		0.8		U	GAM
Thorium 228	14274-82-9	U		0.7		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

N211150-07

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07931

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-07	Client sample id	B07931
Dept sample id	7125-007	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	79.3	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	0.16	0.25	0.7	2	U	Y
Tritium	10028-17-8	0.26	0.099	0.1	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.7	6.9				GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		40		U	GAM
Cobalt 60	10198-40-0	U		0.7	0.05	U	GAM
Zinc 65	17982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		7		U	GAM
Cesium 134	17967-70-9	U		0.7		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Europium 152	14683-23-9	U		0.8	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

N211150-08

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07932

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-08	Client sample id	B07932
Dept sample id	7125-008	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	54.4	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	0.068	0.22	0.8	2	U	Y
Tritium	10028-17-8	0.34	0.077	0.1	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.0	6.4				GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.6	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	17967-70-9	U		0.8		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		2		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
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N211150-09

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07933

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-09	Client sample id	B07933
Dept sample id	7125-009	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	74.9	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	0.35	0.25	0.8	2	U	Y
Tritium	10028-17-8	0.12	0.089	0.1	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		10		U	GAM
Iron 59		U		4	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.7	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	17967-70-9	U		0.6		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Europium 152	14683-23-9	U		1	0.1	U	GAM
Europium 154	15585-10-1	U		0.7	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
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Form	DVD-DS
Version	2.22
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N211150-10

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07934

SDG 7125
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N211150-10
Dept sample id 7125-010
Received 11/13/92
% moisture 78.5
Client sample id B07934
Matrix BIOTA
Collected 10/29/92
Chain of custody id WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	88	3.0	0.8	2		Y
Tritium	10028-17-8	0.26	0.092	0.1	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	5.0	3.1				GAM
Iron 59		U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		10		U	GAM
Cobalt 60	10198-40-0	U		0.2	0.05	U	GAM
Zinc 65	17982-39-3	U		0.5		U	GAM
Ruthenium 106	13967-48-1	U		2		U	GAM
Cesium 134	17967-70-9	U		0.2		U	GAM
Cesium 137	10045-97-3	U		0.2	0.05	U	GAM
Europium 152	14683-23-9	U		0.3	0.1	U	GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	U		0.4		U	GAM
Thorium 228	14274-82-9	U		0.3		U	GAM
Thorium 232	7440-29-1	U		0.8		U	GAM

Lab id TMAN
Protocol WHC-HEIS
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N211150-11

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07935

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-11	Client sample id	B07935
Dept sample id	7125-011	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	61.9	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	-0.16	1.9	1	2	U	Y
Tritium	10028-17-8	1.8	0.13	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	4.8	3.2				GAM
Iron 59		U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		10		U	GAM
Cobalt 60	10198-40-0	U		0.2	0.05	U	GAM
Zinc 65	17982-39-3	U		0.5		U	GAM
Ruthenium 106	13967-48-1	U		2		U	GAM
Cesium 134	17967-70-9	U		0.2		U	GAM
Cesium 137	10045-97-3	U		0.2	0.05	U	GAM
Europium 152	14683-23-9	U		0.3	0.1	U	GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	U		0.4		U	GAM
Thorium 228	14274-82-9	U		0.3		U	GAM
Thorium 232	7440-29-1	U		0.8		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
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N211150-12

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07936

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-12	Client sample id	B07936
Dept sample id	7125-012	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	89.2	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	0.55	0.27	0.8	2	U	Y
Tritium	10028-17-8	0.75	0.11	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		10		U	GAM
Iron 59		U		4	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.5	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	17967-70-9	U		0.5		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.8		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

9613471.1355

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator C.E. Heiden

Company Contact Dan Landeen Telephone 376-1038

Project Designation/Sampling Locations 100 Area Biota Sampling Collection Date 10/29/92

Ice Chest No. RM #110 Field Logbook No. WHC-N-444-1

Bill of Lading/Airbill No. 251900694 1 Offsite Property No. W93-0-0002 #42

Method of Shipment Emery

Shipped to TMA / NORCAL

Possible Sample Hazards/Remarks N/A

Sample Identification

B07926	Ziplock Bag - Leaves	B07925	Ziplock Bag - Twigs
B07927		B07928	
B07931		B07929	
B07933		B07930	
B07934		B07932	
B07936		B07935	

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)		
Relinquished by: C.E. Heiden C.E. Heiden	Received by: Kermit Blum	Date/Time: 11-13-92 1400
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: CK 11-5-93

Comments:

9613471.1356

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

Collector: Dan Landeen / Ron Mitchell Date: 11/19/92

Company Contact: Dan Landeen Telephone: (509) 376-1038

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B07925	X	10/29/92	0845	1 Ziplock Bag Total Gamma, Sr-90, Tritium / Lab SOP
B07926	X		0845	
B07927	X		0850	
B07928	X		0850	
B07929	X		0945	
B07930	X		0915	
B07931	X		0915	
B07932	X		0920	
B07933	X		0920	
B07934	X		0945	
B07935	X		0940	
B07936	X	10/29/92	0940	1 Ziplock Bag Total Gamma, Sr-90, Tritium / Lab SOP

*Type of Sample: A = Air; DL = Drum Liquids; DS = Drum Solids; L = Liquid; O = Oil; S = Soil; SE = Sediment; SL = Sludge; SO = Solid; T = Tissue; W = Water; WI = Wipe; X = Other

Field Information: X = Tree Leaves and Twigs

Special Handling and/or Storage: N/A

Possible Sample Hazards: N/A

CK 11-5-93

~~43~~

A-6000-406 (06/91)

9613471.1357

Next Day Delivery

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
Westinghouse Hanford Co.		W93-0-0002 #42

PART I – TO BE COMPLETED BY ORIGINATOR

Department Environ. Eng.	Section Site Remediation	Unit
The following items are to be shipped from	☑ Contractor	☐ Vendor
Routing Emery	☑ Contractor	☐ Vendor
Shipped to TMA/NORCAL 2030 Wright Ave. Richmond, CA 94804	Off-site Custodian Robert Fox	
	Full Title Sample Receipt	

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 32 lbs	Poly ice chest (RM #110) containing ziplock bags of tree leaves & twigs packed in vermiculite & blue ice. Sample #s – B07925 thru B07936	

RECEIVED
NOV 12 1992
PROPERTY RECORDS

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

Necessity for the Off-Site Use of this Property

Program not available onsite.
Bill of Lading 251900694 1

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

RM Clearance for Public Release: C Rumsmoke	RM Survey No. 346	Date 11-12-92
Location of Property (Area & Bldg.) 100A Rota – 100BC & 100K	Contact Don Lanicen	Phone 376-1038
Date Ready for Shipment 11-12-92	Cost Code to be Charged PE7/C 81323	Approximate Date This Property will be Returned N/A
Originated By N. G. Lucas	Date 11-12-92	Authorized By [signature] Date 11/12/92
Signature and Name of Property Control	Custodian Date	Property Management Approval [signature] Date 11/12/92

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
[signature] Date 11-12-92				

DISTRIBUTION

By Originator	Shipping Operation – Sign all Copies and Forward to:
White, Green, Yellow, Pink – Property Management Goldenrod – Retain	White – Property Management Green – Property Control Custodian (Issuing Office) Yellow – Retain Pink – Originator

54-3000-479 (09/89)

~~45A~~ CK 11-5-93

FORM OF PAYMENT

Check [X] GBL [ ] FCCOD [ ]

Bill to Shipper [XX] Bill to Consignee [ ] Third Party Billing [ ]

Shipper's Account Number: E 850281585

EMERY WORLDWIDE

A CF Company

SERVICES **

UNITED STATES / CANADA: Same Day (Extra Charges) [ ] AM [XX] PM [ ] Second Day [ ] Saturday Delivery

INTERNATIONAL: Express [ ] Standard Plus [ ] Preferred [ ] Standard [ ] Business Documents [ ] Customs Clearance [ ] Delivery [ ]

Date: 11-12-92 Origin: PSC Shipment Control No.: 251900694 1

From:
WESTINGHOUSE SHIPPING DEPT (509) 376-6665
U.S. DEPARTMENT OF ENERGY C/O
WESTINGHOUSE HANFORD
BLDG 1163
2355 STEVENS DRIVE
RICHLAND WA
Canada [ ]

To:
ROBERT FOX
RMA?NORCAL
2030 WRIGHT AVENUE
RICHMOND CA
Hold for Pick Up [ ]
Canada [ ]

Tariff Dest. | Gateway

$

EMERY WORLDWIDE will accept Consignee's check with all risks being assumed by Shipper, including but not limited to non-payment, fraud and misrepresentation.

Customer's Reference Numbers: W81323 PE71C W93-0-0002 #4299352

Consignee's Account Number: E 94804

Description	Pcs.	L	W	H	Total Pieces	Total Weight (In Lbs.)
1 ICE CHEST RM#110 SAMPLES B07925 thru B07936	1	[illegible]	14	17	1	32

FOR INFORMATION OR RATES CALL 1-800 44 EMERY (1-800-443-6379)

Declared Value $

2 5 1 9 0 0 6 9 4 1

Remarks: OVERNIGHT DELIVERY

Shipper's Signature: X [illegible] 11/12/92

Zip Ship [ ]
For shipments within the 50 United States Shipper has the option to check this box and, by checking, agrees that the Zip Ship conditions, described in the area to the right, apply.

Mark if Emery Packaging is used
Urgent Letter 9X12 [X] Urgent Pack 12X15 [X]

International Shipments: Free Domicile [ ] Commodity Code

Third Party Account Number mandatory for Third Party Billing. Third Party Account Number: E

International Customs Value | International Insurance

Base Charge

Total Transportation Charges | Other Charges/Advance at Origin [ ] OC/AO- $

1-OAK-A

Terms and Conditions on Back

OK 11-5-93

54

458

9613471.1359

PAGE 1 TMA/Normal CHAIN OF CUSTODY ORD # N2-11-150

RCVD: 11/13/92 DUE: 12/28/92 11/20/92 16:44:05 KEEP: 03/28/93 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS		
	01A-V B07925	SCA2(1)	GLY	H_DST	Y90
	02A-V B07926	SCA2(1)	GLY	H_DST	Y90
	03A-V B07927	SCA2(1)	GLY	H_DST	Y90
	04A-V B07928	SCA2(1)	GLY	H_DST	Y90
	05A-V B07929	SCA2(1)	GLY	H_DST	Y90
	06A-V B07930	SCA2(1)	GLY	H_DST	Y90
	07A-V B07931	SCA2(1)	GLY	H_DST	Y90
	08A-V B07932	SCA2(1)	GLY	H_DST	Y90
	09A-V B07933	SCA2(1)	GLY	H_DST	Y90
	10A-V B07934	SCA2(1)	GLY	H_DST	Y90
	11A-V B07935	SCA2(1)	GLY	H_DST	Y90
	12A-V B07936	SCA2(1)	GLY	H_DST	Y90
	13A-~~V QC LCS~~	n/a	GLY	H_DST	Y90
	14A-V ~~QC blank~~	n/a	GLY	H_DST	Y90
	15A-V ~~QC dup of~~ 01	n/a	GLY	H_DST	Y90

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
Kermit Blum	1-25-93			J. Bielski	1-25-93
T Cay	3/1/93	SCA		Al Hobaf	3-1-93

55

ck 11-5-93

~~45C~~

N211150 DPK WHC
7125 11/13/92 15 samps
100 area biota

9613471.1360

XMP 3/14/93

100 AREA BIOTA RADIOCHEMICAL DATA VALIDATION REPORT

FOR SDG N2-11-150-7125 (Leaves and Twigs)

The 100 Area Biota Radiochemical Validation was performed to the requirements outlined in the draft procedure titled "Data Validation Procedure for Radiological Analysis, Rev. 0, June 18, 1991."

The SDG consisted of 12 samples. Six samples were identified on the chain of custody as being "Leaves" and the other six were identified on the chain of custody as "Twigs". All samples were analyzed at the Thermo Analytical Laboratory Norcal Laboratory. Radiological parameters of interest were: Gross Gamma Scan, Strontium - 90, and Tritium.

The radiological validation process, in part, is a detailed and in-depth technical review of the laboratory counting systems used, standards and quality control used in analyzing the samples. Review of chain of custody requirements, completeness of data reported and contract required detection limits are also part of the validation process. The technical review of the laboratory counting systems is documented on the attached appendices taken from the radiological data validation procedure. Sample analysis batch Quality Control (QC) and instrument performance are reviewed on an individual delivery group basis.

Data limitations and explanation of qualifiers for SDG # N2-11-150-7125

STRONTIUM-90

The processing group contains the following sample numbers: B07925, B07926, B07927, B07928, B07929, B07930, B07931, B07932, B07933, B07934, B07935, and B07936.

The relative percent difference on the sample and duplicate sample, 47%, exceeds the validation acceptance limit of 35%. Qualify all results greater than the LLD as "J" estimated and all results less than the LLD as "UJ" estimated non-detectable.

All other QC samples and method specific requirements are within acceptable limits.

9613471.1361

xnp 3/4/93

100 AREA BIOTA RADIOCHEMICAL DATA VALIDATION REPORT

FOR SDG N2-11-150-7125 (Leaves and Twigs)

GAMMA SCAN

The processing group contains the following sample numbers: B07925, B07926, B07927, B07928, B07929, B07930, B07931, B07932, B07933, B07934, B07935, and B07936.

All QC samples and method specific requirements are within acceptable limits. Do to the limited amount of sample mass that could be provided for these samples, the laboratory could not obtain required detection limits.

TRITIUM

The processing group contains the following sample numbers: B07925, B07926, B07927, B07928, B07929, B07930, B07931, B07932, B07933, B07934, B07935, and B07936.

The relative percent difference on the sample and duplicate sample, 37%, exceeds the validation acceptance limit of 35%. Qualify all results greater than the LLD as "J" estimated and all results less than the LLD as "UJ" estimated non-detectable.

All other QC samples and method specific requirements are within acceptable limits.

9613471.1362

XnP 3/14/93

N211150-01

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07925

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-01	Client sample id	B07925
Dept sample id	7125-001	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	67.8	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	9.9 J	1.5	0.8	2		Y
Tritium	10028-17-8	3.0 J	0.17	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		8		U	GAM
Iron 59		U		3	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.6	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		6		U	GAM
Cesium 134	17967-70-9	U		0.6		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.8		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

9613471.1363

XnP 3/14/93

N211150-02

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07926

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-02	Client sample id	B07926
Dept sample id	7125-002	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	79.5	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	23 J	1.9	0.7	2		Y
Tritium	10028-17-8	1.2 J	0.14	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		10		U	GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		40		U	GAM
Cobalt 60	10198-40-0	U		0.7	0.05	U	GAM
Zinc 65	17982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		6		U	GAM
Cesium 134	17967-70-9	U		0.7		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

9613471.1364

XNP 3/14/93

N211150-03

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07927

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-03	Client sample id	B07927
Dept sample id	7125-003	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	66.9	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Strontium 90	10098-97-2	13 J	0.83	0.8	2		Y
Tritium	10028-17-8	1.0 J	0.12	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	5.4	3.1				GAM
Iron 59		U		3	0.05	U	GAM
Chromium 51	14392-02-0	U		20		U	GAM
Cobalt 60	10198-40-0	U		0.4	0.05	U	GAM
Zinc 65	17982-39-3	U		0.8		U	GAM
Ruthenium 106	13967-48-1	U		3		U	GAM
Cesium 134	17967-70-9	U		0.4		U	GAM
Cesium 137	10045-97-3	U		0.3	0.05	U	GAM
Europium 152	14683-23-9	U		0.7	0.1	U	GAM
Europium 154	15585-10-1	U		0.4	0.1	U	GAM
Radium 226	13982-67-7	U		0.7		U	GAM
Thorium 228	14274-82-9	U		0.7		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	3.22
Report date	02/19/93

9613471.1365

XnP 3/14/93

N211150-04

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07928

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-04	Client sample id	B07928
Dept sample id	7125-004	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	55.6	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	7.1 J	1.2	0.8	2		Y
Tritium	10028-17-8	3.8 J	0.16	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		10		U	GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		40		U	GAM
Cobalt 60	10198-40-0	U		0.6	0.05	U	GAM
Zinc 65	17982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		7		U	GAM
Cesium 134	17967-70-9	U		0.7		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

9615471.1366

XnP 3/14/93

N211150-05

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07929

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-05	Client sample id	B07929
Dept sample id	7125-005	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	49.6	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	43 J	3.0	0.7	2		Y
Tritium	10028-17-8	0.39 J	0.075	0.09	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	9.8	8.5				GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		40		U	GAM
Cobalt 60	10198-40-0	U		0.9	0.05	U	GAM
Zinc 65	17982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		7		U	GAM
Cesium 134	17967-70-9	U		0.8		U	GAM
Cesium 137	10045-97-3	U		0.7	0.05	U	GAM
Europium 152	14683-23-9	U		1	0.1	U	GAM
Europium 154	15585-10-1	U		0.8	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		1		U	GAM
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

9613471.1367

XnP 3/14/93

N211150-06

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07930

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-06	Client sample id	B07930
Dept sample id	7125-006	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	58.0	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	-0.37 UJ	1.5	0.8	2	U	Y
Tritium	10028-17-8	0.34 J	0.074	0.09	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	4.6	3.6				GAM
Iron 59		U		4	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.4	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	17967-70-9	U		0.5		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		0.8		U	GAM
Thorium 228	14274-82-9	U		0.7		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

9613471.1368

XNP 3/14/93

N211150-07

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07931

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-07	Client sample id	B07931
Dept sample id	7125-007	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	79.3	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	0.16 UJ	0.25	0.7	2	U	Y
Tritium	10028-17-8	0.26 J	0.099	0.1	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.7	6.9				GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		40		U	GAM
Cobalt 60	10198-40-0	U		0.7	0.05	U	GAM
Zinc 65	17982-39-3	U		2		U	GAM
Ruthenium 106	13967-48-1	U		7		U	GAM
Cesium 134	17967-70-9	U		0.7		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Europium 152	14683-23-9	U		0.8	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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N211150-08

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07932

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-08	Client sample id	B07932
Dept sample id	7125-008	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	54.4	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	0.068 UJ	0.22	0.8	2	U	Y
Tritium	10028-17-8	0.34 J	0.077	0.1	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	7.0	6.4				GAM
Iron 59		U		5	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.6	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	17967-70-9	U		0.8		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		2		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		3		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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N211150-09

TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07933

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-09	Client sample id	B07933
Dept sample id	7125-009	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	74.9	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Strontium 90	10098-97-2	0.35 UJ	0.25	0.8	2	U	Y
Tritium	10028-17-8	0.12 J	0.089	0.1	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		10		U	GAM
Iron 59		U		4	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.7	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	17967-70-9	U		0.6		U	GAM
Cesium 137	10045-97-3	U		0.6	0.05	U	GAM
Europium 152	14683-23-9	U		1	0.1	U	GAM
Europium 154	15585-10-1	U		0.7	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.9		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07934

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-10	Client sample id	B07934
Dept sample id	7125-010	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	78.5	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	88 J	3.0	0.8	2		Y
Tritium	10028-17-8	0.26 J	0.092	0.1	0.5	J	H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	5.0	3.1				GAM
Iron 59		U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		10		U	GAM
Cobalt 60	10198-40-0	U		0.2	0.05	U	GAM
Zinc 65	17982-39-3	U		0.5		U	GAM
Ruthenium 106	13967-48-1	U		2		U	GAM
Cesium 134	17967-70-9	U		0.2		U	GAM
Cesium 137	10045-97-3	U		0.2	0.05	U	GAM
Europium 152	14683-23-9	U		0.3	0.1	U	GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	U		0.4		U	GAM
Thorium 228	14274-82-9	U		0.3		U	GAM
Thorium 232	7440-29-1	U		0.8		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07935

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-11	Client sample id	B07935
Dept sample id	7125-011	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	61.9	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALIFIERS	TEST
Strontium 90	10098-97-2	-0.16 UJ	1.9	1	2	U	Y
Tritium	10028-17-8	1.8 J	0.13	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	4.8	3.2				GAM
Iron 59		U		2	0.05	U	GAM
Chromium 51	14392-02-0	U		10		U	GAM
Cobalt 60	10198-40-0	U		0.2	0.05	U	GAM
Zinc 65	17982-39-3	U		0.5		U	GAM
Ruthenium 106	13967-48-1	U		2		U	GAM
Cesium 134	17967-70-9	U		0.2		U	GAM
Cesium 137	10045-97-3	U		0.2	0.05	U	GAM
Europium 152	14683-23-9	U		0.3	0.1	U	GAM
Europium 154	15585-10-1	U		0.2	0.1	U	GAM
Radium 226	13982-67-7	U		0.4		U	GAM
Thorium 228	14274-82-9	U		0.3		U	GAM
Thorium 232	7440-29-1	U		0.8		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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TMA NORCAL
REPORTING GROUP 7125

DATA SHEET

B07936

SDG	7125	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N211150-12	Client sample id	B07936
Dept sample id	7125-012	Matrix	BIOTA
Received	11/13/92	Collected	10/29/92
% moisture	89.2	Chain of custody id	WHC-N-444-1

PARAMETER	CAS NO	RESULT pCi/G	2σ ERR (COUNT)	MDA pCi/G	RDL pCi/G	QUALI-FIERS	TEST
Strontium 90	10098-97-2	0.55 UJ	0.27	0.8	2	U	Y
Tritium	10028-17-8	0.75 J	0.11	0.1	0.5		H
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	U		10		U	GAM
Iron 59		U		4	0.05	U	GAM
Chromium 51	14392-02-0	U		30		U	GAM
Cobalt 60	10198-40-0	U		0.5	0.05	U	GAM
Zinc 65	17982-39-3	U		1		U	GAM
Ruthenium 106	13967-48-1	U		5		U	GAM
Cesium 134	17967-70-9	U		0.5		U	GAM
Cesium 137	10045-97-3	U		0.5	0.05	U	GAM
Europium 152	14683-23-9	U		0.9	0.1	U	GAM
Europium 154	15585-10-1	U		0.6	0.1	U	GAM
Radium 226	13982-67-7	U		1		U	GAM
Thorium 228	14274-82-9	U		0.8		U	GAM
Thorium 232	7440-29-1	U		2		U	GAM

Lab id	TMAN
Protocol	WHC-HEIS
Version	Ver 1.0
Form	DVD-DS
Version	2.22
Report date	02/19/93

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Supplemental Requirements for Analyses Using
Gamma Spectroscopy

C.0 Completeness Checklist

Analysis Results

0 Results Report for Sample Analyses and Reanalyses
0 Raw Data (Spectra, Printouts of Counts per Channel, Notebook Pages)
0 Calculation Sheets
0 Sample Identifications
0 Detector Identification and Counting Position
0 Analysis Date and Initials of Analyst
0 Amounts of Samples Counted

Initial and Continuing Calibration

0 Detector Identification
0 Calibration Date(s) and Initials of Analyst
0 Identification of Calibration and Check Standards including Radionuclides, Certification, Expiration Date, and Activity
0 Amount of (Check) Standard Used
0 Raw Data including Counts and Count Duration for Standards
0 Efficiencies and/or Geometry and Matrix Factors
0 Raw Data of Background Counts, Count Dates, and Duration of Counts
0 Kev/Channel
0 FWHM

Blanks

0 Detector Identification
0 Date of Analysis
0 MDA of Method
0 Amounts of Reagents Used in Blank
0 Raw Data

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Supplemental Requirements for Analyses Using Gamma Spectroscopy (Cont.)

Duplicates

O Detector Identification
O Date of Analysis
O Amounts of Samples
O Count Durations
O Sample Identifications
O Results of Analyses and Calculated Precision
O Raw Data

Radiometric and Gravimetric Yields

N/A Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used
N/A Weights of Precipitates or Solids Counted
N/A Calculated Recoveries

Laboratory Control Samples

O Detector Identification
O Date of Analysis
O Calculation of Recoveries
O Results of Analyses

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Supplemental Requirements for the Analysis of Tritium Using Liquid Scintillation Counting

F.0 Completeness Checklist

Analysis Results

O Results Report for Sample Analyses and Reanalyses
O Raw Data (Gross Counts, Notebook Pages, etc.)
O Calculation Sheets
O Sample Identifications
O Instrument Identification
O Analysis Date and Analyst Initials
O Amounts of Samples Counted
O Background Counts Associated with Each Sample Result

Initial and Continuing Instrument Calibration

O Instrument Identification
O Identification of Calibration Standards including Radionuclides, Certification, Expiration Date and Activity
O Amount of Standard Used for Calibration
O Raw Data (Gross Counts, Count Duration, Background Count, and Background Count Duration)
O Counting Efficiency Determination Method and Results
N/A Quench Correction Method

Blanks

O Instrument Identification
O Date of Analysis
O MDA of Method
O Amounts of Reagents Used
O Lot Numbers of Reagents Used
O Raw Data
O Tritium Levels in Background Water

Duplicates

O Instrument Identification
O Date of Analysis
O Amounts of Samples
N/A Amount of Spike for Spiked Duplicates
O Raw Data (Gross Counts, Count Duration, Background Counts, and Background Count Duration)

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Radiometric and Gravitimetric Yields

O Amount of Tritium Standard Used for Radiometric Yield Determination
X Radiometric Yield Calculations and Results

Laboratory Control Samples

O Instrument Identification
O Date of Analysis
O Calculated Recoveries
O Results of Analyses

F.1 General

Scope

This Appendix provides supplemental information used for validating analytical data from the determination of tritium in water using liquid scintillation counting.

Applicability

The validation criteria in this appendix are intended to be applied in addition to those found in the body of the procedure. In cases where discrepancies exist between the requirements of the procedure and the appendix, the criteria in the appendix shall apply.

F.2 Calibration

Liquid scintillation counting systems are calibrated using NIST traceable external or internal standards. The chemical and physical matrix of the standards should resemble the samples as closely as possible in order to match light emission (scintillation) and quenching properties.

- If the matrix of the sample is not representative of that for the samples, qualify all associated results as estimated, (J).

Most automated liquid scintillation systems are capable of processing many more samples than is normally contained in an SDG. As a minimum, one calibration standard should be included with every analytical run of samples. An analytical run can be comprised of more than one SDG.

- Qualify the results associated with runs lacking calibration standards as unusable, (R).

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Supplemental Requirements for Analyses Using Gas Proportional Counters

A.0 Completeness Checklist

Analysis Results

- O Results Report for Sample Analyses and Reanalyses
- O Raw Data (Counting Logs, Printouts, Notebook Pages)
- O Calculation Sheets
- O Sample Identifications
- O Detector Identification
- O Analysis Date and Initials of Analyst
- O Amounts of Samples Prepared or Counted
- O Weights of Solids Counted

Initial and Continuing Calibration

- O Detector Identification
- O Calibration Date(s) and Initials of Analyst
- O Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity
- O Amount of (Check) Standard Used
- O Raw Data including Counts and Count Duration for Standards
- O Weights of Preparations
- O Efficiencies
- O Weights of Carriers Added, If Applicable
- O Results of Statistical Tests Used to Evaluate Instrument Reliability and Efficiency Checks
- O Raw Data of Background Counts and Count Duration
- O Results of Statistical Test Used to Evaluate Instrument Background
- O Control Limits for Check Source and Background Counts

Blanks

- O Detector Identification
- O Date of Analysis
- O MDA of Method
- O Amounts of Reagents Used in Blank

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Supplemental Requirements for Analyses Using Gas Proportional Counters (Cont.)

Radiometric and Gravimetric Yields

O Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used
O Weights of Precipitates or Solids Counted
O Calculated Recoveries

Duplicates

O Detector Identification
O Date of Analysis
O Aliquots of Samples
O Weights of Solids Counted
O Count Durations
O Sample Identifications
O Calculated Precision

Laboratory Control Samples

O Detector Identification
O Date of Analysis
O Calculation of Recoveries
O Results of Analyses