

A4CM-ZR-0011
Revision A.

**AREA IV RADIOLOGICAL
CHARACTERIZATION SURVEY**

FINAL REPORT

Volume III

**Santa Susana Field Laboratory
Rocketdyne Division
Rockwell International**

August 15, 1996

TMA Laboratory Data Sheets

2030 Wright Avenue

P.O. Box 4040

Richmond, CA 94804-0040

(510) 235-2633 Fax: 235-0438

April 21, 1995

Mr. Alex Klein
Rockwell International Corp.
Rocketdyne Division
6633 Canoga Ave.
Canoga Park, CA 91303

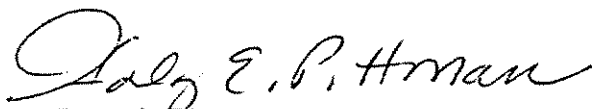
Ref: Customer P.O. No. R44PJZ94034044
TMA/Richmond Report N5-03-062-6108
Report N5-03-063-6109

Dear Mr. Klein:

The enclosed data report is for the radiochemical analyses of the twenty-one soil and two water samples collected March 6 through 9, 1995. The samples were received at TMA/Richmond on March 15, 1995. The accompanying case narrative discusses all parameters which are underlined in the data report that are not in compliance with the Statement of Work.

If you have any questions regarding this data, or any problems with either the hard copy or electronic deliverable diskette, please call me at (510) 235-2633.

Sincerely,



Italy E. Pittman
Program Manager

Enclosure: Data Report N5-03-001-6108 (rinsate)
Data Report N5-03-002-6109 (soil)
Electronic diskette 6108, 6109

DOCUMENT INVENTORY FOR SAMPLE DELIVERY GROUP 6108 AND 6109

SECTION 1 Case Narrative

SECTION 2 Summary Data Section

X APPENDIX 1 Chains-of-Custody Copies

SECTION 1 Case Narrative

TMA/Richmond

Report N5-03-062-6108

Report N5-03-063-6109

Sample Delivery Group 6108/6109

Case Narrative

Rockwell International Corp.

Contract R44PJZ94034044

April 21, 1995

1.0 GENERAL

TMA/Richmond Sample Delivery Group 6108 consists of two liquid samples, and SDG 6109 consists of twenty-one soil samples. These samples were received on March 15, 1995.

2.0 ANALYTICAL NOTES

The internal quality control consists of 5% each of laboratory control samples, blanks and duplicates. The QC samples are prepared by the Quality Control Department, and copies of the QC Notebook pages are included with the data package.

The blanks and laboratory control samples are created using the 1989 ASTM formula for moderately hard water, listed in Table 8010: *Recommended Composition for Reconstituted Fresh Water*. This consists of the following:

NaHCO ₃	96 mg/L
CaSO ₄ ·2H ₂ O	60 mg/L
MgSO ₄	60 mg/L

KCl at 4.0 mg/L - specified in the table - is not added since KCl contains natural ⁴⁰K which raises the gamma background spectra considerably.

2.1 Tritium Analyses

6108 (rinsate) and 6109 (soils)

No problems were associated with either SDG during the analyses.

2.2 Strontium-90 Analyses

6108 (Rinsate)

The LCS was counted for less than the nominal 200 minutes count time required; however, the RDL was achieved despite the shorter count time. The average yield for 3 samples was 76% ± 24%.

6109 (Soil)

Several samples were counted for less than the 200 minute nominal count time; however, the RDL was achieved for all samples despite the shorter count time. The average yield for 24 samples was 82% ± 16%.

TMA/Richmond

Report N5-03-062-6108

Report N5-03-063-6109

Sample Delivery Group 6108/6109

Case Narrative

Rockwell International Corp.

Contract R44PJZ94034044

April 21, 1995

2.3 Thorium 228, 230, 232 Analyses

6108 (Rinsate)

The reagent blank and sample A4CM-95-0026 have count times less than the 500 minute nominal count time; however, both samples' MDA were less than the RDL despite the shorter counting times. The average yield for 3 samples was $72\% \pm 21\%$.

6109 (Soil)

Several samples have count times less than the nominal 500 minutes required; however, all of the sample MDA's were less than the RDL despite the shorter count times. Due to a poor chemical yield during the initial analysis, sample A4CM-95-0028 was re-aliquoted and re-analyzed in sample prep-batch# 2781-070A. No problems were associated with this sample prep group. The average yield for 26 samples was $59\% \pm 22\%$.

2.4 Uranium 233/234, 235, 238 Analyses

6108 (Rinsate)

The MDA for the LCS was greater the RDL; however, this is not a problem since the activity of the LCS is significantly greater than the MDA. The average yield for 3 samples was $56\% \pm 6\%$.

6109 (Soil)

Samples A4CM-95-0045 and A4CM-95-0046 have MDA's slightly greater than the RDL. The Laboratory Control Sample was counted for less than the nominal 720 minute count time, and had a MDA greater than the RDL; however, this is not a problem since the activity of the LCS is significantly greater than the MDA. The average yield for 24 samples was $72\% \pm 17\%$.

2.5 Plutonium 238, 239/240 Analyses

6108 (Rinsate)

No problems were associated with the analyses. The average yield for 3 samples was $50\% \pm 39\%$.

6109 (Soil)

Sample A4CM-95-0034 has a MDA just slightly greater than the RDL. No other problems were associated with the analyses. The average yield for 24 samples was $68\% \pm 20\%$.

TMA/Richmond

Report N5-03-062-6108

Report N5-03-063-6109

Sample Delivery Group 6108/6109

Case Narrative

Rockwell International Corp.

Contract R44PJZ94034044

April 21, 1995

2.6 Gamma Spectroscopy Analyses

6108 (Rinsate)

No problems were associated with the analysis.

6109 (Soil)

All samples have aliquots less than the 850g nominal required; however, despite the smaller aliquots, all of the MDA's were less than or equal to the RDL.

SECTION 2 Summary Data Section

T M A / R I C H M O N D
REPORTING GROUP 6108

SDG 6108
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S					
Sample Summaries	.	.	.	.	1
Prep Batch Summary	.	.	.	.	3
Work Summary	.	.	.	.	4
Method Blanks	.	.	.	.	5
Lab Control Samples	.	.	.	.	7
Data Sheets	.	.	.	.	9
Method Summaries	.	.	.	.	12
End of Section	.	.	.	.	17

Italy E. Pittman 4/21/95

Prepared by

WJN 4/21
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

SDG 6108

Contract Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0025	SSFL AREA 4	WATER		N503062-01			03/06/95 14:30
A4CM-95-0026	SSFL AREA 4	WATER		N503062-02			03/06/95 14:30
Method Blank		WATER		N503062-03			
Lab Control Sample		WATER		N503062-04			

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

QC SUMMARY

SDG 6108

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	DEPARTMENT SAMPLE ID
6108		A4CM-95-0025	WATER				03/15/95 9	N503062-01	6108-001
		A4CM-95-0026	WATER				03/15/95 9	N503062-02	6108-002
		Method Blank	WATER					N503062-03	6108-003
		Lab Control Sample	WATER					N503062-04	6108-004

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

SDG 6108

Contact Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION	ERROR	PLANCHETS ANALYZED				QUALI-			
			BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	FIERS
Alpha Spectroscopy												
PU	WATER	Plutonium, Isotopic in Water	2781-064	5.0	1			1	1			
TH	WATER	Thorium, Isotopic in Water	2781-064	5.0	1			1	1			
U	WATER	Uranium, Isotopic in Water	2781-064	5.0	1			1	1			
Beta Counting												
SR	WATER	Strontium, Total in Water	2781-064	10.0	1			1	1			
Gamma Scan												
GAM	WATER	Gamma Emitters	2781-064	15.0	1			1	1			
Liquid Scintillation												
H	WATER	Tritium in Water	2781-064	10.0	1			1	1			X

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

SDG 6108

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

WORK SUMMARY

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED			SUF-					
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
A4CM-95-0025		N503062-01	6108-001	H		04/04/95	04/12/95	IEP	Tritium in Water	
SSFL AREA 4	WATER	03/06/95								
		03/15/95								
A4CM-95-0026		N503062-02	6108-002	GAM		04/18/95	04/21/95	IEP	Gamma Emitters	
SSFL AREA 4	WATER	03/06/95	6108-002	PU		04/07/95	04/11/95	IEP	Plutonium, Isotopic in Water	
		03/15/95	6108-002	SR		04/05/95	04/17/95	IEP	Strontium, Total in Water	
			6108-002	TH		04/07/95	04/11/95	IEP	Thorium, Isotopic in Water	
			6108-002	U		04/07/95	04/11/95	IEP	Uranium, Isotopic in Water	
Method Blank		N503062-03	6108-003	GAM		04/20/95	04/21/95	IEP	Gamma Emitters	
	WATER		6108-003	H		04/04/95	04/12/95	IEP	Tritium in Water	
			6108-003	PU		04/07/95	04/11/95	IEP	Plutonium, Isotopic in Water	
			6108-003	SR		04/05/95	04/17/95	IEP	Strontium, Total in Water	
			6108-003	TH		04/07/95	04/11/95	IEP	Thorium, Isotopic in Water	
			6108-003	U		04/07/95	04/11/95	IEP	Uranium, Isotopic in Water	
Lab Control Sample		N503062-04	6108-004	GAM		03/30/95	04/17/95	IEP	Gamma Emitters	
	WATER		6108-004	H		04/04/95	04/12/95	IEP	Tritium in Water	
			6108-004	PU		04/07/95	04/11/95	IEP	Plutonium, Isotopic in Water	
			6108-004	SR		04/05/95	04/17/95	IEP	Strontium, Total in Water	
			6108-004	TH		04/07/95	04/11/95	IEP	Thorium, Isotopic in Water	
			6108-004	U		04/07/95	04/11/95	IEP	Uranium, Isotopic in Water	

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
GAM		Gamma Emitters	ASTM 3649-85; EPA 901.1	1			1	1		3
H		Tritium in Water	EPA 906.0; ASTM 2476-81	1			1	1		3
PU		Plutonium, Isotopic in Water	ASTM 3865-90	1			1	1		3
SR		Strontium, Total in Water	HASL 300/SR-01,-02	1			1	1		3
TH		Thorium, Isotopic in Water		1			1	1		3
U		Uranium, Isotopic in Water	ASTM 3972-90	1			1	1		3
TOTALS				6			6	6		18

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

N503062-03

METHOD BLANK

Method Blank

SDG 6108

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N503062-03

Client sample id Method Blank

Dept sample id 6108-003

Material/Matrix WATER

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		13	150	300	500	U	H
Strontium 90	10098-97-2	-0.028	0.14	0.2	0.5	U	SR
Thorium 228		0.008	0.031	0.07	0.5	U	TH
Thorium 230	14269-63-7	0.031	0.047	0.09	0.5	U	TH
Thorium 232	7740-29-1	0.008	0.031	0.06	0.5	U	TH
Uranium 233/234	11-08-5	0	0.079	0.1	0.5	U	U
Uranium 235	14117-96-1	0	0.048	0.09	0.5	U	U
Uranium 238	7440-61-1	0.030	0.040	0.08	0.5	U	U
Plutonium 238	13981-16-3	0.017	0.058	0.1	0.1	U	PU
Plutonium 239/240	10-12-8	0.012	0.023	0.04	0.1	U	PU
MA SCAN ANALYTES		U					
Barium 40		U		20		U	GAM
Chromium 51		U		10		U	GAM
Manganese 54		U		2		U	GAM
Cobalt 58		U		2		U	GAM
Iron 59		U		4		U	GAM
Cobalt 60		U		2		U	GAM
Zinc 65		U		4		U	GAM
Niobium 94		U		2		U	GAM
Ruthenium 103		U		2		U	GAM
Ruthenium 106		U		20		U	GAM
Tin 113		U		2		U	GAM
Cesium 134		U		2		U	GAM
Cesium 137		U		2	5	U	GAM
Cerium 144		U		10		U	GAM
Europium 152		U		5		U	GAM
Europium 154		U		3		U	GAM
Europium 155		U		6		U	GAM
Radium 226		U		4		U	GAM
Thorium 232		U		9		U	GAM

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

N503062-03

BLANK, cont.

Method Blank

SDG 6108

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503062-03

Client sample id Method Blank

Dept sample id 6108-003

Material/Matrix WATER

QC-BLANK #23558

METHOD BLANKS

Page 2

SUMMARY DATA SECTION

Page 6

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

N503062-04

Lab Control Sample

LAB CONTROL SAMPLE

SDG 6108

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N503062-04

Client sample id Lab Control Sample

Dept sample id 6108-004

Material/Matrix WATER

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	9500	430	200	500	X	H	9550	380	99	83-117	
Strontium 90	18	0.83	0.4	0.5		SR	19.6	0.78	92	83-117	
Thorium 230	3.9	0.38	0.05	0.5		TH	3.58	0.14	109	81-119	
Uranium 233/234	19	1.2	0.6	0.5		U	19.4	0.78	98	86-114	
Uranium 235	16	1.1	0.09	0.5		U	14.8	0.59	108	84-116	
Uranium 238	20	1.2	0.6	0.5		U	19.4	0.78	103	86-114	
Plutonium 238	2.1	0.19	0.09	0.1		PU	2.08	0.083	101	83-117	
Plutonium 239/240	2.0	0.18	0.04	0.1		PU	1.85	0.074	108	82-118	
GAMMA SCAN ANALYTES											
Potassium 40	U		100		U	GAM					
Sodium 51	U		60		U	GAM					
Manganese 54	U		8		U	GAM					
Cobalt 58	U		8		U	GAM					
Iron 59	U		10		U	GAM					
Cobalt 60	U		8		U	GAM					
Zinc 65	U		20		U	GAM					
Niobium 94	U		8		U	GAM					
Ruthenium 103	U		9		U	GAM					
Ruthenium 106	U		80		U	GAM					
Tin 113	U		10		U	GAM					
Cesium 134	U		9		U	GAM					
Cesium 137	310	18		5		GAM	318	13	97	76-124	
Cerium 144	U		40		U	GAM					
Europium 152	U		20		U	GAM					
Europium 154	U		10		U	GAM					
Europium 155	U		20		U	GAM					
Radium 226	U		20		U	GAM					
Thorium 232	U		40		U	GAM					

CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

N503062-04

LAB CONTROL SAMPLE, cont.

Lab Control Sample

SDG 6108Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N503062-04Dept sample id 6108-004Client sample id Lab Control SampleMaterial/Matrix WATER

QC-LCS #23559

CONTROL SAMPLES

Page 2

SUMMARY DATA SECTION

Page 8

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-LCSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

N503062-01

A4CM-95-0025

DATA SHEET

SDG 6108Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503062-01Client sample id A4CM-95-0025Dept sample id 6108-001Location/Matrix SSFL AREA 4 WATERReceived 03/15/95Collected 03/06/95 14:30

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		51	160	300	500	U	H

ATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 9

17

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

N503062-02

A4CM-95-0026

DATA SHEET

SDG 6108

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503062-02

Client sample id A4CM-95-0026

Dept sample id 6108-002

Location/Matrix SSFL AREA 4

WATER

Received 03/15/95

Collected 03/06/95 14:30

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	-0.012	0.12	0.2	0.5	U	SR
Thorium 228		0.036	0.036	0.05	0.5	U	TH
Thorium 230	14269-63-7	0.036	0.036	0.05	0.5	U	TH
Thorium 232	7740-29-1	0.030	0.036	0.05	0.5	U	TH
Uranium 233/234	11-08-5	0.020	0.10	0.2	0.5	U	U
Uranium 235	14117-96-1	0.073	0.073	0.09	0.5	U	U
Uranium 238	7440-61-1	0.14	0.080	0.08	0.5	J	U
Plutonium 238	13981-16-3	0.005	0.031	0.05	0.1	U	PU
Plutonium 239/240	10-12-8	0.003	0.010	0.02	0.1	U	PU
MA SCAN ANALYTES		U					
Potassium 40		U		20		U	GAM
Chromium 51		U		40		U	GAM
Manganese 54		U		2		U	GAM
Cobalt 58		U		3		U	GAM
Iron 59		U		7		U	GAM
Cobalt 60		U		2		U	GAM
Zinc 65		U		5		U	GAM
Niobium 94		U		2		U	GAM
Ruthenium 103		U		4		U	GAM
Ruthenium 106		U		20		U	GAM
Tin 113		U		3		U	GAM
Cesium 134		U		2		U	GAM
Cesium 137		U		2	5	U	GAM
Cerium 144		U		10		U	GAM
Europium 152		U		5		U	GAM
Europium 154		U		3		U	GAM
Europium 155		U		6		U	GAM
Radium 226		U		4		U	GAM

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 10

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

N503062-02

A4CM-95-0026

DATA SHEET, cont

SDG 6108Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503062-02Client sample id A4CM-95-0026Dept sample id 6108-002Location/Matrix SSFL AREA 4 WATERReceived 03/15/95Collected 03/06/95 14:30

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		9		U	GAM

DATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 11

19

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

Test PU Matrix WATER

SDG 6108

Contact Italy E. Pittman

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Plutonium 238	Plutonium 239/240
------------------	------------------	-----------------	------------------	------------------	----------------------

Preparation batch 2781-064

A4CM-95-0026	N503062-02	6108-002	U	U
BLK (QC ID=23558)	N503062-03	6108-003	U	U
LCS (QC ID=23559)	N503062-04	6108-004	ok	ok

Nominal values and limits from method	RDLs (pCi/L)	0.1	0.1
---------------------------------------	--------------	-----	-----

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-064 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 064

A4CM-95-0026	N503062-02	0.05	0.500	70	1187	32	04/06/95	04/07	SS-027
BLK (QC ID=23558)	N503062-03	0.1	0.500	31	1187	04/06/95	04/07	SS-028	
LCS (QC ID=23559)	N503062-04	0.09	0.500	48	1187	04/06/95	04/07	SS-030	

Nominal values and limits from method	0.1	0.500	20-105	1000	100	180
---------------------------------------	-----	-------	--------	------	-----	-----

PROCEDURES	REFERENCE	ASTM 3865-90
EP-040	Environmental Water Dissolution, rev 1	
EP-940	Plutonium Purification, rev 0	
EP-008	Heavy Elements Electroplating, rev 0	

AVERAGES ± 2 SD	MDA	0.08	=	0.05
FOR 3 SAMPLES	YIELD	50	±	39

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 12

Lab id	TMAN
Protocol	ROCKETDYNE
Version	Ver 1.0
Form	DVD-CMS
Version	3.16
Report date	03/21/95

TMA/RICHMOND

REPORTING GROUP 6108

METHOD SUMMARY

THORIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Test TH Matrix WATER
SDG 6108
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Thorium 228	Thorium 230	Thorium 232
------------------	------------------	-----------------	------------------	-------------	-------------	-------------

Preparation batch 2781-064

A4CM-95-0026	N503062-02	6108-002	U	U	U
BLK (QC ID=23558)	N503062-03	6108-003	U	U	U
LCS (QC ID=23559)	N503062-04	6108-004	ok		

Nominal values and limits from method	RDLs (pCi/L)	0.5	0.5	0.5
---------------------------------------	--------------	-----	-----	-----

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-064 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 064

A4CM-95-0026	N503062-02	0.05	0.500	78	474	32	04/06/95	04/07	SS-045
BLK (QC ID=23558)	N503062-03	0.09	0.500	60	474	04/06/95	04/07	SS-046	
LCS (QC ID=23559)	N503062-04	0.05	0.500	79	630	04/06/95	04/07	SS-022	

Nominal values and limits from method	0.5	0.500	20-110	500	100	180
---------------------------------------	-----	-------	--------	-----	-----	-----

PROCEDURES EP-040 Environmental Water Dissolution, rev 1
EP-900 Thorium Purification, rev 0
EP-008 Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD MDA 0.06 ± 0.05
FOR 3 SAMPLES YIELD 72 ± 21

MOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 13

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

Test U Matrix WATER

SDG 6108

Contact Italy E. Pittman

METHOD SUMMARY

URANIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJ294034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%)			
							1+3	20	2+3	20
Preparation batch 2781-064										
A4CM-95-0026	N503062-02		6108-002	U	U	0.14 J	14	72	52	60
BLK (QC ID=23487)	N503062-03		6108-003	U	U	U				
LCS (QC ID=23488)	N503062-04		6108-004	ok	ok	ok				
Nominal values and limits from method										
			RDLs (pCi/L)	0.5	0.5	0.5	100		4	
							Averages	14	52	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-064 20 prep error 5.0 % Reference Lab Notebook 2781 pg. 064																
A4CM-95-0026	N503062-02		0.2	0.200				53	1042				32	04/06/95	04/07	SS-036
BLK (QC ID=23487)	N503062-03		0.1	0.200				59	1000					04/06/95	04/07	SS-037
LCS (QC ID=23488)	N503062-04		0.6	0.200				55	1042					04/06/95	04/07	SS-037
Nominal values and limits from method																
			0.5	0.200				30-105	300	100		180				

PROCEDURES REFERENCE ASTM 3972-90

EP-040 Environmental Water Dissolution, rev 1

EP-910 Uranium Purification, rev 0

EP-008 Heavy Elements Electroplating, rev 0

AVERAGES $\pm$ 2 SD MDA 0.3 $\pm$ 0.5

FOR 3 SAMPLES YIELD 56 $\pm$ 6

METHOD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 14

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

Test SR Matrix WATER

SDG 6108

Lab Italy E. Pittman

METHOD SUMMARY

STRONTIUM, TOTAL IN WATER

BETA COUNTING

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Strontium 90
------------------	------------------	-----------------	------------------	--------------

Preparation batch 2781-064

A4CM-95-0026	N503062-02	6108-002	U
BLK (QC ID=23558)	N503062-03	6108-003	U
LCS (QC ID=23559)	N503062-04	6108-004	ok

Nominal values and limits from method RDLs (pCi/L) 0.5

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	-----	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-064 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 064

A4CM-95-0026	N503062-02	0.2	1.00	89	200	30	04/05/95	04/05	LBG-015
BLK (QC ID=23558)	N503062-03	0.2	1.00	66	200	04/05/95	04/05	LBG-016	
LCS (QC ID=23559)	N503062-04	0.4	1.00	72	105	04/05/95	04/05	LBG-016	

Nominal values and limits from method 0.5 1.00 200 180

PROCEDURES	REFERENCE	HASL 300/SR-01,-02
EP-040	Environmental Water Dissolution, rev 1	
EP-500	Strontium-89,90 - Purification, rev 0	
EP-519	Strontium-89,90 Planchet Demounting and Yttrium Purification, rev 0	

AVERAGES ± 2 SD	MDA	0.3	±	0.2
FOR 3 SAMPLES	YIELD	76	±	24

METHOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 15

Lab id	TMAN
Protocol	ROCKETDYNE
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

Test GAM Matrix WATERSDG 6108Contact Italy E. Pittman

METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Client RocketdyneContract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cobalt 60	Cesium 137
------------------	------------------	-----------------	------------------	-----------	------------

Preparation batch 2781-064

A4CM-95-0026	N503062-02	6108-002	U	U
BLK (QC ID=23558)	N503062-03	6108-003	U	U
LCS (QC ID=23559)	N503062-04	6108-004	No data U	ok

Nominal values and limits from method	RDLs (pCi/L)	5
---------------------------------------	--------------	---

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM keV	DRIFT HOLD	DAYS PREPARED	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	----------	-------------	--------------	------------	------------	------------	--------------	-------------	---------------	------------------	---------------	----------

Preparation batch 2781-064 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 054

A4CM-95-0026	N503062-02	2	1.00	1441	43	04/18/95	02,04,00
BLK (QC ID=23558)	N503062-03	2	1.00	1441	04/20/95	02,04,00	
LCS (QC ID=23559)	N503062-04	1.00	430	03/30/95	02,01,00		

Nominal values and limits from method	5	1.00	400	180
---------------------------------------	---	------	-----	-----

PROCEDURES REFERENCE ASTM 3649-85; EPA 901.1
EP-100 Ge(Li) Preparation for Environmental Samples,
rev 0

AVERAGES ± 2 SD MDA 2 ± 0
FOR 2 SAMPLES YIELD ±

MOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 16

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6108

METHOD SUMMARY

TRITIUM IN WATER

LIQUID SCINTILLATION

Test H Matrix WATER

SDG 6108

Cact Italy E. Pittman

Client Rocketdyne

Contract R44PJ294034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
------------------	------------------	-----------------	------------------	---------

Preparation batch 2781-064

A4CM-95-0025	N503062-01	6108-001	U
BLK (QC ID=23558)	N503062-03	6108-003	U
LCS (QC ID=23559)	N503062-04	6108-004	ok X

Nominal values and limits from method RDLs (pCi/L) . 500

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM keV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	----------	-------------	--------------	------------	------------	------------	--------------	-------------	---------------	------------------	---------------	----------

Preparation batch 2781-064 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 064

A4CM-95-0025	N503062-01	300	0.0100						50			29	04/03/95	04/04	LSC-005
BLK (QC ID=23558)	N503062-03	300	0.0100						50				04/04/95	04/04	LSC-005
LCS (QC ID=23559)	N503062-04	200	0.0100						50				04/04/95	04/04	LSC-005

Nominal values and limits from method 500 0.0100 50 180

PROCEDURES	REFERENCE	EPA 906.0; ASTM 2476-81
	EP-210	Tritium in Water by Distillation, rev 0

AVERAGES ± 2 SD	MDA 300 ± 100
FOR 3 SAMPLES	YIELD ±

METHOD SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 17

Lab id	TMAN
Protocol	ROCKETDYNE
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	04/21/95

T M A / R I C H M O N D
REPORTING GROUP 6109

SDG 6109
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S				
Sample Summaries	.	.	.	1
Prep Batch Summary	.	.	.	3
Work Summary	.	.	.	4
Method Blanks	.	.	.	10
Lab Control Samples	.	.	.	13
Duplicates	.	.	.	16
Data Sheets	.	.	.	18
Method Summaries	.	.	.	60
End of Section	.	.	.	72

Italy E. Pittman 4/21/95
Prepared by

202 4/21
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

Contact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0024	SSFL AREA 4	SOIL		N503063-01			03/06/95 14:30
A4CM-95-0027	SSFL AREA 4	SOIL		N503063-02			03/06/95 14:30
A4CM-95-0028	SSFL AREA 4	SOIL		N503063-03			03/06/95 14:30
A4CM-95-0029	SSFL AREA 4	SOIL		N503063-04			03/06/95 14:30
A4CM-95-0030	SSFL AREA 4	SOIL		N503063-05			03/06/95 14:30
A4CM-95-0031	SSFL AREA 4	SOIL		N503063-06			03/07/95 11:00
A4CM-95-0032	SSFL AREA 4	SOIL		N503063-07			03/07/95 11:00
A4CM-95-0033	SSFL AREA 4	SOIL		N503063-08			03/07/95 11:00
A4CM-95-0034	SSFL AREA 4	SOIL		N503063-09			03/07/95 14:30
A4CM-95-0035	SSFL AREA 4	SOIL		N503063-10			03/07/95 14:30
A4CM-95-0036	SSFL AREA 4	SOIL		N503063-11			03/07/95 14:30
A4CM-95-0037	SSFL AREA 4	SOIL		N503063-12			03/08/95 15:00
A4CM-95-0038	SSFL AREA 4	SOIL		N503063-13			03/08/95 15:00
A4CM-95-0039	SSFL AREA 4	SOIL		N503063-14			03/08/95 15:00
A4CM-95-0040	SSFL AREA 4	SOIL		N503063-15			03/08/95 15:00
A4CM-95-0041	SSFL AREA 4	SOIL		N503063-16			03/08/95 15:00
A4CM-95-0042	SSFL AREA 4	SOIL		N503063-17			03/09/95 11:00
A4CM-95-0043	SSFL AREA 4	SOIL		N503063-18			03/09/95 11:00
95-0044	SSFL AREA 4	SOIL		N503063-19			03/09/95 11:00
95-0045	SSFL AREA 4	SOIL		N503063-20			03/09/95 14:00
A4CM-95-0046	SSFL AREA 4	SOIL		N503063-21			03/09/95 14:00
Method Blank		SOIL		N503063-22			
Method Blank		SOIL		N503063-26			
Lab Control Sample		SOIL		N503063-23			
Lab Control Sample		SOIL		N503063-25			
Duplicate (N503063-10)	SSFL AREA 4	SOIL		N503063-24			03/07/95 14:30

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

act Italy E. Pittman

QC SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
6109		A4CM-95-0024	SOIL	13.2			03/15/95	9 N503063-01	6109-001
		A4CM-95-0027	SOIL	11.6			03/15/95	9 N503063-02	6109-002
		A4CM-95-0028	SOIL	13.2			03/15/95	9 N503063-03	6109-003
		A4CM-95-0029	SOIL	20.6			03/15/95	9 N503063-04	6109-004
		A4CM-95-0030	SOIL	25.8			03/15/95	9 N503063-05	6109-005
		A4CM-95-0031	SOIL	27.8			03/15/95	8 N503063-06	6109-006
		A4CM-95-0032	SOIL	23.4			03/15/95	8 N503063-07	6109-007
		A4CM-95-0033	SOIL	22.2			03/15/95	8 N503063-08	6109-008
		A4CM-95-0034	SOIL	26.8			03/15/95	8 N503063-09	6109-009
		A4CM-95-0035	SOIL	22.2			03/15/95	8 N503063-10	6109-010
		A4CM-95-0036	SOIL	19.9			03/15/95	8 N503063-11	6109-011
		A4CM-95-0037	SOIL	13.1			03/15/95	7 N503063-12	6109-012
		A4CM-95-0038	SOIL	10.6			03/15/95	7 N503063-13	6109-013
		A4CM-95-0039	SOIL	11.0			03/15/95	7 N503063-14	6109-014
		A4CM-95-0040	SOIL	24.1			03/15/95	7 N503063-15	6109-015
		A4CM-95-0041	SOIL	20.3			03/15/95	7 N503063-16	6109-016
		A4CM-95-0042	SOIL	29.1			03/15/95	6 N503063-17	6109-017
		A4CM-95-0043	SOIL	18.5			03/15/95	6 N503063-18	6109-018
		A4CM-95-0044	SOIL	20.8			03/15/95	6 N503063-19	6109-019
		A4CM-95-0045	SOIL	43.9			03/15/95	6 N503063-20	6109-020
		A4CM-95-0046	SOIL	23.8			03/15/95	6 N503063-21	6109-021
		Method Blank	SOIL					N503063-22	6109-022
		Method Blank	SOIL					N503063-26	6109-026
		Lab Control Sample	SOIL					N503063-23	6109-023
		Lab Control Sample	SOIL					N503063-25	6109-025
		Duplicate (N503063-10)	SOIL				03/15/95	8 N503063-24	6109-024

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.05

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

act Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI-			
			BATCH	2σ ±	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	FIERS
Alpha Spectroscopy												
PU	SOIL	Plutonium, Isotopic in Soil	2781-070	5.0	21			1	1	1/1		
TH	SOIL	Thorium, Isotopic in Soil	2781-070	5.0	20			1	1	1/1		
			2781-070A	5.0	1			1	1			
U	SOIL	Uranium, Isotopic in Soil	2781-070	5.0	21			1	1	1/1		
Beta Counting												
SR	SOIL	Strontium, Total in Soil	2781-070	10.0	21			1	1	1/1		
Gamma Spectroscopy												
GAM	SOIL	Gamma Scan	2781-070	15.0	21			1	1	1/1		
Liquid Scintillation												
H	SOIL	Tritium-Soil	2781-070	10.0	21			1	1	1/1		X

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

29

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

tact Italy E. Pittman

WORK SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID													
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD						
CUSTODY	SAS no	RECEIVED			FIX										
A4CM-95-0024		N503063-01	6109-001	GAM		04/05/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/06/95	6109-001	H		04/01/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-001	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-001	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-001	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-001	U		04/13/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0027		N503063-02	6109-002	GAM		04/05/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/06/95	6109-002	H		04/01/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-002	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-002	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-002	TH		04/20/95	04/21/95	IEP	Thorium, Isotopic in Soil						
			6109-002	U		04/13/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0028		N503063-03	6109-003	GAM		04/05/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/06/95	6109-003	H		04/01/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-003	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-003	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-003	TH	A1	04/20/95	04/21/95	IEP	Thorium, Isotopic in Soil						
			6109-003	U		04/13/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0029		N503063-04	6109-004	GAM		04/06/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/06/95	6109-004	H		04/01/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-004	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-004	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-004	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-004	U		04/13/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0030		N503063-05	6109-005	GAM		04/06/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/06/95	6109-005	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-005	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-005	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-005	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-005	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil						

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID													
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD						
CUSTODY	SAS no	RECEIVED			FIX										
A4CM-95-0031		N503063-06	6109-006	GAM		04/06/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/07/95	6109-006	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-006	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-006	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-006	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-006	U		04/14/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0032		N503063-07	6109-007	GAM		04/07/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/07/95	6109-007	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-007	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-007	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-007	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-007	U		04/14/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0033		N503063-08	6109-008	GAM		04/07/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/07/95	6109-008	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-008	PU		04/19/95	04/20/95	IEP	Plutonium, Isotopic in Soil						
			6109-008	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-008	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-008	U		04/14/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0034		N503063-09	6109-009	GAM		04/07/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/07/95	6109-009	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-009	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-009	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-009	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-009	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0035		N503063-10	6109-010	GAM		04/07/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/07/95	6109-010	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-010	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-010	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-010	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-010	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil						

WORK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PUZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD		
CUSTODY	SAS no	RECEIVED			FIX						
A4CM-95-0036		N503063-11	6109-011	GAM		04/08/95	04/18/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	03/07/95	6109-011	H		04/02/95	04/17/95	IEP	Tritium-Soil		
		03/15/95	6109-011	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil		
			6109-011	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil		
			6109-011	TH		04/14/95	04/18/95	IEP	Thorium, Isotopic in Soil		
			6109-011	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0037		N503063-12	6109-012	GAM		04/10/95	04/18/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	03/08/95	6109-012	H		04/02/95	04/17/95	IEP	Tritium-Soil		
		03/15/95	6109-012	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil		
			6109-012	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil		
			6109-012	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil		
			6109-012	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0038		N503063-13	6109-013	GAM		04/10/95	04/18/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	03/08/95	6109-013	H		04/02/95	04/17/95	IEP	Tritium-Soil		
		03/15/95	6109-013	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil		
			6109-013	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil		
			6109-013	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil		
			6109-013	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0039		N503063-14	6109-014	GAM		04/11/95	04/18/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	03/08/95	6109-014	H		04/02/95	04/17/95	IEP	Tritium-Soil		
		03/15/95	6109-014	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil		
			6109-014	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil		
			6109-014	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil		
			6109-014	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0040		N503063-15	6109-015	GAM		04/11/95	04/18/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	03/08/95	6109-015	H		04/02/95	04/17/95	IEP	Tritium-Soil		
		03/15/95	6109-015	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil		
			6109-015	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil		
			6109-015	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil		
			6109-015	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil		

WORK SUMMARY

Page 3

SUMMARY DATA SECTION

Page 6

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID													
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD						
CUSTODY	SAS no	RECEIVED			FIX										
A4CM-95-0041		N503063-16	6109-016	GAM		04/11/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/08/95	6109-016	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-016	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-016	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-016	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-016	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0042		N503063-17	6109-017	GAM		04/11/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/09/95	6109-017	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-017	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-017	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-017	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-017	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0043		N503063-18	6109-018	GAM		04/11/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/09/95	6109-018	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-018	PU		04/13/95	04/17/95	IEP	Plutonium, Isotopic in Soil						
			6109-018	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-018	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-018	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0044		N503063-19	6109-019	GAM		04/11/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/09/95	6109-019	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-019	PU		04/17/95	04/18/95	IEP	Plutonium, Isotopic in Soil						
			6109-019	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-019	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-019	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0045		N503063-20	6109-020	GAM		04/13/95	04/18/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/09/95	6109-020	H		04/02/95	04/17/95	IEP	Tritium-Soil						
		03/15/95	6109-020	PU		04/17/95	04/18/95	IEP	Plutonium, Isotopic in Soil						
			6109-020	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil						
			6109-020	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil						
			6109-020	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil						

RK SUMMARY

Page 4

SUMMARY DATA SECTION

Page 7

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID											
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD				
CUSTODY	SAS no	RECEIVED			FIX								
A4CM-95-0046		N503063-21	6109-021	GAM		04/12/95	04/18/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	03/09/95	6109-021	H		04/02/95	04/17/95	IEP	Tritium-Soil				
		03/15/95	6109-021	PU		04/17/95	04/18/95	IEP	Plutonium, Isotopic in Soil				
			6109-021	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil				
			6109-021	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil				
			6109-021	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil				
Method Blank		N503063-22	6109-022	GAM		04/12/95	04/18/95	IEP	Gamma Scan				
	SOIL		6109-022	H		04/01/95	04/17/95	IEP	Tritium-Soil				
			6109-022	PU		04/14/95	04/17/95	IEP	Plutonium, Isotopic in Soil				
			6109-022	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil				
			6109-022	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil				
			6109-022	U		04/17/95	04/18/95	IEP	Uranium, Isotopic in Soil				
Method Blank		N503063-26	6109-026	TH		04/20/95	04/21/95	IEP	Thorium, Isotopic in Soil				
	SOIL												
Lab Control Sample		N503063-23	6109-023	GAM		04/12/95	04/18/95	IEP	Gamma Scan				
	SOIL		6109-023	H		04/01/95	04/17/95	IEP	Tritium-Soil				
			6109-023	PU		04/17/95	04/18/95	IEP	Plutonium, Isotopic in Soil				
			6109-023	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil				
			6109-023	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil				
			6109-023	U		04/18/95	04/20/95	IEP	Uranium, Isotopic in Soil				
Lab Control Sample		N503063-25	6109-025	TH		04/20/95	04/21/95	IEP	Thorium, Isotopic in Soil				
	SOIL												
Duplicate (N503063-10)		N503063-24	6109-024	GAM		04/13/95	04/18/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	03/07/95	6109-024	H		04/02/95	04/17/95	IEP	Tritium-Soil				
		03/15/95	6109-024	PU		04/17/95	04/18/95	IEP	Plutonium, Isotopic in Soil				
			6109-024	SR		04/13/95	04/21/95	IEP	Strontium, Total in Soil				
			6109-024	TH		04/15/95	04/18/95	IEP	Thorium, Isotopic in Soil				
			6109-024	U		04/18/95	04/20/95	IEP	Uranium, Isotopic in Soil				

WORK SUMMARY

Page 5

SUMMARY DATA SECTION

Page 8

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

SDG 6109

tact Italy E. Pittman

WORK SUMMARY, cont.

Client RocketdyneContract R44PJZ94034044

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
GAM		Gamma Scan		21			1	1	1	24
H		Tritium-Soil	EPA 906.0; ASTM 2476-81	21			1	1	1	24
PU		Plutonium, Isotopic in Soil	HASL 300/PU-02	21			1	1	1	24
SR		Strontium, Total in Soil	HASL 300/SR-01,-02	21			1	1	1	24
TH		Thorium, Isotopic in Soil		21			2	2	1	26
U		Uranium, Isotopic in Soil	HASL 300/U-04	21			1	1	1	24
TOTALS				126			7	7	6	146

WORK SUMMARY

Page 6

SUMMARY DATA SECTION

Page 9

Lab id TMAXProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CWSVersion 3.05Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-22

METHOD BLANK

Method Blank

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N503063-22

Client sample id Method Blank

Dept sample id 6109-022

Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.027	0.080	0.1	0.5	U	H
Strontium 90	10098-97-2	-0.035	0.075	0.1	0.5	U	SR
Thorium 228		0.004	0.029	0.06	0.1	U	TH
Thorium 230	14269-63-7	0.022	0.029	0.04	0.1	U	TH
Thorium 232	7740-29-1	-0.004	0.014	0.03	0.1	U	TH
Uranium 233/234	11-08-5	-0.005	0.004	0.01	0.01	U	U
Uranium 235	14117-96-1	0.001	0.004	0.007	0.01	U	U
Uranium 238	7440-61-1	0	0.003	0.007	0.01	U	U
Plutonium 238	13981-16-3	0.002	0.005	0.009	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.002	0.003	0.01	U	PU
MA SCAN ANALYTES		U					
Cassium 40		U		0.06		U	GAM
Chromium 51		U		0.04		U	GAM
Manganese 54		U		0.005		U	GAM
Cobalt 58		U		0.005		U	GAM
Iron 59		U		0.01		U	GAM
Cobalt 60		U		0.007		U	GAM
Zinc 65		U		0.01		U	GAM
Niobium 94		U		0.005		U	GAM
Ruthenium 103		U		0.005		U	GAM
Ruthenium 106		U		0.05		U	GAM
Tin 113		U		0.006		U	GAM
Cesium 134		U		0.005		U	GAM
Cesium 137		U		0.006	0.02	U	GAM
Cerium 144		U		0.03		U	GAM
Europium 152		U		0.01		U	GAM
Europium 154		U		0.008		U	GAM
Europium 155		U		0.02		U	GAM
Radium 226		U		0.01		U	GAM
Thorium 232		U		0.02		U	GAM

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 10

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-22

BLANK, cont.

Method Blank

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-22

Client sample id Method Blank

Dept sample id 6109-022

Material/Matrix SOIL

QC-BLANK #23573

METHOD BLANKS

Page 2

SUMMARY DATA SECTION

Page 11

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-26

METHOD BLANK

Method Blank

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-26

Client sample id Method Blank

Dept sample id 6109-026

Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 228		0.003	0.015	0.03	0.1	U	TH
Thorium 230	14269-63-7	0.005	0.015	0.02	0.1	U	TH
Thorium 232	7740-29-1	0.005	0.010	0.02	0.1	U	TH

QC-BLANK #23701

METHOD BLANKS

Page 3

SUMMARY DATA SECTION

Page 12

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-23

LAB CONTROL SAMPLE

Lab Control Sample

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N503063-23

Dept sample id 6109-023

Client sample id Lab Control Sample

Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	5.0	0.23	0.1	0.5	X	H	5.00	0.20	100	82-118	
Strontium 90	11	0.59	0.2	0.5		SR	10.8	0.43	102	81-119	
Thorium 230	2.2	0.094	0.02	0.1		TH	2.05	0.082	107	87-113	
Uranium 233/234	1.5	0.11	0.05	0.01		U	1.43	0.057	105	84-116	
Uranium 235	1.0	0.086	0.009	0.01		U	1.09	0.044	92	84-116	
Uranium 238	1.4	0.10	0.04	0.01		U	1.42	0.057	99	85-115	
Plutonium 238	0.35	0.029	0.01	0.01		PU	0.380	0.015	92	85-115	
Plutonium 239/240	0.33	0.027	0.005	0.01		PU	0.340	0.014	97	85-115	
GAMMA SCAN ANALYTES											
Potassium 40	U		0.1		U	GAM					
Uranium 51	U		0.06		U	GAM					
Manganese 54	U		0.007		U	GAM					
Cobalt 58	U		0.006		U	GAM					
Iron 59	U		0.01		U	GAM					
Cobalt 60	U		0.008		U	GAM					
Zinc 65	U		0.01		U	GAM					
Niobium 94	U		0.006		U	GAM					
Ruthenium 103	U		0.008		U	GAM					
Ruthenium 106	U		0.07		U	GAM					
Tin 113	U		0.01		U	GAM					
Cesium 134	U		0.007		U	GAM					
Cesium 137	0.43	0.017		0.02		GAM	0.449	0.018	96	77-123	
Cerium 144	U		0.04		U	GAM					
Europium 152	U		0.02		U	GAM					
Europium 154	U		0.01		U	GAM					
Europium 155	U		0.02		U	GAM					
Radium 226	U		0.01		U	GAM					
Thorium 232	U		0.03		U	GAM					

CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 13

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-LCS
 Version 3.06
 Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-23

Lab Control Sample

LAB CONTROL SAMPLE, cont.

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-23

Client sample id Lab Control Sample

Dept sample id 6109-023

Material/Matrix SOIL

QC-LCS #23574

CONTROL SAMPLES

Page 2

SUMMARY DATA SECTION

Page 14

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-25

LAB CONTROL SAMPLE

Lab Control Sample

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N503063-25

Dept sample id 6109-025

Client sample id Lab Control Sample

Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Thorium 230	1.9	0.16	0.02	0.1		TH	1.79	0.072	106	83-117	

QC-LCS #23700

CONTROL SAMPLES

Page 3

SUMMARY DATA SECTION

Page 15

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-24

A4CM-95-0035

DUPLICATE

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

DUPLICATE

ORIGINAL

Lab sample id N503063-24

Lab sample id N503063-10

Client sample id A4CM-95-0035

Dept sample id 6109-024

Dept sample id 6109-010

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/07/95 14:30

% moisture 22.2

Chain of custody id

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	-0.035	0.053	0.09	0.5	U	H	-0.017	0.054	0.09	U	-		
Strontium 90	0.052	0.059	0.09	0.5	U	SR	0.083	0.049	0.07	J	46	172	
Thorium 228	0.65	0.058	0.03	0.1		TH	0.58	0.095	0.05		11	29	
Thorium 230	0.55	0.051	0.02	0.1		TH	0.41	0.080	0.03		29	32	
Thorium 232	0.58	0.051	0.01	0.1		TH	0.57	0.089	0.02		2	29	
Uranium 233/234	0.54	0.039	0.01	0.01		U	0.55	0.040	0.009		2	19	
Uranium 235	0.032	0.009	0.005	0.01		U	0.033	0.009	0.005		3	60	
Uranium 238	0.53	0.038	0.007	0.01		U	0.54	0.040	0.008		2	19	
Plutonium 238	0.002	0.007	0.01	0.01	U	PU	-0.001	0.004	0.008	U	-		
Plutonium 239/240	0.003	0.003	0.006	0.01	U	PU	0.003	0.003	0.003	J	0	214	
GAMMA SCAN ANALYTES	U						U						
Potassium 40	16	0.71				GAM	21	0.31			27	33	
Chromium 51	U		0.6		U	GAM	U		0.2	U	-		
Manganese 54	U		0.04		U	GAM	U		0.07	U	-		
Cobalt 58	U		0.05		U	GAM	U		0.02	U	-		
Iron 59	U		0.1		U	GAM	U		0.05	U	-		
Cobalt 60	U		0.04		U	GAM	U		0.01	U	-		
Zinc 65	U		0.1		U	GAM	U		0.04	U	-		
Niobium 94	U		0.03		U	GAM	U		0.01	U	-		
Ruthenium 103	U		0.06		U	GAM	U		0.02	U	-		
Ruthenium 106	U		0.3		U	GAM	U		0.1	U	-		
Tin 113	U		0.05		U	GAM	U		0.02	U	-		
Cesium 134	U		0.04		U	GAM	U		0.02	U	-		
Cesium 137	0.30	0.045		0.02		GAM	0.43	0.020			36	38	
Cerium 144	U		0.2		U	GAM	U		0.1	U	-		
Europium 152	U		0.06		U	GAM	U		0.04	U	-		
Europium 154	U		0.04		U	GAM	U		0.02	U	-		
Europium 155	U		0.07		U	GAM	U		0.05	U	-		

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 16

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-24

A4CM-95-0035

DUPLICATE, cont.

SDG 6109

Contact Italy E. Pittman

DUPLICATE

Lab sample id N503063-24

Dept sample id 6109-024

Client Rocketdyne

Contract R44PJZ94034044

ORIGINAL

Lab sample id N503063-10

Dept sample id 6109-010

Received 03/15/95

% moisture 22.2

Client sample id A4CM-95-0035

Location/Matrix SSFL AREA 4

SOIL

Collected 03/07/95 14:30

Chain of custody id

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Radium 226	0.66	0.097				GAM	0.78	0.032			17	38	
Thorium 232	0.84	0.19				GAM	1.2	0.077			35	45	

QC-DUP#10 23575

DUPLICATES

Page 2

SUMMARY DATA SECTION

Page 17

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-01

DATA SHEET

A4CM-95-0024

SDG 6109

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N503063-01Client sample id A4CM-95-0024Dept sample id 6109-001Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 13.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.037	0.056	0.1	0.5	U	H
Strontium 90	10098-97-2	0.030	0.12	0.08	0.5	U	SR
Thorium 228		1.1	0.19	0.1	0.1		TH
Thorium 230	14269-63-7	0.76	0.15	0.06	0.1		TH
Thorium 232	7740-29-1	1.2	0.19	0.05	0.1		TH
Uranium 233/234	11-08-5	0.87	0.053	0.01	0.01		U
Uranium 235	14117-96-1	0.051	0.012	0.005	0.01		U
Uranium 238	7440-61-1	0.89	0.054	0.009	0.01		U
Plutonium 238	13981-16-3	-0.002	0.005	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0	0.003	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.45				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 18

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-01

A4CM-95-0024

DATA SHEET, cont

SDG 6109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N503063-01
Dept sample id 6109-001
Received 03/15/95
% moisture 13.2Client sample id A4CM-95-0024
Location/Matrix SSFL AREA 4 SOIL
Collected 03/06/95 14:30
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.74	0.051				GAM
Thorium 232		1.7	0.13				GAM

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 19

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-02

DATA SHEET

A4CM-95-0027

SDG 6109

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-02Client sample id A4CM-95-0027Dept sample id 6109-002Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 11.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.004	0.054	0.09	0.5	U	H
Strontium 90	10098-97-2	0.026	0.086	0.06	0.5	U	SR
Thorium 228		0.66	0.12	0.03	0.1		TH
Thorium 230	14269-63-7	0.48	0.10	0.04	0.1		TH
Thorium 232	7740-29-1	0.60	0.11	0.03	0.1		TH
Uranium 233/234	11-08-5	0.58	0.035	0.007	0.01		U
Uranium 235	14117-96-1	0.027	0.007	0.004	0.01		U
Uranium 238	7440-61-1	0.55	0.034	0.006	0.01		U
Plutonium 238	13981-16-3	0.001	0.005	0.009	0.01	U	PU
Plutonium 239/240	10-12-8	-0.001	0.002	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.46				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 20

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-02

A4CM-95-0027

DATA SHEET, cont

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-02Client sample id A4CM-95-0027Dept sample id 6109-002Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 11.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.59	0.047				GAM
Thorium 232		1.2	0.12				GAM

DATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 21

47

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-03

A4CM-95-0028

DATA SHEET

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-03

Client sample id A4CM-95-0028

Dept sample id 6109-003

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/06/95 14:30

% moisture 13.2

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.026	0.060	0.1	0.5	U	H
Strontium 90	10098-97-2	-0.058	0.097	0.2	0.5	U	SR
Thorium 228		0.80	0.12	0.04	0.1		TH
Thorium 230	14269-63-7	0.79	0.12	0.04	0.1		TH
Thorium 232	7740-29-1	0.82	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	0.66	0.046	0.01	0.01		U
Uranium 235	14117-96-1	0.041	0.011	0.005	0.01		U
Uranium 238	7440-61-1	0.65	0.045	0.009	0.01		U
Plutonium 238	13981-16-3	0.001	0.006	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.005	0.003	0.003	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		22	0.32				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.01		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.11	0.018		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 22

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-03

A4CM-95-0028

DATA SHEET, cont

SDG <u>6109</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N503063-03</u>	Client sample id <u>A4CM-95-0028</u>
Dept sample id <u>6109-003</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>03/15/95</u>	Collected <u>03/06/95 14:30</u>
% moisture <u>13.2</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.78	0.032				GAM
Thorium 232		1.4	0.089				GAM

DATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 23

4?

Lab id	<u>TMAN</u>
Protocol	<u>ROCKETDYNE</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-DS</u>
Version	<u>3.06</u>
Report date	<u>04/21/95</u>

TMA/RICHMOND

REPORTING GROUP 6109

N503063-04

A4CM-95-0029

DATA SHEET

SDG 6109

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-04Client sample id A4CM-95-0029Dept sample id 6109-004Location/Matrix SSFL AREA 4SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 20.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.015	0.067	0.1	0.5	U	H
Strontium 90	10098-97-2	0.008	0.052	0.1	0.5	U	SR
Thorium 228		0.80	0.13	0.07	0.1		TH
Thorium 230	14269-63-7	0.57	0.10	0.05	0.1		TH
Thorium 232	7740-29-1	0.72	0.11	0.03	0.1		TH
Uranium 233/234	11-08-5	0.84	0.048	0.01	0.01		U
Uranium 235	14117-96-1	0.039	0.010	0.006	0.01		U
Uranium 238	7440-61-1	0.76	0.044	0.008	0.01		U
Actinium 238	13981-16-3	0	0.005	0.01	0.01	U	PU
Actinium 239/240	10-12-8	0.006	0.003	0.005	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		15	0.49				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.072	0.027		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

DATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 24

TMA / RICHMOND

REPORTING GROUP 6109

N503063-04

A4CM-95-0029

DATA SHEET, cont

SDG 6109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N503063-04
Dept sample id 6109-004
Received 03/15/95
% moisture 20.6Client sample id A4CM-95-0029
Location/Matrix SSFL AREA 4 SOIL
Collected 03/06/95 14:30
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.75	0.062				GAM
Thorium 232		1.4	0.14				GAM

DATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 25

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-05

DATA SHEET

A4CM-95-0030

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-05Client sample id A4CM-95-0030Dept sample id 6109-005Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 25.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.018	0.049	0.09	0.5	U	H
Strontium 90	10098-97-2	0.056	0.039	0.05	0.5	J	SR
Thorium 228		0.96	0.12	0.05	0.1		TH
Thorium 230	14269-63-7	0.75	0.096	0.02	0.1		TH
Thorium 232	7740-29-1	0.92	0.11	0.02	0.1		TH
Uranium 233/234	11-08-5	0.68	0.046	0.01	0.01		U
Uranium 235	14117-96-1	0.039	0.011	0.005	0.01		U
Uranium 238	7440-61-1	0.67	0.046	0.008	0.01		U
Plutonium 238	13981-16-3	0.005	0.005	0.008	0.01	U	PU
Plutonium 239/240	10-12-8	-0.003	0.003	0.008	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		16	0.45				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 26

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-05

A4CM-95-0030

DATA SHEET, cont

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-05Client sample id A4CM-95-0030Dept sample id 6109-005Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 25.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.64	0.049				GAM
Thorium 232		1.1	0.13				GAM

DATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 27

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-06

DATA SHEET

A4CM-95-0031

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-06

Client sample id A4CM-95-0031

Dept sample id 6109-006

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/07/95 11:00

% moisture 27.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.023	0.059	0.1	0.5	U	H
Strontium 90	10098-97-2	0.025	0.047	0.06	0.5	U	SR
Thorium 228		0.57	0.091	0.05	0.1		TH
Thorium 230	14269-63-7	0.42	0.077	0.02	0.1		TH
Thorium 232	7740-29-1	0.54	0.085	0.02	0.1		TH
Uranium 233/234	11-08-5	0.50	0.035	0.007	0.01		U
Uranium 235	14117-96-1	0.026	0.008	0.004	0.01		U
Uranium 238	7440-61-1	0.49	0.035	0.007	0.01		U
Plutonium 238	13981-16-3	0.007	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.002	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		21	0.31				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.01		U	GAM
Cobalt 58		U		0.01		U	GAM
Iron 59		U		0.04		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.17	0.014		0.02		GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 11

SUMMARY DATA SECTION

Page 28

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-06

A4CM-95-0031

DATA SHEET, cont

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-06Client sample id A4CM-95-0031Dept sample id 6109-006Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 11:00% moisture 27.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.45	0.028				GAM
Thorium 232		0.89	0.075				GAM

DATA SHEETS

Page 12

SUMMARY DATA SECTION

Page 29

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-07

DATA SHEET

A4CM-95-0032

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-07Client sample id A4CM-95-0032Dept sample id 6109-007Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 11:00% moisture 23.4

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.011	0.056	0.1	0.5	U	H
Strontium 90	10098-97-2	0.032	0.059	0.07	0.5	U	SR
Thorium 228		0.89	0.12	0.07	0.1		TH
Thorium 230	14269-63-7	0.69	0.11	0.03	0.1		TH
Thorium 232	7740-29-1	0.76	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	0.68	0.044	0.008	0.01		U
Uranium 235	14117-96-1	0.037	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.64	0.042	0.007	0.01		U
Plutonium 238	13981-16-3	0.006	0.008	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.005	0.004	0.005	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		22	0.50				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.27	0.032		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 13

SUMMARY DATA SECTION

Page 30

56

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-07

A4CM-95-0032

DATA SHEET, cont

SDG <u>6109</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N503063-07</u>	Client sample id <u>A4CM-95-0032</u>
Dept sample id <u>6109-007</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>03/15/95</u>	Collected <u>03/07/95 11:00</u>
% moisture <u>23.4</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.83	0.056				GAM
Thorium 232		1.3	0.13				GAM

DATA SHEETS

Page 14

SUMMARY DATA SECTION

Page 31

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-08

A4CM-95-0033

DATA SHEET

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-08

Client sample id A4CM-95-0033

Dept sample id 6109-008

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/07/95 11:00

% moisture 22.2

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.008	0.070	0.1	0.5	U	H
Strontium 90	10098-97-2	0.089	0.055	0.06	0.5	J	SR
Thorium 228		0.64	0.099	0.06	0.1		TH
Thorium 230	14269-63-7	0.60	0.092	0.03	0.1		TH
Thorium 232	7740-29-1	0.69	0.10	0.02	0.1		TH
Uranium 233/234	11-08-5	0.69	0.046	0.01	0.01		U
Uranium 235	14117-96-1	0.038	0.010	0.006	0.01		U
Uranium 238	7440-61-1	0.70	0.046	0.009	0.01		U
Plutonium 238	13981-16-3	0	0.002	0.005	0.01	U	PU
Plutonium 239/240	10-12-8	0.004	0.003	0.004	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.47				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.45	0.034		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 15

SUMMARY DATA SECTION

Page 32

58

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-08

DATA SHEET, cont

A4CM-95-0033

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-08Client sample id A4CM-95-0033Dept sample id 6109-008Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 11:00% moisture 22.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.84	0.059				GAM
Thorium 232		1.3	0.13				GAM

DATA SHEETS

Page 16

SUMMARY DATA SECTION

Page 33

Lab id TMAN
Protocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-09

A4CM-95-0034

DATA SHEET

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-09

Client sample id A4CM-95-0034

Dept sample id 6109-009

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/07/95 14:30

% moisture 26.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.024	0.052	0.09	0.5	U	H
Strontium 90	10098-97-2	0.027	0.052	0.1	0.5	U	SR
Thorium 228		0.71	0.10	0.06	0.1		TH
Thorium 230	14269-63-7	0.57	0.089	0.03	0.1		TH
Thorium 232	7740-29-1	0.66	0.096	0.02	0.1		TH
Uranium 233/234	11-08-5	0.71	0.045	0.008	0.01		U
Uranium 235	14117-96-1	0.035	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.71	0.045	0.008	0.01		U
Plutonium 238	13981-16-3	-0.002	0.008	0.02	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.003	0.007	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.50				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.43	0.036		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

DATA SHEETS

Page 17

SUMMARY DATA SECTION

Page 34

TMA/RICHMOND

REPORTING GROUP 6109

N503063-09

A4CM-95-0034

DATA SHEET, cont

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-09Client sample id A4CM-95-0034Dept sample id 6109-009Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 14:30% moisture 26.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.83	0.060				GAM
Thorium 232		1.4	0.14				GAM

DATA SHEETS

Page 18

SUMMARY DATA SECTION

Page 35

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-10

A4CM-95-0035

DATA SHEET

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N503063-10

Client sample id A4CM-95-0035

Dept sample id 6109-010

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/07/95 14:30

% moisture 22.2

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.017	0.054	0.09	0.5	U	H
Strontium 90	10098-97-2	0.083	0.049	0.07	0.5	J	SR
Thorium 228		0.58	0.095	0.05	0.1		TH
Thorium 230	14269-63-7	0.41	0.080	0.03	0.1		TH
Thorium 232	7740-29-1	0.57	0.089	0.02	0.1		TH
Uranium 233/234	11-08-5	0.55	0.040	0.009	0.01		U
Uranium 235	14117-96-1	0.033	0.009	0.005	0.01		U
Uranium 238	7440-61-1	0.54	0.040	0.008	0.01		U
Plutonium 238	13981-16-3	-0.001	0.004	0.008	0.01	U	PU
Plutonium 239/240	10-12-8	0.003	0.003	0.003	0.01	J	PU
GAMMA SCAN ANALYTES							
Potassium 40		21	0.31				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.07		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.43	0.020		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 19

SUMMARY DATA SECTION

Page 36

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-10

A4CM-95-0035

DATA SHEET, cont

SDG <u>6109</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N503063-10</u>	Client sample id <u>A4CM-95-0035</u>
Dept sample id <u>6109-010</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>03/15/95</u>	Collected <u>03/07/95 14:30</u>
% moisture <u>22.2</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.78	0.032				GAM
Thorium 232		1.2	0.077				GAM

DATA SHEETS

Page 20

SUMMARY DATA SECTION

Page 37

63

Lab id	<u>TMAN</u>
Protocol	<u>ROCKETDYNE</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-DS</u>
Version	<u>3.06</u>
Report date	<u>04/21/95</u>

TMA/RICHMOND

REPORTING GROUP 6109

N503063-11

A4CM-95-0036

DATA SHEET

SDG 6109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N503063-11
Dept sample id 6109-011
Received 03/15/95
% moisture 19.9Client sample id A4CM-95-0036
Location/Matrix SSFL AREA 4 SOIL
Collected 03/07/95 14:30
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.044	0.049	0.09	0.5	U	H
Strontium 90	10098-97-2	0.099	0.058	0.08	0.5	J	SR
Thorium 228		0.66	0.097	0.05	0.1		TH
Thorium 230	14269-63-7	0.57	0.084	0.03	0.1		TH
Thorium 232	7740-29-1	0.82	0.10	0.02	0.1		TH
Uranium 233/234	11-08-5	0.59	0.041	0.01	0.01		U
Uranium 235	14117-96-1	0.026	0.009	0.005	0.01		U
Uranium 238	7440-61-1	0.56	0.039	0.006	0.01		U
Polonium 238	13981-16-3	0	0.004	0.009	0.01	U	PU
Polonium 239/240	10-12-8	0.012	0.006	0.007	0.01		PU
GAMMA SCAN ANALYTES		U					
Potassium 40		22	0.31				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.01		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.44	0.017		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 21

SUMMARY DATA SECTION

Page 38

64

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-11

A4CM-95-0036

DATA SHEET, cont

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-11

Client sample id A4CM-95-0036

Dept sample id 6109-011

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/07/95 14:30

% moisture 19.9

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.78	0.031				GAM
Thorium 232		1.2	0.072				GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

DATA SHEETS

Page 22

SUMMARY DATA SECTION

Page 39

TMA/RICHMOND

REPORTING GROUP 6109

N503063-12

A4CM-95-0037

DATA SHEET

SDG 6109

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N503063-12Client sample id A4CM-95-0037Dept sample id 6109-012Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 13.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.036	0.063	0.1	0.5	U	H
Strontium 90	10098-97-2	0.032	0.076	0.1	0.5	U	SR
Thorium 228		0.70	0.15	0.09	0.1		TH
Thorium 230	14269-63-7	0.50	0.12	0.05	0.1		TH
Thorium 232	7740-29-1	0.71	0.15	0.05	0.1		TH
Uranium 233/234	11-08-5	0.58	0.041	0.009	0.01		U
Uranium 235	14117-96-1	0.040	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.59	0.042	0.008	0.01		U
Plutonium 238	13981-16-3	0.003	0.005	0.008	0.01	U	PU
Plutonium 239/240	10-12-8	0.003	0.005	0.008	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.51				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.12	0.030		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 23

SUMMARY DATA SECTION

Page 40

66

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-12

A4CM-95-0037

DATA SHEET, cont

SDG 6109Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N503063-12Client sample id A4CM-95-0037Dept sample id 6109-012Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 13.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.74	0.057				GAM
Thorium 232		1.2	0.15				GAM

DATA SHEETS

Page 24

SUMMARY DATA SECTION

Page 41

67

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-13

DATA SHEET

A4CM-95-0038

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N503063-13

Client sample id A4CM-95-0038

Dept sample id 6109-013

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/08/95 15:00

% moisture 10.6

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.048	0.064	0.1	0.5	U	H
Strontium 90	10098-97-2	-0.037	0.058	0.1	0.5	U	SR
Thorium 228		0.51	0.11	0.06	0.1		TH
Thorium 230	14269-63-7	0.43	0.098	0.04	0.1		TH
Thorium 232	7740-29-1	0.56	0.11	0.04	0.1		TH
Uranium 233/234	11-08-5	0.65	0.043	0.009	0.01		U
Uranium 235	14117-96-1	0.043	0.011	0.005	0.01		U
Uranium 238	7440-61-1	0.62	0.041	0.008	0.01		U
Plutonium 238	13981-16-3	-0.001	0.004	0.009	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.006	0.01	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		21	0.32				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 25

SUMMARY DATA SECTION

Page 42

68

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-13

A4CM-95-0038

DATA SHEET, cont

SDG 6109Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N503063-13Client sample id A4CM-95-0038Dept sample id 6109-013Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 10.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.85	0.034				GAM
Thorium 232		1.3	0.082				GAM

DATA SHEETS

Page 26

SUMMARY DATA SECTION

Page 43

69

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-14

A4CM-95-0039

DATA SHEET

SDG 6109Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N503063-14Client sample id A4CM-95-0039Dept sample id 6109-014Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 11.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.047	0.065	0.1	0.5	U	H
Strontium 90	10098-97-2	0.041	0.061	0.1	0.5	U	SR
Thorium 228		0.60	0.17	0.1	0.1		TH
Thorium 230	14269-63-7	0.56	0.17	0.1	0.1		TH
Thorium 232	7740-29-1	0.61	0.17	0.08	0.1		TH
Uranium 233/234	11-08-5	0.66	0.044	0.009	0.01		U
Uranium 235	14117-96-1	0.036	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.66	0.044	0.007	0.01		U
Plutonium 238	13981-16-3	0	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.010	0.007	0.01	0.01		PU
GAMMA SCAN ANALYTES		U					
Potassium 40		22	0.31				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.01		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		U		0.01	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 27

SUMMARY DATA SECTION

Page 44

70

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-14

A4CM-95-0039

DATA SHEET, cont

SDG 6109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N503063-14Client sample id A4CM-95-0039Dept sample id 6109-014Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 11.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.88	0.037				GAM
Thorium 232		1.3	0.087				GAM

DATA SHEETS

Page 28

SUMMARY DATA SECTION

Page 45

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-15

A4CM-95-0040

DATA SHEET

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-15

Client sample id A4CM-95-0040

Dept sample id 6109-015

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/08/95 15:00

% moisture 24.1

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.043	0.062	0.1	0.5	U	H
Strontium 90	10098-97-2	0.025	0.052	0.08	0.5	U	SR
Thorium 228		0.92	0.17	0.09	0.1		TH
Thorium 230	14269-63-7	0.75	0.14	0.06	0.1		TH
Thorium 232	7740-29-1	0.85	0.15	0.05	0.1		TH
Uranium 233/234	11-08-5	0.58	0.044	0.01	0.01		U
Uranium 235	14117-96-1	0.028	0.009	0.006	0.01		U
Uranium 238	7440-61-1	0.53	0.042	0.008	0.01		U
Polonium 238	13981-16-3	0	0.004	0.009	0.01	U	PU
Polonium 239/240	10-12-8	0.004	0.005	0.007	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.54				GAM
Chromium 51		U		0.4		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.09		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.03		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.083	0.027		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.06		U	GAM

DATA SHEETS

Page 29

SUMMARY DATA SECTION

Page 46

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-15

A4CM-95-0040

DATA SHEET, cont

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-15Client sample id A4CM-95-0040Dept sample id 6109-015Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 24.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.90	0.060				GAM
Thorium 232		1.3	0.16				GAM

DATA SHEETS

Page 30

SUMMARY DATA SECTION

Page 47

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-16

A4CM-95-0041

DATA SHEET

SDG 6109

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N503063-16Client sample id A4CM-95-0041Dept sample id 6109-016Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 20.3

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.038	0.055	0.1	0.5	U	H
Strontium 90	10098-97-2	0.031	0.047	0.08	0.5	U	SR
Thorium 228		0.59	0.11	0.07	0.1		TH
Thorium 230	14269-63-7	0.52	0.10	0.03	0.1		TH
Thorium 232	7740-29-1	0.60	0.10	0.03	0.1		TH
Uranium 233/234	11-08-5	0.60	0.046	0.01	0.01		U
Uranium 235	14117-96-1	0.033	0.011	0.006	0.01		U
Uranium 238	7440-61-1	0.61	0.047	0.008	0.01		U
Plutonium 238	13981-16-3	-0.001	0.005	0.01	0.01	U	PU
Neptunium 239/240	10-12-8	0	0.003	0.006	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		21	0.50				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.06		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.06		U	GAM

DATA SHEETS

Page 31

SUMMARY DATA SECTION

Page 48

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-16

A4CM-95-0041

DATA SHEET, cont

SDG <u>6109</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N503063-16</u>	Client sample id <u>A4CM-95-0041</u>
Dept sample id <u>6109-016</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>03/15/95</u>	Collected <u>03/08/95 15:00</u>
% moisture <u>20.3</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.82	0.054				GAM
Thorium 232		1.3	0.15				GAM

DATA SHEETS

Page 32

SUMMARY DATA SECTION

Page 49

75

Lab id	<u>TMAN</u>
Protocol	<u>ROCKETDYNE</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-DS</u>
Version	<u>3.06</u>
Report date	<u>04/21/95</u>

TMA / RICHMOND

REPORTING GROUP 6109

N503063-17

A4CM-95-0042

DATA SHEET

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-17

Client sample id A4CM-95-0042

Dept sample id 6109-017

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/09/95 11:00

% moisture 29.1

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.039	0.045	0.08	0.5	U	H
Strontium 90	10098-97-2	0.024	0.060	0.1	0.5	U	SR
Thorium 228		0.76	0.12	0.06	0.1		TH
Thorium 230	14269-63-7	0.71	0.11	0.03	0.1		TH
Thorium 232	7740-29-1	0.75	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	0.91	0.062	0.01	0.01		U
Uranium 235	14117-96-1	0.046	0.013	0.008	0.01		U
Uranium 238	7440-61-1	0.81	0.057	0.01	0.01		U
Plutonium 238	13981-16-3	0.006	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.005	0.009	0.01	U	PU
GAMMA SCAN ANALYTES							
Potassium 40		18	0.56				GAM
Chromium 51		U		0.4		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.09		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.08		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.04		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.085	0.028		0.02		GAM
Cerium 144		U		0.2		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 33

SUMMARY DATA SECTION

Page 50

76

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-17

DATA SHEET, cont

A4CM-95-0042

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-17Client sample id A4CM-95-0042Dept sample id 6109-017Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 11:00% moisture 29.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.98	0.058				GAM
Thorium 232		1.4	0.14				GAM

DATA SHEETS

Page 34

SUMMARY DATA SECTION

Page 51

77

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-18

A4CM-95-0043

DATA SHEET

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-18

Client sample id A4CM-95-0043

Dept sample id 6109-018

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/09/95 11:00

% moisture 18.5

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.093	0.055	0.1	0.5	U	H
Strontium 90	10098-97-2	0.006	0.066	0.1	0.5	U	SR
Thorium 228		0.81	0.12	0.07	0.1		TH
Thorium 230	14269-63-7	0.66	0.11	0.04	0.1		TH
Thorium 232	7740-29-1	0.81	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	0.62	0.051	0.01	0.01		U
Uranium 235	14117-96-1	0.022	0.009	0.009	0.01		U
Uranium 238	7440-61-1	0.65	0.053	0.007	0.01		U
Plutonium 238	13981-16-3	-0.002	0.007	0.01	0.01	U	PU
Neptunium 239/240	10-12-8	0.001	0.003	0.006	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.48				GAM
Chromium 51		U		0.4		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.2		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 35

SUMMARY DATA SECTION

Page 52

78

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-18

A4CM-95-0043

DATA SHEET, cont

SDG 6109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N503063-18Client sample id A4CM-95-0043Dept sample id 6109-018Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 11:00% moisture 18.5

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.85	0.057				GAM
Thorium 232		1.3	0.14				GAM

DATA SHEETS

Page 36

SUMMARY DATA SECTION

Page 53

79

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-19

DATA SHEET

A4CM-95-0044

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-19

Client sample id A4CM-95-0044

Dept sample id 6109-019

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/09/95 11:00

% moisture 20.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.031	0.054	0.1	0.5	U	H
Strontium 90	10098-97-2	0.021	0.057	0.1	0.5	U	SR
Thorium 228		0.68	0.11	0.06	0.1		TH
Thorium 230	14269-63-7	0.63	0.10	0.03	0.1		TH
Thorium 232	7740-29-1	0.60	0.096	0.03	0.1		TH
Uranium 233/234	11-08-5	0.70	0.052	0.01	0.01		U
Uranium 235	14117-96-1	0.043	0.013	0.008	0.01		U
Uranium 238	7440-61-1	0.67	0.050	0.009	0.01		U
Plutonium 238	13981-16-3	0	0.006	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.005	0.004	0.004	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.51				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.09		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.04		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.17	0.033		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 37

SUMMARY DATA SECTION

Page 54

80

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-19

A4CM-95-0044

DATA SHEET, cont

SDG 6109

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-19Client sample id A4CM-95-0044Dept sample id 6109-019Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 11:00% moisture 20.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.82	0.059				GAM
Thorium 232		1.2	0.14				GAM

DATA SHEETS

Page 38

SUMMARY DATA SECTION

Page 55

81

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA / RICHMOND

REPORTING GROUP 6109

N503063-20

A4CM-95-0045

DATA SHEET

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-20Client sample id A4CM-95-0045Dept sample id 6109-020Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 14:00% moisture 43.9

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.039	0.069	0.1	0.5	U	H
Strontium 90	10098-97-2	0.056	0.046	0.07	0.5	U	SR
Thorium 228		0.95	0.14	0.07	0.1		TH
Thorium 230	14269-63-7	0.69	0.12	0.04	0.1		TH
Thorium 232	7740-29-1	0.57	0.11	0.03	0.1		TH
Uranium 233/234	11-08-5	1.2	0.077	0.02	0.01		U
Uranium 235	14117-96-1	0.063	0.015	0.01	0.01		U
Uranium 238	7440-61-1	1.1	0.070	0.01	0.01		U
Plutonium 238	13981-16-3	0.003	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.005	0.003	0.004	0.01	J	PU
GAMMA SCAN ANALYTES							
Potassium 40		16	0.48				GAM
Chromium 51		U		0.4		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.04		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.67	0.036		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.09		U	GAM

DATA SHEETS

Page 39

SUMMARY DATA SECTION

Page 56

82

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-20

A4CM-95-0045

DATA SHEET, cont

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-20Client sample id A4CM-95-0045Dept sample id 6109-020Location/Matrix SSFL AREA 4SOILReceived 03/15/95Collected 03/09/95 14:00% moisture 43.9

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		1.3	0.064				GAM
Thorium 232		1.8	0.14				GAM

DATA SHEETS

Page 40

SUMMARY DATA SECTION

Page 57

83

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-21

A4CM-95-0046

DATA SHEET

SDG 6109

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N503063-21

Client sample id A4CM-95-0046

Dept sample id 6109-021

Location/Matrix SSFL AREA 4 SOIL

Received 03/15/95

Collected 03/09/95 14:00

% moisture 23.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.033	0.050	0.09	0.5	U	H
Strontium 90	10098-97-2	0.046	0.061	0.1	0.5	U	SR
Thorium 228		0.85	0.12	0.06	0.1		TH
Thorium 230	14269-63-7	0.72	0.11	0.04	0.1		TH
Thorium 232	7740-29-1	0.82	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	1.2	0.075	0.02	0.01		U
Uranium 235	14117-96-1	0.051	0.014	0.009	0.01		U
Uranium 238	7440-61-1	1.2	0.073	0.01	0.01		U
Plutonium 238	13981-16-3	0.002	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0	0.002	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.45				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.085	0.023		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.06		U	GAM

DATA SHEETS

Page 41

SUMMARY DATA SECTION

Page 58

84

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

N503063-21

A4CM-95-0046

DATA SHEET, cont

SDG 6109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N503063-21Client sample id A4CM-95-0046Dept sample id 6109-021Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 14:00% moisture 23.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		1.0	0.056				GAM
Thorium 232		1.5	0.11				GAM

TA SHEETS

Page 42

SUMMARY DATA SECTION

Page 59

85

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test PU Matrix SOIL

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 2781-070				
A4CM-95-0024	N503063-01	6109-001	U	U
A4CM-95-0027	N503063-02	6109-002	U	U
A4CM-95-0028	N503063-03	6109-003	U	0.005 J
A4CM-95-0029	N503063-04	6109-004	U	0.006 J
A4CM-95-0030	N503063-05	6109-005	U	U
A4CM-95-0031	N503063-06	6109-006	U	U
A4CM-95-0032	N503063-07	6109-007	U	0.005 J
A4CM-95-0033	N503063-08	6109-008	U	0.004 J
A4CM-95-0034	N503063-09	6109-009	U	U
A4CM-95-0035	N503063-10	6109-010	U	0.003 J
A4CM-95-0036	N503063-11	6109-011	U	0.012
A4CM-95-0037	N503063-12	6109-012	U	U
A4CM-95-0038	N503063-13	6109-013	U	U
A4CM-95-0039	N503063-14	6109-014	U	0.010
A4CM-95-0040	N503063-15	6109-015	U	U
A4CM-95-0041	N503063-16	6109-016	U	U
A4CM-95-0042	N503063-17	6109-017	U	U
A4CM-95-0043	N503063-18	6109-018	U	U
A4CM-95-0044	N503063-19	6109-019	U	0.005 J
A4CM-95-0045	N503063-20	6109-020	U	0.005 J
A4CM-95-0046	N503063-21	6109-021	U	U
BLK (QC ID=23573)	N503063-22	6109-022	U	U
LCS (QC ID=23574)	N503063-23	6109-023	ok	ok
Duplicate (N503063-10)	N503063-24	6109-024	- U	ok U

Nominal values and limits from method	RDLs (pCi/g)	0.01	0.01
---------------------------------------	--------------	------	------

MOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 60

86

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test PU Matrix SOILSDG 6109Contact Italy E. Pittman

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client RocketdyneContract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MAX MDA g	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM KeV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
Preparation batch 2781-070 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 070															
A4CM-95-0024	N503063-01	0.01	3.00	61	1338	38	04/13/95	04/13	SS-027						
A4CM-95-0027	N503063-02	0.009	3.00	62	1338	38	04/13/95	04/13	SS-028						
A4CM-95-0028	N503063-03	0.01	3.00	68	1338	38	04/13/95	04/13	SS-029						
A4CM-95-0029	N503063-04	0.01	3.00	64	1338	38	04/13/95	04/13	SS-030						
A4CM-95-0030	N503063-05	0.008	3.00	57	1338	38	04/13/95	04/13	SS-032						
A4CM-95-0031	N503063-06	0.01	3.00	53	1338	37	04/13/95	04/13	SS-033						
A4CM-95-0032	N503063-07	0.01	3.00	53	1338	37	04/13/95	04/13	SS-035						
A4CM-95-0033	N503063-08	0.005	3.00	80	1013	43	04/13/95	04/19	SS-050						
A4CM-95-0034	N503063-09	0.02	3.00	50	1338	37	04/13/95	04/13	SS-038						
A4CM-95-0035	N503063-10	0.008	3.00	81	1338	37	04/13/95	04/13	SS-039						
A4CM-95-0036	N503063-11	0.009	3.00	76	1338	37	04/13/95	04/13	SS-017						
A4CM-95-0037	N503063-12	0.008	3.00	65	1338	36	04/13/95	04/13	SS-018						
A4CM-95-0038	N503063-13	0.01	3.00	60	1338	36	04/13/95	04/13	SS-019						
A4CM-95-0039	N503063-14	0.01	3.00	67	1338	36	04/13/95	04/13	SS-020						
A4CM-95-0040	N503063-15	0.009	3.00	81	1338	36	04/13/95	04/13	SS-021						
A4CM-95-0041	N503063-16	0.01	3.00	79	1338	36	04/13/95	04/13	SS-022						
A4CM-95-0042	N503063-17	0.02	3.00	77	1338	35	04/13/95	04/13	SS-023						
A4CM-95-0043	N503063-18	0.01	3.00	80	1338	35	04/13/95	04/13	SS-024						
A4CM-95-0044	N503063-19	0.01	3.00	77	1005	39	04/13/95	04/17	SS-027						
A4CM-95-0045	N503063-20	0.01	3.00	63	1005	39	04/13/95	04/17	SS-028						
A4CM-95-0046	N503063-21	0.01	3.00	68	1005	39	04/13/95	04/17	SS-029						
BLK (QC ID=23573)	N503063-22	0.009	3.00	85	1008		04/13/95	04/14	SS-039						
LCS (QC ID=23574)	N503063-23	0.01	3.00	68	1005		04/13/95	04/17	SS-030						
Duplicate (N503063-10)	N503063-24	0.01	3.00	66	1006	41	04/13/95	04/17	SS-035						
Nominal values and limits from method			0.01	3.00	20-105	500	100	180							

PROCEDURES	REFERENCE	HASL 300/PU-02
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-940	Plutonium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	0.01 ± 0.005
FOR 24 SAMPLES	YIELD	68 ± 20

MOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 61

87

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test TH Matrix SOIL

SDG 6109

Contact Italy E. Pittman

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

	LAB	RAW	SUF-			
CLIENT SAMPLE ID	SAMPLE ID	TEST FIX	PLANCHET	Thorium 228	Thorium 230	Thorium 232
Preparation batch 2781-070						
A4CM-95-0024	N503063-01	6109-001	1.1	0.76	1.2	
A4CM-95-0027	N503063-02	6109-002	0.66	0.48	0.60	
A4CM-95-0029	N503063-04	6109-004	0.80	0.57	0.72	
A4CM-95-0030	N503063-05	6109-005	0.96	0.75	0.92	
A4CM-95-0031	N503063-06	6109-006	0.57	0.42	0.54	
A4CM-95-0032	N503063-07	6109-007	0.89	0.69	0.76	
A4CM-95-0033	N503063-08	6109-008	0.64	0.60	0.69	
A4CM-95-0034	N503063-09	6109-009	0.71	0.57	0.66	
A4CM-95-0035	N503063-10	6109-010	0.58	0.41	0.57	
A4CM-95-0036	N503063-11	6109-011	0.66	0.57	0.82	
A4CM-95-0037	N503063-12	6109-012	0.70	0.50	0.71	
A4CM-95-0038	N503063-13	6109-013	0.51	0.43	0.56	
A4CM-95-0039	N503063-14	6109-014	0.60	0.56	0.61	
A4CM-95-0040	N503063-15	6109-015	0.92	0.75	0.85	
A4CM-95-0041	N503063-16	6109-016	0.59	0.52	0.60	
A4CM-95-0042	N503063-17	6109-017	0.76	0.71	0.75	
5-0043	N503063-18	6109-018	0.81	0.66	0.81	
A4CM-95-0044	N503063-19	6109-019	0.68	0.63	0.60	
A4CM-95-0045	N503063-20	6109-020	0.95	0.69	0.57	
A4CM-95-0046	N503063-21	6109-021	0.85	0.72	0.82	
BLK (QC ID=23573)	N503063-22	6109-022	U	U	U	
LCS (QC ID=23574)	N503063-23	6109-023		ok		
Duplicate (N503063-10)	N503063-24	6109-024	ok	ok	ok	

Preparation batch 2781-070A

A4CM-95-0028	N503063-03	A1	6109-003	0.80	0.79	0.82
BLK (QC ID=23701)	N503063-26		6109-026	U	U	U
LCS (QC ID=23700)	N503063-25		6109-025		ok	

Nominal values and limits from method	RDLs (pCi/g)	0.1	0.1	0.1
---------------------------------------	--------------	-----	-----	-----

MOD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 62

88

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test TH Matrix SOIL

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX pCi/g	MDA g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFP %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	---------------	----------	----------	-----------	-------	--------	----------	------------	---------	-------	-----------	----------	-----------	-----------	----------------	------	----------

Preparation batch 2781-070 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 070

A4CM-95-0024	N503063-01	0.1	1.00			40		631			39	04/13/95	04/14	SS-017
A4CM-95-0027	N503063-02	0.04	1.00			50		530			45	04/13/95	04/20	SS-050
A4CM-95-0029	N503063-04	0.07	1.00			63		631			39	04/13/95	04/14	SS-024
A4CM-95-0030	N503063-05	0.05	1.00			61		630			39	04/13/95	04/14	SS-027
A4CM-95-0031	N503063-06	0.05	1.00			56		630			38	04/13/95	04/14	SS-028
A4CM-95-0032	N503063-07	0.07	1.00			48		630			38	04/13/95	04/14	SS-029
A4CM-95-0033	N503063-08	0.06	1.00			56		630			38	04/13/95	04/14	SS-030
A4CM-95-0034	N503063-09	0.06	1.00			58		630			38	04/13/95	04/14	SS-032
A4CM-95-0035	N503063-10	0.05	1.00			55		630			38	04/13/95	04/14	SS-033
A4CM-95-0036	N503063-11	0.05	1.00			61		630			38	04/13/95	04/14	SS-036
A4CM-95-0037	N503063-12	0.09	1.00			55		452			38	04/13/95	04/15	SS-017
A4CM-95-0038	N503063-13	0.06	1.00			69		452			38	04/13/95	04/15	SS-018
A4CM-95-0039	N503063-14	0.1	1.00			34		452			38	04/13/95	04/15	SS-022
A4CM-95-0040	N503063-15	0.09	1.00			61		452			38	04/13/95	04/15	SS-024
A4CM-95-0041	N503063-16	0.07	1.00			58		469			38	04/13/95	04/15	SS-027
A4CM-95-0042	N503063-17	0.06	1.00			57		469			37	04/13/95	04/15	SS-028
A4CM-95-0043	N503063-18	0.07	1.00			60		469			37	04/13/95	04/15	SS-029
A4CM-95-0044	N503063-19	0.06	1.00			67		469			37	04/13/95	04/15	SS-030
A4CM-95-0045	N503063-20	0.07	1.00			55		469			37	04/13/95	04/15	SS-032
A4CM-95-0046	N503063-21	0.06	1.00			63		469			37	04/13/95	04/15	SS-033
BLK (QC ID=23573)	N503063-22	0.06	1.00			68		452				04/13/95	04/15	SS-036
LCS (QC ID=23574)	N503063-23	0.02	1.00			69		2220				04/13/95	04/15	SS-032
Duplicate (N503063-10)	N503063-24	0.03	1.00			50		2219			39	04/13/95	04/15	SS-033

Preparation batch 2781-070A 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 070

A4CM-95-0028	N503063-03	A1	0.04	1.00		62		530			45	04/20/95	04/20	SS-047
BLK (QC ID=23701)	N503063-26		0.03	1.00		81		530				04/20/95	04/20	SS-049
LCS (QC ID=23700)	N503063-25		0.02	1.00		87		530				04/20/95	04/20	SS-048

Nominal values and limits from method	0.1	1.00	20-105	500	180
---------------------------------------	-----	------	--------	-----	-----

METHOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 63

89

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test TH Matrix _____
SDG 6109
Contact Italy E. Pittman

METHOD SUMMARY, cont.

THORIUM, ISOTOPIC IN SOIL
ALPHA SPECTROSCOPY

Client Rocketdyne
Contract R44PJZ94034044

PROCEDURES	EP-000	Data Entry and Document Preparation, rev 0
	EP-001	Q.C. Preparation, rev 0
	EP-003	Tracing, rev 0
	EP-008	Heavy Elements Electroplating, rev 0
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-900	Thorium Purification, rev 0

AVERAGES $\pm$ 2 SD	MDA	<u>0.06</u>	$\pm$	<u>0.04</u>
FOR 26 SAMPLES	YIELD	<u>59</u>	$\pm$	<u>22</u>

METHOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 64

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test U Matrix SOIL

SDG 6109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%)			
							1+3	2σ	2+3	2σ
Preparation batch 2781-070										
A4CM-95-0024	N503063-01		6109-001	0.87	0.051	0.89	98	8	6	1
A4CM-95-0027	N503063-02		6109-002	0.58	0.027	0.55	105	9	5	1
A4CM-95-0028	N503063-03		6109-003	0.66	0.041	0.65	102	10	6	2
A4CM-95-0029	N503063-04		6109-004	0.84	0.039	0.76	111	9	5	1
A4CM-95-0030	N503063-05		6109-005	0.68	0.039	0.67	101	10	6	2
A4CM-95-0031	N503063-06		6109-006	0.50	0.026	0.49	102	10	5	2
A4CM-95-0032	N503063-07		6109-007	0.68	0.037	0.64	106	10	6	2
A4CM-95-0033	N503063-08		6109-008	0.69	0.038	0.70	99	9	5	1
A4CM-95-0034	N503063-09		6109-009	0.71	0.035	0.71	100	9	5	1
A4CM-95-0035	N503063-10		6109-010	0.55	0.033	0.54	102	11	6	2
A4CM-95-0036	N503063-11		6109-011	0.59	0.026	0.56	105	10	5	2
A4CM-95-0037	N503063-12		6109-012	0.58	0.040	0.59	98	10	7	2
A4CM-95-0038	N503063-13		6109-013	0.65	0.043	0.62	105	10	7	2
A4CM-95-0039	N503063-14		6109-014	0.66	0.036	0.66	100	9	5	2
A4CM-95-0040	N503063-15		6109-015	0.58	0.028	0.53	109	12	5	2
A4CM-95-0041	N503063-16		6109-016	0.60	0.033	0.61	98	11	5	2
A4CM-95-0042	N503063-17		6109-017	0.91	0.046	0.81	112	11	6	2
A4CM-95-0043	N503063-18		6109-018	0.62	0.022	0.65	95	11	3	1
A4CM-95-0044	N503063-19		6109-019	0.70	0.043	0.67	104	11	6	2
A4CM-95-0045	N503063-20		6109-020	1.2	0.063	1.1	109	10	6	1
A4CM-95-0046	N503063-21		6109-021	1.2	0.051	1.2	100	9	4	1
BLK (QC ID=23573)	N503063-22		6109-022	U	U	U				
LCS (QC ID=23574)	N503063-23		6109-023	ok	ok	ok				
Duplicate (N503063-10)	N503063-24		6109-024	ok	ok	ok	102	10	6	2
Nominal values and limits from method				RDLs (pCi/g)	0.01	0.01	0.01	100	4	
								Averages 103	6	

METHOD SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 65

91

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test U Matrix SOIL
SDG 6109
Contact Italy E. Pittman

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne
Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-070 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 070																
A4CM-95-0024	N503063-01			0.01	3.00			55	1338				38	04/13/95	04/13	SS-037
A4CM-95-0027	N503063-02			0.007	3.00			71	1338				38	04/13/95	04/13	SS-040
A4CM-95-0028	N503063-03			0.01	3.00			49	1338				38	04/13/95	04/13	SS-041
A4CM-95-0029	N503063-04			0.01	3.00			62	1338				38	04/13/95	04/13	SS-042
A4CM-95-0030	N503063-05			0.01	3.00			66	1006				42	04/13/95	04/17	SS-038
A4CM-95-0031	N503063-06			0.007	3.00			77	1008				38	04/13/95	04/14	SS-040
A4CM-95-0032	N503063-07			0.008	3.00			74	1008				38	04/13/95	04/14	SS-041
A4CM-95-0033	N503063-08			0.01	3.00			67	1008				38	04/13/95	04/14	SS-042
A4CM-95-0034	N503063-09			0.008	3.00			73	1005				41	04/13/95	04/17	SS-040
A4CM-95-0035	N503063-10			0.009	3.00			68	1005				41	04/13/95	04/17	SS-041
A4CM-95-0036	N503063-11			0.01	3.00			71	1005				41	04/13/95	04/17	SS-042
A4CM-95-0037	N503063-12			0.009	3.00			68	1007				40	04/13/95	04/17	SS-044
A4CM-95-0038	N503063-13			0.009	3.00			75	1007				40	04/13/95	04/17	SS-045
A4CM-95-0039	N503063-14			0.009	3.00			77	1007				40	04/13/95	04/17	SS-047
A4CM-95-0040	N503063-15			0.01	3.00			62	1007				40	04/13/95	04/17	SS-048
A4CM-95-0041	N503063-16			0.01	3.00			80	996				40	04/13/95	04/17	SS-017
A4CM-95-0042	N503063-17			0.01	3.00			74	996				39	04/13/95	04/17	SS-018
A4CM-95-0043	N503063-18			0.01	3.00			74	996				39	04/13/95	04/17	SS-019
A4CM-95-0044	N503063-19			0.01	3.00			80	996				39	04/13/95	04/17	SS-020
A4CM-95-0045	N503063-20			0.02	3.00			77	996				39	04/13/95	04/17	SS-022
A4CM-95-0046	N503063-21			0.02	3.00			84	996				39	04/13/95	04/17	SS-023
BLK (QC ID=23573)	N503063-22			0.01	3.00			74	996				04/13/95	04/17	SS-024	
LCS (QC ID=23574)	N503063-23			0.05	3.00			86	444				04/13/95	04/18	SS-042	
Duplicate (N503063-10)	N503063-24			0.01	3.00			77	903				42	04/13/95	04/18	SS-042

Nominal values and limits from method 0.01 3.00 30-105 720 100 180

PROCEDURES REFERENCE HASL 300/U-04
EP-060 Soil Preparation, rev 0
EP-070 Soil Dissolution, rev 0
EP-910 Uranium Purification, rev 0
EP-008 Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD MDA 0.01 ± 0.02
FOR 24 SAMPLES YIELD 72 ± 17

METHOD SUMMARIES

Page 7

SUMMARY DATA SECTION

Page 66

92

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test SR Matrix SOILSDG 6109Lab Italy E. Pittman

METHOD SUMMARY

STRONTIUM, TOTAL IN SOIL

BETA COUNTING

Client RocketdyneContract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Strontium 90
------------------	------------------	-----------------	------------------	--------------

Preparation batch 2781-070

A4CM-95-0024	N503063-01	6109-001	U
A4CM-95-0027	N503063-02	6109-002	U
A4CM-95-0028	N503063-03	6109-003	U
A4CM-95-0029	N503063-04	6109-004	U
A4CM-95-0030	N503063-05	6109-005	0.056 J
A4CM-95-0031	N503063-06	6109-006	U
A4CM-95-0032	N503063-07	6109-007	U
A4CM-95-0033	N503063-08	6109-008	0.089 J
A4CM-95-0034	N503063-09	6109-009	U
A4CM-95-0035	N503063-10	6109-010	0.083 J
A4CM-95-0036	N503063-11	6109-011	0.099 J
A4CM-95-0037	N503063-12	6109-012	U
A4CM-95-0038	N503063-13	6109-013	U
A4CM-95-0039	N503063-14	6109-014	U
A4CM-95-0040	N503063-15	6109-015	U
A4CM-95-0041	N503063-16	6109-016	U
A4CM-95-0042	N503063-17	6109-017	U
A4CM-95-0043	N503063-18	6109-018	U
A4CM-95-0044	N503063-19	6109-019	U
A4CM-95-0045	N503063-20	6109-020	U
A4CM-95-0046	N503063-21	6109-021	U
BLK (QC ID=23573)	N503063-22	6109-022	U
LCS (QC ID=23574)	N503063-23	6109-023	ok
Duplicate (N503063-10)	N503063-24	6109-024	ok U

Nominal values and limits from method	RDLs (pCi/g)	0.5
---------------------------------------	--------------	-----

METHOD SUMMARIES

Page 8

SUMMARY DATA SECTION

Page 67

93

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test SR Matrix SOIL

SDG 6109

Contact Italy E. Pittman

METHOD SUMMARY

STRONTIUM, TOTAL IN SOIL

BETA COUNTING

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-070 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 070																
A4CM-95-0024	N503063-01			0.08	2.00			69	1329				38	04/13/95	04/13	LBG-015
A4CM-95-0027	N503063-02			0.06	2.00			82	1329				38	04/13/95	04/13	LBG-016
A4CM-95-0028	N503063-03			0.2	2.00			60	100				38	04/13/95	04/13	LBG-015
A4CM-95-0029	N503063-04			0.1	2.00			83	100				38	04/13/95	04/13	LBG-003
A4CM-95-0030	N503063-05			0.05	2.00			86	368				38	04/13/95	04/13	LBG-003
A4CM-95-0031	N503063-06			0.06	2.00			85	368				37	04/13/95	04/13	LBG-004
A4CM-95-0032	N503063-07			0.07	2.00			82	394				37	04/13/95	04/13	LBG-015
A4CM-95-0033	N503063-08			0.06	2.00			78	394				37	04/13/95	04/13	LBG-016
A4CM-95-0034	N503063-09			0.1	2.00			84	124				37	04/13/95	04/13	LBG-003
A4CM-95-0035	N503063-10			0.07	2.00			83	200				37	04/13/95	04/13	LBG-003
A4CM-95-0036	N503063-11			0.08	2.00			87	200				37	04/13/95	04/13	LBG-004
A4CM-95-0037	N503063-12			0.1	2.00			73	200				36	04/13/95	04/13	LBG-015
A4CM-95-0038	N503063-13			0.1	2.00			91	139				36	04/13/95	04/13	LBG-015
A4CM-95-0039	N503063-14			0.1	2.00			84	139				36	04/13/95	04/13	LBG-016
A4CM-95-0040	N503063-15			0.08	2.00			93	200				36	04/13/95	04/13	LBG-016
A4CM-95-0041	N503063-16			0.08	2.00			88	133				36	04/13/95	04/13	LBG-003
A4CM-95-0042	N503063-17			0.1	2.00			82	133				35	04/13/95	04/13	LBG-004
A4CM-95-0043	N503063-18			0.1	2.00			86	133				35	04/13/95	04/13	LBG-015
A4CM-95-0044	N503063-19			0.1	2.00			89	133				35	04/13/95	04/13	LBG-016
A4CM-95-0045	N503063-20			0.07	2.00			89	163				35	04/13/95	04/13	LBG-003
A4CM-95-0046	N503063-21			0.1	2.00			78	163				35	04/13/95	04/13	LBG-004
BLK (QC ID=23573)	N503063-22			0.1	2.00			69	163					04/13/95	04/13	LBG-015
LCS (QC ID=23574)	N503063-23			0.2	2.00			74	63					04/13/95	04/13	LBG-016
Duplicate (N503063-10)	N503063-24			0.09	2.00			84	163				37	04/13/95	04/13	LBG-016
Nominal values and limits from method				0.5	2.00			20-105	200				180			

PROCEDURES	REFERENCE	HASL 300/SR-01,-02
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-500	Strontium-89,90 - Purification, rev 0	

AVERAGES ± 2 SD	MDA	0.09 ± 0.07
FOR 24 SAMPLES	YIELD	82 ± 16

METHOD SUMMARIES

Page 9

SUMMARY DATA SECTION

Page 68

94

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test GAM Matrix SOILSDG 6109Sact Italy E. Pittman

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client RocketdyneContract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cesium 137
------------------	------------------	-----------------	------------------	------------

Preparation batch 2781-070

A4CM-95-0024	N503063-01	6109-001	U
A4CM-95-0027	N503063-02	6109-002	U
A4CM-95-0028	N503063-03	6109-003	0.11
A4CM-95-0029	N503063-04	6109-004	0.072
A4CM-95-0030	N503063-05	6109-005	U
A4CM-95-0031	N503063-06	6109-006	0.17
A4CM-95-0032	N503063-07	6109-007	0.27
A4CM-95-0033	N503063-08	6109-008	0.45
A4CM-95-0034	N503063-09	6109-009	0.43
A4CM-95-0035	N503063-10	6109-010	0.43
A4CM-95-0036	N503063-11	6109-011	0.44
A4CM-95-0037	N503063-12	6109-012	0.12
A4CM-95-0038	N503063-13	6109-013	U
A4CM-95-0039	N503063-14	6109-014	U
A4CM-95-0040	N503063-15	6109-015	0.083
A4CM-95-0041	N503063-16	6109-016	U
A4CM-95-0042	N503063-17	6109-017	0.085
A4CM-95-0043	N503063-18	6109-018	U
A4CM-95-0044	N503063-19	6109-019	0.17
A4CM-95-0045	N503063-20	6109-020	0.67
A4CM-95-0046	N503063-21	6109-021	0.085
BLK (QC ID=23573)	N503063-22	6109-022	U
LCS (QC ID=23574)	N503063-23	6109-023	ok
Duplicate (N503063-10)	N503063-24	6109-024	ok

Nominal values and limits from method	RDLs (pCi/g)	0.02
---------------------------------------	--------------	------

D SUMMARIES

Page 10

SUMMARY DATA SECTION

Page 69

95

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test GAM Matrix SOILSDG 6109cact Italy E. Pittman

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client RocketdyneContract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA g	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM KeV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
Preparation batch 2781-070 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 070															
A4CM-95-0024	N503063-01	0.02	785							830		30	04/05/95	01,01,00	
A4CM-95-0027	N503063-02	0.02	761							830		30	04/05/95	MB,02,00	
A4CM-95-0028	N503063-03		704							829		30	04/05/95	01,04,00	
A4CM-95-0029	N503063-04		690							772		31	04/06/95	MB,03,00	
A4CM-95-0030	N503063-05	0.02	763							763		31	04/06/95	MB,02,00	
A4CM-95-0031	N503063-06		737							763		30	04/06/95	01,04,00	
A4CM-95-0032	N503063-07		757							776		31	04/07/95	01,01,00	
A4CM-95-0033	N503063-08		780							775		31	04/07/95	MB,02,00	
A4CM-95-0034	N503063-09		756							775		31	04/07/95	MB,03,00	
A4CM-95-0035	N503063-10		762							775		31	04/07/95	01,04,00	
A4CM-95-0036	N503063-11		759							803		32	04/08/95	01,04,00	
A4CM-95-0037	N503063-12		694							771		33	04/10/95	MB,03,00	
A4CM-95-0038	N503063-13	0.02	713							771		33	04/10/95	01,04,00	
A4CM-95-0039	N503063-14	0.01	769							754		34	04/11/95	01,04,00	
A4CM-95-0040	N503063-15		635							735		34	04/11/95	01,01,00	
A4CM-95-0041	N503063-16	0.02	758							752		34	04/11/95	01,01,00	
A4CM-95-0042	N503063-17		675							735		33	04/11/95	MB,03,00	
A4CM-95-0043	N503063-18	0.02	767							776		33	04/11/95	MB,02,00	
A4CM-95-0044	N503063-19		768							753		33	04/11/95	MB,03,00	
A4CM-95-0045	N503063-20		520							1390		35	04/13/95	MB,03,00	
A4CM-95-0046	N503063-21		760							903		34	04/12/95	01,01,00	
BLK (QC ID=23573)	N503063-22	0.006	850							904			04/12/95	MB,02,00	
LCS (QC ID=23574)	N503063-23		850							904			04/12/95	MB,03,00	
Duplicate (N503063-10)	N503063-24		184							1391		37	04/13/95	JR,01,00	

Nominal values and limits from method

0.02 850

700

180

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

AVERAGES ± 2 SD MDA 0.02 ± 0.01
FOR 8 SAMPLES YIELD _____ ± _____

D SUMMARIES

Page 11

SUMMARY DATA SECTION

Page 70

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test H Matrix SOIL

SDG 6109

Contact Italy E. Pittman

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Client Rocketdyne

Contract R44PJ294034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Tritium
------------------	------------------	----------------------	----------	---------

Preparation batch 2781-070

A4CM-95-0024	N503063-01	6109-001	U
A4CM-95-0027	N503063-02	6109-002	U
A4CM-95-0028	N503063-03	6109-003	U
A4CM-95-0029	N503063-04	6109-004	U
A4CM-95-0030	N503063-05	6109-005	U
A4CM-95-0031	N503063-06	6109-006	U
A4CM-95-0032	N503063-07	6109-007	U
A4CM-95-0033	N503063-08	6109-008	U
A4CM-95-0034	N503063-09	6109-009	U
A4CM-95-0035	N503063-10	6109-010	U
A4CM-95-0036	N503063-11	6109-011	U
A4CM-95-0037	N503063-12	6109-012	U
A4CM-95-0038	N503063-13	6109-013	U
A4CM-95-0039	N503063-14	6109-014	U
A4CM-95-0040	N503063-15	6109-015	U
A4CM-95-0041	N503063-16	6109-016	U
A4CM-95-0042	N503063-17	6109-017	U
A4CM-95-0043	N503063-18	6109-018	U
A4CM-95-0044	N503063-19	6109-019	U
A4CM-95-0045	N503063-20	6109-020	U
A4CM-95-0046	N503063-21	6109-021	U
BLK (QC ID=23573)	N503063-22	6109-022	U
LCS (QC ID=23574)	N503063-23	6109-023	ok X
Duplicate (N503063-10)	N503063-24	6109-024	- U

Nominal values and limits from method	RDLs (pCi/g)	0.5
---------------------------------------	--------------	-----

METHOD SUMMARIES

Page 12

SUMMARY DATA SECTION

Page 71

97

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 04/21/95

TMA/RICHMOND

REPORTING GROUP 6109

Test H Matrix SOIL

SDG 6109

Contact Italy E. Pittman

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA g	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM KeV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
Preparation batch 2781-070 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 070															
A4CM-95-0024	N503063-01		0.1	27.4					50			26	03/30/95	04/01	LSC-005
A4CM-95-0027	N503063-02		0.09	29.4					50			26	03/30/95	04/01	LSC-005
A4CM-95-0028	N503063-03		0.1	26.0					50			26	03/30/95	04/01	LSC-005
A4CM-95-0029	N503063-04		0.1	24.8					50			26	03/30/95	04/01	LSC-005
A4CM-95-0030	N503063-05		0.09	34.0					50			27	03/30/95	04/02	LSC-005
A4CM-95-0031	N503063-06		0.1	27.6					50			26	03/30/95	04/02	LSC-005
A4CM-95-0032	N503063-07		0.1	29.3					50			26	03/30/95	04/02	LSC-005
A4CM-95-0033	N503063-08		0.1	23.1					50			26	03/30/95	04/02	LSC-005
A4CM-95-0034	N503063-09		0.09	30.5					50			26	03/30/95	04/02	LSC-005
A4CM-95-0035	N503063-10		0.09	30.1					50			26	03/30/95	04/02	LSC-005
A4CM-95-0036	N503063-11		0.09	30.9					50			26	03/30/95	04/02	LSC-005
A4CM-95-0037	N503063-12		0.1	25.2					50			25	03/30/95	04/02	LSC-005
A4CM-95-0038	N503063-13		0.1	24.5					50			25	03/30/95	04/02	LSC-005
A4CM-95-0039	N503063-14		0.1	23.9					50			25	03/30/95	04/02	LSC-005
A4CM-95-0040	N503063-15		0.1	27.2					50			25	03/30/95	04/02	LSC-005
A4CM-95-0041	N503063-16		0.1	29.0					50			25	03/30/95	04/02	LSC-005
A4CM-95-0042	N503063-17		0.08	34.5					50			24	03/30/95	04/02	LSC-005
A4CM-95-0043	N503063-18		0.1	26.4					50			24	03/30/95	04/02	LSC-005
A4CM-95-0044	N503063-19		0.1	29.4					50			24	03/30/95	04/02	LSC-005
A4CM-95-0045	N503063-20		0.1	23.5					50			24	03/30/95	04/02	LSC-005
A4CM-95-0046	N503063-21		0.09	31.1					50			24	03/30/95	04/02	LSC-005
BLK (QC ID=23573)	N503063-22		0.1	20.0					50				03/30/95	04/01	LSC-005
LCS (QC ID=23574)	N503063-23		0.1	20.0					50				03/30/95	04/01	LSC-005
Duplicate (N503063-10)	N503063-24		0.09	29.7					50			26	03/30/95	04/02	LSC-005
Nominal values and limits from method			0.5	20.0					50			180			

PROCEDURES REFERENCE EPA 906.0; ASTM 2476-81
 EP-060 Soil Preparation, rev 0
 EP-070 Soil Dissolution, rev 0
 EP-211 Tritium in Solid Samples by Azeotropic Distillation, rev 0

AVERAGES ± 2 SD MDA 0.1 ± 0.01
 FOR 24 SAMPLES YIELD _____ ± _____

SD SUMMARIES

Page 13

SUMMARY DATA SECTION

Page 72

93

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 04/21/95



TMA/RICHMOND

REPORTING GROUP 6111

N504012-08

A4CM-95-0056

DATA SHEET, cont

SDG 6111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504012-08Client sample id A4CM-95-0056Dept sample id 6111-008Location/Matrix SSFL AREA 4SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 13.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.78	0.049				GAM
Thorium 232		1.3	0.12				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
4012-08	H	6111-008		27.5 g	04/22/95	05/10/95	IEP
4012-08	SR	6111-008		2.00 g	05/01/95	05/10/95	IEP
N504012-08	TH	6111-008	AOR1	1.00 g	05/10/95	05/12/95	IEP
N504012-08	U	6111-008		3.00 g	05/03/95	05/08/95	IEP
N504012-08	PU	6111-008		3.00 g	05/05/95	05/09/95	IEP
N504012-08	GAM	6111-008		750 g	04/27/95	05/10/95	IEP

ATA SHEETS

Page 16

SUMMARY DATA SECTION

Page 37

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA / RICHMOND

REPORTING GROUP 6111

N504012-09

A4CM-95-0057

DATA SHEET

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-09

Client sample id A4CM-95-0057

Dept sample id 6111-009

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/29/95 14:45

% moisture 13.2

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.011	0.065	0.1	0.5	U	H
Strontium 90	10098-97-2	0.087	0.050	0.07	0.5	J	SR
Thorium 228		0.84	0.18	0.1	0.1		TH
Thorium 230	14269-63-7	0.48	0.13	0.07	0.1	B	TH
Thorium 232	7740-29-1	0.63	0.14	0.06	0.1		TH
Uranium 233/234	11-08-5	0.63	0.041	0.01	0.01		U
Uranium 235	14117-96-1	0.049	0.010	0.004	0.01		U
Uranium 238	7440-61-1	0.66	0.042	0.008	0.01		U
Plutonium 238	13981-16-3	0.001	0.002	0.005	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.003	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		15	0.44				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.14	0.027		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		0.057	0.056				GAM

DATA SHEETS

Page 17

SUMMARY DATA SECTION

Page 38

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-09

DATA SHEET, cont

A4CM-95-0057

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-09

Client sample id A4CM-95-0057

Dept sample id 6111-009

Location/Matrix SSFL AREA 4

SOIL

Received 04/06/95

Collected 03/29/95 14:45

% moisture 13.2

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.68	0.054				GAM
Thorium 232		1.3	0.12				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
1012-09	H	6111-009		23.4 g	04/22/95	05/10/95	IEP
1012-09	SR	6111-009		2.00 g	05/01/95	05/10/95	IEP
N504012-09	TH	6111-009		1.00 g	05/08/95	05/09/95	IEP
N504012-09	U	6111-009		3.00 g	05/03/95	05/08/95	IEP
N504012-09	PU	6111-009		3.00 g	05/08/95	05/10/95	IEP
N504012-09	GAM	6111-009		750 g	04/26/95	05/10/95	IEP

DATA SHEETS

Page 18

SUMMARY DATA SECTION

Page 39

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-10

A4CM-95-0058

DATA SHEET

SDG 6111

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-10Client sample id A4CM-95-0058Dept sample id 6111-010Location/Matrix SSFL AREA 4SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 16.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.018	0.061	0.1	0.5	U	H
Strontium 90	10098-97-2	0.028	0.053	0.08	0.5	U	SR
Thorium 228		0.72	0.12	0.07	0.1		TH
Thorium 230	14269-63-7	0.59	0.11	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.72	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	0.64	0.054	0.01	0.01		U
Uranium 235	14117-96-1	0.039	0.014	0.008	0.01		U
Uranium 238	7440-61-1	0.70	0.056	0.01	0.01		U
Plutonium 238	13981-16-3	-0.001	0.003	0.006	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.003	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.28				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		0.013	0.007				GAM
Cobalt 58		U		0.01		U	GAM
Iron 59		U		0.04		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.036	0.012		0.02		GAM
Cerium 144		U		0.08		U	GAM
Europium 152		U		0.03		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.04		U	GAM

DATA SHEETS

Page 19

SUMMARY DATA SECTION

Page 40

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-10

A4CM-95-0058

DATA SHEET, cont

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-10Client sample id A4CM-95-0058Dept sample id 6111-010Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 16.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.68	0.028				GAM
Thorium 232		1.4	0.073				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N504012-10	H	6111-010		24.8 g	04/22/95	05/10/95	IEP
N504012-10	SR	6111-010		2.00 g	05/01/95	05/10/95	IEP
N504012-10	TH	6111-010		1.00 g	05/08/95	05/10/95	IEP
N504012-10	U	6111-010		3.00 g	05/04/95	05/08/95	IEP
N504012-10	PU	6111-010		3.00 g	05/08/95	05/10/95	IEP
N504012-10	GAM	6111-010		750 g	04/26/95	05/10/95	IEP

DATA SHEETS

Page 20

SUMMARY DATA SECTION

Page 41

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-11

A4CM-95-0059

DATA SHEET

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-11

Client sample id A4CM-95-0059

Dept sample id 6111-011

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/30/95 14:45

% moisture 14.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.043	0.058	0.1	0.5	U	H
Strontium 90	10098-97-2	0.010	0.057	0.08	0.5	U	SR
Thorium 228		0.74	0.12	0.07	0.1		TH
Thorium 230	14269-63-7	0.58	0.10	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.81	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	0.74	0.045	0.009	0.01		U
Uranium 235	14117-96-1	0.039	0.009	0.004	0.01		U
Uranium 238	7440-61-1	0.77	0.046	0.007	0.01		U
Plutonium 238	13981-16-3	0.001	0.003	0.006	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.002	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.44				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

ATA SHEETS

Page 21

SUMMARY DATA SECTION

Page 42

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-11

A4CM-95-0059

DATA SHEET, cont

SDG 6111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504012-11
Dept sample id 6111-011
Received 04/06/95
% moisture 14.8Client sample id A4CM-95-0059
Location/Matrix SSFL AREA 4 SOIL
Collected 03/30/95 14:45
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.80	0.050				GAM
Thorium 232		1.2	0.11				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N504012-11	H	6111-011		27.5 g	04/22/95	05/10/95	IEP
N504012-11	SR	6111-011		2.00 g	05/01/95	05/12/95	IEP
N504012-11	TH	6111-011		1.00 g	05/08/95	05/10/95	IEP
N504012-11	U	6111-011		3.00 g	05/04/95	05/09/95	IEP
N504012-11	PU	6111-011		3.00 g	05/08/95	05/10/95	IEP
N504012-11	GAM	6111-011		751 g	04/27/95	05/10/95	IEP

DATA SHEETS

Page 22

SUMMARY DATA SECTION

Page 43

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 05/18/95

TMA / RICHMOND

REPORTING GROUP 6111

N504012-12

A4CM-95-0060

DATA SHEET

SDG 6111

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504012-12Client sample id A4CM-95-0060Dept sample id 6111-012Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 10.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.024	0.058	0.1	0.5	U	H
Strontium 90	10098-97-2	0.014	0.047	0.08	0.5	U	SR
Thorium 228		0.83	0.18	0.1	0.1		TH
Thorium 230	14269-63-7	0.63	0.15	0.05	0.1	B	TH
Thorium 232	7740-29-1	0.91	0.17	0.05	0.1		TH
Uranium 233/234	11-08-5	0.56	0.034	0.008	0.01		U
Uranium 235	14117-96-1	0.022	0.007	0.005	0.01		U
Uranium 238	7440-61-1	0.56	0.034	0.006	0.01		U
Polonium 238	13981-16-3	0	0.004	0.007	0.01	U	PU
Polonium 239/240	10-12-8	0.003	0.004	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.48				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.03	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 23

SUMMARY DATA SECTION

Page 44

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-12

A4CM-95-0060

DATA SHEET, cont

SDG <u>6111</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504012-12</u>	Client sample id <u>A4CM-95-0060</u>
Dept sample id <u>6111-012</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/06/95</u>	Collected <u>03/30/95 14:45</u>
% moisture <u>10.2</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.68	0.049				GAM
Thorium 232		1.3	0.10				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
1012-12	H	6111-012		25.6 g	04/22/95	05/10/95	IEP
1012-12	SR	6111-012		2.00 g	05/01/95	05/12/95	IEP
N504012-12	TH	6111-012	AOR1	1.00 g	05/12/95	05/16/95	IEP
N504012-12	U	6111-012		3.00 g	05/05/95	05/09/95	IEP
N504012-12	PU	6111-012		3.00 g	05/08/95	05/10/95	IEP
N504012-12	GAM	6111-012		750 g	04/27/95	05/10/95	IEP

DATA SHEETS

Page 24

SUMMARY DATA SECTION

Page 45

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-13

DATA SHEET

A4CM-95-0061

SDG 6111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504012-13Client sample id A4CM-95-0061Dept sample id 6111-013Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 16.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.002	0.056	0.1	0.5	U	H
Strontium 90	10098-97-2	0.048	0.054	0.09	0.5	U	SR
Thorium 228		1.0	0.21	0.2	0.1		TH
Thorium 230	14269-63-7	0.80	0.17	0.06	0.1	B	TH
Thorium 232	7740-29-1	0.82	0.18	0.06	0.1		TH
Uranium 233/234	11-08-5	0.70	0.047	0.01	0.01		U
Uranium 235	14117-96-1	0.051	0.012	0.005	0.01		U
Uranium 238	7440-61-1	0.78	0.050	0.009	0.01		U
Plutonium 238	13981-16-3	0	0.003	0.006	0.01	U	PU
Plutonium 239/240	10-12-8	0.19	0.022	0.004	0.01		PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.48				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.035	0.025		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.06		U	GAM

ATA SHEETS

Page 25

SUMMARY DATA SECTION

Page 46

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-13

A4CM-95-0061

DATA SHEET, cont

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-13Client sample id A4CM-95-0061Dept sample id 6111-013Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 16.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.87	0.050				GAM
Thorium 232		1.4	0.14				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4012-13	H	6111-013		26.5 g	04/22/95	05/10/95	IEP
4012-13	SR	6111-013		2.00 g	05/01/95	05/12/95	IEP
N504012-13	TH	6111-013	A0R1	1.00 g	05/12/95	05/16/95	IEP
N504012-13	U	6111-013		3.00 g	05/04/95	05/08/95	IEP
N504012-13	PU	6111-013		3.00 g	05/08/95	05/10/95	IEP
N504012-13	GAM	6111-013		750 g	04/27/95	05/10/95	IEP

DATA SHEETS

Page 26

SUMMARY DATA SECTION

Page 47

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-14

A4CM-95-0062

DATA SHEET

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-14

Client sample id A4CM-95-0062

Dept sample id 6111-014

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/30/95 14:45

% moisture 22.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.024	0.052	0.09	0.5	U	H
Strontium 90	10098-97-2	0.076	0.063	0.08	0.5	U	SR
Thorium 228		0.67	0.11	0.06	0.1		TH
Thorium 230	14269-63-7	0.59	0.099	0.03	0.1	B	TH
Thorium 232	7740-29-1	0.74	0.11	0.03	0.1		TH
Uranium 233/234	11-08-5	0.77	0.054	0.01	0.01		U
Uranium 235	14117-96-1	0.036	0.011	0.007	0.01		U
Uranium 238	7440-61-1	0.78	0.054	0.009	0.01		U
Plutonium 238	13981-16-3	-0.001	0.004	0.009	0.01	U	PU
Plutonium 239/240	10-12-8	0.008	0.004	0.004	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.51				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.53	0.035		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.06		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

ATA SHEETS

Page 27

SUMMARY DATA SECTION

Page 48

TMA/RICHMOND

REPORTING GROUP 6111

N504012-14

A4CM-95-0062

DATA SHEET, cont

SDG 6111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504012-14
Dept sample id 6111-014
Received 04/06/95
% moisture 22.8Client sample id A4CM-95-0062
Location/Matrix SSFL AREA 4 SOIL
Collected 03/30/95 14:45
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.86	0.056				GAM
Thorium 232		1.4	0.14				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N504012-14	H	6111-014		29.9 g	04/22/95	05/10/95	IEP
N504012-14	SR	6111-014		2.00 g	05/01/95	05/10/95	IEP
N504012-14	TH	6111-014		1.00 g	05/08/95	05/10/95	IEP
N504012-14	U	6111-014		3.00 g	05/04/95	05/08/95	IEP
N504012-14	PU	6111-014		3.00 g	05/08/95	05/10/95	IEP
N504012-14	GAM	6111-014		750 g	04/28/95	05/10/95	IEP

DATA SHEETS

Page 28

SUMMARY DATA SECTION

Page 49

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-15

DATA SHEET

A4CM-95-0063

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-15

Client sample id A4CM-95-0063

Dept sample id 6111-015

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/30/95 14:45

% moisture 14.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.024	0.056	0.1	0.5	U	H
Strontium 90	10098-97-2	0.016	0.054	0.08	0.5	U	SR
Thorium 228		0.71	0.11	0.06	0.1		TH
Thorium 230	14269-63-7	0.59	0.10	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.76	0.11	0.03	0.1		TH
Uranium 233/234	11-08-5	0.67	0.054	0.01	0.01		U
Uranium 235	14117-96-1	0.043	0.014	0.007	0.01		U
Uranium 238	7440-61-1	0.62	0.052	0.01	0.01		U
Plutonium 238	13981-16-3	0	0.005	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.003	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.50				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.084	0.025		0.02		GAM
Cerium 144		U		0.2		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.08		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

DATA SHEETS

Page 29

SUMMARY DATA SECTION

Page 50

TMA/RICHMOND

REPORTING GROUP 6111

N504012-15

A4CM-95-0063

DATA SHEET, cont

SDG 6111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504012-15Client sample id A4CM-95-0063Dept sample id 6111-015Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 14.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.82	0.052				GAM
Thorium 232		1.2	0.12				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
4012-15	H	6111-015		27.5 g	04/22/95	05/10/95	IEP
N504012-15	SR	6111-015		2.00 g	05/01/95	05/10/95	IEP
N504012-15	TH	6111-015		1.00 g	05/08/95	05/09/95	IEP
N504012-15	U	6111-015		3.00 g	05/04/95	05/08/95	IEP
N504012-15	PU	6111-015		3.00 g	05/08/95	05/10/95	IEP
N504012-15	GAM	6111-015		750 g	04/28/95	05/10/95	IEP

DATA SHEETS

Page 30

SUMMARY DATA SECTION

Page 51

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA / RICHMOND

REPORTING GROUP 6111

N504012-16

DATA SHEET

A4CM-95-0064

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-16Client sample id A4CM-95-0064Dept sample id 6111-016Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 13.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.008	0.059	0.1	0.5	U	H
Strontium 90	10098-97-2	0.008	0.060	0.1	0.5	U	SR
Thorium 228		0.70	0.11	0.07	0.1		TH
Thorium 230	14269-63-7	0.57	0.10	0.03	0.1	B	TH
Thorium 232	7740-29-1	0.64	0.10	0.03	0.1		TH
Uranium 233/234	11-08-5	0.66	0.043	0.009	0.01		U
Uranium 235	14117-96-1	0.041	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.66	0.043	0.007	0.01		U
Plutonium 238	13981-16-3	0.007	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.003	0.003	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		21	0.52				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.23	0.031		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 31

SUMMARY DATA SECTION

Page 52

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-16

A4CM-95-0064

DATA SHEET, cont

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-16

Client sample id A4CM-95-0064

Dept sample id 6111-016

Location/Matrix SSFL AREA 4

SOIL

Received 04/06/95

Collected 03/31/95

% moisture 13.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.83	0.058				GAM
Thorium 232		1.3	0.16				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
4012-16	H	6111-016		25.1 g	04/22/95	05/10/95	IEP
04012-16	SR	6111-016		2.00 g	05/01/95	05/12/95	IEP
N504012-16	TH	6111-016		1.00 g	05/08/95	05/10/95	IEP
N504012-16	U	6111-016		3.00 g	05/04/95	05/08/95	IEP
N504012-16	PU	6111-016		3.00 g	05/08/95	05/10/95	IEP
N504012-16	GAM	6111-016		751 g	04/27/95	05/10/95	IEP

DATA SHEETS

Page 32

SUMMARY DATA SECTION

Page 53

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-17

DATA SHEET

A4CM-95-0065

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-17

Client sample id A4CM-95-0065

Dept sample id 6111-017

Location/Matrix SSFL AREA 4

SOIL

Received 04/06/95

Collected 03/31/95

% moisture 7.4

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.027	0.053	0.09	0.5	U	H
Strontium 90	10098-97-2	0.049	0.045	0.07	0.5	U	SR
Thorium 228		0.59	0.13	0.1	0.1		TH
Thorium 230	14269-63-7	0.65	0.13	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.71	0.13	0.04	0.1		TH
Uranium 233/234	11-08-5	0.70	0.050	0.01	0.01		U
Uranium 235	14117-96-1	0.032	0.010	0.006	0.01		U
Uranium 238	7440-61-1	0.70	0.050	0.008	0.01		U
Plutonium 238	13981-16-3	0.001	0.003	0.006	0.01	U	PU
Plutonium 239/240	10-12-8	0.006	0.004	0.005	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		23	0.33				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.13	0.018		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 33

SUMMARY DATA SECTION

Page 54

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-17

A4CM-95-0065

DATA SHEET, cont

SDG 6111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504012-17Client sample id A4CM-95-0065Dept sample id 6111-017Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 7.4

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.87	0.033				GAM
Thorium 232		1.5	0.076				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
1012-17	H	6111-017		28.8 g	04/22/95	05/10/95	IEP
N504012-17	SR	6111-017		2.00 g	05/01/95	05/12/95	IEP
N504012-17	TH	6111-017	A0R1	1.00 g	05/12/95	05/16/95	IEP
N504012-17	U	6111-017		3.00 g	05/04/95	05/08/95	IEP
N504012-17	PU	6111-017		3.00 g	05/09/95	05/12/95	IEP
N504012-17	GAM	6111-017		750 g	04/28/95	05/10/95	IEP

DATA SHEETS

Page 34

SUMMARY DATA SECTION

Page 55

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-18

A4CM-95-0066

DATA SHEET

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-18Client sample id A4CM-95-0066Dept sample id 6111-018Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 11.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.057	0.065	0.1	0.5	U	H
Strontium 90	10098-97-2	0.017	0.050	0.07	0.5	U	SR
Thorium 228		0.73	0.16	0.1	0.1		TH
Thorium 230	14269-63-7	0.58	0.13	0.06	0.1	B	TH
Thorium 232	7740-29-1	0.68	0.14	0.05	0.1		TH
Uranium 233/234	11-08-5	0.62	0.037	0.007	0.01		U
Uranium 235	14117-96-1	0.027	0.008	0.004	0.01		U
Uranium 238	7440-61-1	0.62	0.037	0.006	0.01		U
Plutonium 238	13981-16-3	0.001	0.006	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.003	0.004	0.007	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		23	0.31				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		0.018	0.009				GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.04		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.13	0.016		0.02		GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		0.040	0.036				GAM

DATA SHEETS

Page 35

SUMMARY DATA SECTION

Page 56

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-18

A4CM-95-0066

DATA SHEET, cont

SDG 6111

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-18Client sample id A4CM-95-0066Dept sample id 6111-018Location/Matrix SSFL AREA 4SOILReceived 04/06/95Collected 03/31/95% moisture 11.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.85	0.033				GAM
Thorium 232		1.3	0.085				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4012-18	H	6111-018		24.6 g	04/22/95	05/10/95	IEP
504012-18	SR	6111-018		2.00 g	05/01/95	05/12/95	IEP
N504012-18	TH	6111-018		1.00 g	05/10/95	05/12/95	IEP
N504012-18	U	6111-018		3.00 g	05/05/95	05/09/95	IEP
N504012-18	PU	6111-018		3.00 g	05/08/95	05/10/95	IEP
N504012-18	GAM	6111-018		750 g	04/28/95	05/10/95	IEP

DATA SHEETS

Page 36

SUMMARY DATA SECTION

Page 57

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-19

DATA SHEET

A4CM-95-0067

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-19

Client sample id A4CM-95-0067

Dept sample id 6111-019

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/31/95

% moisture 8.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.003	0.060	0.1	0.5	U	H
Strontium 90	10098-97-2	0.042	0.063	0.08	0.5	U	SR
Thorium 228		1.2	0.18	0.1	0.1		TH
Thorium 230	14269-63-7	0.96	0.15	0.05	0.1	B	TH
Thorium 232	7740-29-1	1.1	0.16	0.04	0.1		TH
Uranium 233/234	11-08-5	0.95	0.057	0.01	0.01		U
Uranium 235	14117-96-1	0.040	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.93	0.055	0.008	0.01		U
Actinium 238	13981-16-3	-0.001	0.007	0.01	0.01	U	PU
Actinium 239/240	10-12-8	0.004	0.004	0.006	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.53				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.11	0.029		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		0.11	0.054				GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

DATA SHEETS

Page 37

SUMMARY DATA SECTION

Page 58

TMA/RICHMOND

REPORTING GROUP 6111

N504012-19

DATA SHEET, cont

A4CM-95-0067

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-19

Client sample id A4CM-95-0067

Dept sample id 6111-019

Location/Matrix SSFL AREA 4

SOIL

Received 04/06/95

Collected 03/31/95

% moisture 8.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.98	0.060				GAM
Thorium 232		1.3	0.14				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504012-19	H	6111-019		25.3 g	04/23/95	05/10/95	IEP
N504012-19	SR	6111-019		2.00 g	05/01/95	05/12/95	IEP
N504012-19	TH	6111-019		1.00 g	05/08/95	05/10/95	IEP
N504012-19	U	6111-019		3.00 g	05/04/95	05/08/95	IEP
N504012-19	PU	6111-019		3.00 g	05/08/95	05/10/95	IEP
N504012-19	GAM	6111-019		751 g	04/28/95	05/10/95	IEP

DATA SHEETS

Page 38

SUMMARY DATA SECTION

Page 59

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-20

DATA SHEET

A4CM-95-0068

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-20Client sample id A4CM-95-0068Dept sample id 6111-020Location/Matrix SSFL AREA 4SOILReceived 04/06/95Collected 03/31/95% moisture 11.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.020	0.054	0.09	0.5	U	H
Strontium 90	10098-97-2	0.095	0.052	0.07	0.5	J	SR
Thorium 228		0.73	0.14	0.08	0.1		TH
Thorium 230	14269-63-7	0.57	0.12	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.67	0.13	0.04	0.1		TH
Uranium 233/234	11-08-5	0.81	0.053	0.01	0.01		U
Uranium 235	14117-96-1	0.055	0.013	0.005	0.01		U
Uranium 238	7440-61-1	0.86	0.056	0.01	0.01		U
Plutonium 238	13981-16-3	0.002	0.006	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.003	0.004	0.006	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		22	0.48				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.38	0.031		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		0.064	0.038				GAM

DATA SHEETS

Page 39

SUMMARY DATA SECTION

Page 60

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-20

DATA SHEET, cont

A4CM-95-0068

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-20

Client sample id A4CM-95-0068

Dept sample id 6111-020

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/31/95

% moisture 11.1

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		1.1	0.053				GAM
Thorium 232		1.7	0.13				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504012-20	H	6111-020		28.8 g	04/23/95	05/10/95	IEP
N504012-20	SR	6111-020		2.00 g	05/01/95	05/18/95	IEP
N504012-20	TH	6111-020	AOR1	1.00 g	05/13/95	05/16/95	IEP
N504012-20	U	6111-020		3.00 g	05/04/95	05/08/95	IEP
N504012-20	PU	6111-020		3.00 g	05/08/95	05/10/95	IEP
N504012-20	GAM	6111-020		750 g	04/28/95	05/10/95	IEP

DATA SHEETS

Page 40

SUMMARY DATA SECTION

Page 61

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-21

A4CM-95-0069

DATA SHEET

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-21

Client sample id A4CM-95-0069

Dept sample id 6111-021

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/31/95

% moisture 8.0

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.016	0.053	0.09	0.5	U	H
Strontium 90	10098-97-2	0.023	0.052	0.08	0.5	U	SR
Thorium 228		0.82	0.14	0.09	0.1		TH
Thorium 230	14269-63-7	0.63	0.12	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.90	0.14	0.04	0.1		TH
Uranium 233/234	11-08-5	0.72	0.050	0.01	0.01		U
Uranium 235	14117-96-1	0.040	0.012	0.006	0.01		U
Uranium 238	7440-61-1	0.72	0.050	0.009	0.01		U
Plutonium 238	13981-16-3	-0.001	0.002	0.005	0.01	U	PU
Plutonium 239/240	10-12-8	0	0.002	0.004	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.48				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.094	0.025		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.08		U	GAM

ATA SHEETS

Page 41

SUMMARY DATA SECTION

Page 62

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-21

A4CM-95-0069

DATA SHEET, cont

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-21Client sample id A4CM-95-0069Dept sample id 6111-021Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 8.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.78	0.053				GAM
Thorium 232		1.2	0.12				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
4012-21	H	6111-021		29.1 g	04/23/95	05/10/95	IEP
4012-21	SR	6111-021		2.00 g	05/01/95	05/12/95	IEP
N504012-21	TH	6111-021		1.00 g	05/08/95	05/09/95	IEP
N504012-21	U	6111-021		3.00 g	05/04/95	05/08/95	IEP
N504012-21	PU	6111-021		3.00 g	05/09/95	05/10/95	IEP
N504012-21	GAM	6111-021		750 g	04/28/95	05/10/95	IEP

DATA SHEETS

Page 42

SUMMARY DATA SECTION

Page 63

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test PU Matrix SOIL

SDG 6111

Contact Italy E. Pittman

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 2781-090					
A4CM-95-0047	N504012-01	6111-001	U	U	
A4CM-95-0048	N504012-02	6111-002	U	U	
A4CM-95-0049	N504012-03	6111-003	U	0.008 J	
A4CM-95-0052	N504012-04	6111-004	U	0.007 J	
A4CM-95-0053	N504012-05	6111-005	U	U	
A4CM-95-0054	N504012-06	6111-006	U	U	
A4CM-95-0055	N504012-07	6111-007	U	U	
A4CM-95-0056	N504012-08	6111-008	U	U	
A4CM-95-0057	N504012-09	6111-009	U	U	
A4CM-95-0058	N504012-10	6111-010	U	U	
A4CM-95-0059	N504012-11	6111-011	U	U	
A4CM-95-0060	N504012-12	6111-012	U	U	
A4CM-95-0061	N504012-13	6111-013	U	0.19	
A4CM-95-0062	N504012-14	6111-014	U	0.008 J	
A4CM-95-0063	N504012-15	6111-015	U	U	
A4CM-95-0064	N504012-16	6111-016	U	U	
A4CM-95-0065	N504012-17	6111-017	U	0.006 J	
A4CM-95-0066	N504012-18	6111-018	U	U	
A4CM-95-0067	N504012-19	6111-019	U	U	
A4CM-95-0068	N504012-20	6111-020	U	U	
A4CM-95-0069	N504012-21	6111-021	U	U	
BLK (QC ID=23683)	N504012-24	6111-024	U	U	
BLK (QC ID=23684)	N504012-25	6111-025	U	U	
LCS (QC ID=23681)	N504012-22	6111-022	ok	ok	
LCS (QC ID=23682)	N504012-23	6111-023	ok	ok	
Duplicate (N504012-03)	N504012-26	6111-026	- U	ok U	
Duplicate (N504012-15)	N504012-27	6111-027	- U	- U	

Nominal values and limits from method	RDLs (pCi/g)	0.01	0.01
---------------------------------------	--------------	------	------

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 64

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test PU Matrix SOIL

SDG 6111

Contact Italy E. Pittman

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-090 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 090															
A4CM-95-0047	N504012-01		0.004	3.00			82	1009				37	05/04/95	05/04	SS-063
A4CM-95-0048	N504012-02		0.004	3.00			78	1009				37	05/04/95	05/04	SS-064
A4CM-95-0049	N504012-03		0.005	3.00			83	1009				37	05/04/95	05/04	SS-065
A4CM-95-0052	N504012-04		0.004	3.00			76	1009				36	05/04/95	05/04	SS-066
A4CM-95-0053	N504012-05		0.009	3.00			78	1260				37	05/04/95	05/05	SS-030
A4CM-95-0054	N504012-06		0.008	3.00			88	1260				37	05/04/95	05/05	SS-035
A4CM-95-0055	N504012-07		0.008	3.00			86	1260				37	05/04/95	05/05	SS-038
A4CM-95-0056	N504012-08		0.01	3.00			77	1286				37	05/04/95	05/05	SS-040
A4CM-95-0057	N504012-09		0.005	3.00			78	1093				40	05/04/95	05/08	SS-045
A4CM-95-0058	N504012-10		0.006	3.00			74	1093				40	05/04/95	05/08	SS-046
A4CM-95-0059	N504012-11		0.006	3.00			77	1092				39	05/04/95	05/08	SS-047
A4CM-95-0060	N504012-12		0.007	3.00			72	1092				39	05/04/95	05/08	SS-049
A4CM-95-0061	N504012-13		0.006	3.00			77	1092				39	05/04/95	05/08	SS-050
A4CM-95-0062	N504012-14		0.009	3.00			83	1040				39	05/04/95	05/08	SS-030
A4CM-95-0063	N504012-15		0.01	3.00			78	1040				39	05/04/95	05/08	SS-033
A4CM-95-0064	N504012-16		0.01	3.00			71	1040				38	05/04/95	05/08	SS-035
A4CM-95-0065	N504012-17		0.006	3.00			66	1004				39	05/04/95	05/09	SS-045
A4CM-95-0066	N504012-18		0.01	3.00			68	1040				38	05/04/95	05/08	SS-039
A4CM-95-0067	N504012-19		0.01	3.00			68	1040				38	05/04/95	05/08	SS-042
A4CM-95-0068	N504012-20		0.01	3.00			70	1040				38	05/04/95	05/08	SS-027
A4CM-95-0069	N504012-21		0.005	3.00			87	955				39	05/04/95	05/09	SS-045
BLK (QC ID=23683)	N504012-24		0.007	3.00			77	955					05/04/95	05/09	SS-049
BLK (QC ID=23684)	N504012-25		0.006	3.00			84	955					05/04/95	05/09	SS-050
LCS (QC ID=23681)	N504012-22		0.007	3.00			71	955					05/04/95	05/09	SS-046
LCS (QC ID=23682)	N504012-23		0.008	3.00			67	955					05/04/95	05/09	SS-047
Duplicate (N504012-03)	N504012-26		0.01	3.00			75	1003				42	05/04/95	05/09	SS-027
Duplicate (N504012-15)	N504012-27		0.006	3.00			88	1004				40	05/04/95	05/09	SS-046
Nominal values and limits from method			0.01	3.00			20-105	500	100			180			

METHOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 65

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test PU Matrix SOIL

SDG 6111

Contact Italy E. Pittman

METHOD SUMMARY, cont.

PLUTONIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

PROCEDURES	REFERENCE	HASL 300/PU-02
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-940	Plutonium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES $\pm$ 2 SD	MDA <u>0.007</u> $\pm$ <u>0.004</u>
FOR 27 SAMPLES	YIELD <u>77</u> $\pm$ <u>13</u>

MOD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 66

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test TH Matrix SOIL

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Thorium 228	Thorium 230	Thorium 232
Preparation batch 2781-090						
A4CM-95-0047	N504012-01		6111-001	1.0	0.79	0.86
A4CM-95-0048	N504012-02	AOR1	6111-002	0.76	0.45	0.67
A4CM-95-0049	N504012-03		6111-003	0.62	0.50	0.56
A4CM-95-0052	N504012-04		6111-004	0.84	0.62	0.85
A4CM-95-0053	N504012-05	AOR1	6111-005	0.70	0.61	0.77
A4CM-95-0054	N504012-06		6111-006	0.82	0.57	0.74
A4CM-95-0055	N504012-07		6111-007	0.53	0.45	0.49
A4CM-95-0056	N504012-08	AOR1	6111-008	0.54	0.48	0.40
A4CM-95-0057	N504012-09		6111-009	0.84	0.48	0.63
A4CM-95-0058	N504012-10		6111-010	0.72	0.59	0.72
A4CM-95-0059	N504012-11		6111-011	0.74	0.58	0.81
A4CM-95-0060	N504012-12	AOR1	6111-012	0.83	0.63	0.91
A4CM-95-0061	N504012-13	AOR1	6111-013	1.0	0.80	0.82
A4CM-95-0062	N504012-14		6111-014	0.67	0.59	0.74
A4CM-95-0063	N504012-15		6111-015	0.71	0.59	0.76
A4CM-95-0064	N504012-16		6111-016	0.70	0.57	0.64
S-0065	N504012-17	AOR1	6111-017	0.59	0.65	0.71
A4CM-95-0066	N504012-18		6111-018	0.73	0.58	0.68
A4CM-95-0067	N504012-19		6111-019	1.2	0.96	1.1
A4CM-95-0068	N504012-20	AOR1	6111-020	0.73	0.57	0.67
A4CM-95-0069	N504012-21		6111-021	0.82	0.63	0.90
BLK (QC ID=23683)	N504012-24		6111-024	U	U	U
BLK (QC ID=23684)	N504012-25		6111-025	U	0.092 J	U
LCS (QC ID=23681)	N504012-22		6111-022		ok	
LCS (QC ID=23682)	N504012-23		6111-023		ok	
Duplicate (N504012-03)	N504012-26		6111-026	ok	ok	ok
Duplicate (N504012-15)	N504012-27		6111-027	ok	ok	ok

Nominal values and limits from method	RDLs (pCi/g)	0.1	0.1	0.1
---------------------------------------	--------------	-----	-----	-----

40D SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 67

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-CMS
 Version 3.06
 Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test TH Matrix SOIL

SDG 6111

Contact Italy E. Pittman

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MAX MDA g	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-090 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 090																
A4CM-95-0047	N504012-01		0.07	1.00			48	629					35	05/02/95	05/02	SS-021
A4CM-95-0048	N504012-02	AOR1	0.1	1.00			42	427					43	05/09/95	05/10	SS-023
A4CM-95-0049	N504012-03		0.1	1.00			32	547					41	05/02/95	05/08	SS-018
A4CM-95-0052	N504012-04		0.1	1.00			43	547					40	05/02/95	05/08	SS-019
A4CM-95-0053	N504012-05	AOR1	0.1	1.00			32	665					42	05/09/95	05/10	SS-033
A4CM-95-0054	N504012-06		0.06	1.00			61	547					37	05/02/95	05/05	SS-021
A4CM-95-0055	N504012-07		0.08	1.00			57	548					40	05/02/95	05/08	SS-022
A4CM-95-0056	N504012-08	AOR1	0.1	1.00			34	664					42	05/09/95	05/10	SS-035
A4CM-95-0057	N504012-09		0.1	1.00			41	548					40	05/02/95	05/08	SS-024
A4CM-95-0058	N504012-10		0.07	1.00			49	503					40	05/02/95	05/08	SS-027
A4CM-95-0059	N504012-11		0.07	1.00			54	503					39	05/02/95	05/08	SS-028
A4CM-95-0060	N504012-12	AOR1	0.1	1.00			25	618					43	05/12/95	05/12	SS-027
A4CM-95-0061	N504012-13	AOR1	0.2	1.00			19	758					43	05/12/95	05/12	SS-035
A4CM-95-0062	N504012-14		0.06	1.00			61	503					39	05/02/95	05/08	SS-032
A4CM-95-0063	N504012-15		0.06	1.00			57	503					39	05/02/95	05/08	SS-033
A4CM-95-0064	N504012-16		0.07	1.00			58	502					38	05/02/95	05/08	SS-035
A4CM-95-0065	N504012-17	AOR1	0.1	1.00			28	762					42	05/12/95	05/12	SS-039
A4CM-95-0066	N504012-18		0.1	1.00			26	665					40	05/02/95	05/10	SS-028
A4CM-95-0067	N504012-19		0.1	1.00			45	502					38	05/02/95	05/08	SS-038
A4CM-95-0068	N504012-20	AOR1	0.08	1.00			42	508					43	05/12/95	05/13	SS-027
A4CM-95-0069	N504012-21		0.09	1.00			48	501					38	05/02/95	05/08	SS-040
BLK (QC ID=23683)	N504012-24		0.1	1.00			39	491						05/02/95	05/11	SS-023
BLK (QC ID=23684)	N504012-25		0.08	1.00			45	664						05/02/95	05/10	SS-039
LCS (QC ID=23681)	N504012-22		0.04	1.00			55	501						05/02/95	05/08	SS-041
LCS (QC ID=23682)	N504012-23		0.04	1.00			66	501						05/02/95	05/08	SS-042
Duplicate (N504012-03)	N504012-26		0.06	1.00			55	664					43	05/02/95	05/10	SS-040
Duplicate (N504012-15)	N504012-27		0.07	1.00			49	664					41	05/02/95	05/10	SS-041
Nominal values and limits from method			0.1	1.00			20-105	500					180			

METHOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 68

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

METHOD SUMMARY, cont.

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test TH Matrix SOIL

SDG 6111

Analyst Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

PROCEDURES	EP-000	Data Entry and Document Preparation, rev 0
	EP-001	Q.C. Preparation, rev 0
	EP-003	Tracing, rev 0
	EP-008	Heavy Elements Electroplating, rev 0
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-900	Thorium Purification, rev 0

AVERAGES $\pm$ 2 SD

MDA 0.09 $\pm$ 0.06

FOR 27 SAMPLES

YIELD 45 $\pm$ 25

ADDITIONAL SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 69

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test U Matrix SOIL

SDG 6111

Contact Italy E. Pittman

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%)			
							1+3	2σ	2+3	2σ
Preparation batch 2781-090										
A4CM-95-0047	N504012-01	6111-001		0.67	0.036	0.67	100	9	5	2
A4CM-95-0048	N504012-02	6111-002		0.65	0.029	0.67	97	9	4	1
A4CM-95-0049	N504012-03	6111-003		0.52	0.018	0.50	104	10	4	1
A4CM-95-0052	N504012-04	6111-004		0.63	0.042	0.62	102	10	7	2
A4CM-95-0053	N504012-05	6111-005		0.73	0.039	0.75	97	9	5	2
A4CM-95-0054	N504012-06	6111-006		0.66	0.045	0.68	97	10	7	2
A4CM-95-0055	N504012-07	6111-007		0.66	0.037	0.66	100	9	6	2
A4CM-95-0056	N504012-08	6111-008		0.67	0.032	0.66	102	10	5	1
A4CM-95-0057	N504012-09	6111-009		0.63	0.049	0.66	95	9	7	2
A4CM-95-0058	N504012-10	6111-010		0.64	0.039	0.70	91	11	6	2
A4CM-95-0059	N504012-11	6111-011		0.74	0.039	0.77	96	8	5	1
A4CM-95-0060	N504012-12	6111-012		0.56	0.022	0.56	100	9	4	1
A4CM-95-0061	N504012-13	6111-013		0.70	0.051	0.78	90	8	7	2
A4CM-95-0062	N504012-14	6111-014		0.77	0.036	0.78	99	10	5	1
A4CM-95-0063	N504012-15	6111-015		0.67	0.043	0.62	108	13	7	2
A4CM-95-0064	N504012-16	6111-016		0.66	0.041	0.66	100	9	6	2
A4CM-95-0065	N504012-17	6111-017		0.70	0.032	0.70	100	10	5	1
A4CM-95-0066	N504012-18	6111-018		0.62	0.027	0.62	100	8	4	1
A4CM-95-0067	N504012-19	6111-019		0.95	0.040	0.93	102	9	4	1
A4CM-95-0068	N504012-20	6111-020		0.81	0.055	0.86	94	9	6	2
A4CM-95-0069	N504012-21	6111-021		0.72	0.040	0.72	100	10	6	2
BLK (QC ID=23683)	N504012-24	6111-024		U	U	U				
BLK (QC ID=23684)	N504012-25	6111-025		U	U	U				
LCS (QC ID=23681)	N504012-22	6111-022		ok	ok	ok				
LCS (QC ID=23682)	N504012-23	6111-023		ok	ok	ok				
Duplicate (N504012-03)	N504012-26	6111-026		OUT	OUT	OUT	100	9	5	2
Duplicate (N504012-15)	N504012-27	6111-027		ok	ok	ok	106	10	5	1

Nominal values and limits from method

RDLs (pCi/g)

0.01

0.01

0.01

100

4

Averages 99

5

METHOD SUMMARIES

Page 7

SUMMARY DATA SECTION

Page 70

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test U Matrix SOIL

SDG 6111

Contact Italy E. Pittman

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MAX pCi/g	MDA g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-090 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 090																	
A4CM-95-0047	N504012-01			0.008	3.00				70		1003			36	05/03/95	05/03	SS-033
A4CM-95-0048	N504012-02			0.008	3.00				79		968			37	05/03/95	05/04	SS-028
A4CM-95-0049	N504012-03			0.007	3.00				81		968			37	05/03/95	05/04	SS-029
A4CM-95-0052	N504012-04			0.01	3.00				75		968			36	05/03/95	05/04	SS-030
A4CM-95-0053	N504012-05			0.009	3.00				66		969			36	05/03/95	05/04	SS-032
A4CM-95-0054	N504012-06			0.01	3.00				65		1001			35	05/03/95	05/03	SS-039
A4CM-95-0055	N504012-07			0.009	3.00				72		1001			35	05/03/95	05/03	SS-040
A4CM-95-0056	N504012-08			0.009	3.00				67		1001			35	05/03/95	05/03	SS-041
A4CM-95-0057	N504012-09			0.01	3.00				77		1001			35	05/03/95	05/03	SS-042
A4CM-95-0058	N504012-10			0.01	3.00				46		969			36	05/03/95	05/04	SS-033
A4CM-95-0059	N504012-11			0.009	3.00				78		1000			35	05/03/95	05/04	SS-035
A4CM-95-0060	N504012-12			0.008	3.00				74		1260			36	05/03/95	05/05	SS-029
A4CM-95-0061	N504012-13			0.01	3.00				74		1000			35	05/03/95	05/04	SS-037
A4CM-95-0062	N504012-14			0.01	3.00				60		1000			35	05/03/95	05/04	SS-038
A4CM-95-0063	N504012-15			0.01	3.00				48		969			35	05/03/95	05/04	SS-039
A4CM-95-0064	N504012-16			0.009	3.00				78		969			34	05/03/95	05/04	SS-040
A4CM-95-0065	N504012-17			0.01	3.00				62		969			34	05/03/95	05/04	SS-041
A4CM-95-0066	N504012-18			0.007	3.00				74		1260			35	05/03/95	05/05	SS-032
A4CM-95-0067	N504012-19			0.01	3.00				73		962			34	05/03/95	05/04	SS-044
A4CM-95-0068	N504012-20			0.01	3.00				65		962			34	05/03/95	05/04	SS-045
A4CM-95-0069	N504012-21			0.01	3.00				64		962			34	05/03/95	05/04	SS-046
BLK (QC ID=23683)	N504012-24			0.007	3.00				51		962				05/03/95	05/04	SS-048
BLK (QC ID=23684)	N504012-25			0.01	3.00				50		962				05/03/95	05/04	SS-049
LCS (QC ID=23681)	N504012-22			0.04	3.00				61		962				05/03/95	05/04	SS-047
LCS (QC ID=23682)	N504012-23			0.05	3.00				43		968				05/03/95	05/04	SS-027
Duplicate (N504012-03)	N504012-26			0.01	3.00				52		1260			38	05/03/95	05/05	SS-033
Duplicate (N504012-15)	N504012-27			0.009	3.00				66		1040			39	05/03/95	05/08	SS-029
Nominal values and limits from method				0.01	3.00				30-105		720	100		180			

METHOD SUMMARIES

Page 8

SUMMARY DATA SECTION

Page 71

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

METHOD SUMMARY, cont.

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test U Matrix SOILSDG 6111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044

PROCEDURES	REFERENCE	HASL 300/U-04
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-910	Uranium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES $\pm$ 2 SDMDA 0.01 $\pm$ 0.02

FOR 27 SAMPLES

YIELD 66 $\pm$ 22

METHOD SUMMARIES

Page 9

SUMMARY DATA SECTION

Page 72

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test SR Matrix SOIL

SDG 6111

Contact Italy E. Pittman

METHOD SUMMARY

STRONTIUM, TOTAL IN SOIL

BETA COUNTING

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Strontium 90
------------------	------------------	-----------------	------------------	--------------

Preparation batch 2781-090

A4CM-95-0047	N504012-01	6111-001	U
A4CM-95-0048	N504012-02	6111-002	U
A4CM-95-0049	N504012-03	6111-003	U
A4CM-95-0052	N504012-04	6111-004	U
A4CM-95-0053	N504012-05	6111-005	0.071 J
A4CM-95-0054	N504012-06	6111-006	U
A4CM-95-0055	N504012-07	6111-007	U
A4CM-95-0056	N504012-08	6111-008	U
A4CM-95-0057	N504012-09	6111-009	0.087 J
A4CM-95-0058	N504012-10	6111-010	U
A4CM-95-0059	N504012-11	6111-011	U
A4CM-95-0060	N504012-12	6111-012	U
A4CM-95-0061	N504012-13	6111-013	U
A4CM-95-0062	N504012-14	6111-014	U
A4CM-95-0063	N504012-15	6111-015	U
A4CM-95-0064	N504012-16	6111-016	U
A4CM-95-0065	N504012-17	6111-017	U
A4CM-95-0066	N504012-18	6111-018	U
A4CM-95-0067	N504012-19	6111-019	U
A4CM-95-0068	N504012-20	6111-020	0.095 J
A4CM-95-0069	N504012-21	6111-021	U
BLK (QC ID=23683)	N504012-24	6111-024	U
BLK (QC ID=23684)	N504012-25	6111-025	U
LCS (QC ID=23681)	N504012-22	6111-022	ok
LCS (QC ID=23682)	N504012-23	6111-023	ok
Duplicate (N504012-03)	N504012-26	6111-026	ok J
Duplicate (N504012-15)	N504012-27	6111-027	- U

Nominal values and limits from method	RDLs (pCi/g)	0.5
---------------------------------------	--------------	-----

SD SUMMARIES

Page 10

SUMMARY DATA SECTION

Page 73

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test SR Matrix SOILSDG 6111Contact Italy E. Pittman

METHOD SUMMARY

STRONTIUM, TOTAL IN SOIL

BETA COUNTING

Client RocketdyneContract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-090 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 090																
A4CM-95-0047	N504012-01			0.1	2.00			86	145				34	05/01/95	05/01	LBG-016
A4CM-95-0048	N504012-02			0.07	2.00			84	242				34	05/01/95	05/01	LBG-016
A4CM-95-0049	N504012-03			0.07	2.00			81	195				34	05/01/95	05/01	LBG-003
A4CM-95-0052	N504012-04			0.06	2.00			89	203				33	05/01/95	05/01	LBG-003
A4CM-95-0053	N504012-05			0.04	2.00			85	707				33	05/01/95	05/01	LBG-016
A4CM-95-0054	N504012-06			0.09	2.00			88	204				33	05/01/95	05/01	LBG-003
A4CM-95-0055	N504012-07			0.1	2.00			83	204				33	05/01/95	05/01	LBG-004
A4CM-95-0056	N504012-08			0.1	2.00			80	204				33	05/01/95	05/01	LBG-015
A4CM-95-0057	N504012-09			0.07	2.00			84	207				33	05/01/95	05/01	LBG-003
A4CM-95-0058	N504012-10			0.08	2.00			88	207				33	05/01/95	05/01	LBG-004
A4CM-95-0059	N504012-11			0.08	2.00			88	203				32	05/01/95	05/01	LBG-015
A4CM-95-0060	N504012-12			0.08	2.00			84	143				32	05/01/95	05/01	LBG-003
A4CM-95-0061	N504012-13			0.09	2.00			89	143				32	05/01/95	05/01	LBG-004
A4CM-95-0062	N504012-14			0.08	2.00			89	207				32	05/01/95	05/01	LBG-015
A4CM-95-0063	N504012-15			0.08	2.00			86	207				32	05/01/95	05/01	LBG-016
A4CM-95-0064	N504012-16			0.1	2.00			79	143				31	05/01/95	05/01	LBG-016
A4CM-95-0065	N504012-17			0.07	2.00			81	220				31	05/01/95	05/01	LBG-003
A4CM-95-0066	N504012-18			0.07	2.00			83	220				31	05/01/95	05/01	LBG-004
A4CM-95-0067	N504012-19			0.08	2.00			82	220				31	05/01/95	05/01	LBG-015
A4CM-95-0068	N504012-20			0.07	2.00			86	195				31	05/01/95	05/01	LBG-004
A4CM-95-0069	N504012-21			0.08	2.00			86	203				31	05/01/95	05/01	LBG-016
BLK (QC ID=23683)	N504012-24			0.07	2.00			88	200				05/01/95	05/01	LBG-016	
BLK (QC ID=23684)	N504012-25			0.03	2.00			85	707				05/01/95	05/01	LBG-003	
LCS (QC ID=23681)	N504012-22			0.1	2.00			86	200				05/01/95	05/01	LBG-016	
LCS (QC ID=23682)	N504012-23			0.1	2.00			89	109				05/01/95	05/01	LBG-003	
Duplicate (N504012-03)	N504012-26			0.04	2.00			78	707				34	05/01/95	05/01	LBG-004
Duplicate (N504012-15)	N504012-27			0.05	2.00			80	707				32	05/01/95	05/01	LBG-015

Nominal values and limits from method

0.5

2.00

20-105

200

180

PROCEDURES REFERENCE HASL 300/SR-01,-02

EP-060 Soil Preparation, rev 0

EP-070 Soil Dissolution, rev 0

EP-500 Strontium-89,90 - Purification, rev 0

AVERAGES ± 2 SD

MDA 0.08 ± 0.04

FOR 27 SAMPLES

YIELD 85 ± 7

METHOD SUMMARIES

Page 11

SUMMARY DATA SECTION

Page 74

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test GAM Matrix SOILSDG 6111Contact Italy E. Pittman

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client RocketdyneContract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX PLANCHET	Cesium 137
Preparation batch 2781-090			
A4CM-95-0047	N504012-01	6111-001	0.20
A4CM-95-0048	N504012-02	6111-002	0.097
A4CM-95-0049	N504012-03	6111-003	0.23
A4CM-95-0052	N504012-04	6111-004	0.093
A4CM-95-0053	N504012-05	6111-005	0.059
A4CM-95-0054	N504012-06	6111-006	U
A4CM-95-0055	N504012-07	6111-007	U
A4CM-95-0056	N504012-08	6111-008	U
A4CM-95-0057	N504012-09	6111-009	0.14
A4CM-95-0058	N504012-10	6111-010	0.036
A4CM-95-0059	N504012-11	6111-011	U
A4CM-95-0060	N504012-12	6111-012	U
A4CM-95-0061	N504012-13	6111-013	0.035
A4CM-95-0062	N504012-14	6111-014	0.53
A4CM-95-0063	N504012-15	6111-015	0.084
A4CM-95-0064	N504012-16	6111-016	0.23
A4CM-95-0065	N504012-17	6111-017	0.13
A4CM-95-0066	N504012-18	6111-018	0.13
A4CM-95-0067	N504012-19	6111-019	0.11
A4CM-95-0068	N504012-20	6111-020	0.38
A4CM-95-0069	N504012-21	6111-021	0.094
BLK (QC ID=23683)	N504012-24	6111-024	U
BLK (QC ID=23684)	N504012-25	6111-025	U
LCS (QC ID=23681)	N504012-22	6111-022	ok
LCS (QC ID=23682)	N504012-23	6111-023	ok
Duplicate (N504012-03)	N504012-26	6111-026	ok
Duplicate (N504012-15)	N504012-27	6111-027	ok U

Nominal values and limits from method RDLs (pCi/g) 0.02

JD SUMMARIES

Page 12

SUMMARY DATA SECTION

Page 75

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test GAM Matrix SOILSDG 6111Contact Italy E. Pittman

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client RocketdyneContract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-	
SAMPLE ID	TEST	FIX	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR

Preparation batch 2781-090 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 090

A4CM-95-0047	N504012-01		750					752				29	04/20/95	04/26	01,01,00
A4CM-95-0048	N504012-02		750					919				28	04/20/95	04/25	01,01,00
A4CM-95-0049	N504012-03		750					919				28	04/20/95	04/25	MB,02,00
A4CM-95-0052	N504012-04		751					919				27	04/20/95	04/25	MB,03,00
A4CM-95-0053	N504012-05		750					740				29	04/20/95	04/27	01,04,00
A4CM-95-0054	N504012-06	0.02	750					751				28	04/20/95	04/26	MB,03,00
A4CM-95-0055	N504012-07	0.02	750					868				29	04/20/95	04/27	01,01,00
A4CM-95-0056	N504012-08	0.02	750					868				29	04/20/95	04/27	MB,02,00
A4CM-95-0057	N504012-09		750					751				28	04/20/95	04/26	MB,02,00
A4CM-95-0058	N504012-10		750					878				28	04/20/95	04/26	01,04,00
A4CM-95-0059	N504012-11	0.02	751					868				28	04/20/95	04/27	MB,03,00
A4CM-95-0060	N504012-12	0.03	750					804				28	04/20/95	04/27	MB,02,00
A4CM-95-0061	N504012-13		750					758				28	04/20/95	04/27	01,01,00
A4CM-95-0062	N504012-14		750					750				29	04/20/95	04/28	01,01,00
A4CM-95-0063	N504012-15		750					775				29	04/20/95	04/28	MB,02,00
A4CM-95-0064	N504012-16		751					754				27	04/20/95	04/27	MB,03,00
A4CM-95-0065	N504012-17		750					760				28	04/20/95	04/28	01,04,00
A4CM-95-0066	N504012-18		750					809				28	04/20/95	04/28	01,04,00
A4CM-95-0067	N504012-19		751					755				28	04/20/95	04/28	MB,03,00
A4CM-95-0068	N504012-20		750					918				28	04/20/95	04/28	01,01,00
A4CM-95-0069	N504012-21		750					829				28	04/20/95	04/28	MB,02,00
BLK (QC ID=23683)	N504012-24	0.004	850					1878					04/20/95	04/29	MB,02,00
BLK (QC ID=23684)	N504012-25	0.005	850					1695					04/20/95	04/29	MB,03,00
LCS (QC ID=23681)	N504012-22		850					771					04/20/95	04/28	MB,03,00
LCS (QC ID=23682)	N504012-23		850					771					04/20/95	04/28	01,04,00
Duplicate (N504012-03)	N504012-26		180					1749				32	04/20/95	04/29	JR,04,00
Duplicate (N504012-15)	N504012-27	0.03	181					1417				35	04/20/95	05/04	JR,04,00

Nominal values and limits from method

0.02 850

700

180

PROCEDURES EP-060

Soil Preparation, rev 0

EP-100

Ge(Li) Preparation for Environmental Samples,
rev 0

AVERAGES ± 2 SD

MDA 0.02 ± 0.02

FOR 8 SAMPLES

YIELD ±

MOD SUMMARIES

Page 13

SUMMARY DATA SECTION

Page 76

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
Preparation batch 2781-090				
A4CM-95-0047	N504012-01	6111-001	U	
A4CM-95-0048	N504012-02	6111-002	U	
A4CM-95-0049	N504012-03	6111-003	U	
A4CM-95-0052	N504012-04	6111-004	U	
A4CM-95-0053	N504012-05	6111-005	U	
A4CM-95-0054	N504012-06	6111-006	U	
A4CM-95-0055	N504012-07	6111-007	U	
A4CM-95-0056	N504012-08	6111-008	U	
A4CM-95-0057	N504012-09	6111-009	U	
A4CM-95-0058	N504012-10	6111-010	U	
A4CM-95-0059	N504012-11	6111-011	U	
A4CM-95-0060	N504012-12	6111-012	U	
A4CM-95-0061	N504012-13	6111-013	U	
A4CM-95-0062	N504012-14	6111-014	U	
A4CM-95-0063	N504012-15	6111-015	U	
A4CM-95-0064	N504012-16	6111-016	U	
A4CM-95-0065	N504012-17	6111-017	U	
A4CM-95-0066	N504012-18	6111-018	U	
A4CM-95-0067	N504012-19	6111-019	U	
A4CM-95-0068	N504012-20	6111-020	U	
A4CM-95-0069	N504012-21	6111-021	U	
BLK (QC ID=23683)	N504012-24	6111-024	U	
BLK (QC ID=23684)	N504012-25	6111-025	U	
LCS (QC ID=23681)	N504012-22	6111-022	ok	X
LCS (QC ID=23682)	N504012-23	6111-023	ok	X
Duplicate (N504012-03)	N504012-26	6111-026	-	U
Duplicate (N504012-15)	N504012-27	6111-027	-	U

Nominal values and limits from method RDLs (pCi/g) 0.5

METHOD SUMMARIES

Page 14

SUMMARY DATA SECTION

Page 77

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

Test H Matrix SOIL

SDG 6111

Contact Italy E. Pittman

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA g	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM keV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
Preparation batch 2781-090 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 090															
A4CM-95-0047	N504012-01		0.09	30.6					50			25	04/21/95	04/22	LSC-004
A4CM-95-0048	N504012-02		0.09	28.9					50			25	04/21/95	04/22	LSC-004
A4CM-95-0049	N504012-03		0.09	30.0					50			25	04/21/95	04/22	LSC-004
A4CM-95-0052	N504012-04		0.1	25.9					50			24	04/21/95	04/22	LSC-004
A4CM-95-0053	N504012-05		0.09	27.5					50			24	04/21/95	04/22	LSC-004
A4CM-95-0054	N504012-06		0.09	29.8					50			24	04/21/95	04/22	LSC-004
A4CM-95-0055	N504012-07		0.1	25.5					50			24	04/21/95	04/22	LSC-004
A4CM-95-0056	N504012-08		0.09	27.5					50			24	04/21/95	04/22	LSC-004
A4CM-95-0057	N504012-09		0.1	23.4					50			24	04/21/95	04/22	LSC-004
A4CM-95-0058	N504012-10		0.1	24.8					50			24	04/21/95	04/22	LSC-004
A4CM-95-0059	N504012-11		0.1	27.5					50			23	04/21/95	04/22	LSC-004
A4CM-95-0060	N504012-12		0.1	25.6					50			23	04/21/95	04/22	LSC-004
A4CM-95-0061	N504012-13		0.1	26.5					50			23	04/21/95	04/22	LSC-004
A4CM-95-0062	N504012-14		0.09	29.9					50			23	04/21/95	04/22	LSC-004
A4CM-95-0063	N504012-15		0.1	27.5					50			23	04/21/95	04/22	LSC-004
A4CM-95-0064	N504012-16		0.1	25.1					50			22	04/21/95	04/22	LSC-004
A4CM-95-0065	N504012-17		0.09	28.8					50			22	04/21/95	04/22	LSC-004
A4CM-95-0066	N504012-18		0.1	24.6					50			22	04/21/95	04/22	LSC-004
A4CM-95-0067	N504012-19		0.1	25.3					50			23	04/21/95	04/23	LSC-004
A4CM-95-0068	N504012-20		0.09	28.8					50			23	04/21/95	04/23	LSC-004
A4CM-95-0069	N504012-21		0.09	29.1					50			23	04/21/95	04/23	LSC-004
BLK (QC ID=23683)	N504012-24		0.1	20.0					50				04/21/95	04/22	LSC-004
BLK (QC ID=23684)	N504012-25		0.1	20.0					50				04/21/95	04/22	LSC-004
LCS (QC ID=23681)	N504012-22		0.1	20.0					50				04/21/95	04/22	LSC-004
LCS (QC ID=23682)	N504012-23		0.1	20.0					50				04/21/95	04/22	LSC-004
Duplicate (N504012-03)	N504012-26		0.09	28.5					50			26	04/21/95	04/23	LSC-004
Duplicate (N504012-15)	N504012-27		0.09	27.3					50			24	04/21/95	04/23	LSC-004
Nominal values and limits from method			0.5	20.0					50			180			

METHOD SUMMARIES

Page 15

SUMMARY DATA SECTION

Page 78

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

METHOD SUMMARY, cont.

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL
SDG 6111
act Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

PROCEDURES	REFERENCE	EPA 906.0; ASTM 2476-81
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-211	Tritium in Solid Samples by Azeotropic Distillation, rev 0	

AVERAGES $\pm$ 2 SD	MDA <u>0.1</u> $\pm$ <u>0.01</u>
FOR 27 SAMPLES	YIELD <u> </u> $\pm$ <u> </u>

SD SUMMARIES

Page 16

SUMMARY DATA SECTION

Page 79

Lab id	<u>TMAN</u>
Protocol	<u>ROCKETDYNE</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-CMS</u>
Version	<u>3.06</u>
Report date	<u>05/18/95</u>

APPENDIX 1: COPIES OF CHAINS-OF-CUSTODY

TMA

Thermo Analytical

17440 Richmond 2020 Wildcat Avenue P.O. Box 4040 Richmond, CA 94804-0040 (415) 236-2633 Fax No. (415) 236-0430

Chain of Custody

CLIENT: <u>Rockedyme</u>			ADDRESS: <u>P.O. Box 7930</u>			PROJECT: <u>Canoga Park, CA 91309-7930</u>			PROJECT: <u>Area IV Characterization</u>		
SAMPLE SIGNATURE: <u>[Signature]</u>			DATE: <u>3-28-95</u>			TIME: <u>1300</u>			LOCATION: <u>SSFL AREA 4</u>		
Sample No.	Date	Time	Location	Gamma Scan	SR ⁹⁰	Thorium Isotopes	Uranium Isotopes	Plutonium Isotopes	Tritium	SAMPLE TYPE OR MATRIX	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST
AKCH-95-0047	3-28-95	1300	SSFL AREA 4	X	X	X	X	X	X	Soil	1212g
AKCH-95-0048	3-28-95	1300	SSFL AREA 4	X	X	X	X	X	X	Soil	1254g
AKCH-95-0049	3-28-95	1300	SSFL AREA 4	X	X	X	X	X	X	Soil	1584g
AKCH-95-0050	3-28-95	1330	SSFL AREA 4	X	X	X	X	X	X	Soil	-
AKCH-95-0051	3-28-95	1430	SSFL AREA 4	X	X	X	X	X	X	Soil	-
1) RELINQUISHED BY / DATE: <u>3-28-95</u> COMPANY: <u>Rockedyme</u> 2) RECEIVED BY / DATE: <u>3-28-95</u> COMPANY: <u>Rockedyme</u> 3) RELINQUISHED BY / DATE: <u>3-28-95</u> COMPANY: <u>Rockedyme</u> 4) RECEIVED BY / DATE: <u>3-28-95</u> COMPANY: <u>TMA</u>											
5) RELINQUISHED BY / DATE: COMPANY: 6) RECEIVED BY / DATE: COMPANY: 7) RELINQUISHED BY / DATE: COMPANY: 8) RECEIVED BY / DATE: COMPANY:											
TOTAL NO. OF CONTAINERS: METHOD OF SHIPMENT: SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS:											

"quality environmental services"

Chain of Custody

Project Area IV Characterization

EXPLSNO 0557202

87328

Atu=93	0031	↑	↑
Atu=95	0058	↑	↑

$\frac{1}{2}$	$\frac{1}{2}$
-----------------------------------	-----------------------------------

十	十
十	十

7	7
7	7

1000

Year	Population	Area
1990	1,000,000	100,000
2000	1,200,000	120,000
2010	1,400,000	140,000
2020	1,600,000	160,000
2030	1,800,000	180,000
2040	2,000,000	200,000
2050	2,200,000	220,000
2060	2,400,000	240,000
2070	2,600,000	260,000
2080	2,800,000	280,000
2090	3,000,000	300,000
2100	3,200,000	320,000

--	--

--	--

1

1

0760

[illegible]

Abstract

5) RELINQUISHED BY / DATED:

6) RECEIVED BY / DATE:

7) RELINQUISHED BY / DATE:

0) RECEIVED BY / DATE:

100

S-W

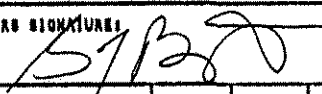
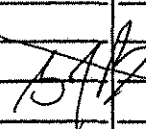
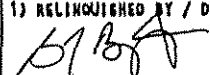
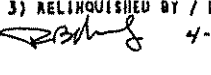
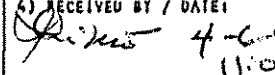
Form 607-1,5 09-15-94

quality environmental services

Thermo Analytical

TM/ATechmond 2030 Wight Avenue P. O. Box 4040 Richmond, CA 94804-0040 (510) 236-2033 Fax No. (510) 236-0430

Chain of Custody

CLIENT: <u>Rocketdyne</u> ADDRESS: <u>P.O. Box 7930</u> <u>Canoga Park, CA 91309-7930</u> PROJECT: <u>Area IV Characterization</u>				PARAMETERS										CONTAINER	DATE: <u>3-30-95</u> PAGE <u>OF</u>			
SAMPLER SIGNATURE: 				Gamma Scan	SP90	Thorium Isotopes	Uranium Isotopes	Plutonium Isotopes	Tritium						SAMPLE TYPE OR MATRIX	#	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST	
Sample No.	Date	Time	Location															
AHCM-95-0059	3-30-95	1445	SSFL AREA 4	X	X	X	X	X	X							SOIL	1	1303 g
AHCM-95-0060				X	X	X	X	X	X							SOIL	1	1382 g
AHCM-95-0061				X	X	X	X	X	X							SOIL	1	1310 g
AHCM-95-0062				X	X	X	X	X	X							SOIL	1	1746 g
AHCM-95-0063				X	X	X	X	X	X							SOIL	1	1585g
																		
1) RELINQUISHED BY / DATE:  3-30-95 COMPANY: <u>ROCKETDYNE</u>				2) RECEIVED BY / DATE:  3-30-95 COMPANY: <u>Rocketdyne</u>				3) RELINQUISHED BY / DATE:  4-5-95 COMPANY: <u>Rocketdyne</u>				4) RECEIVED BY / DATE:  4-6-95 11:00 COMPANY: <u>T.M.A./Richmond</u>				TOTAL NO. OF CONTAINERS: <u>5</u>		
5) RELINQUISHED BY / DATE: COMPANY:				6) RECEIVED BY / DATE: COMPANY:				7) RELINQUISHED BY / DATE: COMPANY:				8) RECEIVED BY / DATE: COMPANY:				METHOD OF SHIPMENT:		
												SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS						

Thermo Analytical

261A/Vehmsind 2030 Wright Avenue

P. O. Box 4040

Attachment CA #4884-0040

(010) 236-2033

Case No. 10101 230-0430

Chain of Custody

CLIENT <u>Rockwell</u>				PARAMETERS										# CONTAINERS	DATE <u>3-31-95</u> PAGE <u>1</u> OF <u>1</u>				
ADDRESS <u>P.O. Box 7930</u> <u>Canoga Park, CA 91309-7930</u>				Gamma Scan	SR90	Thorium Isotopes	Uranium Isotopes	Plutonium Isotopes	Tritium									OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST	
PROJECT <u>Area IV Characterization</u>																			
SAMPLER SIGNATURE <u>[Signature]</u>																			
Sample No.	Date	Time	Location																
A4CM-95-0064	3-31-95		SSFLAREAY	X	X	X	X	X	X							SOIL	1274 g		
A4CM-95-0065				X	X	X	X	X	X							SOIL	1298 g		
A4CM-95-0066				X	X	X	X	X	X							SOIL	1370 g		
A4CM-95-0067			↓	X	X	X	X	X	X							SOIL	1301 g		
A4CM-95-0068			↓	X	X	X	X	X	X							SOIL	1443 g		
A4CM-95-0069	↓		↓	X	X	X	X	X	X							SOIL	1402 g		
<u>[Signature]</u>																			
1) RELINQUISHED BY / DATE: <u>[Signature]</u> 3-31-95				2) RECEIVED BY / DATE: <u>[Signature]</u> 3-31-95				3) RELINQUISHED BY / DATE: <u>[Signature]</u> 4-5-95				4) RECEIVED BY / DATE: <u>[Signature]</u> 4-6-95 11:00				TOTAL NO. OF CONTAINERS: <u>6</u>			
COMPANY: <u>ROCKETDYNE</u>				COMPANY: <u>Rockwell</u>				COMPANY: <u>Rockwell</u>				COMPANY: <u>TMA/RICHMOND</u>				METHOD OF SHIPMENT:			
5) RELINQUISHED BY / DATE:				6) RECEIVED BY / DATE:				7) RELINQUISHED BY / DATE:				8) RECEIVED BY / DATE:				SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS:			
COMPANY:				COMPANY:				COMPANY:				COMPANY:							

Form SCP-1.5 09-15-94

"quality environmental services"

TMA
Thermo Analytical

2030 Wright Avenue

P.O. Box 4040

Richmond, CA 94804-0040

(510) 235-2633 Fax: 235-0438

July 12, 1995

Mr. Alex Klein
Rockwell International Corp.
Rocketdyne Division
6633 Canoga Ave.
Canoga Park, CA 91303

Ref: Customer P.O. No. R44PJZ94034044
TMA/Richmond Report N5-04-012-6111 (re-analysis)

Dear Mr. Klein:

Enclosed is the data report for the Plutonium 238, 239/240 re-analysis for sample A4CM-95-0061. This sample was previously reported on May 18, 1995. The new report includes data for the sample and the associated quality control samples.

If you have any questions regarding this data, or any problems with the hard copy or electronic deliverable diskette, please call me at (510) 235-2633.

Sincerely,



Italy E. Pittman
Program Manager

Enclosures: Data Report N5-05-064-6116 (re-analysis)
Diskette

Case Narrative

July 12, 1995

1.0 GENERAL

TMA/Richmond Sample Delivery Group (SDG) 6116 consists of one soil sample received on April 6, 1995. This samples was re-analyzed for isotopic-Plutonium.

2.0 ANALYTICAL NOTES

The internal quality control consists 5% each of laboratory control samples, blanks, and duplicates. The QC samples are prepared by the Quality Control Department.

The blanks and laboratory control samples are created using the 1989 ASTM formula for moderately hard water, listed in Table 8010: *Recommended Composition for Reconstituted Fresh Water*. This consists of the following:

NaHCO ₃	96 mg/L
CaSO ₄ ·2H ₂ O	60 mg/L
MgSO ₄	60 mg/L

KCl at 4.0 mg/L - specified in the table - is not added since KCl contains natural ⁴⁰K which raises the gross beta background.

2.1 Plutonium 238, 239/240 Analyses
6116 (Soil)

Sample prep batch 2781-124 list the sample along with the Laboratory Control Sample and reagent blank that were re-analyzed for isotopic plutonium. No problems were associated with the analyses. The average chemical yield for three samples was 68% ± 24%.

3.0 Summary

3.1 Processing and reanalysis of sample A4CM-95-0061

The entire original sample (~1000 grams) was ground by mortar and pestle and sieved to remove the rock chunks. A 12-gram aliquot of the ground sample was dissolved. From this solution, an aliquot representing 3-grams of the original sample was taken for plutonium analysis. The original reported result was 0.19 ± 0.02 pCi/gm.

Because of the positive result, a re-analysis was performed by taking another portion of the originally dissolved solution, again representing 3-grams of sample, and processing it through chemistry. The results of this re-analysis were 0.18 ± 0.02 pCi/gm, which verifies the original result.

Case Narrative

July 12, 1995

In an attempt to determine if sample homogeneity was an issue with this sample, a second re-analysis was initiated by TMA, by dissolving a separate 3-gram portion of the original, ground sample and processing the entire dissolved solution through chemistry. The results of this analysis were 0.003 ± 0.004 pCi/gm, which is essentially not detected. This supports the scenario that Pu activity was in the originally dissolved portion of sample, but none was in the second portion dissolved. This implies that the activity was in the form of a "hot" particle that was not homogenized by the grinding process.

We are reporting the confirming second analysis in this report, but wanted Rockwell to be aware of the potential for inhomogeneous samples that might produce results such as these.

T M A / R I C H M O N D
REPORTING GROUP 6116

SDG 6116
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S

Sample Summaries		1
Prep Batch Summary		3
Work Summary		4
Method Blanks		5
Lab Control Samples		6
Data Sheets		7
Method Summaries		8
End of Section		8

Prepared by

Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 07/12/95

TMA/RICHMOND

REPORTING GROUP 6116

SDG 6116

Contact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0061	SSFL AREA 4	SOIL		N505064-01			03/30/95 14:45
Method Blank		SOIL		N505064-03			
Lab Control Sample		SOIL		N505064-02			

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 07/12/95

TMA/RICHMOND

REPORTING GROUP 6116

SDG 6116

Contact Italy E. Pittman

QC SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	DEPARTMENT SAMPLE ID
6116		A4CM-95-0061	SOIL	16.1			04/06/95 7	N505064-01	6116-001
		Method Blank	SOIL					N505064-03	6116-003
		Lab Control Sample	SOIL					N505064-02	6116-002

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 07/12/95

TMA/RICHMOND

REPORTING GROUP 6116

SDG 6116

Contact Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALI- FIERS
Alpha Spectroscopy												
PU	SOIL	Plutonium, Isotopic in Soil	2781-124	5.0	1			1	1			

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 07/12/95

TMA/RICHMOND

REPORTING GROUP 6116

SDG 6116

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

WORK SUMMARY

CLIENT SAMPLE ID		LAB SAMPLE ID								
LOCATION	MATRIX	COLLECTED			SUF-					
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
A4CM-95-0061		N505064-01	6116-001	PU		05/30/95	06/01/95	IEP	Plutonium, Isotopic in Soil	
SSFL AREA 4	SOIL	03/30/95								
		04/06/95								
Method Blank		N505064-03	6116-003	PU		05/30/95	06/01/95	IEP	Plutonium, Isotopic in Soil	
	SOIL									
Lab Control Sample		N505064-02	6116-002	PU		05/30/95	06/01/95	IEP	Plutonium, Isotopic in Soil	
	SOIL									

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
PU		Plutonium, Isotopic in Soil	HASL 300/PU-02	1			1	1		3
ALS				1			1	1		3

RK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 07/12/95

TMA/RICHMOND

REPORTING GROUP 6116

N505064-03

METHOD BLANK

Method Blank

SDG 6116

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N505064-03

Client sample id Method Blank

Dept sample id 6116-003

Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.001	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.003	0.004	0.007	0.01	U	PU

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N505064-03	PU	6116-003		3.00 g	05/30/95	06/01/95	IEP

QC-BLANK #23967

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 07/12/95

TMA/RICHMOND

REPORTING GROUP 6116

N505064-02

Lab Control Sample

LAB CONTROL SAMPLE

SDG 6116

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N505064-02

Client sample id Lab Control Sample

Dept sample id 6116-002

Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Plutonium 238	0.34	0.027	0.008	0.01		PU	0.347	0.014	98	85-115	
Plutonium 239/240	0.34	0.026	0.005	0.01		PU	0.340	0.014	100	85-115	

TEST	PLANCHET	SUF- FIX	ALIQOUT	PREP ERR 2σ %	ANALYZED	REVIEWED	BY
PU	6116-002		3.00 g	5.0	05/30/95	06/01/95	IEP

QC-LCS #23966

CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 6

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 07/12/95

TMA/RICHMOND

REPORTING GROUP 6116

N505064-01

DATA SHEET

A4CM-95-0061

SDG 6116Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N505064-01Client sample id A4CM-95-0061Dept sample id 6116-001Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 16.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.002	0.005	0.009	0.01	U	PU
Plutonium 239/240	10-12-8	0.18	0.020	0.004	0.01		PU

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
5064-01	PU	6116-001		3.00 g	05/30/95	06/01/95	IEP

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 07/12/95

TMA/RICHMOND

REPORTING GROUP 6116

Test PU Matrix SOIL

SDG 6116

Act Italy E. Pittman

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Plutonium 238	Plutonium 239/240
------------------	------------------	-----------------	------------------	------------------	----------------------

Preparation batch 2781-124

A4CM-95-0061	N505064-01	6116-001	U	0.18
BLK (QC ID=23967)	N505064-03	6116-003	U	U
LCS (QC ID=23966)	N505064-02	6116-002	ok	ok

Nominal values and limits from method	RDLS (pCi/g)	0.01	0.01
---------------------------------------	--------------	------	------

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MAX MDA g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-124 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 124

A4CM-95-0061	N505064-01	0.009	3.00	67	1287	61	05/27/95	05/30	SS-028
BLK (QC ID=23967)	N505064-03	0.01	3.00	56	1288	05/27/95	05/30	SS-035	
LCS (QC ID=23966)	N505064-02	0.008	3.00	80	1287	05/27/95	05/30	SS-030	

Nominal values and limits from method	0.01	3.00	20-105	500	100	180
---------------------------------------	------	------	--------	-----	-----	-----

PROCEDURES	REFERENCE	HASL 300/PU-02
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-940	Plutonium Purification, rev 0	
EP-008	Heavy Elements Electroplating, rev 0	

AVERAGES ± 2 SD	MDA	0.009 ± 0.002
FOR 3 SAMPLES	YIELD	68 ± 24

MOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 8

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 07/12/95

TMA
Thermo Analytical

Batol # 4

2030 Wright Avenue

P.O. Box 4040

Richmond, CA 94804-0040

(510) 235-2633 Fax: 235-0438

May 18, 1995

Mr. Alex Klein
Rockwell International Corp.
Rocketdyne Division
6633 Canoga Ave.
Canoga Park, CA 91303

Ref: Customer P.O. No. R44PJZ94034044
TMA/Richmond Report N5-04-011-6110
Report N5-04-012-6111

Dear Mr. Klein:

The enclosed data report is for the radiochemical analyses of twenty-one soil and two water samples collected March 28 through 31, 1995. These samples were received at TMA/Richmond on April 6, 1995. The accompanying case narrative discusses all parameters that are underlined in the data report that are not in compliance with the Statement of Work.

If you have any questions regarding this data, or any problems with the hard copy or electronic deliverable diskette, please call me at (510) 235-2633.

Sincerely,

Italy E. Pittman
Program Manager

Enclosure: Data Report N5-04-011-6110 (rinsate)
Data Report N5-04-012-6111 (soil)
Electronic diskette 6110, 6111

DOCUMENT INVENTORY FOR SAMPLE DELIVERY GROUPS 6110 AND 6111

SECTION 1	Case Narrative
SECTION 2	Summary Data Section
<u>X</u> APPENDIX 1	Chains-of-Custody Copies

SECTION 1 Case Narrative

TMA/Richmond

Report N5-04-011-6110

Report N5-04-012-6111

Sample Delivery Group 6110/6111

Case Narrative

Rockwell International Corp.

Contract R44PJZ94034044

May 18, 1995

1.0 GENERAL

TMA/Richmond Sample Delivery Group 6110 consists of two liquid samples, and SDG 6111 consists of twenty-one soil samples. These samples were received on April 6, 1995.

2.0 ANALYTICAL NOTES

The internal quality control consists 5% each of laboratory control samples, blanks and duplicates. The QC samples are prepared by the Quality Control Department.

The blanks and laboratory control samples are created using the 1989 ASTM formula for moderately hard water, listed in Table 8010: *Recommended Composition for Reconstituted Fresh Water*. This consists of the following:

NaHCO ₃	96 mg/L
CaSO ₄ ·2H ₂ O	60 mg/L
MgSO ₄	60 mg/L

KCl at 4.0 mg/L - specified in the table - is not added since KCl contains natural ⁴⁰K which raises the gamma background spectra considerably.

2.1 Tritium Analyses

6110 (rinsate) and 6111 (soils)

No problems were associated with either SDG during the analyses.

2.2 Strontium-90 Analyses

6110 (Rinsate)

The LCS was counted for less than the nominal 200 minutes count time required; however, the RDL was achieved despite the shorter count time. The average yield for 3 samples was 73% ± 26%.

6111 (Soil)

Several samples were counted for less than the 200 minute nominal count time; however, the MDA's were below the RDL despite the shorter count time. The average yield for 27 samples was 85% ± 7%.

TMA/Richmond

Report N5-04-011-6110

Report N5-04-012-6111

Sample Delivery Group 6110/6111

Case Narrative

Rockwell International Corp.

Contract R44PJZ94034044

May 18, 1995

2.3 Thorium 228, 230, 232 Analyses

6110 (Rinsate)

Sample A4CM-95-0051 has a count time less than the 500 minute nominal count time; however, the MDA was less than the RDL despite the shorter counting times. The Thorium-230 result for the reagent blank was greater than the MDA, but less than the RDL. The average yield for 3 samples was $56\% \pm 15\%$.

6111 (Soil)

Sample A4CM-95-0048 and the reagent blank have count times less than the nominal 500 minutes required; however, the MDAs were less than the RDL despite the shorter count times. Sample A4CM-95-0061 has a chemical yield slightly less than the nominal 20% required and a MDA slightly greater than the RDL. The average yield for 27 samples was $45\% \pm 25\%$.

2.4 Uranium 233/234, 235, 238 Analyses

6110 (Rinsate)

The MDA for the LCS was greater than the RDL; however, this is not a problem since the activity of the LCS is significantly greater than the MDA. The average yield for 3 samples was $47\% \pm 36\%$.

6111 (Soil)

The Laboratory Control Samples have MDA's greater than the RDL; however, this is not a problem since the activities of both are significantly greater than the MDA. The average yield for 27 samples was $66\% \pm 22\%$.

2.5 Plutonium 238, 239/240 Analyses

6110 (Rinsate)

No problems were associated with the analyses. The average yield for 3 samples was $61\% \pm 18\%$.

6111 (Soil)

No problems were associated with the analyses. The average yield for 27 samples was $77\% \pm 13\%$.

TMA/Richmond

Report N5-04-011-6110

Report N5-04-012-6111

Sample Delivery Group 6110/6111

Case Narrative

Rockwell International Corp.

Contract R44PJZ94034044

May 18, 1995

2.6 Gamma Spectroscopy Analyses

6110 (Rinsate)

No problems were associated with the analysis.

6111 (Soil)

All samples have an aliquot less than the 850g nominal required; however, despite the smaller aliquot, all of the MDA's were less than or equal to the RDL.

SECTION 2 Summary Data Section

T M A / R I C H M O N D
REPORTING GROUP 6110

SDG 6110
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S				
Sample Summaries	.	.	.	1
Prep Batch Summary	.	.	.	3
Work Summary	.	.	.	4
Method Blanks	.	.	.	5
Lab Control Samples	.	.	.	7
Data Sheets	.	.	.	9
Method Summaries	.	.	.	12
End of Section	.	.	.	17

Italy E. Pittman 5/18/98
Prepared by

mgv 5/18
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

SDG 6110

tact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0050	SSFL AREA4	WATER		N504011-01			03/28/95 14:30
A4CM-95-0051	SSFL AREA4	WATER		N504011-02			03/28/95 14:30
Method Blank		WATER		N504011-04			
Lab Control Sample		WATER		N504011-03			

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

SDG 6110

Contact Italy E. Pittman

QC SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	DEPARTMENT SAMPLE ID
6110		A4CM-95-0050	WATER				04/06/95 9	N504011-01	6110-001
		A4CM-95-0051	WATER				04/06/95 9	N504011-02	6110-002
		Method Blank	WATER					N504011-04	6110-004
		Lab Control Sample	WATER					N504011-03	6110-003

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

SDG 6110
Contact Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne
Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR				PLANCHETS ANALYZED				QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	FIERS
Alpha Spectroscopy												
PU	WATER	Plutonium, Isotopic in Water	2781-084	5.0	1			1	1			
TH	WATER	Thorium, Isotopic in Water	2781-084	5.0	1			1	1			
U	WATER	Uranium, Isotopic in Water	2781-084	5.0	1			1	1			
Beta Counting												
SR	WATER	Strontium, Total in Water	2781-084	10.0	1			1	1			
Gamma Scan												
GAM	WATER	Gamma Emitters	2781-084	15.0	1			1	1			
Liquid Scintillation												
H	WATER	Tritium in Water	2781-084	10.0	1			1	1			X

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

SDG 6110

Contact Italy E. Pittman

WORK SUMMARY

Client Rocketdyne

Contract R44PJ294034044

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED			SUP-					
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
A4CM-95-0050		N504011-01	6110-001	H		04/19/95	05/10/95	IEP	Tritium in Water	
SSFL AREA4	WATER	03/28/95								
		04/06/95								
A4CM-95-0051		N504011-02	6110-002	GAM		05/03/95	05/10/95	IEP	Gamma Emitters	
SSFL AREA4	WATER	03/28/95	6110-002	PU		04/28/95	05/02/95	IEP	Plutonium, Isotopic in Water	
		04/06/95	6110-002	SR		04/26/95	05/10/95	IEP	Strontium, Total in Water	
			6110-002	TH		04/27/95	05/02/95	IEP	Thorium, Isotopic in Water	
			6110-002	U	AOR1	05/08/95	05/10/95	IEP	Uranium, Isotopic in Water	
Method Blank		N504011-04	6110-004	GAM		04/21/95	05/10/95	IEP	Gamma Emitters	
	WATER		6110-004	H		04/20/95	05/11/95	IEP	Tritium in Water	
			6110-004	PU		04/27/95	05/02/95	IEP	Plutonium, Isotopic in Water	
			6110-004	SR		04/26/95	05/12/95	IEP	Strontium, Total in Water	
			6110-004	TH		04/29/95	05/02/95	IEP	Thorium, Isotopic in Water	
			6110-004	U	AOR1	05/08/95	05/10/95	IEP	Uranium, Isotopic in Water	
Lab Control Sample		N504011-03	6110-003	GAM		04/21/95	05/10/95	IEP	Gamma Emitters	
	WATER		6110-003	H		04/20/95	05/11/95	IEP	Tritium in Water	
			6110-003	PU		04/28/95	05/02/95	IEP	Plutonium, Isotopic in Water	
			6110-003	SR		04/26/95	05/05/95	IEP	Strontium, Total in Water	
			6110-003	TH		04/27/95	05/02/95	IEP	Thorium, Isotopic in Water	
			6110-003	U		04/27/95	05/10/95	IEP	Uranium, Isotopic in Water	

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
GAM		Gamma Emitters	ASTM 3649-85; EPA 901.1	1			1	1		3
H		Tritium in Water	EPA 906.0; ASTM 2476-81	1			1	1		3
PU		Plutonium, Isotopic in Water	ASTM 3865-90	1			1	1		3
SR		Strontium, Total in Water	HASL 300/SR-01,-02	1			1	1		3
TH		Thorium, Isotopic in Water		1			1	1		3
U		Uranium, Isotopic in Water	ASTM 3972-90	1			1	1		3
TOTALS				6			6	6		18

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 05/18/95

TMA / RICHMOND

REPORTING GROUP 6110

N504011-04

METHOD BLANK

Method Blank

SDG 6110

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504011-04

Client sample id Method Blank

Dept sample id 6110-004

Material/Matrix WATER

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		93	150	200	500	U	H
Strontium 90	10098-97-2	-0.016	0.12	0.1	0.5	U	SR
Thorium 228		0.016	0.064	0.1	0.5	U	TH
Thorium 230	14269-63-7	0.064	0.048	0.06	0.5	J	TH
Thorium 232	7740-29-1	0.024	0.032	0.06	0.5	U	TH
Uranium 233/234	11-08-5	-0.051	0.13	0.3	0.5	U	U
Uranium 235	14117-96-1	0.041	0.082	0.2	0.5	U	U
Uranium 238	7440-61-1	0.017	0.034	0.1	0.5	U	U
Plutonium 238	13981-16-3	0	0.039	0.07	0.1	U	PU
Plutonium 239/240	10-12-8	0.016	0.019	0.03	0.1	U	PU
MA SCAN ANALYTES		U					
Potassium 40		49	40				GAM
Chromium 51		U		20		U	GAM
Manganese 54		U		3		U	GAM
Cobalt 58		U		3		U	GAM
Iron 59		U		5		U	GAM
Cobalt 60		U		3		U	GAM
Zinc 65		U		7		U	GAM
Niobium 94		U		3		U	GAM
Ruthenium 103		U		3		U	GAM
Ruthenium 106		U		30		U	GAM
Tin 113		U		4		U	GAM
Cesium 134		U		3		U	GAM
Cesium 137		U		3	5	U	GAM
Cerium 144		U		20		U	GAM
Europium 152		U		7		U	GAM
Europium 154		U		5		U	GAM
Europium 155		U		10		U	GAM
Radium 226		U		6		U	GAM
Thorium 232		U		10		U	GAM

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

N504011-04

BLANK, cont.

Method Blank

SDG 6110

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504011-04

Client sample id Method Blank

Dept sample id 6110-004

Material/Matrix WATER

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504011-04	H	6110-004		0.0100 L	04/20/95	05/11/95	IEP
N504011-04	SR	6110-004		1.00 L	04/26/95	05/12/95	IEP
N504011-04	TH	6110-004		0.500 L	04/29/95	05/02/95	IEP
N504011-04	U	6110-004	AOR1	0.200 L	05/08/95	05/10/95	IEP
N504011-04	PU	6110-004		0.500 L	04/27/95	05/02/95	IEP
N504011-04	GAM	6110-004		1.00 L	04/21/95	05/10/95	IEP

QC-BLANK #23674

METHOD BLANKS

Page 2

SUMMARY DATA SECTION

Page 6

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

N504011-03

Lab Control Sample

LAB CONTROL SAMPLE

SDG 6110

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504011-03

Client sample id Lab Control Sample

Dept sample id 6110-003

Material/Matrix WATER

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMIS (TOTAL)	PROTOCOL LIMITS
Tritium	11000	460	200	500	X	H	11000	440	100	82-118	
Strontium 90	20	1.0	0.4	0.5		SR	20.5	0.82	98	82-118	
Thorium 230	4.9	0.50	0.08	0.5		TH	4.62	0.18	106	81-119	
Uranium 233/234	24	1.8	0.8	0.5		U	25.2	1.0	95	86-114	
Uranium 235	19	1.5	0.1	0.5		U	19.3	0.77	98	85-115	
Uranium 238	25	1.8	0.8	0.5		U	25.2	1.0	99	85-115	
Plutonium 238	1.9	0.18	0.06	0.1		PU	2.08	0.083	91	84-116	
Plutonium 239/240	2.3	0.21	0.04	0.1		PU	2.40	0.096	96	84-116	
GAMMA SCAN ANALYTES											
Potassium 40	U		100		U	GAM					
Uranium 51	U		60		U	GAM					
Manganese 54	U		7		U	GAM					
Cobalt 58	U		7		U	GAM					
Iron 59	U		10		U	GAM					
Cobalt 60	U		7		U	GAM					
Zinc 65	U		10		U	GAM					
Niobium 94	U		6		U	GAM					
Ruthenium 103	U		8		U	GAM					
Ruthenium 106	U		70		U	GAM					
Tin 113	U		10		U	GAM					
Cesium 134	U		7		U	GAM					
Cesium 137	330	15		5		GAM	350	14	94	77-123	
Cerium 144	U		40		U	GAM					
Europium 152	U		20		U	GAM					
Europium 154	U		10		U	GAM					
Europium 155	U		20		U	GAM					
Radium 226	U		20		U	GAM					
Thorium 232	U		30		U	GAM					

CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

N504011-03

LAB CONTROL SAMPLE, cont.

Lab Control Sample

SDG 6110Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504011-03Dept sample id 6110-003Client sample id Lab Control SampleMaterial/Matrix WATER

TEST	PLANCHET	SUF- FIX	ALIQUOT	PREP ERR			
				2σ %	ANALYZED	REVIEWED	BY
H	6110-003		0.0100 L	10.0	04/20/95	05/11/95	IEP
SR	6110-003		1.00 L	10.0	04/26/95	05/05/95	IEP
TH	6110-003		0.500 L	5.0	04/27/95	05/02/95	IEP
U	6110-003		0.200 L	5.0	04/27/95	05/10/95	IEP
PU	6110-003		0.500 L	5.0	04/28/95	05/02/95	IEP
GAM	6110-003		1.00 L	15.0	04/21/95	05/10/95	IEP

CCLCS #23673

CONTROL SAMPLES

Page 2

SUMMARY DATA SECTION

Page 8

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

N504011-01

A4CM-95-0050

DATA SHEET

SDG <u>6110</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504011-01</u>	Client sample id <u>A4CM-95-0050</u>
Dept sample id <u>6110-001</u>	Location/Matrix <u>SSFL AREA4</u> <u>WATER</u>
Received <u>04/06/95</u>	Collected <u>03/28/95 14:30</u>
Chain of custody id _____	

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		130	150	300	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504011-01	H	6110-001		0.0100 L	04/19/95	05/10/95	IEP

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 9

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

N504011-02

DATA SHEET

A4CM-95-0051

SDG 6110
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504011-02
Dept sample id 6110-002
Received 04/06/95Client sample id A4CM-95-0051
Location/Matrix SSFL AREA4 WATER
Collected 03/28/95 14:30
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	-0.048	0.20	0.2	0.5	U	SR
Thorium 228		-0.022	0.067	0.1	0.5	U	TH
Thorium 230	14269-63-7	0	0.022	0.08	0.5	U	TH
Thorium 232	7740-29-1	0.011	0.022	0.08	0.5	U	TH
Uranium 233/234	11-08-5	-0.025	0.074	0.1	0.5	U	U
Uranium 235	14117-96-1	-0.030	0.030	0.1	0.5	U	U
Uranium 238	7440-61-1	0	0.049	0.09	0.5	U	U
Plutonium 238	13981-16-3	0.004	0.057	0.1	0.1	U	PU
Plutonium 239/240	10-12-8	0	0.016	0.04	0.1	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		39	31			B	GAM
Chromium 51		U		30		U	GAM
Manganese 54		U		2		U	GAM
Cobalt 58		U		3		U	GAM
Iron 59		U		6		U	GAM
Cobalt 60		U		2		U	GAM
Zinc 65		U		4		U	GAM
Niobium 94		U		2		U	GAM
Ruthenium 103		U		3		U	GAM
Ruthenium 106		U		20		U	GAM
Tin 113		U		3		U	GAM
Cesium 134		U		2		U	GAM
Cesium 137		U		2	5	U	GAM
Cerium 144		U		10		U	GAM
Europium 152		U		5		U	GAM
Europium 154		U		3		U	GAM
Europium 155		U		6		U	GAM
Radium 226		U		4		U	GAM

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 10

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

N504011-02

A4CM-95-0051

DATA SHEET, cont

SDG <u>6110</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504011-02</u>	Client sample id <u>A4CM-95-0051</u>
Dept sample id <u>6110-002</u>	Location/Matrix <u>SSFL AREA4</u> <u>WATER</u>
Received <u>04/06/95</u>	Collected <u>03/28/95 14:30</u>
Chain of custody id _____	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		9		U	GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504011-02	SR	6110-002		1.00 L	04/26/95	05/10/95	IEP
4011-02	TH	6110-002		0.500 L	04/27/95	05/02/95	IEP
504011-02	U	6110-002	AOR1	0.200 L	05/08/95	05/10/95	IEP
N504011-02	PU	6110-002		0.500 L	04/28/95	05/02/95	IEP
N504011-02	GAM	6110-002		1.00 L	05/03/95	05/10/95	IEP

DATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 11

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

Test PU Matrix WATER

SDG 6110

Contact Italy E. Pittman

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Plutonium 238	Plutonium 239/240
------------------	------------------	-----------------	------------------	------------------	----------------------

Preparation batch 2781-084

A4CM-95-0051	N504011-02	6110-002	U	U
BLK (QC ID=23674)	N504011-04	6110-004	U	U
LCS (QC ID=23673)	N504011-03	6110-003	ok	ok

Nominal values and limits from method	RDLS (pCi/L)	0.1	0.1
---------------------------------------	--------------	-----	-----

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	---------------	----------

Preparation batch 2781-084 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 084

A4CM-95-0051	N504011-02	0.1	0.500	51	1040	31	04/27/95	04/28	SS-029
BLK (QC ID=23674)	N504011-04	0.07	0.500	66	1029	04/27/95	04/27	SS-035	
LCS (QC ID=23673)	N504011-03	0.06	0.500	67	1040	04/27/95	04/28	SS-030	

Nominal values and limits from method	0.1	0.500	20-105	1000	100	180
---------------------------------------	-----	-------	--------	------	-----	-----

PROCEDURES	REFERENCE	ASTM 3865-90
EP-040	Environmental Water Dissolution, rev 1	
EP-940	Plutonium Purification, rev 0	
EP-008	Heavy Elements Electroplating, rev 0	

AVERAGES ± 2 SD	MDA	0.08 ± 0.04
FOR 3 SAMPLES	YIELD	51 ± 18

MOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 12

Lab id	TMAN
Protocol	ROCKETDYNE
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

Test TH Matrix WATER

SDG 6110

Contact Italy E. Pittman

METHOD SUMMARY

THORIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Thorium 228	Thorium 230	Thorium 232
------------------	------------------	-----------------	------------------	-------------	-------------	-------------

Preparation batch 2781-084

A4CM-95-0051	N504011-02	6110-002	U	U	U
BLK (QC ID=23674)	N504011-04	6110-004	U	0.064 J	U
LCS (QC ID=23673)	N504011-03	6110-003		ok	

Nominal values and limits from method	RDLs (pCi/L)	0.5	0.5	0.5
---------------------------------------	--------------	-----	-----	-----

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	---------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-084 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 084

A4CM-95-0051	N504011-02	0.1	0.500	63	466	30	04/27/95	04/27	SS-019
BLK (QC ID=23674)	N504011-04	0.1	0.500	58	709	04/27/95	04/29	SS-019	
LCS (QC ID=23673)	N504011-03	0.08	0.500	48	540	04/27/95	04/27	SS-040	

Nominal values and limits from method	0.5	0.500	20-110	500	100	180
---------------------------------------	-----	-------	--------	-----	-----	-----

PROCEDURES	EP-040	Environmental Water Dissolution, rev 1
	EP-900	Thorium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	0.09 ± 0.02
FOR 3 SAMPLES	YIELD	56 ± 15

AD SUMMARIES

Page 2

PRIMARY DATA SECTION

Page 13

Lab id	TMAN
Protocol	ROCKETDYNE
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

Test U Matrix WATER

SDG 6110

Contact Italy E. Pittman

METHOD SUMMARY

URANIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJ294034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%)			
							1+3	2σ	2+3	2σ
Preparation batch 2781-084										
A4CM-95-0051	N504011-02	AOR1	6110-002	U	U	U				
BLK (QC ID=23674)	N504011-04	AOR1	6110-004	U	U	U				
LCS (QC ID=23673)	N504011-03		6110-003	ok	ok	ok				
Nominal values and limits from method				RDLs (pCi/L)	0.5	0.5	0.5	100	4	
										Averages

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MAX MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-084 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 084															
A4CM-95-0051	N504011-02	AOR1	0.1	0.200			43	1040				41	05/06/95	05/08	SS-032
BLK (QC ID=23674)	N504011-04	AOR1	0.3	0.200			31	1040					05/06/95	05/08	SS-028
I (QC ID=23673)	N504011-03		0.8	0.200			66	539					04/27/95	04/27	SS-032
Nominal values and limits from method			0.5	0.200			30-105	300	100		180				

PROCEDURES REFERENCE ASTM 3972-90

EP-040 Environmental Water Dissolution, rev 1

EP-910 Uranium Purification, rev 0

EP-008 Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD MDA 0.4 ± 0.7

FOR 3 SAMPLES YIELD 47 ± 36

SD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 14

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

Test SR Matrix WATERSDG 6110act Italy E. Pittman

METHOD SUMMARY

STRONTIUM, TOTAL IN WATER

BETA COUNTING

Client RocketdyneContract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Strontium 90
------------------	------------------	-----------------	------------------	--------------

Preparation batch 2781-084

A4CM-95-0051	N504011-02	6110-002	U
BLK (QC ID=23674)	N504011-04	6110-004	U
LCS (QC ID=23673)	N504011-03	6110-003	ok

Nominal values and limits from method	RDLs (pCi/L)	0.5
---------------------------------------	--------------	-----

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	-----	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-084 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 084

A4CM-95-0051	N504011-02	0.2	1.00	59	781	29	04/26/95	04/26	LBG-015
BLK (QC ID=23674)	N504011-04	0.1	1.00	85	700	04/26/95	04/26	LBG-016	
LCS (QC ID=23673)	N504011-03	0.4	1.00	74	78	04/26/95	04/26	LBG-016	

Nominal values and limits from method	0.5	1.00	200	180
---------------------------------------	-----	------	-----	-----

PROCEDURES	REFERENCE	HASL 300/SR-01,-02
EP-040	Environmental Water Dissolution, rev 1	
EP-500	Strontium-89,90 - Purification, rev 0	
EP-519	Strontium-89,90 Planchet Demounting and Yttrium Purification, rev 0	

AVERAGES ± 2 SD	MDA	0.2	±	0.3
FOR 3 SAMPLES	YIELD	73	±	26

D SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 15

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Test GAM Matrix WATERSDG 6110Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cobalt 60	Cesium 137
------------------	------------------	-----------------	------------------	-----------	------------

Preparation batch 2781-084

A4CM-95-0051	N504011-02	6110-002	U	U
BLK (QC ID=23674)	N504011-04	6110-004	U	U
LCS (QC ID=23673)	N504011-03	6110-003	No data U	ok

Nominal values and limits from method	RDLs (pCi/L)	5
---------------------------------------	--------------	---

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM keV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
Preparation batch 2781-084 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 084															
A4CM-95-0051	N504011-02		2	1.00						1414		36	04/20/95	05/03	02.04,00
BLK (QC ID=23674)	N504011-04		3	1.00						673			04/20/95	04/21	02.04,00
LCS (QC ID=23673)	N504011-03			1.00						673			04/20/95	04/21	MB,03,00

Nominal values and limits from method	5	1.00	400	180
---------------------------------------	---	------	-----	-----

PROCEDURES	REFERENCE	ASTM 3649-85; EPA 901.1
	EP-100	Ge(Li) Preparation for Environmental Samples, rev 0

AVERAGES ± 2 SD	MDA	2	±	1
FOR 2 SAMPLES	YIELD		±	

JD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 16

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6110

METHOD SUMMARY

TRITIUM IN WATER

LIQUID SCINTILLATION

Test H Matrix WATER
SDG 6110
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
------------------	------------------	-----------------	------------------	---------

Preparation batch 2781-084

A4CM-95-0050	N504011-01	6110-001	U	
BLK (QC ID=23674)	N504011-04	6110-004	U	
LCS (QC ID=23673)	N504011-03	6110-003	ok	X

Nominal values and limits from method RDLs (pCi/L) 500

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM keV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	----------	-------------	--------------	------------	------------	------------	--------------	-------------	---------------	------------------	---------------	----------

Preparation batch 2781-084 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 084

A4CM-95-0050	N504011-01	300	0.0100						50			22	04/18/95	04/19	LSC-004
BLK (QC ID=23674)	N504011-04	200	0.0100						50				04/18/95	04/20	LSC-004
LCS (QC ID=23673)	N504011-03	200	0.0100						50				04/18/95	04/20	LSC-004

Nominal values and limits from method 500 0.0100 50 180

PROCEDURES REFERENCE EPA 906.0; ASTM 2476-81
EP-210 Tritium in Water by Distillation, rev 0

AVERAGES ± 2 SD MDA 200 ± 100
FOR 3 SAMPLES YIELD ±

METHOD SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 17

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 05/18/95

T M A / R I C H M O N D
REPORTING GROUP 6111

SDG 6111
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S

Sample Summaries	.	.	.	.	1
Prep Batch Summary	.	.	.	.	3
Work Summary	.	.	.	.	4
Method Blanks	.	.	.	.	10
Lab Control Samples	.	.	.	.	14
Duplicates	.	.	.	.	18
Data Sheets	.	.	.	.	22
Method Summaries	.	.	.	.	64
End of Section	.	.	.	.	79

Italy E. Pittman 5/18/95
Prepared by

297 5/18
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111

Contact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0047	SSFL AREA 4	SOIL		N504012-01			03/28/95 13:00
A4CM-95-0048	SSFL AREA 4	SOIL		N504012-02			03/28/95 13:00
A4CM-95-0049	SSFL AREA 4	SOIL		N504012-03			03/28/95 13:00
A4CM-95-0052	SSFL AREA 4	SOIL		N504012-04			03/29/95 14:45
A4CM-95-0053	SSFL AREA 4	SOIL		N504012-05			03/29/95 14:45
A4CM-95-0054	SSFL AREA 4	SOIL		N504012-06			03/29/95 14:45
A4CM-95-0055	SSFL AREA 4	SOIL		N504012-07			03/29/95 14:45
A4CM-95-0056	SSFL AREA 4	SOIL		N504012-08			03/29/95 14:45
A4CM-95-0057	SSFL AREA 4	SOIL		N504012-09			03/29/95 14:45
A4CM-95-0058	SSFL AREA 4	SOIL		N504012-10			03/29/95 14:45
A4CM-95-0059	SSFL AREA 4	SOIL		N504012-11			03/30/95 14:45
A4CM-95-0060	SSFL AREA 4	SOIL		N504012-12			03/30/95 14:45
A4CM-95-0061	SSFL AREA 4	SOIL		N504012-13			03/30/95 14:45
A4CM-95-0062	SSFL AREA 4	SOIL		N504012-14			03/30/95 14:45
A4CM-95-0063	SSFL AREA 4	SOIL		N504012-15			03/30/95 14:45
A4CM-95-0064	SSFL AREA 4	SOIL		N504012-16			03/31/95
A4CM-95-0065	SSFL AREA 4	SOIL		N504012-17			03/31/95
A4CM-95-0066	SSFL AREA 4	SOIL		N504012-18			03/31/95
-95-0067	SSFL AREA 4	SOIL		N504012-19			03/31/95
-95-0068	SSFL AREA 4	SOIL		N504012-20			03/31/95
A4CM-95-0069	SSFL AREA 4	SOIL		N504012-21			03/31/95
Method Blank		SOIL		N504012-24			
Method Blank		SOIL		N504012-25			
Lab Control Sample		SOIL		N504012-22			
Lab Control Sample		SOIL		N504012-23			
Duplicate (N504012-03)	SSFL AREA 4	SOIL		N504012-26			03/28/95 13:00
Duplicate (N504012-15)	SSFL AREA 4	SOIL		N504012-27			03/30/95 14:45

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111
Contact Italy E. Pittman

QC SUMMARY

Client Rocketdyne
Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	† MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
6111		A4CM-95-0047	SOIL	14.8			04/06/95	9 N504012-01	6111-001
		A4CM-95-0048	SOIL	18.5			04/06/95	9 N504012-02	6111-002
		A4CM-95-0049	SOIL	14.7			04/06/95	9 N504012-03	6111-003
		A4CM-95-0052	SOIL	15.2			04/06/95	8 N504012-04	6111-004
		A4CM-95-0053	SOIL	10.6				N504012-05	6111-005
		A4CM-95-0054	SOIL	16.4			04/06/95	8 N504012-06	6111-006
		A4CM-95-0055	SOIL	12.8			04/06/95	8 N504012-07	6111-007
		A4CM-95-0056	SOIL	13.1			04/06/95	8 N504012-08	6111-008
		A4CM-95-0057	SOIL	13.2			04/06/95	8 N504012-09	6111-009
		A4CM-95-0058	SOIL	16.2			04/06/95	8 N504012-10	6111-010
		A4CM-95-0059	SOIL	14.8			04/06/95	7 N504012-11	6111-011
		A4CM-95-0060	SOIL	10.2			04/06/95	7 N504012-12	6111-012
		A4CM-95-0061	SOIL	16.1			04/06/95	7 N504012-13	6111-013
		A4CM-95-0062	SOIL	22.8			04/06/95	7 N504012-14	6111-014
		A4CM-95-0063	SOIL	14.8			04/06/95	7 N504012-15	6111-015
		A4CM-95-0064	SOIL	13.8			04/06/95	6 N504012-16	6111-016
		A4CM-95-0065	SOIL	7.4			04/06/95	6 N504012-17	6111-017
		A4CM-95-0066	SOIL	11.8			04/06/95	6 N504012-18	6111-018
		A4CM-95-0067	SOIL	8.8			04/06/95	6 N504012-19	6111-019
		A4CM-95-0068	SOIL	11.1			04/06/95	6 N504012-20	6111-020
		A4CM-95-0069	SOIL	8.0			04/06/95	6 N504012-21	6111-021
		Method Blank	SOIL					N504012-24	6111-024
		Method Blank	SOIL					N504012-25	6111-025
		Lab Control Sample	SOIL					N504012-22	6111-022
		Lab Control Sample	SOIL					N504012-23	6111-023
		Duplicate (N504012-03)	SOIL				04/06/95	9 N504012-26	6111-026
		Duplicate (N504012-15)	SOIL				04/06/95	7 N504012-27	6111-027

SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111

Contact Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR		CLIENT	MORE	PLANCHETS ANALYZED			QUALI-	
			BATCH	2σ ±			RE	BLANK	LCS		DUP/ORIG
Alpha Spectroscopy											
PU	SOIL	Plutonium, Isotopic in Soil	2781-090	5.0	21		2	2	2/2		
TH	SOIL	Thorium, Isotopic in Soil	2781-090	5.0	21		2	2	2/2		
U	SOIL	Uranium, Isotopic in Soil	2781-090	5.0	21		2	2	2/2		
Beta Counting											
SR	SOIL	Strontium, Total in Soil	2781-090	10.0	21		2	2	2/2		
Gamma Spectroscopy											
GAM	SOIL	Gamma Scan	2781-090	15.0	21		2	2	2/2		
Liquid Scintillation											
H	SOIL	Tritium-Soil	2781-090	10.0	21		2	2	2/2		X

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111

Contact Italy E. Pittman

WORK SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID													
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD						
CUSTODY	SAS no	RECEIVED			FIX										
A4CM-95-0047		N504012-01	6111-001	GAM		04/26/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/28/95	6111-001	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-001	PU		05/04/95	05/08/95	IEP	Plutonium, Isotopic in Soil						
			6111-001	SR		05/01/95	05/09/95	IEP	Strontium, Total in Soil						
			6111-001	TH		05/02/95	05/08/95	IEP	Thorium, Isotopic in Soil						
			6111-001	U		05/03/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0048		N504012-02	6111-002	GAM		04/25/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/28/95	6111-002	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-002	PU		05/04/95	05/08/95	IEP	Plutonium, Isotopic in Soil						
			6111-002	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil						
			6111-002	TH	AOR1	05/10/95	05/10/95	IEP	Thorium, Isotopic in Soil						
			6111-002	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0049		N504012-03	6111-003	GAM		04/25/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/28/95	6111-003	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-003	PU		05/04/95	05/09/95	IEP	Plutonium, Isotopic in Soil						
			6111-003	SR		05/01/95	05/18/95	IEP	Strontium, Total in Soil						
			6111-003	TH		05/08/95	05/09/95	IEP	Thorium, Isotopic in Soil						
			6111-003	U		05/04/95	05/09/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0052		N504012-04	6111-004	GAM		04/25/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/29/95	6111-004	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-004	PU		05/04/95	05/09/95	IEP	Plutonium, Isotopic in Soil						
			6111-004	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil						
			6111-004	TH		05/08/95	05/09/95	IEP	Thorium, Isotopic in Soil						
			6111-004	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0053		N504012-05	6111-005	GAM		04/27/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/29/95	6111-005	H		04/22/95	05/10/95	IEP	Tritium-Soil						
			6111-005	PU		05/05/95	05/09/95	IEP	Plutonium, Isotopic in Soil						
			6111-005	SR		05/01/95	05/17/95	IEP	Strontium, Total in Soil						
			6111-005	TH	AOR1	05/10/95	05/12/95	IEP	Thorium, Isotopic in Soil						
			6111-005	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil						

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-CWS
 Version 3.06
 Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID													
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUP-	ANALYZED	REVIEWED	BY	METHOD						
CUSTODY	SAS no	RECEIVED			FIX										
A4CM-95-0054		N504012-06	6111-006	GAM		04/26/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/29/95	6111-006	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-006	PU		05/05/95	05/09/95	IEP	Plutonium, Isotopic in Soil						
			6111-006	SR		05/01/95	05/10/95	IEP	Strontium, Total in Soil						
			6111-006	TH		05/05/95	05/09/95	IEP	Thorium, Isotopic in Soil						
			6111-006	U		05/03/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0055		N504012-07	6111-007	GAM		04/27/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/29/95	6111-007	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-007	PU		05/05/95	05/09/95	IEP	Plutonium, Isotopic in Soil						
			6111-007	SR		05/01/95	05/10/95	IEP	Strontium, Total in Soil						
			6111-007	TH		05/08/95	05/09/95	IEP	Thorium, Isotopic in Soil						
			6111-007	U		05/03/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0056		N504012-08	6111-008	GAM		04/27/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/29/95	6111-008	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-008	PU		05/05/95	05/09/95	IEP	Plutonium, Isotopic in Soil						
			6111-008	SR		05/01/95	05/10/95	IEP	Strontium, Total in Soil						
			6111-008	TH	AOR1	05/10/95	05/12/95	IEP	Thorium, Isotopic in Soil						
			6111-008	U		05/03/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0057		N504012-09	6111-009	GAM		04/26/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/29/95	6111-009	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-009	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil						
			6111-009	SR		05/01/95	05/10/95	IEP	Strontium, Total in Soil						
			6111-009	TH		05/08/95	05/09/95	IEP	Thorium, Isotopic in Soil						
			6111-009	U		05/03/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0058		N504012-10	6111-010	GAM		04/26/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/29/95	6111-010	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-010	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil						
			6111-010	SR		05/01/95	05/10/95	IEP	Strontium, Total in Soil						
			6111-010	TH		05/08/95	05/10/95	IEP	Thorium, Isotopic in Soil						
			6111-010	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil						

WORK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111

tact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID													
LOCATION	MATRIX	COLLECTED	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD							
CUSTODY	SAS no	RECEIVED	PLANCHET	FIX											
A4CM-95-0059		N504012-11	6111-011	GAM		04/27/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/30/95	6111-011	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-011	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil						
			6111-011	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil						
			6111-011	TH		05/08/95	05/10/95	IEP	Thorium, Isotopic in Soil						
			6111-011	U		05/04/95	05/09/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0060		N504012-12	6111-012	GAM		04/27/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/30/95	6111-012	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-012	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil						
			6111-012	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil						
			6111-012	TH	AOR1	05/12/95	05/16/95	IEP	Thorium, Isotopic in Soil						
			6111-012	U		05/05/95	05/09/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0061		N504012-13	6111-013	GAM		04/27/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/30/95	6111-013	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-013	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil						
			6111-013	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil						
			6111-013	TH	AOR1	05/12/95	05/16/95	IEP	Thorium, Isotopic in Soil						
			6111-013	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0062		N504012-14	6111-014	GAM		04/28/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/30/95	6111-014	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-014	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil						
			6111-014	SR		05/01/95	05/10/95	IEP	Strontium, Total in Soil						
			6111-014	TH		05/08/95	05/10/95	IEP	Thorium, Isotopic in Soil						
			6111-014	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil						
A4CM-95-0063		N504012-15	6111-015	GAM		04/28/95	05/10/95	IEP	Gamma Scan						
SSFL AREA 4	SOIL	03/30/95	6111-015	H		04/22/95	05/10/95	IEP	Tritium-Soil						
		04/06/95	6111-015	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil						
			6111-015	SR		05/01/95	05/10/95	IEP	Strontium, Total in Soil						
			6111-015	TH		05/08/95	05/09/95	IEP	Thorium, Isotopic in Soil						
			6111-015	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil						

RK SUMMARY

Page 3

SUMMARY DATA SECTION

Page 6

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID											
LOCATION	MATRIX	COLLECTED			SUF-								
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD				
A4CM-95-0064		N504012-16	6111-016	GAM		04/27/95	05/10/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	03/31/95	6111-016	H		04/22/95	05/10/95	IEP	Tritium-Soil				
		04/06/95	6111-016	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-016	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil				
			6111-016	TH		05/08/95	05/10/95	IEP	Thorium, Isotopic in Soil				
			6111-016	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				
A4CM-95-0065		N504012-17	6111-017	GAM		04/28/95	05/10/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	03/31/95	6111-017	H		04/22/95	05/10/95	IEP	Tritium-Soil				
		04/06/95	6111-017	PU		05/09/95	05/12/95	IEP	Plutonium, Isotopic in Soil				
			6111-017	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil				
			6111-017	TH	AOR1	05/12/95	05/16/95	IEP	Thorium, Isotopic in Soil				
			6111-017	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				
A4CM-95-0066		N504012-18	6111-018	GAM		04/28/95	05/10/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	03/31/95	6111-018	H		04/22/95	05/10/95	IEP	Tritium-Soil				
		04/06/95	6111-018	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-018	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil				
			6111-018	TH		05/10/95	05/12/95	IEP	Thorium, Isotopic in Soil				
			6111-018	U		05/05/95	05/09/95	IEP	Uranium, Isotopic in Soil				
A4CM-95-0067		N504012-19	6111-019	GAM		04/28/95	05/10/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	03/31/95	6111-019	H		04/23/95	05/10/95	IEP	Tritium-Soil				
		04/06/95	6111-019	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-019	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil				
			6111-019	TH		05/08/95	05/10/95	IEP	Thorium, Isotopic in Soil				
			6111-019	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				
A4CM-95-0068		N504012-20	6111-020	GAM		04/28/95	05/10/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	03/31/95	6111-020	H		04/23/95	05/10/95	IEP	Tritium-Soil				
		04/06/95	6111-020	PU		05/08/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-020	SR		05/01/95	05/18/95	IEP	Strontium, Total in Soil				
			6111-020	TH	AOR1	05/13/95	05/16/95	IEP	Thorium, Isotopic in Soil				
			6111-020	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				

RK SUMMARY

Page 4

SUMMARY DATA SECTION

Page 7

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client RocketdyneContract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID											
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD				
CUSTODY	SAS no	RECEIVED			FIX								
A4CM-95-0069		N504012-21	6111-021	GAM		04/28/95	05/10/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	03/31/95	6111-021	H		04/23/95	05/10/95	IEP	Tritium-Soil				
		04/06/95	6111-021	PU		05/09/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-021	SR		05/01/95	05/12/95	IEP	Strontium, Total in Soil				
			6111-021	TH		05/08/95	05/09/95	IEP	Thorium, Isotopic in Soil				
			6111-021	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				
Method Blank		N504012-24	6111-024	GAM		04/29/95	05/10/95	IEP	Gamma Scan				
	SOIL		6111-024	H		04/22/95	05/11/95	IEP	Tritium-Soil				
			6111-024	PU		05/09/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-024	SR		05/01/95	05/17/95	IEP	Strontium, Total in Soil				
			6111-024	TH		05/11/95	05/12/95	IEP	Thorium, Isotopic in Soil				
			6111-024	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				
Method Blank		N504012-25	6111-025	GAM		04/29/95	05/10/95	IEP	Gamma Scan				
	SOIL		6111-025	H		04/22/95	05/11/95	IEP	Tritium-Soil				
			6111-025	PU		05/09/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-025	SR		05/01/95	05/17/95	IEP	Strontium, Total in Soil				
			6111-025	TH		05/10/95	05/12/95	IEP	Thorium, Isotopic in Soil				
			6111-025	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				
Lab Control Sample		N504012-22	6111-022	GAM		04/28/95	05/10/95	IEP	Gamma Scan				
	SOIL		6111-022	H		04/22/95	05/11/95	IEP	Tritium-Soil				
			6111-022	PU		05/09/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-022	SR		05/01/95	05/16/95	IEP	Strontium, Total in Soil				
			6111-022	TH		05/08/95	05/10/95	IEP	Thorium, Isotopic in Soil				
			6111-022	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				
Lab Control Sample		N504012-23	6111-023	GAM		04/28/95	05/10/95	IEP	Gamma Scan				
	SOIL		6111-023	H		04/22/95	05/11/95	IEP	Tritium-Soil				
			6111-023	PU		05/09/95	05/10/95	IEP	Plutonium, Isotopic in Soil				
			6111-023	SR		05/01/95	05/10/95	IEP	Strontium, Total in Soil				
			6111-023	TH		05/08/95	05/10/95	IEP	Thorium, Isotopic in Soil				
			6111-023	U		05/04/95	05/08/95	IEP	Uranium, Isotopic in Soil				

WORK SUMMARY

Page 5

SUMMARY DATA SECTION

Page 8

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CWSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

SDG 6111

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID		SUF-						
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
CUSTODY	SAS no	RECEIVED								
Duplicate (N504012-03)		N504012-26	6111-026	GAM		04/29/95	05/10/95	IEP	Gamma Scan	
SSFL AREA 4	SOIL	03/28/95	6111-026	H		04/23/95	05/10/95	IEP	Tritium-Soil	
		04/06/95	6111-026	PU		05/09/95	05/10/95	IEP	Plutonium, Isotopic in Soil	
			6111-026	SR		05/01/95	05/17/95	IEP	Strontium, Total in Soil	
			6111-026	TH		05/10/95	05/12/95	IEP	Thorium, Isotopic in Soil	
			6111-026	U		05/05/95	05/08/95	IEP	Uranium, Isotopic in Soil	
Duplicate (N504012-15)		N504012-27	6111-027	GAM		05/04/95	05/10/95	IEP	Gamma Scan	
SSFL AREA 4	SOIL	03/30/95	6111-027	H		04/23/95	05/10/95	IEP	Tritium-Soil	
		04/06/95	6111-027	PU		05/09/95	05/12/95	IEP	Plutonium, Isotopic in Soil	
			6111-027	SR		05/01/95	05/17/95	IEP	Strontium, Total in Soil	
			6111-027	TH		05/10/95	05/12/95	IEP	Thorium, Isotopic in Soil	
			6111-027	U		05/08/95	05/10/95	IEP	Uranium, Isotopic in Soil	

COUNTS OF TESTS BY SAMPLE TYPE

SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
GAM	Gamma Scan		21			2	2	2	27
H	Tritium-Soil	EPA 906.0; ASTM 2476-81	21			2	2	2	27
PU	Plutonium, Isotopic in Soil	HASL 300/PU-02	21			2	2	2	27
SR	Strontium, Total in Soil	HASL 300/SR-01,-02	21			2	2	2	27
TH	Thorium, Isotopic in Soil		21			2	2	2	27
U	Uranium, Isotopic in Soil	HASL 300/U-04	21			2	2	2	27
TOTALS			126			12	12	12	162

RK SUMMARY

Page 6

SUMMARY DATA SECTION

Page 9

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-24

METHOD BLANK

Method Blank

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-24

Client sample id Method Blank

Dept sample id 6111-024

Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.025	0.080	0.1	0.5	U	H
Strontium 90	10098-97-2	-0.017	0.047	0.07	0.5	U	SR
Thorium 228		0.025	0.085	0.1	0.1	U	TH
Thorium 230	14269-63-7	0.034	0.067	0.1	0.1	U	TH
Thorium 232	7740-29-1	-0.008	0.034	0.08	0.1	U	TH
Uranium 233/234	11-08-5	0.003	0.005	0.006	0.01	U	U
Uranium 235	14117-96-1	0	0.004	0.007	0.01	U	U
Uranium 238	7440-61-1	0.002	0.003	0.006	0.01	U	U
Plutonium 238	13981-16-3	0.004	0.004	0.007	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.002	0.005	0.01	U	PU
MA SCAN ANALYTES		U					
Barium 137		U		0.04		U	GAM
Chromium 51		U		0.03		U	GAM
Manganese 54		U		0.004		U	GAM
Cobalt 58		U		0.004		U	GAM
Iron 59		U		0.007		U	GAM
Cobalt 60		U		0.005		U	GAM
Zinc 65		U		0.008		U	GAM
Niobium 94		U		0.004		U	GAM
Ruthenium 103		U		0.003		U	GAM
Ruthenium 106		U		0.03		U	GAM
Tin 113		U		0.004		U	GAM
Cesium 134		U		0.004		U	GAM
Cesium 137		U		0.004	0.02	U	GAM
Cerium 144		U		0.02		U	GAM
Europium 152		U		0.008		U	GAM
Europium 154		U		0.005		U	GAM
Europium 155		U		0.01		U	GAM
Radium 226		U		0.007		U	GAM
Thorium 232		U		0.02		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 10

TMA/RICHMOND

REPORTING GROUP 6111

N504012-24

BLANK, cont.

Method Blank

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-24

Client sample id Method Blank

Dept sample id 6111-024

Material/Matrix SOIL

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N504012-24	H	6111-024		20.0 g	04/22/95	05/11/95	IEP
N504012-24	SR	6111-024		2.00 g	05/01/95	05/17/95	IEP
N504012-24	TH	6111-024		1.00 g	05/11/95	05/12/95	IEP
N504012-24	U	6111-024		3.00 g	05/04/95	05/08/95	IEP
N504012-24	PU	6111-024		3.00 g	05/09/95	05/10/95	IEP
N504012-24	GAM	6111-024		850 g	04/29/95	05/10/95	IEP

QC-BLANK #23683

METHOD BLANKS

Page 2

SUMMARY DATA SECTION

Page 11

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-25

METHOD BLANK

Method Blank

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-25

Client sample id Method Blank

Dept sample id 6111-025

Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.033	0.080	0.1	0.5	U	H
Strontium 90	10098-97-2	0.002	0.033	0.03	0.5	U	SR
Thorium 228		0.019	0.045	0.08	0.1	U	TH
Thorium 230	14269-63-7	0.092	0.045	0.04	0.1	J	TH
Thorium 232	7740-29-1	-0.004	0.007	0.03	0.1	U	TH
Uranium 233/234	11-08-5	0.005	0.006	0.01	0.01	U	U
Uranium 235	14117-96-1	0.002	0.004	0.007	0.01	U	U
Uranium 238	7440-61-1	-0.001	0.002	0.006	0.01	U	U
Plutonium 238	13981-16-3	0.004	0.004	0.006	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.002	0.004	0.01	U	PU
TMA SCAN ANALYTES		U					
Potassium 40		U		0.07		U	GAM
Chromium 51		U		0.03		U	GAM
Manganese 54		U		0.004		U	GAM
Cobalt 58		U		0.004		U	GAM
Iron 59		U		0.009		U	GAM
Cobalt 60		U		0.005		U	GAM
Zinc 65		U		0.01		U	GAM
Niobium 94		U		0.004		U	GAM
Ruthenium 103		U		0.004		U	GAM
Ruthenium 106		U		0.04		U	GAM
Tin 113		U		0.005		U	GAM
Cesium 134		U		0.005		U	GAM
Cesium 137		U		0.005	0.02	U	GAM
Cerium 144		U		0.02		U	GAM
Europium 152		U		0.01		U	GAM
Europium 154		U		0.007		U	GAM
Europium 155		U		0.01		U	GAM
Radium 226		U		0.009		U	GAM
Thorium 232		U		0.02		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

METHOD BLANKS

Page 3

SUMMARY DATA SECTION

Page 12

TMA/RICHMOND

REPORTING GROUP 6111

N504012-25

BLANK, cont.

Method Blank

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-25Client sample id Method BlankDept sample id 6111-025Material/Matrix SOIL

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504012-25	H	6111-025		20.0 g	04/22/95	05/11/95	IEP
N504012-25	SR	6111-025		2.00 g	05/01/95	05/17/95	IEP
N504012-25	TH	6111-025		1.00 g	05/10/95	05/12/95	IEP
N504012-25	U	6111-025		3.00 g	05/04/95	05/08/95	IEP
N504012-25	PU	6111-025		3.00 g	05/09/95	05/10/95	IEP
N504012-25	GAM	6111-025		850 g	04/29/95	05/10/95	IEP

QC-BLANK #23684

METHOD BLANKS

Page 4

SUMMARY DATA SECTION

Page 13

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-22

LAB CONTROL SAMPLE

Lab Control Sample

SDG 6111

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-22Client sample id Lab Control SampleDept sample id 6111-022Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	4.4	0.21	0.1	0.5	X	H	4.78	0.19	92	84-116	
Strontium 90	9.0	0.29	0.1	0.5		SR	9.75	0.39	92	84-116	
Thorium 230	1.8	0.20	0.04	0.1	B	TH	1.79	0.072	101	80-120	
Uranium 233/234	1.3	0.084	0.04	0.01		U	1.30	0.052	100	86-114	
Uranium 235	0.98	0.070	0.006	0.01		U	0.990	0.040	99	86-114	
Uranium 238	1.3	0.085	0.04	0.01		U	1.29	0.052	101	85-115	
Plutonium 238	0.32	0.032	0.007	0.01		PU	0.347	0.014	92	83-117	
Plutonium 239/240	0.29	0.029	0.006	0.01		PU	0.309	0.012	94	83-117	
GAMMA SCAN ANALYTES											
Potassium 40	U		0.1		U	GAM					
Uranium 51	U		0.06		U	GAM					
Manganese 54	U		0.006		U	GAM					
Cobalt 58	U		0.007		U	GAM					
Iron 59	U		0.01		U	GAM					
Cobalt 60	U		0.008		U	GAM					
Zinc 65	U		0.01		U	GAM					
Niobium 94	U		0.006		U	GAM					
Ruthenium 103	U		0.008		U	GAM					
Ruthenium 106	U		0.07		U	GAM					
Tin 113	U		0.01		U	GAM					
Cesium 134	U		0.008		U	GAM					
Cesium 137	0.37	0.017		0.02		GAM	0.374	0.015	99	76-124	
Cerium 144	U		0.04		U	GAM					
Europium 152	U		0.02		U	GAM					
Europium 154	U		0.01		U	GAM					
Europium 155	U		0.02		U	GAM					
Radium 226	U		0.02		U	GAM					
Thorium 232	U		0.03		U	GAM					

CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 14

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-LCSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-22

LAB CONTROL SAMPLE, cont.

Lab Control Sample

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-22

Client sample id Lab Control Sample

Dept sample id 6111-022

Material/Matrix SOIL

TEST	PLANCHET	SUF- FIX	ALIQOOT	PREP ERR			
				2σ %	ANALYZED	REVIEWED	BY
H	6111-022		20.0 g	10.0	04/22/95	05/11/95	IEP
SR	6111-022		2.00 g	10.0	05/01/95	05/16/95	IEP
TH	6111-022		1.00 g	5.0	05/08/95	05/10/95	IEP
U	6111-022		3.00 g	5.0	05/04/95	05/08/95	IEP
PU	6111-022		3.00 g	5.0	05/09/95	05/10/95	IEP
GAM	6111-022		850 g	15.0	04/28/95	05/10/95	IEP

QC-LCS #23681

CONTROL SAMPLES

Page 2

SUMMARY DATA SECTION

Page 15

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-23

LAB CONTROL SAMPLE

Lab Control Sample

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-23

Client sample id Lab Control Sample

Dept sample id 6111-023

Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	RBC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	4.4	0.21	0.1	0.5	X	H	4.95	0.20	89	84-116	
Strontium 90	10	0.37	0.1	0.5		SR	10.8	0.43	93	83-117	
Thorium 230	1.9	0.19	0.04	0.1	B	TH	2.05	0.082	93	83-117	
Uranium 233/234	1.4	0.10	0.05	0.01		U	1.42	0.057	99	85-115	
Uranium 235	1.2	0.091	0.008	0.01		U	1.09	0.044	110	83-117	
Uranium 238	1.5	0.10	0.05	0.01		U	1.43	0.057	105	85-115	
Plutonium 238	0.33	0.034	0.008	0.01		PU	0.380	0.015	87	84-116	
Plutonium 239/240	0.30	0.032	0.006	0.01		PU	0.340	0.014	88	83-117	
GAMMA SCAN ANALYTES											
Potassium 40	U		0.04		U	GAM					
Barium 137	U		0.03		U	GAM					
Manganese 54	U		0.003		U	GAM					
Cobalt 58	U		0.003		U	GAM					
Iron 59	U		0.006		U	GAM					
Cobalt 60	U		0.003		U	GAM					
Zinc 65	U		0.007		U	GAM					
Niobium 94	U		0.003		U	GAM					
Ruthenium 103	U		0.005		U	GAM					
Ruthenium 106	U		0.04		U	GAM					
Tin 113	U		0.006		U	GAM					
Cesium 134	U		0.004		U	GAM					
Cesium 137	0.47	0.010		0.02		GAM	0.449	0.018	105	75-125	
Cerium 144	U		0.02		U	GAM					
Europium 152	U		0.01		U	GAM					
Europium 154	U		0.007		U	GAM					
Europium 155	U		0.01		U	GAM					
Radium 226	U		0.007		U	GAM					
Thorium 232	U		0.01		U	GAM					

CONTROL SAMPLES

Page 3

SUMMARY DATA SECTION

Page 16

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-23

LAB CONTROL SAMPLE, cont.

Lab Control Sample

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-23Client sample id Lab Control SampleDept sample id 6111-023Material/Matrix SOIL

TEST	PLANCHET	SUF- FIX	ALIQUOT	PREP ERR		ANALYZED	REVIEWED	BY
				2σ	±			
H	6111-023		20.0 g	10.0		04/22/95	05/11/95	IEP
SR	6111-023		2.00 g	10.0		05/01/95	05/10/95	IEP
TH	6111-023		1.00 g	5.0		05/08/95	05/10/95	IEP
U	6111-023		3.00 g	5.0		05/04/95	05/08/95	IEP
PU	6111-023		3.00 g	5.0		05/09/95	05/10/95	IEP
GAM	6111-023		850 g	15.0		04/28/95	05/10/95	IEP

OC-LCS #23682

L CONTROL SAMPLES

Page 4

SUMMARY DATA SECTION

Page 17

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-LCSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-26

A4CM-95-0049

DUPLICATE

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

DUPLICATE

ORIGINAL

Lab sample id N504012-26

Lab sample id N504012-03

Client sample id A4CM-95-0049

Dept sample id 6111-026

Dept sample id 6111-003

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/28/95 13:00

% moisture 14.7

Chain of custody id

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	0.014	0.054	0.09	0.5	U	H	0.010	0.052	0.09	U	-		
Strontium 90	0.042	0.045	0.04	0.5	J	SR	0.044	0.045	0.07	U	5	223	
Thorium 228	0.80	0.11	0.06	0.1		TH	0.62	0.16	0.1		25	42	
Thorium 230	0.60	0.089	0.03	0.1	B	TH	0.50	0.14	0.07	B	18	47	
Thorium 232	0.75	0.10	0.02	0.1		TH	0.56	0.14	0.07		29	41	
Uranium 233/234	0.73	0.049	0.01	0.01		U	0.52	0.036	0.007		34	18	
Uranium 235	0.040	0.011	0.005	0.01		U	0.018	0.007	0.005		76	68	
Uranium 238	0.73	0.049	0.008	0.01		U	0.50	0.035	0.005		37	18	
Uranium 238	0.001	0.005	0.01	0.01	U	PU	0.001	0.002	0.004	U	-		
Uranium 239/240	0.005	0.004	0.006	0.01	U	PU	0.008	0.004	0.005	J	46	132	
GAMMA SCAN ANALYTES	U						U						
Potassium 40	19	0.42				GAM	19	0.43			0	32	
Chromium 51	U		0.3		U	GAM	U		0.3	U	-		
Manganese 54	U		0.02		U	GAM	U		0.02	U	-		
Cobalt 58	U		0.02		U	GAM	U		0.02	U	-		
Iron 59	U		0.06		U	GAM	U		0.07	U	-		
Cobalt 60	U		0.02		U	GAM	U		0.02	U	-		
Zinc 65	U		0.06		U	GAM	U		0.06	U	-		
Niobium 94	U		0.02		U	GAM	U		0.02	U	-		
Ruthenium 103	U		0.03		U	GAM	U		0.03	U	-		
Ruthenium 106	U		0.2		U	GAM	U		0.2	U	-		
Tin 113	U		0.03		U	GAM	U		0.03	U	-		
Cesium 134	U		0.02		U	GAM	U		0.03	U	-		
Cesium 137	0.20	0.025		0.02		GAM	0.23	0.028			14	41	
Cerium 144	U		0.1		U	GAM	U		0.1	U	-		
Europium 152	U		0.04		U	GAM	U		0.05	U	-		
Europium 154	U		0.03		U	GAM	U		0.03	U	-		
Europium 155	U		0.06		U	GAM	U		0.07	U	-		

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 18

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-26

A4CM-95-0049

DUPLICATE, cont.

SDG 6111

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044

DUPLICATE

ORIGINAL

Lab sample id N504012-26Lab sample id N504012-03Client sample id A4CM-95-0049Dept sample id 6111-026Dept sample id 6111-003Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/28/95 13:00% moisture 14.7

Chain of custody id _____

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Radium 226	0.58	0.043				GAM	0.68	0.048			16	35	
Thorium 232	1.1	0.11				GAM	1.1	0.098			0	38	

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	6111-026		28.5	04/23/95	05/10/95 IEP	6111-003		30.0 g	04/22/95	05/10/95 IEP
SR	6111-026		2.00	05/01/95	05/17/95 IEP	6111-003		2.00 g	05/01/95	05/18/95 IEP
TH	6111-026		1.00	05/10/95	05/12/95 IEP	6111-003		1.00 g	05/08/95	05/09/95 IEP
U	6111-026		3.00	05/05/95	05/08/95 IEP	6111-003		3.00 g	05/04/95	05/09/95 IEP
PU	6111-026		3.00	05/09/95	05/10/95 IEP	6111-003		3.00 g	05/04/95	05/09/95 IEP
GAM	6111-026		180	04/29/95	05/10/95 IEP	6111-003		750 g	04/25/95	05/10/95 IEP

QC-DUP#3 23685

DUPLICATES

Page 2

SUMMARY DATA SECTION

Page 19

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-27

A4CM-95-0063

DUPLICATE

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

DUPLICATE

ORIGINAL

Lab sample id N504012-27

Lab sample id N504012-15

Client sample id A4CM-95-0063

Dept sample id 6111-027

Dept sample id 6111-015

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/30/95 14:45

% moisture 14.8

Chain of custody id

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	0.011	0.055	0.09	0.5	U	H	0.024	0.056	0.1	U	-		
Strontium 90	0.007	0.053	0.05	0.5	U	SR	0.016	0.054	0.08	U	-		
Thorium 228	0.77	0.12	0.07	0.1		TH	0.71	0.11	0.06		8	35	
Thorium 230	0.53	0.092	0.03	0.1	B	TH	0.59	0.10	0.04	B	11	38	
Thorium 232	0.67	0.10	0.03	0.1		TH	0.76	0.11	0.03		13	33	
Uranium 233/234	0.66	0.045	0.009	0.01		U	0.67	0.054	0.01		2	19	
Uranium 235	0.032	0.009	0.005	0.01		U	0.043	0.014	0.007		29	67	
Uranium 238	0.62	0.042	0.007	0.01		U	0.62	0.052	0.01		0	19	
Uranium 238	0.001	0.003	0.006	0.01	U	PU	0	0.005	0.01	U	-		
Neptunium 239/240	0.002	0.003	0.005	0.01	U	PU	0.001	0.003	0.005	U	-		
GAMMA SCAN ANALYTES	U						U						
Potassium 40	19	0.46				GAM	19	0.50			0	33	
Chromium 51	U		0.3		U	GAM	U		0.3	U	-		
Manganese 54	U		0.02		U	GAM	U		0.02	U	-		
Cobalt 58	U		0.03		U	GAM	U		0.03	U	-		
Iron 59	U		0.08		U	GAM	U		0.07	U	-		
Cobalt 60	U		0.02		U	GAM	U		0.03	U	-		
Zinc 65	U		0.06		U	GAM	U		0.07	U	-		
Niobium 94	U		0.02		U	GAM	U		0.02	U	-		
Ruthenium 103	U		0.03		U	GAM	U		0.03	U	-		
Ruthenium 106	U		0.2		U	GAM	U		0.2	U	-		
Tin 113	U		0.03		U	GAM	U		0.03	U	-		
Cesium 134	U		0.03		U	GAM	U		0.03	U	-		
Cesium 137	U		0.03	0.02	U	GAM	0.084	0.025			95	109	
Cerium 144	U		0.1		U	GAM	U		0.2	U	-		
Europium 152	U		0.05		U	GAM	U		0.06	U	-		
Europium 154	U		0.03		U	GAM	U		0.04	U	-		
Europium 155	0.048	0.044				GAM	U		0.08	U	50	216	

DUPLICATES

Page 3

SUMMARY DATA SECTION

Page 20

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-27

A4CM-95-0063

DUPLICATE, cont.

SDG 6111

Contact Italy E. Pittman

DUPLICATE

ORIGINAL

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-27

Lab sample id N504012-15

Client sample id A4CM-95-0063

Dept sample id 6111-027

Dept sample id 6111-015

Location/Matrix SSFL AREA 4

SOIL

Received 04/06/95

Collected 03/30/95 14:45

% moisture 14.8

Chain of custody id

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD t	3σ TOT	PROT LIMIT
Radium 226	0.61	0.046				GAM	0.82	0.052			29	35	
Thorium 232	1.2	0.11				GAM	1.2	0.12			0	38	

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	6111-027		27.3	04/23/95	05/10/95 IEP	6111-015		27.5 g	04/22/95	05/10/95 IEP
SR	6111-027		2.00	05/01/95	05/17/95 IEP	6111-015		2.00 g	05/01/95	05/10/95 IEP
TH	6111-027		1.00	05/10/95	05/12/95 IEP	6111-015		1.00 g	05/08/95	05/09/95 IEP
U	6111-027		3.00	05/08/95	05/10/95 IEP	6111-015		3.00 g	05/04/95	05/08/95 IEP
PU	6111-027		3.00	05/09/95	05/12/95 IEP	6111-015		3.00 g	05/08/95	05/10/95 IEP
GAM	6111-027		181	05/04/95	05/10/95 IEP	6111-015		750 g	04/28/95	05/10/95 IEP

QC-DUP#15 23686

DUPLICATES

Page 4

SUMMARY DATA SECTION

Page 21

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-01

DATA SHEET

A4CM-95-0047

SDG 6111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504012-01
Dept sample id 6111-001
Received 04/06/95
% moisture 14.8Client sample id A4CM-95-0047
Location/Matrix SSFL AREA 4 SOIL
Collected 03/28/95 13:00
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.004	0.049	0.09	0.5	U	H
Strontium 90	10098-97-2	0	0.064	0.1	0.5	U	SR
Thorium 228		1.0	0.17	0.07	0.1		TH
Thorium 230	14269-63-7	0.79	0.13	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.86	0.14	0.04	0.1		TH
Uranium 233/234	11-08-5	0.67	0.044	0.008	0.01		U
Uranium 235	14117-96-1	0.036	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.67	0.044	0.007	0.01		U
Polonium 238	13981-16-3	-0.001	0.001	0.004	0.01	U	PU
Polonium 239/240	10-12-8	0.003	0.003	0.004	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		17	0.45				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.20	0.029		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.06		U	GAM

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 22

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-01

A4CM-95-0047

DATA SHEET, cont

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-01

Client sample id A4CM-95-0047

Dept sample id 6111-001

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/28/95 13:00

% moisture 14.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.69	0.050				GAM
Thorium 232		1.2	0.12				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4012-01	H	6111-001		30.6 g	04/22/95	05/10/95	IEP
504012-01	SR	6111-001		2.00 g	05/01/95	05/09/95	IEP
N504012-01	TH	6111-001		1.00 g	05/02/95	05/08/95	IEP
N504012-01	U	6111-001		3.00 g	05/03/95	05/08/95	IEP
N504012-01	PU	6111-001		3.00 g	05/04/95	05/08/95	IEP
N504012-01	GAM	6111-001		750 g	04/26/95	05/10/95	IEP

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 23

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-02

A4CM-95-0048

DATA SHEET

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-02

Client sample id A4CM-95-0048

Dept sample id 6111-002

Location/Matrix SSFL AREA 4

SOIL

Received 04/06/95

Collected 03/28/95 13:00

% moisture 18.5

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.012	0.053	0.09	0.5	U	H
Strontium 90	10098-97-2	0.037	0.053	0.07	0.5	U	SR
Thorium 228		0.76	0.19	0.1	0.1		TH
Thorium 230	14269-63-7	0.45	0.15	0.1	0.1		TH
Thorium 232	7740-29-1	0.67	0.17	0.09	0.1		TH
Uranium 233/234	11-08-5	0.65	0.042	0.008	0.01		U
Uranium 235	14117-96-1	0.029	0.008	0.004	0.01		U
Uranium 238	7440-61-1	0.67	0.043	0.006	0.01		U
Plutonium 238	13981-16-3	0	0.001	0.004	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.003	0.004	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		16	0.42				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.06		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.097	0.023		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 24

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-02

A4CM-95-0048

DATA SHEET, cont

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-02

Client sample id A4CM-95-0048

Dept sample id 6111-002

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/28/95 13:00

% moisture 18.5

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.66	0.044				GAM
Thorium 232		1.4	0.11				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4012-02	H	6111-002		28.9 g	04/22/95	05/10/95	IEP
4012-02	SR	6111-002		2.00 g	05/01/95	05/12/95	IEP
N504012-02	TH	6111-002	A0R1	1.00 g	05/10/95	05/10/95	IEP
N504012-02	U	6111-002		3.00 g	05/04/95	05/08/95	IEP
N504012-02	PU	6111-002		3.00 g	05/04/95	05/08/95	IEP
N504012-02	GAM	6111-002		750 g	04/25/95	05/10/95	IEP

DATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 25

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-03

DATA SHEET

A4CM-95-0049

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-03

Client sample id A4CM-95-0049

Dept sample id 6111-003

Location/Matrix SSFL AREA 4

SOIL

Received 04/06/95

Collected 03/28/95 13:00

% moisture 14.7

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.010	0.052	0.09	0.5	U	H
Strontium 90	10098-97-2	0.044	0.045	0.07	0.5	U	SR
Thorium 228		0.62	0.16	0.1	0.1		TH
Thorium 230	14269-63-7	0.50	0.14	0.07	0.1	B	TH
Thorium 232	7740-29-1	0.56	0.14	0.07	0.1		TH
Uranium 233/234	11-08-5	0.52	0.036	0.007	0.01		U
Uranium 235	14117-96-1	0.018	0.007	0.005	0.01		U
Uranium 238	7440-61-1	0.50	0.035	0.005	0.01		U
Plutonium 238	13981-16-3	0.001	0.002	0.004	0.01	U	PU
Plutonium 239/240	10-12-8	0.008	0.004	0.005	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.43				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.23	0.028		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

DATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 26

TMA/RICHMOND

REPORTING GROUP 6111

N504012-03

A4CM-95-0049

DATA SHEET, cont

SDG 6111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504012-03Client sample id A4CM-95-0049Dept sample id 6111-003Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/28/95 13:00% moisture 14.7

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.68	0.048				GAM
Thorium 232		1.1	0.098				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4012-03	H	6111-003		30.0 g	04/22/95	05/10/95	IEP
N504012-03	SR	6111-003		2.00 g	05/01/95	05/18/95	IEP
N504012-03	TH	6111-003		1.00 g	05/08/95	05/09/95	IEP
N504012-03	U	6111-003		3.00 g	05/04/95	05/09/95	IEP
N504012-03	PU	6111-003		3.00 g	05/04/95	05/09/95	IEP
N504012-03	GAM	6111-003		750 g	04/25/95	05/10/95	IEP

DATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 27

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-04

A4CM-95-0052

DATA SHEET

SDG 6111

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504012-04Client sample id A4CM-95-0052Dept sample id 6111-004Location/Matrix SSFL AREA 4SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 15.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.055	0.062	0.1	0.5	U	H
Strontium 90	10098-97-2	0.050	0.042	0.06	0.5	U	SR
Thorium 228		0.84	0.18	0.1	0.1		TH
Thorium 230	14269-63-7	0.62	0.15	0.07	0.1	B	TH
Thorium 232	7740-29-1	0.85	0.17	0.05	0.1		TH
Uranium 233/234	11-08-5	0.63	0.043	0.01	0.01		U
Uranium 235	14117-96-1	0.042	0.011	0.006	0.01		U
Uranium 238	7440-61-1	0.62	0.042	0.008	0.01		U
Plutonium 238	13981-16-3	0	0.001	0.004	0.01	U	PU
Plutonium 239/240	10-12-8	0.007	0.004	0.004	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.45				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.093	0.027		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

DATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 28

TMA/RICHMOND

REPORTING GROUP 6111

N504012-04

A4CM-95-0052

DATA SHEET, cont

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-04Client sample id A4CM-95-0052Dept sample id 6111-004Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 15.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.77	0.057				GAM
Thorium 232		1.3	0.12				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
1012-04	H	6111-004		25.9 g	04/22/95	05/10/95	IEP
04012-04	SR	6111-004		2.00 g	05/01/95	05/12/95	IEP
N504012-04	TH	6111-004		1.00 g	05/08/95	05/09/95	IEP
N504012-04	U	6111-004		3.00 g	05/04/95	05/08/95	IEP
N504012-04	PU	6111-004		3.00 g	05/04/95	05/09/95	IEP
N504012-04	GAM	6111-004		751 g	04/25/95	05/10/95	IEP

DATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 29

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-05

DATA SHEET

A4CM-95-0053

SDG 6111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504012-05

Client sample id A4CM-95-0053

Dept sample id 6111-005

Location/Matrix SSFL AREA 4 SOIL

Received

Collected 03/29/95 14:45

% moisture 10.6

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.023	0.056	0.09	0.5	U	H
Strontium 90	10098-97-2	0.071	0.043	0.04	0.5	J	SR
Thorium 228		0.70	0.14	0.1	0.1		TH
Thorium 230	14269-63-7	0.61	0.12	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.77	0.13	0.04	0.1		TH
Uranium 233/234	11-08-5	0.73	0.049	0.009	0.01		U
Uranium 235	14117-96-1	0.039	0.011	0.005	0.01		U
Uranium 238	7440-61-1	0.75	0.051	0.008	0.01		U
Plutonium 238	13981-16-3	0.001	0.004	0.009	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.003	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		17	0.29				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		0.030	0.014				GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.04		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.059	0.014		0.02		GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 30

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-05

A4CM-95-0053

DATA SHEET, cont

SDG 6111

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-05Client sample id A4CM-95-0053Dept sample id 6111-005Location/Matrix SSFL AREA 4 SOIL

Received _____

Collected 03/29/95 14:45% moisture 10.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.60	0.029				GAM
Thorium 232		1.4	0.078				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
4012-05	H	6111-005		27.5 g	04/22/95	05/10/95	IEP
04012-05	SR	6111-005		2.00 g	05/01/95	05/17/95	IEP
N504012-05	TH	6111-005	A0R1	1.00 g	05/10/95	05/12/95	IEP
N504012-05	U	6111-005		3.00 g	05/04/95	05/08/95	IEP
N504012-05	PU	6111-005		3.00 g	05/05/95	05/09/95	IEP
N504012-05	GAM	6111-005		750 g	04/27/95	05/10/95	IEP

DATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 31

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-06

DATA SHEET

A4CM-95-0054

SDG 6111

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504012-06

Client sample id A4CM-95-0054

Dept sample id 6111-006

Location/Matrix SSFL AREA 4 SOIL

Received 04/06/95

Collected 03/29/95 14:45

% moisture 16.4

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.029	0.052	0.09	0.5	U	H
Strontium 90	10098-97-2	0.058	0.056	0.09	0.5	U	SR
Thorium 228		0.82	0.14	0.06	0.1		TH
Thorium 230	14269-63-7	0.57	0.11	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.74	0.13	0.04	0.1		TH
Uranium 233/234	11-08-5	0.66	0.047	0.01	0.01		U
Uranium 235	14117-96-1	0.045	0.011	0.005	0.01		U
Uranium 238	7440-61-1	0.68	0.047	0.009	0.01		U
Plutonium 238	13981-16-3	0.004	0.005	0.008	0.01	U	PU
Plutonium 239/240	10-12-8	0	0.001	0.004	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.52				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		0.061	0.048				GAM

DATA SHEETS

Page 11

SUMMARY DATA SECTION

Page 32

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-06

A4CM-95-0054

DATA SHEET, cont

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-06Client sample id A4CM-95-0054Dept sample id 6111-006Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 16.4

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.83	0.053				GAM
Thorium 232		1.3	0.13				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4012-06	H	6111-006		29.8 g	04/22/95	05/10/95	IEP
4012-06	SR	6111-006		2.00 g	05/01/95	05/10/95	IEP
N504012-06	TH	6111-006		1.00 g	05/05/95	05/09/95	IEP
N504012-06	U	6111-006		3.00 g	05/03/95	05/08/95	IEP
N504012-06	PU	6111-006		3.00 g	05/05/95	05/09/95	IEP
N504012-06	GAM	6111-006		750 g	04/26/95	05/10/95	IEP

ATA SHEETS

Page 12

SUMMARY DATA SECTION

Page 33

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-07

A4CM-95-0055

DATA SHEET

SDG 6111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504012-07Client sample id A4CM-95-0055Dept sample id 6111-007Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 12.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-0.010	0.059	0.1	0.5	U	H
Strontium 90	10098-97-2	0.027	0.071	0.1	0.5	U	SR
Thorium 228		0.53	0.12	0.08	0.1		TH
Thorium 230	14269-63-7	0.45	0.10	0.04	0.1	B	TH
Thorium 232	7740-29-1	0.49	0.11	0.04	0.1		TH
Uranium 233/234	11-08-5	0.66	0.044	0.009	0.01		U
Uranium 235	14117-96-1	0.037	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.66	0.044	0.007	0.01		U
Polonium 238	13981-16-3	0.004	0.005	0.008	0.01	U	PU
Polonium 239/240	10-12-8	-0.001	0.002	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.46				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 13

SUMMARY DATA SECTION

Page 34

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA/RICHMOND

REPORTING GROUP 6111

N504012-07

A4CM-95-0055

DATA SHEET, cont

SDG 6111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504012-07Client sample id A4CM-95-0055Dept sample id 6111-007Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 12.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.85	0.051				GAM
Thorium 232		1.4	0.11				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N504012-07	H	6111-007		25.5 g	04/22/95	05/10/95	IEP
N504012-07	SR	6111-007		2.00 g	05/01/95	05/10/95	IEP
N504012-07	TH	6111-007		1.00 g	05/08/95	05/09/95	IEP
N504012-07	U	6111-007		3.00 g	05/03/95	05/08/95	IEP
N504012-07	PU	6111-007		3.00 g	05/05/95	05/09/95	IEP
N504012-07	GAM	6111-007		750 g	04/27/95	05/10/95	IEP

DATA SHEETS

Page 14

SUMMARY DATA SECTION

Page 35

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA / RICHMOND

REPORTING GROUP 6111

N504012-08

A4CM-95-0056

DATA SHEET

SDG 6111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504012-08
Dept sample id 6111-008
Received 04/06/95
% moisture 13.1Client sample id A4CM-95-0056
Location/Matrix SSFL AREA 4 SOIL
Collected 03/29/95 14:45
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0.053	0.058	0.09	0.5	U	H
Strontium 90	10098-97-2	0.013	0.083	0.1	0.5	U	SR
Thorium 228		0.54	0.12	0.1	0.1		TH
Thorium 230	14269-63-7	0.48	0.10	0.05	0.1	B	TH
Thorium 232	7740-29-1	0.40	0.091	0.04	0.1		TH
Uranium 233/234	11-08-5	0.67	0.045	0.009	0.01		U
Uranium 235	14117-96-1	0.032	0.009	0.005	0.01		U
Uranium 238	7440-61-1	0.66	0.045	0.007	0.01		U
Plutonium 238	13981-16-3	0.003	0.006	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.001	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.46				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 15

SUMMARY DATA SECTION

Page 36

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 05/18/95

TMA
Thermo Analytical

2030 Wright Avenue

P.O. Box 4040

Richmond, CA 94804-0040

(510) 235-2633 Fax: 235-0438

June 14, 1995

Mr. Alex Klein
Rockwell International Corp.
Rocketdyne Division
6633 Canoga Ave.
Canoga Park, CA 91303

Batal 5

Ref: Customer P.O. No. R44PJZ94034044
TMA/Richmond Report N5-04-096-6112
Report N5-04-097-6113

Dear Mr. Klein:

The enclosed data report is for the radiochemical analyses of nineteen soil and eight water samples collected between April 18 and 24, 1995. The samples were received at TMA/Richmond on April 27, 1995. The accompanying case narrative discusses all parameters underlined in the data report which are not in compliance with the Statement of Work.

If you have any questions regarding this data, or any problems with the hard copy or electronic deliverable diskette, please call me at (510) 235-2633.

Sincerely,



Italy E. Pittman
Program Manager

IEP:ss

Enclosures: Data Report N5-04-096-6112 (rinsate)
Data Report N5-04-097-6113 (soil)
Diskette

DOCUMENT INVENTORY FOR SAMPLE DELIVERY GROUPS 6112 AND 6113

SECTION 1 Case Narrative

SECTION 2 Summary Data Section

X APPENDIX 1 Chains-of-Custody Copies

SECTION 1 Case Narrative

Case Narrative

June 14, 1995

1.0 GENERAL

TMA/Richmond Sample Delivery Group (SDG) 6112 consists of eight liquid samples, and SDG 6113 consists of twenty-one soil samples. These samples were received on April 27, 1995.

2.0 ANALYTICAL NOTES

The internal quality control consists 5% each of laboratory control samples, blanks, and duplicates. The QC samples are prepared by the Quality Control Department.

The blanks and laboratory control samples are created using the 1989 ASTM formula for moderately hard water, listed in Table 8010: *Recommended Composition for Reconstituted Fresh Water*. This consists of the following:

NaHCO ₃	96 mg/L
CaSO ₄ ·2H ₂ O	60 mg/L
MgSO ₄	60 mg/L

KCl at 4.0 mg/L - specified in the table - is not added since KCl contains natural ⁴⁰K which raises the gross beta background.

2.1 Tritium Analyses

6112 (Rinsate)

No problems were associated with the samples during the analyses.

6113 (Soil)

In changing the reporting format for the tritium results to pCi/volume water extracted; the following underlines are noted. The aliquot for the tritium samples are below the minimum required; this is due to the relatively small percent moisture present in the samples. The Minimum Detectable Activity (MDA) is therefore above the Required Detection Limit (RDL) because of the small aliquot size. The report list the result units as pCi/g which is incorrect. The data reported is actually for pCi/L values. We are working to change the mechanisms of our reporting software to be able to include multiple units per sample matrix where applicable.

Case Narrative

June 14, 1995

2.2 Strontium-90 Analyses

6112 (Rinsate)

The Laboratory Control Sample (LCS) was counted for less than the nominal 200 minutes count time required; however, the Required Detection Limit (RDL) was achieved despite the shorter count time. The average yield for 6 samples was $75\% \pm 6\%$.

6113 (Soil)

Three samples, A4CM-95-0071, A4CM-95-0079, and A4CM-95-0082 were counted for less than the 200 minute nominal count time; however, the Minimum Detectable Activity (MDA) were below the RDL despite the shorter count time. The average yield for 22 samples was $83\% \pm 6\%$.

2.3 Thorium 228, 230, 232 Analyses

6112 (Rinsate)

All of the samples were counted for less than the nominal 500 minutes required; however, the MDA's were less than the RDL. The MDA for the LCS was greater than the RDL; however, this is not a problem since the activity of the LCS is significantly greater than the MDA. The average yield for 6 samples was $73\% \pm 15\%$.

6113 (Soil)

Sample A4CM-95-0072 has a MDA slightly greater than the RDL. The reagent blank has a result for Th230 greater than the MDA, but less than the RDL. The average yield for 22 samples was $51\% \pm 34\%$.

2.4 Uranium 233/234, 235, 238 Analyses

6112 (Rinsate)

Sample A4CM-95-0090 has a chemical yield lower than the nominal 30% required; however, the MDA was less than the RDL. The reagent blank has a result for U238 greater than the MDA, but less than the RDL. The MDA for the LCS was greater than the RDL; however, this is not a problem since the activity of the LCS is significantly greater than the MDA. The average yield for 6 samples was $50\% \pm 29\%$.

2.4 Uranium 233/234, 235, 238 Analyses (continued)

6113 (Soil)

Sample A4CM-95-0083 has a MDA slightly greater than the RDL. The LCS has an MDA's greater than the RDL; however, this is not a problem since the activity the LCS is significantly greater than the MDA. The average yield for 22 samples was $67\% \pm 14\%$.

2.5 Plutonium 238, 239/240 Analyses

6112 (Rinsate)

No problems were associated with the analyses. The average yield for 6 samples was $55\% \pm 15\%$.

6113 (Soil)

The duplicate sample failed due to a high relative percent difference for the Pu239 result. Sample A4CM-95-0078 was re-analyzed along with a new LCS and Blank because of a higher chemical yield from the first analysis. The average yield for 24 samples was $70\% \pm 32\%$.

2.6 Gamma Spectroscopy Analyses

6112 (Rinsate)

Three samples have MDA's greater than the RDL. These samples were counted for more than the 400 minutes required; however, these samples still did not meet the 5 pCi/L RDL. We have scheduled these samples for a 24 hour count to obtain a MDA that will meet the RDL, and will resubmit the gamma data for these samples.

6113 (Soil)

All samples have an aliquot less than the 850 g nominal required, and several have count times less than the nominal 700 minutes required; however, despite the smaller aliquot and shorter count times, all of the MDA's were less than or equal to the RDL except for samples A4CM-95-0070, A4CM-95-0077, A4CM-95-0083 and, A4CM-95-0084. These samples have been rescheduled for counting, and we will resubmit the gamma data for these samples.

SECTION 2 Summary Data Section

T M A / R I C H M O N D
REPORTING GROUP 6112

SDG 6112
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S					
About this section	.	.	.	.	1
Sample Summaries	.	.	.	.	3
Prep Batch Summary	.	.	.	.	5
Work Summary	.	.	.	.	6
Method Blanks	.	.	.	.	8
Lab Control Samples	.	.	.	.	10
Data Sheets	.	.	.	.	12
Method Summaries	.	.	.	.	24
Report Guides	.	.	.	.	30
End of Section	.	.	.	.	44

Sara Sourensen
Prepared by
Italy E. Pittman 6/14/95
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

REPORT GUIDE

SDG 6112

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

ABOUT THE DATA SUMMARY SECTION

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

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

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

PREPARATION BATCH SUMMARY

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

WORK SUMMARY

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

METHOD BLANKS

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

LAB CONTROL SAMPLES

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

DUPLICATES

REPORT GUIDES

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-RG

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

SDG 6112
Contact Italy E. Pittman

GUIDE, cont.

Client Rocketdyne
Contract R44PJZ94034044

ABOUT THE DATA SUMMARY SECTION

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

MATRIX SPIKES

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

DATA SHEETS

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

METHOD SUMMARIES

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

REPORT GUIDES

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

REPORT GUIDES

Page 2

SUMMARY DATA SECTION

Page 2

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

SDG 6112

Contact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0085	SSFL AREA 4	WATER		N504096-01			04/20/95
A4CM-95-0086	SSFL AREA 4	WATER		N504096-02			04/20/95
A4CM-95-0089	SSFL AREA 4	WATER		N504096-03			04/24/95
A4CM-95-0090	SSFL AREA 4	WATER		N504096-04			04/24/95
A4CM-95-0091	SSFL AREA 4	WATER		N504096-05			04/24/95
A4CM-95-0092	SSFL AREA 4	WATER		N504096-06			04/24/95
A4CM-95-0094	SSFL AREA 4	WATER		N504096-07			04/24/95
A4CM-95-0095	SSFL AREA 4	WATER		N504096-08			04/24/95
Method Blank		WATER		N504096-10			
Lab Control Sample		WATER		N504096-09			

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

QC SUMMARY

SDG 6112

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
6112		A4CM-95-0085	WATER				04/27/95 7	N504096-01		6112-001
		A4CM-95-0086	WATER				04/27/95 7	N504096-02		6112-002
		A4CM-95-0089	WATER				04/27/95 3	N504096-03		6112-003
		A4CM-95-0090	WATER				04/27/95 3	N504096-04		6112-004
		A4CM-95-0091	WATER				04/27/95 3	N504096-05		6112-005
		A4CM-95-0092	WATER				04/27/95 3	N504096-06		6112-006
		A4CM-95-0094	WATER				04/27/95 3	N504096-07		6112-007
		A4CM-95-0095	WATER				04/27/95 3	N504096-08		6112-008
		Method Blank	WATER					N504096-10		6112-010
		Lab Control Sample	WATER					N504096-09		6112-009

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

SDG 6112

Contact Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED						QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	FIERS
Alpha Spectroscopy												
PU	WATER	Plutonium, Isotopic in Water	2781-104	5.0	4				1	1		
TH	WATER	Thorium, Isotopic in Water	2781-104	5.0	4				1	1		
U	WATER	Uranium, Isotopic in Water	2781-104	5.0	4				1	1		
Beta Counting												
SR	WATER	Strontium, Total in Water	2781-104	10.0	4				1	1		
Gamma Scan												
GAM	WATER	Gamma Emitters	2781-104	15.0	4				1	1		
Liquid Scintillation												
H	WATER	Tritium in Water	2781-104	10.0	4				1	1		

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

SDG 6112

Contact Italy E. Pittman

WORK SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID											
LOCATION	MATRIX	COLLECTED		SUF-									
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD				
A4CM-95-0085		N504096-01	6112-001	H		05/12/95	06/05/95	IEP	Tritium in Water				
SSFL AREA 4	WATER	04/20/95											
		04/27/95											
A4CM-95-0086		N504096-02	6112-002	GAM		05/10/95	05/25/95	IEP	Gamma Emitters				
SSFL AREA 4	WATER	04/20/95	6112-002	PU		05/19/95	05/24/95	IEP	Plutonium, Isotopic in Water				
		04/27/95	6112-002	SR		05/24/95	05/24/95	IEP	Strontium, Total in Water				
			6112-002	TH		05/20/95	05/24/95	IEP	Thorium, Isotopic in Water				
			6112-002	U		05/19/95	05/24/95	IEP	Uranium, Isotopic in Water				
A4CM-95-0089		N504096-03	6112-003	H		05/12/95	06/05/95	IEP	Tritium in Water				
SSFL AREA 4	WATER	04/24/95											
		04/27/95											
A4CM-95-0090		N504096-04	6112-004	GAM		05/10/95	05/25/95	IEP	Gamma Emitters				
SSFL AREA 4	WATER	04/24/95	6112-004	PU		05/19/95	05/24/95	IEP	Plutonium, Isotopic in Water				
		04/27/95	6112-004	SR		05/24/95	05/24/95	IEP	Strontium, Total in Water				
			6112-004	TH		05/20/95	05/24/95	IEP	Thorium, Isotopic in Water				
			6112-004	U		05/19/95	05/24/95	IEP	Uranium, Isotopic in Water				
A4CM-95-0091		N504096-05	6112-005	H		05/12/95	06/05/95	IEP	Tritium in Water				
SSFL AREA 4	WATER	04/24/95											
		04/27/95											
A4CM-95-0092		N504096-06	6112-006	GAM		05/10/95	05/25/95	IEP	Gamma Emitters				
SSFL AREA 4	WATER	04/24/95	6112-006	PU		05/23/95	05/24/95	IEP	Plutonium, Isotopic in Water				
		04/27/95	6112-006	SR		05/24/95	05/24/95	IEP	Strontium, Total in Water				
			6112-006	TH		05/20/95	05/24/95	IEP	Thorium, Isotopic in Water				
			6112-006	U		05/19/95	05/24/95	IEP	Uranium, Isotopic in Water				
A4CM-95-0094		N504096-07	6112-007	H		05/12/95	06/05/95	IEP	Tritium in Water				
SSFL AREA 4	WATER	04/24/95											
		04/27/95											
A4CM-95-0095		N504096-08	6112-008	GAM		05/10/95	05/25/95	IEP	Gamma Emitters				
SSFL AREA 4	WATER	04/24/95	6112-008	PU		05/19/95	05/24/95	IEP	Plutonium, Isotopic in Water				
		04/27/95	6112-008	SR		05/24/95	05/24/95	IEP	Strontium, Total in Water				
			6112-008	TH		06/01/95	06/02/95	IEP	Thorium, Isotopic in Water				
			6112-008	U		05/19/95	05/25/95	IEP	Uranium, Isotopic in Water				

RK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 6

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

SDG 6112

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED		SUF-						
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
Method Blank		NS04096-10	6112-010	GAM	05/11/95	05/25/95	IEP	Gamma Emitters		
	WATER		6112-010	H	05/12/95	06/05/95	IEP	Tritium in Water		
			6112-010	PU	05/19/95	05/25/95	IEP	Plutonium, Isotopic in Water		
			6112-010	SR	05/24/95	05/24/95	IEP	Strontium, Total in Water		
			6112-010	TH	06/01/95	06/02/95	IEP	Thorium, Isotopic in Water		
			6112-010	U	05/19/95	05/25/95	IEP	Uranium, Isotopic in Water		
Lab Control Sample		NS04096-09	6112-009	GAM	05/11/95	05/25/95	IEP	Gamma Emitters		
	WATER		6112-009	H	05/12/95	06/05/95	IEP	Tritium in Water		
			6112-009	PU	05/19/95	05/25/95	IEP	Plutonium, Isotopic in Water		
			6112-009	SR	05/24/95	05/24/95	IEP	Strontium, Total in Water		
			6112-009	TH	06/01/95	06/06/95	IEP	Thorium, Isotopic in Water		
			6112-009	U	05/19/95	05/25/95	IEP	Uranium, Isotopic in Water		

COUNTS OF TESTS BY SAMPLE TYPE

T	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
GAM		Gamma Emitters	ASTM 3649-85; EPA 901.1	4			1	1		6
H		Tritium in Water	EPA 906.0; ASTM 2476-81	4			1	1		6
PU		Plutonium, Isotopic in Water	ASTM 3865-90	4			1	1		6
SR		Strontium, Total in Water	HASL 300/SR-01,-02	4			1	1		6
TH		Thorium, Isotopic in Water		4			1	1		6
U		Uranium, Isotopic in Water	ASTM 3972-90	4			1	1		6
TOTALS				24			6	6		36

RK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 7

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/06/95

TMA / RICHMOND

REPORTING GROUP 6112

N504096-10

METHOD BLANK

Method Blank

SDG 6112

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504096-10

Client sample id Method Blank

Dept sample id 6112-010

Material/Matrix WATER

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		22	170	300	500	U	H
Strontium 90	10098-97-2	-0.005	0.11	0.1	0.5	U	SR
Thorium 228		-0.014	0.083	0.2	0.5	U	TH
Thorium 230	14269-63-7	0.048	0.068	0.1	0.5	U	TH
Thorium 232	7740-29-1	-0.007	0.027	0.07	0.5	U	TH
Uranium 233/234	11-08-5	0.020	0.078	0.1	0.5	U	U
Uranium 235	14117-96-1	0.047	0.071	0.09	0.5	U	U
Uranium 238	7440-61-1	0.098	0.059	0.07	0.5	J	U
Plutonium 238	13981-16-3	0	0.047	0.1	0.1	U	PU
Plutonium 239/240	10-12-8	0.008	0.024	0.05	0.1	U	PU
TMA SCAN ANALYTES		U					
Cesium 40		U		50		U	GAM
Chromium 51		U		20		U	GAM
Manganese 54		U		3		U	GAM
Cobalt 58		U		3		U	GAM
Iron 59		U		5		U	GAM
Cobalt 60		U		4		U	GAM
Zinc 65		U		6		U	GAM
Niobium 94		U		3		U	GAM
Ruthenium 103		U		3		U	GAM
Ruthenium 106		U		30		U	GAM
Tin 113		U		4		U	GAM
Cesium 134		U		3		U	GAM
Cesium 137		U		3	5	U	GAM
Cerium 144		U		20		U	GAM
Europium 152		U		8		U	GAM
Europium 154		U		4		U	GAM
Europium 155		U		9		U	GAM
Radium 226		U		6		U	GAM
Thorium 232		U		10		U	GAM

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 8

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-20

Lab Control Sample

LAB CONTROL SAMPLE

SDG 6113

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504097-20

Client sample id Lab Control Sample

Dept sample id 6113-020

Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	9000	430	300	500	X	H	10400	420	87	84-116	
Strontium 90	11	0.37	0.1	0.5		SR	10.7	0.43	103	82-118	
Thorium 230	2.1	0.17	0.03	0.1	B	TH	2.05	0.082	102	84-116	
Uranium 233/234	1.5	0.098	0.05	0.01		U	1.43	0.057	105	85-115	
Uranium 235	1.2	0.087	0.007	0.01		U	1.09	0.044	110	83-117	
Uranium 238	1.5	0.099	0.04	0.01		U	1.42	0.057	106	85-115	
Plutonium 238	0.36	0.035	0.007	0.01		PU	0.313	0.013	115	80-120	
Plutonium 239/240	0.36	0.035	0.006	0.01		PU	0.340	0.014	106	81-119	
GAMMA SCAN ANALYTES											
Potassium 40	U				U	GAM					
Barium 137	U		0.08		U	GAM					
Barium 138	U		0.06		U	GAM					
Manganese 54	U		0.006		U	GAM					
Cobalt 58	U		0.006		U	GAM					
Iron 59	U		0.02		U	GAM					
Cobalt 60	U		0.007		U	GAM					
Zinc 65	U		0.02		U	GAM					
Niobium 94	U		0.006		U	GAM					
Ruthenium 103	U		0.008		U	GAM					
Ruthenium 106	U		0.07		U	GAM					
Tin 113	U		0.01		U	GAM					
Cesium 134	U		0.008		U	GAM					
Cesium 137	0.45	0.022		0.02		GAM	0.448	0.018	100	75-125	
Cerium 144	U		0.04		U	GAM					
Europium 152	U		0.02		U	GAM					
Europium 154	U		0.01		U	GAM					
Europium 155	U		0.03		U	GAM					
Radium 226	U		0.02		U	GAM					
Thorium 232	U		0.03		U	GAM					

CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 12

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6112

N504096-10

BLANK, cont.

Method Blank

SDG 6112

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504096-10

Client sample id Method Blank

Dept sample id 6112-010

Material/Matrix WATER

QC-BLANK #23822

METHOD BLANKS

Page 2

SUMMARY DATA SECTION

Page 9

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

N504096-09

Lab Control Sample

LAB CONTROL SAMPLE

SDG 6112

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504096-09

Client sample id Lab Control Sample

Dept sample id 6112-009

Material/Matrix WATER

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	10000	450	300	500		H	9870	390	101	81-119	
Strontium 90	20	0.99	0.5	0.5		SR	19.5	0.78	103	82-118	
Thorium 228	0.032	0.047	0.08	0.5	U	TH					
Thorium 230	3.8	0.25	0.04	0.5		TH	3.58		106	87-113	
Thorium 232	0	0.017	0.03	0.5	U	TH					
Uranium 233/234	19	1.2	0.6	0.5		U	19.4	0.78	98	86-114	
Uranium 235	16	1.0	0.08	0.5		U	14.8	0.59	108	85-115	
Uranium 238	20	1.2	0.5	0.5		U	19.4	0.78	103	86-114	
Plutonium 238	2.1	0.25	0.1	0.1		PU	2.08	0.083	101	79-121	
Plutonium 239/240	1.8	0.21	0.05	0.1		PU	1.85	0.074	97	80-120	
SCAN ANALYTES	U										
Potassium 40	U		100		U	GAM					
Chromium 51	U		60		U	GAM					
Manganese 54	U		7		U	GAM					
Cobalt 58	U		6		U	GAM					
Iron 59	U		10		U	GAM					
Cobalt 60	U		8		U	GAM					
Zinc 65	U		20		U	GAM					
Niobium 94	U		8		U	GAM					
Ruthenium 103	U		9		U	GAM					
Ruthenium 106	U		80		U	GAM					
Tin 113	U		10		U	GAM					
Cesium 134	U		8		U	GAM					
Cesium 137	310	17		5		GAM	318	13	97	76-124	
Cerium 144	U		40		U	GAM					
Europium 152	U		20		U	GAM					
Europium 154	U		10		U	GAM					
Europium 155	U		20		U	GAM					
Radium 226	U		20		U	GAM					
Thorium 232	U		30		U	GAM					

CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 10

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

N504096-09

LAB CONTROL SAMPLE, cont.

Lab Control Sample

SDG 6112Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504096-09Client sample id Lab Control SampleDept sample id 6112-009Material/Matrix WATER

QC-LCS #23821

CONTROL SAMPLES

Page 2

SUMMARY DATA SECTION

Page 11

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-LCSVersion 3.06Report date 06/06/95

TMA / RICHMOND

REPORTING GROUP 6112

N504096-01

DATA SHEET

A4CM-95-0085

SDG 6112
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504096-01
Dept sample id 6112-001
Received 04/27/95Client sample id A4CM-95-0085
Location/Matrix SSFL AREA 4 WATER
Collected 04/20/95
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		32	170	300	500	U	H

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 12

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/06/95

TMA / RICHMOND

REPORTING GROUP 6112

N504096-02

DATA SHEET

A4CM-95-0086

SDG 6112Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504096-02Client sample id A4CM-95-0086Dept sample id 6112-002Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/20/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	-0.002	0.092	0.2	0.5	U	SR
Thorium 228		0	0.062	0.1	0.5	U	TH
Thorium 230	14269-63-7	0.062	0.062	0.08	0.5	U	TH
Thorium 232	7740-29-1	0.010	0.021	0.08	0.5	U	TH
Uranium 233/234	11-08-5	0.036	0.054	0.09	0.5	U	U
Uranium 235	14117-96-1	0	0.022	0.08	0.5	U	U
Uranium 238	7440-61-1	0.018	0.036	0.07	0.5	U	U
Plutonium 238	13981-16-3	-0.004	0.023	0.05	0.1	U	PU
Plutonium 239/240	10-12-8	0.008	0.008	0.03	0.1	U	PU
TMA SCAN ANALYTES							
Potassium 40		U		100		U	GAM
Chromium 51		U		70		U	GAM
Manganese 54		U		7		U	GAM
Cobalt 58		U		7		U	GAM
Iron 59		U		20		U	GAM
Cobalt 60		U		7		U	GAM
Zinc 65		U		20		U	GAM
Niobium 94		U		6		U	GAM
Ruthenium 103		U		8		U	GAM
Ruthenium 106		U		60		U	GAM
Tin 113		U		8		U	GAM
Cesium 134		U		7		U	GAM
Cesium 137		U		7	5	U	GAM
Cerium 144		U		30		U	GAM
Europium 152		U		10		U	GAM
Europium 154		U		7		U	GAM
Europium 155		U		10		U	GAM
Radium 226		U		10		U	GAM

ATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 13

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA / RICHMOND

REPORTING GROUP 6112

N504096-02

A4CM-95-0086

DATA SHEET, cont

SDG 6112
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504096-02
Dept sample id 6112-002
Received 04/27/95Client sample id A4CM-95-0086
Location/Matrix SSFL AREA 4 WATER
Collected 04/20/95
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		30		U	GAM

ATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 14

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.05
Report date 06/06/95

TMA / RICHMOND

REPORTING GROUP 6112

N504096-03

DATA SHEET

A4CM-95-0089

SDG 6112Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504096-03Client sample id A4CM-95-0089Dept sample id 6112-003Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		66	170	300	500	U	H

ATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 15

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA / RICHMOND

REPORTING GROUP 6112

N504096-04

A4CM-95-0090

DATA SHEET

SDG 6112

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504096-04

Client sample id A4CM-95-0090

Dept sample id 6112-004

Location/Matrix SSFL AREA 4

WATER

Received 04/27/95

Collected 04/24/95

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	0.14	0.13	0.2	0.5	U	SR
Thorium 228		0.035	0.070	0.1	0.5	U	TH
Thorium 230	14269-63-7	0.009	0.053	0.08	0.5	U	TH
Thorium 232	7740-29-1	0	0.035	0.07	0.5	U	TH
Uranium 233/234	11-08-5	1.8	0.47	0.2	0.5		U
Uranium 235	14117-96-1	0.12	0.12	0.2	0.5	U	U
Uranium 238	7440-61-1	1.4	0.37	0.2	0.5		U
Plutonium 238	13981-16-3	-0.007	0.014	0.04	0.1	U	PU
Plutonium 239/240	10-12-8	0	0.007	0.03	0.1	U	PU
MMA SCAN ANALYTES							
Potassium 40		U		50		U	GAM
Chromium 51		U		60		U	GAM
Manganese 54		U		5		U	GAM
Cobalt 58		U		6		U	GAM
Iron 59		U		10		U	GAM
Cobalt 60		U		7		U	GAM
Zinc 65		U		10		U	GAM
Niobium 94		U		5		U	GAM
Ruthenium 103		U		6		U	GAM
Ruthenium 106		U		50		U	GAM
Tin 113		U		6		U	GAM
Cesium 134		U		6		U	GAM
Cesium 137		U		6	5	U	GAM
Cerium 144		U		30		U	GAM
Europium 152		U		10		U	GAM
Europium 154		U		6		U	GAM
Europium 155		U		10		U	GAM
Radium 226		U		10		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/06/95

DATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 16

TMA/RICHMOND

REPORTING GROUP 6112

N504096-04

A4CM-95-0090

DATA SHEET, cont

SDG 6112Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504096-04Client sample id A4CM-95-0090Dept sample id 6112-004Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		20		U	GAM

DATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 17

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

N504096-05

DATA SHEET

A4CM-95-0091

SDG 6112Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504096-05Client sample id A4CM-95-0091Dept sample id 6112-005Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		22	160	300	500	U	H

ATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 18

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

N504096-06

DATA SHEET

A4CM-95-0092

SDG 6112Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504096-06Client sample id A4CM-95-0092Dept sample id 6112-006Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	-0.026	0.096	0.2	0.5	U	SR
Thorium 228		0.088	0.10	0.2	0.5	U	TH
Thorium 230	14269-63-7	0.050	0.075	0.1	0.5	U	TH
Thorium 232	7740-29-1	-0.013	0.025	0.1	0.5	U	TH
Uranium 233/234	11-08-5	-0.040	0.10	0.2	0.5	U	U
Uranium 235	14117-96-1	0.012	0.072	0.1	0.5	U	U
Uranium 238	7440-61-1	0.020	0.040	0.08	0.5	U	U
Plutonium 238	13981-16-3	0.009	0.018	0.04	0.1	U	PU
Plutonium 239/240	10-12-8	0.004	0.018	0.03	0.1	U	PU
TMA SCAN ANALYTES							
Potassium 40		U		100		U	GAM
Chromium 51		U		60		U	GAM
Manganese 54		U		6		U	GAM
Cobalt 58		U		7		U	GAM
Iron 59		U		10		U	GAM
Cobalt 60		U		7		U	GAM
Zinc 65		U		20		U	GAM
Niobium 94		U		7		U	GAM
Ruthenium 103		U		8		U	GAM
Ruthenium 106		U		50		U	GAM
Tin 113		U		8		U	GAM
Cesium 134		U		7		U	GAM
Cesium 137		U		7	5	U	GAM
Cerium 144		U		30		U	GAM
Europium 152		U		10		U	GAM
Europium 154		U		9		U	GAM
Europium 155		U		20		U	GAM
Radium 226		U		10		U	GAM

DATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 19

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

N504096-06

A4CM-95-0092

DATA SHEET, cont

SDG 6112Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504096-06Client sample id A4CM-95-0092Dept sample id 6112-006Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		30		U	GAM

DATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 20

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

N504096-07

A4CM-95-0094

DATA SHEET

SDG 6112Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504096-07Client sample id A4CM-95-0094Dept sample id 6112-007Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		140	170	300	500	U	H

ATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 21

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA / RICHMOND

REPORTING GROUP 6112

N504096-08

A4CM-95-0095

DATA SHEET

SDG 6112Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504096-08Client sample id A4CM-95-0095Dept sample id 6112-008Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	0.20	0.11	0.1	0.5	J	SR
Thorium 228		0.015	0.060	0.1	0.5	U	TH
Thorium 230	14269-63-7	0.22	0.089	0.07	0.5	J	TH
Thorium 232	7740-29-1	0	0.015	0.06	0.5	U	TH
Uranium 233/234	11-08-5	1.2	0.24	0.2	0.5		U
Uranium 235	14117-96-1	0.065	0.052	0.1	0.5	U	U
Uranium 238	7440-61-1	0.93	0.22	0.1	0.5		U
Plutonium 238	13981-16-3	0.030	0.040	0.07	0.1	U	PU
Plutonium 239/240	10-12-8	-0.003	0.020	0.05	0.1	U	PU
GMA SCAN ANALYTES		U					
Potassium 40		U		40		U	GAM
Chromium 51		U		30		U	GAM
Manganese 54		U		3		U	GAM
Cobalt 58		U		3		U	GAM
Iron 59		U		8		U	GAM
Cobalt 60		U		3		U	GAM
Zinc 65		U		6		U	GAM
Niobium 94		U		3		U	GAM
Ruthenium 103		U		4		U	GAM
Ruthenium 106		U		30		U	GAM
Tin 113		U		3		U	GAM
Cesium 134		U		3		U	GAM
Cesium 137		U		3	5	U	GAM
Cerium 144		U		10		U	GAM
Europium 152		U		6		U	GAM
Europium 154		U		4		U	GAM
Europium 155		U		7		U	GAM
Radium 226		U		6		U	GAM

DATA SHEETS

Page 11

SUMMARY DATA SECTION

Page 22

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

N504096-08

A4CM-95-0095

DATA SHEET, cont

SDG 6112Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504096-08Client sample id A4CM-95-0095Dept sample id 6112-008Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		10		U	GAM

DATA SHEETS

Page 12

SUMMARY DATA SECTION

Page 23

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

Test PU Matrix WATER

SDG 6112

Contact Italy E. Pittman

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Plutonium 238	Plutonium 239/240
------------------	------------------	-----------------	------------------	------------------	----------------------

Preparation batch 2781-104

A4CM-95-0086	N504096-02	6112-002	U	U
A4CM-95-0090	N504096-04	6112-004	U	U
A4CM-95-0092	N504096-06	6112-006	U	U
A4CM-95-0095	N504096-08	6112-008	U	U
BLK (QC ID=23822)	N504096-10	6112-010	U	U
LCS (QC ID=23821)	N504096-09	6112-009	ok	ok

Nominal values and limits from method	RDLs (pCi/L)	0.1	0.1
---------------------------------------	--------------	-----	-----

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-104 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 104

A4CM-95-0086	N504096-02	0.05	0.500	55	1017	29	05/19/95	05/19	SS-044
A4CM-95-0090	N504096-04	0.04	0.500	61	1017	25	05/19/95	05/19	SS-045
A4CM-95-0092	N504096-06	0.04	0.500	49	1093	29	05/19/95	05/23	SS-047
A4CM-95-0095	N504096-08	0.07	0.500	66	1018	25	05/19/95	05/19	SS-038
BLK (QC ID=23822)	N504096-10	0.1	0.500	54	1018	05/19/95	05/19	SS-040	
LCS (QC ID=23821)	N504096-09	0.1	0.500	45	1018	05/19/95	05/19	SS-039	

Nominal values and limits from method	0.1	0.500	20-105	1000	100	180
---------------------------------------	-----	-------	--------	------	-----	-----

PROCEDURES	REFERENCE	ASTM 3865-90
EP-040	Environmental Water Dissolution, rev 1	
EP-940	Plutonium Purification, rev 0	
EP-008	Heavy Elements Electroplating, rev 0	

AVERAGES ± 2 SD	MDA 0.07 ± 0.06
FOR 6 SAMPLES	YIELD 55 ± 15

OD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 24

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

Test TH Matrix WATER

SDG 6112

Contact Italy E. Pittman

METHOD SUMMARY

THORIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Thorium 228	Thorium 230	Thorium 232
Preparation batch 2781-104						
A4CM-95-0086	N504096-02	6112-002	U	U	U	
A4CM-95-0090	N504096-04	6112-004	U	U	U	
A4CM-95-0092	N504096-06	6112-006	U	U	U	
A4CM-95-0095	N504096-08	6112-008	U	0.22 J	U	
BLK (QC ID=23822)	N504096-10	6112-010	U	U	U	
LCS (QC ID=23821)	N504096-09	6112-009	No data U	ok	No data U	
Nominal values and limits from method						
		RDLs (pCi/L)	0.5	0.5	0.5	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-104 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 104																
A 5-0086	N504096-02	0.1	0.500	75	403	30	05/20/95	05/20	SS-017							
A 5-0090	N504096-04	0.1	0.500	82	403	26	05/20/95	05/20	SS-018							
A4CM-95-0092	N504096-06	0.2	0.500	63	403	26	05/20/95	05/20	SS-020							
A4CM-95-0095	N504096-08	0.1	0.500	77	391	38	05/20/95	06/01	SS-038							
BLK (QC ID=23822)	N504096-10	0.2	0.500	65	715		05/20/95	06/01	SS-023							
LCS (QC ID=23821)	N504096-09	0.08	0.500	77	1015		05/20/95	06/01	SS-038							
Nominal values and limits from method																
		0.5	0.500	20-110	500	100	180									

PROCEDURES EP-040 Environmental Water Dissolution, rev 1
 EP-900 Thorium Purification, rev 0
 EP-008 Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD MDA 0.1 ± 0.1
 FOR 6 SAMPLES YIELD 73 ± 15

SD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 25

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

Test U Matrix WATER
SDG 6112
Contact Italy E. Pittman

METHOD SUMMARY

URANIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Client Rocketdyne
Contract R44PJ294034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%)			
							1+3	2σ	2+3	2σ
Preparation batch 2781-104										
A4CM-95-0086	N504096-02		6112-002	U	U	U				
A4CM-95-0090	N504096-04		6112-004	1.8	U	1.4	129	48	9	9
A4CM-95-0092	N504096-06		6112-006	U	U	U				
A4CM-95-0095	N504096-08		6112-008	1.2	U	0.93	129	40	7	6
BLK (QC ID=23822)	N504096-10		6112-010	U	U	0.098 J				
LCS (QC ID=23821)	N504096-09		6112-009	ok	ok	ok				
Nominal values and limits from method				RDLs (pCi/L)	0.5	0.5	0.5	100	4	
								Averages 129	8	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MAX MDA L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-104 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 104																
A4CM-95-0086	N504096-02		0.09	0.200				59		1018			29	05/19/95	05/19	SS-029
A4CM-95-0090	N504096-04		0.2	0.200				21		1018			25	05/19/95	05/19	SS-041
A4CM-95-0092	N504096-06		0.2	0.200				54		1018			25	05/19/95	05/19	SS-042
A4CM-95-0095	N504096-08		0.2	0.200				50		1018			25	05/19/95	05/19	SS-030
BLK (QC ID=23822)	N504096-10		0.1	0.200				55		1018				05/19/95	05/19	SS-035
LCS (QC ID=23821)	N504096-09		0.6	0.200				61		1018				05/19/95	05/19	SS-028
Nominal values and limits from method				0.5	0.200			30-105		300	100	180				

PROCEDURES REFERENCE ASTM 3972-90
EP-040 Environmental Water Dissolution, rev 1
EP-910 Uranium Purification, rev 0
EP-008 Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD MDA 0.2 ± 0.4
FOR 6 SAMPLES YIELD 50 ± 29

OD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 26

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

METHOD SUMMARY

STRONTIUM, TOTAL IN WATER

BETA COUNTING

Test SR Matrix WATER

SDG 6112

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Strontium 90
------------------	------------------	-----------------	------------------	--------------

Preparation batch 2781-104

A4CM-95-0086	N504096-02	6112-002	U	
A4CM-95-0090	N504096-04	6112-004	U	
A4CM-95-0092	N504096-06	6112-006	U	
A4CM-95-0095	N504096-08	6112-008	0.20 J	
BLK (QC ID=23822)	N504096-10	6112-010	U	
LCS (QC ID=23821)	N504096-09	6112-009	ok	

Nominal values and limits from method	RDLs (pCi/L)	0.5
---------------------------------------	--------------	-----

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- %	YIELD %	BFF min	COUNT keV	FWHM keV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	----------	-------------	--------------	------------	------------	------------	--------------	-------------	---------------	------------------	---------------	----------

Preparation batch 2781-104 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 104

A4CM-95-0086	N504096-02	0.2	1.00				78	220				34	05/17/95	05/24	LBG-003
A4CM-95-0090	N504096-04	0.2	1.00				73	220				30	05/17/95	05/24	LBG-004
A4CM-95-0092	N504096-06	0.2	1.00				72	253				30	05/17/95	05/24	LBG-003
A4CM-95-0095	N504096-08	0.1	1.00				73	571				30	05/17/95	05/24	LBG-003
BLK (QC ID=23822)	N504096-10	0.1	1.00				79	571					05/17/95	05/24	LBG-004
LCS (QC ID=23821)	N504096-09	0.5	1.00				73	105					05/17/95	05/24	LBG-015

Nominal values and limits from method	0.5	1.00	200	180
---------------------------------------	-----	------	-----	-----

PROCEDURES	REFERENCE	HASL 300/SR-01,-02
EP-040	Environmental Water Dissolution, rev 1	
EP-500	Strontium-89,90 - Purification, rev 0	
EP-519	Strontium-89,90 Planchet Demounting and Yttrium Purification, rev 0	

AVERAGES ± 2 SD	MDA 0.2 ± 0.3
FOR 6 SAMPLES	YIELD 75 ± 6

MOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 27

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

Test GAM Matrix WATERSDG 6112Contact Italy E. Pittman

METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Client RocketdyneContract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cobalt 60	Cesium 137
------------------	------------------	-----------------	------------------	-----------	------------

Preparation batch 2781-104

A4CM-95-0086	N504096-02	6112-002	U	U
A4CM-95-0090	N504096-04	6112-004	U	U
A4CM-95-0092	N504096-06	6112-006	U	U
A4CM-95-0095	N504096-08	6112-008	U	U
BLK (QC ID=23822)	N504096-10	6112-010	U	U
LCS (QC ID=23821)	N504096-09	6112-009	No data U	ok

Nominal values and limits from method RDLs (pCi/L) 5

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	-----	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-104 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 104

A4CM-95-0086	N504096-02	7	1.00					514		20	05/10/95	05/10	02,01,00
A4CM-95-0090	N504096-04	6	1.00					514		16	05/10/95	05/10	MB,02,00
A4CM-95-0092	N504096-06	7	1.00					514		16	05/10/95	05/10	MB,03,00
A4CM-95-0095	N504096-08	3	1.00					514		16	05/10/95	05/10	02,04,00
BLK (QC ID=23822)	N504096-10	3	1.00					412			05/11/95	05/11	02,04,00
LCS (QC ID=23821)	N504096-09		1.00					412			05/11/95	05/11	MB,03,00

Nominal values and limits from method 5 1.00 400 180

PROCEDURES REFERENCE ASTM 3649-85; EPA 901.1
EP-100 Ge(Li) Preparation for Environmental Samples,
rev 0

AVERAGES ± 2 SD MDA 5 ± 4
FOR 5 SAMPLES YIELD ±

METHOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 28

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 06/06/95

TMA/RICHMOND

REPORTING GROUP 6112

METHOD SUMMARY

TRITIUM IN WATER

LIQUID SCINTILLATION

Test H Matrix WATER

SDG 6112

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
------------------	------------------	-----------------	------------------	---------

Preparation batch 2781-104

A4CM-95-0085	N504096-01	6112-001	U
A4CM-95-0089	N504096-03	6112-003	U
A4CM-95-0091	N504096-05	6112-005	U
A4CM-95-0094	N504096-07	6112-007	U
BLK (QC ID=23822)	N504096-10	6112-010	U
LCS (QC ID=23821)	N504096-09	6112-009	ok

Nominal values and limits from method RDLs (pCi/L) 500

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM keV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	----------	-------------	--------------	------------	------------	------------	--------------	-------------	---------------	------------------	---------------	----------

Preparation batch 2781-104 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 104

7 5-0085	N504096-01	300	0.0100	50	22	05/12/95	05/12	LSC-004
A 95-0089	N504096-03	300	0.0100	50	18	05/12/95	05/12	LSC-004
A4CM-95-0091	N504096-05	300	0.0100	50	18	05/12/95	05/12	LSC-004
A4CM-95-0094	N504096-07	300	0.0100	50	18	05/12/95	05/12	LSC-004
BLK (QC ID=23822)	N504096-10	300	0.0100	50	05/12/95	05/12	LSC-004	
LCS (QC ID=23821)	N504096-09	300	0.0100	50	05/12/95	05/12	LSC-004	

Nominal values and limits from method 500 0.0100 50 180

PROCEDURES	REFERENCE	EPA 906.0; ASTM 2476-81
	EP-210	Tritium in Water by Distillation, rev 0

AVERAGES ± 2 SD	MDA 300 ± 0
FOR 6 SAMPLES	YIELD ±

MOD SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 29

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/06/95

T M A / R I C H M O N D
REPORTING GROUP 6113

SDG 6113
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S

Sample Summaries		1
Prep Batch Summary		3
Work Summary		4
Method Blanks		9
Lab Control Samples		12
Duplicates		15
Data Sheets		17
Method Summaries		55
End of Section		66

Italy E. Pittman 6/14/95
Prepared by

ngv 6/15/95
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

SDG 6113

Contact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0070	SSFL AREA 4	SOIL		N504097-01			04/18/95
A4CM-95-0071	SSFL AREA 4	SOIL		N504097-02			04/18/95
A4CM-95-0072	SSFL AREA 4	SOIL		N504097-05			04/21/95
A4CM-95-0073	SSFL AREA 4	SOIL		N504097-06			04/21/95
A4CM-95-0074	SSFL AREA 4	SOIL		N504097-07			04/19/95
A4CM-95-0075	SSFL AREA 4	SOIL		N504097-08			04/19/95
A4CM-95-0076	SSFL AREA 4	SOIL		N504097-09			04/19/95
A4CM-95-0077	SSFL AREA 4	SOIL		N504097-10			04/19/95
A4CM-95-0078	SSFL AREA 4	SOIL		N504097-11			04/19/95
A4CM-95-0079	SSFL AREA 4	SOIL		N504097-12			04/20/95
A4CM-95-0080	SSFL AREA 4	SOIL		N504097-13			04/20/95
A4CM-95-0081	SSFL AREA 4	SOIL		N504097-14			04/20/95
A4CM-95-0082	SSFL AREA 4	SOIL		N504097-15			04/20/95
A4CM-95-0083	SSFL AREA 4	SOIL		N504097-16			04/20/95
A4CM-95-0084	SSFL AREA 4	SOIL		N504097-17			04/20/95
A4CM-95-0087	SSFL AREA 4	SOIL		N504097-03			04/21/95
A4CM-95-0088	SSFL AREA 4	SOIL		N504097-04			04/21/95
A4CM-95-0093	SSFL AREA 4	SOIL		N504097-18			04/24/95
95-0096	SSFL AREA 4	SOIL		N504097-19			04/24/95
Method Blank		SOIL		N504097-21			
Method Blank		SOIL		N504097-26			
Lab Control Sample		SOIL		N504097-20			
Lab Control Sample		SOIL		N504097-25			
Duplicate (N504097-11)	SSFL AREA 4	SOIL		N504097-22			04/19/95

LE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

SDG 6113

tact Italy E. Pittman

QC SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL. SAMPLE ID	DEPARTMENT SAMPLE ID
6113		A4CM-95-0070	SOIL	26.0			04/27/95 9	N504097-01	6113-001
		A4CM-95-0071	SOIL	14.8			04/27/95 9	N504097-02	6113-002
		A4CM-95-0072	SOIL	18.8			04/27/95 6	N504097-05	6113-005
		A4CM-95-0073	SOIL	20.2			04/27/95 6	N504097-06	6113-006
		A4CM-95-0074	SOIL	10.0			04/27/95 8	N504097-07	6113-007
		A4CM-95-0075	SOIL	14.7			04/27/95 8	N504097-08	6113-008
		A4CM-95-0076	SOIL	19.6			04/27/95 8	N504097-09	6113-009
		A4CM-95-0077	SOIL	16.7			04/27/95 8	N504097-10	6113-010
		A4CM-95-0078	SOIL	14.0			04/27/95 8	N504097-11	6113-011
		A4CM-95-0079	SOIL	13.2			04/27/95 7	N504097-12	6113-012
		A4CM-95-0080	SOIL	14.2			04/27/95 7	N504097-13	6113-013
		A4CM-95-0081	SOIL	12.6			04/27/95 7	N504097-14	6113-014
		A4CM-95-0082	SOIL	12.2			04/27/95 7	N504097-15	6113-015
		A4CM-95-0083	SOIL	17.0			04/27/95 7	N504097-16	6113-016
		A4CM-95-0084	SOIL	15.7			04/27/95 7	N504097-17	6113-017
		A4CM-95-0087	SOIL	16.6			04/27/95 6	N504097-03	6113-003
		A4CM-95-0088	SOIL	19.9			04/27/95 6	N504097-04	6113-004
		A4CM-95-0093	SOIL	45.4			04/27/95 3	N504097-18	6113-018
		A4CM-95-0096	SOIL	30.9			04/27/95 3	N504097-19	6113-019
		Method Blank	SOIL					N504097-21	6113-021
		Method Blank	SOIL					N504097-26	6113-026
		Lab Control Sample	SOIL					N504097-20	6113-020
		Lab Control Sample	SOIL					N504097-25	6113-025
		Duplicate (N504097-11)	SOIL				04/27/95 8	N504097-22	6113-022

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

SDG 6113

Contact Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED							QUALI-
			BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	FIERS
Alpha Spectroscopy												
PU	SOIL	Plutonium, Isotopic in Soil	2781-110	5.0	18			1	1	1/0		
			2781-110B	5.0	1			1	1	0/1		
TH	SOIL	Thorium, Isotopic in Soil	2781-110	5.0	19			1	1	1/1		
U	SOIL	Uranium, Isotopic in Soil	2781-110	5.0	19			1	1	1/1		
Beta Counting												
SR	SOIL	Strontium, Total in Soil	2781-110	10.0	19			1	1	1/1		
Gamma Spectroscopy												
GAM	SOIL	Gamma Scan	2781-110	15.0	19			1	1	1/1		
Liquid Scintillation												
H	SOIL	Tritium-Soil	2781-110	10.0	19			1	1	1/1		X

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

SDG 6113

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

WORK SUMMARY

CLIENT SAMPLE ID		LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED			SUF-						
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD		
A4CM-95-0070		N504097-01	6113-001	GAM		05/15/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/18/95	6113-001	H		05/12/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-001	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-001	SR		05/27/95	06/06/95	IEP	Strontium, Total in Soil		
			6113-001	TH		06/06/95	06/14/95	IEP	Thorium, Isotopic in Soil		
			6113-001	U		05/26/95	06/05/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0071		N504097-02	6113-002	GAM		05/15/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/18/95	6113-002	H		05/12/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-002	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-002	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-002	TH		05/26/95	06/06/95	IEP	Thorium, Isotopic in Soil		
			6113-002	U		05/26/95	06/05/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0072		N504097-05	6113-005	GAM		05/15/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/21/95	6113-005	H		05/13/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-005	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-005	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-005	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil		
			6113-005	U		05/30/95	06/05/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0073		N504097-06	6113-006	GAM		05/15/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/21/95	6113-006	H		05/13/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-006	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-006	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-006	TH		06/07/95	06/14/95	IEP	Thorium, Isotopic in Soil		
			6113-006	U		05/31/95	06/05/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0074		N504097-07	6113-007	GAM		05/15/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/19/95	6113-007	H		05/13/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-007	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-007	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-007	TH		06/05/95	06/06/95	IEP	Thorium, Isotopic in Soil		
			6113-007	U		05/30/95	06/05/95	IEP	Uranium, Isotopic in Soil		

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

SDG 6113

tact Italy E. Pittman

WORK SUMMARY, cont.

Client RocketdyneContract R44PJ294034044

CLIENT SAMPLE ID		LAB SAMPLE ID											
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD				
CUSTODY	SAS no	RECEIVED			FIX								
A4CM-95-0075		N504097-08	6113-008	GAM		05/15/95	06/14/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	04/19/95	6113-008	H		05/13/95	06/14/95	IEP	Tritium-Soil				
		04/27/95	6113-008	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil				
			6113-008	SR		05/27/95	06/06/95		Strontium, Total in Soil				
			6113-008	TH		06/07/95	06/14/95	IEP	Thorium, Isotopic in Soil				
			6113-008	U		05/30/95	06/05/95	IEP	Uranium, Isotopic in Soil				
A4CM-95-0076		N504097-09	6113-009	GAM		05/16/95	06/14/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	04/19/95	6113-009	H		05/13/95	06/14/95	IEP	Tritium-Soil				
		04/27/95	6113-009	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil				
			6113-009	SR		05/27/95	06/06/95		Strontium, Total in Soil				
			6113-009	TH		06/05/95	06/06/95	IEP	Thorium, Isotopic in Soil				
			6113-009	U		05/30/95	06/05/95	IEP	Uranium, Isotopic in Soil				
A4CM-95-0077		N504097-10	6113-010	GAM		05/16/95	06/14/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	04/19/95	6113-010	H		05/13/95	06/14/95	IEP	Tritium-Soil				
		04/27/95	6113-010	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil				
			6113-010	SR		05/27/95	06/06/95		Strontium, Total in Soil				
			6113-010	TH		06/05/95	06/06/95	IEP	Thorium, Isotopic in Soil				
			6113-010	U		05/30/95	06/05/95	IEP	Uranium, Isotopic in Soil				
A4CM-95-0078		N504097-11	6113-011	GAM		05/16/95	06/14/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	04/19/95	6113-011	H		05/13/95	06/14/95	IEP	Tritium-Soil				
		04/27/95	6113-011	PU	A1	06/13/95	06/14/95	IEP	Plutonium, Isotopic in Soil				
			6113-011	SR		05/27/95	06/06/95		Strontium, Total in Soil				
			6113-011	TH		06/05/95	06/06/95	IEP	Thorium, Isotopic in Soil				
			6113-011	U		05/30/95	06/05/95	IEP	Uranium, Isotopic in Soil				
A4CM-95-0079		N504097-12	6113-012	GAM		05/17/95	06/14/95	IEP	Gamma Scan				
SSFL AREA 4	SOIL	04/20/95	6113-012	H		05/13/95	06/14/95	IEP	Tritium-Soil				
		04/27/95	6113-012	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil				
			6113-012	SR		05/27/95	06/06/95		Strontium, Total in Soil				
			6113-012	TH		06/05/95	06/06/95	IEP	Thorium, Isotopic in Soil				
			6113-012	U		06/01/95	06/06/95	IEP	Uranium, Isotopic in Soil				

RK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 5

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CWSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

SDG 6113

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED			SUP-						
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD		
A4CM-95-0080		N504097-13	6113-013	GAM		05/17/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/20/95	6113-013	H		05/13/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-013	PU		05/25/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-013	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-013	TH		06/05/95	06/06/95	IEP	Thorium, Isotopic in Soil		
			6113-013	U		06/01/95	06/06/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0081		N504097-14	6113-014	GAM		05/17/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/20/95	6113-014	H		05/13/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-014	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-014	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-014	TH		06/05/95	06/06/95	IEP	Thorium, Isotopic in Soil		
			6113-014	U		05/31/95	06/05/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0082		N504097-15	6113-015	GAM		05/17/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/20/95	6113-015	H		05/13/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-015	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-015	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-015	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil		
			6113-015	U		05/31/95	06/05/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0083		N504097-16	6113-016	GAM		05/18/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/20/95	6113-016	H		05/13/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-016	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-016	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-016	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil		
			6113-016	U		05/31/95	06/05/95	IEP	Uranium, Isotopic in Soil		
A4CM-95-0084		N504097-17	6113-017	GAM		05/18/95	06/14/95	IEP	Gamma Scan		
SSFL AREA 4	SOIL	04/20/95	6113-017	H		05/13/95	06/14/95	IEP	Tritium-Soil		
		04/27/95	6113-017	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil		
			6113-017	SR		05/27/95	06/06/95		Strontium, Total in Soil		
			6113-017	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil		
			6113-017	U		06/01/95	06/06/95	IEP	Uranium, Isotopic in Soil		

RK SUMMARY

Page 3

SUMMARY DATA SECTION

Page 6

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

SDG 6113

tact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID		SUF-						
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
CUSTODY	SAS no	RECEIVED								
A4CM-95-0087		N504097-03	6113-003	GAM		05/15/95	06/14/95	IEP	Gamma Scan	
SSFL AREA 4	SOIL	04/21/95	6113-003	H		05/12/95	06/14/95	IEP	Tritium-Soil	
		04/27/95	6113-003	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil	
			6113-003	SR		05/27/95	06/06/95		Strontium, Total in Soil	
			6113-003	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil	
			6113-003	U		05/26/95	06/05/95	IEP	Uranium, Isotopic in Soil	
A4CM-95-0088		N504097-04	6113-004	GAM		05/15/95	06/14/95	IEP	Gamma Scan	
SSFL AREA 4	SOIL	04/21/95	6113-004	H		05/12/95	06/14/95	IEP	Tritium-Soil	
		04/27/95	6113-004	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil	
			6113-004	SR		05/27/95	06/06/95		Strontium, Total in Soil	
			6113-004	TH		06/05/95	06/06/95	IEP	Thorium, Isotopic in Soil	
			6113-004	U		05/26/95	06/05/95	IEP	Uranium, Isotopic in Soil	
A4CM-95-0093		N504097-18	6113-018	GAM		05/17/95	06/14/95	IEP	Gamma Scan	
SSFL AREA 4	SOIL	04/24/95	6113-018	H		05/13/95	06/14/95	IEP	Tritium-Soil	
		04/27/95	6113-018	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil	
			6113-018	SR		05/27/95	06/08/95		Strontium, Total in Soil	
			6113-018	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil	
			6113-018	U		06/01/95	06/06/95	IEP	Uranium, Isotopic in Soil	
A4CM-95-0096		N504097-19	6113-019	GAM		05/18/95	06/14/95	IEP	Gamma Scan	
SSFL AREA 4	SOIL	04/24/95	6113-019	H		05/13/95	06/14/95	IEP	Tritium-Soil	
		04/27/95	6113-019	PU		05/24/95	06/08/95	IEP	Plutonium, Isotopic in Soil	
			6113-019	SR		05/27/95	06/08/95		Strontium, Total in Soil	
			6113-019	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil	
			6113-019	U		06/07/95	06/14/95	IEP	Uranium, Isotopic in Soil	
Method Blank		N504097-21	6113-021	GAM		05/18/95	06/14/95	IEP	Gamma Scan	
	SOIL		6113-021	H		05/12/95	06/14/95	IEP	Tritium-Soil	
			6113-021	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil	
			6113-021	SR		05/27/95	06/06/95		Strontium, Total in Soil	
			6113-021	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil	
			6113-021	U		06/01/95	06/14/95	IEP	Uranium, Isotopic in Soil	
Method Blank		N504097-26	6113-026	PU		06/13/95	06/14/95	IEP	Plutonium, Isotopic in Soil	
	SOIL									

K SUMMARY

Page 4

SUMMARY DATA SECTION

Page 7

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

SDG 6113

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID							
LOCATION	MATRIX	COLLECTED		TEST	SUF-				
CUSTODY	SAS no	RECEIVED	PLANCHET		FIX	ANALYZED	REVIEWED	BY	METHOD
Lab Control Sample		N504097-20	6113-020	GAM		05/18/95	06/14/95	IEP	Gamma Scan
	SOIL		6113-020	H		05/12/95	06/14/95	IEP	Tritium-Soil
			6113-020	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil
			6113-020	SR		05/27/95	06/06/95		Strontium, Total in Soil
			6113-020	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil
			6113-020	U		05/26/95	06/05/95	IEP	Uranium, Isotopic in Soil
Lab Control Sample		N504097-25	6113-025	PU		06/13/95	06/14/95	IEP	Plutonium, Isotopic in Soil
	SOIL								
Duplicate (N504097-11)		N504097-22	6113-022	GAM		05/18/95	06/14/95	IEP	Gamma Scan
SSFL AREA 4	SOIL	04/19/95	6113-022	H		05/13/95	06/14/95	IEP	Tritium-Soil
		04/27/95	6113-022	PU		05/24/95	06/05/95	IEP	Plutonium, Isotopic in Soil
			6113-022	SR		05/27/95	06/14/95		Strontium, Total in Soil
			6113-022	TH		06/06/95	06/08/95	IEP	Thorium, Isotopic in Soil
			6113-022	U		06/01/95	06/06/95	IEP	Uranium, Isotopic in Soil

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
GAM		Gamma Scan		19			1	1	1		22
H		Tritium-Soil	EPA 906.0; ASTM 2476-81	19			1	1	1		22
PU		Plutonium, Isotopic in Soil	HASL 300/PU-02	19			2	2	1		24
SR		Strontium, Total in Soil	HASL 300/SR-01,-02	19			1	1	1		22
TH		Thorium, Isotopic in Soil		19			1	1	1		22
U		Uranium, Isotopic in Soil	HASL 300/U-04	19			1	1	1		22
TOTALS				114			7	7	6		134

WORK SUMMARY

Page 5

SUMMARY DATA SECTION

Page 8

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-21

METHOD BLANK

Method Blank

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-21

Client sample id Method Blank

Dept sample id 6113-021

Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-19	170	300	500	U	H
Strontium 90	10098-97-2	-0.032	0.054	0.05	0.5	U	SR
Thorium 228		0.014	0.028	0.05	0.1	U	TH
Thorium 230	14269-63-7	0.057	0.027	0.03	0.1	J	TH
Thorium 232	7740-29-1	0.002	0.009	0.02	0.1	U	TH
Uranium 233/234	11-08-5	0.005	0.005	0.008	0.01	U	U
Uranium 235	14117-96-1	0.003	0.003	0.006	0.01	U	U
Uranium 238	7440-61-1	0.003	0.003	0.005	0.01	U	U
Plutonium 238	13981-16-3	0.003	0.004	0.007	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.003	0.006	0.01	U	PU
MA SCAN ANALYTES		U					
Scandium 40		U		0.2		U	GAM
Chromium 51		U		0.05		U	GAM
Manganese 54		U		0.008		U	GAM
Cobalt 58		U		0.007		U	GAM
Iron 59		U		0.02		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.02		U	GAM
Niobium 94		U		0.007		U	GAM
Ruthenium 103		U		0.008		U	GAM
Ruthenium 106		U		0.07		U	GAM
Tin 113		U		0.009		U	GAM
Cesium 134		U		0.008		U	GAM
Cesium 137		U		0.009	0.02	U	GAM
Cerium 144		U		0.04		U	GAM
Europium 152		U		0.02		U	GAM
Europium 154		U		0.01		U	GAM
Europium 155		U		0.02		U	GAM
Radium 226		U		0.02		U	GAM
Thorium 232		U		0.04		U	GAM

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 9

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA / RICHMOND

REPORTING GROUP 6113

N504097-21

BLANK, cont.

Method Blank

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-21Client sample id Method BlankDept sample id 6113-021Material/Matrix SOIL

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504097-21	H	6113-021		0.0100 L	05/12/95	06/14/95	IEP
N504097-21	SR	6113-021		2.00 g	05/27/95	06/06/95	
N504097-21	TH	6113-021		1.00 g	06/06/95	06/08/95	IEP
N504097-21	U	6113-021		3.00 g	06/01/95	06/14/95	IEP
N504097-21	PU	6113-021		3.00 g	05/24/95	06/05/95	IEP
N504097-21	GAM	6113-021		850 g	05/18/95	06/14/95	IEP

QC-BLANK #23824

METHOD BLANKS

Page 2

SUMMARY DATA SECTION

Page 10

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-26

METHOD BLANK

Method Blank

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-26

Client sample id Method Blank

Dept sample id 6113-026

Material/Matrix SOIL

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.001	0.002	0.006	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.002	0.006	0.01	U	PU

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504097-26	PU	6113-026		3.00 g	06/13/95	06/14/95	IEP

QC-BLANK #24062

METHOD BLANKS

Page 3

SUMMARY DATA SECTION

Page 11

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

NS04097-20

LAB CONTROL SAMPLE, cont.

Lab Control Sample

SDG 6113

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id NS04097-20Client sample id Lab Control SampleDept sample id 6113-020Material/Matrix SOIL

TEST	PLANCHET	SUF-		ALIQOUT	PREP ERR			REVIEWED	BY
		FIX			2σ %	ANALYZED			
H	6113-020			0.0100 L	10.0	05/12/95	06/14/95	IEP	
SR	6113-020			2.00 g	10.0	05/27/95	06/06/95		
TH	6113-020			1.00 g	5.0	06/06/95	06/08/95	IEP	
U	6113-020			3.00 g	5.0	05/26/95	06/05/95	IEP	
PU	6113-020			3.00 g	5.0	05/24/95	06/05/95	IEP	
GAM	6113-020			850 g	15.0	05/18/95	06/14/95	IEP	

QC-LCS #23823

CONTROL SAMPLES

Page 2

SUMMARY DATA SECTION

Page 13

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-LCSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-25

Lab Control Sample

LAB CONTROL SAMPLE

SDG 6113

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504097-25

Client sample id Lab Control Sample

Dept sample id 6113-025

Material/Matrix SOIL

ANALYTE	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2 σ ERR pCi/g	REC %	3 σ LIMS (TOTAL)	PROTOCOL LIMITS
Plutonium 238	0.37	0.042	0.006	0.01		PU	0.347	0.014	107	79-121	
Plutonium 239/240	0.31	0.037	0.006	0.01		PU	0.309	0.012	100	80-120	

TEST	PLANCHET	SUF- FIX	ALIQUOT	PREP ERR 2 σ %	ANALYZED	REVIEWED	BY
PU	6113-025		3.00 g	5.0	06/13/95	06/14/95	IEP

QC-LCS #24061

CONTROL SAMPLES

Page 3

SUMMARY DATA SECTION

Page 14

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-22

A4CM-95-0078

DUPLICATE

SDG 6113

Contact Italy E. Pittman

DUPLICATE

ORIGINAL

Client RocketdyneContract R44PJZ94034044Lab sample id N504097-22Lab sample id N504097-11Client sample id A4CM-95-0078Dept sample id 6113-022Dept sample id 6113-011Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/19/95% moisture 14.0

Chain of custody id _____

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	66	400	700	500	U	H	-72	320	600	U	-		
Strontium 90	-0.003	0.045	0.04	0.5	U	SR	-0.015	0.063	0.09	U	-		
Thorium 228	1.4	0.14	0.06	0.1		TH	1.3	0.24	0.1		7	33	
Thorium 230	0.91	0.11	0.04	0.1	B	TH	1.1	0.20	0.08		19	36	
Thorium 232	1.2	0.13	0.03	0.1		TH	1.1	0.20	0.06		9	34	
Uranium 233/234	0.98	0.057	0.01	0.01		U	0.98	0.051	0.01		0	16	
Uranium 235	0.058	0.012	0.005	0.01		U	0.054	0.011	0.005		7	45	
Uranium 238	0.99	0.057	0.009	0.01		U	1.0	0.051	0.008		1	17	
Plutonium 238	0.001	0.003	0.006	0.01	U	PU	-0.001	0.003	0.008	U	-		
Plutonium 239/240	0.012	0.006	0.007	0.01		PU	0	0.001	0.005	U	200	153	
GAMMA SCAN ANALYTES													
Potassium 40	18	0.52				GAM	21	0.43			15	33	
Chromium 51	U		0.3		U	GAM	U		0.2	U	-		
Manganese 54	U		0.02		U	GAM	U		0.02	U	-		
Cobalt 58	U		0.03		U	GAM	U		0.02	U	-		
Iron 59	U		0.07		U	GAM	U		0.06	U	-		
Cobalt 60	U		0.02		U	GAM	U		0.02	U	-		
Zinc 65	U		0.06		U	GAM	U		0.04	U	-		
Niobium 94	U		0.02		U	GAM	U		0.01	U	-		
Ruthenium 103	U		0.03		U	GAM	U		0.02	U	-		
Ruthenium 106	U		0.2		U	GAM	U		0.1	U	-		
Tin 113	U		0.02		U	GAM	U		0.02	U	-		
Cesium 134	U		0.03		U	GAM	U		0.02	U	-		
Cesium 137	U		0.02	0.02	U	GAM	U		0.02	U	-		
Cerium 144	U		0.1		U	GAM	U		0.1	U	-		
Europium 152	U		0.04		U	GAM	U		0.04	U	-		
Europium 154	U		0.03		U	GAM	U		0.03	U	-		
Europium 155	U		0.09		U	GAM	U		0.1	U	-		

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 15

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-22

A4CM-95-0078

DUPLICATE, cont.

SDG 6113

Contact Italy E. Pittman

DUPLICATE

Lab sample id N504097-22

Dept sample id 6113-022

Client Rocketdyne

Contract R44PJZ94034044

ORIGINAL

Lab sample id N504097-11

Dept sample id 6113-011

Received 04/27/95

* moisture 14.0

Client sample id A4CM-95-0078

Location/Matrix SSFL AREA 4 SOIL

Collected 04/19/95

Chain of custody id

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Radium 226	0.55	0.048				GAM	0.72	0.036			27	35	
Thorium 232	1.2	0.11				GAM	1.2	0.072			0	36	

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	6113-022		0.00420	05/13/95	06/14/95 IEP	6113-011		0.00510 L	05/13/95	06/14/95 IEP
SR	6113-022		2.00	05/27/95	06/14/95	6113-011		2.00 g	05/27/95	06/06/95
TH	6113-022		1.00	06/06/95	06/08/95 IEP	6113-011		1.00 g	06/05/95	06/06/95 IEP
U	6113-022		3.00	06/01/95	06/06/95 IEP	6113-011		3.00 g	05/30/95	06/05/95 IEP
PU	6113-022		3.00	05/24/95	06/05/95 IEP	6113-011	A1	3.15 g	06/13/95	06/14/95 IEP
GAM	6113-022		186	05/18/95	06/14/95 IEP	6113-011		751 g	05/16/95	06/14/95 IEP

QC-DUP#11 23825

DUPLICATES

Page 2

SUMMARY DATA SECTION

Page 16

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-01

DATA SHEET

A4CM-95-0070

SDG 6113

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-01Client sample id A4CM-95-0070Dept sample id 6113-001Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/18/95% moisture 26.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-35	250	400	500	U	H
Strontium 90	10098-97-2	-0.016	0.059	0.09	0.5	U	SR
Thorium 228		1.2	0.14	0.07	0.1		TH
Thorium 230	14269-63-7	0.68	0.095	0.03	0.1	B	TH
Thorium 232	7740-29-1	0.79	0.10	0.02	0.1		TH
Uranium 233/234	11-08-5	0.68	0.049	0.009	0.01		U
Uranium 235	14117-96-1	0.023	0.009	0.006	0.01		U
Uranium 238	7440-61-1	0.59	0.044	0.007	0.01		U
Plutonium 238	13981-16-3	0.001	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.003	0.006	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Beryllium 7		0.44	0.26				GAM
Potassium 40		21	0.64				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.09		U	GAM
Cobalt 60		0.039	0.026				GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.03	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

ATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 17

TMA/RICHMOND

REPORTING GROUP 6113

N504097-01

A4CM-95-0070

DATA SHEET, cont

SDG 6113
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504097-01Client sample id A4CM-95-0070Dept sample id 6113-001Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/18/95% moisture 26.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Europium 155		U		0.09		U	GAM
Radium 226		0.58	0.053				GAM
Thorium 232		1.3	0.14				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N504097-01	H	6113-001		0.00780 L	05/12/95	06/14/95	IEP
N504097-01	SR	6113-001		2.00 g	05/27/95	06/06/95	IEP
N504097-01	TH	6113-001		1.00 g	06/06/95	06/14/95	IEP
N504097-01	U	6113-001		3.00 g	05/26/95	06/05/95	IEP
N504097-01	PU	6113-001		3.00 g	05/24/95	06/05/95	IEP
N504097-01	GAM	6113-001		751 g	05/15/95	06/14/95	IEP

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 18

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-02

A4CM-95-0071

DATA SHEET

SDG 6113

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-02Client sample id A4CM-95-0071Dept sample id 6113-002Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/18/95% moisture 14.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-53	470	800	500	U	H
Strontium 90	10098-97-2	0.031	0.052	0.09	0.5	U	SR
Thorium 228		0.82	0.11	0.05	0.1		TH
Thorium 230	14269-63-7	0.68	0.10	0.03	0.1	B	TH
Thorium 232	7740-29-1	0.64	0.093	0.02	0.1		TH
Uranium 233/234	11-08-5	0.54	0.039	0.009	0.01		U
Uranium 235	14117-96-1	0.035	0.010	0.005	0.01		U
Uranium 238	7440-61-1	0.55	0.039	0.008	0.01		U
Polonium 238	13981-16-3	0.001	0.006	0.01	0.01	U	PU
Polonium 239/240	10-12-8	0.005	0.004	0.005	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.64				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.069	0.029		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.1		U	GAM

ATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 19

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-02

A4CM-95-0071

DATA SHEET, cont

SDG <u>6113</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504097-02</u>	Client sample id <u>A4CM-95-0071</u>
Dept sample id <u>6113-002</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/27/95</u>	Collected <u>04/18/95</u>
% moisture <u>14.8</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.55	0.051				GAM
Thorium 232		0.92	0.11				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-02	H	6113-002		0.00340 L	05/12/95	06/14/95	IEP
4097-02	SR	6113-002		2.00 g	05/27/95	06/06/95	
N504097-02	TH	6113-002		1.00 g	05/26/95	06/06/95	IEP
N504097-02	U	6113-002		3.00 g	05/26/95	06/05/95	IEP
N504097-02	PU	6113-002		3.00 g	05/24/95	06/05/95	IEP
N504097-02	GAM	6113-002		750 g	05/15/95	06/14/95	IEP

TMA/RICHMOND

REPORTING GROUP 6113

N504097-05

A4CM-95-0072

DATA SHEET

SDG 6113

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504097-05

Client sample id A4CM-95-0072

Dept sample id 6113-005

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/21/95

% moisture 18.8

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-22	190	300	500	U	H
Strontium 90	10098-97-2	0.004	0.043	0.04	0.5	U	SR
Thorium 228		0.85	0.18	0.2	0.1		TH
Thorium 230	14269-63-7	0.94	0.17	0.08	0.1		TH
Thorium 232	7740-29-1	0.59	0.14	0.06	0.1		TH
Uranium 233/234	11-08-5	0.60	0.039	0.008	0.01		U
Uranium 235	14117-96-1	0.027	0.008	0.004	0.01		U
Uranium 238	7440-61-1	0.58	0.038	0.006	0.01		U
Plutonium 238	13981-16-3	0	0.005	0.009	0.01	U	PU
Plutonium 239/240	10-12-8	0.009	0.005	0.005	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Beryllium 7		0.50	0.16				GAM
Potassium 40		22	0.42				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.06		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.05		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.12	0.018		0.02		GAM
Europium 152		U		0.03		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.07		U	GAM

ATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 21

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-05

A4CM-95-0072

DATA SHEET, cont

SDG 6113Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-05Client sample id A4CM-95-0072Dept sample id 6113-005Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/21/95% moisture 18.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.60	0.034				GAM
Thorium 232		1.2	0.080				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-05	H	6113-005		0.00820 L	05/13/95	06/14/95	IEP
4097-05	SR	6113-005		2.00 g	05/27/95	06/06/95	
N504097-05	TH	6113-005		1.00 g	06/06/95	06/08/95	IEP
N504097-05	U	6113-005		3.00 g	05/30/95	06/05/95	IEP
N504097-05	PU	6113-005		3.00 g	05/24/95	06/05/95	IEP
N504097-05	GAM	6113-005		751 g	05/15/95	06/14/95	IEP

DATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 22

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA / RICHMOND

REPORTING GROUP 6113

N504097-06

A4CM-95-0073

DATA SHEET

SDG 6113

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-06Client sample id A4CM-95-0073Dept sample id 6113-006Location/Matrix SSFL AREA 4SOILReceived 04/27/95Collected 04/21/95% moisture 20.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-28	160	300	500	U	H
Strontium 90	10098-97-2	-0.003	0.066	0.1	0.5	U	SR
Thorium 228		1.1	0.11	0.04	0.1		TH
Thorium 230	14269-63-7	0.72	0.081	0.02	0.1	B	TH
Thorium 232	7740-29-1	0.94	0.096	0.02	0.1		TH
Uranium 233/234	11-08-5	0.98	0.057	0.01	0.01		U
Uranium 235	14117-96-1	0.056	0.013	0.005	0.01		U
Uranium 238	7440-61-1	0.74	0.047	0.009	0.01		U
Plutonium 238	13981-16-3	0	0.002	0.004	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.002	0.004	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.40				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.23	0.020		0.02		GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 23

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-06

A4CM-95-0073

DATA SHEET, cont

SDG <u>6113</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504097-06</u>	Client sample id <u>A4CM-95-0073</u>
Dept sample id <u>6113-006</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/27/95</u>	Collected <u>04/21/95</u>
% moisture <u>20.2</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.61	0.032				GAM
Thorium 232		1.1	0.075				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-06	H	6113-006		0.0100 L	05/13/95	06/14/95	IEP
4097-06	SR	6113-006		2.00 g	05/27/95	06/06/95	
N504097-06	TH	6113-006		1.00 g	06/07/95	06/14/95	IEP
N504097-06	U	6113-006		3.00 g	05/31/95	06/05/95	IEP
N504097-06	PU	6113-006		3.00 g	05/24/95	06/05/95	IEP
N504097-06	GAM	6113-006		750 g	05/15/95	06/14/95	IEP

ATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 24

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-07

A4CM-95-0074

DATA SHEET

SDG 6113Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-07Client sample id A4CM-95-0074Dept sample id 6113-007Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/19/95% moisture 10.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		160	520	900	500	U	H
Strontium 90	10098-97-2	0.034	0.067	0.06	0.5	U	SR
Thorium 228		1.3	0.14	0.07	0.1		TH
Thorium 230	14269-63-7	1.1	0.13	0.03	0.1	B	TH
Thorium 232	7740-29-1	1.2	0.13	0.03	0.1		TH
Uranium 233/234	11-08-5	1.1	0.056	0.009	0.01		U
Uranium 235	14117-96-1	0.048	0.011	0.004	0.01		U
Uranium 238	7440-61-1	1.0	0.054	0.007	0.01		U
Plutonium 238	13981-16-3	0.004	0.003	0.004	0.01	J	PU
Plutonium 239/240	10-12-8	0.15	0.018	0.003	0.01		PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.41				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.05		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.071	0.013		0.02		GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.03		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.1		U	GAM

DATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 25

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-07

A4CM-95-0074

DATA SHEET, cont

SDG <u>6113</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504097-07</u>	Client sample id <u>A4CM-95-0074</u>
Dept sample id <u>6113-007</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/27/95</u>	Collected <u>04/19/95</u>
% moisture <u>10.0</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.77	0.039				GAM
Thorium 232		1.2	0.084				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-07	H	6113-007		0.00320 L	05/13/95	06/14/95	IEP
4097-07	SR	6113-007		2.00 g	05/27/95	06/06/95	
N504097-07	TH	6113-007		1.00 g	06/05/95	06/06/95	IEP
N504097-07	U	6113-007		3.00 g	05/30/95	06/05/95	IEP
N504097-07	PU	6113-007		3.00 g	05/24/95	06/05/95	IEP
N504097-07	GAM	6113-007		750 g	05/15/95	06/14/95	IEP

ATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 26

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-08

DATA SHEET

A4CM-95-0075

SDG 6113Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-08Client sample id A4CM-95-0075Dept sample id 6113-008Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/19/95% moisture 14.7

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		68	350	600	500	U	H
Strontium 90	10098-97-2	0.022	0.042	0.05	0.5	U	SR
Thorium 228		1.3	0.12	0.04	0.1		TH
Thorium 230	14269-63-7	1.1	0.10	0.02	0.1	B	TH
Thorium 232	7740-29-1	1.2	0.11	0.02	0.1		TH
Uranium 233/234	11-08-5	0.72	0.043	0.01	0.01		U
Uranium 235	14117-96-1	0.042	0.010	0.004	0.01		U
Uranium 238	7440-61-1	0.78	0.045	0.007	0.01		U
Plutonium 238	13981-16-3	0.003	0.003	0.005	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.002	0.004	0.01	U	PU
GAMMA SCAN ANALYTES							
Potassium 40		21	0.26				GAM
Chromium 51		U		0.1		U	GAM
Manganese 54		U		0.01		U	GAM
Cobalt 58		U		0.01		U	GAM
Iron 59		U		0.03		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.03		U	GAM
Niobium 94		U		0.008		U	GAM
Ruthenium 103		U		0.01		U	GAM
Ruthenium 106		U		0.08		U	GAM
Tin 113		U		0.01		U	GAM
Cesium 134		U		0.01		U	GAM
Cesium 137		0.056	0.011		0.02		GAM
Cerium 144		U		0.06		U	GAM
Europium 152		U		0.02		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.05		U	GAM

DATA SHEETS

Page 11

SUMMARY DATA SECTION

Page 27

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-08

A4CM-95-0075

DATA SHEET, cont

SDG 6113
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504097-08
Dept sample id 6113-008
Received 04/27/95
% moisture 14.7Client sample id A4CM-95-0075
Location/Matrix SSFL AREA 4 SOIL
Collected 04/19/95
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.68	0.022				GAM
Thorium 232		1.2	0.049				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-08	H	6113-008		0.00460 L	05/13/95	06/14/95	IEP
4097-08	SR	6113-008		2.00 g	05/27/95	06/06/95	
N504097-08	TH	6113-008		1.00 g	06/07/95	06/14/95	IEP
N504097-08	U	6113-008		3.00 g	05/30/95	06/05/95	IEP
N504097-08	PU	6113-008		3.00 g	05/24/95	06/05/95	IEP
N504097-08	GAM	6113-008		750 g	05/15/95	06/14/95	IEP

DATA SHEETS

Page 12

SUMMARY DATA SECTION

Page 28

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-09

A4CM-95-0076

DATA SHEET

SDG 6113

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504097-09

Client sample id A4CM-95-0076

Dept sample id 6113-009

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/19/95

% moisture 19.6

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		8500	430	500	500		H
Strontium 90	10098-97-2	0.020	0.047	0.07	0.5	U	SR
Thorium 228		1.3	0.16	0.09	0.1		TH
Thorium 230	14269-63-7	1.0	0.14	0.03	0.1	B	TH
Thorium 232	7740-29-1	1.2	0.15	0.03	0.1		TH
Uranium 233/234	11-08-5	0.80	0.043	0.009	0.01		U
Uranium 235	14117-96-1	0.048	0.010	0.004	0.01		U
Uranium 238	7440-61-1	0.78	0.043	0.007	0.01		U
Polonium 238	13981-16-3	0.001	0.003	0.005	0.01	U	PU
Polonium 239/240	10-12-8	0.006	0.003	0.004	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.67				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.09		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.08		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.04		U	GAM
Cesium 137		0.11	0.022		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 13

SUMMARY DATA SECTION

Page 29

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-09

A4CM-95-0076

DATA SHEET, cont

SDG <u>6113</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504097-09</u>	Client sample id <u>A4CM-95-0076</u>
Dept sample id <u>6113-009</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/27/95</u>	Collected <u>04/19/95</u>
% moisture <u>19.6</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.76	0.060				GAM
Thorium 232		1.3	0.14				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
4097-09	H	6113-009		0.00570 L	05/13/95	06/14/95	IEP
4097-09	SR	6113-009		2.00 g	05/27/95	06/06/95	
N504097-09	TH	6113-009		1.00 g	06/05/95	06/06/95	IEP
N504097-09	U	6113-009		3.00 g	05/30/95	06/05/95	IEP
N504097-09	PU	6113-009		3.00 g	05/24/95	06/05/95	IEP
N504097-09	GAM	6113-009		751 g	05/16/95	06/14/95	IEP

ATA SHEETS

Page 14

SUMMARY DATA SECTION

Page 30

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-10

DATA SHEET

A4CM-95-0077

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-10Client sample id A4CM-95-0077Dept sample id 6113-010Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/19/95% moisture 16.7

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-160	270	500	500	U	H
Strontium 90	10098-97-2	0.016	0.052	0.08	0.5	U	SR
Thorium 228		1.2	0.15	0.07	0.1		TH
Thorium 230	14269-63-7	1.3	0.15	0.03	0.1	B	TH
Thorium 232	7740-29-1	1.1	0.13	0.03	0.1		TH
Uranium 233/234	11-08-5	1.3	0.063	0.01	0.01		U
Uranium 235	14117-96-1	0.070	0.013	0.004	0.01		U
Uranium 238	7440-61-1	1.3	0.062	0.008	0.01		U
Plutonium 238	13981-16-3	-0.004	0.004	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	-0.001	0.001	0.007	0.01	U	PU
GAMMA SCAN ANALYTES							
Potassium 40		19	0.66				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.1		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.08		U	GAM
Niobium 94		U		0.03		U	GAM
Ruthenium 103		U		0.04		U	GAM
Ruthenium 106		U		0.3		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.04		U	GAM
Cesium 137		U		0.03	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 15

SUMMARY DATA SECTION

Page 31

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-10

A4CM-95-0077

DATA SHEET, cont

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-10

Client sample id A4CM-95-0077

Dept sample id 6113-010

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/19/95

% moisture 16.7

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.73	0.066				GAM
Thorium 232		1.3	0.13				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
4097-10	H	6113-010		0.00570 L	05/13/95	06/14/95	IEP
04097-10	SR	6113-010		2.00 g	05/27/95	06/06/95	
N504097-10	TH	6113-010		1.00 g	06/05/95	06/06/95	IEP
N504097-10	U	6113-010		3.00 g	05/30/95	06/05/95	IEP
N504097-10	PU	6113-010		3.00 g	05/24/95	06/05/95	IEP
N504097-10	GAM	6113-010		750 g	05/16/95	06/14/95	IEP

DATA SHEETS

Page 16

SUMMARY DATA SECTION

Page 32

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-11

A4CM-95-0078

DATA SHEET

SDG 6113

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-11Client sample id A4CM-95-0078Dept sample id 6113-011Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/19/95% moisture 14.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-72	320	600	500	U	H
Strontium 90	10098-97-2	-0.015	0.063	0.09	0.5	U	SR
Thorium 228		1.3	0.24	0.1	0.1		TH
Thorium 230	14269-63-7	1.1	0.20	0.08	0.1		TH
Thorium 232	7740-29-1	1.1	0.20	0.06	0.1		TH
Uranium 233/234	11-08-5	0.98	0.051	0.01	0.01		U
Uranium 235	14117-96-1	0.054	0.011	0.005	0.01		U
Uranium 238	7440-61-1	1.0	0.051	0.008	0.01		U
Plutonium 238	13981-16-3	-0.001	0.003	0.008	0.01	U	PU
Plutonium 239/240	10-12-8	0	0.001	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		21	0.43				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.06		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.1		U	GAM

DATA SHEETS

Page 17

SUMMARY DATA SECTION

Page 33

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-11

A4CM-95-0078

DATA SHEET, cont

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-11Client sample id A4CM-95-0078Dept sample id 6113-011Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/19/95% moisture 14.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.72	0.036				GAM
Thorium 232		1.2	0.072				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-11	H	6113-011		0.00510 L	05/13/95	06/14/95	IEP
4097-11	SR	6113-011		2.00 g	05/27/95	06/06/95	
N504097-11	TH	6113-011		1.00 g	06/05/95	06/06/95	IEP
N504097-11	U	6113-011		3.00 g	05/30/95	06/05/95	IEP
N504097-11	PU	6113-011	A1	3.15 g	06/13/95	06/14/95	IEP
N504097-11	GAM	6113-011		751 g	05/16/95	06/14/95	IEP

DATA SHEETS

Page 18

SUMMARY DATA SECTION

Page 34

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-12

DATA SHEET

A4CM-95-0079

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-12

Client sample id A4CM-95-0079

Dept sample id 6113-012

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/20/95

% moisture 13.2

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-150	480	800	500	U	H
Strontium 90	10098-97-2	0.029	0.049	0.08	0.5	U	SR
Thorium 228		1.4	0.15	0.06	0.1		TH
Thorium 230	14269-63-7	1.0	0.13	0.04	0.1	B	TH
Thorium 232	7740-29-1	1.3	0.14	0.03	0.1		TH
Uranium 233/234	11-08-5	0.84	0.054	0.01	0.01		U
Uranium 235	14117-96-1	0.058	0.012	0.005	0.01		U
Uranium 238	7440-61-1	0.82	0.052	0.01	0.01		U
Plutonium 238	13981-16-3	0	0.002	0.005	0.01	U	PU
Plutonium 239/240	10-12-8	0	0.002	0.003	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		23	0.43				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.30	0.016		0.02		GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 19

SUMMARY DATA SECTION

Page 35

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-12

A4CM-95-0079

DATA SHEET, cont

SDG 6113Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-12Client sample id A4CM-95-0079Dept sample id 6113-012Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 13.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.78	0.038				GAM
Thorium 232		1.3	0.079				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504097-12	H	6113-012		0.00340 L	05/13/95	06/14/95	IEP
N504097-12	SR	6113-012		2.00 g	05/27/95	06/06/95	
N504097-12	TH	6113-012		1.00 g	06/05/95	06/06/95	IEP
N504097-12	U	6113-012		3.00 g	06/01/95	06/06/95	IEP
N504097-12	PU	6113-012		3.00 g	05/24/95	06/05/95	IEP
N504097-12	GAM	6113-012		750 g	05/17/95	06/14/95	IEP

ATA SHEETS

Page 20

SUMMARY DATA SECTION

Page 36

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-13

DATA SHEET

A4CM-95-0080

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-13

Client sample id A4CM-95-0080

Dept sample id 6113-013

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/20/95

% moisture 14.2

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-200	430	800	500	U	H
Strontium 90	10098-97-2	0.033	0.048	0.07	0.5	U	SR
Thorium 228		1.3	0.13	0.04	0.1		TH
Thorium 230	14269-63-7	0.87	0.11	0.02	0.1	B	TH
Thorium 232	7740-29-1	1.3	0.13	0.02	0.1		TH
Uranium 233/234	11-08-5	1.0	0.059	0.01	0.01		U
Uranium 235	14117-96-1	0.059	0.013	0.005	0.01		U
Uranium 238	7440-61-1	0.96	0.057	0.009	0.01		U
Plutonium 238	13981-16-3	0	0.001	0.003	0.01	U	PU
Plutonium 239/240	10-12-8	0.010	0.004	0.003	0.01		PU
GAMMA SCAN ANALYTES							
Potassium 40		23	0.62				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.08		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.098	0.033		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 21

SUMMARY DATA SECTION

Page 37

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA / RICHMOND

REPORTING GROUP 6113

N504097-13

DATA SHEET, cont

A4CM-95-0080

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-13Client sample id A4CM-95-0080Dept sample id 6113-013Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 14.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.90	0.057				GAM
Thorium 232		1.4	0.12				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-13	H	6113-013		0.00370 L	05/13/95	06/14/95	IEP
4097-13	SR	6113-013		2.00 g	05/27/95	06/06/95	
N504097-13	TH	6113-013		1.00 g	06/05/95	06/06/95	IEP
N504097-13	U	6113-013		3.00 g	06/01/95	06/06/95	IEP
N504097-13	PU	6113-013		3.00 g	05/25/95	06/05/95	IEP
N504097-13	GAM	6113-013		751 g	05/17/95	06/14/95	IEP

DATA SHEETS

Page 22

SUMMARY DATA SECTION

Page 38

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA / RICHMOND

REPORTING GROUP 6113

N504097-14

A4CM-95-0081

DATA SHEET

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-14Client sample id A4CM-95-0081Dept sample id 6113-014Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 12.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		25	450	800	500	U	H
Strontium 90	10098-97-2	0.053	0.057	0.07	0.5	U	SR
Thorium 228		1.3	0.14	0.07	0.1		TH
Thorium 230	14269-63-7	1.0	0.12	0.04	0.1	B	TH
Thorium 232	7740-29-1	1.3	0.14	0.03	0.1		TH
Uranium 233/234	11-08-5	0.97	0.056	0.01	0.01		U
Uranium 235	14117-96-1	0.061	0.012	0.005	0.01		U
Uranium 238	7440-61-1	0.89	0.053	0.009	0.01		U
Plutonium 238	13981-16-3	0	0.002	0.005	0.01	U	PU
Plutonium 239/240	10-12-8	0.005	0.003	0.003	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		22	0.42				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.05		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.087	0.018		0.02		GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.1		U	GAM

DATA SHEETS

Page 23

SUMMARY DATA SECTION

Page 39

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-14

A4CM-95-0081

DATA SHEET, cont

SDG <u>6113</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504097-14</u>	Client sample id <u>A4CM-95-0081</u>
Dept sample id <u>6113-014</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/27/95</u>	Collected <u>04/20/95</u>
% moisture <u>12.6</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.78	0.036				GAM
Thorium 232		1.3	0.086				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALiquot	ANALYZED	REVIEWED	BY
04097-14	H	6113-014		0.00370 L	05/13/95	06/14/95	IEP
04097-14	SR	6113-014		2.00 g	05/27/95	06/06/95	
N504097-14	TH	6113-014		1.00 g	06/05/95	06/06/95	IEP
N504097-14	U	6113-014		3.00 g	05/31/95	06/05/95	IEP
N504097-14	PU	6113-014		3.00 g	05/24/95	06/05/95	IEP
N504097-14	GAM	6113-014		750 g	05/17/95	06/14/95	IEP

DATA SHEETS

Page 24

SUMMARY DATA SECTION

Page 40

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-15

A4CM-95-0082

DATA SHEET

SDG 6113Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-15Client sample id A4CM-95-0082Dept sample id 6113-015Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 12.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-290	530	<u>900</u>	500	U	H
Strontium 90	10098-97-2	0.021	0.051	0.09	0.5	U	SR
Thorium 228		1.4	0.14	0.07	0.1		TH
Thorium 230	14269-63-7	1.3	0.13	0.03	0.1	B	TH
Thorium 232	7740-29-1	1.2	0.13	0.02	0.1		TH
Uranium 233/234	11-08-5	0.98	0.060	0.01	0.01		U
Uranium 235	14117-96-1	0.052	0.013	0.005	0.01		U
Uranium 238	7440-61-1	0.90	0.057	0.009	0.01		U
tonium 238	13981-16-3	0	0.001	0.003	0.01	U	PU
tonium 239/240	10-12-8	0	0.002	0.004	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		23	0.68				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.1		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.09		U	GAM
Niobium 94		U		0.03		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		0.032	0.030				GAM
Cesium 137		0.088	0.030		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 25

SUMMARY DATA SECTION

Page 41

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-15

A4CM-95-0082

DATA SHEET, cont

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-15Client sample id A4CM-95-0082Dept sample id 6113-015Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 12.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.91	0.064				GAM
Thorium 232		1.2	0.14				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
04097-15	H	6113-015		0.00300 L	05/13/95	06/14/95	IEP
04097-15	SR	6113-015		2.00 g	05/27/95	06/06/95	
N504097-15	TH	6113-015		1.00 g	06/06/95	06/08/95	IEP
N504097-15	U	6113-015		3.00 g	05/31/95	06/05/95	IEP
N504097-15	PU	6113-015		3.00 g	05/24/95	06/05/95	IEP
N504097-15	GAM	6113-015		751 g	05/17/95	06/14/95	IEP

DATA SHEETS

Page 26

SUMMARY DATA SECTION

Page 42

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-16

DATA SHEET

A4CM-95-0083

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-16

Client sample id A4CM-95-0083

Dept sample id 6113-016

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/20/95

% moisture 17.0

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0	330	600	500	U	H
Strontium 90	10098-97-2	0.003	0.062	0.09	0.5	U	SR
Thorium 228		1.5	0.13	0.06	0.1		TH
Thorium 230	14269-63-7	1.1	0.11	0.02	0.1	B	TH
Thorium 232	7740-29-1	1.3	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	0.81	0.060	0.02	0.01		U
Uranium 235	14117-96-1	0.050	0.014	0.008	0.01		U
Uranium 238	7440-61-1	0.82	0.060	0.01	0.01		U
Plutonium 238	13981-16-3	0.001	0.001	0.004	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.003	0.005	0.01	U	PU
GAMMA SCAN ANALYTES							
Potassium 40		18	0.58				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.08		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.03	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.09		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

DATA SHEETS

Page 27

SUMMARY DATA SECTION

Page 43

TMA/RICHMOND

REPORTING GROUP 6113

N504097-16

A4CM-95-0083

DATA SHEET, cont

SDG 6113

Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-16Client sample id A4CM-95-0083Dept sample id 6113-016Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 17.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.73	0.054				GAM
Thorium 232		1.2	0.12				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-16	H	6113-016		0.00520 L	05/13/95	06/14/95	IEP
04097-16	SR	6113-016		2.00 g	05/27/95	06/06/95	
N504097-16	TH	6113-016		1.00 g	06/06/95	06/08/95	IEP
N504097-16	U	6113-016		3.00 g	05/31/95	06/05/95	IEP
N504097-16	PU	6113-016		3.00 g	05/24/95	06/05/95	IEP
N504097-16	GAM	6113-016		751 g	05/18/95	06/14/95	IEP

DATA SHEETS

Page 28

SUMMARY DATA SECTION

Page 44

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-17

A4CM-95-0084

DATA SHEET

SDG 6113

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504097-17

Client sample id A4CM-95-0084

Dept sample id 6113-017

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/20/95

% moisture 15.7

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0	500	900	500	U	H
Strontium 90	10098-97-2	-0.004	0.047	0.07	0.5	U	SR
Thorium 228		1.1	0.099	0.05	0.1		TH
Thorium 230	14269-63-7	0.92	0.086	0.02	0.1	B	TH
Thorium 232	7740-29-1	1.1	0.095	0.01	0.1		TH
Uranium 233/234	11-08-5	0.83	0.051	0.01	0.01		U
Uranium 235	14117-96-1	0.043	0.011	0.005	0.01		U
Uranium 238	7440-61-1	0.81	0.049	0.008	0.01		U
Plutonium 238	13981-16-3	0.001	0.003	0.008	0.01	U	PU
Plutonium 239/240	10-12-8	0.003	0.003	0.007	0.01	U	PU
GAMMA SCAN ANALYTES							
Potassium 40		18	0.59				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.09		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.08		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.04		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		U		0.03	0.02	U	GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 29

SUMMARY DATA SECTION

Page 45

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA / RICHMOND

REPORTING GROUP 6113

N504097-17

A4CM-95-0084

DATA SHEET, cont

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-17Client sample id A4CM-95-0084Dept sample id 6113-017Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 15.7

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.78	0.053				GAM
Thorium 232		1.3	0.14				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-17	H	6113-017		0.00340 L	05/13/95	06/14/95	IEP
4097-17	SR	6113-017		2.00 g	05/27/95	06/06/95	
N504097-17	TH	6113-017		1.00 g	06/06/95	06/08/95	IEP
N504097-17	U	6113-017		3.00 g	06/01/95	06/06/95	IEP
N504097-17	PU	6113-017		3.00 g	05/24/95	06/05/95	IEP
N504097-17	GAM	6113-017		750 g	05/18/95	06/14/95	IEP

DATA SHEETS

Page 30

SUMMARY DATA SECTION

Page 46

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-03

A4CM-95-0087

DATA SHEET

SDG 6113Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-03Client sample id A4CM-95-0087Dept sample id 6113-003Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/21/95% moisture 16.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-110	500	900	500	U	H
Strontium 90	10098-97-2	0.036	0.041	0.04	0.5	U	SR
Thorium 228		1.3	0.19	0.08	0.1		TH
Thorium 230	14269-63-7	0.99	0.16	0.04	0.1	B	TH
Thorium 232	7740-29-1	1.3	0.19	0.04	0.1		TH
Uranium 233/234	11-08-5	0.95	0.056	0.01	0.01		U
Uranium 235	14117-96-1	0.076	0.014	0.005	0.01		U
Uranium 238	7440-61-1	0.81	0.050	0.01	0.01		U
Plutonium 238	13981-16-3	0.003	0.006	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.003	0.006	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.61				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.09		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.07		U	GAM
Niobium 94		U		0.03		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.031	0.028		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.08		U	GAM

DATA SHEETS

Page 31

SUMMARY DATA SECTION

Page 47

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-03

A4CM-95-0087

DATA SHEET, cont

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-03Client sample id A4CM-95-0087Dept sample id 6113-003Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/21/95% moisture 16.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.65	0.055				GAM
Thorium 232		1.2	0.13				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-03	H	6113-003		0.00320 L	05/12/95	06/14/95	IEP
4097-03	SR	6113-003		2.00 g	05/27/95	06/06/95	
N504097-03	TH	6113-003		1.00 g	06/06/95	06/08/95	IEP
N504097-03	U	6113-003		3.00 g	05/26/95	06/05/95	IEP
N504097-03	PU	6113-003		3.00 g	05/24/95	06/05/95	IEP
N504097-03	GAM	6113-003		750 g	05/15/95	06/14/95	IEP

DATA SHEETS

Page 32

SUMMARY DATA SECTION

Page 48

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/15/95

TMA / RICHMOND

REPORTING GROUP 6113

N504097-04

DATA SHEET

A4CM-95-0088

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-04

Client sample id A4CM-95-0088

Dept sample id 6113-004

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/21/95

% moisture 19.9

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		37	330	600	500	U	H
Strontium 90	10098-97-2	0.013	0.055	0.05	0.5	U	SR
Thorium 228		1.5	0.14	0.05	0.1		TH
Thorium 230	14269-63-7	1.1	0.12	0.02	0.1	B	TH
Thorium 232	7740-29-1	1.3	0.13	0.02	0.1		TH
Uranium 233/234	11-08-5	1.2	0.066	0.01	0.01		U
Uranium 235	14117-96-1	0.057	0.012	0.005	0.01		U
Uranium 238	7440-61-1	1.1	0.062	0.009	0.01		U
Plutonium 238	13981-16-3	0.003	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.008	0.005	0.006	0.01	J	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.39				GAM
Chromium 51		U		0.2		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.04		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.02		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		0.19	0.021		0.02		GAM
Cerium 144		U		0.08		U	GAM
Europium 152		U		0.04		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.07		U	GAM

DATA SHEETS

Page 33

SUMMARY DATA SECTION

Page 49

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-04

A4CM-95-0088

DATA SHEET, cont

SDG <u>6113</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504097-04</u>	Client sample id <u>A4CM-95-0088</u>
Dept sample id <u>6113-004</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/27/95</u>	Collected <u>04/21/95</u>
% moisture <u>19.9</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.69	0.031				GAM
Thorium 232		1.2	0.084				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
4097-04	H	6113-004		0.00510 L	05/12/95	06/14/95	IEP
4097-04	SR	6113-004		2.00 g	05/27/95	06/06/95	
N504097-04	TH	6113-004		1.00 g	06/05/95	06/06/95	IEP
N504097-04	U	6113-004		3.00 g	05/26/95	06/05/95	IEP
N504097-04	PU	6113-004		3.00 g	05/24/95	06/05/95	IEP
N504097-04	GAM	6113-004		750 g	05/15/95	06/14/95	IEP

DATA SHEETS

Page 34

SUMMARY DATA SECTION

Page 50

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-18

A4CM-95-0093

DATA SHEET

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-18

Client sample id A4CM-95-0093

Dept sample id 6113-018

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/24/95

% moisture 45.4

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-95	160	300	500	U	H
Strontium 90	10098-97-2	0.21	0.043	0.03	0.5	J	SR
Thorium 228		2.5	0.16	0.05	0.1		TH
Thorium 230	14269-63-7	2.3	0.15	0.01	0.1	B	TH
Thorium 232	7740-29-1	2.1	0.14	0.02	0.1		TH
Uranium 233/234	11-08-5	2.1	0.10	0.01	0.01		U
Uranium 235	14117-96-1	0.10	0.017	0.005	0.01		U
Uranium 238	7440-61-1	2.0	0.099	0.01	0.01		U
Plutonium 238	13981-16-3	0	0.002	0.005	0.01	U	PU
Plutonium 239/240	10-12-8	0.013	0.005	0.004	0.01		PU
GAMMA SCAN ANALYTES		U					
Potassium 40		15	0.53				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.03		U	GAM
Zinc 65		U		0.06		U	GAM
Niobium 94		U		0.02		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.03		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		0.68	0.028		0.02		GAM
Cerium 144		U		0.1		U	GAM
Europium 152		U		0.05		U	GAM
Europium 154		U		0.03		U	GAM
Europium 155		U		0.2		U	GAM

ATA SHEETS

Page 35

SUMMARY DATA SECTION

Page 51

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-18

DATA SHEET, cont

A4CM-95-0093

SDG 6113

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504097-18

Client sample id A4CM-95-0093

Dept sample id 6113-018

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/24/95

% moisture 45.4

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		1.3	0.064				GAM
Thorium 232		2.1	0.15				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504097-18	H	6113-018		0.0100 L	05/13/95	06/14/95	IEP
N504097-18	SR	6113-018		2.00 g	05/27/95	06/08/95	
N504097-18	TH	6113-018		1.00 g	06/06/95	06/08/95	IEP
N504097-18	U	6113-018		3.00 g	06/01/95	06/06/95	IEP
N504097-18	PU	6113-018		3.00 g	05/24/95	06/05/95	IEP
N504097-18	GAM	6113-018		117 g	05/17/95	06/14/95	IEP

DATA SHEETS

Page 36

SUMMARY DATA SECTION

Page 52

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-19

DATA SHEET

A4CM-95-0096

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-19

Client sample id A4CM-95-0096

Dept sample id 6113-019

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/24/95

% moisture 30.9

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		15	180	300	500	U	H
Strontium 90	10098-97-2	0.16	0.050	0.04	0.5	J	SR
Thorium 228		1.4	0.10	0.04	0.1		TH
Thorium 230	14269-63-7	1.2	0.092	0.02	0.1	B	TH
Thorium 232	7740-29-1	1.3	0.097	0.02	0.1		TH
Uranium 233/234	11-08-5	1.2	0.067	0.01	0.01		U
Uranium 235	14117-96-1	0.070	0.013	0.005	0.01		U
Uranium 238	7440-61-1	1.2	0.065	0.01	0.01		U
Plutonium 238	13981-16-3	0.001	0.002	0.005	0.01	U	PU
Plutonium 239/240	10-12-8	0.019	0.007	0.004	0.01		PU
GAMMA SCAN ANALYTES		U					
Potassium 40		19	0.61				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.03		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		0.13	0.036				GAM
Zinc 65		U		0.09		U	GAM
Niobium 94		U		0.03		U	GAM
Ruthenium 103		U		0.04		U	GAM
Ruthenium 106		U		0.2		U	GAM
Tin 113		U		0.04		U	GAM
Cesium 134		U		0.03		U	GAM
Cesium 137		2.4	0.058		0.02		GAM
Cerium 144		U		0.2		U	GAM
Europium 152		U		0.06		U	GAM
Europium 154		U		0.04		U	GAM
Europium 155		U		0.09		U	GAM

ATA SHEETS

Page 37

SUMMARY DATA SECTION

Page 53

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

N504097-19

A4CM-95-0096

DATA SHEET, cont

SDG 6113
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504097-19
Dept sample id 6113-019
Received 04/27/95
% moisture 30.9Client sample id A4CM-95-0096
Location/Matrix SSFL AREA 4 SOIL
Collected 04/24/95
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		1.1	0.067				GAM
Thorium 232		1.5	0.13				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504097-19	H	6113-019		0.0100 L	05/13/95	06/14/95	IEP
N504097-19	SR	6113-019		2.00 g	05/27/95	06/08/95	
N504097-19	TH	6113-019		1.00 g	06/06/95	06/08/95	IEP
N504097-19	U	6113-019		3.00 g	06/07/95	06/14/95	IEP
N504097-19	PU	6113-019		3.00 g	05/24/95	06/08/95	IEP
N504097-19	GAM	6113-019		751 g	05/18/95	06/14/95	IEP

DATA SHEETS

Page 38

SUMMARY DATA SECTION

Page 54

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test PU Matrix SOIL

SDG 6113

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 2781-110				
A4CM-95-0070	N504097-01	6113-001	U	U
A4CM-95-0071	N504097-02	6113-002	U	0.005 J
A4CM-95-0072	N504097-05	6113-005	U	0.009 J
A4CM-95-0073	N504097-06	6113-006	U	U
A4CM-95-0074	N504097-07	6113-007	0.004 J	0.15
A4CM-95-0075	N504097-08	6113-008	U	U
A4CM-95-0076	N504097-09	6113-009	U	0.006 J
A4CM-95-0077	N504097-10	6113-010	U	U
A4CM-95-0079	N504097-12	6113-012	U	U
A4CM-95-0080	N504097-13	6113-013	U	0.010
A4CM-95-0081	N504097-14	6113-014	U	0.005 J
A4CM-95-0082	N504097-15	6113-015	U	U
A4CM-95-0083	N504097-16	6113-016	U	U
A4CM-95-0084	N504097-17	6113-017	U	U
A4CM-95-0087	N504097-03	6113-003	U	U
A4CM-95-0088	N504097-04	6113-004	U	0.008 J
A4CM-95-0093	N504097-18	6113-018	U	0.013
A4CM-95-0096	N504097-19	6113-019	U	0.019
BLK (QC ID=23824)	N504097-21	6113-021	U	U
LCS (QC ID=23823)	N504097-20	6113-020	ok	ok
Duplicate (N504097-11)	N504097-22	6113-022	- U	OUT

Preparation batch 2781-110B

A4CM-95-0078	N504097-11	A1 6113-011	U	U
BLK (QC ID=24062)	N504097-26	6113-026	U	U
LCS (QC ID=24061)	N504097-25	6113-025	ok	ok

Nominal values and limits from method	RDLs (pCi/g)	0.01	0.01
---------------------------------------	--------------	------	------

MOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 55

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test PU Matrix SOIL

SDG 6113

cact Italy E. Pittman

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MAX MDA g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-110 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 110

A4CM-95-0070	N504097-01	0.01	3.00	64	1023	36	05/23/95	05/24	SS-027
A4CM-95-0071	N504097-02	0.01	3.00	55	1023	36	05/23/95	05/24	SS-028
A4CM-95-0072	N504097-05	0.009	3.00	92	1022	33	05/23/95	05/24	SS-039
A4CM-95-0073	N504097-06	0.004	3.00	83	1016	33	05/23/95	05/24	SS-044
A4CM-95-0074	N504097-07	0.004	3.00	81	1016	35	05/23/95	05/24	SS-045
A4CM-95-0075	N504097-08	0.005	3.00	78	993	35	05/23/95	05/24	SS-047
A4CM-95-0076	N504097-09	0.005	3.00	81	993	35	05/23/95	05/24	SS-048
A4CM-95-0077	N504097-10	0.01	3.00	52	993	35	05/23/95	05/24	SS-049
A4CM-95-0079	N504097-12	0.005	3.00	83	1058	34	05/23/95	05/24	SS-059
A4CM-95-0080	N504097-13	0.003	3.00	96	1074	35	05/23/95	05/25	SS-052
A4CM-95-0081	N504097-14	0.005	3.00	87	1058	34	05/23/95	05/24	SS-060
A4CM-95-0082	N504097-15	0.004	3.00	85	1058	34	05/23/95	05/24	SS-061
A4CM-95-0083	N504097-16	0.005	3.00	83	1058	34	05/23/95	05/24	SS-062
A4CM-95-0084	N504097-17	0.008	3.00	43	1058	34	05/23/95	05/24	SS-055
A4CM-95-0087	N504097-03	0.01	3.00	68	1023	33	05/23/95	05/24	SS-030
A4CM-95-0088	N504097-04	0.01	3.00	64	1023	33	05/23/95	05/24	SS-038
7 5-0093	N504097-18	0.005	3.00	88	1058	30	05/23/95	05/24	SS-063
A 95-0096	N504097-19	0.005	3.00	74	1058	30	05/23/95	05/24	SS-064
BLK (QC ID=23824)	N504097-21	0.007	3.00	48	1058		05/23/95	05/24	SS-056
LCS (QC ID=23823)	N504097-20	0.007	3.00	59	1058		05/23/95	05/24	SS-065
Duplicate (N504097-11)	N504097-22	0.007	3.00	54	1058	35	05/23/95	05/24	SS-057

Preparation batch 2781-110B 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 110

A4CM-95-0078	N504097-11	A1	0.008	3.15	59	995	55	06/12/95	06/13	SS-063
BLK (QC ID=24062)	N504097-26		0.006	3.00	60	995		06/12/95	06/13	SS-065
LCS (QC ID=24061)	N504097-25		0.006	3.00	45	995		06/12/95	06/13	SS-064

Nominal values and limits from method 0.01 3.00 20-105 500 100 180

PROCEDURES	REFERENCE	HASL 300/PU-02
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-940	Plutonium Purification, rev 0	
EP-008	Heavy Elements Electroplating, rev 0	

AVERAGES ± 2 SD	MDA 0.007 ± 0.005
FOR 24 SAMPLES	YIELD 70 ± 32

MOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 56

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test TH Matrix SOIL

SDG 6113

Contact Italy E. Pittman

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

	LAB	RAW	SUF-			
CLIENT SAMPLE ID	SAMPLE ID	TEST FIX	PLANCHET	Thorium 228	Thorium 230	Thorium 232
Preparation batch 2781-110						
A4CM-95-0070	N504097-01	6113-001	1.2	0.68	0.79	
A4CM-95-0071	N504097-02	6113-002	0.82	0.68	0.64	
A4CM-95-0072	N504097-05	6113-005	0.85	0.94	0.59	
A4CM-95-0073	N504097-06	6113-006	1.1	0.72	0.94	
A4CM-95-0074	N504097-07	6113-007	1.3	1.1	1.2	
A4CM-95-0075	N504097-08	6113-008	1.3	1.1	1.2	
A4CM-95-0076	N504097-09	6113-009	1.3	1.0	1.2	
A4CM-95-0077	N504097-10	6113-010	1.2	1.3	1.1	
A4CM-95-0078	N504097-11	6113-011	1.3	1.1	1.1	
A4CM-95-0079	N504097-12	6113-012	1.4	1.0	1.3	
A4CM-95-0080	N504097-13	6113-013	1.3	0.87	1.3	
A4CM-95-0081	N504097-14	6113-014	1.3	1.0	1.3	
A4CM-95-0082	N504097-15	6113-015	1.4	1.3	1.2	
A4CM-95-0083	N504097-16	6113-016	1.5	1.1	1.3	
A4CM-95-0084	N504097-17	6113-017	1.1	0.92	1.1	
A4CM-95-0087	N504097-03	6113-003	1.3	0.99	1.3	
A4CM-95-0088	N504097-04	6113-004	1.5	1.1	1.3	
A4CM-95-0093	N504097-18	6113-018	2.5	2.3	2.1	
A4CM-95-0096	N504097-19	6113-019	1.4	1.2	1.3	
BLK (QC ID=23824)	N504097-21	6113-021	U	0.057 J	U	
LCS (QC ID=23823)	N504097-20	6113-020		ok		
Duplicate (N504097-11)	N504097-22	6113-022	ok	ok	ok	

Nominal values and limits from method	RDLs (pCi/g)	0.1	0.1	0.1
---------------------------------------	--------------	-----	-----	-----

MOD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 57

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test TH Matrix SOIL

SDG 6113

Contact Italy E. Pittman

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-110 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 110															
A4CM-95-0070	N504097-01		0.07	1.00			28	1315				49	05/26/95	06/06	SS-028
A4CM-95-0071	N504097-02		0.05	1.00			57	599				38	05/26/95	05/26	SS-028
A4CM-95-0072	N504097-05		0.2	1.00			29	853				46	05/26/95	06/06	SS-024
A4CM-95-0073	N504097-06		0.04	1.00			54	1012				47	05/26/95	06/07	SS-033
A4CM-95-0074	N504097-07		0.07	1.00			48	792				47	05/26/95	06/05	SS-035
A4CM-95-0075	N504097-08		0.04	1.00			54	1012				49	05/26/95	06/07	SS-028
A4CM-95-0076	N504097-09		0.09	1.00			35	793				47	05/26/95	06/05	SS-040
A4CM-95-0077	N504097-10		0.07	1.00			42	793				47	05/26/95	06/05	SS-041
A4CM-95-0078	N504097-11		0.1	1.00			27	788				47	05/26/95	06/05	SS-019
A4CM-95-0079	N504097-12		0.06	1.00			65	788				46	05/26/95	06/05	SS-021
A4CM-95-0080	N504097-13		0.04	1.00			73	788				46	05/26/95	06/05	SS-022
A4CM-95-0081	N504097-14		0.07	1.00			69	788				46	05/26/95	06/05	SS-024
A4CM-95-0082	N504097-15		0.07	1.00			31	1315				47	05/26/95	06/06	SS-033
A4CM-95-0083	N504097-16		0.06	1.00			40	1316				47	05/26/95	06/06	SS-035
A4CM-95-0084	N504097-17		0.05	1.00			50	1317				47	05/26/95	06/06	SS-039
A4CM-95-0087	N504097-03		0.08	1.00			33	853				46	05/26/95	06/06	SS-022
A4CM-95-0088	N504097-04		0.05	1.00			56	792				45	05/26/95	06/05	SS-028
A4CM-95-0093	N504097-18		0.05	1.00			49	1317				43	05/26/95	06/06	SS-040
A4CM-95-0096	N504097-19		0.04	1.00			58	1317				43	05/26/95	06/06	SS-041
BLK (QC ID=23824)	N504097-21		0.05	1.00			85	853					05/26/95	06/06	SS-019
LCS (QC ID=23823)	N504097-20		0.03	1.00			81	853					05/26/95	06/06	SS-017
Duplicate (N504097-11)	N504097-22		0.06	1.00			66	853				48	05/26/95	06/06	SS-021

Nominal values and limits from method

0.1

1.00

20-105

500

180

PROCEDURES EP-000 Data Entry and Document Preparation, rev 0
 EP-001 Q.C. Preparation, rev 0
 EP-003 Tracing, rev 0
 EP-008 Heavy Elements Electroplating, rev 0
 EP-060 Soil Preparation, rev 0
 EP-070 Soil Dissolution, rev 0
 EP-900 Thorium Purification, rev 0

AVERAGES ± 2 SD

MDA 0.07 ± 0.07

FOR 22 SAMPLES

YIELD 51 ± 34

METHOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 58

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test U Matrix SOIL

SDG 6113

tact Italy E. Pittman

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (†)			
							1+3	2σ	2+3	2σ
Preparation batch 2781-110										
A4CM-95-0070	N504097-01		6113-001	0.68	0.023	0.59	115	12	4	2
A4CM-95-0071	N504097-02		6113-002	0.54	0.035	0.55	98	10	6	2
A4CM-95-0072	N504097-05		6113-005	0.60	0.027	0.58	103	10	5	1
A4CM-95-0073	N504097-06		6113-006	0.98	0.056	0.74	132	11	8	2
A4CM-95-0074	N504097-07		6113-007	1.1	0.048	1.0	110	8	5	1
A4CM-95-0075	N504097-08		6113-008	0.72	0.042	0.78	92	8	5	1
A4CM-95-0076	N504097-09		6113-009	0.80	0.048	0.78	103	8	6	1
A4CM-95-0077	N504097-10		6113-010	1.3	0.070	1.3	100	7	5	1
A4CM-95-0078	N504097-11		6113-011	0.98	0.054	1.0	98	7	5	1
A4CM-95-0079	N504097-12		6113-012	0.84	0.058	0.82	102	9	7	2
A4CM-95-0080	N504097-13		6113-013	1.0	0.059	0.96	104	9	6	1
A4CM-95-0081	N504097-14		6113-014	0.97	0.061	0.89	109	9	7	1
A4CM-95-0082	N504097-15		6113-015	0.98	0.052	0.90	109	10	6	1
A4CM-95-0083	N504097-16		6113-016	0.81	0.050	0.82	99	10	6	2
A4CM-95-0084	N504097-17		6113-017	0.83	0.043	0.81	102	9	5	1
A4CM-95-0087	N504097-03		6113-003	0.95	0.076	0.81	117	10	9	2
A4CM-95-0088	N504097-04		6113-004	1.2	0.057	1.1	109	9	5	1
A4CM-95-0093	N504097-18		6113-018	2.1	0.10	2.0	105	7	5	1
A4CM-95-0096	N504097-19		6113-019	1.2	0.070	1.2	100	8	6	1
BLK (QC ID=23824)	N504097-21		6113-021	U	U	U				
LCS (QC ID=23823)	N504097-20		6113-020	ok	ok	ok				
Duplicate (N504097-11)	N504097-22		6113-022	ok	ok	ok	99	8	6	1
Nominal values and limits from method				RDLs (pCi/g)	0.01	0.01	0.01	100	4	
								Averages 105	6	

OD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 59

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test U Matrix SOIL

SDG 6113

Contact Italy E. Pittman

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MAX MDA g	ALIQ FAC	PREP TION	DILU- t	YIELD t	EFF min	COUNT keV	FWHM KeV	DRIFT HOLD	DAYS PREPARED	ANAL- YZED	DETECTOR
Preparation batch 2781-110 2σ prep error 5.0 % Reference Lab Notebook 2781 pg. 110															
A4CM-95-0070	N504097-01		0.009	3.00			57	1059					38	05/26/95	05/26 SS-033
A4CM-95-0071	N504097-02		0.009	3.00			68	1013					38	05/26/95	05/26 SS-039
A4CM-95-0072	N504097-05		0.008	3.00			59	1287					39	05/26/95	05/30 SS-029
A4CM-95-0073	N504097-06		0.01	3.00			75	1019					40	05/26/95	05/31 SS-037
A4CM-95-0074	N504097-07		0.009	3.00			66	1288					41	05/26/95	05/30 SS-033
A4CM-95-0075	N504097-08		0.01	3.00			71	1288					41	05/26/95	05/30 SS-037
A4CM-95-0076	N504097-09		0.009	3.00			72	1288					41	05/26/95	05/30 SS-040
A4CM-95-0077	N504097-10		0.01	3.00			66	1288					41	05/26/95	05/30 SS-041
A4CM-95-0078	N504097-11		0.01	3.00			69	1288					41	05/26/95	05/30 SS-042
A4CM-95-0079	N504097-12		0.01	3.00			63	1015					42	05/26/95	06/01 SS-029
A4CM-95-0080	N504097-13		0.01	3.00			69	1015					42	05/26/95	06/01 SS-035
A4CM-95-0081	N504097-14		0.01	3.00			71	1019					41	05/26/95	05/31 SS-040
A4CM-95-0082	N504097-15		0.01	3.00			62	1019					41	05/26/95	05/31 SS-041
A4CM-95-0083	N504097-16		0.02	3.00			50	1019					41	05/26/95	05/31 SS-042
A4CM-95-0084	N504097-17		0.01	3.00			72	1015					42	05/26/95	06/01 SS-036
A4CM-95-0087	N504097-03		0.01	3.00			71	1013					35	05/26/95	05/26 SS-040
95-0088	N504097-04		0.01	3.00			71	1013					35	05/26/95	05/26 SS-041
95-0093	N504097-18		0.01	3.00			74	1015					38	05/26/95	06/01 SS-037
A4CM-95-0096	N504097-19		0.01	3.00			73	1012					44	05/26/95	06/07 SS-027
BLK (QC ID=23824)	N504097-21		0.008	3.00			53	1015						05/26/95	06/01 SS-039
LCS (QC ID=23823)	N504097-20		0.05	3.00			71	678						05/26/95	05/26 SS-037
Duplicate (N504097-11)	N504097-22		0.01	3.00			70	1015					43	05/26/95	06/01 SS-040
Nominal values and limits from method			0.01	3.00			30-105	720	100				180		

PROCEDURES	REFERENCE	HASL 300/U-04
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-910	Uranium Purification, rev 0	
EP-008	Heavy Elements Electroplating, rev 0	

AVERAGES ± 2 SD	MDA 0.01 ± 0.02
FOR 22 SAMPLES	YIELD 67 ± 14

HOD SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 60

Lab id	TMAN
Protocol	ROCKETDYNE
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test SR Matrix SOIL

SDG 6113

Contact Italy E. Pittman

METHOD SUMMARY

STRONTIUM, TOTAL IN SOIL

BETA COUNTING

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Strontium 90
------------------	------------------	-----------------	------------------	--------------

Preparation batch 2781-110

A4CM-95-0070	N504097-01	6113-001	U
A4CM-95-0071	N504097-02	6113-002	U
A4CM-95-0072	N504097-05	6113-005	U
A4CM-95-0073	N504097-06	6113-006	U
A4CM-95-0074	N504097-07	6113-007	U
A4CM-95-0075	N504097-08	6113-008	U
A4CM-95-0076	N504097-09	6113-009	U
A4CM-95-0077	N504097-10	6113-010	U
A4CM-95-0078	N504097-11	6113-011	U
A4CM-95-0079	N504097-12	6113-012	U
A4CM-95-0080	N504097-13	6113-013	U
A4CM-95-0081	N504097-14	6113-014	U
A4CM-95-0082	N504097-15	6113-015	U
A4CM-95-0083	N504097-16	6113-016	U
A4CM-95-0084	N504097-17	6113-017	U
A4CM-95-0087	N504097-03	6113-003	U
A4CM-95-0088	N504097-04	6113-004	U
A4CM-95-0093	N504097-18	6113-018	0.21 J
A4CM-95-0096	N504097-19	6113-019	0.16 J
BLK (QC ID=23824)	N504097-21	6113-021	U
LCS (QC ID=23823)	N504097-20	6113-020	ok
Duplicate (N504097-11)	N504097-22	6113-022	- U

Nominal values and limits from method	RDLs (pCi/g)	0.5
---------------------------------------	--------------	-----

DD SUMMARIES

Page 7

SUMMARY DATA SECTION

Page 61

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test SR Matrix SOILSDG 6113Lab Italy E. Pittman

METHOD SUMMARY

STRONTIUM, TOTAL IN SOIL

BETA COUNTING

Client RocketdyneContract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-110 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 110																
A4CM-95-0070	N504097-01			0.09	2.00			82	201				39	05/27/95	05/27	LBG-016
A4CM-95-0071	N504097-02			0.09	2.00			85	158				39	05/27/95	05/27	LBG-003
A4CM-95-0072	N504097-05			0.04	2.00			84	783				36	05/27/95	05/27	LBG-016
A4CM-95-0073	N504097-06			0.1	2.00			85	200				36	05/27/95	05/27	LBG-015
A4CM-95-0074	N504097-07			0.06	2.00			84	550				38	05/27/95	05/27	LBG-015
A4CM-95-0075	N504097-08			0.05	2.00			80	565				38	05/27/95	05/27	LBG-003
A4CM-95-0076	N504097-09			0.07	2.00			81	218				38	05/27/95	05/27	LBG-003
A4CM-95-0077	N504097-10			0.08	2.00			85	218				38	05/27/95	05/27	LBG-004
A4CM-95-0078	N504097-11			0.09	2.00			83	218				38	05/27/95	05/27	LBG-015
A4CM-95-0079	N504097-12			0.08	2.00			83	186				37	05/27/95	05/27	LBG-003
A4CM-95-0080	N504097-13			0.07	2.00			85	275				37	05/27/95	05/27	LBG-003
A4CM-95-0081	N504097-14			0.07	2.00			85	275				37	05/27/95	05/27	LBG-004
A4CM-95-0082	N504097-15			0.09	2.00			80	162				37	05/27/95	05/27	LBG-003
A4CM-95-0083	N504097-16			0.09	2.00			78	275				37	05/27/95	05/27	LBG-016
A4CM-95-0084	N504097-17			0.07	2.00			83	257				37	05/27/95	05/27	LBG-003
A4CM-95-0087	N504097-03			0.04	2.00			87	783				36	05/27/95	05/27	LBG-004
A4CM-95-0088	N504097-04			0.05	2.00			78	783				36	05/27/95	05/27	LBG-015
A4CM-95-0093	N504097-18			0.03	2.00			86	847				33	05/27/95	05/27	LBG-004
A4CM-95-0096	N504097-19			0.04	2.00			88	847				33	05/27/95	05/27	LBG-015
BLK (QC ID=23824)	N504097-21			0.05	2.00			86	657					05/27/95	05/27	LBG-015
LCS (QC ID=23823)	N504097-20			0.1	2.00			84	121					05/27/95	05/27	LBG-016
Duplicate (N504097-11)	N504097-22			0.04	2.00			77	847				38	05/27/95	05/27	LBG-016
Nominal values and limits from method				0.5	2.00			20-105	200				180			

PROCEDURES	REFERENCE	HASL 300/SR-01,-02
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-500	Strontium-89,90 - Purification, rev 0

AVERAGES ± 2 SD	MDA	0.07	±	0.04
FOR 22 SAMPLES	YIELD	83	±	6

OD SUMMARIES

Page 8

SUMMARY DATA SECTION

Page 62

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOILSDG 6113Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cesium 137
------------------	------------------	-----------------	------------------	------------

Preparation batch 2781-110

A4CM-95-0070	N504097-01	6113-001	U
A4CM-95-0071	N504097-02	6113-002	0.069
A4CM-95-0072	N504097-05	6113-005	0.12
A4CM-95-0073	N504097-06	6113-006	0.23
A4CM-95-0074	N504097-07	6113-007	0.071
A4CM-95-0075	N504097-08	6113-008	0.056
A4CM-95-0076	N504097-09	6113-009	0.11
A4CM-95-0077	N504097-10	6113-010	U
A4CM-95-0078	N504097-11	6113-011	U
A4CM-95-0079	N504097-12	6113-012	0.30
A4CM-95-0080	N504097-13	6113-013	0.098
A4CM-95-0081	N504097-14	6113-014	0.087
A4CM-95-0082	N504097-15	6113-015	0.088
A4CM-95-0083	N504097-16	6113-016	U
A4CM-95-0084	N504097-17	6113-017	U
A4CM-95-0087	N504097-03	6113-003	0.031
A4CM-95-0088	N504097-04	6113-004	0.19
A4CM-95-0093	N504097-18	6113-018	0.68
A4CM-95-0096	N504097-19	6113-019	2.4
BLK (QC ID=23824)	N504097-21	6113-021	U
LCS (QC ID=23823)	N504097-20	6113-020	ok
Duplicate (N504097-11)	N504097-22	6113-022	U

Nominal values and limits from method	RDLs (pCi/g)	0.02
---------------------------------------	--------------	------

SD SUMMARIES

Page 9

SUMMARY DATA SECTION

Page 63

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test GAM Matrix SOILSDG 6113Lab Italy E. Pittman

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client RocketdyneContract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-110 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 110																
A4CM-95-0070	N504097-01			0.03	751						405		27	05/11/95	05/15	01,01,00
A4CM-95-0071	N504097-02				750						406		27	05/11/95	05/15	MB,02,00
A4CM-95-0072	N504097-05				751						1018		24	05/11/95	05/15	01,01,00
A4CM-95-0073	N504097-06				750						1018		24	05/11/95	05/15	MB,02,00
A4CM-95-0074	N504097-07				750						1018		26	05/11/95	05/15	MB,03,00
A4CM-95-0075	N504097-08				750						1018		26	05/11/95	05/15	01,04,00
A4CM-95-0076	N504097-09				751						365		27	05/11/95	05/16	01,01,00
A4CM-95-0077	N504097-10			0.03	750						364		27	05/11/95	05/16	MB,03,00
A4CM-95-0078	N504097-11			0.02	751						364		27	05/11/95	05/16	01,04,00
A4CM-95-0079	N504097-12				750						403		27	05/11/95	05/17	01,04,00
A4CM-95-0080	N504097-13				751						488		27	05/11/95	05/17	01,01,00
A4CM-95-0081	N504097-14				750						401		27	05/11/95	05/17	01,04,00
A4CM-95-0082	N504097-15				751						400		27	05/11/95	05/17	01,01,00
A4CM-95-0083	N504097-16			0.03	751						446		28	05/11/95	05/18	MB,02,00
A4CM-95-0084	N504097-17			0.03	750						446		28	05/11/95	05/18	MB,03,00
A4CM-95-0087	N504097-03				750						406		24	05/11/95	05/15	MB,03,00
A4CM-95-0088	N504097-04				750						405		24	05/11/95	05/15	01,04,00
A4CM-95-0093	N504097-18				117						1573		23	05/11/95	05/17	JR,04,00
A4CM-95-0096	N504097-19				751						431		24	05/11/95	05/18	01,01,00
BLK (QC ID=23824)	N504097-21			0.009	850						431			05/11/95	05/18	MB,03,00
LCS (QC ID=23823)	N504097-20				850						431			05/11/95	05/18	MB,02,00
Duplicate (N504097-11)	N504097-22			0.02	186						909		29	05/11/95	05/18	JR,04,00
Nominal values and limits from method				0.02	850						700		180			

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

AVERAGES ± 2 SD MDA 0.02 ± 0.02
FOR 7 SAMPLES YIELD ±

DD SUMMARIES

Page 10

SUMMARY DATA SECTION

Page 64

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL

SDG 6113

Lab Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Tritium
Preparation batch 2781-110				
A4CM-95-0070	N504097-01	6113-001	U	
A4CM-95-0071	N504097-02	6113-002	U	
A4CM-95-0072	N504097-05	6113-005	U	
A4CM-95-0073	N504097-06	6113-006	U	
A4CM-95-0074	N504097-07	6113-007	U	
A4CM-95-0075	N504097-08	6113-008	U	
A4CM-95-0076	N504097-09	6113-009	8500	
A4CM-95-0077	N504097-10	6113-010	U	
A4CM-95-0078	N504097-11	6113-011	U	
A4CM-95-0079	N504097-12	6113-012	U	
A4CM-95-0080	N504097-13	6113-013	U	
A4CM-95-0081	N504097-14	6113-014	U	
A4CM-95-0082	N504097-15	6113-015	U	
A4CM-95-0083	N504097-16	6113-016	U	
A4CM-95-0084	N504097-17	6113-017	U	
A4CM-95-0087	N504097-03	6113-003	U	
A4CM-95-0088	N504097-04	6113-004	U	
A4CM-95-0093	N504097-18	6113-018	U	
A4CM-95-0096	N504097-19	6113-019	U	
BLK (QC ID=23824)	N504097-21	6113-021	U	
LCS (QC ID=23823)	N504097-20	6113-020	ok	X
Duplicate (N504097-11)	N504097-22	6113-022	-	U

Nominal values and limits from method RDLs (pCi/g) 500

SD SUMMARIES

Page 11

SUMMARY DATA SECTION

Page 65

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/15/95

TMA/RICHMOND

REPORTING GROUP 6113

Test H Matrix SOIL

SDG 6113

Lab Italy E. Pittman

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Client Rocketdyne

Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MDA pCi/g	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 2781-110 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 110															
A4CM-95-0070	N504097-01		400	0.0070					50			24	05/12/95	05/12	LSC-005
A4CM-95-0071	N504097-02		800	0.0034					50			24	05/12/95	05/12	LSC-005
A4CM-95-0072	N504097-05		300	0.0082					50			22	05/12/95	05/13	LSC-005
A4CM-95-0073	N504097-06		300	0.0100					50			22	05/12/95	05/13	LSC-005
A4CM-95-0074	N504097-07		900	0.0032					50			24	05/12/95	05/13	LSC-005
A4CM-95-0075	N504097-08		600	0.0046					50			24	05/12/95	05/13	LSC-005
A4CM-95-0076	N504097-09		500	0.0057					100			24	05/12/95	05/13	LSC-005
A4CM-95-0077	N504097-10		500	0.0057					50			24	05/12/95	05/13	LSC-005
A4CM-95-0078	N504097-11		600	0.0051					50			24	05/12/95	05/13	LSC-005
A4CM-95-0079	N504097-12		800	0.0034					50			23	05/12/95	05/13	LSC-005
A4CM-95-0080	N504097-13		800	0.0037					50			23	05/12/95	05/13	LSC-005
A4CM-95-0081	N504097-14		800	0.0037					50			23	05/12/95	05/13	LSC-005
A4CM-95-0082	N504097-15		900	0.0030					50			23	05/12/95	05/13	LSC-005
A4CM-95-0083	N504097-16		600	0.0052					50			23	05/12/95	05/13	LSC-005
A4CM-95-0084	N504097-17		900	0.0034					50			23	05/12/95	05/13	LSC-005
A4CM-95-0087	N504097-03		900	0.0032					50			21	05/12/95	05/12	LSC-005
A4CM-95-0088	N504097-04		600	0.0051					50			21	05/12/95	05/12	LSC-005
A4CM-95-0093	N504097-18		300	0.0100					50			19	05/12/95	05/13	LSC-005
A4CM-95-0096	N504097-19		300	0.0100					50			19	05/12/95	05/13	LSC-005
BLK (QC ID=23824)	N504097-21		300	0.0100					50				05/12/95	05/12	LSC-005
LCS (QC ID=23823)	N504097-20		300	0.0100					50				05/12/95	05/12	LSC-005
Duplicate (N504097-11)	N504097-22		700	0.0042					50			24	05/12/95	05/13	LSC-005
Nominal values and limits from method			500	0.0100					50			180			

PROCEDURES REFERENCE EPA 906.0; ASTM 2476-81

EP-060 Soil Preparation, rev 0

EP-070 Soil Dissolution, rev 0

EP-211 Tritium in Solid Samples by Azeotropic Distillation, rev 0

AVERAGES ± 2 SD MDA 600 ± 500

FOR 22 SAMPLES YIELD ±

METHOD SUMMARIES

Page 12

SUMMARY DATA SECTION

Page 66

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/15/95

APPENDIX 1: COPIES OF CHAINS-OF-CUSTODY

TIVA

Tivrio Analytical

7AVA/Technical 3030 Mait Avenue P. O. Box 4040

Hillman, CA 94040-0440

(415) 336-2613

Fax No. (415) 336-0430

Chain of Custody

DATE 4-18-95 PAGE 1 of 1

CLIENT: <u>Rockaldyne</u>			ADDRESS: <u>P.O. Box 7930</u>			PROJECT: <u>Canoga Park, CA 91309-7930</u>			PROJECT: <u>Area IV Characterization</u>			PARAMETERS			OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST		
Sample No.	Date	Time	Location	Gamma Scan	SR90	Thorium Isotopes	Uranium Isotopes	Plutonium Isotopes	Tritium	SAMPLE TYPE OR MIX	NO. OF CONTAINERS	METHOD OF SHIPMENT	SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS				
<u>AYCH-95-0070</u>	<u>4-18-95</u>	<u>1400</u>	<u>SSFL AREA 4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Soil</u>	<u>1</u>	<u>1600g</u>					
<u>AYCH-95-0071</u>	<u>4-18-95</u>	<u>1400</u>	<u>SSFL AREA 4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Soil</u>	<u>1</u>	<u>1706g</u>					
1) RELINQUISHED BY / DATE: <u>8/15/95</u> <u>4-18-95</u> COMPANY: <u>Rockwell</u> 2) RECEIVED BY / DATE: <u>RECEIVED</u> <u>4-18-95</u> COMPANY: <u>RI</u> 3) RELINQUISHED BY / DATE: <u>RECEIVED</u> <u>4-26-95</u> COMPANY: <u>Rockwell</u> 4) RECEIVED BY / DATE: <u>RECEIVED</u> <u>4-27-95</u> COMPANY: <u>TMA/RICHMOND</u> 5) RELINQUISHED BY / DATE: <u>RECEIVED</u> <u>11:40 AM</u> COMPANY: <u>TMA/RICHMOND</u>																	

"quality environmental services"

TMA

Thermo Analytical

7444 Robinson 2000 Whitt Avenue P.O. Box 4030 Richmond, CA 94804-0300 (415) 236-2032 FAX No. (415) 236-0430

Chain of Custody

DATE 4-21-95 PAGE 1 OF 1

CLIENT <u>Rockel,dyne</u> ADDRESS <u>P.O. Box 7930</u> <u>Canoga Park, CA 91309-7930</u> PROJECT <u>Area IV Characterization</u>			ANALYST SIGNATURE <u>[Signature]</u>			PARTICULATE DATE <u>4-21-95</u>						
Sample No.	Date	Time	Location	Gamma Scan	SR90	Thorium Isotopes	Uranium Isotopes	Plutonium Isotopes	Tritium	SAMPLE TYPE OR MATRIX	CONC'D	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST
A4CM-95-0087	4-21-95	1415	55FL AREA 4	X	X	X	X	X	X	SOIL	1	1431g
A4CM-95-0088	1	1415		X	X	X	X	X	X	SOIL	1	1162g
A4CM-950072	1	1415		X	X	X	X	X	X	SOIL	1	1798g
A4CM-95-0073	1	1415		X	X	X	X	X	X	SOIL	1	1742g
1) RECEIVED BY / DATE: <u>4-21-95</u> <u>[Signature]</u> COMPANY: <u>Rockel,dyne</u>												
2) RECEIVED BY / DATE: <u>4-21-95</u> <u>[Signature]</u> COMPANY: <u>Rockel,dyne</u>												
3) RECEIVED BY / DATE: <u>4-26-95</u> <u>[Signature]</u> COMPANY: <u>Rockel,dyne</u>												
4) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>H. MACISO</u>												
5) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
6) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
7) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
8) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
9) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
10) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
11) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
12) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
13) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
14) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
15) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
16) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
17) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
18) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
19) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
20) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
21) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
22) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
23) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
24) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
25) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
26) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
27) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
28) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
29) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
30) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
31) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
32) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
33) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
34) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
35) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
36) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
37) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
38) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
39) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
40) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
41) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
42) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
43) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
44) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
45) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
46) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
47) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
48) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
49) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
50) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
51) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
52) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
53) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
54) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
55) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
56) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
57) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
58) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
59) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
60) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
61) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
62) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
63) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
64) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
65) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
66) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
67) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
68) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
69) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
70) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
71) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
72) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
73) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
74) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
75) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
76) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
77) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
78) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
79) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
80) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
81) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
82) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
83) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
84) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
85) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
86) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
87) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
88) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
89) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
90) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
91) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
92) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
93) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
94) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
95) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
96) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
97) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
98) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
99) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												
100) RECEIVED BY / DATE: <u>4-27-95</u> <u>[Signature]</u> COMPANY: <u>TMA/ROCKWELL</u>												

"quality environmental services"

Thermo Analytical

11/11/1941 Richmond 3030 Wright Avenue

P. O. Box 4040

Richmond, CA 94804 0040

4010-238-2033

File No. 16101 230-0430

Chain of Custody

[illegible]

Form 8CP-1.5 09-15-94

"quality environmental services"

TMA

Thermo Analytical

TMA/Technoid 3030 Wright Avenue P. O. Box 4040 Richmond, CA 94804-0040 (415) 236-2633 Fax No. (415) 236-0430

Chain of Custody

CLIENT <u>Rocketdyne</u> ADDRESS <u>P.O. Box 7930</u> <u>Canoga Park, CA 91309-7930</u> PROJECT <u>Area IV Characterization</u> SAMPLE SIGNATURE <u>[Signature]</u>				PARAMETERS										CONTAINER # OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST			
Sample No.	Date	Time	Location	Gamma Scan	SR90	Thorium Isotopes	Uranium Isotopes	Plutonium Isotopes	Tritium						SAMPLE TYPE OR MATRIX		
AHCM-95-0079	4/20/95	1445	SSEL AREA 4	X	X	X	X	X	X					SOIL	1	1608g	
AHCM-95-0080				X	X	X	X	X	X					SOIL	1	1615g	
AHCM-95-0081				X	X	X	X	X	X					SOIL	1	1498g	
AHCM-95-0082				X	X	X	X	X	X					SOIL	1	1562g	
AHCM-95-0083				X	X	X	X	X	X					SOIL	1	1870g	
AHCM-95-0084	✓		✓	X	X	X	X	X	X					SOIL	1	1937g	
AHCM-95-0085									X					H ₂ O	1	—	
AHCM-95-0086	✓	✓	✓	X	X	X	X	X						H ₂ O	1	—	
1) RELINQUISHED BY / DATE: <u>[Signature]</u> 4-20-95				2) RECEIVED BY / DATE: <u>[Signature]</u> 4-20-95				3) RELINQUISHED BY / DATE: <u>[Signature]</u> 4-26-95				4) RECEIVED BY / DATE: <u>[Signature]</u> 4-27-95 11:40				TOTAL NO. OF CONTAINERS:	
COMPANY: <u>ROCKETDYNE</u>				COMPANY: <u>RI</u>				COMPANY: <u>Rocketdyne</u>				COMPANY: <u>TMA/RICHMOND</u>				METHOD OF SHIPMENT:	
5) RELINQUISHED BY / DATE:				6) RECEIVED BY / DATE:				7) RELINQUISHED BY / DATE:								SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS:	
COMPANY:				COMPANY:				COMPANY:									

Thermo Analytical

11/11/1964 2030 Wright Avenue

P. O. Box 4040

McDonald, CA 94004:0040

1010) 236-2033

File No. (b)(6) 238-0430

Chain of Custody

"quality environmental services"



TMA
Thermo Analytical

2030 Wright Avenue

P.O. Box 4040

Richmond, CA 94804-0040

(510) 235-2633 Fax: 235-0438

H₂O
95-0086
95-0090
95-0092

95-0070
95-0077
95-0083
95-0084
Soe

June 20, 1995

Mr. Alex Klein
Rockwell International Corp.
Rocketdyne Division
6633 Canoga Ave.
Canoga Park, CA 91303

Ref: Customer P.O. No. R44PJZ94034044
TMA/Richmond Report N5-04-096-6112 (rev)
Report N5-04-097-6113 (rev)

Dear Mr. Klein:

Enclosed is the revised data report is for the Gamma analyses for the four soil and three water samples collected between April 18 and 24, 1995. The samples were received at TMA/Richmond on April 27, 1995. The these samples were previously reported on June 14, 1995. The new report for the samples recounted includes data for the entire sample. The samples are segregated into separate sample batch groups from the other samples previously reported.

If you have any questions regarding this data, or any problems with the hard copy or electronic deliverable diskette, please call me at (510) 235-2633.

Sincerely,



Italy E. Pittman
Program Manager

Enclosures: Data Report N5-04-096-6112 (rinsate)
Data Report N5-04-097-6113 (soil)
Diskette

Case Narrative

June 20, 1995

1.0 GENERAL

TMA/Richmond Sample Delivery Group (SDG) 6112 consists of eight liquid samples, and SDG 6113 consists of twenty-one soil samples. These samples were received on April 27, 1995.

2.0 ANALYTICAL NOTES

2.1 Gamma Spectroscopy Analyses

6112 (Rinsate)

Three samples have MDA's greater than the RDL. These samples were counted for more than the 400 minutes required; however, these samples still did not meet the 5 pCi/L RDL. We have scheduled these samples for a 24 hour count to obtain a MDA that will meet the RDL, and will resubmit the gamma data for these samples.

Sample prep batch 2781-104B list the samples that were recounted for 1000 plus minutes to reach the less than 5 pCi/L RDL for Cs-137. No problems associated with the analyses.

6113 (Soil)

All samples have an aliquot less than the 850 g nominal required, and several have count times less than the nominal 700 minutes required; however, despite the smaller aliquot and shorter count times, all of the MDA's were less than or equal to the RDL except for samples A4CM-95-0070, A4CM-95-0077, A4CM-95-0083 and, A4CM-95-0084. These samples have been rescheduled for counting, and we will resubmit the gamma data for these samples.

Sample prep batch 2781-110B list the samples that were recounted for more than the 700 minutes nominal required to reach the less than 0.02 pCi/gram RDL for Cs-137. No problems associated with the analyses.

TMA/RICHMOND

REPORTING GROUP 6112

6112-002

DATA SHEET

A4CM-95-0086

SDG 6112Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504096-02Client sample id A4CM-95-0086Dept sample id 6112-002Location/Matrix SSFL AREA 4WATERReceived 04/27/95Collected 04/20/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	-0.002	0.092	0.2	0.5	U	SR
Thorium 228		0	0.062	0.1	0.5	U	TH
Thorium 230	14269-63-7	0.062	0.062	0.08	0.5	U	TH
Thorium 232	7740-29-1	0.010	0.021	0.08	0.5	U	TH
Uranium 233/234	11-08-5	0.036	0.054	0.09	0.5	U	U
Uranium 235	14117-96-1	0	0.022	0.08	0.5	U	U
Uranium 238	7440-61-1	0.018	0.036	0.07	0.5	U	U
Plutonium 238	13981-16-3	-0.004	0.023	0.05	0.1	U	PU
Plutonium 239/240	10-12-8	0.008	0.008	0.03	0.1	U	PU
TMA SCAN ANALYTES		U					
Potassium 40		U		50		U	GAM
Chromium 51		U		100		U	GAM
Manganese 54		U		5		U	GAM
Cobalt 58		U		7		U	GAM
Iron 59		U		20		U	GAM
Cobalt 60		U		6		U	GAM
Zinc 65		U		10		U	GAM
Niobium 94		U		4		U	GAM
Ruthenium 103		U		10		U	GAM
Ruthenium 106		U		40		U	GAM
Tin 113		U		6		U	GAM
Cesium 134		U		6		U	GAM
Cesium 137		U		4	5	U	GAM
Cerium 144		U		20		U	GAM
Europium 152		U		8		U	GAM
Europium 154		U		5		U	GAM
Europium 155		U		10		U	GAM
Radium 226		U		8		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6112

6112-002

A4CM-95-0086

DATA SHEET, cont

SDG <u>6112</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N504096-02</u>	Client sample id <u>A4CM-95-0086</u>
Dept sample id <u>6112-002</u>	Location/Matrix <u>SSFL AREA 4</u> <u>WATER</u>
Received <u>04/27/95</u>	Collected <u>04/20/95</u>
Chain of custody id _____	

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		20		U	GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504096-02	SR	6112-002		1.00 L	05/24/95	05/24/95	IEP
4096-02	TH	6112-002		0.500 L	05/20/95	05/24/95	IEP
4096-02	U	6112-002		0.200 L	05/19/95	05/24/95	IEP
N504096-02	PU	6112-002		0.500 L	05/19/95	05/24/95	IEP
N504096-02	GAM	6112-002		1.00 L	06/15/95	06/20/95	IEP

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6112

6112-004

DATA SHEET

A4CM-95-0090

SDG 6112

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

Lab sample id N504096-04

Client sample id A4CM-95-0090

Dept sample id 6112-004

Location/Matrix SSFL AREA 4

WATER

Received 04/27/95

Collected 04/24/95

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	0.14	0.13	0.2	0.5	U	SR
Thorium 228		0.035	0.070	0.1	0.5	U	TH
Thorium 230	14269-63-7	0.009	0.053	0.08	0.5	U	TH
Thorium 232	7740-29-1	0	0.035	0.07	0.5	U	TH
Uranium 233/234	11-08-5	1.8	0.47	0.2	0.5	U	U
Uranium 235	14117-96-1	0.12	0.12	0.2	0.5	U	U
Uranium 238	7440-61-1	1.4	0.37	0.2	0.5	U	U
Plutonium 238	13981-16-3	-0.007	0.014	0.04	0.1	U	PU
Plutonium 239/240	10-12-8	0	0.007	0.03	0.1	U	PU
MMA SCAN ANALYTES		U					
Potassium 40		U		80		U	GAM
Chromium 51		U		100		U	GAM
Manganese 54		U		5		U	GAM
Cobalt 58		U		8		U	GAM
Iron 59		U		20		U	GAM
Cobalt 60		U		5		U	GAM
Zinc 65		U		10		U	GAM
Niobium 94		U		5		U	GAM
Ruthenium 103		U		10		U	GAM
Ruthenium 106		U		40		U	GAM
Tin 113		U		7		U	GAM
Cesium 134		U		6		U	GAM
Cesium 137		U		5	5	U	GAM
Cerium 144		U		20		U	GAM
Europium 152		U		10		U	GAM
Europium 154		U		6		U	GAM
Europium 155		U		10		U	GAM
Radium 226		U		9		U	GAM

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6112

6112-004

DATA SHEET, cont

A4CM-95-0090

SDG 6112Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504096-04Client sample id A4CM-95-0090Dept sample id 6112-004Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		20		U	GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504096-04	SR	6112-004		1.00 L	05/24/95	05/24/95	IEP
4096-04	TH	6112-004		0.500 L	05/20/95	05/24/95	IEP
4096-04	U	6112-004		0.200 L	05/19/95	05/24/95	IEP
N504096-04	PU	6112-004		0.500 L	05/19/95	05/24/95	IEP
N504096-04	GAM	6112-004		1.00 L	06/15/95	06/20/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA / RICHMOND

REPORTING GROUP 6112

6112-006

A4CM-95-0092

DATA SHEET

SDG 6112

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504096-06Client sample id A4CM-95-0092Dept sample id 6112-006Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Strontium 90	10098-97-2	-0.026	0.096	0.2	0.5	U	SR
Thorium 228		0.088	0.10	0.2	0.5	U	TH
Thorium 230	14269-63-7	0.050	0.075	0.1	0.5	U	TH
Thorium 232	7740-29-1	-0.013	0.025	0.1	0.5	U	TH
Uranium 233/234	11-08-5	-0.040	0.10	0.2	0.5	U	U
Uranium 235	14117-96-1	0.012	0.072	0.1	0.5	U	U
Uranium 238	7440-61-1	0.020	0.040	0.08	0.5	U	U
Plutonium 238	13981-16-3	0.009	0.018	0.04	0.1	U	PU
Plutonium 239/240	10-12-8	0.004	0.018	0.03	0.1	U	PU
MA SCAN ANALYTES		U					
Potassium 40		U		90		U	GAM
Chromium 51		U		100		U	GAM
Manganese 54		U		6		U	GAM
Cobalt 58		U		8		U	GAM
Iron 59		U		20		U	GAM
Cobalt 60		U		6		U	GAM
Zinc 65		U		10		U	GAM
Niobium 94		U		5		U	GAM
Ruthenium 103		U		10		U	GAM
Ruthenium 106		U		40		U	GAM
Tin 113		U		7		U	GAM
Cesium 134		U		6		U	GAM
Cesium 137		U		5	5	U	GAM
Cerium 144		U		20		U	GAM
Europium 152		U		8		U	GAM
Europium 154		U		5		U	GAM
Europium 155		U		9		U	GAM
Radium 226		U		9		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6112

6112-006

A4CM-95-0092

DATA SHEET, cont

SDG 6112Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504096-06Client sample id A4CM-95-0092Dept sample id 6112-006Location/Matrix SSFL AREA 4 WATERReceived 04/27/95Collected 04/24/95

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Thorium 232		U		20		U	GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N504096-06	SR	6112-006		1.00 L	05/24/95	05/24/95	IEP
4096-06	TH	6112-006		0.500 L	05/20/95	05/24/95	IEP
4096-06	U	6112-006		0.200 L	05/19/95	05/24/95	IEP
N504096-06	PU	6112-006		0.500 L	05/23/95	05/24/95	IEP
N504096-06	GAM	6112-006		1.00 L	06/15/95	06/20/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6112

Test GAM Matrix WATERSDG 6112Contact Italy E. Pittman

LAB METHOD SUMMARY

GAMMA EMITTERS

GAMMA SCAN

Client RocketdyneContract R44PJZ94034044

RESULTS

LAB RAW SUP-

SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Cobalt 60 Cesium 137

Preparation batch 2781-104

N504096-08	6112-008	A4CM-95-0095	U	U
N504096-09	6112-009	LCS (QC ID=23821)	No data U	ok
N504096-10	6112-010	BLK (QC ID=23822)	U	U

Preparation batch 2781-104B

N504096-02	6112-002	A4CM-95-0086	U	U
N504096-04	6112-004	A4CM-95-0090	U	U
N504096-06	6112-006	A4CM-95-0092	U	U

Nominal values and limits from method RDLs (pCi/L) 5

METHOD PERFORMANCE

LAB RAW SUP-

SAMPLE ID TEST FIX CLIENT SAMPLE ID MDA ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS ANAL-
pCi/L L FAC TION % % min keV KeV HELD PREPARED YZED DETECTOR

Preparation batch 2781-104 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 104

N504096-08	A4CM-95-0095	3	1.00			514		16	05/10/95	05/10	02.04,00
N504096-09	LCS (QC ID=23821)		1.00			412			05/11/95	05/11	MB,03,00
N504096-10	BLK (QC ID=23822)	3	1.00			412			05/11/95	05/11	02.04,00

Preparation batch 2781-104B 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 104

N504096-02	A4CM-95-0086	4	1.00			1023		56	05/10/95	06/15	01.02,00
N504096-04	A4CM-95-0090	5	1.00			1032		52	05/10/95	06/15	01.03,00
N504096-06	A4CM-95-0092	5	1.00			1047		52	05/10/95	06/15	01.01,00

Nominal values and limits from method 5 1.00 400 180

PROCEDURES REFERENCE ASTM 3649-85; EPA 901.1
EP-100 Ge(Li) Preparation for Environmental Samples,
rev 0

AVERAGES ± 2 SD

MDA 4 ± 2

FOR 5 SAMPLES

YIELD ±

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-LMSVersion 3.06Report date 06/20/95

TMA / RICHMOND

REPORTING GROUP 6113

6113-001

DATA SHEET

A4CM-95-0070

SDG 6113Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-01Client sample id A4CM-95-0070Dept sample id 6113-001Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/18/95% moisture 26.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-35	250	400	500	U	H
Strontium 90	10098-97-2	-0.016	0.059	0.09	0.5	U	SR
Thorium 228		1.2	0.14	0.07	0.1		TH
Thorium 230	14269-63-7	0.68	0.095	0.03	0.1	B	TH
Thorium 232	7740-29-1	0.79	0.10	0.02	0.1		TH
Uranium 233/234	11-08-5	0.68	0.049	0.009	0.01		U
Uranium 235	14117-96-1	0.023	0.009	0.006	0.01		U
Uranium 238	7440-61-1	0.59	0.044	0.007	0.01		U
Plutonium 238	13981-16-3	0.001	0.007	0.01	0.01	U	PU
Plutonium 239/240	10-12-8	0.002	0.003	0.006	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Beryllium 7		0.34	0.19				GAM
Potassium 40		19	0.35				GAM
Chromium 51		U		0.4		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.08		U	GAM
Cobalt 60		0.013	0.012				GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		U		0.02	0.02	U	GAM
Cerium 144		U		0.09		U	GAM
Europium 152		U		0.03		U	GAM
Europium 154		U		0.02		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6113

6113-001

A4CM-95-0070

DATA SHEET, cont

SDG 6113

Client Rocketdyne

Contact Italy E. Pittman

Contract R44PJZ94034044

Lab sample id N504097-01

Client sample id A4CM-95-0070

Dept sample id 6113-001

Location/Matrix SSFL AREA 4 SOIL

Received 04/27/95

Collected 04/18/95

% moisture 26.0

Chain of custody id

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Europium 155		U		0.07		U	GAM
Radium 226		0.72	0.030				GAM
Thorium 232		1.3	0.069				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
4097-01	H	6113-001		0.00700 L	05/12/95	06/14/95	IEP
N504097-01	SR	6113-001		2.00 g	05/27/95	06/06/95	IEP
N504097-01	TH	6113-001		1.00 g	06/06/95	06/14/95	IEP
N504097-01	U	6113-001		3.00 g	05/26/95	06/05/95	IEP
N504097-01	PU	6113-001		3.00 g	05/24/95	06/05/95	IEP
N504097-01	GAM	6113-001		751 g	06/16/95	06/20/95	IEP

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-DS

Version 3.06

Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6113

6113-010

DATA SHEET

A4CM-95-0077

SDG 6113

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-10Client sample id A4CM-95-0077Dept sample id 6113-010Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/19/95% moisture 16.7

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		-160	270	500	500	U	H
Strontium 90	10098-97-2	0.016	0.052	0.08	0.5	U	SR
Thorium 228		1.2	0.15	0.07	0.1		TH
Thorium 230	14269-63-7	1.3	0.15	0.03	0.1	B	TH
Thorium 232	7740-29-1	1.1	0.13	0.03	0.1		TH
Uranium 233/234	11-08-5	1.3	0.063	0.01	0.01		U
Uranium 235	14117-96-1	0.070	0.013	0.004	0.01		U
Uranium 238	7440-61-1	1.3	0.062	0.008	0.01		U
Antonium 238	13981-16-3	-0.004	0.004	0.01	0.01	U	PU
Antonium 239/240	10-12-8	-0.001	0.001	0.007	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		18	0.35				GAM
Chromium 51		U		0.4		U	GAM
Manganese 54		U		0.02		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.05		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		U		0.01	0.02	U	GAM
Cerium 144		U		0.08		U	GAM
Europium 152		U		0.03		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.06		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6113

6113-010

A4CM-95-0077

DATA SHEET, cont

SDG 6113
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504097-10
Dept sample id 6113-010
Received 04/27/95
% moisture 16.7Client sample id A4CM-95-0077
Location/Matrix SSFL AREA 4 SOIL
Collected 04/19/95
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.85	0.031				GAM
Thorium 232		1.2	0.068				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
04097-10	H	6113-010		0.00570 L	05/13/95	06/14/95	IEP
04097-10	SR	6113-010		2.00 g	05/27/95	06/06/95	
N504097-10	TH	6113-010		1.00 g	06/05/95	06/06/95	IEP
N504097-10	U	6113-010		3.00 g	05/30/95	06/05/95	IEP
N504097-10	PU	6113-010		3.00 g	05/24/95	06/05/95	IEP
N504097-10	GAM	6113-010		750 g	06/16/95	06/20/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA / RICHMOND

REPORTING GROUP 6113

6113-016

A4CM-95-0083

DATA SHEET

SDG 6113

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N504097-16Client sample id A4CM-95-0083Dept sample id 6113-016Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 17.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0	330	600	500	U	H
Strontium 90	10098-97-2	0.003	0.062	0.09	0.5	U	SR
Thorium 228		1.5	0.13	0.06	0.1		TH
Thorium 230	14269-63-7	1.1	0.11	0.02	0.1	B	TH
Thorium 232	7740-29-1	1.3	0.12	0.03	0.1		TH
Uranium 233/234	11-08-5	0.81	0.060	0.02	0.01		U
Uranium 235	14117-96-1	0.050	0.014	0.008	0.01		U
Uranium 238	7440-61-1	0.82	0.060	0.01	0.01		U
Plutonium 238	13981-16-3	0.001	0.001	0.004	0.01	U	PU
Plutonium 239/240	10-12-8	0.001	0.003	0.005	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.35				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.02		U	GAM
Zinc 65		U		0.05		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		U		0.01	0.02	U	GAM
Cerium 144		U		0.08		U	GAM
Europium 152		U		0.03		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.08		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6113

6113-016

DATA SHEET, cont

A4CM-95-0083

SDG 6113Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N504097-16Client sample id A4CM-95-0083Dept sample id 6113-016Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 17.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.96	0.032				GAM
Thorium 232		1.4	0.075				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
04097-16	H	6113-016		0.00520 L	05/13/95	06/14/95	IEP
04097-16	SR	6113-016		2.00 g	05/27/95	06/06/95	
N504097-16	TH	6113-016		1.00 g	06/06/95	06/08/95	IEP
N504097-16	U	6113-016		3.00 g	05/31/95	06/05/95	IEP
N504097-16	PU	6113-016		3.00 g	05/24/95	06/05/95	IEP
N504097-16	GAM	6113-016		751 g	06/16/95	06/20/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6113

6113-017

A4CM-95-0084

DATA SHEET

SDG 6113

Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id NS04097-17Client sample id A4CM-95-0084Dept sample id 6113-017Location/Matrix SSFL AREA 4 SOILReceived 04/27/95Collected 04/20/95% moisture 15.7

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium		0	500	900	500	U	H
Strontium 90	10098-97-2	-0.004	0.047	0.07	0.5	U	SR
Thorium 228		1.1	0.099	0.05	0.1		TH
Thorium 230	14269-63-7	0.92	0.086	0.02	0.1	B	TH
Thorium 232	7740-29-1	1.1	0.095	0.01	0.1		TH
Uranium 233/234	11-08-5	0.83	0.051	0.01	0.01		U
Uranium 235	14117-96-1	0.043	0.011	0.005	0.01		U
Uranium 238	7440-61-1	0.81	0.049	0.008	0.01		U
Plutonium 238	13981-16-3	0.001	0.003	0.008	0.01	U	PU
Plutonium 239/240	10-12-8	0.003	0.003	0.007	0.01	U	PU
GAMMA SCAN ANALYTES		U					
Potassium 40		20	0.34				GAM
Chromium 51		U		0.3		U	GAM
Manganese 54		U		0.03		U	GAM
Cobalt 58		U		0.02		U	GAM
Iron 59		U		0.07		U	GAM
Cobalt 60		U		0.01		U	GAM
Zinc 65		U		0.04		U	GAM
Niobium 94		U		0.01		U	GAM
Ruthenium 103		U		0.03		U	GAM
Ruthenium 106		U		0.1		U	GAM
Tin 113		U		0.02		U	GAM
Cesium 134		U		0.02		U	GAM
Cesium 137		U		0.01	0.02	U	GAM
Cerium 144		U		0.08		U	GAM
Europium 152		U		0.03		U	GAM
Europium 154		U		0.02		U	GAM
Europium 155		U		0.1		U	GAM

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6113

6113-017

A4CM-95-0084

DATA SHEET, cont

SDG 6113
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N504097-17
Dept sample id 6113-017
Received 04/27/95
% moisture 15.7Client sample id A4CM-95-0084
Location/Matrix SSFL AREA 4 SOIL
Collected 04/20/95
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Radium 226		0.93	0.034				GAM
Thorium 232		1.4	0.080				GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUT	ANALYZED	REVIEWED	BY
N504097-17	H	6113-017		0.00340 L	05/13/95	06/14/95	IEP
4097-17	SR	6113-017		2.00 g	05/27/95	06/06/95	
N504097-17	TH	6113-017		1.00 g	06/06/95	06/08/95	IEP
N504097-17	U	6113-017		3.00 g	06/01/95	06/06/95	IEP
N504097-17	PU	6113-017		3.00 g	05/24/95	06/05/95	IEP
N504097-17	GAM	6113-017		750 g	06/17/95	06/20/95	IEP

Lab id TMAN
 Protocol ROCKETDYNE
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6113

Test GAM Matrix SOILSDG 6113Contact Italy E. Pittman

LAB METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client RocketdyneContract R44PJZ94034044

RESULTS

LAB RAW SUF-

SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Cesium 137

Preparation batch 2781-110

N504097-02	6113-002	A4CM-95-0071	0.063
N504097-03	6113-003	A4CM-95-0087	0.031
N504097-04	6113-004	A4CM-95-0088	0.19
N504097-05	6113-005	A4CM-95-0072	0.12
N504097-06	6113-006	A4CM-95-0073	0.23
N504097-07	6113-007	A4CM-95-0074	0.071
N504097-08	6113-008	A4CM-95-0075	0.056
N504097-09	6113-009	A4CM-95-0076	0.11
N504097-11	6113-011	A4CM-95-0078	U
N504097-12	6113-012	A4CM-95-0079	0.30
N504097-13	6113-013	A4CM-95-0080	0.098
N504097-14	6113-014	A4CM-95-0081	0.087
N504097-15	6113-015	A4CM-95-0082	0.088
N504097-18	6113-018	A4CM-95-0093	0.68
N504097-19	6113-019	A4CM-95-0096	2.4
N504097-20	6113-020	LCS (QC ID=23823)	ok
N504097-21	6113-021	BLK (QC ID=23824)	U
N504097-22	6113-022	Duplicate (N504097-11)	- U

Preparation batch 2781-110B

N504097-01	6113-001	A4CM-95-0070	U
N504097-10	6113-010	A4CM-95-0077	U
N504097-16	6113-016	A4CM-95-0083	U
N504097-17	6113-017	A4CM-95-0084	U

Nominal values and limits from method RDLs (pCi/g) 0.02

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-LMSVersion 3.06Report date 06/20/95

TMA/RICHMOND

REPORTING GROUP 6113

Test GAM Matrix SOILSDG 6113Contact Italy E. Pittman

LAB METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client RocketdyneContract R44PJZ94034044

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-				
SAMPLE ID	TEST	FIX	CLIENT	SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR

Preparation batch 2781-110 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 110

N504097-02	A4CM-95-0071			750					406			27	05/11/95	05/15	MB,02,00
N504097-03	A4CM-95-0087			750					406			24	05/11/95	05/15	MB,03,00
N504097-04	A4CM-95-0088			750					405			24	05/11/95	05/15	01,04,00
N504097-05	A4CM-95-0072			751					1018			24	05/11/95	05/15	01,01,00
N504097-06	A4CM-95-0073			750					1018			24	05/11/95	05/15	MB,02,00
N504097-07	A4CM-95-0074			750					1018			26	05/11/95	05/15	MB,03,00
N504097-08	A4CM-95-0075			750					1018			26	05/11/95	05/15	01,04,00
N504097-09	A4CM-95-0076			751					365			27	05/11/95	05/16	01,01,00
N504097-11	A4CM-95-0078		0.02	751					364			27	05/11/95	05/16	01,04,00
N504097-12	A4CM-95-0079			750					403			27	05/11/95	05/17	01,04,00
N504097-13	A4CM-95-0080			751					488			27	05/11/95	05/17	01,01,00
N504097-14	A4CM-95-0081			750					401			27	05/11/95	05/17	01,04,00
N504097-15	A4CM-95-0082			751					400			27	05/11/95	05/17	01,01,00
N504097-18	A4CM-95-0093			117					1573			23	05/11/95	05/17	JR,04,00
N504097-19	A4CM-95-0096			751					431			24	05/11/95	05/18	01,01,00
N504097-20	LCS (QC ID=23823)			850					431				05/11/95	05/18	MB,02,00
N504097-21	BLK (QC ID=23824)		0.009	850					431				05/11/95	05/18	MB,03,00
N504097-22	Duplicate (N504097-11)		0.02	186					909			29	05/11/95	05/18	JR,04,00

Preparation batch 2781-110B 2σ prep error 15.0 % Reference Lab Notebook 2781 pg. 110

N504097-01	A4CM-95-0070		0.02	751					1442			59	05/11/95	06/16	02,02,00
N504097-10	A4CM-95-0077		0.01	750					1477			58	05/11/95	06/16	02,03,00
N504097-16	A4CM-95-0083		0.01	751					1444			57	05/11/95	06/16	02,01,00
N504097-17	A4CM-95-0084		0.01	750					1503			58	05/11/95	06/17	02,01,00

Nominal values and limits from method 0.02 850 700 180

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

AVERAGES ± 2 SD MDA 0.01 ± 0.01
FOR 7 SAMPLES YIELD ±

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 06/20/95

TMA
Thermo Analytical

2030 Wright Avenue

P.O. Box 4040

Richmond, CA 94804-0040

(510) 235-2633 Fax: 235-0438

June 29, 1995

Mr. Alex Klein
Rockwell International Corp.
Rocketdyne Division
6633 Canoga Ave.
Canoga Park, CA 91303

Ref: Customer P.O. No. R44PJZ94034044
TMA/Richmond Report N5-06-054-6103 (rev)
Report N5-06-055-6104 (rev)
Report N5-06-056-6105 (rev)
Report N5-06-057-6106 (rev)
Report N5-06-058-6109 (rev)
Report N5-06-059-6111 (rev)

Dear Mr. Klein:

Enclosed is the recalculated data report for Tritium analyses for the first four soil batches received at TMA/Richmond between December 9, 1994 and April 6, 1995. The recalculated data are being submitted for the samples and not the Quality Controls samples since they were not affected by the changes in units. This report includes data for the tritium analyses only. To maintain two separate reports in our data base, the group numbers for these samples have been modified slightly. The recalculated data is being reported using an "H" before the last three digits of the previous group number, example: H103 instead of 6103.

If you have any questions regarding this data, or any problems with the hard copy or electronic deliverable diskette, please call me at (510) 235-2633.

Sincerely,



Italy E. Pittman
Program Manager

Enclosures: Data Report
Diskette

1.0 GENERAL

TMA/Richmond Sample Delivery Group (SDG) 6103 consists of eleven soils that were received on December 9, 1994. SDG 6104 consists of ten soil samples received on December 9, 1994. SDG 6105 consists of eleven soil samples received on February 28, 1995. SDG 6106 consists of ten soil samples received on February 28, 1995. SDG 6109 consists of twenty-one soil samples received on March 15, 1995. SDG 6111 consists of twenty-one soil samples received on April 6, 1995.

2.0 ANALYTICAL NOTES

2.1 Tritium Analyses

H103 (Soil)

All samples have aliquot sizes less than the nominal 10 mL required. The Minimum Detected Activity (MDA) for all of the samples are greater than the Required Detection Limit (RDL). This is a resultant of the low percent moisture present in the sample that yield a smaller aliquot from Azeotropic distillation for tritium analysis.

H104 (Soil)

All samples have aliquot sizes less than the nominal 10 mL required. The MDA for all of the samples are greater than the RDL. This is a resultant of the low percent moisture present in the sample that yield a smaller aliquot from Azeotropic distillation for tritium analysis.

H105 (Soil)

All samples have aliquot sizes less than the nominal 10 mL required. The MDA for all of the samples are greater than the RDL, except for samples A4CM-95-0001A and A4CM-95-0003A. The higher MDA's are a resultant of the low percent moisture present in the sample that yield a smaller aliquot from Azeotropic distillation for tritium analysis.

H106 (Soil)

All samples have aliquot sizes less than the nominal 10 mL required. The MDA for all of the samples are greater than the RDL. This is a resultant of the low percent moisture present in the sample that yield a smaller aliquot from Azeotropic distillation for tritium analysis.

2.1 Tritium Analyses continuedH109 (Soil)

Several samples have aliquot sizes less than the nominal 10 mL required. The following samples have MDAs' greater than the RDL: A4CM-95-0024, A4CM-95-0027, A4CM-95-0028, A4CM-95-0029, A4CM-95-0033, A4CM-95-0037, A4CM-95-0038, and A4CM-95-0039. This is a resultant of the low percent moisture present in the sample that yield a smaller aliquot from Azeotropic distillation for tritium analysis.

H111 (Soil)

All samples have aliquot sizes less than the nominal 10 mL required. The MDA for all of the samples are greater than the RDL, except for sample A4CM-95-0062. The higher MDA is a resultant of the low percent moisture present in the sample that yield a smaller aliquot from Azeotropic distillation for tritium analysis.

T M A / R I C H M O N D
REPORTING GROUP H103

SDG H103
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S					
Sample Summaries	.	.	.	.	1
Prep Batch Summary	.	.	.	.	3
Work Summary	.	.	.	.	4
Data Sheets	.	.	.	.	6
Method Summaries	.	.	.	.	17
End of Section	.	.	.	.	18

Italy E. Pittman 6/29/95
Prepared by

Walid Maha 6/29/95
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

SDG H103

Contact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-94-0001	SSFL AREA 4	SOIL		N506054-01			11/17/94
A4CM-94-0002	SSFL AREA 4	SOIL		N506054-02			11/17/94
A4CM-94-0003	SSFL AREA 4	SOIL		N506054-03			11/18/94
A4CM-94-0004	SSFL AREA 4	SOIL		N506054-04			11/18/94
A4CM-94-0005	SSFL AREA 4	SOIL		N506054-05			11/18/94
A4CM-94-0006	SSFL AREA 4	SOIL		N506054-06			11/18/94
A4CM-94-0007	SSFL AREA 4	SOIL		N506054-07			11/21/94
A4CM-94-0008	SSFL AREA 4	SOIL		N506054-08			11/21/94
A4CM-94-0009	SSFL AREA 4	SOIL		N506054-09			11/21/94
A4CM-94-0010	SSFL AREA 4	SOIL		N506054-10			11/22/94
A4CM-94-0011	SSFL AREA 4	SOIL		N506054-11			11/22/94

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

SDG H103

Contact Italy E. Pittman

QC SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CHAIN OF		CLIENT SAMPLE ID	MATRIX	%	SAMPLE MOIST	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	DEPARTMENT SAMPLE ID
QC BATCH	CUSTODY								
H103		A4CM-94-0001	SOIL	10.5			12/09/94 22	N506054-01	H103-001
		A4CM-94-0002	SOIL	10.8			12/09/94 22	N506054-02	H103-002
		A4CM-94-0003	SOIL	7.0			12/09/94 21	N506054-03	H103-003
		A4CM-94-0004	SOIL	7.0			12/09/94 21	N506054-04	H103-004
		A4CM-94-0005	SOIL	9.3			12/09/94 21	N506054-05	H103-005
		A4CM-94-0006	SOIL	8.0			12/09/94 21	N506054-06	H103-006
		A4CM-94-0007	SOIL	7.0			12/09/94 18	N506054-07	H103-007
		A4CM-94-0008	SOIL	9.2			12/09/94 18	N506054-08	H103-008
		A4CM-94-0009	SOIL	10.2			12/09/94 18	N506054-09	H103-009
		A4CM-94-0010	SOIL	11.1			12/09/94 17	N506054-10	H103-010
		A4CM-94-0011	SOIL	10.6			12/09/94 17	N506054-11	H103-011

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

SDG H103

Fact Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI-	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Liquid Scintillation										
H	SOIL-R	Tritium-Soil	2781-016H	10.0	11					

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

SDG H103

Contact Italy E. Pittman

WORK SUMMARY

Client RocketdyneContract R44PJZ94034044

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED			SUF-					
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
A4CM-94-0001		N506054-01	H103-001	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/17/94 12/09/94								
A4CM-94-0002		N506054-02	H103-002	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/17/94 12/09/94								
A4CM-94-0003		N506054-03	H103-003	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/18/94 12/09/94								
A4CM-94-0004		N506054-04	H103-004	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/18/94 12/09/94								
A4CM-94-0005		N506054-05	H103-005	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/18/94 12/09/94								
A4CM-94-0006		N506054-06	H103-006	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/18/94 12/09/94								
A4CM-94-0007		N506054-07	H103-007	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/21/94 12/09/94								
A4CM-94-0008		N506054-08	H103-008	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/21/94 12/09/94								
A4CM-94-0009		N506054-09	H103-009	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/21/94 12/09/94								
A4CM-94-0010		N506054-10	H103-010	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/22/94 12/09/94								

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CWSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

SDG H103tact Italy E. Pittman

WORK SUMMARY, cont.

Client RocketdyneContract R44PJZ94034044

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED			SUF-					
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
A4CM-94-0011		N506054-11	H103-011	H		01/05/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	11/22/94								
		12/09/94								

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
H		Tritium-Soil	EPA 906.0; ASTM 2476-81	11							11
TOTALS				11							11

AK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 5

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CWSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

N506054-01

A4CM-94-0001

DATA SHEET

SDG H103Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506054-01Client sample id A4CM-94-0001Dept sample id H103-001Location/Matrix SSFL AREA 4SOILReceived 12/09/94Collected 11/17/94% moisture 10.5

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-540	860	2600	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506054-01	H	H103-001		0.00180 L	01/05/95	06/28/95	IEP

ATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 6

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

N506054-02

A4CM-94-0002

DATA SHEET

SDG H103Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506054-02Client sample id A4CM-94-0002Dept sample id H103-002Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/17/94% moisture 10.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-130	730	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUT	ANALYZED	REVIEWED	BY
N506054-02	H	H103-002		0.00210 L	01/05/95	06/28/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

ATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 7

TMA/RICHMOND

REPORTING GROUP H103

N506054-03

A4CM-94-0003

DATA SHEET

SDG <u>H103</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506054-03</u>	Client sample id <u>A4CM-94-0003</u>
Dept sample id <u>H103-003</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>12/09/94</u>	Collected <u>11/18/94</u>
% moisture <u>7.0</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		<u>-1500</u>	1200	<u>2000</u>	500	<u>U</u>	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506054-03	H	H103-003		<u>0.00120 L</u>	01/05/95	06/28/95	IEP

DATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 8

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

N506054-04

A4CM-94-0004

DATA SHEET

SDG H103
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506054-04Client sample id A4CM-94-0004Dept sample id H103-004Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/18/94% moisture 7.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-930	1300	2000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506054-04	H	H103-004		0.00110 L	01/05/95	06/28/95	IEP

DATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 9

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA / RICHMOND

REPORTING GROUP H103

N506054-05

A4CM-94-0005

DATA SHEET

SDG H103Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506054-05Client sample id A4CM-94-0005Dept sample id H103-005Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/18/94% moisture 9.3

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-1000	870	2000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N506054-05	H	H103-005		0.00170 L	01/05/95	06/28/95	IEP

ATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 10

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

N506054-06

A4CM-94-0006

DATA SHEET

SDG H103Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506054-06Client sample id A4CM-94-0006Dept sample id H103-006Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/18/94% moisture 8.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-900	990	2000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506054-06	H	H103-006		0.00150 L	01/05/95	06/28/95	IEP

7

ATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 11

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

N506054-07

A4CM-94-0007

DATA SHEET

SDG H103Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506054-07Client sample id A4CM-94-0007Dept sample id H103-007Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/21/94% moisture 7.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-650	1400	2000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506054-07	H	H103-007		0.00110 L	01/05/95	06/28/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

DATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 12

TMA / RICHMOND

REPORTING GROUP H103

N506054-08

DATA SHEET

A4CM-94-0008

SDG H103Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506054-08Client sample id A4CM-94-0008Dept sample id H103-008Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/21/94% moisture 9.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		<u>-1000</u>	920	<u>2000</u>	500	<u>U</u>	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506054-08	H	H103-008		<u>0.00160 L</u>	01/05/95	06/28/95	IEP

ATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 13

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

N506054-09

A4CM-94-0009

DATA SHEET

SDG H103Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506054-09Client sample id A4CM-94-0009Dept sample id H103-009Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/21/94% moisture 10.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-130	880	2000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506054-09	H	H103-009		0.00180 L	01/05/95	06/28/95	IEP

ATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 14

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

N506054-10

A4CM-94-0010

DATA SHEET

SDG H103Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506054-10Client sample id A4CM-94-0010Dept sample id H103-010Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/22/94% moisture 11.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-370	770	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506054-10	H	H103-010		0.00200 L	01/05/95	06/28/95	IEP

DATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 15

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

N506054-11

A4CM-94-0011

DATA SHEET

SDG H103
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506054-11
Dept sample id H103-011
Received 12/09/94
% moisture 10.6Client sample id A4CM-94-0011
Location/Matrix SSFL AREA 4 SOIL
Collected 11/22/94
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		<u>-1100</u>	780	<u>1000</u>	500	<u>U</u>	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506054-11	H	H103-011		<u>0.00190 L</u>	01/05/95	06/28/95	IEP

ATA SHEETS

Page 11

SUMMARY DATA SECTION

Page 16

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL-R
SDG H103
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Tritium
------------------	------------------	----------------------	----------	---------

Preparation batch 2781-016H

A4CM-94-0001	N506054-01	H103-001	U
A4CM-94-0002	N506054-02	H103-002	U
A4CM-94-0003	N506054-03	H103-003	U
A4CM-94-0004	N506054-04	H103-004	U
A4CM-94-0005	N506054-05	H103-005	U
A4CM-94-0006	N506054-06	H103-006	U
A4CM-94-0007	N506054-07	H103-007	U
A4CM-94-0008	N506054-08	H103-008	U
A4CM-94-0009	N506054-09	H103-009	U
A4CM-94-0010	N506054-10	H103-010	U
A4CM-94-0011	N506054-11	H103-011	U

Nominal values and limits from method RDLs (pCi/L) 500

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	----------------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 2781-016H 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 016

A4CM-94-0001	N506054-01	2000	0.0018						50			49	12/20/94	01/05	LSC-005
A4CM-94-0002	N506054-02	1000	0.0021						50			49	12/20/94	01/05	LSC-005
A4CM-94-0003	N506054-03	2000	0.0012						50			48	12/20/94	01/05	LSC-005
A4CM-94-0004	N506054-04	2000	0.0011						50			48	12/20/94	01/05	LSC-005
A4CM-94-0005	N506054-05	2000	0.0017						50			48	12/20/94	01/05	LSC-005
A4CM-94-0006	N506054-06	2000	0.0015						50			48	12/20/94	01/05	LSC-005
A4CM-94-0007	N506054-07	2000	0.0011						50			45	12/20/94	01/05	LSC-005
A4CM-94-0008	N506054-08	2000	0.0016						50			45	12/20/94	01/05	LSC-005
A4CM-94-0009	N506054-09	2000	0.0018						50			45	12/20/94	01/05	LSC-005
A4CM-94-0010	N506054-10	1000	0.0020						50			44	12/20/94	01/05	LSC-005
A4CM-94-0011	N506054-11	1000	0.0019						50			44	12/20/94	01/05	LSC-005

Nominal values and limits from method 500 0.0100 50 180

D SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 17

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H103

METHOD SUMMARY, cont.

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL-R
SDG H103
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

PROCEDURES	REFERENCE	EPA 906.0; ASTM 2476-81
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-211	Tritium in Solid Samples by Azeotropic Distillation, rev 0

AVERAGES $\pm$ 2 SD	MDA <u>2000</u> $\pm$ <u>900</u>
FOR 11 SAMPLES	YIELD _____ $\pm$ _____

OD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 18

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 06/29/95



T M A / R I C H M O N D
REPORTING GROUP H104

SDG H104
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S					
Sample Summaries	.	.	.	.	1
Prep Batch Summary	.	.	.	.	3
Work Summary	.	.	.	.	4
Duplicates	.	.	.	.	6
Data Sheets	.	.	.	.	7
Method Summaries	.	.	.	.	17
End of Section	.	.	.	.	18

Italy E. Pittman 6/29/95
Prepared by

Nahid Mahan 6/29/95
Reviewed by

Lab id	<u>TMAN</u>
Protocol	<u>ROCKETDYNE</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-TOC</u>
Version	<u>3.06</u>
Report date	<u>06/29/95</u>

TMA/RICHMOND

REPORTING GROUP H104

SDG H104

act Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-94-0013	SSFL AREA 4	SOIL		N506055-03			11/22/94
A4CM-94-0014	SSFL AREA 4	SOIL		N506055-04			11/23/94
A4CM-94-0015	SSFL AREA 4	SOIL		N506055-05			11/23/94
A4CM-94-0016	SSFL AREA 4	SOIL		N506055-06			11/23/94
A4CM-94-0017	SSFL AREA 4	SOIL		N506055-07			11/28/94
A4CM-94-0018	SSFL AREA 4	SOIL		N506055-08			11/28/94
A4CM-94-0019	SSFL AREA 4	SOIL		N506055-09			11/29/94
A4CM-94-0020	SSFL AREA 4	SOIL		N506055-10			11/29/94
A4CM-94-0021	SSFL AREA 4	SOIL		N506055-11			11/30/94
A4CM-94-0022	SSFL AREA 4	SOIL		N506055-12			11/30/94
Duplicate (N506055-05)	SSFL AREA 4	SOIL		N506055-15			11/23/94

LE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

SDG H104act Italy E. Pittman

QC SUMMARY

Client RocketdyneContract R44PJZ94034044

CHAIN OF		CLIENT SAMPLE ID	MATRIX	%	SAMPLE MOIST	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	DEPARTMENT SAMPLE ID
QC BATCH	CUSTODY								
H104		A4CM-94-0013	SOIL				12/09/94	17	N506055-03 H104-003
		A4CM-94-0014	SOIL				12/09/94	16	N506055-04 H104-004
		A4CM-94-0015	SOIL				12/09/94	16	N506055-05 H104-005
		A4CM-94-0016	SOIL				12/09/94	16	N506055-06 H104-006
		A4CM-94-0017	SOIL				12/09/94	11	N506055-07 H104-007
		A4CM-94-0018	SOIL				12/09/94	11	N506055-08 H104-008
		A4CM-94-0019	SOIL				12/09/94	10	N506055-09 H104-009
		A4CM-94-0020	SOIL				12/09/94	10	N506055-10 H104-010
		A4CM-94-0021	SOIL				12/09/94	9	N506055-11 H104-011
		A4CM-94-0022	SOIL				12/09/94	9	N506055-12 H104-012
		Duplicate (N506055-05)	SOIL				12/09/94	16	N506055-15 H104-015

SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-QSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

PREP BATCH SUMMARY

SDG H104

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALI- FIERS
Liquid Scintillation												
H	SOIL-R	Tritium-Soil	2781-024H	10.0	10							1/1

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

SDG H104

Contact Italy E. Pittman

WORK SUMMARY

Client RocketdyneContract R44PJZ94034044

CLIENT SAMPLE ID	MATRIX	LAB SAMPLE ID	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD
LOCATION		COLLECTED		FIX				
CUSTODY	SAS no	RECEIVED	PLANCHET					
A4CM-94-0013		N506055-03	H104-003	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/22/94 12/09/94						
A4CM-94-0014		N506055-04	H104-004	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/23/94 12/09/94						
A4CM-94-0015		N506055-05	H104-005	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/23/94 12/09/94						
A4CM-94-0016		N506055-06	H104-006	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/23/94 12/09/94						
A4CM-94-0017		N506055-07	H104-007	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/28/94 12/09/94						
A4CM-94-0018		N506055-08	H104-008	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/28/94 12/09/94						
A4CM-94-0019		N506055-09	H104-009	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/29/94 12/09/94						
A4CM-94-0020		N506055-10	H104-010	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/29/94 12/09/94						
A4CM-94-0021		N506055-11	H104-011	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/30/94 12/09/94						
A4CM-94-0022		N506055-12	H104-012	H	12/22/94	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/30/94 12/09/94						

K SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CWSVersion 3.06Report date 06/29/95

REPORTING GROUP H104

tact Italy E. Pittman

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID							
LOCATION	MATRIX	COLLECTED			SUF-				
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD
Duplicate (N506055-05)		N506055-15	H104-015	H	A1	01/10/95	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	11/23/94							
		12/09/94							

COUNTS OF TESTS BY SAMPLE TYPE											
TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
H		Tritium-Soil	EPA 906.0; ASTM 2476-81	10					1		11
TOTALS				10					1		11

Page 5

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-15

A4CM-94-0015

DUPLICATE

SDG H104Contact Italy E. Pittman

DUPLICATE

Lab sample id N506055-15Dept sample id H104-015

ORIGINAL

Lab sample id N506055-05Dept sample id H104-005Received 12/09/94Client RocketdyneContract R44PJZ94034044Client sample id A4CM-94-0015Location/Matrix SSFL AREA 4 SOILCollected 11/23/94

Chain of custody id _____

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	-430	1200	2000	500	U	H	120	680	1000	U	-		

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	H104-015	A1	0.00230	01/10/95	06/28/95 IEP	H104-005		0.00250 L	12/22/94	06/28/95 IEP

QC 22646-22651 DUP #5

/PLICATES

Page 1

SUMMARY DATA SECTION

Page 6

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-03

A4CM-94-0013

DATA SHEET

SDG H104Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506055-03Client sample id A4CM-94-0013Dept sample id H104-003Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/22/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-240	790	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUT	ANALYZED	REVIEWED	BY
N506055-03	H	H104-003		0.00210 L	12/22/94	06/28/95	IEP

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-04

A4CM-94-0014

DATA SHEET

SDG H104Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506055-04Client sample id A4CM-94-0014Dept sample id H104-004Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/23/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		67	670	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506055-04	H	H104-004		0.00250 L	12/22/94	06/28/95	IEP

ATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 8

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-05

A4CM-94-0015

DATA SHEET

SDG H104Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506055-05Client sample id A4CM-94-0015Dept sample id H104-005Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/23/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		120	680	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506055-05	H	H104-005		0.00250 L	12/22/94	06/28/95	IEP

ATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 9

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-06

A4CM-94-0016

DATA SHEET

SDG H104Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506055-06Client sample id A4CM-94-0016Dept sample id H104-006Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/23/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		1000	720	1000	500		H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506055-06	H	H104-006		0.00250 L	12/22/94	06/28/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

DATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 10

TMA / RICHMOND

REPORTING GROUP H104

N506055-07

A4CM-94-0017

DATA SHEET

SDG H104Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506055-07Client sample id A4CM-94-0017Dept sample id H104-007Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/28/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		150	670	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506055-07	H	H104-007		0.00250 L	12/22/94	06/28/95	IEP

ATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 11

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-08

A4CM-94-0018

DATA SHEET

SDG H104Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506055-08Client sample id A4CM-94-0018Dept sample id H104-008Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/28/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		380	780	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506055-08	H	H104-008		0.00220 L	12/22/94	06/28/95	IEP

ATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 12

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-09

A4CM-94-0019

DATA SHEET

SDG H104Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506055-09Client sample id A4CM-94-0019Dept sample id H104-009Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/29/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		620	800	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALiquot	ANALYZED	REVIEWED	BY
N506055-09	H	H104-009		0.00220 L	12/22/94	06/28/95	IEP

DATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 13

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-10

A4CM-94-0020

DATA SHEET

SDG H104Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506055-10Client sample id A4CM-94-0020Dept sample id H104-010Location/Matrix SSFL AREA 4SOILReceived 12/09/94Collected 11/29/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		280	670	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506055-10	H	H104-010		0.00260 L	12/22/94	06/28/95	IEP

ATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 14

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

N506055-11

A4CM-94-0021

DATA SHEET

SDG H104
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506055-11
Dept sample id H104-011
Received 12/09/94Client sample id A4CM-94-0021
Location/Matrix SSFL AREA 4 SOIL
Collected 11/30/94
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		41	820	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506055-11	H	H104-011		0.00210 L	12/22/94	06/28/95	IEP

DATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 15

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA / RICHMOND

REPORTING GROUP H104

N506055-12

A4CM-94-0022

DATA SHEET

SDG H104Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506055-12Client sample id A4CM-94-0022Dept sample id H104-012Location/Matrix SSFL AREA 4 SOILReceived 12/09/94Collected 11/30/94

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		460	590	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506055-12	H	H104-012		0.00290 L	12/22/94	06/28/95	IEP

ATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 16

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL-R

SDG H104

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
------------------	------------------	-----------------	------------------	---------

Preparation batch 2781-024H

A4CM-94-0013	N506055-03		H104-003	U
A4CM-94-0014	N506055-04		H104-004	U
A4CM-94-0015	N506055-05		H104-005	U
A4CM-94-0016	N506055-06		H104-006	1000
A4CM-94-0017	N506055-07		H104-007	U
A4CM-94-0018	N506055-08		H104-008	U
A4CM-94-0019	N506055-09		H104-009	620 U
A4CM-94-0020	N506055-10		H104-010	U
A4CM-94-0021	N506055-11		H104-011	U
A4CM-94-0022	N506055-12		H104-012	U
Duplicate (N506055-05)	N506055-15	A1	H104-015	- U

Nominal values and limits from method RDLs (pCi/L) 500

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- %	YIELD %	EFF min	COUNT keV	FWHM KeV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	----------	-------------	--------------	------------	------------	------------	--------------	-------------	---------------	------------------	---------------	----------

Preparation batch 2781-024H 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 024

A4CM-94-0013	N506055-03		1000	0.0021						50		30	12/22/94	12/22	LSC-004
A4CM-94-0014	N506055-04		1000	0.0025						50		29	12/22/94	12/22	LSC-004
A4CM-94-0015	N506055-05		1000	0.0025						50		29	12/22/94	12/22	LSC-004
A4CM-94-0016	N506055-06		1000	0.0025						50		29	12/22/94	12/22	LSC-004
A4CM-94-0017	N506055-07		1000	0.0025						50		24	12/22/94	12/22	LSC-004
A4CM-94-0018	N506055-08		1000	0.0022						50		24	12/22/94	12/22	LSC-004
A4CM-94-0019	N506055-09		1000	0.0022						50		23	12/22/94	12/22	LSC-004
A4CM-94-0020	N506055-10		1000	0.0026						50		23	12/22/94	12/22	LSC-004
A4CM-94-0021	N506055-11		1000	0.0021						50		22	12/22/94	12/22	LSC-004
A4CM-94-0022	N506055-12		1000	0.0029						50		22	12/22/94	12/22	LSC-004
Duplicate (N506055-05)	N506055-15	A1	2000	0.0023						50		48	01/10/95	01/10	LSC-005

Nominal values and limits from method 500 0.0100 50 180

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 17

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H104

Test H Matrix SOIL-R

SDG H104

act Italy E. Pittman

METHOD SUMMARY, cont.

TRITIUM-SOIL

LIQUID SCINTILLATION

Client Rocketdyne

Contract R44PJZ94034044

PROCEDURES	REFERENCE	EPA 906.0; ASTM 2476-81
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-211	Tritium in Solid Samples by Azeotropic Distillation, rev 0	

AVERAGES $\pm$ 2 SD

MDA 1000 $\pm$ 600

FOR 11 SAMPLES

YIELD _____ $\pm$ _____

SD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 18

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/29/95



T M A / R I C H M O N D
REPORTING GROUP H105

SDG H105
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S				
Sample Summaries	.	.	.	1
Prep Batch Summary	.	.	.	3
Work Summary	.	.	.	4
Duplicates	.	.	.	6
Data Sheets	.	.	.	7
Method Summaries	.	.	.	18
End of Section	.	.	.	19

Italy E. Pittman 6/29/95
Prepared by

David Mahan 6/29/95
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

SDG H105

act Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0001A	SSFL AREA 4	SOIL		N506056-01			02/15/95 08:25
A4CM-95-0002A	SSFL AREA 4	SOIL		N506056-02			02/15/95 09:35
A4CM-95-0003A	SSFL AREA 4	SOIL		N506056-03			02/15/95 10:00
A4CM-95-0004A	SSFL AREA 4	SOIL		N506056-04			02/16/95 09:05
A4CM-95-0005A	SSFL AREA 4	SOIL		N506056-05			02/16/95 10:00
A4CM-95-0006A	SSFL AREA 4	SOIL		N506056-06			02/16/95 10:20
A4CM-95-0007A	SSFL AREA 4	SOIL		N506056-07			02/16/95 13:15
A4CM-95-0008A	SSFL AREA 4	SOIL		N506056-08			02/16/95 13:55
A4CM-95-0009	SSFL AREA 4	SOIL		N506056-09			02/22/95 09:08
A4CM-95-0010	SSFL AREA 4	SOIL		N506056-10			02/22/95 10:02
A4CM-95-0013	SSFL AREA 4	SOIL		N506056-11			02/22/95 10:35
Duplicate (N506056-01)	SSFL AREA 4	SOIL		N506056-14			02/15/95 08:25

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

SDG H105

Contact Italy E. Pittman

QC SUMMARY

Client Rocketdyne

Contract R44FJZ94034044

CHAIN OF		CLIENT SAMPLE ID	MATRIX	%	SAMPLE MOIST AMOUNT	BASIS AMOUNT	DAYS SINCE		LAB SAMPLE ID	DEPARTMENT SAMPLE ID
QC BATCH	CUSTODY						RECEIVED	COLL		
H105		A4CM-95-0001A	SOIL	20.8			02/28/95	13	N506056-01	H105-001
		A4CM-95-0002A	SOIL	17.7			02/28/95	13	N506056-02	H105-002
		A4CM-95-0003A	SOIL	23.0			02/28/95	13	N506056-03	H105-003
		A4CM-95-0004A	SOIL	17.4			02/28/95	12	N506056-04	H105-004
		A4CM-95-0005A	SOIL	16.5			02/28/95	12	N506056-05	H105-005
		A4CM-95-0006A	SOIL	15.2			02/28/95	12	N506056-06	H105-006
		A4CM-95-0007A	SOIL	18.5			02/28/95	12	N506056-07	H105-007
		A4CM-95-0008A	SOIL	12.5			02/28/95	12	N506056-08	H105-008
		A4CM-95-0009	SOIL	14.5			02/28/95	6	N506056-09	H105-009
		A4CM-95-0010	SOIL	15.7			02/28/95	6	N506056-10	H105-010
		A4CM-95-0013	SOIL	13.2			02/28/95	6	N506056-11	H105-011
		Duplicate (N506056-01)	SOIL				02/28/95	13	N506056-14	H105-014

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

PREP BATCH SUMMARY

SDG H105

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALI- FIERS
Liquid Scintillation												
H	SOIL-R	Tritium-Soil	2781-038H	10.0	11							1/1

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

SDG H105

Act Italy E. Pittman

WORK SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID											
LOCATION	MATRIX	COLLECTED		SUF-									
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD				
A4CM-95-0001A		N506056-01	H105-001	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/15/95											
		02/28/95											
A4CM-95-0002A		N506056-02	H105-002	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/15/95											
		02/28/95											
A4CM-95-0003A		N506056-03	H105-003	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/15/95											
		02/28/95											
A4CM-95-0004A		N506056-04	H105-004	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/16/95											
		02/28/95											
A4CM-95-0005A		N506056-05	H105-005	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/16/95											
		02/28/95											
A4CM-95-0006A		N506056-06	H105-006	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/16/95											
		02/28/95											
A4CM-95-0007A		N506056-07	H105-007	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/16/95											
		02/28/95											
A4CM-95-0008A		N506056-08	H105-008	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/16/95											
		02/28/95											
A4CM-95-0009		N506056-09	H105-009	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/22/95											
		02/28/95											
A4CM-95-0010		N506056-10	H105-010	H		03/21/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	02/22/95											
		02/28/95											

K SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

SDG H105

tact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED		SUF-							
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD		
A4CM-95-0013		N506056-11	H105-011	H		03/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	02/22/95									
		02/28/95									
Duplicate (N506056-01)		N506056-14	H105-014	H		03/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	02/15/95									
		02/28/95									

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
H		Tritium-Soil	EPA 906.0; ASTM 2476-81	11					1		12
TOTALS				11					1		12

RK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-14

A4CM-95-0001A

DUPLICATE

SDG H105Contact Italy E. Pittman

DUPLICATE

Lab sample id N506056-14Dept sample id H105-014

ORIGINAL

Lab sample id N506056-01Dept sample id H105-001Received 02/28/95% moisture 20.8Client RocketdyneContract R44PJZ94034044Client sample id A4CM-95-0001ALocation/Matrix SSFL AREA 4 SOILCollected 02/15/95 08:25

Chain of custody id _____

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ PROT TOT LIMIT
Tritium	200	270	500	500	U	H	360	290	500	U	-	

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	H105-014		0.00620	03/22/95	06/28/95 IEP	H105-001		0.00600 L	03/21/95	06/28/95 IEP

QC-DUP#1 23483

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 6

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-01

A4CM-95-0001A

DATA SHEET

SDG H105Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506056-01Client sample id A4CM-95-0001ADept sample id H105-001Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/15/95 08:25% moisture 20.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		360	290	500	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUPPIX	ALIQOT	ANALYZED	REVIEWED	BY
N506056-01	H	H105-001		0.00600 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-02

A4CM-95-0002A

DATA SHEET

SDG H105Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506056-02Client sample id A4CM-95-0002ADept sample id H105-002Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/15/95 09:35% moisture 17.7

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		340	380	600	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506056-02	H	H105-002		0.00450 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 8

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-03

A4CM-95-0003A

DATA SHEET

SDG <u>H105</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506056-03</u>	Client sample id <u>A4CM-95-0003A</u>
Dept sample id <u>H105-003</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>02/28/95</u>	Collected <u>02/15/95 10:00</u>
% moisture <u>23.0</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		300	290	500	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506056-03	H	H105-003		0.00600 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 9

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-04

A4CM-95-0004A

DATA SHEET

SDG <u>H105</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506056-04</u>	Client sample id <u>A4CM-95-0004A</u>
Dept sample id <u>H105-004</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>02/28/95</u>	Collected <u>02/16/95 09:05</u>
% moisture <u>17.4</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		250	430	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUT	ANALYZED	REVIEWED	BY
N506056-04	H	H105-004		0.00390 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 10

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-05

A4CM-95-0005A

DATA SHEET

SDG <u>H105</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506056-05</u>	Client sample id <u>A4CM-95-0005A</u>
Dept sample id <u>H105-005</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>02/28/95</u>	Collected <u>02/16/95 10:00</u>
% moisture <u>16.5</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		220	440	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506056-05	H	H105-005		0.00380 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 11

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-06

A4CM-95-0006A

DATA SHEET

SDG H105Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506056-06Client sample id A4CM-95-0006ADept sample id H105-006Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/16/95 10:20% moisture 15.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		400	420	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506056-06	H	H105-006		0.00400 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 12

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-07

A4CM-95-0007A

DATA SHEET

SDG H105Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506056-07Client sample id A4CM-95-0007ADept sample id H105-007Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/16/95 13:15% moisture 18.5

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		170	400	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506056-07	H	H105-007		0.00410 L	03/21/95	06/28/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

ATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 13

TMA/RICHMOND

REPORTING GROUP H105

N506056-08

A4CM-95-0008A

DATA SHEET

SDG H105Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506056-08Client sample id A4CM-95-0008ADept sample id H105-008Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/16/95 13:55% moisture 12.5

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		590	530	900	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506056-08	H	H105-008		0.00320 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 14

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-09

A4CM-95-0009

DATA SHEET

SDG <u>H105</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506056-09</u>	Client sample id <u>A4CM-95-0009</u>
Dept sample id <u>H105-009</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>02/28/95</u>	Collected <u>02/22/95 09:08</u>
% moisture <u>14.5</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		0	450	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506056-09	H	H105-009		0.00360 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 15

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-10

DATA SHEET

A4CM-95-0010

SDG H105
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506056-10Client sample id A4CM-95-0010Dept sample id H105-010Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/22/95 10:02% moisture 15.7

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		450	370	600	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506056-10	H	H105-010		0.00450 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 16

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

N506056-11

A4CM-95-0013

DATA SHEET

SDG H105Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506056-11Client sample id A4CM-95-0013Dept sample id H105-011Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/22/95 10:35% moisture 13.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		370	480	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506056-11	H	H105-011		0.00350 L	03/22/95	06/28/95	IEP

ATA SHEETS

Page 11

SUMMARY DATA SECTION

Page 17

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

Test H Matrix SOIL-R
SDG H105
Contact Italy E. Pittman

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Client Rocketdyne
Contract R44PJZ94034044

RESULTS

LAB RAW SUF-
CLIENT SAMPLE ID SAMPLE ID TEST FIX PLANCHET Tritium

Preparation batch 2781-038H

A4CM-95-0001A	N506056-01	H105-001	U
A4CM-95-0002A	N506056-02	H105-002	U
A4CM-95-0003A	N506056-03	H105-003	U
A4CM-95-0004A	N506056-04	H105-004	U
A4CM-95-0005A	N506056-05	H105-005	U
A4CM-95-0006A	N506056-06	H105-006	U
A4CM-95-0007A	N506056-07	H105-007	U
A4CM-95-0008A	N506056-08	H105-008	590 U
A4CM-95-0009	N506056-09	H105-009	U
A4CM-95-0010	N506056-10	H105-010	U
A4CM-95-0013	N506056-11	H105-011	U
Duplicate (N506056-01)	N506056-14	H105-014	- U

Nominal values and limits from method RDLs (pCi/L) 500

METHOD PERFORMANCE

LAB RAW SUF- MDA ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS ANAL-
CLIENT SAMPLE ID SAMPLE ID TEST FIX pCi/L L FAC TION % % min keV KeV HELD PREPARED YZED DETECTOR

Preparation batch 2781-038H 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 038

A4CM-95-0001A	N506056-01	500	0.0060					50			34	03/20/95	03/21	LSC-005
A4CM-95-0002A	N506056-02	600	0.0045					50			34	03/20/95	03/21	LSC-005
A4CM-95-0003A	N506056-03	500	0.0060					50			34	03/20/95	03/21	LSC-005
A4CM-95-0004A	N506056-04	700	0.0039					50			33	03/20/95	03/21	LSC-005
A4CM-95-0005A	N506056-05	700	0.0038					50			33	03/20/95	03/21	LSC-005
A4CM-95-0006A	N506056-06	700	0.0040					50			33	03/20/95	03/21	LSC-005
A4CM-95-0007A	N506056-07	700	0.0041					50			33	03/20/95	03/21	LSC-005
A4CM-95-0008A	N506056-08	900	0.0032					50			33	03/20/95	03/21	LSC-005
A4CM-95-0009	N506056-09	800	0.0036					50			27	03/20/95	03/21	LSC-005
A4CM-95-0010	N506056-10	600	0.0045					50			27	03/20/95	03/21	LSC-005
A4CM-95-0013	N506056-11	800	0.0035					50			28	03/20/95	03/22	LSC-005
Duplicate (N506056-01)	N506056-14	500	0.0062					50			35	03/20/95	03/22	LSC-005

Nominal values and limits from method 500 0.0100 50 180

AD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 18

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H105

METHOD SUMMARY, cont.

TRITIUM-SOIL
LIQUID SCINTILLATION

Test H Matrix SOIL-R

SDG H105

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

PROCEDURES	REFERENCE	EPA 906.0; ASTM 2476-81
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-211	Tritium in Solid Samples by Azeotropic Distillation, rev 0	

AVERAGES $\pm$ 2 SD	MDA <u>700</u> $\pm$ <u>300</u>
FOR 12 SAMPLES	YIELD <u> </u> $\pm$ <u> </u>

AD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 19

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/29/95



T M A / R I C H M O N D
REPORTING GROUP H109

SDG H109
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S				
Sample Summaries	.	.	.	1
Prep Batch Summary	.	.	.	3
Work Summary	.	.	.	4
Duplicates	.	.	.	7
Data Sheets	.	.	.	8
Method Summaries	.	.	.	29
End of Section	.	.	.	30

Italy E. Pittman 6/29/95
Prepared by

Nahid Mahan 6/29/95
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

SDG H109

tact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0024	SSFL AREA 4	SOIL		N506058-01			03/06/95 14:30
A4CM-95-0027	SSFL AREA 4	SOIL		N506058-02			03/06/95 14:30
A4CM-95-0028	SSFL AREA 4	SOIL		N506058-03			03/06/95 14:30
A4CM-95-0029	SSFL AREA 4	SOIL		N506058-04			03/06/95 14:30
A4CM-95-0030	SSFL AREA 4	SOIL		N506058-05			03/06/95 14:30
A4CM-95-0031	SSFL AREA 4	SOIL		N506058-06			03/07/95 11:00
A4CM-95-0032	SSFL AREA 4	SOIL		N506058-07			03/07/95 11:00
A4CM-95-0033	SSFL AREA 4	SOIL		N506058-08			03/07/95 11:00
A4CM-95-0034	SSFL AREA 4	SOIL		N506058-09			03/07/95 14:30
A4CM-95-0035	SSFL AREA 4	SOIL		N506058-10			03/07/95 14:30
A4CM-95-0036	SSFL AREA 4	SOIL		N506058-11			03/07/95 14:30
A4CM-95-0037	SSFL AREA 4	SOIL		N506058-12			03/08/95 15:00
A4CM-95-0038	SSFL AREA 4	SOIL		N506058-13			03/08/95 15:00
A4CM-95-0039	SSFL AREA 4	SOIL		N506058-14			03/08/95 15:00
A4CM-95-0040	SSFL AREA 4	SOIL		N506058-15			03/08/95 15:00
A4CM-95-0041	SSFL AREA 4	SOIL		N506058-16			03/08/95 15:00
A4CM-95-0042	SSFL AREA 4	SOIL		N506058-17			03/09/95 11:00
A4CM-95-0043	SSFL AREA 4	SOIL		N506058-18			03/09/95 11:00
-95-0044	SSFL AREA 4	SOIL		N506058-19			03/09/95 11:00
-95-0045	SSFL AREA 4	SOIL		N506058-20			03/09/95 14:00
A4CM-95-0046	SSFL AREA 4	SOIL		N506058-21			03/09/95 14:00
Duplicate (N506058-10)	SSFL AREA 4	SOIL		N506058-24			03/07/95 14:30

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

SDG H109

Fact Italy E. Pittman

QC SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
H109		A4CM-95-0024	SOIL	13.2			03/15/95	9	N506058-01	H109-001
		A4CM-95-0027	SOIL	11.6			03/15/95	9	N506058-02	H109-002
		A4CM-95-0028	SOIL	13.2			03/15/95	9	N506058-03	H109-003
		A4CM-95-0029	SOIL	20.6			03/15/95	9	N506058-04	H109-004
		A4CM-95-0030	SOIL	25.8			03/15/95	9	N506058-05	H109-005
		A4CM-95-0031	SOIL	27.8			03/15/95	8	N506058-06	H109-006
		A4CM-95-0032	SOIL	23.4			03/15/95	8	N506058-07	H109-007
		A4CM-95-0033	SOIL	22.2			03/15/95	8	N506058-08	H109-008
		A4CM-95-0034	SOIL	26.8			03/15/95	8	N506058-09	H109-009
		A4CM-95-0035	SOIL	22.2			03/15/95	8	N506058-10	H109-010
		A4CM-95-0036	SOIL	19.9			03/15/95	8	N506058-11	H109-011
		A4CM-95-0037	SOIL	13.1			03/15/95	7	N506058-12	H109-012
		A4CM-95-0038	SOIL	10.6			03/15/95	7	N506058-13	H109-013
		A4CM-95-0039	SOIL	11.0			03/15/95	7	N506058-14	H109-014
		A4CM-95-0040	SOIL	24.1			03/15/95	7	N506058-15	H109-015
		A4CM-95-0041	SOIL	20.3			03/15/95	7	N506058-16	H109-016
		A4CM-95-0042	SOIL	29.1			03/15/95	6	N506058-17	H109-017
		A4CM-95-0043	SOIL	18.5			03/15/95	6	N506058-18	H109-018
		A4CM-95-0044	SOIL	20.8			03/15/95	6	N506058-19	H109-019
		A4CM-95-0045	SOIL	43.9			03/15/95	6	N506058-20	H109-020
		A4CM-95-0046	SOIL	23.8			03/15/95	6	N506058-21	H109-021
		Duplicate (N506058-10)	SOIL				03/15/95	8	N506058-24	H109-024

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

SDG H109

act Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR BATCH	2σ %	CLIENT MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALI- FIERS
Liquid Scintillation											
H	SOIL-R	Tritium-Soil	2781-070H	10.0	21						1/1

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

SDG H109

Fact Italy E. Pittman

WORK SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID											
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD				
CUSTODY	SAS no	RECEIVED			FIX								
A4CM-95-0024		N506058-01	H109-001	H		04/01/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/06/95											
		03/15/95											
A4CM-95-0027		N506058-02	H109-002	H		04/01/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/06/95											
		03/15/95											
A4CM-95-0028		N506058-03	H109-003	H		04/01/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/06/95											
		03/15/95											
A4CM-95-0029		N506058-04	H109-004	H		04/01/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/06/95											
		03/15/95											
A4CM-95-0030		N506058-05	H109-005	H		04/02/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/06/95											
		03/15/95											
A4CM-95-0031		N506058-06	H109-006	H		04/02/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/07/95											
		03/15/95											
A4CM-95-0032		N506058-07	H109-007	H		04/02/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/07/95											
		03/15/95											
A4CM-95-0033		N506058-08	H109-008	H		04/02/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/07/95											
		03/15/95											
A4CM-95-0034		N506058-09	H109-009	H		04/02/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/07/95											
		03/15/95											
A4CM-95-0035		N506058-10	H109-010	H		04/02/95	06/28/95	IEP	Tritium-Soil				
SSFL AREA 4	SOIL	03/07/95											
		03/15/95											

RK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

SDG H109

tact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED			SUF-					
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
A4CM-95-0036		N506058-11	H109-011	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/07/95								
		03/15/95								
A4CM-95-0037		N506058-12	H109-012	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/08/95								
		03/15/95								
A4CM-95-0038		N506058-13	H109-013	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/08/95								
		03/15/95								
A4CM-95-0039		N506058-14	H109-014	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/08/95								
		03/15/95								
A4CM-95-0040		N506058-15	H109-015	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/08/95								
		03/15/95								
A4CM-95-0041		N506058-16	H109-016	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/08/95								
		03/15/95								
A4CM-95-0042		N506058-17	H109-017	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/09/95								
		03/15/95								
A4CM-95-0043		N506058-18	H109-018	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/09/95								
		03/15/95								
A4CM-95-0044		N506058-19	H109-019	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/09/95								
		03/15/95								
A4CM-95-0045		N506058-20	H109-020	H		04/02/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/09/95								
		03/15/95								

RK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

SDG H109

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	MATRIX	LAB SAMPLE ID	COLLECTED	SUF-	ANALYZED	REVIEWED	BY	METHOD
LOCATION		RECEIVED	PLANCHET	TEST	FIX			
CUSTODY	SAS no							
A4CM-95-0046		N506058-21	H109-021	H	04/02/95	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	03/09/95						
		03/15/95						
Duplicate (N506058-10)		N506058-24	H109-024	H	04/02/95	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	03/07/95						
		03/15/95						

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
H		Tritium-Soil	EPA 906.0; ASTM 2476-81	21					1		22
TOTALS				21					1		22

WORK SUMMARY

Page 3

SUMMARY DATA SECTION

Page 6

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-24

A4CM-95-0035

DUPLICATE

SDG H109

Contact Italy E. Pittman

DUPLICATE

Lab sample id N506058-24Dept sample id H109-024Client RocketdyneContract R44PJZ94034044

ORIGINAL

Lab sample id N506058-10Dept sample id H109-010Received 03/15/95% moisture 22.2Client sample id A4CM-95-0035Location/Matrix SSFL AREA 4 SOILCollected 03/07/95 14:30

Chain of custody id _____

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	100	160	300	500	U	H	52	170	300	U	-		

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	H109-024		0.0100	04/02/95	06/28/95 IEP	H109-010		0.00970 L	04/02/95	06/28/95 IEP

QC-DUP#10 23575

JPLICATES

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 06/29/95

T M A / R I C H M O N D
REPORTING GROUP H106

SDG H106
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S				
Sample Summaries	.	.	.	1
Prep Batch Summary	.	.	.	3
Work Summary	.	.	.	4
Duplicates	.	.	.	6
Data Sheets	.	.	.	7
Method Summaries	.	.	.	17
End of Section	.	.	.	18

Italy E. Pittman
Prepared by

Nahid Mahabadi 6/29/95
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

SDG H106

Contact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB		CHAIN OF		COLLECTED
				SAMPLE ID	SAS NO	CUSTODY		
A4CM-95-0011	SSFL AREA 4	SOIL		N506057-03				02/21/95 08:47
A4CM-95-0012	SSFL AREA 4	SOIL		N506057-04				02/21/95 09:35
A4CM-95-0014	SSFL AREA 4	SOIL		N506057-01				02/22/95 14:17
A4CM-95-0015	SSFL AREA 4	SOIL		N506057-02				02/22/95 14:21
A4CM-95-0016A	SSFL AREA 4	SOIL		N506057-05				02/23/95 09:02
A4CM-95-0017A	SSFL AREA 4	SOIL		N506057-06				02/23/95 09:45
A4CM-95-0018	SSFL AREA 4	SOIL		N506057-09				02/20/95 12:45
A4CM-95-0019	SSFL AREA 4	SOIL		N506057-10				02/20/95 13:20
A4CM-95-0020A	SSFL AREA 4	SOIL		N506057-07				02/23/95 10:40
A4CM-95-0023A	SSFL AREA 4	SOIL		N506057-08				02/23/95 13:40
Duplicate (N506057-01)	SSFL AREA 4	SOIL		N506057-13				02/22/95 14:17

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

SDG H106
tact Italy E. Pittman

QC SUMMARY

Client Rocketdyne
Contract R44PJ294034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
H106		A4CM-95-0011	SOIL	16.3			02/28/95 7	N506057-03	H106-003
		A4CM-95-0012	SOIL	17.8			02/28/95 7	N506057-04	H106-004
		A4CM-95-0014	SOIL	24.8			02/28/95 6	N506057-01	H106-001
		A4CM-95-0015	SOIL	15.3			02/28/95 6	N506057-02	H106-002
		A4CM-95-0016A	SOIL	8.4			02/28/95 5	N506057-05	H106-005
		A4CM-95-0017A	SOIL	12.3			02/28/95 5	N506057-06	H106-006
		A4CM-95-0018	SOIL	8.9			02/28/95 8	N506057-09	H106-009
		A4CM-95-0019	SOIL	12.3			02/28/95 8	N506057-10	H106-010
		A4CM-95-0020A	SOIL	15.8			02/28/95 5	N506057-07	H106-007
		A4CM-95-0023A	SOIL	17.3			02/28/95 5	N506057-08	H106-008
		Duplicate (N506057-01)	SOIL				02/28/95 6	N506057-13	H106-013

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

SDG H106

Contact Italy E. Pittman

PREP BATCH SUMMARY

Client Rocketdyne

Contract R44PJ294034044

TEST	MATRIX	METHOD	PREPARATION ERROR BATCH	2σ ±	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALI- FIERS
Liquid Scintillation												
H	SOIL-R	Tritium-Soil	2781-046H	10.0	10							1/1

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

SDG H106

act Italy E. Pittman

WORK SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID								
LOCATION	MATRIX	COLLECTED		SUF-						
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
A4CM-95-0011		N506057-03	H106-003	H		03/21/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/21/95								
		02/28/95								
A4CM-95-0012		N506057-04	H106-004	H		03/21/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/21/95								
		02/28/95								
A4CM-95-0014		N506057-01	H106-001	H		03/21/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/22/95								
		02/28/95								
A4CM-95-0015		N506057-02	H106-002	H		03/21/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/22/95								
		02/28/95								
A4CM-95-0016A		N506057-05	H106-005	H		03/21/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/23/95								
		02/28/95								
A4CM-95-0017A		N506057-06	H106-006	H		03/21/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/23/95								
		02/28/95								
A4CM-95-0018		N506057-09	H106-009	H		03/22/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/20/95								
		02/28/95								
A4CM-95-0019		N506057-10	H106-010	H		03/22/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/20/95								
		02/28/95								
A4CM-95-0020A		N506057-07	H106-007	H		03/21/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/23/95								
		02/28/95								
A4CM-95-0023A		N506057-08	H106-008	H		03/22/95	06/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	02/23/95								
		02/28/95								

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

SDG H106

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LAB SAMPLE ID								
LOCATION	MATRIX	COLLECTED	SUF-						
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD
Duplicate (N506057-01)		N506057-13	H106-013	H		03/22/95	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	02/22/95							
		02/28/95							

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
H		Tritium-Soil	EPA 906.0; ASTM 2476-81	10					1		11
TOTALS				10					1		11

RK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-13

A4CM-95-0014

DUPLICATE

SDG H106Contact Italy E. Pittman

DUPLICATE

Lab sample id N506057-13Dept sample id H106-013Client RocketdyneContract R44PJZ94034044

ORIGINAL

Lab sample id N506057-01Dept sample id H106-001Received 02/28/95% moisture 24.8Client sample id A4CM-95-0014Location/Matrix SSFL AREA 4 SOILCollected 02/22/95 14:17

Chain of custody id _____

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	0	0	800	500	U	H	58	450	800	U	-		

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	H106-013	0.00360	03/22/95	06/28/95	IEP	H106-001	0.00370 L	03/21/95	06/28/95	IEP

QC-DUP#1 23486

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 6

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-03

DATA SHEET

A4CM-95-0011

SDG H106
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506057-03Client sample id A4CM-95-0011Dept sample id H106-003Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/21/95 08:47% moisture 16.3

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		240	430	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-03	H	H106-003		0.00400 L	03/21/95	06/28/95	IEP

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-04

A4CM-95-0012

DATA SHEET

SDG H106
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506057-04
Dept sample id H106-004
Received 02/28/95
% moisture 17.8Client sample id A4CM-95-0012
Location/Matrix SSFL AREA 4 SOIL
Collected 02/21/95 09:35
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		340	420	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-04	H	H106-004		0.00420 L	03/21/95	06/28/95	IEP

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 8

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-01

A4CM-95-0014

DATA SHEET

SDG H106Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506057-01Client sample id A4CM-95-0014Dept sample id H106-001Location/Matrix SSFL AREA 4SOILReceived 02/28/95Collected 02/22/95 14:17% moisture 24.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		58	450	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-01	H	H106-001		0.00370 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 9

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-02

A4CM-95-0015

DATA SHEET

SDG H106Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506057-02Client sample id A4CM-95-0015Dept sample id H106-002Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/22/95 14:21% moisture 15.3

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-99	480	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-02	H	H106-002		0.00350 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 10

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-05

A4CM-95-0016A

DATA SHEET

SDG H106Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506057-05Client sample id A4CM-95-0016ADept sample id H106-005Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/23/95 09:02% moisture 8.4

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		510	1100	2000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-05	H	H106-005		0.00160 L	03/21/95	06/28/95	IEP

ATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 11

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-06

DATA SHEET

A4CM-95-0017A

SDG H106Contact Italy B. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506057-06Client sample id A4CM-95-0017ADept sample id H106-006Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/23/95 09:45% moisture 12.3

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-30	580	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-06	H	H106-006		0.00290 L	03/21/95	06/28/95	IEP

DATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 12

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

DATA SHEET

N506057-09

A4CM-95-0018

SDG H106Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506057-09Client sample id A4CM-95-0018Dept sample id H106-009Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/20/95 12:45% moisture 8.9

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		110	740	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-09	H	H106-009		0.00230 L	03/22/95	06/28/95	IEP

ATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 13

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-10

DATA SHEET

A4CM-95-0019

SDG H106Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506057-10Client sample id A4CM-95-0019Dept sample id H106-010Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/20/95 13:20% moisture 12.3

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-83	640	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506057-10	H	H106-010		0.00260 L	03/22/95	06/28/95	IEP

DATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 14

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

N506057-07

A4CM-95-0020A

DATA SHEET

SDG H106Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506057-07Client sample id A4CM-95-0020ADept sample id H106-007Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/23/95 10:40% moisture 15.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		27	530	900	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-07	H	H106-007		0.00320 L	03/21/95	06/28/95	IEP

DATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 15

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

DATA SHEET

N506057-08

A4CM-95-0023A

SDG H106Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506057-08Client sample id A4CM-95-0023ADept sample id H106-008Location/Matrix SSFL AREA 4 SOILReceived 02/28/95Collected 02/23/95 13:40% moisture 17.3

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		200	430	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506057-08	H	H106-008		0.00400 L	03/22/95	06/28/95	IEP

DATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 16

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

Test H Matrix SOIL-RSDG H106Contact Italy E. Pittman

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Client RocketdyneContract R44PJ294034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
------------------	------------------	-----------------	------------------	---------

Preparation batch 2781-046H

A4CM-95-0011	N506057-03	H106-003	U	
A4CM-95-0012	N506057-04	H106-004	U	
A4CM-95-0014	N506057-01	H106-001	U	
A4CM-95-0015	N506057-02	H106-002	U	
A4CM-95-0016A	N506057-05	H106-005	S10	U
A4CM-95-0017A	N506057-06	H106-006	U	
A4CM-95-0018	N506057-09	H106-009	U	
A4CM-95-0019	N506057-10	H106-010	U	
A4CM-95-0020A	N506057-07	H106-007	U	
A4CM-95-0023A	N506057-08	H106-008	U	
Duplicate (N506057-01)	N506057-13	H106-013	-	U

Nominal values and limits from method RDLs (pCi/L) 500

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
					L	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR

Preparation batch 2781-046H 2σ prep error 10.0 % Reference Lab Notebook 2781 pg. 046

A4CM-95-0011	N506057-03	700	0.0040							50			28	03/21/95	03/21	LSC-004
A4CM-95-0012	N506057-04	700	0.0042							50			28	03/21/95	03/21	LSC-004
A4CM-95-0014	N506057-01	800	0.0037							50			27	03/21/95	03/21	LSC-004
A4CM-95-0015	N506057-02	800	0.0035							50			27	03/21/95	03/21	LSC-004
A4CM-95-0016A	N506057-05	2000	0.0016							50			26	03/21/95	03/21	LSC-004
A4CM-95-0017A	N506057-06	1000	0.0029							50			26	03/21/95	03/21	LSC-004
A4CM-95-0018	N506057-09	1000	0.0023							50			30	03/21/95	03/22	LSC-004
A4CM-95-0019	N506057-10	1000	0.0026							50			30	03/21/95	03/22	LSC-004
A4CM-95-0020A	N506057-07	900	0.0032							50			26	03/21/95	03/21	LSC-004
A4CM-95-0023A	N506057-08	700	0.0040							50			27	03/21/95	03/22	LSC-004
Duplicate (N506057-01)	N506057-13	800	0.0036							50			28	03/21/95	03/22	LSC-004

Nominal values and limits from method 500 0.0100 50 180

SD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 17

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H106

METHOD SUMMARY, cont.

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL-R

SDG H106

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

PROCEDURES	REFERENCE	EPA 906.0; ASTM 2476-81
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-211	Tritium in Solid Samples by Azeotropic Distillation, rev 0	

AVERAGES $\pm$ 2 SD	MDA <u>900</u> $\pm$ <u>700</u>
FOR 11 SAMPLES	YIELD _____ $\pm$ _____

OD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 18

Lab id	<u>TMAN</u>
Protocol	<u>ROCKETDYNE</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-CMS</u>
Version	<u>3.06</u>
Report date	<u>06/29/95</u>

TMA / RICHMOND

REPORTING GROUP H109

N506058-01

A4CM-95-0024

DATA SHEET

SDG H109Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506058-01Client sample id A4CM-95-0024Dept sample id H109-001Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 13.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-340	510	900	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-01	H	H109-001		0.00300 L	04/01/95	06/28/95	IEP

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 8

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-02

DATA SHEET

A4CM-95-0027

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-02Client sample id A4CM-95-0027Dept sample id H109-002Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 11.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-47	570	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-02	H	H109-002		0.00280 L	04/01/95	06/28/95	IEP

ATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 9

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-03

A4CM-95-0028

DATA SHEET

SDG H109Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506058-03Client sample id A4CM-95-0028Dept sample id H109-003Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 13.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-210	490	900	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-03	H	H109-003		0.00320 L	04/01/95	06/28/95	IEP

ATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 10

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-04

A4CM-95-0029

DATA SHEET

SDG <u>H109</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506058-04</u>	Client sample id <u>A4CM-95-0029</u>
Dept sample id <u>H109-004</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>03/15/95</u>	Collected <u>03/06/95 14:30</u>
% moisture <u>20.6</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-82	360	600	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALiquot	ANALYZED	REVIEWED	BY
N506058-04	H	H109-004		0.00460 L	04/01/95	06/28/95	IEP

ATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 11

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-05

A4CM-95-0030

DATA SHEET

SDG H109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506058-05Client sample id A4CM-95-0030Dept sample id H109-005Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/06/95 14:30% moisture 25.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-61	170	300	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-05	H	H109-005		0.0100 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 12

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-06

DATA SHEET

A4CM-95-0031

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-06Client sample id A4CM-95-0031Dept sample id H109-006Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 11:00% moisture 27.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-65	160	300	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-06	H	H109-006		0.0100 L	04/02/95	06/28/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

DATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 13

TMA/RICHMOND

REPORTING GROUP H109

N506058-07

A4CM-95-0032

DATA SHEET

SDG <u>H109</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506058-07</u>	Client sample id <u>A4CM-95-0032</u>
Dept sample id <u>H109-007</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>03/15/95</u>	Collected <u>03/07/95 11:00</u>
% moisture <u>23.4</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-46	230	400	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-07	H	H109-007		0.00700 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 14

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-08

A4CM-95-0033

DATA SHEET

SDG H109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506058-08Client sample id A4CM-95-0033Dept sample id H109-008Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 11:00% moisture 22.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-37	340	600	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-08	H	H109-008		0.00480 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 15

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-09

DATA SHEET

A4CM-95-0034

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-09Client sample id A4CM-95-0034Dept sample id H109-009Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 14:30% moisture 26.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-98	220	400	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-09	H	H109-009		0.00740 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 16

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-10

DATA SHEET

A4CM-95-0035

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-10Client sample id A4CM-95-0035Dept sample id H109-010Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 14:30% moisture 22.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-52	170	300	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506058-10	H	H109-010		0.00970 L	04/02/95	06/28/95	IEP

ATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 17

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-11

A4CM-95-0036

DATA SHEET

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-11Client sample id A4CM-95-0036Dept sample id H109-011Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/07/95 14:30% moisture 19.9

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-150	160	300	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-11	H	H109-011		0.00930 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 11

SUMMARY DATA SECTION

Page 18

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-12

A4CM-95-0037

DATA SHEET

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-12Client sample id A4CM-95-0037Dept sample id H109-012Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 13.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		300	530	900	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-12	H	H109-012		0.00300 L	04/02/95	06/28/95	IEP

ATA SHEETS

Page 12

SUMMARY DATA SECTION

Page 19

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-13

DATA SHEET

A4CM-95-0038

SDG H109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506058-13
Dept sample id H109-013
Received 03/15/95
% moisture 10.6Client sample id A4CM-95-0038
Location/Matrix SSFL AREA 4 SOIL
Collected 03/08/95 15:00
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-560	750	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506058-13	H	H109-013		0.00210 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 13

SUMMARY DATA SECTION

Page 20

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-14

A4CM-95-0039

DATA SHEET

SDG <u>H109</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506058-14</u>	Client sample id <u>A4CM-95-0039</u>
Dept sample id <u>H109-014</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>03/15/95</u>	Collected <u>03/08/95 15:00</u>
% moisture <u>11.0</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-490	670	1000	500	0	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-14	H	H109-014		0.00230 L	04/02/95	06/28/95	IEP

ATA SHEETS

Page 14

SUMMARY DATA SECTION

Page 21

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-15

A4CM-95-0040

DATA SHEET

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-15Client sample id A4CM-95-0040Dept sample id H109-015Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 24.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-190	270	500	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQVOT	ANALYZED	REVIEWED	BY
N506058-15	H	H109-015		0.00620 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 15

SUMMARY DATA SECTION

Page 22

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-16

DATA SHEET

A4CM-95-0041

SDG H109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506058-16Client sample id A4CM-95-0041Dept sample id H109-016Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/08/95 15:00% moisture 20.3

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-120	180	300	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-16	H	H109-016		0.00890 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 16

SUMMARY DATA SECTION

Page 23

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA / RICHMOND

REPORTING GROUP H109

N506058-17

DATA SHEET

A4CM-95-0042

SDG H109Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506058-17Client sample id A4CM-95-0042Dept sample id H109-017Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 11:00% moisture 29.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-140	160	300	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506058-17	H	H109-017		0.0100 L	04/02/95	06/28/95	IEP

ATA SHEETS

Page 17

SUMMARY DATA SECTION

Page 24

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-18

DATA SHEET

A4CM-95-0043

SDG H109Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506058-18Client sample id A4CM-95-0043Dept sample id H109-018Location/Matrix SSFL AREA 4SOILReceived 03/15/95Collected 03/09/95 11:00% moisture 18.5

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-350	210	400	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIUQUOT	ANALYZED	REVIEWED	BY
N506058-18	H	H109-018		0.00700 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 18

SUMMARY DATA SECTION

Page 25

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-19

A4CM-95-0044

DATA SHEET

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-19Client sample id A4CM-95-0044Dept sample id H109-019Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 11:00% moisture 20.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-130	230	400	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUT	ANALYZED	REVIEWED	BY
N506058-19	H	H109-019		0.00700 L	04/02/95	06/28/95	IEP

ATA SHEETS

Page 19

SUMMARY DATA SECTION

Page 26

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-20

DATA SHEET

A4CM-95-0045

SDG H109Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506058-20Client sample id A4CM-95-0045Dept sample id H109-020Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 14:00% moisture 43.9

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-92	160	300	500	0	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUT	ANALYZED	REVIEWED	BY
N506058-20	H	H109-020		0.0100 L	04/02/95	06/28/95	IEP

DATA SHEETS

Page 20

SUMMARY DATA SECTION

Page 27

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

N506058-21

DATA SHEET

A4CM-95-0046

SDG H109
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506058-21Client sample id A4CM-95-0046Dept sample id H109-021Location/Matrix SSFL AREA 4 SOILReceived 03/15/95Collected 03/09/95 14:00% moisture 23.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-100	160	300	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506058-21	H	H109-021		0.0100 L	04/02/95	06/28/95	IEP

ATA SHEETS

Page 21

SUMMARY DATA SECTION

Page 28

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL-R
SDG H109
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
------------------	------------------	-----------------	------------------	---------

Preparation batch 2781-070H

A4CM-95-0024	N506058-01	H109-001	U
A4CM-95-0027	N506058-02	H109-002	U
A4CM-95-0028	N506058-03	H109-003	U
A4CM-95-0029	N506058-04	H109-004	U
A4CM-95-0030	N506058-05	H109-005	U
A4CM-95-0031	N506058-06	H109-006	U
A4CM-95-0032	N506058-07	H109-007	U
A4CM-95-0033	N506058-08	H109-008	U
A4CM-95-0034	N506058-09	H109-009	U
A4CM-95-0035	N506058-10	H109-010	U
A4CM-95-0036	N506058-11	H109-011	U
A4CM-95-0037	N506058-12	H109-012	U
A4CM-95-0038	N506058-13	H109-013	U
A4CM-95-0039	N506058-14	H109-014	U
A4CM-95-0040	N506058-15	H109-015	U
A4CM-95-0041	N506058-16	H109-016	U
A4CM-95-0042	N506058-17	H109-017	U
A4CM-95-0043	N506058-18	H109-018	U
A4CM-95-0044	N506058-19	H109-019	U
A4CM-95-0045	N506058-20	H109-020	U
A4CM-95-0046	N506058-21	H109-021	U
Duplicate (N506058-10)	N506058-24	H109-024	- U

Nominal values and limits from method RDLs (pCi/L) 500

AD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 29

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H109

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Test H Matrix SOIL-R

SDG H109

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJ294034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- t	YIELD t	EFF min	COUNT keV	FWHM KeV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
Preparation batch 2781-070H 2σ prep error 10.0 ‡ Reference Lab Notebook 2781 pg. 070															
A4CM-95-0024	N506058-01	900	0.0030						50			26	03/30/95	04/01	LSC-005
A4CM-95-0027	N506058-02	1000	0.0028						50			26	03/30/95	04/01	LSC-005
A4CM-95-0028	N506058-03	900	0.0032						50			26	03/30/95	04/01	LSC-005
A4CM-95-0029	N506058-04	600	0.0046						50			26	03/30/95	04/01	LSC-005
A4CM-95-0030	N506058-05	300	0.0100						50			27	03/30/95	04/02	LSC-005
A4CM-95-0031	N506058-06	300	0.0100						50			26	03/30/95	04/02	LSC-005
A4CM-95-0032	N506058-07	400	0.0070						50			26	03/30/95	04/02	LSC-005
A4CM-95-0033	N506058-08	600	0.0048						50			26	03/30/95	04/02	LSC-005
A4CM-95-0034	N506058-09	400	0.0074						50			26	03/30/95	04/02	LSC-005
A4CM-95-0035	N506058-10	300	0.0097						50			26	03/30/95	04/02	LSC-005
A4CM-95-0036	N506058-11	300	0.0093						50			26	03/30/95	04/02	LSC-005
A4CM-95-0037	N506058-12	900	0.0030						50			25	03/30/95	04/02	LSC-005
A4CM-95-0038	N506058-13	1000	0.0021						50			25	03/30/95	04/02	LSC-005
A4CM-95-0039	N506058-14	1000	0.0023						50			25	03/30/95	04/02	LSC-005
A4CM-95-0040	N506058-15	500	0.0062						50			25	03/30/95	04/02	LSC-005
A4CM-95-0041	N506058-16	300	0.0089						50			25	03/30/95	04/02	LSC-005
A4CM-95-0042	N506058-17	300	0.0100						50			24	03/30/95	04/02	LSC-005
A4CM-95-0043	N506058-18	400	0.0070						50			24	03/30/95	04/02	LSC-005
A4CM-95-0044	N506058-19	400	0.0070						50			24	03/30/95	04/02	LSC-005
A4CM-95-0045	N506058-20	300	0.0100						50			24	03/30/95	04/02	LSC-005
A4CM-95-0046	N506058-21	300	0.0100						50			24	03/30/95	04/02	LSC-005
Duplicate (N506058-10)	N506058-24	300	0.0100						50			26	03/30/95	04/02	LSC-005
Nominal values and limits from method			500	0.0100					50			180			

PROCEDURES REFERENCE EPA 906.0; ASTM 2476-81
EP-060 Soil Preparation, rev 0
EP-070 Soil Dissolution, rev 0
EP-211 Tritium in Solid Samples by Azeotropic
Distillation, rev 0

AVERAGES ± 2 SD MDA 500 ± 500
FOR 22 SAMPLES YIELD ±

MOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 30

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 06/29/95



T M A / R I C H M O N D
REPORTING GROUP H111

SDG H111
Contact Italy E. Pittman

Client Rocketdyne
Contract R44PJZ94034044

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S				
Sample Summaries	.	.	.	1
Prep Batch Summary	.	.	.	3
Work Summary	.	.	.	4
Duplicates	.	.	.	7
Data Sheets	.	.	.	9
Method Summaries	.	.	.	30
End of Section	.	.	.	31

Italy E. Pittman 6/29/95
pared by

Nahid Maham 6/29/95
Reviewed by

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

SDG H111
Contact Italy E. Pittman

SAMPLE SUMMARY

Client Rocketdyne
Contract R44PJZ94034044

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAS NO	CHAIN OF CUSTODY	COLLECTED
A4CM-95-0047	SSFL AREA 4	SOIL		N506059-01			03/28/95 13:00
A4CM-95-0048	SSFL AREA 4	SOIL		N506059-02			03/28/95 13:00
A4CM-95-0049	SSFL AREA 4	SOIL		N506059-03			03/28/95 13:00
A4CM-95-0052	SSFL AREA 4	SOIL		N506059-04			03/29/95 14:45
A4CM-95-0053	SSFL AREA 4	SOIL		N506059-05			03/29/95 14:45
A4CM-95-0054	SSFL AREA 4	SOIL		N506059-06			03/29/95 14:45
A4CM-95-0055	SSFL AREA 4	SOIL		N506059-07			03/29/95 14:45
A4CM-95-0056	SSFL AREA 4	SOIL		N506059-08			03/29/95 14:45
A4CM-95-0057	SSFL AREA 4	SOIL		N506059-09			03/29/95 14:45
A4CM-95-0058	SSFL AREA 4	SOIL		N506059-10			03/29/95 14:45
A4CM-95-0059	SSFL AREA 4	SOIL		N506059-11			03/30/95 14:45
A4CM-95-0060	SSFL AREA 4	SOIL		N506059-12			03/30/95 14:45
A4CM-95-0061	SSFL AREA 4	SOIL		N506059-13			03/30/95 14:45
A4CM-95-0062	SSFL AREA 4	SOIL		N506059-14			03/30/95 14:45
A4CM-95-0063	SSFL AREA 4	SOIL		N506059-15			03/30/95 14:45
A4CM-95-0064	SSFL AREA 4	SOIL		N506059-16			03/31/95
A4CM-95-0065	SSFL AREA 4	SOIL		N506059-17			03/31/95
A4CM-95-0066	SSFL AREA 4	SOIL		N506059-18			03/31/95
A4CM-95-0067	SSFL AREA 4	SOIL		N506059-19			03/31/95
A4CM-95-0068	SSFL AREA 4	SOIL		N506059-20			03/31/95
A4CM-95-0069	SSFL AREA 4	SOIL		N506059-21			03/31/95
Duplicate (N506059-03)	SSFL AREA 4	SOIL		N506059-26			03/28/95 13:00
Duplicate (N506059-15)	SSFL AREA 4	SOIL		N506059-27			03/30/95 14:45

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 1

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

QC SUMMARY

SDG H111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	DEPARTMENT SAMPLE ID
H111		A4CM-95-0047	SOIL	14.8			04/06/95	9 N506059-01	H111-001
		A4CM-95-0048	SOIL	18.5			04/06/95	9 N506059-02	H111-002
		A4CM-95-0049	SOIL	14.7			04/06/95	9 N506059-03	H111-003
		A4CM-95-0052	SOIL	15.2			04/06/95	8 N506059-04	H111-004
		A4CM-95-0053	SOIL	10.6			04/06/95	8 N506059-05	H111-005
		A4CM-95-0054	SOIL	16.4			04/06/95	8 N506059-06	H111-006
		A4CM-95-0055	SOIL	12.8			04/06/95	8 N506059-07	H111-007
		A4CM-95-0056	SOIL	13.1			04/06/95	8 N506059-08	H111-008
		A4CM-95-0057	SOIL	13.2			04/06/95	8 N506059-09	H111-009
		A4CM-95-0058	SOIL	16.2			04/06/95	8 N506059-10	H111-010
		A4CM-95-0059	SOIL	14.8			04/06/95	7 N506059-11	H111-011
		A4CM-95-0060	SOIL	10.2			04/06/95	7 N506059-12	H111-012
		A4CM-95-0061	SOIL	16.1			04/06/95	7 N506059-13	H111-013
		A4CM-95-0062	SOIL	22.8			04/06/95	7 N506059-14	H111-014
		A4CM-95-0063	SOIL	14.8			04/06/95	7 N506059-15	H111-015
		A4CM-95-0064	SOIL	13.8			04/06/95	6 N506059-16	H111-016
		A4CM-95-0065	SOIL	7.4			04/06/95	6 N506059-17	H111-017
		A4CM-95-0066	SOIL	11.8			04/06/95	6 N506059-18	H111-018
		A4CM-95-0067	SOIL	8.8			04/06/95	6 N506059-19	H111-019
		A4CM-95-0068	SOIL	11.1			04/06/95	6 N506059-20	H111-020
		A4CM-95-0069	SOIL	8.0			04/06/95	6 N506059-21	H111-021
		Duplicate (N506059-03)	SOIL				04/06/95	9 N506059-26	H111-026
		Duplicate (N506059-15)	SOIL				04/06/95	7 N506059-27	H111-027

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 2

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-QS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

PREP BATCH SUMMARY

SDG H111

Fact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED							QUALIFIERS
			BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	
Liquid Scintillation												
H	SOIL-R	Tritium-Soil	2781-090H	10.0	21						2/2	

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

SDG H111

Contact Italy E. Pittman

WORK SUMMARY

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID		LAB SAMPLE ID		SUF-						
LOCATION	MATRIX	COLLECTED		FIX	ANALYZED	REVIEWED	BY	METHOD		
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST						
A4CM-95-0047		N506059-01	H111-001	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/28/95 04/06/95								
A4CM-95-0048		N506059-02	H111-002	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/28/95 04/06/95								
A4CM-95-0049		N506059-03	H111-003	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/28/95 04/06/95								
A4CM-95-0052		N506059-04	H111-004	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/29/95 04/06/95								
A4CM-95-0053		N506059-05	H111-005	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/29/95 04/06/95								
A4CM-95-0054		N506059-06	H111-006	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/29/95 04/06/95								
A4CM-95-0055		N506059-07	H111-007	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/29/95 04/06/95								
A4CM-95-0056		N506059-08	H111-008	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/29/95 04/06/95								
A4CM-95-0057		N506059-09	H111-009	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/29/95 04/06/95								
A4CM-95-0058		N506059-10	H111-010	H	04/22/95	06/28/95	IEP	Tritium-Soil		
SSFL AREA 4	SOIL	03/29/95 04/06/95								

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

SDG H111

Contact Italy E. Pittman

WORK SUMMARY, cont.

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED		SUF-						
CUSTODY	SAS no	RECEIVED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
A4CM-95-0059		N506059-11	H111-011	H		04/22/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/30/95								
		04/06/95								
A4CM-95-0060		N506059-12	H111-012	H		04/22/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/30/95								
		04/06/95								
A4CM-95-0061		N506059-13	H111-013	H		04/22/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/30/95								
		04/06/95								
A4CM-95-0062		N506059-14	H111-014	H		04/22/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/30/95								
		04/06/95								
A4CM-95-0063		N506059-15	H111-015	H		04/22/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/30/95								
		04/06/95								
A4CM-95-0064		N506059-16	H111-016	H		04/22/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/31/95								
		04/06/95								
A4CM-95-0065		N506059-17	H111-017	H		04/22/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/31/95								
		04/06/95								
A4CM-95-0066		N506059-18	H111-018	H		04/22/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/31/95								
		04/06/95								
A4CM-95-0067		N506059-19	H111-019	H		04/23/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/31/95								
		04/06/95								
A4CM-95-0068		N506059-20	H111-020	H		04/23/95	05/28/95	IEP	Tritium-Soil	
SSFL AREA 4	SOIL	03/31/95								
		04/06/95								

WORK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 5

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

WORK SUMMARY, cont.

SDG H111

tact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

CLIENT SAMPLE ID	MATRIX	LAB SAMPLE ID	COLLECTED	SUF-	FIX	ANALYZED	REVIEWED	BY	METHOD
LOCATION	SAS no	RECEIVED	PLANCHET	TEST					
A4CM-95-0069		N506059-21	H111-021	H		04/23/95	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	03/31/95							
		04/06/95							
Duplicate (N506059-03)		N506059-26	H111-026	H		04/23/95	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	03/28/95							
		04/06/95							
Duplicate (N506059-15)		N506059-27	H111-027	H		04/23/95	06/28/95	IEP	Tritium-Soil
SSFL AREA 4	SOIL	03/30/95							
		04/06/95							

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAS no	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
		Tritium-Soil	EPA 906.0; ASTM 2476-81	21				2			23
TOTALS				21				2			23

WORK SUMMARY

Page 3

SUMMARY DATA SECTION

Page 6

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-26

A4CM-95-0049

DUPLICATE

SDG H111Contact Italy E. Pittman

DUPLICATE

Lab sample id N506059-26Dept sample id H111-026Client RocketdyneContract R44PJZ94034044

ORIGINAL

Lab sample id N506059-03Dept sample id H111-003Received 04/06/95% moisture 14.7Client sample id A4CM-95-0049Location/Matrix SSFL AREA 4 SOILCollected 03/28/95 13:00

Chain of custody id _____

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	110	430	700	500	U	H	150	780	1000	U	-		

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	H111-026	0.00360	04/23/95	06/28/95	IEP	H111-003	0.00200 L	04/22/95	06/28/95	IEP

QC-DUP#3 23685

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 7

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-27

A4CM-95-0063

DUPLICATE

SDG H111Contact Italy E. Pittman

DUPLICATE

ORIGINAL

Client RocketdyneContract R44PJZ94034044Lab sample id N506059-27Lab sample id N506059-15Client sample id A4CM-95-0063Dept sample id H111-027Dept sample id H111-015Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 14.8

Chain of custody id _____

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	79	400	700	500	U	H	180	430	700	U	-		

TEST	DUPLICATE PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY	ORIGINAL PLANCHET	SUF- FIX	ALIQUOT	ANALYZED	REVIEWED BY
	H111-027	0.00380	04/23/95	06/28/95	IEP	H111-015	0.00360 L	04/22/95	06/28/95	IEP

QC-DUP#15 23686

DUPLICATES

Page 2

SUMMARY DATA SECTION

Page 8

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-01

A4CM-95-0047

DATA SHEET

SDG H111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506059-01Client sample id A4CM-95-0047Dept sample id H111-001Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/28/95 13:00% moisture 14.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-31	360	600	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N506059-01	H	H111-001		0.00420 L	04/22/95	06/28/95	IEP

ATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 9

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-02

A4CM-95-0048

DATA SHEET

SDG H111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506059-02Client sample id A4CM-95-0048Dept sample id H111-002Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/28/95 13:00% moisture 18.5

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		73	330	600	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-02	H	H111-002		0.00470 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 10

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-03

A4CM-95-0049

DATA SHEET

SDG <u>H111</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506059-03</u>	Client sample id <u>A4CM-95-0049</u>
Dept sample id <u>H111-003</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/06/95</u>	Collected <u>03/28/95 13:00</u>
% moisture <u>14.7</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		150	780	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOUT	ANALYZED	REVIEWED	BY
N506059-03	H	H111-003		0.00200 L	04/22/95	06/28/95	IEP

ATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 11

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-04

A4CM-95-0052

DATA SHEET

SDG <u>H111</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506059-04</u>	Client sample id <u>A4CM-95-0052</u>
Dept sample id <u>H111-004</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/06/95</u>	Collected <u>03/29/95 14:45</u>
% moisture <u>15.2</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		420	470	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-04	H	H111-004		0.00340 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 12

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-05

DATA SHEET

A4CM-95-0053

SDG H111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506059-05Client sample id A4CM-95-0053Dept sample id H111-005Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 10.6

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		230	550	200	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-05	H	H111-005		0.00280 L	04/22/95	06/28/95	IEP

ATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 13

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-06

DATA SHEET

A4CM-95-0054

SDG H111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506059-06Client sample id A4CM-95-0054Dept sample id H111-006Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 16.4

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		190	350	600	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALiquot	ANALYZED	REVIEWED	BY
N506059-06	H	H111-006		0.00450 L	04/22/95	05/28/95	IEP

DATA SHEETS

Page 6

SUMMARY DATA SECTION

Page 14

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-07

A4CM-95-0055

DATA SHEET

SDG H111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506059-07Client sample id A4CM-95-0055Dept sample id H111-007Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 12.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-92	530	900	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-07	H	H111-007		0.00280 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 15

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-08

DATA SHEET

A4CM-95-0056

SDG H111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506059-08Client sample id A4CM-95-0056Dept sample id H111-008Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 13.1

Chain of custody id _____

ANALYTE	CAS NO.	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		470	510	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-08	H	H111-008		0.00310 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 8

SUMMARY DATA SECTION

Page 16

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA / RICHMOND

REPORTING GROUP H111

N506059-09

A4CM-95-0057

DATA SHEET

SDG <u>H111</u>	Client <u>Rocketdyne</u>
Contact <u>Italy E. Pittman</u>	Contract <u>R44PJZ94034044</u>
Lab sample id <u>N506059-09</u>	Client sample id <u>A4CM-95-0057</u>
Dept sample id <u>H111-009</u>	Location/Matrix <u>SSFL AREA 4</u> <u>SOIL</u>
Received <u>04/06/95</u>	Collected <u>03/29/95 14:45</u>
% moisture <u>13.2</u>	Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		100	610	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-09	H	H111-009		0.00250 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 9

SUMMARY DATA SECTION

Page 17

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

DATA SHEET

N506059-10

A4CM-95-0058

SDG H111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506059-10Client sample id A4CM-95-0058Dept sample id H111-010Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/29/95 14:45% moisture 16.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-130	430	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-10	H	H111-010		0.00350 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 10

SUMMARY DATA SECTION

Page 18

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-11

A4CM-95-0059

DATA SHEET

SDG H111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506059-11Client sample id A4CM-95-0059Dept sample id H111-011Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 14.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		330	440	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-11	H	H111-011		0.00360 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 11

SUMMARY DATA SECTION

Page 19

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-12

DATA SHEET

A4CM-95-0060

SDG H111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506059-12Client sample id A4CM-95-0060Dept sample id H111-012Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 10.2

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-250	610	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUT	ANALYZED	REVIEWED	BY
N506059-12	H	H111-012		0.00240 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 12

SUMMARY DATA SECTION

Page 20

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-13

DATA SHEET

A4CM-95-0061

SDG H111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506059-13Client sample id A4CM-95-0061Dept sample id H111-013Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 16.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-11	380	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIUQUOT	ANALYZED	REVIEWED	BY
N506059-13	H	H111-013		0.00390 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 13

SUMMARY DATA SECTION

Page 21

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-14

DATA SHEET

A4CM-95-0062

SDG H111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506059-14Client sample id A4CM-95-0062Dept sample id H111-014Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/30/95 14:45% moisture 22.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		120	250	400	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-14	H	H111-014		0.00620 L	04/22/95	06/28/95	IEP

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVP-DSVersion 3.06Report date 06/29/95

ATA SHEETS

Page 14

SUMMARY DATA SECTION

Page 22

TMA/RICHMOND

REPORTING GROUP H111

N506059-15

DATA SHEET

A4CM-95-0063

SDG H111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506059-15
Dept sample id H111-015
Received 04/06/95
% moisture 14.8Client sample id A4CM-95-0063
Location/Matrix SSFL AREA 4 SOIL
Collected 03/30/95 14:45
Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		180	430	700	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-15	H	H111-015		0.00360 L	04/22/95	06/28/95	IEP

ATA SHEETS

Page 15

SUMMARY DATA SECTION

Page 23

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-16

A4CM-95-0064

DATA SHEET

SDG H111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506059-16Client sample id A4CM-95-0064Dept sample id H111-016Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 13.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		68	480	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-16	H	H111-016		0.00310 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 16

SUMMARY DATA SECTION

Page 24

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-17

DATA SHEET

A4CM-95-0065

SDG H111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506059-17Client sample id A4CM-95-0065Dept sample id H111-017Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 7.4

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		430	860	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALiquot	ANALYZED	REVIEWED	BY
N506059-17	H	H111-017		0.00180 L	04/22/95	06/28/95	IEP

ATA SHEETS

Page 17

SUMMARY DATA SECTION

Page 25

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-18

A4CM-95-0066

DATA SHEET

SDG H111Client RocketdyneContact Italy E. PittmanContract R44PJZ94034044Lab sample id N506059-18Client sample id A4CM-95-0066Dept sample id H111-018Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 11.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		560	640	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQOT	ANALYZED	REVIEWED	BY
N506059-18	H	H111-018		0.00250 L	04/22/95	06/28/95	IEP

DATA SHEETS

Page 18

SUMMARY DATA SECTION

Page 26

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-19

DATA SHEET

A4CM-95-0067

SDG H111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506059-19Client sample id A4CM-95-0067Dept sample id H111-019Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 8.8

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		-43	760	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N506059-19	H	H111-019		0.00200 L	04/23/95	06/28/95	IEP

ATA SHEETS

Page 19

SUMMARY DATA SECTION

Page 27

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA / RICHMOND

REPORTING GROUP H111

N506059-20

A4CM-95-0068

DATA SHEET

SDG H111
Contact Italy E. PittmanClient Rocketdyne
Contract R44PJZ94034044Lab sample id N506059-20Client sample id A4CM-95-0068Dept sample id H111-020Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 11.1

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		180	500	800	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N506059-20	H	H111-020		0.00310 L	04/23/95	06/28/95	IEP

ATA SHEETS

Page 20

SUMMARY DATA SECTION

Page 28

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

N506059-21

DATA SHEET

A4CM-95-0069

SDG H111Contact Italy E. PittmanClient RocketdyneContract R44PJZ94034044Lab sample id N506059-21Client sample id A4CM-95-0069Dept sample id H111-021Location/Matrix SSFL AREA 4 SOILReceived 04/06/95Collected 03/31/95% moisture 8.0

Chain of custody id _____

ANALYTE	CAS NO	RESULT pCi/L	2 σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium		210	670	1000	500	U	H

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALiquot	ANALYZED	REVIEWED	BY
N506059-21	H	H111-021		0.00230 L	04/23/95	06/28/95	IEP

ATA SHEETS

Page 21

SUMMARY DATA SECTION

Page 29

Lab id TMANProtocol ROCKETDYNEVersion Ver 1.0Form DVD-DSVersion 3.06Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

METHOD SUMMARY

TRITIUM-SOIL
LIQUID SCINTILLATION

Test H Matrix SOIL-R

SDG H111

Contact Italy E. Pittman

Client Rocketdyne

Contract R44PJZ94034044

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Tritium
Preparation batch 2781-090H				
A4CM-95-0047	N506059-01	H111-001	U	
A4CM-95-0048	N506059-02	H111-002	U	
A4CM-95-0049	N506059-03	H111-003	U	
A4CM-95-0052	N506059-04	H111-004	U	
A4CM-95-0053	N506059-05	H111-005	U	
A4CM-95-0054	N506059-06	H111-006	U	
A4CM-95-0055	N506059-07	H111-007	U	
A4CM-95-0056	N506059-08	H111-008	U	
A4CM-95-0057	N506059-09	H111-009	U	
A4CM-95-0058	N506059-10	H111-010	U	
A4CM-95-0059	N506059-11	H111-011	U	
A4CM-95-0060	N506059-12	H111-012	U	
A4CM-95-0061	N506059-13	H111-013	U	
A4CM-95-0062	N506059-14	H111-014	U	
A4CM-95-0063	N506059-15	H111-015	U	
A4CM-95-0064	N506059-16	H111-016	U	
A4CM-95-0065	N506059-17	H111-017	U	
A4CM-95-0066	N506059-18	H111-018	560 U	
A4CM-95-0067	N506059-19	H111-019	U	
A4CM-95-0068	N506059-20	H111-020	U	
A4CM-95-0069	N506059-21	H111-021	U	
Duplicate (N506059-03)	N506059-26	H111-026	- U	
Duplicate (N506059-15)	N506059-27	H111-027	- U	

Nominal values and limits from method RDLs (pCi/L) 500

D SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 30

Lab id TMAN

Protocol ROCKETDYNE

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 06/29/95

TMA/RICHMOND

REPORTING GROUP H111

Test H Matrix SOIL-R
SDG H111
Contact Italy E. Pittman

METHOD SUMMARY

TRITIUM-SOIL

LIQUID SCINTILLATION

Client Rocketdyne
Contract R44PJZ94034044

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ FAC	PREP TION	DILU- t	YIELD t	EFF min	COUNT keV	FWHM KeV	DRIFT HELD	DAYS PREPARED	ANAL- YZED	DETECTOR
Preparation batch 2781-090H 2σ prep error 10.0 † Reference Lab Notebook 2781 pg. 090															
A4CM-95-0047	N506059-01	600	0.0042						50			25	04/21/95	04/22	LSC-004
A4CM-95-0048	N506059-02	600	0.0047						50			25	04/21/95	04/22	LSC-004
A4CM-95-0049	N506059-03	1000	0.0020						50			25	04/21/95	04/22	LSC-004
A4CM-95-0052	N506059-04	800	0.0034						50			24	04/21/95	04/22	LSC-004
A4CM-95-0053	N506059-05	900	0.0028						50			24	04/21/95	04/22	LSC-004
A4CM-95-0054	N506059-06	600	0.0045						50			24	04/21/95	04/22	LSC-004
A4CM-95-0055	N506059-07	900	0.0028						50			24	04/21/95	04/22	LSC-004
A4CM-95-0056	N506059-08	800	0.0031						50			24	04/21/95	04/22	LSC-004
A4CM-95-0057	N506059-09	1000	0.0025						50			24	04/21/95	04/22	LSC-004
A4CM-95-0058	N506059-10	800	0.0035						50			24	04/21/95	04/22	LSC-004
A4CM-95-0059	N506059-11	700	0.0036						50			23	04/21/95	04/22	LSC-004
A4CM-95-0060	N506059-12	1000	0.0024						50			23	04/21/95	04/22	LSC-004
A4CM-95-0061	N506059-13	700	0.0039						50			23	04/21/95	04/22	LSC-004
A4CM-95-0062	N506059-14	400	0.0062						50			23	04/21/95	04/22	LSC-004
A4CM-95-0063	N506059-15	700	0.0036						50			23	04/21/95	04/22	LSC-004
A4CM-95-0064	N506059-16	800	0.0031						50			22	04/21/95	04/22	LSC-004
A4CM-95-0065	N506059-17	1000	0.0018						50			22	04/21/95	04/22	LSC-004
A4CM-95-0066	N506059-18	1000	0.0025						50			22	04/21/95	04/22	LSC-004
A4CM-95-0067	N506059-19	1000	0.0020						50			23	04/21/95	04/23	LSC-004
A4CM-95-0068	N506059-20	800	0.0031						50			23	04/21/95	04/23	LSC-004
A4CM-95-0069	N506059-21	1000	0.0023						50			23	04/21/95	04/23	LSC-004
Duplicate (N506059-03)	N506059-26	700	0.0036						50			26	04/21/95	04/23	LSC-004
Duplicate (N506059-15)	N506059-27	700	0.0038						50			24	04/21/95	04/23	LSC-004
Nominal values and limits from method		500	0.0100						50			180			

PROCEDURES REFERENCE EPA 906.0; ASTM 2476-81
EP-060 Soil Preparation, rev 0
EP-070 Soil Dissolution, rev 0
EP-211 Tritium in Solid Samples by Azeotropic Distillation, rev 0

AVERAGES ± 2 SD MDA 800 ± 300
FOR 23 SAMPLES YIELD ±

AD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 31

Lab id TMAN
Protocol ROCKETDYNE
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 06/29/95