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FINAL REPORT FOR SAMPLE B1NRJ2 FROM 216-A-2 AND 216-A-21 CHARACTERIZATION SAMPLING– COLLECTED JUNE 2007

Sample Group No. 222S20070742

Ruth A. Bushaw
Advanced Technologies and Laboratories International, Inc.

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Prepared for:

Fluor Hanford

Stephen J. Trent
Fluor Hanford, Inc.
Post Office Box 1000, T5-49
Richland, Washington 99352-1000
(509)373-5869

Prepared by:

Hanford Analytical Services
Advanced Technologies and Laboratories International, Inc.
222-S LAB

ATL International, Inc.
P.O. Box 250
Richland, WA 99352-0250
509-373-4314

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Robert W Schroeder 7/31/07
R. W. Schroeder; Acting ATL Chief Operating Officer

Ruth A Bushaw 7/31/07
R. A. Bushaw; ATL Project Coordinator

222-S LABORATORY

FINAL REPORT FOR SAMPLE B1NRJ2 FROM 216-A-2 AND 216-A-21 CHARACTERIZATION SAMPLING—COLLECTED JUNE 2007

1.0 INTRODUCTION

One soil sample from the 216-A-2 and 216-A-21 characterization sampling was received at the 222-S Laboratory on June 28, 2007, and assigned to group 222S20070742. The sample was analyzed in accordance with ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory*; *Analytical Instruction: 216-A-4 Crib Characterization Sampling and Analysis* (AI), and verbal and electronic communication with the customer point of contact.

The Data Summary Report is included as Attachment 1. The correlation between the customer sample identification number and laboratory identification numbers is presented in the Sample Breakdown Diagram included as Attachment 2. Tracer and carrier recoveries are presented in Attachment 3. Analysis date and time are presented in Attachment 4. Nonrequested isotopes from the inductively coupled plasma/mass spectrometry (ICP/MS), gamma energy analysis (GEA), and americium analyses are included as "Opportunistic Analytes" in Attachment 5. Significant correspondence is included as Attachment 6, and copies of the sample receipt paperwork are included as Attachment 7.

2.0 SAMPLE APPEARANCE AND HANDLING

Sample B1NRJ2 was collected on June 18, 2007, and delivered to the laboratory on June 28, 2007. The sample consisted of approximately 7 g of soil.

The sample was homogenized with a spatula prior to removing aliquots for analysis. The relative percent difference (RPD) between sample and duplicate results for all requested analytes met the acceptance criteria listed in the analytical instructions, indicating good precision was obtained.

The environmental digestion used in the analysis of soil samples is specific to the soluble forms of the requested isotopes. Highly insoluble, mineralized, or refractory species are not expected to be represented in the results.

3.0 ANALYTICAL RESULTS

The Data Summary Report, included as Attachment 1, presents the analytical results for the analytes requested in Table 1 of the AI. In this attachment, solid samples that were prepared by acid digest for the isotopic uranium analysis by the ICP/MS method are indicated with an "A" in the aliquot class (A#) column; an "E" indicates that the stronger acid soil leach procedure was used to prepare the sample prior to radiochemical analyses. Note that the result for ^{241}Am in Attachment 5 is reported from the GEA.

For all analytes except for isotopic uranium by ICP/MS, the results reported for the blank in the Data Summary Report are in the same units as indicated for the sample. For the ICP/MS analysis, the units for the results reported for the blank are actually μg/mL.

4.0 QUALITY CONTROL RESULTS

4.1 LABORATORY CONTROL SAMPLES

For the isotopic uranium analysis, gross (or total) alpha, and gross (or total) beta, the accuracy of the analysis was evaluated from the recovery of a laboratory control sample (LCS) and a matrix spike (MS). For all other radionuclide analyses, the accuracy was evaluated only from the LCS recovery. The requested accuracy was LCS within 70-130% recovery. All LCS recoveries were acceptable in accordance with the AI.

4.2 METHOD AND PREPARATION BLANKS

For all analyses except GEA and ICP/MS, no analytes were detected in the method or preparation blanks. A very low level of ^{137}Cs was detected in the preparation blank for the GEA, and ^{235}U and ^{238}U were detected in the initial or continuing calibration blanks for the ICP/MS analysis. The level of ^{137}Cs measured in the blanks was below the minimum detectable activity for the sample and the uranium isotope results were less than the estimated quantitation limits and less than 5% of the sample results. Therefore, these levels were considered insignificant.

4.3 DUPLICATE ANALYSES

A duplicate analysis was performed for each analyte. The requested precision was an RPD within ±30%. All analyses met this criterion.

4.4 MATRIX SPIKE ANALYSES

An MS sample was analyzed for the isotopic uranium by ICP/MS, gross alpha, and gross beta. The requested accuracy was MS within 70-130% recovery. All MS recoveries were acceptable in accordance with the AI.

4.5 TARGET QUANTITATION LIMITS

Table 1 in the AI provided target quantitation limits for each requested analyte. These were met for the isotopic uranium analysis. However, these were not attainable for the nondetected radionuclides because of the limited amount of sample provided and the level of activity of analytes present in the sample. The laboratory used the largest possible sample size to obtain the lowest possible detection limits.

5.0 ANALYTICAL PROCEDURES

Table 1 presents the 222-S Laboratory analytical procedures used to generate the reported results.

Table 1. Analytical Procedures.

Analysis	Preparation Procedure	Analysis Procedure
Inorganic Analyses		
ICP-MS	Acid digest	LA-506-102 Rev. D-0
Radionuclide Analyses		
Total alpha/total beta	Environmental digest	LA-508-101 Rev. K-0
GEA	Environmental digest	LA-548-121 Rev. H-0
^{90}Sr	Environmental digest	LA-220-103 Rev. H-0
^{238}Pu, $^{239/240}Pu$	Environmental digest	LA-953-104 Rev. F-0
^{241}Am	Environmental digest	LA-953-104 Rev. F-0

Notes:
Acid digest procedure: LA-505-163 Rev. E-0
Environmental acid digest procedure: LA-544-101 Rev. E-0

6.0 REFERENCES

"Analytical Instruction: 216-A-4 Crib Characterization Sampling and Analysis," dated November 28, 2006, Fluor Hanford, Inc., Richland, Washington.

ATL-MP-1011, 2007, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Revision 7, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

Attachment 1

DATA SUMMARY REPORT

Attachment 1
A2 CRIB1
Data Summary Report

Sample Group: 20070742

Customer Group or SDG Number: 222S20070742

Customer Sample ID: B1NRJ2

Sample Portion: Acid Dig

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S07M000056		A	Uranium 235 by ICP/MS	ug/g	101	<1.10E-05	0.913	1.04	0.976	12.9	101	2.19E-03	n/a	
S07M000056		A	U 238 by ICP/MS	ug/g	103	<5.50E-04	141	164	152	15.1	102	0.109	n/a	

Sample Portion: Env Dig

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S07M000055		E	Gross alpha	uCi/g	100	<1.15E-05	0.483	0.422	0.452	13.5	81.8	1.93E-05	.348	
S07M000055		E	Gross beta	uCi/g	104	<5.08E-05	0.341	0.311	0.326	9.20	99.2	5.66E-05	.313	
S07M000055		E	Americium-241	uCi/g	101	<0.0162	0.0939	0.0838	0.0888	11.4	n/a	0.0331	5.1	
S07M000055		E	Cobalt-60	uCi/g	102	<1.01E-05	<3.34E-05	<3.13E-05	n/a	n/a	n/a	3.34E-05	n/a	U
S07M000055		E	Cesium-137	uCi/g	102	1.46E-05	0.0309	0.0296	0.0302	4.21	n/a	5.90E-05	4.25	
S07M000055		E	Europium-152	uCi/g	n/a	<5.26E-05	<1.46E-04	<1.33E-04	n/a	n/a	n/a	1.46E-04	n/a	U
S07M000055		E	Europium-154	uCi/g	n/a	<3.02E-05	<1.04E-04	<9.85E-05	n/a	n/a	n/a	1.04E-04	n/a	U
S07M000055		E	Europium-155	uCi/g	n/a	<1.59E-05	<1.02E-04	<1.00E-04	n/a	n/a	n/a	1.02E-04	n/a	U
S07M000055		E	Plutonium-239/240	uCi/g	101	<8.05E-03	0.426	0.384	0.405	10.4	n/a	0.0211	2.28	
S07M000055		E	Plutonium-238	uCi/g	n/a	<8.05E-03	<0.0211	<0.0199	n/a	n/a	n/a	0.0211	9.26	U
S07M000055		E	Strontium-89/90	uCi/g	88.5	<1.66E-04	0.125	0.116	0.120	7.47	n/a	2.17E-04	1.67	

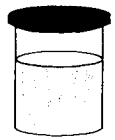
U - Less Than Detection Limit

Attachment 2

SAMPLE BREAKDOWN DIAGRAM

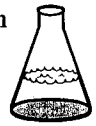
A2 CRIB1
216-A-2 Crib samples
Group 222S20070742

B1NRJ2



S07M000054

Environ Acid Digest



S07M000055
Alpha/Beta
^{90}Sr
^{241}Am
^{238}Pu
$^{239/240}Pu$
GEA

Acid Digest

S07M000056
ICP/MS: Iso Uranium

222S20070742

Attachment 3

TRACER AND CARRIER RECOVERY REPORT

Tracer and Carrier Recovery Report

B1NRJ2	S07M000055	Americium-243	%	46.8
		Plutonium-236	%	104
		Strontium	%	90.0

Attachment 4

ANALYSIS DATE REPORT

ANALYSIS DATE REPORT

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B1NRJ2	S07M000055	Alpha/Beta	7/11/2007	7/16/2007
		Americium	7/11/2007	7/18/2007
		GEA	7/11/2007	7/12/2007
		Plutonium	7/11/2007	7/18/2007
		Sr-90	7/11/2007	7/17/2007
	S07M000056	ICP/MS	7/19/2007	7/19/2007

Attachment 5

OPPORTUNISTIC ANALYTE RESULTS

Attachment 5
A2 CRIB1
Opportunistic Analyte Results

Sample Group: 20070742

Customer Group or SDG Number: 222S20070742

Customer Sample ID: B1NRJ2

Sample Portion: Acid Dig

Sample# R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S07M000056	A	Uranium 233 by ICP/MS	ug/g	n/a	<1.00E-05	<1.99E-03	<1.99E-03	n/a	n/a	n/a	1.99E-03	n/a	U
S07M000056	A	Uranium 234 by ICP/MS	ug/g	n/a	<5.00E-06	7.77E-03	6.88E-03	7.33E-03	12.2	n/a	9.95E-04	n/a	J
S07M000056	A	Uranium 236 by ICP/MS	ug/g	n/a	<4.00E-06	0.0157	0.0273	0.0215	53.9	n/a	7.96E-04	n/a	c

Sample Portion: Env Dig

Sample# R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S07M000055	E	Curium-243/244	uCi/g	n/a	<0.0162	<0.0331	<0.0244	n/a	n/a	n/a	0.0331	100	U
S07M000055	E	Curium-242	uCi/g	n/a	<0.0162	<0.0331	<0.0244	n/a	n/a	n/a	0.0331	n/a	U
S07M000055	E	Americium-241	uCi/g	n/a	n/a	0.0873	0.0794	0.0834	9.44	n/a	2.16E-04	5.27	

J - Estimated U - Less Than Detection Limit c - RPD Outside Range

Attachment 6

CORRESPONDENCE

From: Trent, Stephen J
Sent: Thursday, June 28, 2007 2:15 PM
To: Bushaw, Ruth A
Subject: Samples from A-2

Ruth,

Here's the skinny on the samples that will be delivered today...

B1NRJ2 - 20 mL Poly, approximately 1/4 full. Guessing 10 grams max.
6 m/r window open at 1 inch
< 0.5 m/r at 1 ft.
Requested analysis - radiochemical suite. Priorities are Cs-137, Sr-90, alpha emitters.

B1NPB9 - 60 mL poly(?), full. Guessing 70 - 80 grams
7 m/r window open at 1 inch
<0.5 m/r at 1 ft.
Requested analysis - radscreen (screening GEA)

B1NRB5 - 20 mL poly, full. Guessing 20 - 30 grams max.
4 m/r window open at 1 inch
<0.5 m/r at 1 ft.
Requested analysis - radscreen (screening GEA)

Samples are arriving this afternoon...

Steve

Attachment 7

RECEIPT PAPERWORK

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F07-043-015	PAGE 1 OF 1

COLLECTOR Pope/Pfister/Mokler	**COMPANY CONTACT** Trent, SJ	**TELEPHONE NO.** 373-5869	**PROJECT COORDINATOR** TRENT, SJ
PRICE CODE 8A	**DATA TURNAROUND** 3 Days / 15 Days	**AIR QUALITY** ☐	
SAMPLING LOCATION C5515, I-008 26.5'-28.5'	**PROJECT DESIGNATION** 216-A-2 and 216-A-21 Characterization Sampling and Analysis - Soil	**SAF NO.** F07-043	
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**COA** 122868 ES3	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegitation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE
507M000054

PRESERVATION	None
TYPE OF CONTAINER	G/P
NO. OF CONTAINER(S)	1
VOLUME	20mL
SAMPLE ANALYSIS	Rad Screen;

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B1NRJ2	SOIL	6-18-07	1030	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
[signature]	6/28/07	[signature] 6-28-07	1415
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

LABORATORY SECTION	**RECEIVED BY**	**TITLE**	**DATE/TIME**
FINAL SAMPLE DISPOSITION	**DISPOSAL METHOD**	**DISPOSED BY**	**DATE/TIME**

A-6003-618(01/06)

17

222S20070742

GENERATOR KNOWLEDGE INFORMATION

1. Chain of Custody Number _____ CACN/COA 122868/ES20 Customer Identification Number SAF F07-043

2. List generator knowledge or description of process that produced sample. Or list description of sample source:
216-A-2 and 216-A-21 Characterization Sampling and Analysis - Soil

MSDS Available? (•) No ( ) Yes Hanford MSDS No. _____

3. List all waste codes and constituents associated with the waste or media that was sampled, regardless of CERCLA status.

a) Does the sample contain any of the following listed waste codes?
By checking "unknown" the customer understands that no knowledge is available following a careful search.

	List Federal Waste Code(s):	List Constituent(s):			
P Codes:			( ) Yes	(•) No	( ) Unknown
U Codes:			( ) Yes	(•) No	( ) Unknown
K Codes:			( ) Yes	(•) No	( ) Unknown
F Codes:			( ) Yes	(•) No	( ) Unknown

b) List applicable characteristic waste codes, flash point, pH, constituents, and concentrations as appropriate.

D001:	☐ FP <100°F	☐ FP ≥100 <140°F	☐ DOT Oxidizer	( ) Yes	(•) No	( ) Unknown
D002:	☐ pH ≤2	☐ pH ≥12.5	☐ Solid Corrosive (WSC2)	( ) Yes	(•) No	( ) Unknown
D003:	☐ Cyanide	☐ Sulfide	☐ Water Reactive	☐ Other _____ (i.e., peroxide former, explosive, air reactive)	( ) Yes	(•) No	( ) Unknown
D004-D043 (Identify applicable waste codes and concentrations):					( ) Yes	(•) No	( ) Unknown

N/A

c) If characteristic, list any known underlying hazardous constituents (UHCs) reasonably expected to be present, and their concentrations that may be present above the LDR treatment standard (40 CFR 268.48):

N/A

d) List any known Land Disposal Restrictions (LDR) subcategories, if applicable (40 CFR 268.40):

N/A

e) List any applicable Washington State dangerous waste codes: (not required if federally regulated)

WT01:	( ) Yes	(•) No	( ) Unknown
WT02:	( ) Yes	(•) No	( ) Unknown
W001:	( ) Yes	(•) No	( ) Unknown

(*State mixture rule for ignitability)

WP01:	( ) Yes	(•) No	( ) Unknown
WP02:	( ) Yes	(•) No	( ) Unknown
WP03:	( ) Yes	(•) No	( ) Unknown
F003:*	( ) Yes	(•) No	( ) Unknown

List constituents and concentrations:

N/A

4. Is this material TSCA regulated for PCBs? ( ) Yes (•) No ( ) Unknown ( ) Analysis Requested

List concentration if applicable: _____

If yes, what is the source of the PCBs? (see TSCA PCB Hanford Site User Guide, DOE/RL-2001-50)

☐ PCB Liquid Waste ☐ PCB Bulk Product Waste ☐ PCB Transformer ≥500 ppm ☐ Unknown
☐ PCB Remediation Waste ☐ PCB R&D Waste ☐ PCB contaminated electrical equipment (capacitor/ballast) <500 ppm
☐ PCB Spill Material ☐ PCB Item ☐ Other PCB Waste (list) _____

5. Is this material TRU? ( ) Yes (•) No ( ) Unknown

6. ACCURACY OF INFORMATION

Based on my inquiry of those individuals immediately responsible for obtaining this information, that to the best of my knowledge, the information entered in this document is true, accurate, and complete.

Print & Sign S J TRENT / [signature] Date 6/13/07

A-6002-990 (08/03)

Group #: 222S20070742

222-S Laboratory
Sample Receipt and Chain of Custody Verification Checklist

COC #: F07-043-015 Date Samples Received: 6-28-07

Customer Project Name: A2CRIB1 Number of Samples: 3

Sample Custodian: [illegible]

Sample Custodian to Complete:

Action	OK? (Y/N)	N/A	Comments
RSA or COC provided?	✓		
RSR provided?		✓	
Verify GKI is complete		✓	
Check that outer custody seal is intact, if present	✓		
Record cooler temperature, as appropriate		✓	☐ check if no cooler & no ice
Samples are intact & in good condition	✓		If no, provide comments on back
Verify that COC or RSA is accurate & complete, containing the following information:			
• Client name & client sample number	✓		
• Date & time of sampling	✓		
• Sampling location or origin	✓		
• Container type, size, and number	✓		
• Sample preservation, as appropriate		✓	
• Analysis request is clear	✓		
• Signature of persons relinquishing & receiving samples	✓		
• Date & time of sample custody exchange	✓		
Verify that sample numbers on containers match the COC and/or RSA	✓		
Samples stored properly (e.g., refrigeration)		✓	

Notify the PC immediately if any problems are noted.

PC to Complete:

Samples acceptable for release? YES PC Initials RAB Date 6/28/07

If no, comment on communication and resolution:

Version 5/23/06

CANBERRA

CH-017
Batch Data Report
For
233-S ISOCS NDA Assays

Measurement and Analysis by: _____ **Date:** 6/27/02
Martin Winterrose

Data Review by: _____ **Date:** 6/28/02
Bruce Gillespie

RECEIVED
JUL 2002

Canberra Industries, Inc.
1050 Gillmore, Suite A
Richland, Washington 99352
Tel. 509-943-3442 Fax 509-943-0363

00000001

COGEMA GROUP

1. Introduction

This report documents results for four (4) items, one (1) Porta-ban, and three (3) HEPA Filters assayed by Canberra Hanford using the In Situ Object Counting System (ISOCS). All measurements were performed in accordance with the "Sampling and Analysis Plan for the 233-S Plutonium Concentration Facility" (DOE/RL-97-87 Rev. 1) and the Canberra Hanford Quality Control Plan and procedure. All items were assayed at the 233-S facility. The individual items and drum were assayed during the time period from June 24 to June 28, 2002.

2. Technical Information

The items were assayed within the assay trailer at the 233-S facility grounds. Assays were conducted in one of two manners: For smaller items, a single sample average spectrum was obtained by measuring the item, manually rotating it 180 degrees then continuing data acquisition for a total of 1800 seconds. Items were placed on a cart or turn table within a reduced background area of the trailer. The detector was positioned a minimum of 24 inches from the item with the detector face visually centered on the largest surface area of the package. The detector sides were shielded with a lead collimator to minimize scatter and background.

Individual ISOCS efficiency calibrations were created for each item. Box geometry models were used. An item's composition was determined as best as possible through a combination of the item's packaging description, visual inspection, and package handling. Some items proved very easy to model (e.g. HEPA Filters) while others more difficult. Model matrices were varied or the expected activity distribution adjusted to obtain reasonable correlation between the low and high energy Pu-239 and Am -241 emissions.

The Porta-ban was assayed for 1800 seconds live time and was rotated 180 degrees at 900 seconds during data acquisition. Rotating the Package helps average out and minimizes the potential of sample self-shielding. The HEPA filters were place on the cart and rotated 180 degrees to allow for two (2) sides to be counted. The detector sides were shielded with a lead collimator to minimize scatter and background. None of the items required use of the cadmium attenuator to lessen the detector dead time and improve system performance.

Individual ISOCS efficiency calibrations were created for the Porta-ban based upon the assumption that the Porta-ban Filled the geometry and had an average density based on the net weight of the Porta-ban (waste matrix) divided by the volume. No tare weight was applied. The same approach was used on the HEPA filters and no tare weight was applied. Model matrices were varied somewhat with respect to density and material 'Z' to obtain reasonable correlation between the low and high-energy Pu-239 and Am-241 emissions.

Final package results for the Porta-ban and filters were calculated using the Analysis V3.0b spreadsheet. Data analysis was conservative. Method selections (e.g. measured Am-241 versus Am-241 calculated from the measured Pu-239) normally favored higher final results. Additionally, in one of the measurements performed as a part of this batch, the actual total measurement uncertainty should be significantly lower than the reported value. This is expected as the uncertainty calculation for the Am-241 is based on the 59.5 keV gamma the assay has good results for the higher energy Am-241 gamma emissions. One of the measured items did not identify any of the Pu-239 lines so the MDA value was used to calculate the Pu-239 activity.

3. Quality Control Results

Daily background and quality control (QC) check source measurements were performed on the system prior to each day's measurements. Charts for these measurements are on pages 5 - 10. The control charts span the interval from June 1, 2002 to June 30, 2002. The peak area and centroid control charts indicate a very stable system.

No individual item was randomly selected for replicate measurement since ten (10) items have not been assayed since the last replicate was preformed. So the results from the previous replicate assayed on May 7, 2002 will be applied. As shown in the table below, the replicate satisfies the quality requirements of the difference in measurement values are within 2 sigma of the reported measurement uncertainties.

Replicate Analysis	Item 6785
| Pu-239(orig) – Pu-239(rep) |	5.5
$1.96 * \sqrt{[unc(orig)]^2 + [unc(rep)]^2}$	24.3

4. Summary of Results

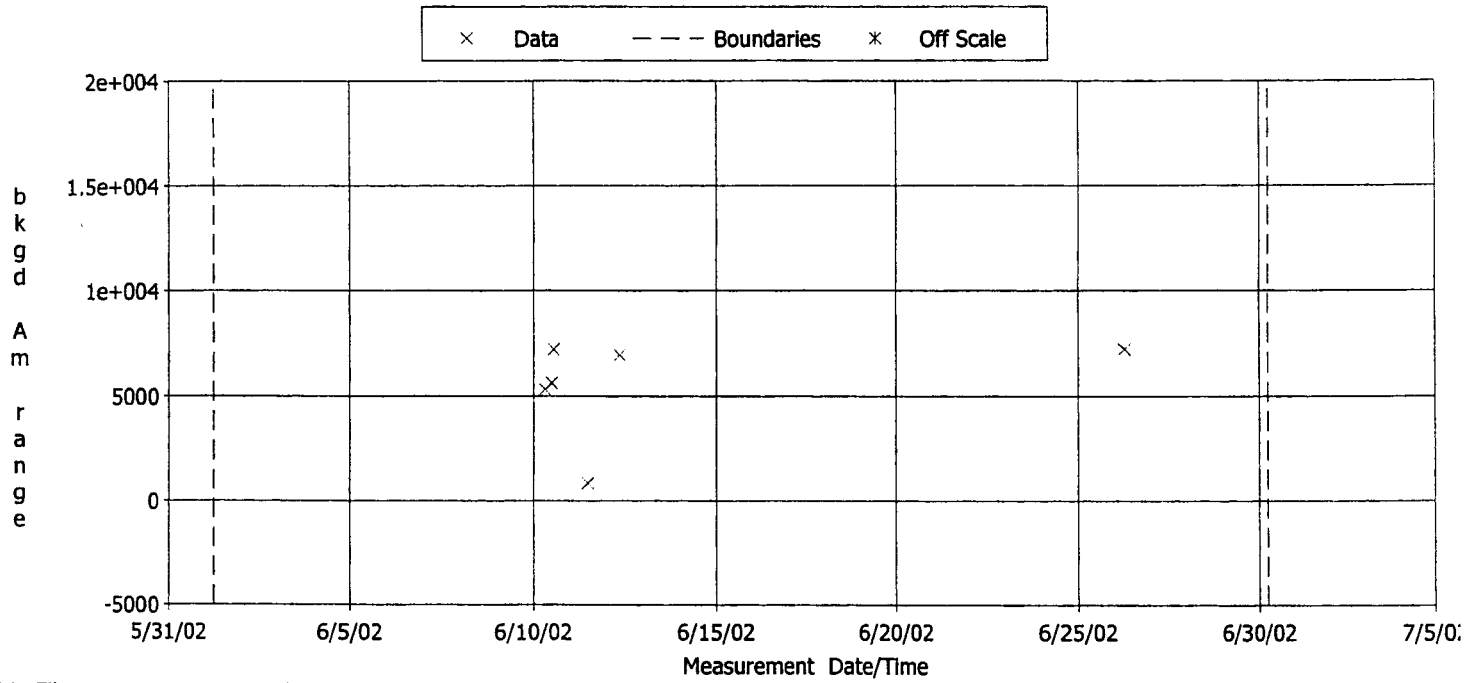
Full data packages for each item are included as an attachment beginning on page 12. The following table summarizes the total TRU activity results and plutonium gram values for each item. The 'Pu Mass + 3-sigma' values in the table are based solely on counting statistics. The 'Pu Mass + 3-sigma TMU' values are not included here, but are reported on the final result spreadsheets.

Summary of package assay results for Data Batch Report CH014

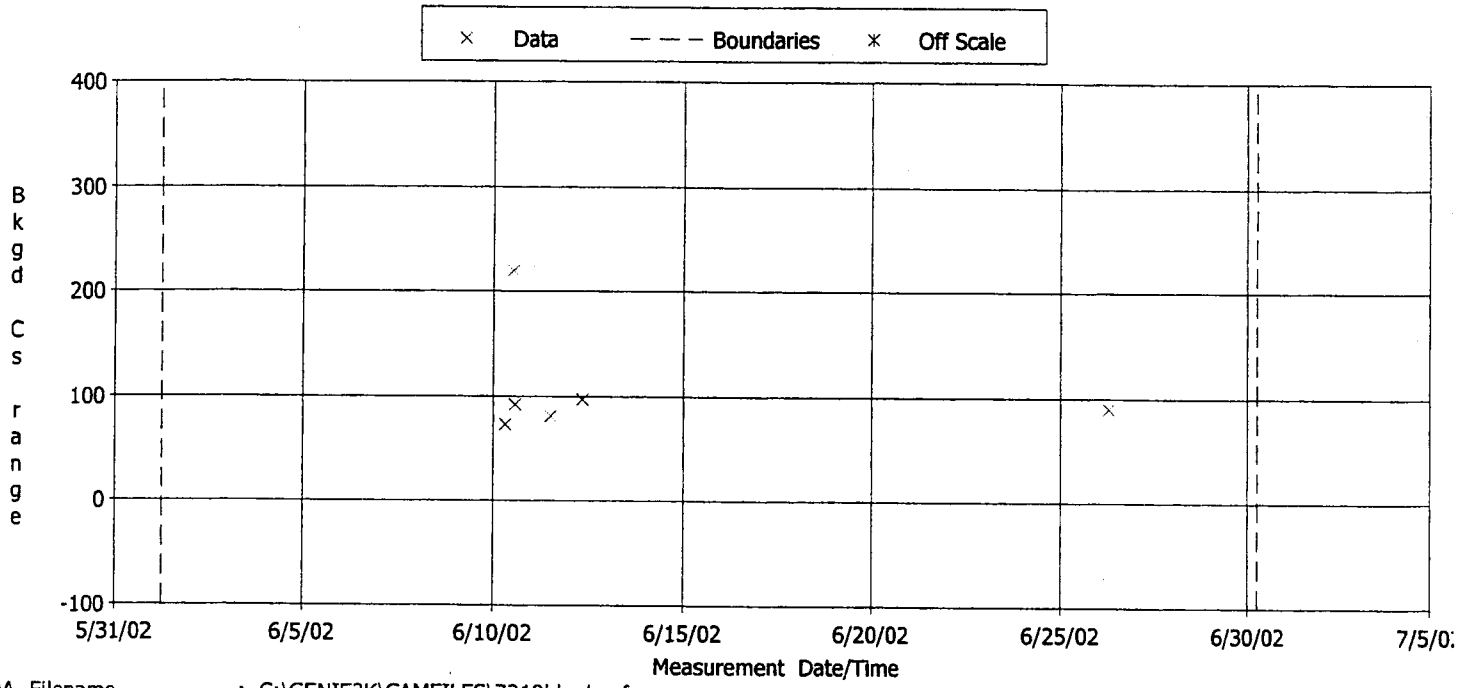
Package Item ID	Assay Weight (kg)	TRU Act (nCi/g)	TRU TMU (nCi/g)	Pu Mass (g)	Pu Mass(g) + 3 sigma	Description, calculation notes
6785	17	1.47E+02 ±	2.00E+01	2.09E-02	2.91E-02	Bagged HEPA filter.
6785 REP		1.58E+02 ±	2.09E+01	2.27E-02	3.11E-02	Previous replicate is of HEPA.
7286	18.5	3.59E+01 ±	7.54E+00	5.43E-03	1.06E-02	HEPA from Omni Force
7272	17.3	5.00E+01 ±	8.74E+00	8.27E-03	8.27E-03	HEPA MDA Values used.
7273	16.8	6.64E+01 ±	1.36E+01	9.79E-03	1.56E-02	HEPA From Hood
7274	15.4	1.16E+02 ±	5.92E+01	1.01E-02	1.56E-02	Porta-ban saw

1	TRU packages
3	LLW packages

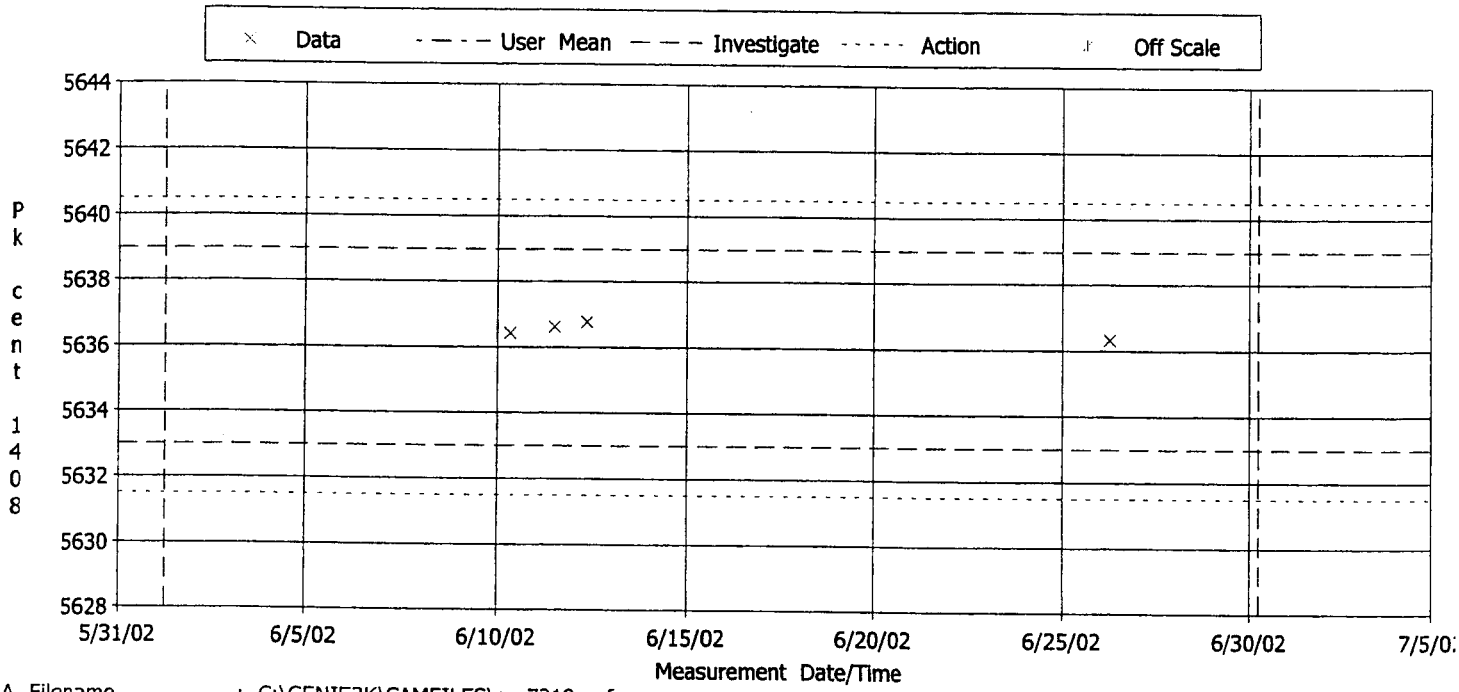
Control Charts



QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf
Parameter Description : bkgd Am range (counts)
Selection Dates : 6/01/02 6:00:00 AM - 6/30/02 6:00:00 AM
Lower/Upper Boundaries : 0.000 - 15000.000

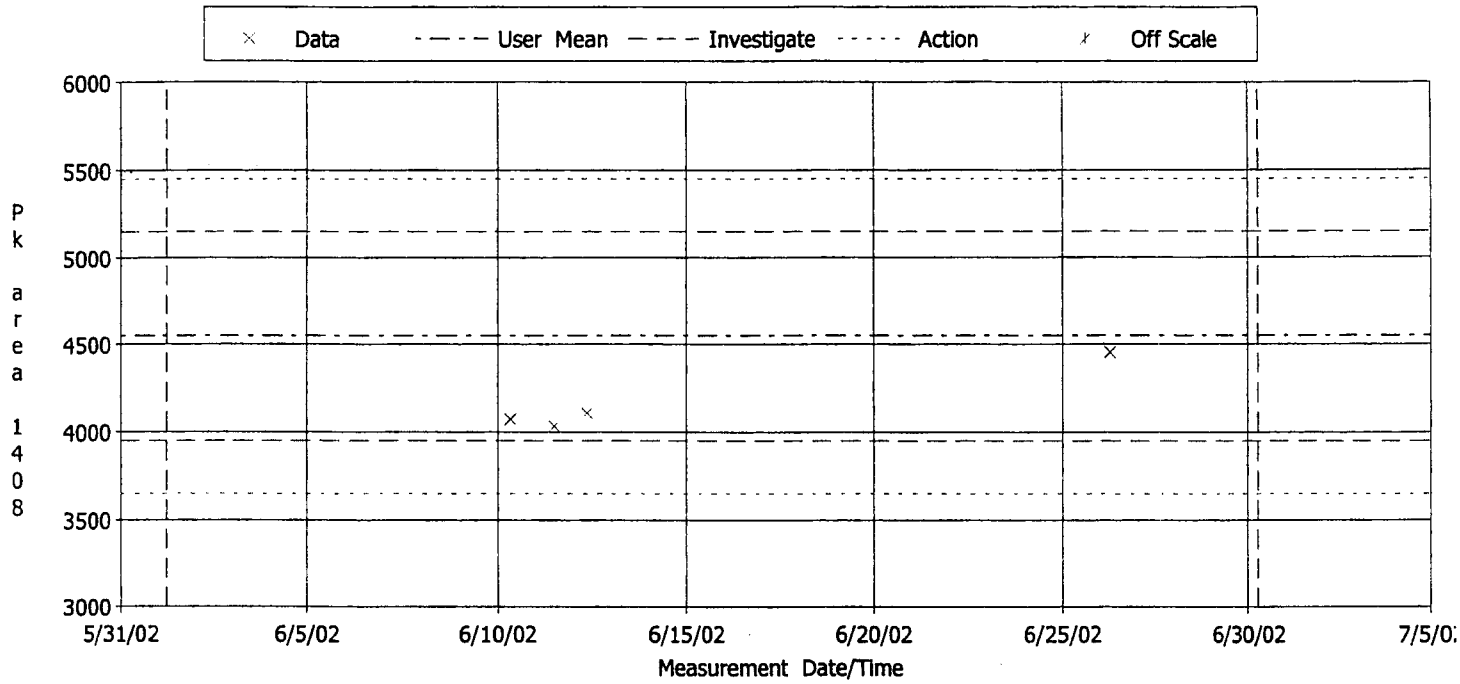


QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf
Parameter Description : Bkgd Cs range (counts)
Selection Dates : 6/01/02 6:00:00 AM - 6/30/02 6:00:00 AM
Lower/Upper Boundaries : 0.000 - 300.000

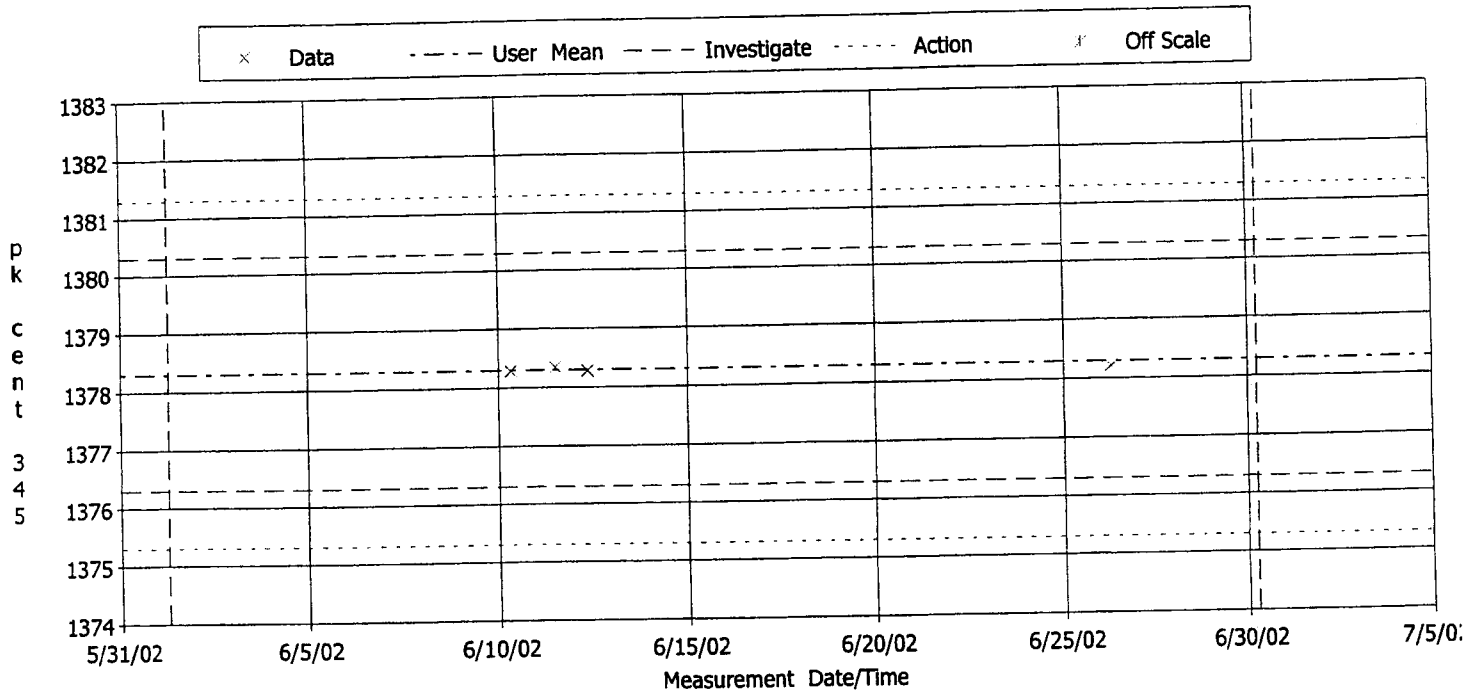


QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk cent 1408 (ch)
Selection Dates : 6/01/02 6:00:00 AM - 6/30/02 6:00:00 AM
User Mean +/- Std Dev : 5636.000 +/- 1.500

00000008

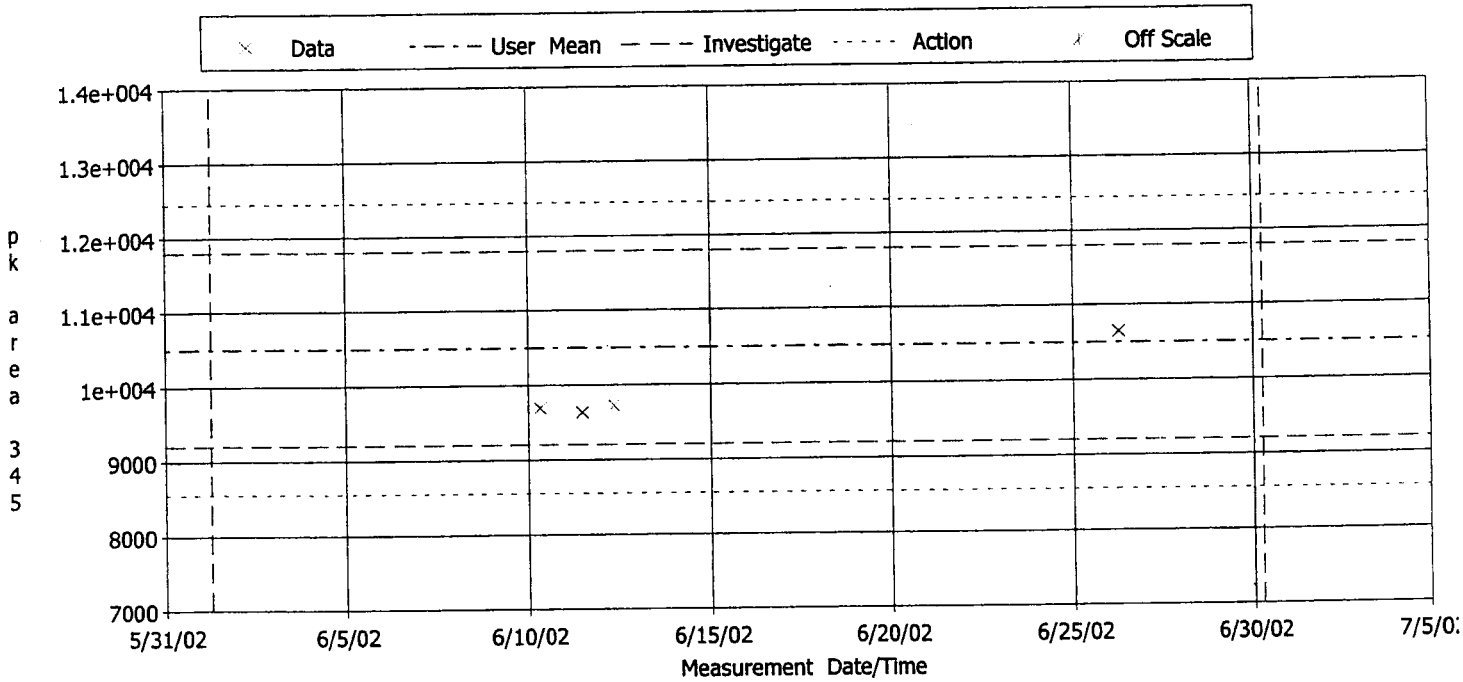


QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk area 1408 (counts)
Selection Dates : 6/01/02 6:00:00 AM - 6/30/02 6:00:00 AM
User Mean +/- Std Dev : 4550.000 +/- 3.00e+002



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk cent 345 (ch)
Selection Dates : 6/01/02 6:00:00 AM - 6/30/02 6:00:00 AM
User Mean +/- Std Dev : 1378.300 +/- 1.000

00000010

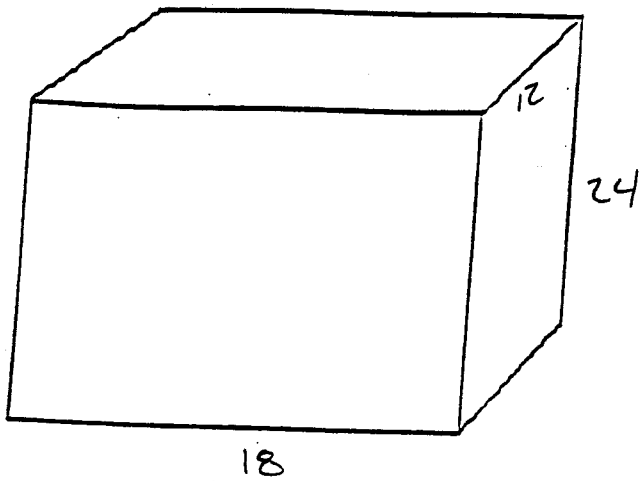


QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk area 345 (counts)
Selection Dates : 6/01/02 6:00:00 AM - 6/30/02 6:00:00 AM
User Mean +/- Std Dev : 10500.000 +/- 6.50e+002

00000011

Data Packages

Bldg 233s
NDA Item Description Sheet
Box Geometry



Put Dimensions on Box

Item ID: 7286

Weight (kg): 18.5 41.

Material Description: HEPA

Packaging: 3 LAYERS

Detector Distance (in): 24"

Detector Filters: N/A

Dose Rate: 0<.5

Comments: A / 900 2002-20
B 2 1800 2002-21

00000013

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 7286

File Name: 2002-21

Assay Date: 26-Jun-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.57E+01	5.00E+00		
Am-241	5.74E+00	4.89E-01		
Np-237	5.70E-03	4.49E-04		
U-238				
U-235				
Cs-137	4.53E-04	1.98E-04		
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Box

Calcs: Use 1st

Dimensions:

Length (in): 18

Width (in): 24

Depth (in): 12

Weight (lbs): 41

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	5.74E+00	+/-	3.70E+00	Use Meas
Calculated	2.17E+01	+/-	1.98E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.35E+00	+/-	2.22E+00
Pu-239	1.57E+01	+/-	5.48E+00
Pu-240	8.16E+00	+/-	2.85E+00
Pu-241	3.05E+01	+/-	1.07E+01
Pu-242	8.24E-03	+/-	2.88E-03
Am-241	5.74E+00	+/-	3.70E+00
Np-237	5.70E-03	+/-	9.23E-04
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	4.53E-04	+/-	2.08E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	3.59E+01	+/-	7.54E+00	Calc from Pu-239 Act
Pu (g):	5.43E-03	**Pu (g) + 3 sigma TMU:**	1.11E-02	
		Pu(g) + 3 sigma:	1.06E-02	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 6/26/02

```
Date & Time: Wed Jun 26 06:56:27 2002
g=SIMPLE_BOX
description=7286_HEPA
comment=HEPA_FROM_OMNI_FORCE
Ccollimator=50MM-180D
crpn=4
Detector=7219
Convergence in %=1            ~MDRPN=4
Lunit=IN  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
at=20        ~ap=760       ~rh=50
Energies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
               300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
              4000.000,
Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                 8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                 4.000,
d1.1=0.25      ~d1.2=18        ~d1.3=24        ~d1.4=12        ~1mater=CELLULOS ~1den=0.45
d3.1=23.5      ~3mater=HEPA     ~3den=0.2177    ~3con=1
sd1=24
```

C A N B E R R A I S O C S A N A L Y S I S

eport Generated On : 6/26/02 7:31:06 AM

ample Title : 7286 Side B
pectrum Description :
ample Identification : 2002-21
ample Size : 18.5 kg

ample Taken On : 6/26/02 7:15:00 AM
cquisition Started : 6/26/02 7:15:59 AM

ive Time: 1800.0 seconds Real Time: 1812.5 seconds

ISOCS Calibration : 7286 HEPA
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 6/26/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.25	59.90	3.18E+005	9819.43	4.55E+003
2	340.60	85.23	8.42E+002	61.71	2.93E+003
3	351.85	88.04	2.79E+002	59.83	2.93E+003
4	377.91	94.55	1.98E+002	52.85	2.91E+003
5	395.94	99.06	8.03E+002	59.90	2.88E+003
6	414.47	103.69	3.40E+002	54.36	2.83E+003
7	501.74	125.50	1.68E+002	48.67	2.57E+003
8	518.55	129.70	2.75E+002	48.24	2.45E+003
9	1201.68	300.43	7.31E+001	15.33	1.81E+002
10	1248.45	312.12	3.80E+002	23.78	1.66E+002
11	1408.64	352.15	1.62E+002	17.08	1.41E+002
12	1500.83	375.19	4.02E+001	12.38	1.27E+002
13	1655.42	413.83	3.73E+001	11.54	8.98E+001
14	2044.20	510.99	1.18E+002	15.25	8.08E+001
15	2437.73	609.34	1.64E+002	15.06	6.16E+001
16	2645.93	661.37	4.63E+001	20.14	5.29E+001
17	2649.15	662.18	5.14E+001	21.26	5.27E+001
18	3647.15	911.59	7.24E+001	10.62	3.07E+001
19	5847.84	1461.59	6.03E+002	25.51	5.88E+000
20	7065.56	1765.92	5.68E+001	8.51	2.93E+000

N U C L I D E I D E N T I F I C A T I O N R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.997	661.65*	85.12	4.53064E-004	1.97775E-004
NP-237	0.859	300.17*	6.20	6.23934E-003	1.34327E-003
		312.00*	36.00	5.69977E-003	4.49064E-004
		340.60	4.20		
		375.45*	0.68	3.55066E-002	1.10439E-002
		415.76*	1.75	1.35594E-002	4.23602E-003
Pu-239	0.969	129.28*	0.01	1.74620E+001	4.24071E+000
		375.00*	0.00	1.52589E+001	4.84328E+000
		413.70*	0.00	1.56696E+001	5.00405E+000
		451.50 @	0.00		
AM-241	0.995	59.54*	35.70	5.73598E+000	4.88973E-001
		125.28*	0.00	1.64915E+001	4.85759E+000
		335.40	0.00		
		662.42* @	0.00	1.19050E+002	4.94114E+001
		722.70	0.00		

I N T E R F E R E N C E C O R R E C T E D R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.997	4.530642E-004	1.977749E-004
NP-237	0.859	5.701191E-003	4.243764E-004
Pu-239 @	0.969	1.446485E+001	2.326189E+000
AM-241 @	0.995	5.843873E+000	4.865142E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

****
*** N U C L I D E M D A R E P O R T *****
****

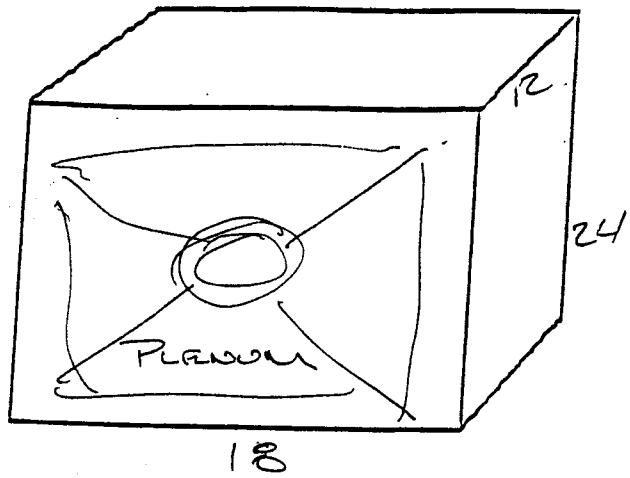
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	6.0688E-004	5.27E-004	2.3912E-004
		1332.49	100.00	5.2667E-004		-5.3926E-005
	CS-134	475.35	1.46	4.0379E-002	6.46E-004	2.9784E-002
		563.23	8.38	6.5154E-003		6.1869E-003
		569.32	15.43	3.3528E-003		1.8201E-003
		604.70	97.60	7.3500E-004		1.6536E-004
		795.84	85.40	6.4599E-004		5.1387E-004
		801.93	8.73	6.4677E-003		-2.1326E-003
		1038.57	1.00	5.2904E-002		-1.0418E-002
		1167.94	1.80	3.4318E-002		-4.6228E-002
		1365.15	3.04	1.6393E-002		-8.9484E-003
+	CS-137	661.65*	85.12	3.5780E-004	3.58E-004	4.5306E-004
+	NP-237	300.17*	6.20	5.5732E-003	9.40E-004	6.2393E-003
		312.00*	36.00	9.4044E-004		5.6998E-003
		340.60	4.20	1.4268E-002		5.9100E-003
		375.45*	0.68	4.8624E-002		3.5507E-002
		415.76*	1.75	1.7020E-002		1.3559E-002
+	Pu-239	129.28*	0.01	1.4789E+001	1.48E+001	1.7462E+001
		375.00*	0.00	2.0896E+001		1.5259E+001
		413.70*	0.00	1.9669E+001		1.5670E+001
		451.50	0.00	2.8216E+002		1.7665E+001
+	AM-241	59.54*	35.70	5.7064E-003	5.71E-003	5.7360E+000
		125.28*	0.00	2.3480E+001		1.6491E+001
		335.40	0.00	1.1736E+002		-1.4560E+002
		662.42*	0.00	8.4583E+001		1.1905E+002
		722.70	0.00	4.5901E+002		4.9308E+001
	PU-241	114.00	0.02	7.4479E+000	7.45E+000	4.4693E+000
		332.60	0.00	1.9227E+001		-2.3699E+001
	CM-243	209.70	3.27	2.2159E-002	4.37E-003	6.9371E-003
		228.18	10.56	6.2205E-003		4.8092E-003
		277.60	14.00	4.3704E-003		-9.3216E-004

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	4.32E-003 +/- 6.94E-004

Bldg 233s
NDA Item Description Sheet
Box Geometry



Put Dimensions on Box

Item ID: 7272

Weight (kg): 17.27 38LB

Material Description: 3° HEPA

Packaging: 3 LAYER

Detector Distance (in): 24

Detector Filters: NONE.

Dose Rate: <B

Comments: A 900 / 2002-22
B 1800 2002-23

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 7272

File Name: 2002-23

Assay Date: 26-Jun-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	2.57E+01	
Pu-239 (414)		
Am-241	5.06E-01	4.25E-02
Np-237		
U-238		
U-235		
Cs-137	9.71E-04	1.30E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Box

Calcs: Use 1st

Dimensions:

Length (in): 18

Weight (lbs): 38

Width (in): 24

Depth for TMU (in): 4

Depth (in): 12

% Volume: 100

Am-241 Calcs:

Measured	5.06E-01	+/-	3.27E-01	Use Meas
Calculated	3.56E+01	+/-	2.71E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.04E+01	+/-	2.95E+00
Pu-239	2.57E+01	+/-	7.29E+00
Pu-240	1.34E+01	+/-	3.80E+00
Pu-241	5.00E+01	+/-	1.42E+01
Pu-242	1.35E-02	+/-	3.84E-03
Am-241	5.06E-01	+/-	3.27E-01
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.71E-04	+/-	1.89E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	5.00E+01	+/-	8.74E+00	Calc from Pu-239 MDA
Pu (g):	8.27E-03	**Pu (g) + 3 sigma TMU:**	1.53E-02	
		Pu(g) + 3 sigma:	8.27E-03	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 6/26/02

```
Date & Time: Wed Jun 26 07:44:05 2002
j=SIMPLE_BOX
description=7272_HEPA
comment=HEPA_FROM_OMNI_FORCE
collimator=50MM-180D
rpn=4
Detector=7219
Convergence in %=1            ~MDRPN=4
Lunit=IN  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
t=20        ~ap=760       ~rh=50
Energies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
               300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
              4000.000,
Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                 8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                 4.000,
d1.1=0.25      ~d1.2=18        ~d1.3=24        ~d1.4=12        ~1mater=CELLULOS ~1den=0.45
d3.1=23.5      ~3mater=HEPA     ~3den=0.2002    ~3con=1
d1=24
```

C A N B E R R A I S O C S A N A L Y S I S

:port Generated On : 6/26/02 8:19:37 AM

ımple Title : 7272 Side B
ɔectrum Description :
ımple Identification : 2002-23
ımple Size : 17.3 kg

ımple Taken On : 6/26/02 8:03:00 AM
:quisition Started : 6/26/02 8:04:31 AM

ıve Time: 1800.0 seconds Real Time: 1803.3 seconds

ISOCS Calibration : 7272 HEPA
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 6/26/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.27	59.90	2.72E+004	732.72	2.31E+003
2	340.31	85.16	8.58E+002	59.93	2.63E+003
3	349.51	87.45	2.45E+002	52.94	2.65E+003
4	395.71	99.00	1.52E+002	54.39	2.68E+003
5	1408.30	352.06	1.01E+002	15.10	1.44E+002
6	2043.57	510.83	1.25E+002	14.75	7.19E+001
7	2437.82	609.36	1.35E+002	14.26	5.47E+001
8	2647.47	661.76	9.43E+001	12.32	4.80E+001
9	5847.60	1461.53	5.60E+002	24.29	7.54E+000
10	7064.73	1765.71	5.06E+001	8.07	2.46E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	9.71985E-004	1.30618E-004
AM-241	0.995	59.54*	35.70	5.06618E-001	4.25089E-002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.29820E+002	3.08776E+001
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	9.698422E-004	1.305915E-004
AM-241 @	0.995	5.066178E-001	4.250889E-002

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

****
*** N U C L I D E M D A R E P O R T *****
****

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	5.9672E-004	5.64E-004	6.0620E-005
		1332.49	100.00	5.6393E-004		-3.3350E-005
	CS-134	475.35	1.46	4.2640E-002	6.63E-004	2.9127E-002
		563.23	8.38	6.6194E-003		-5.0452E-004
		569.32	15.43	3.5667E-003		3.0874E-003
		604.70	97.60	7.5471E-004		-1.7992E-004
		795.84	85.40	6.6287E-004		1.1357E-005
		801.93	8.73	6.5132E-003		-2.4360E-003
		1038.57	1.00	5.7671E-002		2.9160E-003
		1167.94	1.80	3.4313E-002		-5.6063E-003
		1365.15	3.04	1.6529E-002		4.1966E-003
+	CS-137	661.65*	85.12	3.6005E-004	3.60E-004	9.7198E-004
	NP-237	300.17	6.20	1.0244E-002	1.69E-003	4.1869E-003
		312.00	36.00	1.6945E-003		2.0016E-003
		340.60	4.20	1.3922E-002		7.7357E-003
		375.45	0.68	8.0872E-002		-2.2399E-002
		415.76	1.75	3.2463E-002		-3.1485E-003
	Pu-239	129.28	0.01	2.5732E+001	2.57E+001	1.5450E+001
		375.00	0.00	3.4832E+001		1.0029E+000
		413.70	0.00	3.7924E+001		6.4825E-001
		451.50	0.00	3.0322E+002		5.2680E+001
+	AM-241	59.54*	35.70	4.2165E-003	4.22E-003	5.0662E-001
		125.28	0.00	4.0709E+001		1.2773E+001
		335.40	0.00	1.1909E+002		6.4320E+001
		662.42*	0.00	8.5132E+001		2.2982E+002
		722.70	0.00	4.3080E+002		1.0646E+001
	PU-241	114.00	0.02	7.4644E+000	7.46E+000	3.3034E+000
		332.60	0.00	1.9807E+001		-2.7051E+001
	CM-243	209.70	3.27	2.1582E-002	4.31E-003	4.6538E-003
		228.18	10.56	6.3629E-003		-3.9145E-003
		277.60	14.00	4.3077E-003		-1.5692E-004

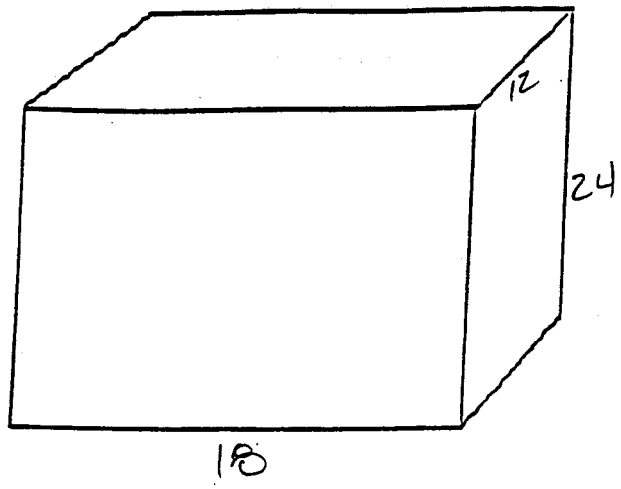
+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)

00000024

Bldg 233s
NDA Item Description Sheet
Box Geometry



Put Dimensions on Box

Item ID: 7273

Weight (kg): 16.81 37 LBS

Material Description: HEPA

Packaging: 3 LAYER

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate:

Comments: 900 2002-24
1800 2002-25

00000025

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 7273

File Name: 2002-25

Assay Date: 26-Jun-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	3.13E+01	6.22E+00
Pu-239 (414)		
Am-241	6.14E+00	5.22E-01
Np-237		
U-238		
U-235		
Cs-137	1.14E-03	1.42E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Box

Calcs: Use 1st

Dimensions:

Length (in): 18

Weight (lbs): 37

Width (in): 24

Depth for TMU (in): 4

Depth (in): 12

% Volume: 100

Am-241 Calcs:

Measured	6.14E+00	+/-	3.97E+00	Use Meas
Calculated	4.33E+01	+/-	3.93E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.27E+01	+/-	4.39E+00
Pu-239	3.13E+01	+/-	1.08E+01
Pu-240	1.63E+01	+/-	5.64E+00
Pu-241	6.09E+01	+/-	2.11E+01
Pu-242	1.65E-02	+/-	5.70E-03
Am-241	6.14E+00	+/-	3.97E+00
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.14E-03	+/-	2.15E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		6.64E+01	+/-	1.36E+01	Calc from Pu-239 Act
Pu (g):	9.79E-03	**Pu (g) + 3 sigma TMU:**		2.00E-02	
		Pu(g) + 3 sigma:		1.56E-02	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 6/26/02

```
ıte & Time: Wed Jun 26 08:26:55 2002
:SIMPLE_BOX
:scription=7273_HEPA
)mment=HEPA_FROM_OMNI_FORCE
:ollimator=50MM-180D
:pn=4
:tector=7219
)nvergence in %=1            ~MDRPN=4
ınit=IN  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
:=20        ~ap=760       ~rh=50
ıergies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
              300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
             4000.000,
rror in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                4.000,
1.1=0.25      ~d1.2=18        ~d1.3=24        ~d1.4=12        ~1mater=CELLULOS ~1den=0.45
3.1=23.5      ~3mater=HEPA     ~3den=0.2002    ~3con=1
d1=24
```

C A N B E R R A I S O C S A N A L Y S I S

port Generated On : 6/26/02 9:00:07 AM

mple Title : 7273 Side B
ectrum Description :
mple Identification : 2002-25
mple Size : 16.8 kg

mple Taken On : 6/26/02 8:44:00 AM
quisition Started : 6/26/02 8:44:56 AM

ve Time: 1800.0 seconds Real Time: 1812.4 seconds

ISOCS Calibration : 7273 HEPA
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 6/26/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	3.21E+005	9729.28	4.48E+003
2	340.20	85.13	7.21E+002	56.59	2.84E+003
3	378.72	94.75	1.76E+002	60.95	2.84E+003
4	395.98	99.07	7.84E+002	68.73	2.82E+003
5	412.36	103.16	2.96E+002	56.16	2.78E+003
6	445.93	111.55	2.06E+002	52.48	2.86E+003
7	518.83	129.77	4.61E+002	49.13	2.42E+003
8	1409.07	352.26	1.02E+002	14.49	1.23E+002
9	1501.60	375.38	8.07E+001	14.20	1.15E+002
10	1656.09	413.99	8.03E+001	13.15	9.21E+001
11	2044.69	511.11	1.30E+002	14.80	7.73E+001
12	2438.10	609.43	1.37E+002	14.18	6.18E+001
13	2647.92	661.87	1.08E+002	13.02	4.81E+001
14	3644.66	910.97	7.36E+001	10.96	3.10E+001
15	3877.51	969.17	5.84E+001	10.07	2.96E+001
16	4483.34	1120.58	5.93E+001	9.72	2.11E+001
17	5847.38	1461.47	5.73E+002	24.65	9.06E+000
18	7064.83	1765.74	4.81E+001	8.11	2.18E+000

N U C L I D E I D E N T I F I C A T I O N R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.998	661.65*	85.12	1.14340E-003	1.42489E-004
Pu-239	0.966	129.28*	0.01	3.12783E+001	6.22047E+000
		375.00*	0.00	3.29852E+001	6.33623E+000
		413.70*	0.00	3.63871E+001	6.59848E+000
		451.50 @	0.00		
AM-241	0.995	59.54*	35.70	6.14081E+000	5.22321E-001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.70350E+002	3.36828E+001
		722.70	0.00		

I N T E R F E R E N C E C O R R E C T E D R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.998	1.117427E-003	1.424727E-004
Pu-239 @	0.966	3.344668E+001	3.683072E+000
AM-241 @	0.995	6.140808E+000	5.223214E-001

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

****
*** N U C L I D E M D A R E P O R T *****
****

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	6.3337E-004	5.17E-004	2.4053E-004
		1332.49	100.00	5.1712E-004		-1.1969E-004
	CS-134	475.35	1.46	3.7855E-002	6.88E-004	1.9632E-002
		563.23	8.38	6.8164E-003		6.3405E-003
		569.32	15.43	3.6555E-003		-3.1253E-004
		604.70	97.60	7.5973E-004		2.5436E-005
		795.84	85.40	6.8788E-004		6.4336E-004
		801.93	8.73	6.4611E-003		3.3576E-003
		1038.57	1.00	5.9513E-002		3.4739E-003
		1167.94	1.80	3.5409E-002		-3.0494E-002
		1365.15	3.04	1.6840E-002		5.8215E-004
+	CS-137	661.65*	85.12	3.7034E-004	3.70E-004	1.1434E-003
	NP-237	300.17	6.20	1.0108E-002	1.67E-003	4.8743E-003
		312.00	36.00	1.6730E-003		2.0574E-004
		340.60	4.20	1.4803E-002		2.7505E-003
		375.45	0.68	9.5611E-002		1.2621E-003
		415.76	1.75	3.5795E-002		6.3114E-003
+	Pu-239	129.28*	0.01	1.5722E+001	1.57E+001	3.1278E+001
		375.00*	0.00	2.1491E+001		3.2985E+001
		413.70*	0.00	2.1447E+001		3.6387E+001
		451.50	0.00	2.9928E+002		-8.5755E+000
+	AM-241	59.54*	35.70	6.0180E-003	6.02E-003	6.1408E+000
		125.28	0.00	4.2125E+001		-5.2294E+000
		335.40	0.00	1.3238E+002		1.2885E+002
		662.42*	0.00	8.7564E+001		2.7035E+002
		722.70	0.00	4.7920E+002		4.5183E+002
	PU-241	114.00	0.02	7.8377E+000	7.84E+000	6.3130E+000
		332.60	0.00	2.1989E+001		-6.4025E+000
	CM-243	209.70	3.27	2.3280E-002	4.47E-003	1.2236E-002
		228.18	10.56	6.5333E-003		3.2593E-003
		277.60	14.00	4.4672E-003		-2.1517E-003

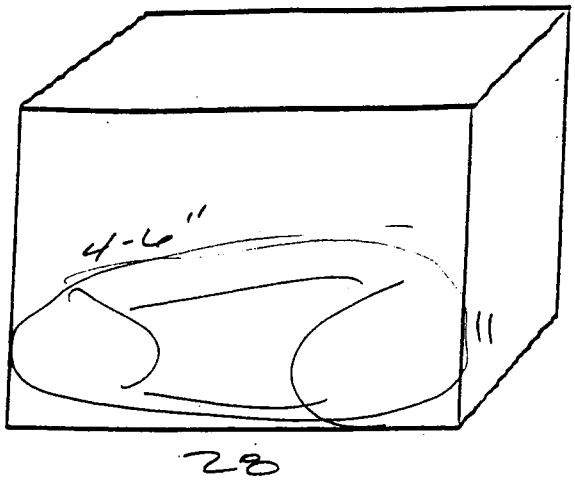
+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	9.07E-003 +/- 9.99E-004

Bldg 233s
NDA Item Description Sheet
~~Box~~ Geometry

~~Box~~ Rectangular



Put Dimensions on Box

.07654

Item ID: 7274

Weight (kg): 34 LBS

Material Description: Porta Bag

Packaging: Bags

Detector Distance (in): 24

Detector Filters: None

Dose Rate:

Comments: A 900 2002-26
B 1800 2002-27

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 7274

File Name: 2002-27

Assay Date: 26-Jun-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	3.52E+01	6.29E+00
Am-241	4.19E+01	3.58E+00
Np-237	1.25E-02	7.66E-04
U-238		
U-235		
Cs-137	9.73E-04	1.23E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Bag

Calcs: Use 1st

Dimensions:

Length (in): 28

Width (in): 11

Depth (in): 4

Weight (lbs): 34

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	4.19E+01	+/-	2.10E+02	Calc from Pu-239
Calculated	4.87E+01	+/-	5.61E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.43E+01	+/-	6.41E+00
Pu-239	3.52E+01	+/-	1.58E+01
Pu-240	1.83E+01	+/-	8.24E+00
Pu-241	6.85E+01	+/-	3.08E+01
Pu-242	1.85E-02	+/-	8.33E-03
Am-241	4.87E+01	+/-	5.61E+01
Np-237	1.25E-02	+/-	5.21E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.73E-04	+/-	4.20E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.16E+02	+/-	5.92E+01	Calc from Pu-239 Act
Pu (g): 1.01E-02	**Pu (g) + 3 sigma TMU:**		2.38E-02	
	Pu(g) + 3 sigma:		1.56E-02	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 6/26/02

```
ate & Time: Wed Jun 26 09:18:31 2002
=SIMPLE_BOX
escription=7274_PORTABAN
omment=PORTABAN
collimator=50MM-180D
rpn=4
etector=7219
onvergence in %=1            ~MDRPN=4
unit=IN  ~Tunit=C  ~Dunit=G/CU.C     ~Punit=MM.HG
t=20        ~ap=760        ~rh=50
nergies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
              300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
             4000.000,
rror in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                4.000,
1.1=0.0625    ~d1.2=28        ~d1.3=11        ~d1.4=4         ~1mater=LPOLYETH ~1den=0.92
3.1=10        ~3mater=SHSD     ~3den=0.7654    ~3con=1
d1=24
```

C A N B E R R A I S O C S A N A L Y S I S

port Generated On : 6/26/02 9:55:02 AM

mple Title : 7274 Side B
ectrum Description :
mple Identification : 2002-27
mple Size : 15.4 kg

mple Taken On : 6/26/02 9:39:00 AM
quisition Started : 6/26/02 9:39:44 AM

ve Time: 1800.0 seconds Real Time: 1821.5 seconds

ISOCS Calibration : 7274 PORTABAN
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 6/26/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	6.29E+005	19843.7	6.95E+003
2	340.28	85.15	9.10E+002	67.94	2.81E+003
3	350.57	87.72	3.12E+002	55.38	2.79E+003
4	378.94	94.81	3.14E+002	53.45	2.73E+003
5	396.19	99.12	1.47E+003	68.90	2.67E+003
6	413.37	103.41	8.40E+002	69.17	2.61E+003
7	444.56	111.21	2.12E+002	47.74	2.65E+003
8	461.00	115.32	1.93E+002	48.08	2.56E+003
9	502.63	125.72	1.98E+002	49.83	2.31E+003
10	518.65	129.72	5.34E+002	50.15	2.20E+003
11	833.59	208.43	2.58E+002	24.07	4.04E+002
12	1201.42	300.36	1.77E+002	18.77	1.86E+002
13	1248.37	312.10	8.42E+002	32.26	1.72E+002
14	1330.20	332.55	5.74E+001	14.48	1.53E+002
15	1361.51	340.37	8.85E+001	15.79	1.49E+002
16	1409.04	352.25	9.56E+001	14.68	1.26E+002
17	1500.83	375.19	1.21E+002	15.34	1.13E+002
18	1654.88	413.69	8.53E+001	13.72	1.00E+002
19	1663.07	415.74	4.03E+001	11.93	1.03E+002
20	2044.94	511.17	1.48E+002	15.28	7.95E+001
21	2438.43	609.51	1.07E+002	12.83	5.13E+001
22	2647.92	661.87	1.02E+002	12.44	4.36E+001
23	3646.37	911.40	7.01E+001	10.23	3.08E+001
24	5847.31	1461.46	5.41E+002	23.93	7.53E+000
25	7064.86	1765.74	3.75E+001	7.38	3.38E+000

N U C L I D E I D E N T I F I C A T I O N R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.998	661.65*	85.12	9.73193E-004	1.22984E-004
NP-237	0.999	300.17*	6.20	1.49871E-002	1.74532E-003
		312.00*	36.00	1.25137E-002	7.66479E-004
		340.60*	4.20	1.17809E-002	2.17248E-003
		375.45*	0.68	1.04910E-001	1.41093E-002
		415.76*	1.75	1.44204E-002	4.31374E-003
Pu-239	0.966	129.28*	0.01	4.19595E+001	8.07111E+000
		375.00*	0.00	4.50846E+001	6.70097E+000
		413.70*	0.00	3.51784E+001	6.29294E+000
		451.50 @	0.00		
AM-241	0.995	59.54*	35.70	4.19085E+001	3.58327E+000
		125.28*	0.00	2.46041E+001	6.30377E+000
		335.40	0.00		
		662.42* @	0.00	2.30106E+002	2.90723E+001
		722.70	0.00		
PU-241	0.940	114.00*	0.02	4.45514E+000	1.13340E+000
		332.60*	0.00	1.09660E+001	2.81374E+000

I N T E R F E R E N C E C O R R E C T E D R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.998	8.138211E-004	1.236600E-004
NP-237	0.999	1.284454E-002	6.594066E-004
Pu-239 @	0.966	3.952274E+001	3.041384E+000
AM-241 @	0.995	3.768259E+001	3.115161E+000
PU-241	0.940	5.364079E+000	1.051314E+000

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

****
*** N U C L I D E M D A R E P O R T *****
****

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	5.8968E-004	4.64E-004	8.1104E-005
		1332.49	100.00	4.6367E-004		-2.3391E-004
	CS-134	475.35	1.46	3.6831E-002	6.14E-004	9.5024E-003
		563.23	8.38	6.4040E-003		2.0626E-003
		569.32	15.43	3.2889E-003		-1.8075E-003
		604.70	97.60	6.1416E-004		3.4068E-005
		795.84	85.40	6.2720E-004		-2.5062E-004
		801.93	8.73	6.0406E-003		-1.2275E-003
		1038.57	1.00	5.4380E-002		2.8499E-002
		1167.94	1.80	3.1579E-002		1.2350E-002
		1365.15	3.04	1.5226E-002		-2.2205E-003
+	CS-137	661.65*	85.12	3.1981E-004	3.20E-004	9.7319E-004
+	NP-237	300.17*	6.20	5.5927E-003	9.46E-004	1.4987E-002
		312.00*	36.00	9.4605E-004		1.2514E-002
		340.60*	4.20	7.9148E-003		1.1781E-002
		375.45*	0.68	4.5267E-002		1.0491E-001
		415.76*	1.75	1.7871E-002		1.4420E-002
+	Pu-239	129.28*	0.01	1.7371E+001	1.74E+001	4.1959E+001
		375.00*	0.00	1.9454E+001		4.5085E+001
		413.70*	0.00	2.0337E+001		3.5178E+001
		451.50	0.00	2.6482E+002		-8.8430E+001
+	AM-241	59.54*	35.70	2.6035E-002	2.60E-002	4.1908E+001
		125.28*	0.00	2.8114E+001		2.4604E+001
		335.40	0.00	1.2616E+002		1.0015E+001
		662.42*	0.00	7.5617E+001		2.3011E+002
		722.70	0.00	3.8028E+002		-2.4544E+002
+	PU-241	114.00*	0.02	5.4851E+000	5.49E+000	4.4551E+000
		332.60*	0.00	1.1519E+001		1.0966E+001
	CM-243	209.70	3.27	2.4272E-002	4.18E-003	3.3532E-002
		228.18	10.56	6.2825E-003		2.9884E-003
		277.60	14.00	4.1814E-003		-4.4830E-003

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	9.85E-003 +/- 7.58E-004