0057662

ADMINISTRATIVE VERIFICATION FORM

VERIFICATION DATE: 12/21/01	VERIFIER: J. M. Duncan
SAF #: Not Generated	PROJECT: Box 39
SDG #: To be assigned after SAF Generation	SDR #(s):

DATA PACKAGE DEFICIENCIES:

NDA Subset (Canberra):

No descrepancies were identified in the administrative verification process. Data package is uniquely paginated and all pages were reproducible to the 5th generation.

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JUN 13 2002
EDMC

DATE SENT TO LAB: N/A	DATE LAB RESPONDED: N/A
DATE VERIFICATION CLOSED: 12/21/01	

CANBERRA

January 9, 2002

To: Joan Kessner
Bechtel Hanford

From: Bruce Gillespie
Canberra Hanford

Subject: Corrections to the Box 39 Report (CH001)

Attached are corrections to the Box 39 report. The corrections are on pages 6 and 7. These corrections include a paragraph on page 6 to explain the change of the Pu mass result on the spreadsheet on page 7.

The spreadsheet on page 7 has been modified to include the corrected hand calculated Pu mass results and a change to the Pu-239 uncertainty.

The uncertainties for the spreadsheet are calculated as the average of the measured uncertainties for the 5 measured values. Although it may be more appropriate the uncertainty was a straight average rather than the square root of the sum of the squares.

The attached pages were replaced by me per laboratory direction.
DAyres
1/21/02

JAN 2002
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Canberra Industries, Inc.
1050 Gillmore, Suite A
Richland, Washington 99352
Tel. 509-943-3442 Fax 509-943-0363

COGEMA GROUP
1000-010902-0001

Final Corrected Results

The following table shows a summary of the corrected peak activities

Comparison of Corrected Peak Activities (Values in nCi/g)

Run #	129 keV	375 keV	413 keV		Am-241 MDA (125 keV)	
1A	36	25	37		49	
1B	35	29	39		60	
2A	53	70	68		45	
2B	57	51	46		55	
End 1	25	23	23		28	
End 2	11	33	35	<MDAs	18	
Sum of the spectra	185	205	209		60.1	measured
divide by 4	46.3	51.3	52.3		15.0	result
Avg of all 6 counts	36.1	38.5	41.3		42.5	
Avg 4 long side meas	45.3	43.8	47.5		52.25	

The final results are reported below. These have been calculated using an unreleased spreadsheet that is being developed based on the revised 233-S Sample and Analysis Plan.

The measured results for the Pu-239 are based on the average of all 6 measurements for the interference corrected 414 keV peak result. The results for the Np-237, Co-60, and Cs-137 are based on the average of all 6 measurements for each nuclide. The Am-241 results are based on the sum of the 4 spectra for the 2 long sides of the box. All other results are calculated based on the isotopic ratios specified in the SAI for Non-Destructive Assay of Box 233s-01-0039.

233-S Item Analysis

Spreadsheet Version 3.0 12/12/2001

Sample Info:

Item ID:	Box 39	**Assay Date:**	30-Nov-01
File Name:		**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	4.13E+01	1.02E+01		
Am-241	1.50E+01	4.30E+00		
Np-237	4.10E-02	3.11E-03		
U-238				
U-235				
Cs-137	9.86E-02	4.97E-03		
Co-60	5.46E-02	1.23E-02		

Item Parameters:

Contamination: Internal Item Type: Box Calcs: Use 1st

Dimensions:

Length (in):	96	Width (in):	48	Depth (in):	48
Weight (lbs):	2800	Depth for TMU (in):	4	% Volume:	25

Am-241 Calcs:

Measured	1.50E+01	+/-	9.03E+01	Use Meas
Calculated	5.72E+01	+/-	1.20E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.67E+01	+/-	1.41E+01
Pu-239	4.13E+01	+/-	3.48E+01
Pu-240	2.15E+01	+/-	1.82E+01
Pu-241	8.04E+01	+/-	6.78E+01
Pu-242	2.17E-02	+/-	1.83E-02
Am-241	1.50E+01	+/-	9.03E+01
Np-237	4.10E-02	+/-	3.32E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.86E-02	+/-	7.96E-02
Co-60	5.46E-02	+/-	4.57E-02

Results:

Total TRU Activity(nCi/g):	9.46E+01	+/-	9.95E+01	Calc from Pu-239 Act
Pu (g):	9.79E-01	**Pu (g) + 3 sigma:**	3.46E+00	

Comments:

Np-237 interference corrected, Am-241 from sum spectrum Pu-239, Np-237, Co-60, and Cs-137 avg

Errors:High Np-237 ratio,

Analyst: Bruce Gillespie **Date:** 12/17/2001

Non Destructive Analysis Report
For Box 39
Using the Canberra
In Situ Object Counting System (ISOCS)
November 30, 2001

Measurements Performed by: Martin Winterrose

Analysis and Report by: _____
Bruce Gillespie

Reviewed by: _____
Andrew McLain

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Introduction

The following is a report on non-destructive assay (NDA) measurements performed on Box 39 using the Canberra In Situ Object Counting System (ISOCS).

Box 39 was exhumed from the Environmental Restoration Disposal Facility (ERDF) in order to more accurately characterize the radioactive content of the box for its acceptability for disposal in ERDF as low level waste (LLW). Box 39 is a wooden box with dimensions of 96" long, 48" high, and 48" deep. The box was known to have a total waste weight of 324.837 kg. For analysis purposes this was rounded to 325 kg. The total shipping weight of the box was 2800 lbs (1273 kg).

The box was initially assayed on Nov 27, 2001, however adverse weather conditions caused problems with the measurement quality. These results were rejected. The box was then moved into a maintenance facility and assayed a second time on Nov 30, 2001. This report will only include results from the Nov 30 measurements.

Measurements were performed on the box in accordance with the Sample and Analysis Instruction (SAI) for Non-Destructive Assay of Box 233s-01-0039 and in accordance with Canberra's NDA procedures.

General Comments on Box 39

Box 39 was intact and was wrapped in plastic for contamination control. The box was located on a removable truck bed. Since the box sat outside in rain and snow conditions, a second layer of plastic was wrapped on the box prior to moving it into the maintenance facility.

Prior to assaying the box the sides were surveyed with a dose rate meter to obtain a general indication of the distribution of activity in the box. Results of this survey indicated a relatively consistent dose rate of 1000 – 2000 cpm over most of the box, with the exception of the upper area along one end of the box which had a hot spot which had a maximum count rate of 8000 cpm.

Measurements

Measurements were performed in accordance with the SAI for Non-Destructive Assay of Box 233s-01-0039. Two measurements were performed on each long side of the box and one measurement was performed on each end of the box. One duplicate measurement was performed to demonstrate the reproducibility of the assay measurements. All

measurements were based on a 1 hour count time. Copies of the assay reports are found in Attachment 1.

The side measurements were performed with the detector centered vertically on the side of the box and offset horizontally by 24" from the center of the box. The measurements on the side of the box were labeled by a side number (side 1 or side 2) and a measurement number (A or B). The detector distance to the side of the box was approximately 34". This varied slightly due to the position of the box on the truck bed.

Measurements at each end of the box were performed with the detector centered vertically and horizontally. The detector distance for these measurements was set at 33".

Attachment 5 shows the worksheet and logbook entries for the box that identifies where each of the measurements were performed. Table 1 below shows the actual measurement distance used for each of the assays.

Table 1

Run number	Detector to Box Distance (in)
1A	35
1B	35
2A	35
2B	33
End 1	33
End 2	33

Two initial models of the geometry were developed using the ISOCS software. These used the box parameters as described in the SAI. One model was developed for measurements along the side of the box. Since each measurement was equally offset from the center of the box the geometry was equivalent for all four side measurements. A second model was developed to take into account the geometry for the end measurements.

The initial review of the data indicated that there were measured Pu-239 results for all 3 of the key gamma lines (129, 375, and 414) for all measurements except the End 2 measurement. The End 2 measurement had no measurable Pu-239 activity. It was also noted that there was a significantly lower result for the measured 129 keV gamma result relative to the 375 and 414 keV gamma results for the Pu-239 analysis on all of the side assays. The lack of correlation between the analysis results for the 3 quantified Pu-239 gamma lines is an indication that the model did not adequately describe the measurement condition.

Initial assay results also indicated a significant Np-237 contribution particularly in the area of the high dose rate at the end of the box. Due to the high Np-237 content it was

determined that corrections to the data would need to be performed to account for interferences with to the 375 and 414 keV Pu-239 gamma lines, caused by the 375 and 415.6 keV gamma lines from the Pa-233 daughter product from Np-237.

Since most of the results were near to the Minimum Detectable Activity (MDA) level and the only measured Am-241 results were from the 59.5 keV gamma, the spectra for the four measurements performed on the 2 long sides of the detector were summed together and analyzed. This analysis provides better measurement statistics, however the results which are reported are a factor of 4 high, since the measurement time is not summed in the spectral summing process. The analysis of this summed spectrum is valid since the efficiency calibration is the same for all four measurements. The results from this analysis provided a measured Am-241 result using the 125 keV gamma line.

Revised ISOCS Model

Several modifications to the ISOCS model were tested. Increasing the matrix density did not seem to significantly improve the correlation between the 3 gamma peaks and tended to create a model which would define a significantly higher waste weight than was know to be in the box. Based on information on how the box was packed (pipes in the lower was area and soft waste in the upper waste area) the material type for the lower waste range was set to steel and the upper waste range was set to cellulose. In addition the multiple layers of plastic were assumed to be an absorber and added to the model. The material description for the sand was also changed to a dirt matrix type which included some higher atomic number elements in the material composition. These modifications improved the correlation somewhat, but were not felt to be adequate.

In order to obtain reasonable correlation for all of the gamma lines, additional absorbers would need to be added to the model. A 1.5 inch dirt absorber was added to the ISOCS model for the side shot geometry. This was felt to be reasonable based on the assumption that some of the upper layer of sand would fall through around the actual waste material. Results obtained with this model eliminated the correlation problems.

Correction for Np-237 Interference

Although the Np-237 activity is significantly lower than the Pu-239, the 375 and 415.6 keV gamma lines from the Np-237 daughter (Pa-233) have a significantly higher abundance than the Pu-239 gamma lines. A list of these is shown below.

Nuclide and Energy	Abundance (%)
Pu-239 (375 keV)	0.00155
Pa-233 (375 keV)	0.68
Pu-239 (414 keV)	0.001466
Pa-233 (415.6 keV)	1.745

The gamma analysis that was performed by the assay software can not accurately differentiate between the Pa-233 and the Pu-239 peaks. There is an accurate calculation for the Np-237 activity from the 312 keV gamma line and a reasonable quantification for the Pu-239 from the 129 keV gamma line. Therefore a calculation for the relative contribution of the activity for each nuclide is calculated based on the activities and emission fractions for each nuclide as shown in the following equation:

$$Pu_{(375\ cor)} = Pu_{(375\ act)} * 0.00155 * Pu_{(129\ act)} / (0.68 * Pa_{(312\ act)} + 0.00155 * Pu_{(129\ act)})$$

And

$$Pu_{(414\ cor)} = Pu_{(414\ act)} * 0.001466 * Pu_{(129\ act)} / (1.745 * Pa_{(312\ act)} + 0.001466 * Pu_{(129\ act)})$$

The table below shows the corrected Pu-239 activities for the 375 and 414 keV gamma lines using this correction.

Corrections for Np-237 Interference

Run #		Gamma Energy (keV)	Emmision Fraction %	Nuclide Activity (uCi/kg)	Fraction of total activity	Reported Activity	Corrected Activity
1A	Pa-233	415 keV	1.745	0.061	0.67		
	Pu-239	414 keV	0.001466	36	0.33	111	36.79
	Pa-233	375 keV	0.68	0.061	0.43		
	Pu-239	375 keV	0.00155	36	0.57	44	25.24
1B	Pa-233	415 keV	1.745	0.116	0.80		
	Pu-239	414 keV	0.001466	35	0.20	195	39.43
	Pa-233	375 keV	0.68	0.116	0.59		
	Pu-239	375 keV	0.00155	35	0.41	71	28.93
2A	Pa-233	415 keV	1.745	0.0113	0.20		
	Pu-239	414 keV	0.001466	52.6	0.80	86	68.49
	Pa-233	375 keV	0.68	0.0113	0.09		
	Pu-239	375 keV	0.00155	52.6	0.91	77	70.37
2B	Pa-233	415 keV	1.745	0.028	0.37		
	Pu-239	414 keV	0.001466	57	0.63	73	46.07
	Pa-233	375 keV	0.68	0.028	0.18		
	Pu-239	375 keV	0.00155	57	0.82	62	51.01
Sum	Pa-233	415 keV	1.745	0.216	0.58		
	Pu-239	414 keV	0.001466	185	0.42	497	208.53
	Pa-233	375 keV	0.68	0.216	0.34		
	Pu-239	375 keV	0.00155	185	0.66	310	205.0
End 1	Pa-233	415 keV	1.745	.0233	0.53		
	Pu-239	414 keV	0.001466	25	0.47	48	22.76
	Pa-233	375 keV	0.68	.0233	0.29		
	Pu-239	375 keV	0.00155	25	0.71	33	23.42

Final Corrected Results

The following table shows a summary of the corrected peak activities

Comparison of Corrected Peak Activities (Values in nCi/g)

Run #	129 keV	375 keV	413 keV		Am-241 MDA (125 keV)	
1A	36	25	37		49	
1B	35	29	39		60	
2A	53	70	68		45	
2B	57	51	46		55	
End 1	25	23	23		28	
End 2	11	33	35	<MDAs	18	
Sum of the spectra	185	205	209		60.1	measured
divide by 4	46.3	51.3	52.3		15.0	result
Avg of all 6 counts	36.1	38.5	41.3		42.5	
Avg 4 long side meas	45.3	43.8	47.5		52.25	

The final results are reported below. These have been calculated using an unreleased spreadsheet that is being developed based on the revised 233-S Sample and Analysis Plan.

The measured results for the Pu-239 are based on the average of all 6 measurements for the interference corrected 414 keV peak result. The results for the Np-237, Co-60, and Cs-137 are based on the average of all 6 measurements for each nuclide. The Am-241 results are based on the sum of the 4 spectra for the 2 long sides of the box. All other results are calculated based on the isotopic ratios specified in the SAI for Non-Destructive Assay of Box 233s-01-0039.

The spreadsheet uses a box weight of 2800 lbs so that the TMU analysis includes the attenuation affects of the sand. This actually causes the Pu mass value to be calculated incorrectly on the spreadsheet since the Pu mass value is calculated by multiplying the Pu nCi/g value by the waste matrix weight which was actually 325 kg or 715 lbs. The correct Pu (g) value is 2.50E-01 g. The Pu(g) + 3 sigma value is 8.84E-01 g.

233-S Item Analysis

Spreadsheet Version 3.0 — 12/12/2001

Sample Info:

Item ID:	Box 39	**Assay Date:**	30-Nov-01
File Name:		**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	4.13E+01	9.78E+00		
Am-241	1.50E+01	4.30E+00		
Np-237	4.10E-02	3.11E-03		
U-238				
U-235				
Cs-137	9.86E-02	4.97E-03		
Co-60	5.46E-02	1.23E-02		

Item Parameters:

Contamination: Internal — Item Type: Box — Calcs: Use 1st

Dimensions:

Length (in):	96	Width (in):	48	Depth (in):	48
Weight (lbs):	2800	Depth for TMU (in):	4	% Volume:	25

Am-241 Calcs:

Measured	1.50E+01	+/-	9.03E+01	Use Meas
Calculated	5.72E+01	+/-	1.20E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.67E+01	+/-	1.41E+01
Pu-239	4.13E+01	+/-	3.47E+01
Pu-240	2.15E+01	+/-	1.81E+01
Pu-241	8.04E+01	+/-	6.76E+01
Pu-242	2.17E-02	+/-	1.83E-02
Am-241	1.50E+01	+/-	9.03E+01
Np-237	4.10E-02	+/-	3.32E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.86E-02	+/-	7.96E-02
Co-60	5.46E-02	+/-	4.57E-02

Results:

Total TRU Activity(nCi/g):		9.46E+01	+/-	9.94E+01	Calc from Pu-239 Act
Pu (g):	~~9.79E-01~~ 2.50E-1 BMG 1/9/02	**Pu (g) + 3 sigma:**		~~3.45E+00~~ 8.84E-1 BMG 1/9/02	

Comments: Np-237 interference corrected, Am-241 from sum spectrum Pu-239, Np-237, Co-60, and Cs-137 avg — Errors:High Np-237 ratio,

Analyst: Bruce Gillespie — **Date:** 12/17/2001

Quality Control

The assay measurements were performed with the ISOCS detector Serial #: 7219. Standard quality control measurements were performed including beginning and end of day QC checks with a Eu-152 source and a beginning of day background measurement. The first end of day QC measurement was at an investigate level for the 345 keV net area, however the second end of day QC measurement passed. The are several action level measurements on the QC chart which occurred when the detector failed during the Nov 27, 2001 assay measurements. The moisture was removed from the detector and several good QC runs were obtained on Nov 29, 2001 (prior to the Box 39 measurements on Nov 30). Copies of the QC reports are found in Attachment 6.

A duplicate assay was performed on the 1B box position. Criteria for acceptance of the duplicate measurement is that the difference for the 2 assay measurement is less than the 2 sigma RMS values for the measurement uncertainties of the 2 assays. The duplicate assay met these criteria. The report for the duplicate assay is found in Attachment 2.

Attachment 1
Assay Reports

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

Report Generated On : 12/03/01 7:43:20 AM

Sample Title : Box 39 Side 1 A 979
Spectrum Description :
Sample Identification : 0979
Sample Size : 325.0 kg

Sample Taken On : 11/30/01 11:45:00 AM
Acquisition Started : 11/30/01 11:44:25 AM

Live Time: 3600.0 seconds Real Time: 3619.3 seconds

ISOCS Calibration : SIDE_SHOTS
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/02/01

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	238.03	59.54	1.37E+005	540.10	4.25E+004
	2	301.00	75.29	8.04E+003	283.14	1.56E+004
	3	340.00	85.04	3.68E+003	272.57	1.61E+004
M	4	395.43	98.90	2.20E+003	103.30	8.96E+003
m	5	413.89	103.51	6.51E+002	82.12	1.15E+004
M	6	445.32	111.37	5.84E+002	89.29	1.02E+004
m	7	458.80	114.74	2.41E+002	77.30	8.42E+003
	8	516.94	129.28	7.81E+002	175.12	9.53E+003
	9	838.56	209.70	3.01E+002	156.32	7.14E+003
	10	1200.40	300.17	1.45E+003	161.83	6.00E+003
	11	1247.69	312.00	9.55E+003	158.06	4.24E+003
	12	1362.07	340.60	1.13E+003	116.27	3.51E+003
	13	1499.65	375.00	2.92E+002	87.40	2.55E+003
	14	1654.42	413.70	7.02E+002	148.19	4.47E+003
	15	2646.05	661.65	3.23E+004	199.49	1.65E+003
	16	4691.96	1173.22	1.77E+004	143.41	5.73E+002
	17	5328.93	1332.49	1.71E+004	133.61	1.43E+002
	18	5847.00	1462.03	7.45E+002	31.93	5.34E+001
	19	7063.00	1766.08	6.94E+001	11.71	1.56E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CO-60	1.000	1173.22*	100.00	5.13226E-002	1.43913E-002
		1332.49*	100.00	5.09752E-002	3.75519E-002
CS-137	1.000	661.65*	85.12	9.99418E-002	5.23747E-003
NP-237	1.000	300.17*	6.20	5.35672E-002	6.86102E-003
		312.00*	36.00	6.09885E-002	3.91717E-003
		340.60*	4.20	6.25744E-002	7.47560E-003
Pu-239	0.966	129.28*	0.01	3.62495E+001	1.02754E+001
		375.00*	0.00	4.36195E+001	1.35885E+001
		413.70*	0.00	1.11465E+002	2.55820E+001
		451.50 @	0.00		
AM-241	0.999	59.54*	35.70	6.58930E+000	9.27286E-001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.36307E+004	1.23672E+003
		722.70	0.00		
PU-241	0.784	114.00*	0.02	3.37149E+000	1.10533E+000
		332.60	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CO-60	1.000	5.127811E-002	1.343826E-002
CS-137	1.000	9.991389E-002	5.230509E-003
NP-237	1.000	5.974913E-002	3.096277E-003
Pu-239 @	0.966	4.568268E+001	7.805122E+000
AM-241 @	0.999	6.589302E+000	9.272864E-001
PU-241	0.784	3.371493E+000	1.105328E+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

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	2.39E-001 +/- 4.09E-002

```
*************************************************************************
*****              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	5.2384E-004	2.85E-004	5.1323E-002
		1332.49*	100.00	2.8478E-004		5.0975E-002
	CS-134	475.35	1.46	6.1885E-002	7.20E-004	1.3161E-002
		563.23	8.38	8.4547E-003		-7.6490E-003
		569.32	15.43	4.6963E-003		-6.2820E-004
		604.70	97.60	7.3464E-004		-4.9999E-006
		795.84	85.40	7.2014E-004		-8.7155E-004
		801.93	8.73	7.1832E-003		-3.8742E-003
		1038.57	1.00	6.3097E-002		-1.5159E-002
		1167.94	1.80	9.9085E-002		-1.9685E-002
		1365.15	3.04	4.6564E-003		-1.5919E-003
+	CS-137	661.65*	85.12	8.8809E-004	8.88E-004	9.9942E-002
+	NP-237	300.17*	6.20	1.9220E-002	2.63E-003	5.3567E-002
		312.00*	36.00	2.6270E-003		6.0988E-002
		340.60*	4.20	2.0407E-002		6.2574E-002
+	Pu-239	129.28*	0.01	2.6517E+001	2.65E+001	3.6249E+001
		375.00*	0.00	4.2472E+001		4.3620E+001
		413.70*	0.00	7.6594E+001		1.1147E+002
		451.50	0.00	4.7908E+002		-5.7546E+001
+	AM-241	59.54*	35.70	6.2056E-002	6.21E-002	6.5893E+000
		125.28	0.00	4.9196E+001		2.7207E+001
		335.40	0.00	1.9583E+002		5.2516E+001
		662.42*	0.00	2.0998E+002		2.3631E+004
		722.70	0.00	4.6528E+002		4.8095E+002
+	PU-241	114.00*	0.02	6.0207E+000	6.02E+000	3.3715E+000
		332.60	0.00	3.2966E+001		2.7365E+001
	CM-243	209.70	3.27	4.0318E-002	7.85E-003	-2.1868E-002
		228.18	10.56	1.1934E-002		-5.7200E-003
		277.60	14.00	7.8479E-003		-4.4694E-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

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

Report Generated On : 12/03/01 8:02:54 AM

Sample Title : Box 39 Side 1B 0980
Spectrum Description :
Sample Identification : 0980
Sample Size : 325.0 kg

Sample Taken On : 11/30/01 1:55:00 PM
Acquisition Started : 11/30/01 1:53:31 PM

Live Time: 3600.0 seconds Real Time: 3623.5 seconds

ISOCS Calibration : SIDE_SHOTS
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/02/01

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	238.03	59.54	1.60E+005	559.70	4.27E+004
	2	301.00	75.29	1.14E+004	335.29	2.19E+004
	3	340.00	85.04	1.60E+003	207.48	1.43E+004
M	4	380.51	95.17	2.40E+003	229.20	2.26E+004
m	5	395.47	98.91	4.04E+003	348.63	2.83E+004
m	6	414.67	103.71	1.31E+003	137.21	2.89E+004
M	7	446.13	111.57	1.37E+003	398.56	1.47E+004
m	8	461.94	115.53	6.11E+002	139.30	2.84E+004
	9	516.94	129.28	7.61E+002	430.16	3.20E+004
	10	1200.40	300.17	3.21E+003	193.23	8.27E+003
	11	1247.69	312.00	1.82E+004	199.98	6.02E+003
	12	1362.07	340.60	2.12E+003	150.51	5.30E+003
	13	1499.65	375.00	4.77E+002	148.36	5.22E+003
	14	1594.00	398.59	4.78E+002	104.47	3.32E+003
	15	1662.00	415.59	1.22E+003	138.76	4.50E+003
M	16	2646.64	661.80	4.81E+004	400.57	1.49E+003
m	17	2665.81	666.59	3.30E+002	28.48	9.80E+002
	18	2780.00	695.14	1.30E+002	67.41	1.14E+003
	19	4691.96	1173.22	1.72E+004	145.58	7.88E+002
	20	5328.93	1332.49	1.64E+004	132.37	2.08E+002
	21	5847.00	1462.03	8.80E+002	33.07	4.15E+001
	22	7061.00	1765.58	6.48E+001	11.63	1.62E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CO-60	1.000	1173.22*	100.00	4.98609E-002	1.39820E-002
		1332.49*	100.00	4.88827E-002	3.60105E-002
CS-137	1.000	661.65*	85.12	1.48633E-001	7.83530E-003
NP-237	1.000	300.17*	6.20	1.18476E-001	1.03124E-002
		312.00*	36.00	1.15979E-001	7.30998E-003
		340.60*	4.20	1.17142E-001	1.09630E-002
Pu-239	0.956	129.28*	0.01	3.53232E+001	2.08800E+001
		375.00*	0.00	7.11790E+001	2.29968E+001
		413.70*	0.00	1.94647E+002	2.81748E+001
		451.50 @	0.00		
AM-241	0.999	59.54*	35.70	7.64941E+000	1.07639E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	3.51435E+004	1.85018E+003
		722.70	0.00		
PU-241	0.757	114.00*	0.02	8.50296E+000	2.01459E+000
		332.60	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CO-60	1.000	4.973276E-002	1.303397E-002
CS-137	1.000	1.486010E-001	7.824999E-003
NP-237	1.000	1.168890E-001	5.238711E-003
Pu-239 @	0.956	8.464137E+001	1.355278E+001
AM-241 @	0.999	7.649415E+000	1.076387E+000
PU-241	0.757	8.502964E+000	2.014585E+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

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	4.44E-001 +/- 7.10E-002

****
***** 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	6.1567E-004	3.43E-004	4.9861E-002
		1332.49*	100.00	3.4329E-004		4.8883E-002
	CS-134	475.35	1.46	6.9404E-002	7.15E-004	-7.7082E-002
		563.23	8.38	9.3372E-003		-6.8711E-003
		569.32	15.43	5.1600E-003		-1.0106E-003
		604.70	97.60	8.0396E-004		1.2809E-004
		795.84	85.40	7.1501E-004		2.3261E-004
		801.93	8.73	7.0571E-003		-4.2891E-003
		1038.57	1.00	6.1531E-002		1.9808E-002
		1167.94	1.80	9.8226E-002		4.1071E-003
		1365.15	3.04	4.5092E-003		-1.0470E-005
+	CS-137	661.65*	85.12	5.6462E-004	5.65E-004	1.4863E-001
+	NP-237	300.17*	6.20	2.2558E-002	3.12E-003	1.1848E-001
		312.00*	36.00	3.1211E-003		1.1598E-001
		340.60*	4.20	2.6233E-002		1.1714E-001
+	Pu-239	129.28*	0.01	6.5660E+001	6.57E+001	3.5323E+001
		375.00*	0.00	7.2428E+001		7.1179E+001
		413.70*	0.00	7.0644E+001		1.9465E+002
		451.50	0.00	5.5031E+002		4.2692E+002
+	AM-241	59.54*	35.70	6.1942E-002	6.19E-002	7.6494E+000
		125.28	0.00	5.9679E+001		5.2969E+000
		335.40	0.00	2.2498E+002		-9.6876E+001
		662.42*	0.00	1.3350E+002		3.5144E+004
		722.70	0.00	4.6826E+002		7.7334E+002
+	PU-241	114.00*	0.02	1.0947E+001	1.09E+001	8.5030E+000
		332.60	0.00	3.7375E+001		3.6659E+000
	CM-243	209.70	3.27	4.8487E-002	9.28E-003	4.3819E-003
		228.18	10.56	1.4342E-002		-1.2122E-002
		277.60	14.00	9.2805E-003		-9.6741E-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

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

Report Generated On : 12/03/01 7:45:08 AM

Sample Title : Box 39 Side 2 A 978
Spectrum Description :
Sample Identification : 0978
Sample Size : 325.0 kg

Sample Taken On : 11/30/01 10:33:00 AM
Acquisition Started : 11/30/01 10:33:49 AM

Live Time: 3600.0 seconds Real Time: 3625.3 seconds

ISOCS Calibration : SIDE_SHOTS
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/02/01

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	238.03	59.54	2.86E+005	752.74	7.66E+004
	2	301.00	75.29	6.32E+003	233.19	1.16E+004
	3	340.00	85.04	3.19E+003	271.23	1.48E+004
M	4	395.75	98.98	1.57E+003	91.71	1.03E+004
m	5	414.15	103.58	7.38E+002	77.50	9.31E+003
	6	446.00	111.54	2.62E+002	137.55	6.76E+003
	7	516.94	129.28	1.13E+003	165.55	8.07E+003
	8	1200.40	300.17	3.82E+002	88.11	2.68E+003
	9	1247.69	312.00	1.77E+003	113.10	3.39E+003
M	10	1362.84	340.79	2.59E+002	54.31	3.49E+003
m	11	1379.78	345.03	1.95E+002	42.26	3.43E+003
	12	1499.65	375.00	5.14E+002	108.31	2.99E+003
	13	1654.42	413.70	5.42E+002	93.33	2.42E+003
	14	2043.00	510.86	6.20E+002	108.50	2.47E+003
	15	2646.05	661.65	2.19E+004	172.11	1.70E+003
	16	4691.96	1173.22	2.14E+004	159.56	7.77E+002
	17	5328.93	1332.49	2.02E+004	147.67	2.77E+002
	18	5847.00	1462.03	8.66E+002	34.19	5.84E+001
	19	7062.00	1765.83	8.25E+001	9.92	3.49E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CO-60	1.000	1173.22*	100.00	6.23494E-002	1.74821E-002
		1332.49*	100.00	6.04597E-002	4.45384E-002
CS-137	1.000	661.65*	85.12	6.77889E-002	3.56768E-003
NP-237	1.000	300.17*	6.20	1.41182E-002	3.37433E-003
		312.00*	36.00	1.12733E-002	1.00548E-003
		340.60*	4.20	1.43520E-002	3.13064E-003
Pu-239	0.966	129.28*	0.01	5.25876E+001	1.19269E+001
		375.00*	0.00	7.66316E+001	1.75003E+001
		413.70*	0.00	8.61005E+001	1.67261E+001
		451.50 @	0.00		
AM-241	0.999	59.54*	35.70	1.37184E+001	1.93012E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	1.60283E+004	8.42446E+002
		722.70	0.00		
PU-241	0.702	114.00*	0.02	3.79239E+000	2.00866E+000
		332.60	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CO-60	1.000	6.209713E-002	1.627341E-002
CS-137	1.000	6.773084E-002	3.562987E-003
NP-237	1.000	1.175170E-002	9.209685E-004
Pu-239	@ 0.966	6.688509E+001	8.491206E+000
AM-241	@ 0.999	1.371841E+001	1.930122E+000
PU-241	0.702	3.792389E+000	2.008657E+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

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	3.51E-001 +/- 4.45E-002

****
***** 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	6.1349E-004	3.98E-004	6.2349E-002
		1332.49*	100.00	3.9793E-004		6.0460E-002
	CS-134	475.35	1.46	5.8676E-002	7.45E-004	4.0324E-002
		563.23	8.38	8.6371E-003		-4.2004E-005
		569.32	15.43	4.7655E-003		4.4564E-003
		604.70	97.60	7.4543E-004		4.6769E-005
		795.84	85.40	7.6443E-004		3.5978E-004
		801.93	8.73	7.5783E-003		-1.8646E-003
		1038.57	1.00	6.7218E-002		-1.7128E-002
		1167.94	1.80	1.0859E-001		-1.4003E-002
		1365.15	3.04	4.6322E-003		-2.3883E-003
+	CS-137	661.65*	85.12	9.0096E-004	9.01E-004	6.7789E-002
+	NP-237	300.17*	6.20	1.0544E-002	2.22E-003	1.4118E-002
		312.00*	36.00	2.2231E-003		1.1273E-002
		340.60*	4.20	1.5367E-002		1.4352E-002
+	Pu-239	129.28*	0.01	2.4871E+001	2.49E+001	5.2588E+001
		375.00*	0.00	5.2386E+001		7.6632E+001
		413.70*	0.00	4.7644E+001		8.6101E+001
		451.50	0.00	4.5005E+002		-1.0943E+001
+	AM-241	59.54*	35.70	8.3628E-002	8.36E-002	1.3718E+001
		125.28	0.00	4.5354E+001		4.5658E+001
		335.40	0.00	1.8205E+002		7.3277E+001
		662.42*	0.00	2.1303E+002		1.6028E+004
		722.70	0.00	4.9560E+002		3.1083E+001
+	PU-241	114.00*	0.02	6.5528E+000	6.55E+000	3.7924E+000
		332.60	0.00	3.0980E+001		3.4816E+001
	CM-243	209.70	3.27	3.6841E-002	7.18E-003	-1.2964E-002
		228.18	10.56	1.1011E-002		8.0599E-004
		277.60	14.00	7.1840E-003		5.1288E-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

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

Report Generated On : 12/02/01 5:47:23 PM

Sample Title : Box 39 Side 2 B 977
Spectrum Description :
Sample Identification : 0977
Sample Size : 325.0 kg

Sample Taken On : 11/30/01 9:10:00 AM
Acquisition Started : 11/30/01 9:25:50 AM

Live Time: 3600.0 seconds Real Time: 3628.7 seconds

ISOCS Calibration : SIDE_SHOTS
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/02/01

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	238.03	59.54	3.14E+005	756.36	7.08E+004
M	2	292.20	73.08	3.66E+003	296.87	1.20E+004
m	3	300.98	75.28	6.38E+003	435.71	1.29E+004
M	4	340.27	85.10	3.03E+003	108.30	1.34E+004
m	5	349.50	87.41	1.12E+003	92.01	1.38E+004
M	6	446.50	111.67	5.61E+002	17.76	1.15E+004
m	7	462.11	115.57	2.94E+002	8.56	1.58E+004
	8	516.94	129.28	1.22E+003	184.10	1.09E+004
	9	1200.40	300.17	6.87E+002	176.68	7.40E+003
	10	1247.69	312.00	4.45E+003	181.21	6.88E+003
	11	1362.07	340.60	3.73E+002	115.73	4.16E+003
	12	1499.65	375.00	4.17E+002	92.12	2.93E+003
	13	1654.42	413.70	4.61E+002	174.34	6.14E+003
	14	2045.00	511.36	6.18E+002	116.59	3.14E+003
	15	2646.05	661.65	3.55E+004	214.09	2.28E+003
	16	2890.21	722.70	9.91E+001	57.61	1.03E+003
	17	4691.96	1173.22	2.56E+004	174.12	9.27E+002
	18	5328.93	1332.49	2.44E+004	160.14	2.17E+002
	19	7063.00	1766.08	8.25E+001	12.78	1.75E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CO-60	1.000	1173.22*	100.00	7.43955E-002	2.08586E-002
		1332.49*	100.00	7.29966E-002	5.37734E-002
CS-137	1.000	661.65*	85.12	1.09828E-001	5.75372E-003
NP-237	1.000	300.17*	6.20	2.53855E-002	6.72020E-003
		312.00*	36.00	2.83965E-002	2.10817E-003
		340.60*	4.20	2.06250E-002	6.52475E-003
Pu-239	0.966	129.28*	0.01	5.65782E+001	1.30127E+001
		375.00*	0.00	6.21905E+001	1.47863E+001
		413.70*	0.00	7.32164E+001	2.84576E+001
		451.50 @	0.00		
AM-241	1.000	59.54*	35.70	1.50402E+001	2.11604E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.59682E+004	1.35862E+003
		722.70*	0.00	2.03963E+002	1.19300E+002
PU-241	0.709	114.00*	0.02	4.09046E+000	2.91629E-001
		332.60	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CO-60	1.000	7.421257E-002	1.944678E-002
CS-137	1.000	1.097642E-001	5.746071E-003
NP-237	1.000	2.747566E-002	1.922239E-003
Pu-239 @	0.966	6.052341E+001	9.239387E+000
AM-241 @	1.000	1.509965E+001	2.115705E+000
PU-241	0.709	4.090457E+000	2.916293E-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

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	3.17E-001 +/- 4.84E-002

****
***** 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	6.6524E-004	3.51E-004	7.4396E-002
		1332.49*	100.00	3.5108E-004		7.2997E-002
	CS-134	475.35	1.46	6.9270E-002	8.39E-004	7.7906E-002
		563.23	8.38	9.9098E-003		-1.5417E-003
		569.32	15.43	5.5023E-003		7.5672E-004
		604.70	97.60	8.4789E-004		-5.9357E-004
		795.84	85.40	8.3902E-004		1.5664E-004
		801.93	8.73	8.3936E-003		1.6533E-003
		1038.57	1.00	7.3341E-002		-1.8431E-002
		1167.94	1.80	1.1848E-001		-5.4464E-002
		1365.15	3.04	4.7044E-003		-1.3748E-003
+	CS-137	661.65*	85.12	1.0418E-003	1.04E-003	1.0983E-001
+	NP-237	300.17*	6.20	2.1340E-002	3.56E-003	2.5385E-002
		312.00*	36.00	3.5568E-003		2.8397E-002
		340.60*	4.20	2.0920E-002		2.0625E-002
+	Pu-239	129.28*	0.01	2.7721E+001	2.77E+001	5.6578E+001
		375.00*	0.00	4.4495E+001		6.2190E+001
		413.70*	0.00	9.0813E+001		7.3216E+001
		451.50	0.00	5.4509E+002		-3.2253E+002
+	AM-241	59.54*	35.70	8.0266E-002	8.03E-002	1.5040E+001
		125.28	0.00	5.5012E+001		5.8205E+001
		335.40	0.00	2.2227E+002		8.9830E+001
		662.42*	0.00	2.4633E+002		2.5968E+004
		722.70*	0.00	3.8987E+002		2.0396E+002
+	PU-241	114.00*	0.02	8.1644E+000	8.16E+000	4.0905E+000
		332.60	0.00	3.7807E+001		1.1766E+001
	CM-243	209.70	3.27	4.5581E-002	8.87E-003	-6.1260E-002
		228.18	10.56	1.3712E-002		-2.0956E-003
		277.60	14.00	8.8735E-003		-2.2515E-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

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

Report Generated On : 12/10/01 6:25:32 PM

Sample Title : Box 39 End 1
Spectrum Description :
Sample Identification : 0983
Sample Size : 325.0 kg

Sample Taken On : 11/30/01 3:45:00 PM
Acquisition Started : 11/30/01 3:43:06 PM

Live Time: 3600.0 seconds Real Time: 3624.7 seconds

ISOCS Calabration : END_SHOTS
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/02/01

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	239.01	59.79	1.66E+005	6118.40	1.03E+004
2	291.96	73.03	4.04E+003	155.21	9.57E+003
3	301.02	75.29	7.23E+003	178.27	9.75E+003
4	340.37	85.13	3.03E+003	125.73	1.12E+004
5	349.59	87.43	1.15E+003	127.89	1.13E+004
6	379.79	94.99	5.45E+002	122.71	1.17E+004
7	395.51	98.92	1.73E+003	108.78	1.18E+004
8	412.52	103.17	6.38E+002	99.13	1.19E+004
9	518.81	129.75	1.13E+003	108.06	1.20E+004
10	1200.98	300.32	1.06E+003	71.79	5.79E+003
11	1248.14	312.11	5.85E+003	101.43	5.35E+003
12	1362.69	340.75	6.28E+002	62.78	4.62E+003
13	1501.01	375.34	3.33E+002	56.50	4.05E+003
14	1660.81	415.30	4.48E+002	56.24	3.90E+003
15	1805.29	451.42	1.42E+002	56.06	3.49E+003
16	2044.44	511.22	4.02E+002	46.69	2.50E+003
17	2646.48	661.76	5.21E+004	513.44	1.06E+003
18	2890.40	722.75	9.06E+001	26.69	8.42E+002
19	4693.82	1173.68	1.76E+004	311.25	3.96E+002
20	5331.61	1333.16	1.62E+004	412.29	4.29E+001
21	5845.81	1461.73	1.07E+003	33.34	1.80E+001
22	7062.23	1765.89	6.07E+001	9.01	5.44E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CO-60	0.987	1173.22*	100.00	4.31529E-002	6.95881E-003
		1332.49*	100.00	4.17369E-002	1.52706E-002
CS-137	1.000	661.65*	85.12	1.21007E-001	6.35441E-003
NP-237	0.999	300.17*	6.20	2.40771E-002	2.15808E-003
		312.00*	36.00	2.32501E-002	1.44400E-003
		340.60*	4.20	2.21415E-002	2.59624E-003
		375.00*	0.68	7.56768E-002	1.36507E-002
		415.60*	1.75	4.14165E-002	5.73900E-003
Pu-239	0.978	129.28*	0.01	2.46549E+001	4.77289E+000
		375.00*	0.00	3.25219E+001	6.21681E+000
		413.70*	0.00	4.78621E+001	7.35062E+000
		451.50* @	0.00	1.25734E+002	5.01290E+001
AM-241	0.997	59.54*	35.70	1.65040E+000	2.38661E-001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.86115E+004	1.50047E+003
		722.70*	0.00	1.42773E+002	4.28379E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CO-60	0.987	4.290945E-002	6.332312E-003
CS-137	1.000	1.210001E-001	6.345990E-003
NP-237	0.999	2.315725E-002	1.071684E-003
Pu-239 @	0.978	2.393103E+001	2.272639E+000
AM-241 @	0.997	1.654781E+000	2.386576E-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

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	1.25E-001 +/- 1.19E-002

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***** N U C L I D E M D A R E P O R T *****
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	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
+	CO-60	1173.22*	100.00	2.3403E-004	8.56E-005	4.3153E-002
		1332.49*	100.00	8.5573E-005		4.1737E-002
	CS-134	475.35	1.46	5.1539E-002	5.60E-004	8.3340E-002
		563.23	8.38	7.1527E-003		1.1738E-003
		569.32	15.43	3.9546E-003		1.9076E-003
		604.70	97.60	6.2486E-004		-9.7564E-005
		795.84	85.40	5.6049E-004		-3.5231E-005
		801.93	8.73	5.6748E-003		8.5692E-004
		1038.57	1.00	5.2528E-002		-3.0741E-003
		1167.94	1.80	8.4553E-002		-1.9716E-001
		1365.15	3.04	4.2575E-003		2.1523E-003
+	CS-137	661.65*	85.12	3.5828E-004	3.58E-004	1.2101E-001
+	NP-237	300.17*	6.20	8.1084E-003	1.36E-003	2.4077E-002
		312.00*	36.00	1.3621E-003		2.3250E-002
		340.60*	4.20	1.1243E-002		2.2142E-002
		375.00*	0.68	6.7868E-002		7.5677E-002
		415.60*	1.75	2.7111E-002		4.1416E-002
+	Pu-239	129.28*	0.01	1.1174E+001	1.12E+001	2.4655E+001
		375.00*	0.00	2.9166E+001		3.2522E+001
		413.70*	0.00	3.1331E+001		4.7862E+001
		451.50*	0.00	2.4582E+002		1.2573E+002
+	AM-241	59.54*	35.70	4.7177E-003	4.72E-003	1.6504E+000
		125.28	0.00	2.8423E+001		-3.5016E+000
		335.40	0.00	1.4812E+002		3.0557E+000
		662.42*	0.00	8.4713E+001		2.8611E+004
		722.70*	0.00	2.1696E+002		1.4277E+002
	PU-241	114.00	0.02	5.2876E+000	5.29E+000	1.1118E+001
		332.60	0.00	2.5108E+001		2.4355E+000
	CM-243	209.70	3.27	2.7985E-002	5.68E-003	-6.8108E-003
		228.18	10.56	8.4397E-003		-1.9112E-003
		277.60	14.00	5.6841E-003		-4.3362E-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

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

Report Generated On : 12/10/01 6:23:34 PM

Sample Title : Box 39 End 2
Spectrum Description :
Sample Identification : 0984
Sample Size : 325.0 kg

Sample Taken On : 11/30/01 4:45:00 PM
Acquisition Started : 11/30/01 4:50:06 PM

Live Time: 3600.0 seconds Real Time: 3615.2 seconds

ISOCS Calabration : END_SHOTS
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/02/01

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	238.03	59.54	1.26E+005	584.86	4.70E+004
	2	301.00	75.29	4.70E+003	227.94	9.94E+003
M	3	340.15	85.08	1.63E+003	241.57	7.32E+003
m	4	350.29	87.61	7.17E+002	108.15	1.02E+004
m	5	372.39	93.13	2.70E+002	61.57	1.04E+004
m	6	394.87	98.76	7.20E+002	110.35	9.90E+003
	7	1200.40	300.17	2.82E+002	96.68	2.78E+003
	8	1247.69	312.00	1.49E+003	109.51	2.90E+003
	9	1362.07	340.60	2.42E+002	97.86	2.57E+003
	10	1499.65	375.00	3.45E+002	102.34	2.53E+003
	11	2045.00	511.36	5.19E+002	91.98	1.87E+003
	12	2646.05	661.65	1.94E+004	170.28	1.76E+003
	13	4691.96	1173.22	1.93E+004	157.32	8.30E+002
	14	5328.93	1332.49	1.83E+004	140.65	1.93E+002
	15	5847.00	1462.03	9.43E+002	35.66	4.96E+001
	16	7061.00	1765.58	5.94E+001	12.25	2.16E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CO-60	1.000	1173.22*	100.00	4.73373E-002	7.57442E-003
		1332.49*	100.00	4.71963E-002	1.71818E-002
CS-137	1.000	661.65*	85.12	4.50853E-002	2.35837E-003
NP-237	1.000	300.17*	6.20	6.41730E-003	2.22850E-003
		312.00*	36.00	5.90562E-003	5.59551E-004
		340.60*	4.20	8.54512E-003	3.48912E-003
AM-241	1.000	59.54*	35.70	1.27056E+000	1.76301E-001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	1.06602E+004	5.56878E+002
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CO-60	1.000	4.731439E-002	6.930834E-003
CS-137	1.000	4.507993E-002	2.355220E-003
NP-237	1.000	5.997600E-003	5.362568E-004
AM-241 @	1.000	1.270561E+000	1.763007E-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

NUCLIDE TOTALS

Nuclide	Mass (g)

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***** 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	6.0480E-004	3.34E-004	4.7337E-002
		1332.49*	100.00	3.3389E-004		4.7196E-002
	CS-134	475.35	1.46	3.7201E-002	5.06E-004	-8.6553E-003
		563.23	8.38	5.7211E-003		2.8751E-004
		569.32	15.43	3.1308E-003		4.0025E-004
		604.70	97.60	5.0571E-004		-2.8223E-006
		795.84	85.40	5.5452E-004		-3.4350E-004
		801.93	8.73	5.6460E-003		-3.9067E-003
		1038.57	1.00	5.0450E-002		-1.9404E-002
		1167.94	1.80	8.7538E-002		3.7330E-004
		1365.15	3.04	4.1979E-003		-6.7823E-004
+	CS-137	661.65*	85.12	7.5381E-004	7.54E-004	4.5085E-002
+	NP-237	300.17*	6.20	7.1778E-003	1.35E-003	6.4173E-003
		312.00*	36.00	1.3497E-003		5.9056E-003
		340.60*	4.20	1.1300E-002		8.5451E-003
	Pu-239	129.28	0.01	1.1230E+001	1.12E+001	1.1527E+001
		375.00	0.00	3.2929E+001		-2.0260E+000
		413.70	0.00	3.4948E+001		5.4499E+001
		451.50	0.00	2.8202E+002		-1.9573E+002
+	AM-241	59.54*	35.70	1.5370E-002	1.54E-002	1.2706E+000
		125.28	0.00	1.7689E+001		-1.2969E+001
		335.40	0.00	1.0114E+002		7.2576E+001
		662.42*	0.00	1.7823E+002		1.0660E+004
		722.70	0.00	3.5163E+002		-3.8726E+002
	PU-241	114.00	0.02	3.2855E+000	3.29E+000	4.6821E+000
		332.60	0.00	1.7178E+001		9.0732E+000
	CM-243	209.70	3.27	1.7699E-002	3.81E-003	-4.5011E-003
		228.18	10.56	5.5259E-003		1.3899E-003
		277.60	14.00	3.8074E-003		-3.1518E-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

Attachment 2
Duplicate Assay Report

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

Report Generated On : 12/10/01 6:26:29 PM

Sample Title : Box 39 Side 1B Duplicate
Spectrum Description :
Sample Identification : 0981
Sample Size : 325.0 kg

Sample Taken On : 11/30/01 2:02:00 PM
Acquisition Started : 11/30/01 2:03:17 PM

Live Time: 3600.0 seconds Real Time: 3623.4 seconds

ISOCS Calabration : SIDE_SHOTS
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/02/01

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	238.03	59.54	1.69E+005	653.36	5.45E+004
	2	301.00	75.29	1.17E+004	306.91	1.94E+004
	3	340.00	85.04	2.02E+003	187.25	1.25E+004
M	4	371.72	92.97	5.88E+002	154.63	1.54E+004
m	5	380.68	95.21	1.88E+003	276.95	2.13E+004
m	6	395.15	98.83	3.55E+003	485.76	2.22E+004
m	7	414.45	103.65	7.67E+002	142.73	1.88E+004
M	8	445.48	111.41	1.30E+003	113.26	1.48E+004
m	9	460.33	115.13	4.04E+002	96.38	1.71E+004
	10	516.94	129.28	8.06E+002	211.56	1.41E+004
	11	1200.40	300.17	3.12E+003	143.20	5.56E+003
	12	1247.69	312.00	1.89E+004	217.32	6.95E+003
	13	1362.07	340.60	2.16E+003	149.33	5.19E+003
	14	1499.65	375.00	6.53E+002	111.44	3.60E+003
	15	1595.00	398.84	6.59E+002	148.52	5.03E+003
	16	1663.00	415.84	9.76E+002	154.71	5.24E+003
M	17	2643.87	661.10	5.88E+003	1413.89	1.52E+003
m	18	2646.96	661.88	4.20E+004	1765.70	1.41E+003
m	19	2665.19	666.44	2.93E+002	28.74	9.36E+002
	20	2779.00	694.89	1.95E+002	60.57	9.58E+002
	21	4691.96	1173.22	1.70E+004	144.20	6.71E+002
	22	5328.93	1332.49	1.63E+004	135.21	2.61E+002
	23	5847.00	1462.03	8.32E+002	33.68	5.64E+001
	24	7062.00	1765.83	6.34E+001	10.44	1.16E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CO-60	1.000	1173.22*	100.00	4.95237E-002	1.38874E-002
		1332.49*	100.00	4.87106E-002	3.58838E-002
CS-137	0.999	661.65*	85.12	1.29770E-001	8.68330E-003
NP-237	1.000	300.17*	6.20	1.15263E-001	8.96692E-003
		312.00*	36.00	1.20961E-001	7.63393E-003
		340.60*	4.20	1.19232E-001	1.09973E-002
Pu-239	0.954	129.28*	0.01	3.73904E+001	1.17665E+001
		375.00*	0.00	9.73678E+001	1.86897E+001
		413.70*	0.00	1.55236E+002	2.82958E+001
		451.50 @	0.00		
AM-241	0.999	59.54*	35.70	8.08107E+000	1.13720E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	3.06835E+004	2.05144E+003
		722.70	0.00		
PU-241	0.773	114.00*	0.02	5.64507E+000	1.39485E+000
		332.60	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CO-60	1.000	4.941780E-002	1.295132E-002
CS-137	0.999	1.297362E-001	8.676223E-003
NP-237	1.000	1.187116E-001	5.139031E-003
Pu-239 @	0.954	6.552482E+001	9.392848E+000
AM-241 @	0.999	8.081066E+000	1.137205E+000
PU-241	0.773	5.645073E+000	1.394852E+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

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	3.43E-001 +/- 4.92E-002

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***** N U C L I D E M D A R E P O R T *****
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	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
+	CO-60	1173.22*	100.00	5.9409E-004	4.46E-004	4.9524E-002
		1332.49*	100.00	4.4570E-004		4.8711E-002
	CS-134	475.35	1.46	7.0420E-002	7.01E-004	9.9754E-002
		563.23	8.38	9.3339E-003		-5.1409E-003
		569.32	15.43	5.1402E-003		-6.3621E-003
		604.70	97.60	8.0730E-004		4.6680E-005
		795.84	85.40	7.0099E-004		-3.8168E-004
		801.93	8.73	7.0526E-003		-3.9414E-003
		1038.57	1.00	6.2942E-002		2.3438E-003
		1167.94	1.80	9.7619E-002		3.3059E-003
		1365.15	3.04	4.7281E-003		-2.7729E-003
+	CS-137	661.65*	85.12	5.4779E-004	5.48E-004	1.2977E-001
+	NP-237	300.17*	6.20	1.6129E-002	3.55E-003	1.1526E-001
		312.00*	36.00	3.5503E-003		1.2096E-001
		340.60*	4.20	2.5984E-002		1.1923E-001
+	Pu-239	129.28*	0.01	3.2131E+001	3.21E+001	3.7390E+001
		375.00*	0.00	5.3641E+001		9.7368E+001
		413.70*	0.00	7.9694E+001		1.5524E+002
		451.50	0.00	5.4525E+002		-1.4541E+002
+	AM-241	59.54*	35.70	8.0267E-002	8.03E-002	8.0811E+000
		125.28	0.00	5.9448E+001		4.5824E+001
		335.40	0.00	2.2342E+002		-8.3820E+001
		662.42*	0.00	1.2952E+002		3.0683E+004
		722.70	0.00	4.6298E+002		3.0149E+001
+	PU-241	114.00*	0.02	8.5278E+000	8.53E+000	5.6451E+000
		332.60	0.00	3.7201E+001		-4.4293E+000
	CM-243	209.70	3.27	4.8604E-002	9.36E-003	-1.5196E-002
		228.18	10.56	1.4424E-002		1.7851E-004
		277.60	14.00	9.3592E-003		7.2677E-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

Attachment 3
Sum of 4 Spectra from the Long Sides of the Box

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

Report Generated On : 12/02/01 5:47:42 PM

Sample Title : Sum of side spectra
Spectrum Description :
Sample Identification : 0979
Sample Size : 325.0 kg

Sample Taken On : 11/30/01 11:45:00 AM
Acquisition Started : 11/30/01 11:44:25 AM

Live Time: 3600.0 seconds Real Time: 3619.3 seconds

ISOCS Calibration : SIDE_SHOTS
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/02/01

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	238.03	59.54	8.97E+005	1320.51	2.33E+005
M	2	292.27	73.10	1.30E+004	925.74	4.02E+004
m	3	300.92	75.27	2.26E+004	1410.17	4.10E+004
	4	340.00	85.04	6.34E+003	405.03	5.02E+004
M	5	370.67	92.71	1.14E+003	194.85	5.08E+004
m	6	380.24	95.10	5.62E+003	396.59	7.47E+004
m	7	395.41	98.89	1.17E+004	740.93	7.94E+004
m	8	413.96	103.53	4.22E+003	305.29	8.12E+004
M	9	445.77	111.48	3.06E+003	641.96	5.04E+004
m	10	460.97	115.28	1.66E+003	327.18	7.37E+004
M	11	502.15	125.58	8.14E+002	225.51	3.63E+004
m	12	518.57	129.69	4.01E+003	844.52	4.80E+004
	13	742.64	185.71	6.65E+002	257.43	2.49E+004
	14	834.00	208.56	1.73E+003	332.83	3.23E+004
	15	1200.40	300.17	5.64E+003	339.45	2.66E+004
	16	1247.69	312.00	3.38E+004	326.83	2.01E+004
	17	1330.08	332.60	5.88E+002	189.70	1.23E+004
M	18	1362.70	340.76	3.86E+003	413.37	1.72E+004
m	19	1380.11	345.11	4.55E+002	97.97	1.65E+004
	20	1499.65	375.00	2.08E+003	273.93	1.77E+004
	21	1594.00	398.59	1.40E+003	272.03	1.71E+004
	22	1654.42	413.70	3.13E+003	356.71	2.31E+004
	23	2045.00	511.36	2.01E+003	215.83	1.08E+004
	24	2437.00	609.38	8.67E+002	125.21	4.92E+003
M	25	2646.73	661.82	1.38E+005	704.87	6.18E+003
m	26	2665.15	666.43	5.65E+002	54.63	4.96E+003
	27	2780.00	695.14	4.90E+002	135.32	4.60E+003
	28	2890.21	722.70	4.53E+002	127.20	4.18E+003
	29	4691.96	1173.22	8.19E+004	312.30	3.06E+003
	30	5100.00	1275.24	1.41E+002	58.10	7.35E+002

31	5328.93	1332.49	7.81E+004	287.79	8.44E+002
32	5847.00	1462.03	3.53E+003	67.76	2.06E+002
33	7063.00	1766.08	3.00E+002	25.14	6.66E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CO-60	1.000	1173.22*	100.00	2.37929E-001	6.66956E-002
		1332.49*	100.00	2.33314E-001	1.71868E-001
CS-137	0.999	661.65*	85.12	4.27310E-001	2.23548E-002
U-235	0.658	143.76	10.50		
		185.71*	54.00	2.91444E-003	1.14206E-003
		205.31	4.70		
NP-237	1.000	300.17*	6.20	2.08241E-001	1.81211E-002
		312.00*	36.00	2.15577E-001	1.35404E-002
		340.60*	4.20	2.13493E-001	2.62984E-002
Pu-239	0.962	129.28*	0.01	1.85410E+002	5.06211E+001
		375.00*	0.00	3.09629E+002	4.90677E+001
		413.70*	0.00	4.97204E+002	7.22051E+001
		451.50 @	0.00		
AM-241	1.000	59.54*	35.70	4.29909E+001	6.04791E+000
		125.28*	0.00	6.01277E+001	1.70961E+001
		335.40	0.00		
		662.42* @	0.00	1.01035E+005	5.27862E+003
		722.70*	0.00	9.33439E+002	2.68466E+002
PU-241	0.943	114.00*	0.02	2.31062E+001	4.80182E+000
		332.60*	0.00	4.71007E+001	1.54639E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CO-60	1.000	2.373251E-001	6.217796E-002
CS-137	0.999	4.271188E-001	2.232501E-002
U-235	0.658	2.914438E-003	1.142057E-003
NP-237	1.000	2.130279E-001	1.002737E-002
Pu-239 @	0.962	2.970986E+002	3.166403E+001
AM-241 @	1.000	4.529757E+001	5.700370E+000
PU-241	0.943	2.521634E+001	4.585819E+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 T O T A L S

Nuclide	Mass (g)
U-235	4.30E-001 +/- 1.69E-001
Pu-239	1.56E+000 +/- 1.66E-001

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	1.2055E-003	6.85E-004	2.3793E-001
		1332.49*	100.00	6.8525E-004		2.3331E-001
	CS-134	475.35	1.46	1.2950E-001	1.51E-003	5.5072E-002
		563.23	8.38	1.8124E-002		-1.6178E-002
		569.32	15.43	1.0038E-002		3.5713E-003
		604.70	97.60	1.5615E-003		-1.5495E-003
		795.84	85.40	1.5139E-003		-1.2799E-004
		801.93	8.73	1.5058E-002		-8.3846E-003
		1038.57	1.00	1.3214E-001		-3.1418E-002
		1167.94	1.80	2.1239E-001		-8.4073E-002
		1365.15	3.04	8.9847E-003		-5.2160E-003
+	CS-137	661.65*	85.12	1.1401E-003	1.14E-003	4.2731E-001
+	NP-237	300.17*	6.20	4.0343E-002	5.70E-003	2.0824E-001
		312.00*	36.00	5.6953E-003		2.1558E-001
		340.60*	4.20	3.3862E-002		2.1349E-001
+	Pu-239	129.28*	0.01	4.7312E+001	4.73E+001	1.8541E+002
		375.00*	0.00	1.3298E+002		3.0963E+002
		413.70*	0.00	1.8447E+002		4.9720E+002
		451.50	0.00	1.0124E+003		3.5076E+001
+	AM-241	59.54*	35.70	1.4523E-001	1.45E-001	4.2991E+001
		125.28*	0.00	6.5677E+001		6.0128E+001
		335.40	0.00	4.1288E+002		2.3502E+002
		662.42*	0.00	2.6958E+002		1.0104E+005
		722.70*	0.00	8.5480E+002		9.3344E+002
+	PU-241	114.00*	0.02	1.7644E+001	1.76E+001	2.3106E+001
		332.60*	0.00	4.9794E+001		4.7101E+001
	CM-243	209.70	3.27	8.5901E-002	1.66E-002	-9.1308E-002
		228.18	10.56	2.5581E-002		-1.9161E-002
		277.60	14.00	1.6632E-002		-1.5865E-002

+ = 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

Attachment 4
ISOCS Models

```
#Date & Time: Sun Dec 02 16:32:04 2001
~g=COMPLEX_BOX
~description=SIDE_SHOTS
~comment=DISTANCE_SET_AT_34_INCHES
~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,   80.000,  100.000,  130.000,  150.000,  200.000,#
                300.000,  500.000,  700.000, 1000.000,
~Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                  8.000,    6.000,    6.000,    4.000,
~d1.1=0.75      ~d1.2=94        ~d1.3=46        ~d1.4=46        ~1mater=CELLULOS
~1den=0.7
~d2.1=19        ~2mater=CELLULOS ~2den=0.125     ~2con=1
~d3.1=4         ~3mater=DIRT1    ~3den=1.6
~d4.1=17        ~4mater=304SS    ~4den=0.125     ~4con=1
~d5.1=4         ~5mater=DIRT1    ~5den=1.6
~1Absor=0.1       ~1Amater=POLYPROP ~1Aden=0.91
~2Absor=1.5       ~2Amater=DIRT1    ~2Aden=1.6
~sd1=34          ~sd2=24          ~sd4=24
```

```
#Date & Time: Sun Dec 02 17:38:16 2001
~g=COMPLEX_BOX
~description=END_SHOTS
~comment=DISTANCE_SET_FOR_33_INCHES
~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,
~Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                  8.000,    6.000,    6.000,    4.000,
~d1.1=0.75      ~d1.2=46        ~d1.3=46        ~d1.4=94        ~1mater=CELLULOS
~1den=0.8
~d2.1=17        ~2mater=CELLULOS ~2den=0.125     ~2con=1
~d3.1=4         ~3mater=DIRT1    ~3den=1.6
~d4.1=17        ~4mater=304SS    ~4den=0.125     ~4con=1
~d5.1=4         ~5mater=DIRT1    ~5den=1.6
~1Absor=0.1       ~1Amater=POLYPROP ~1Aden=0.91
~sd1=33
```

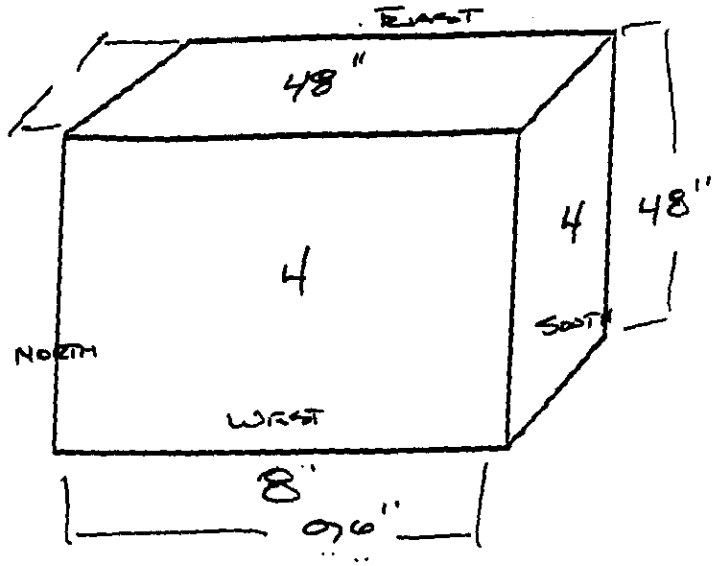
Attachment 5

Worksheet, Logbook Page

Bldg 233s
NDA Item Description Sheet
Box Geometry

COUNTED 11/27/01
11/30/01

WASTE
-7160 LBS
BALANCE
DIRT
FRTF



TARE
894 LBS

Put Dimensions on Box

Kg
GROSS: 1272.72
TARE: 315.45
NET: 957.27

Item ID: Box 39

Weight (kg): 28000 LBS

Material Description: 4x4x8 Wood Box with Sample

Packaging: 4x4x8 Wood Box

Detector Distance (in): 24"

Detector Filters: None

Dose Rate:

A	B
X	Y

Comments:

			11/27/01	11/30/01
WEST SIDE	SIDE 1A	3600	0966	979
11/30/01 COUNTED IN RCFF	SIDE 1B	3600	967	980
MAINTENANCE SHOP. DIR. TO	SIDE 2A	3600	968	978
QCL PROBLEMS 1ST TIME	SIDE 2B	3600	969	977
12/3/01	SIDE 1B REP	3600	970	981
	END SIDE 1	3600	971	983
	END 2	3600	972	984

ERTF 200W 11/30/01

RLT MAINTENCE SHOP: SET UP @ 8:00 - READY

INSIDE

EU-152 SOURCE BD 6000 SEC 0975

PACKED OCL 18.63 Kg

BKGD 11/30/01 6000 SEC 0976

WORKING BD 1 Kg

BOX 39 SIDE 2B 3 6000 SEC 0977

4X4X8 WOOD WITH PLASTIC INRLT SHOP @ 38" 325 Kg

BOX 39 SIDE 2A 3600 SEC 0978

4X4X8 WOOD WITH PLASTIC INRLT SHOP @ 35" 325 Kg

BOX 39 SIDE 1A 3600 SEC 0979

4X4X8 WOOD - BOX 39 1A CAL. @ 35" 325 Kg

BOX 39 SIDE 1B 3600 SEC 0980

4X4X8 WOOD - BOX 39 B CAL. 325 Kg

BOX 39 SIDE 1B TOP 3600 SEC 0981

DUPLICATE 325 Kg

BOX 39 END 1 HOTSPOT 500 SEC / 900 SEC 0982

TOP OF END DRT @ 17" 325 Kg

BOX 39 END 1 3600 SEC 0983

4X4X8 WOODBOX DRT @ 33" 325 Kg

BOX 39 END 2 3600 SEC 0984

4X4X8 WOODBOX DRT @ 33" 325 Kg

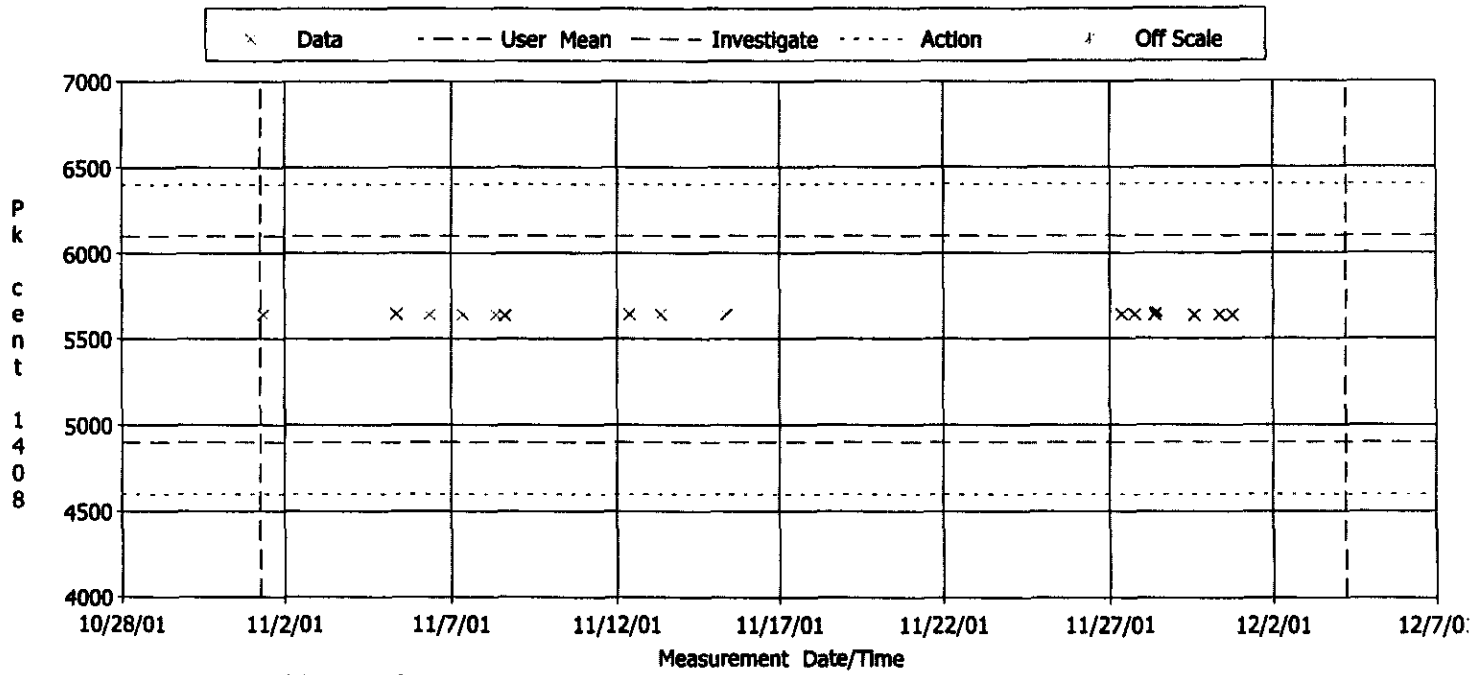
EU-152 SOURCE 6000 SEC 0985

1ST FAILED SECONDED PASSED. 18.63

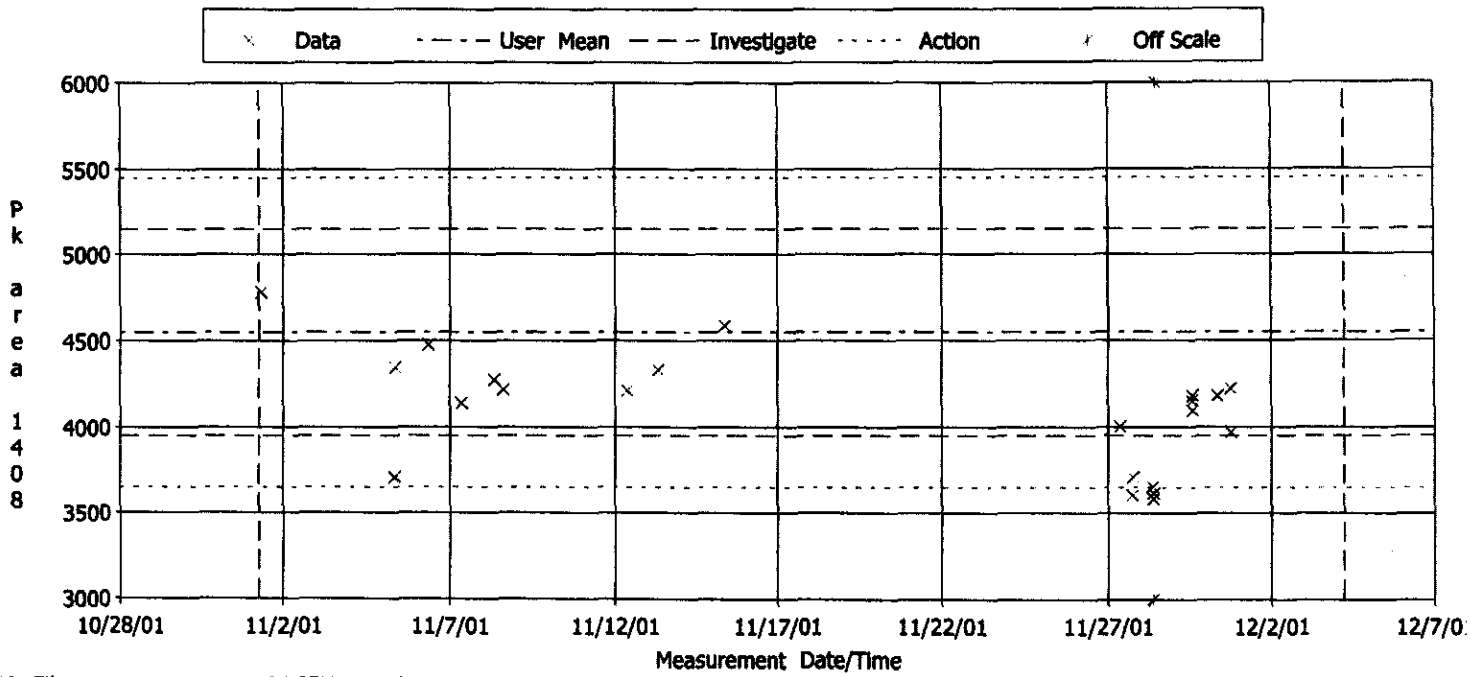
115 SHUT DOWN & LOAD OUT 11/30/01

Attachment 6

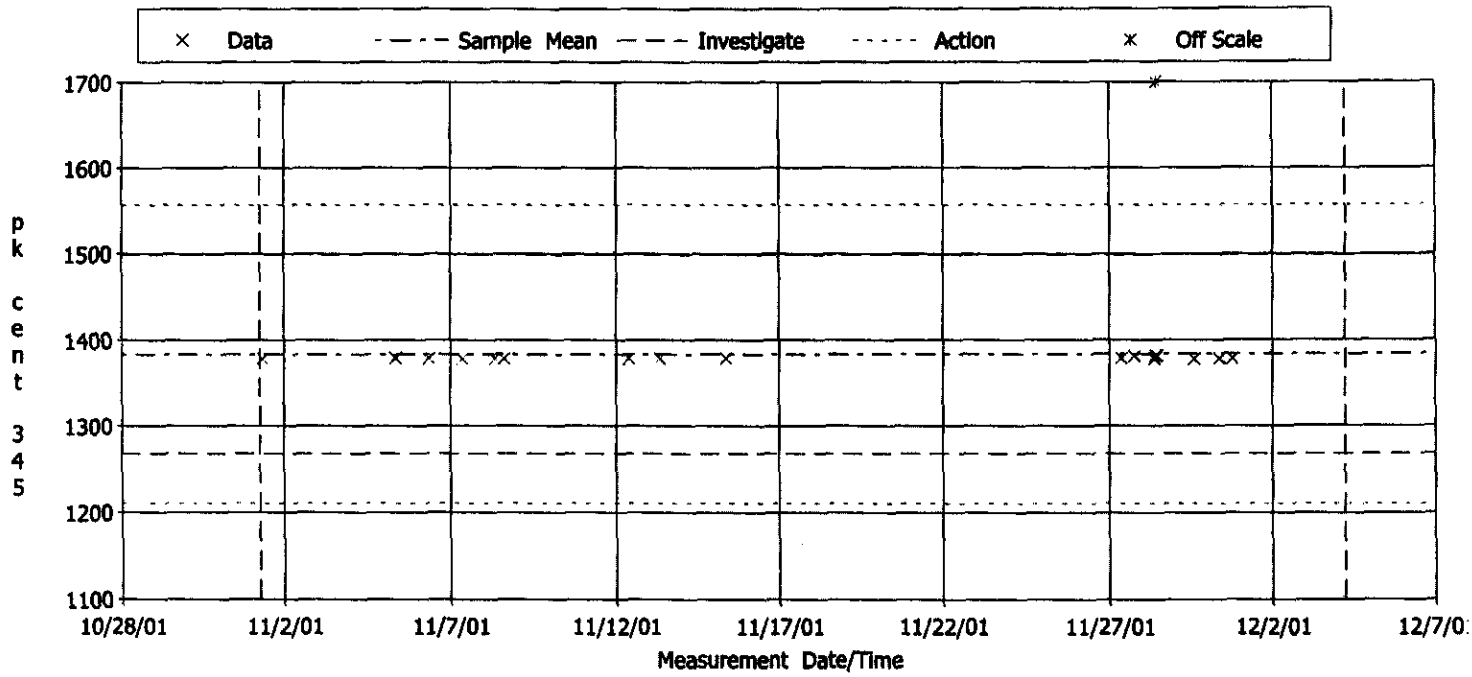
Control Charts



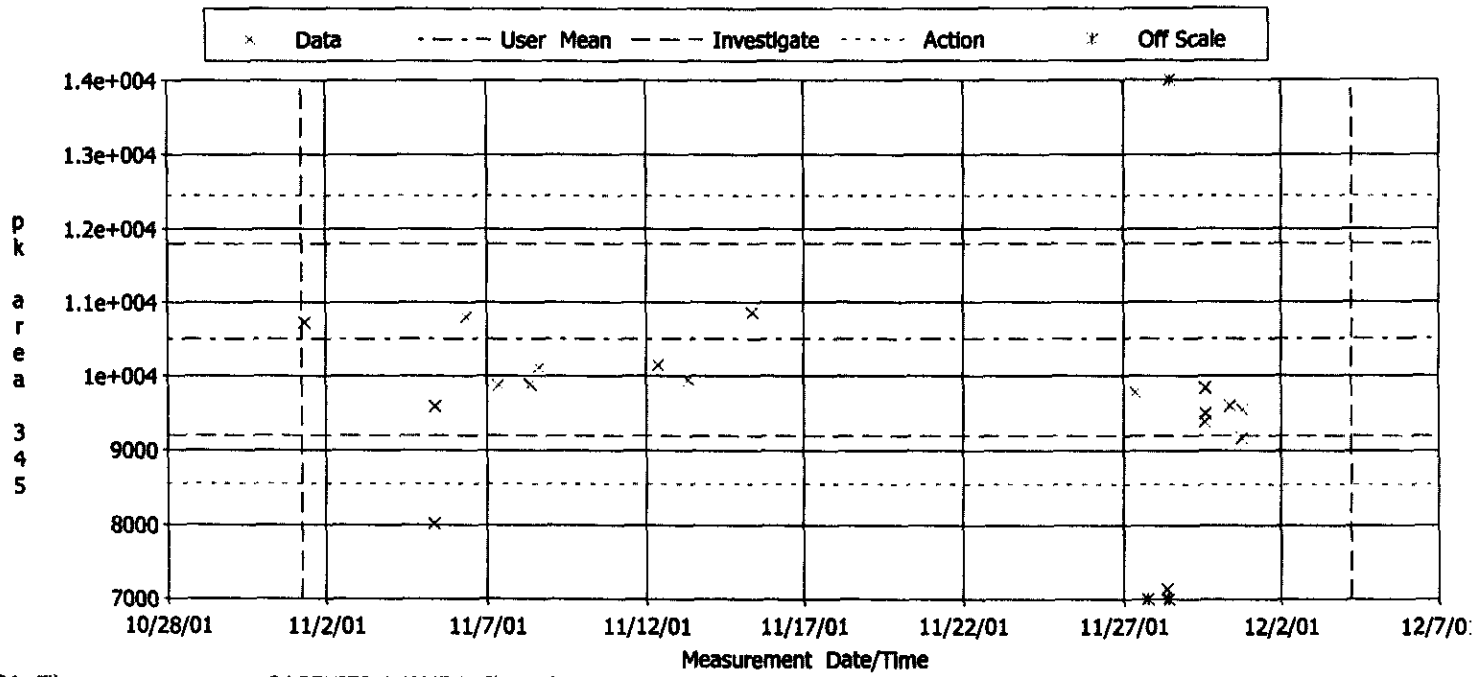
QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk cent 1408 (ch)
Selection Dates : 11/01/01 6:00:00 AM - 12/04/01 6:00:00 AM
User Mean +/- Std Dev : 5500.000 +/- 3.00e+002



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk area 1408 (counts)
Selection Dates : 11/01/01 6:00:00 AM - 12/04/01 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 : 11/01/01 6:00:00 AM - 12/04/01 6:00:00 AM
Sample Mean +/- Std Dev : 1383.791 +/-57.723



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk area 345 (counts)
Selection Dates : 11/01/01 6:00:00 AM - 12/04/01 6:00:00 AM
User Mean +/- Std Dev : 10500.000 +/- 6.50e+002

CANBERRA

Batch Data Report
For
233-S ISOCS NDA Assays

Measurement and Analysis by: _____ **Date:** 1/8/02

Data Review by: Bruce M. Gillespie **Date:** 1/8/02

JAN 2002
RECEIVED

Canberra Industries, Inc.
1050 Gillmore, Suite A
Richland, Washington 99352
Tel. 509-943-3449 Fax 509-943-0363

COGEMA GROUP

1. Introduction

This report covers 55 gallon drums 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 procedures.

Measurements were performed at 233-S from Oct 25, 2001 through Dec 27, 2001.

All measurements in this batch are 55 gallon drums. The batch includes 20 drums and one replicate measurement. All drums are above the 100 nCi/g TRU/LLW sorting criteria.

2. Technical Information

Some drums were assayed by performing four assay measurements in 90 degree increments around the drum. The remainder of the drums were assayed with the drum rotating. Results between these two techniques have been shown to be similar. The detector was centered vertically on the drum and located at a distance of 24" from the side of the drum. For measurements where the drum was assayed in four 90 degree increments, the spectra from the four measurements were summed to provide a single spectrum that provides an average response for the drum.

The ISOCS efficiency calibration was created based on the assumption that the drum was full and had an average density based on the net weight of the drum (waste matrix only) divided by the drum volume (208 liters). Matrix material types were varied somewhat to improve the correlation of results between the low energy and high energy Pu-239 gamma lines.

Final results are calculated using the Analysis V3a spreadsheet.

One measurement had a Np-237 concentration that exceeded the warning criteria on the spreadsheet. This was very close to the warning level and was not significant enough to cause interference problems with the Pu-239 results.

It should be noted that in all measurements performed as a part of this batch, the actual total measurement uncertainty should be significantly lower than the reported value since the uncertainty calculation for the Am-241 is based on the 59.5 keV gamma, and these drum assays all have good results for the higher energy Am-241 gammas.

3. Quality Control Results

Daily background and QC check source measurements are performed on the system. Charts for these measurements are on pages 4 - 8 of this report. The control charts cover the period from Oct 23, 2001 – Dec 27, 2001. All measurements for this period are in control.

A replicate count was performed on drum number 233S-01-0130. The original and replicate results agree within acceptable limits as shown below for the key measurement nuclide Pu-239.

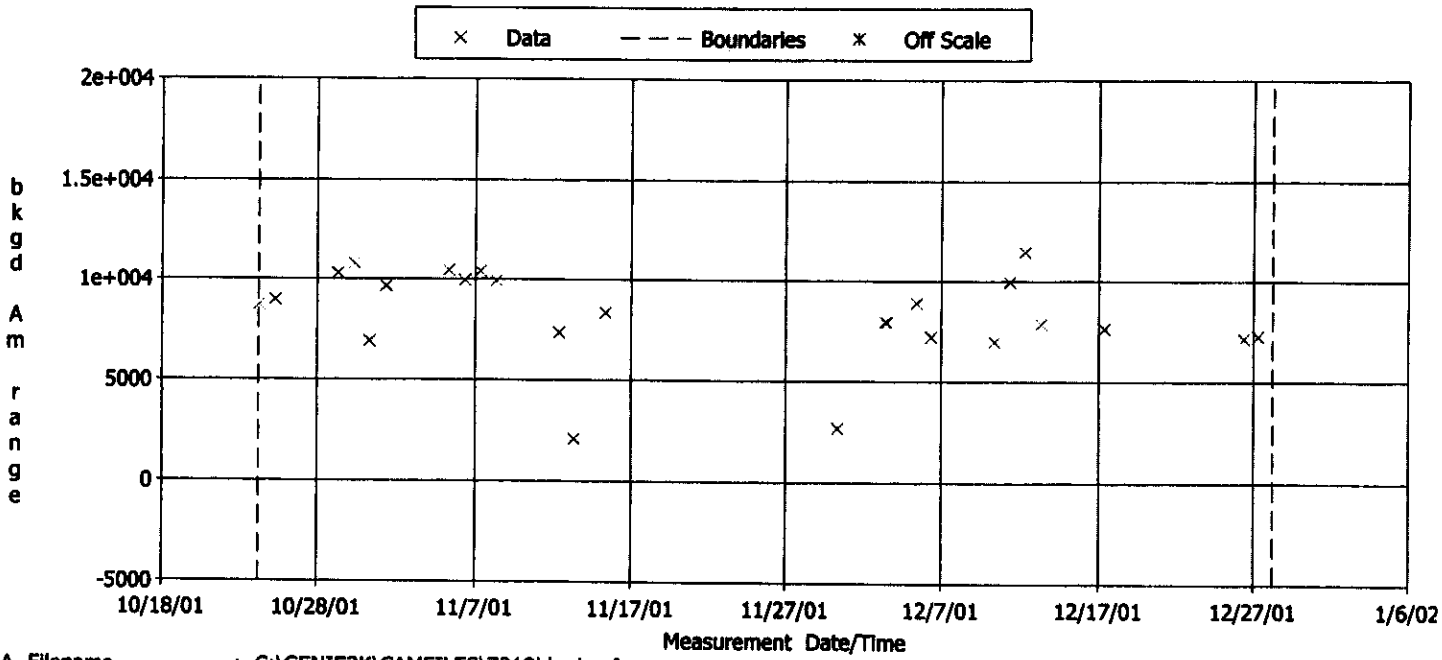
Replicate Analysis	
Pu-239(orig) - Pu-239(rep)	13.7
1.96 * Sqrt(unc(orig)^2+unc(rep)^2)	35.37

4. Summary of Results

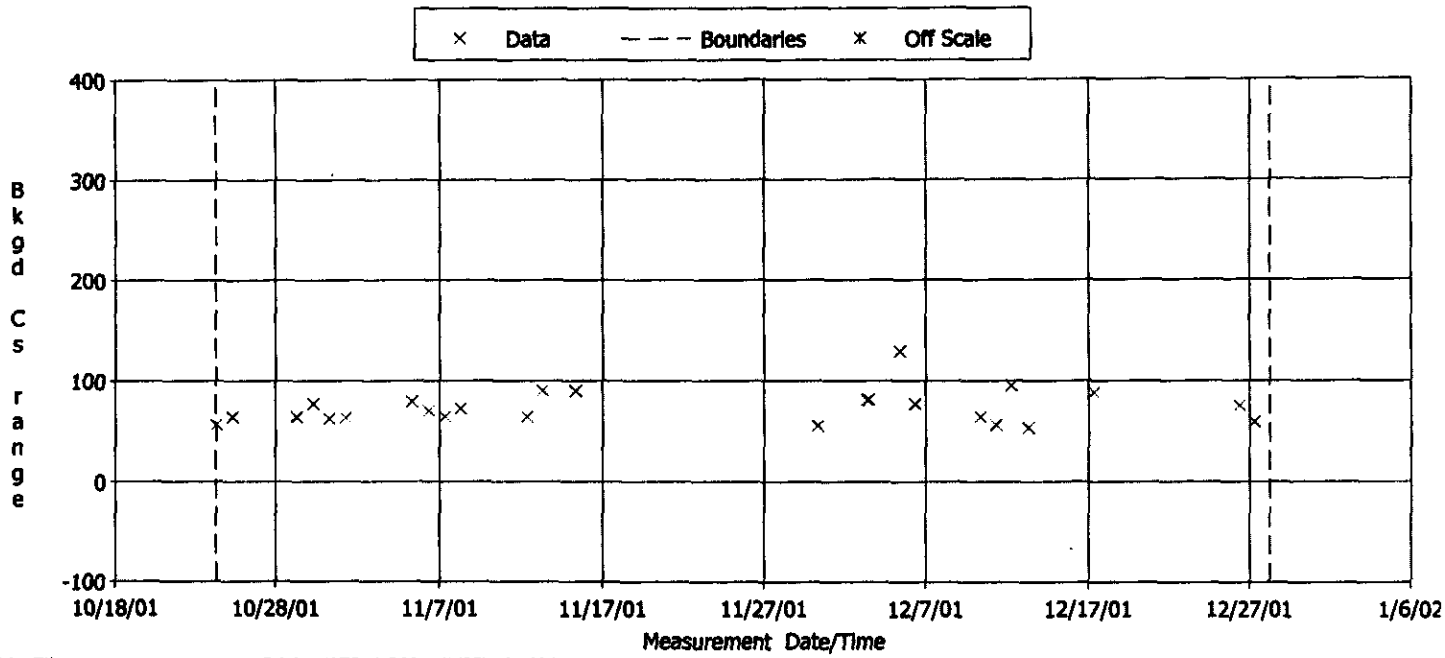
Full data packages for each drum are included as an attachment. The following data is a summary of the total TRU activity results and plutonium gram values for each assay.

Drum ID		Drum Net Weight (kg)		TRU Act nCi/g		TMU Uncert (nCi/g)		Pu Mass (g)	Pu Mass(g) + 3 sigma
233S-01-0028		124.76		1.25E+03	+/-	5.95E+02		8.75E-01	1.98E+00
233S-01-0029		114.6		3.61E+03	+/-	2.53E+03		3.11E+00	7.03E+00
233S-01-0030		77.82		1.03E+04	+/-	5.11E+03		6.58E+00	1.49E+01
233S-01-0031		119.03		1.40E+03	+/-	4.57E+02		1.50E+00	3.38E+00
233S-01-0042		96.42		9.22E+02	+/-	6.01E+02		6.84E-01	1.55E+00
233S-01-0044		69.15		3.07E+03	+/-	2.15E+03		1.60E+00	3.65E+00
233S-01-0045		83.83		3.98E+03	+/-	3.73E+03		2.25E+00	5.08E+00
233S-01-0047		59.87		9.13E+03	+/-	3.10E+03		3.70E+00	6.34E+00
233S-01-0048		64.86		5.35E+03	+/-	1.55E+03		1.95E+00	3.35E+00
233S-01-0049		66.22		4.68E+03	+/-	2.79E+03		2.44E+00	5.52E+00
233S-01-0085		112.33		4.07E+03	+/-	2.80E+03		3.46E+00	7.82E+00
233S-01-0093		123.56		1.53E+03	+/-	1.68E+03		1.17E+00	2.66E+00
233S-01-0094		102.1		1.55E+04	+/-	1.34E+04		1.10E+01	2.50E+01
233S-01-0095		127.1		3.20E+03	+/-	2.93E+03		2.77E+00	6.26E+00
233S-01-0096		115.1		1.50E+03	+/-	1.34E+03		1.19E+00	2.69E+00
233S-01-0097		110.96		1.77E+03	+/-	1.44E+03		1.40E+00	3.17E+00
233S-01-0098		107.32		1.34E+04	+/-	1.07E+04		1.03E+01	2.33E+01
233S-01-0099		129.69		9.59E+02	+/-	9.16E+02		8.29E-01	1.88E+00
233S-01-0130		101.19		3.48E+02	+/-	2.60E+02		2.59E-01	5.87E-01
233S-01-0130		Replicate		4.01E+02	+/-	3.42E+02		2.85E-01	6.45E-01

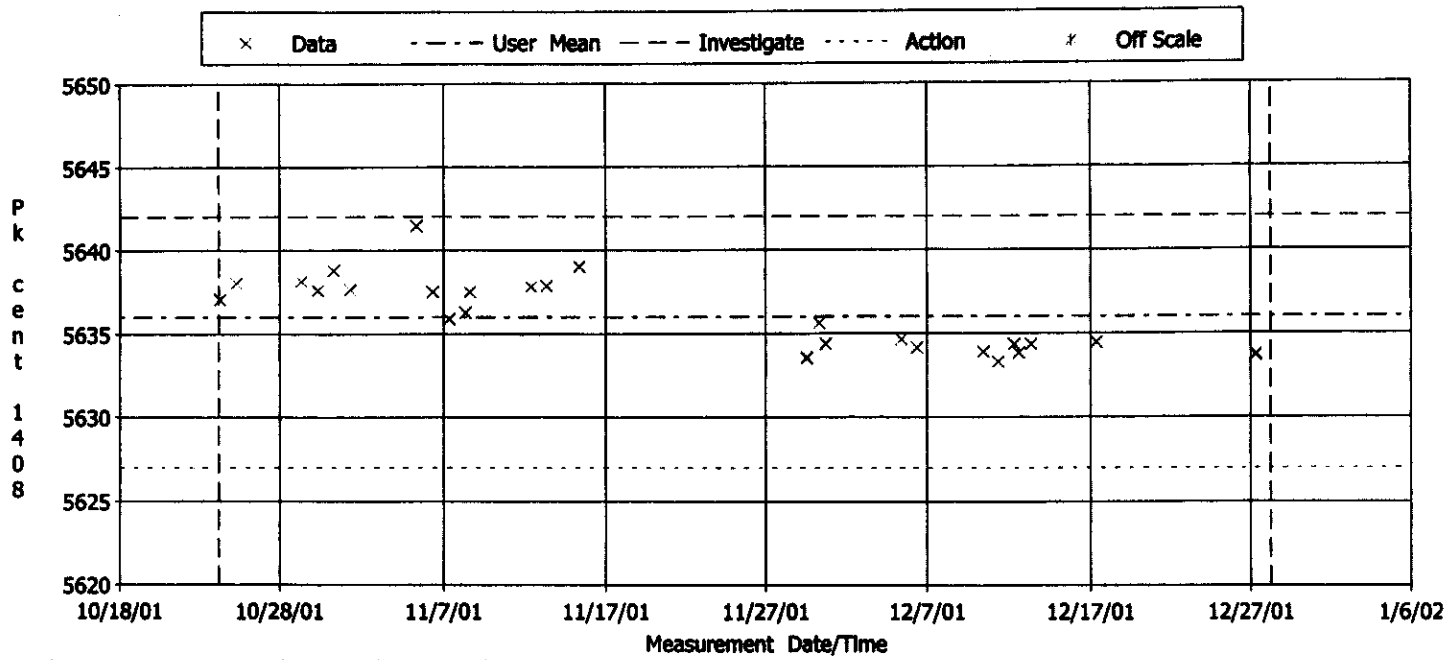
Control Charts



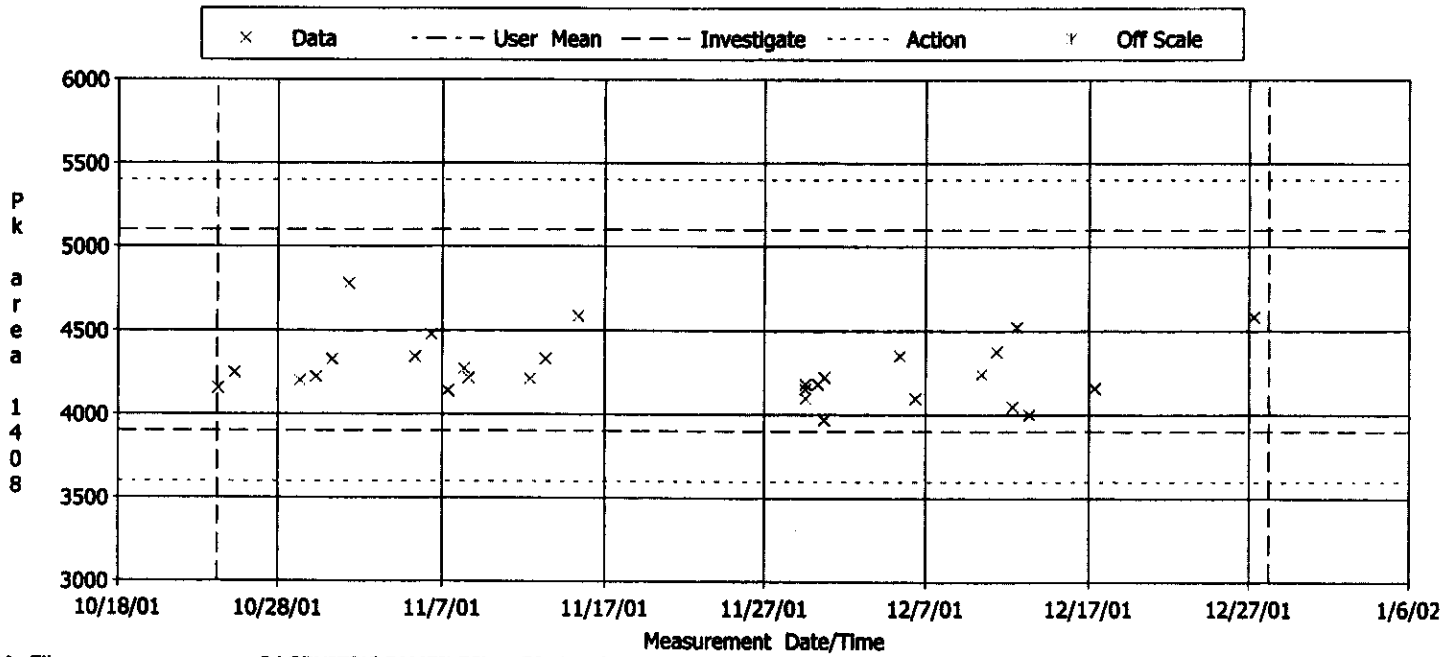
QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf
Parameter Description : bkgd Am range (counts)
Selection Dates : 10/24/01 6:00:00 AM - 12/28/01 6:00:00 AM
Lower/Upper Boundaries : 0.000 - 15000.000



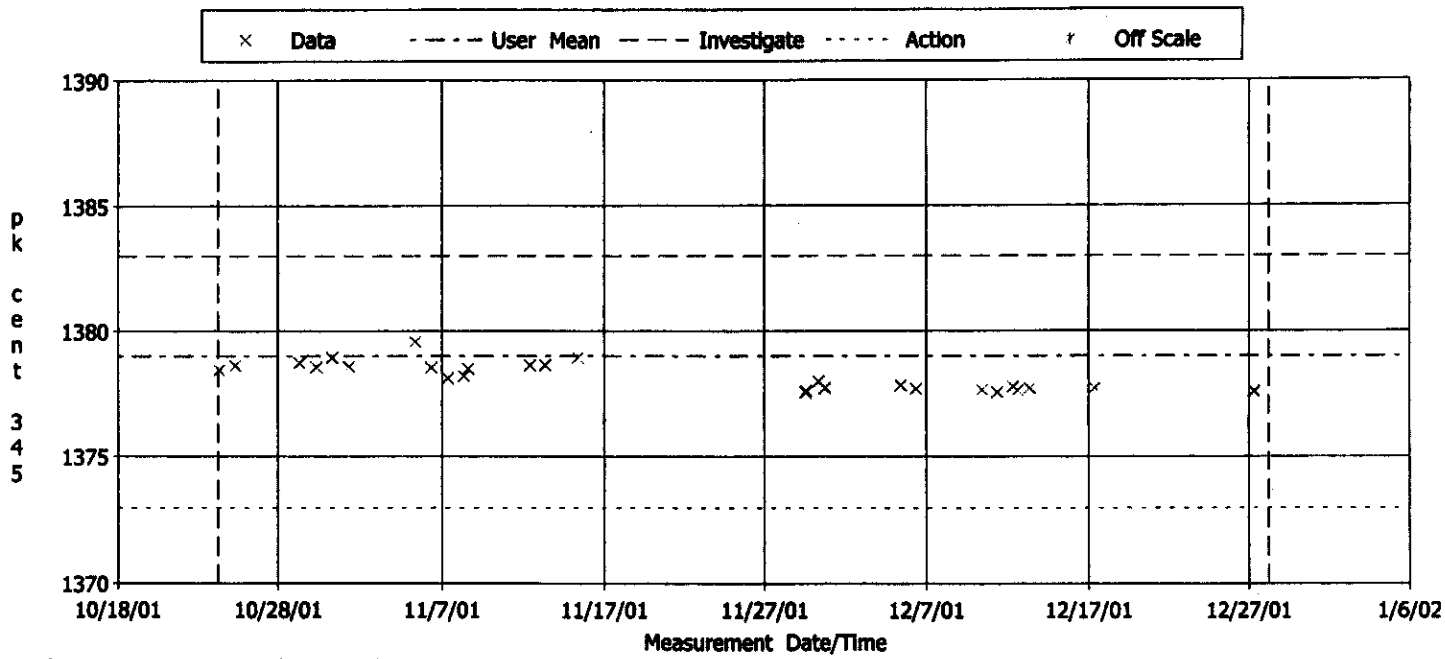
QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf
Parameter Description : Bkgd Cs range (counts)
Selection Dates : 10/24/01 6:00:00 AM - 12/28/01 6:00:00 AM
Lower/Upper Boundaries : 0.000 - 300.000



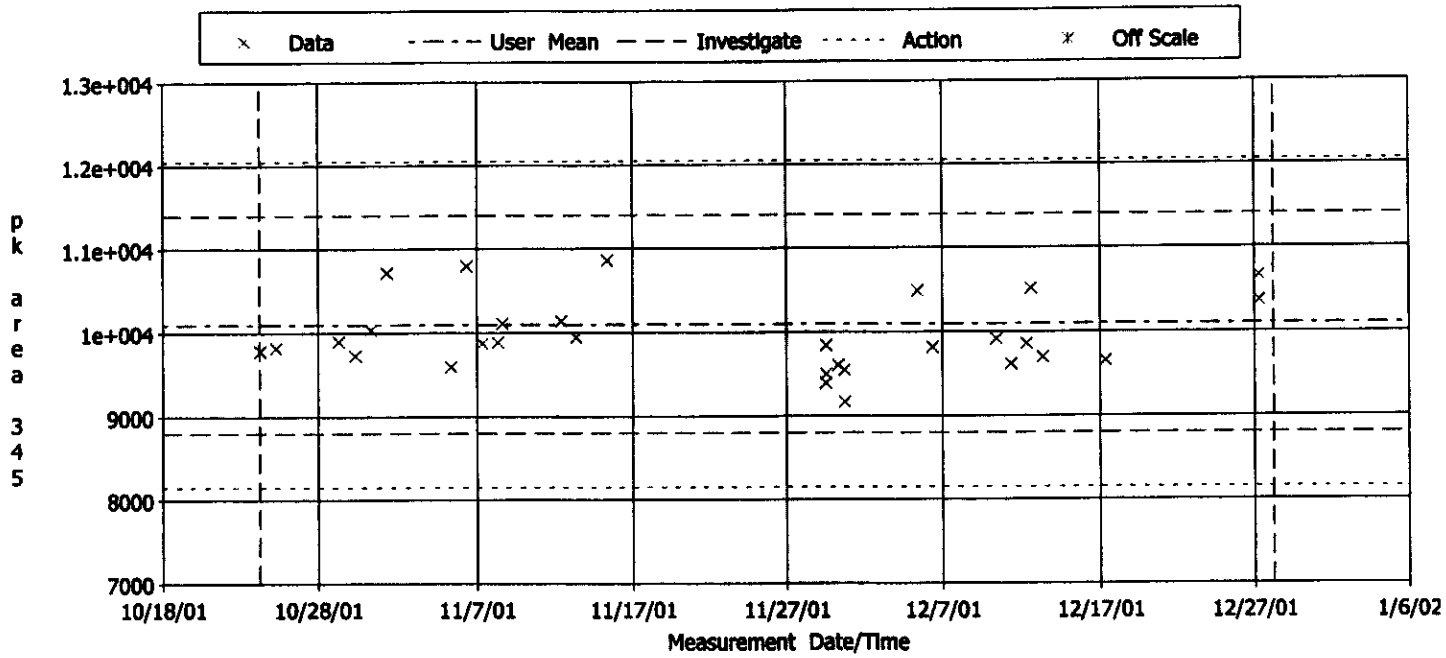
QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk cent 1408 (ch)
Selection Dates : 10/24/01 6:00:00 AM - 12/28/01 6:00:00 AM
User Mean +/- Std Dev : 5636.000 +/- 3.000



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk area 1408 (counts)
Selection Dates : 10/24/01 6:00:00 AM - 12/28/01 6:00:00 AM
User Mean +/- Std Dev : 4500.000 +/- 3.00e+002



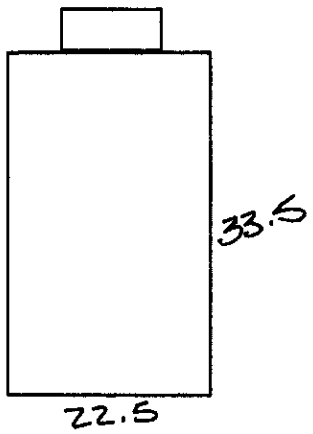
QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk cent 345 (ch)
Selection Dates : 10/24/01 6:00:00 AM - 12/28/01 6:00:00 AM
User Mean +/- Std Dev : 1379.000 +/- 2.000



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk area 345 (counts)
Selection Dates : 10/24/01 6:00:00 AM - 12/28/01 6:00:00 AM
User Mean +/- Std Dev : 10100.000 +/- 6.50e+002

Data Packages

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

GROSS 151.07
TARE 26.308
NET 124.76
.5992

Item ID: 2335-01-0028

Weight (kg): 332.35

Material Description: SAMPLES IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: <.5

Comments: 4 COUNTS TOTAL 1800 SEC
0954
RECOUNTED 12/27/01 1046

```
#Date & Time: Thu Dec 27 13:21:31 2001
~g=SIMPLE_CYLINDER
~description=233S-01-0028
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.5992    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0028

File Name: 1046

Assay Date: 27-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	3.77E+02	3.05E+01
Am-241	4.42E+02	3.51E+01
Np-237	1.23E-01	5.97E-03
U-238		
U-235		
Cs-137	1.64E-03	1.36E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Weight (lbs): 274.45

Width (in): 22.5

Depth for TMU (in): 4

Depth (in): 22.5

% Volume: 50

Am-241 Calcs:

Measured	4.42E+02	+/-	1.34E+03	Calc from Pu-239
Calculated	5.21E+02	+/-	5.64E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.53E+02	+/-	6.42E+01
Pu-239	3.77E+02	+/-	1.58E+02
Pu-240	1.96E+02	+/-	8.25E+01
Pu-241	7.33E+02	+/-	3.08E+02
Pu-242	1.98E-01	+/-	8.34E-02
Am-241	5.21E+02	+/-	5.64E+02
Np-237	1.23E-01	+/-	5.09E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.64E-03	+/-	6.88E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.25E+03	+/-	5.95E+02	Calc from Pu-239 Act
Pu (g):	8.75E-01	**Pu (g) + 3 sigma TMU:**		1.98E+00	
		Pu(g) + 3 sigma:		1.09E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 12/27/01 1:59:38 PM

Sample Title : 233s-01-0028 RC
Spectrum Description :
Sample Identification : 1046
Sample Size : 124.8 kg

Sample Taken On : 12/27/01 1:22:00 PM
Acquisition Started : 12/27/01 1:58:51 PM

Live Time: 1800.0 seconds Real Time: 1861.6 seconds

ISOCS Calabration : 233S-01-0028
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 12/27/01

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	238.03	59.54	1.69E+006	1616.88	2.52E+005
M	2	292.19	73.08	2.62E+003	101.11	1.25E+004
m	3	300.94	75.27	4.98E+003	117.47	1.31E+004
M	4	396.06	99.05	1.44E+004	458.62	2.02E+004
m	5	413.36	103.38	9.36E+003	302.30	1.69E+004
M	6	445.03	111.30	3.37E+003	479.52	1.33E+004
m	7	459.80	114.99	1.86E+003	272.41	1.42E+004
M	8	492.28	123.11	5.81E+002	73.70	6.75E+003
m	9	502.28	125.61	2.73E+003	157.64	9.34E+003
m	10	518.39	129.64	5.23E+003	280.37	8.59E+003
	11	595.00	148.80	9.50E+002	196.26	9.38E+003
	12	833.00	208.31	3.49E+003	114.81	2.82E+003
	13	1200.40	300.17	2.78E+003	100.78	1.91E+003
	14	1247.69	312.00	1.69E+004	151.63	1.48E+003
M	15	1331.24	332.89	7.23E+002	34.16	5.86E+002
m	16	1342.79	335.78	5.32E+002	29.76	6.49E+002
m	17	1362.28	340.65	2.02E+003	47.97	5.87E+002
m	18	1380.52	345.21	6.02E+002	29.66	4.72E+002
M	19	1473.94	368.57	3.70E+002	29.59	4.05E+002
m	20	1500.90	375.31	2.03E+003	104.05	4.12E+002
m	21	1520.78	380.28	3.37E+002	29.22	4.01E+002
m	22	1531.66	383.00	2.89E+002	26.50	3.98E+002
M	23	1571.77	393.03	5.45E+002	59.82	3.46E+002
m	24	1594.16	398.63	5.82E+002	63.38	3.15E+002
M	25	1657.70	414.52	1.98E+003	42.06	4.11E+002
m	26	1688.43	422.20	1.86E+002	16.91	3.52E+002
	27	1805.60	451.50	1.49E+002	23.12	1.40E+002
	28	2045.00	511.36	1.67E+002	29.71	1.74E+002
	29	2333.00	583.37	1.03E+002	27.35	1.43E+002
	30	2437.00	609.38	2.15E+002	26.06	1.24E+002
	31	2649.13	662.42	4.18E+002	32.25	1.50E+002
	32	2890.21	722.70	1.14E+002	23.21	9.36E+001
	33	3644.00	911.18	7.72E+001	16.28	4.98E+001

34	7060.00	1765.33	8.96E+001	11.70	1.04E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.977	661.65*	85.12	1.63544E-003	1.36403E-004
NP-237	1.000	300.17*	6.20	1.15956E-001	7.00067E-003
		312.00*	36.00	1.22625E-001	5.96567E-003
		340.60*	4.20	1.29108E-001	6.72410E-003
Pu-239	0.992	129.28*	0.01	2.87046E+002	5.05958E+001
		375.00*	0.00	3.56481E+002	3.30212E+001
		413.70*	0.00	3.76539E+002	3.04588E+001
		451.50* @	0.00	2.33026E+002	3.73098E+001
AM-241	1.000	59.54*	35.70	4.41594E+002	3.51275E+001
		125.28*	0.00	2.43976E+002	1.84001E+001
		335.40*	0.00	2.87559E+002	2.09487E+001
		662.42* @	0.00	3.86691E+002	3.22347E+001
		722.70*	0.00	3.00904E+002	6.17227E+001
PU-241	0.965	114.00*	0.02	3.39380E+001	5.29936E+000
		332.60*	0.00	6.67092E+001	4.43667E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.977	4.195275E-004	1.463662E-004
NP-237	1.000	1.227283E-001	3.763018E-003
Pu-239 @	0.992	3.541740E+002	2.047385E+001
AM-241 @	1.000	2.874964E+002	1.259356E+001
PU-241	0.965	5.320472E+001	3.401853E+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

NUCLIDE TOTALS

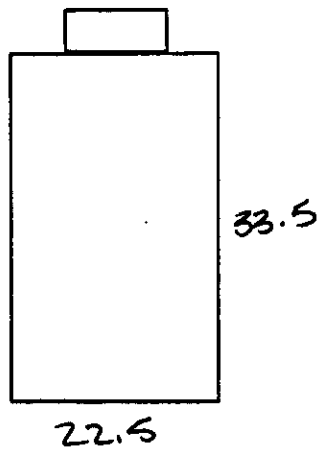
Nuclide	Mass (g)
Pu-239	7.13E-001 +/- 4.12E-002

****
***** 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	2.0930E-004	1.75E-004	-4.6381E-005
		1332.49	100.00	1.7545E-004		6.5848E-005
	CS-134	475.35	1.46	2.0208E-002	2.55E-004	1.0604E-002
		563.23	8.38	2.9682E-003		-5.1906E-005
		569.32	15.43	1.6053E-003		-4.0519E-004
		604.70	97.60	3.4908E-004		4.6644E-005
		795.84	85.40	2.5470E-004		-3.7893E-005
		801.93	8.73	2.4817E-003		-3.8198E-004
		1038.57	1.00	2.1912E-002		9.8638E-003
		1167.94	1.80	1.2117E-002		-5.0068E-003
		1365.15	3.04	5.1068E-003		-2.1833E-005
+	CS-137	661.65*	85.12	3.3216E-004	3.32E-004	1.6354E-003
+	NP-237	300.17*	6.20	1.1913E-002	1.89E-003	1.1596E-001
		312.00*	36.00	1.8923E-003		1.2262E-001
		340.60*	4.20	7.3934E-003		1.2911E-001
+	Pu-239	129.28*	0.01	2.3816E+001	1.71E+001	2.8705E+002
		375.00*	0.00	1.7078E+001		3.5648E+002
		413.70*	0.00	1.8460E+001		3.7654E+002
		451.50*	0.00	1.0532E+002		2.3303E+002
+	AM-241	59.54*	35.70	8.2381E-001	8.24E-001	4.4159E+002
		125.28*	0.00	4.0446E+001		2.4398E+002
		335.40*	0.00	6.5568E+001		2.8756E+002
		662.42*	0.00	7.8537E+001		3.8669E+002
		722.70*	0.00	1.8529E+002		3.0090E+002
+	PU-241	114.00*	0.02	1.0157E+001	1.02E+001	3.3938E+001
		332.60*	0.00	1.0648E+001		6.6709E+001
	CM-243	209.70	3.27	3.4161E-002	5.30E-003	1.6639E-001
		228.18	10.56	7.8172E-003		3.6386E-003
		277.60	14.00	5.3030E-003		-5.0554E-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

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

GROSS 140.90
TARE 26.308
NET 114.60
.5504

Item ID: 2835-01-0029

Weight (kg): 310 LBS

Material Description: PACKAGING IN DRUM

Packaging: 55 GAL

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: < 2/5.5

Comments: DRUM IS BEING ROTATED @
A CONSTANT RATE 1 1800 SEC COUNT
0961
MANUAL ROTATION - 4 COUNTS TOTALING 1800 SEC
~~0963~~
0963

```
Date & Time: Thu Dec 20 14:31:33 2001
g=SIMPLE_CYLINDER
description=233S-01-0029
comment=DRUM_WITH_SAMPLES
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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLES  ~3den=0.5504    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0029

File Name: 961

Assay Date: 15-Nov-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.46E+03	1.15E+02
Am-241	8.01E+02	6.97E+01
Np-237	7.14E-02	3.55E-03
U-238		
U-235		
Cs-137	4.76E-03	2.43E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 252.1

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	8.01E+02	+/-	2.42E+03	Use Meas
Calculated	2.02E+03	+/-	2.18E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	5.90E+02	+/-	2.48E+02
Pu-239	1.46E+03	+/-	6.12E+02
Pu-240	7.59E+02	+/-	3.19E+02
Pu-241	2.84E+03	+/-	1.19E+03
Pu-242	7.67E-01	+/-	3.22E-01
Am-241	8.01E+02	+/-	2.42E+03
Np-237	7.14E-02	+/-	2.96E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	4.76E-03	+/-	1.98E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	3.61E+03	+/-	2.53E+03	Calc from Pu-239 Act
Pu (g):	3.11E+00	**Pu (g) + 3 sigma TMU:**	7.03E+00	
		Pu(g) + 3 sigma:	3.84E+00	

Comments:

Net weight used

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 11/15/01 10:18:42 AM

Sample Title : 233s-01-0029 Rotated
Spectrum Description :
Sample Identification : 0961
Sample Size : 114.6 kg

Sample Taken On : 11/15/01 9:44:00 AM
Acquisition Started : 11/15/01 9:44:56 AM

Live Time: 1800.0 seconds Real Time: 1917.6 seconds

ISOCS Calabration : 233S-01-0029
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 11/15/01

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	237.82	59.54	3.52E+006	2447.07	5.36E+005
M	2	292.42	73.19	4.77E+003	142.10	2.96E+004
m	3	300.87	75.30	9.16E+003	154.24	3.05E+004
M	4	340.78	85.27	3.77E+003	132.57	2.65E+004
m	5	348.98	87.32	1.99E+003	126.49	3.07E+004
M	6	380.14	95.11	1.52E+004	167.35	2.92E+004
m	7	392.47	98.19	1.19E+004	301.41	2.67E+004
m	8	396.70	99.25	4.19E+004	347.47	2.39E+004
m	9	405.18	101.37	6.81E+003	135.72	2.32E+004
m	10	413.15	103.36	2.26E+004	237.23	2.16E+004
m	11	417.85	104.53	7.83E+003	202.47	2.07E+004
m	12	443.33	110.90	4.89E+003	241.96	1.83E+004
m	13	447.20	111.87	6.99E+003	247.27	1.79E+004
m	14	458.60	114.72	5.39E+003	145.45	1.67E+004
m	15	463.78	116.01	5.34E+003	142.90	1.71E+004
m	16	469.22	117.37	2.56E+003	120.92	1.57E+004
m	17	477.31	119.39	4.48E+003	107.44	1.50E+004
m	18	493.70	123.49	1.85E+003	92.13	1.48E+004
m	19	502.64	125.72	7.17E+003	116.25	1.41E+004
m	20	518.75	129.75	3.10E+004	189.11	1.22E+004
M	21	578.33	144.64	1.36E+003	78.31	9.13E+003
m	22	586.62	146.71	1.08E+003	74.74	9.97E+003
m	23	595.90	149.03	1.84E+003	79.10	9.63E+003
M	24	645.96	161.54	9.88E+002	68.96	7.40E+003
m	25	660.24	165.11	7.30E+002	66.38	7.85E+003
	26	686.00	171.55	1.04E+003	147.64	6.64E+003
M	27	758.11	189.57	4.72E+002	57.43	4.87E+003
m	28	784.03	196.05	7.65E+002	57.47	5.03E+003
M	29	815.81	203.99	3.71E+003	76.70	5.01E+003
m	30	833.62	208.44	8.37E+003	100.21	4.61E+003
	31	1024.00	256.02	5.00E+002	91.24	2.50E+003
	32	1200.67	300.17	2.26E+003	147.82	3.65E+003
	33	1247.99	312.00	1.03E+004	141.78	2.37E+003

M 34	1332.59	333.14	3.53E+003	62.53	1.46E+003
m 35	1344.22	336.05	1.48E+003	44.43	1.46E+003
m 36	1364.10	341.02	1.36E+003	42.82	1.38E+003
m 37	1381.66	345.41	3.32E+003	59.95	1.36E+003
M 38	1474.71	368.66	1.05E+003	37.79	1.09E+003
m 39	1485.37	371.33	2.01E+002	25.59	1.07E+003
m 40	1501.98	375.48	8.85E+003	90.37	9.93E+002
m 41	1522.18	380.53	1.77E+003	45.06	9.17E+002
m 42	1532.79	383.18	1.49E+003	42.07	8.46E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
M 43	1573.36	393.32	2.90E+003	53.70	7.22E+002
m 44	1595.39	398.82	3.90E+002	25.11	6.70E+002
M 45	1656.63	414.13	7.93E+003	84.32	5.45E+002
m 46	1691.91	422.94	5.92E+002	28.09	5.25E+002
47	1806.17	451.50	9.99E+002	49.64	3.40E+002
48	2045.00	511.19	2.18E+002	34.57	2.23E+002
49	2335.00	583.66	1.13E+002	26.85	1.48E+002
50	2440.00	609.91	1.94E+002	29.05	1.34E+002
51	2477.00	619.15	8.82E+001	26.25	1.50E+002
52	2585.00	646.14	7.76E+001	20.34	1.03E+002
53	2650.12	662.42	1.23E+003	49.69	2.16E+002
54	2891.32	722.70	3.08E+002	25.10	7.80E+001
55	3184.00	795.84	5.65E+001	13.11	3.15E+001
56	3647.00	911.56	8.10E+001	13.25	2.90E+001
57	4486.00	1121.24	4.98E+001	14.37	4.12E+001
58	7067.00	1766.28	8.20E+001	9.06	0.00E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.977	661.65*	85.12	4.76020E-003	2.43259E-004
NP-237	0.996	300.17*	6.20	8.95743E-002	7.29059E-003
		312.00*	36.00	7.13601E-002	3.55059E-003
		340.60*	4.20	8.37011E-002	4.68251E-003
		375.45*	0.68	3.48483E+000	1.57640E-001
		415.76*	1.75	1.26109E+000	5.38215E-002
Pu-239	0.992	129.28*	0.01	1.39953E+003	2.35133E+002
		375.00*	0.00	1.49759E+003	1.16485E+002
		413.70*	0.00	1.45735E+003	1.14816E+002
		451.50* @	0.00	1.51494E+003	9.59017E+001
AM-241	1.000	59.54*	35.70	3.81882E+002	3.03773E+001
		125.28*	0.00	5.20055E+002	2.65535E+001
		335.40*	0.00	7.63813E+002	4.23804E+001
		662.42* @	0.00	1.12552E+003	5.74367E+001
		722.70*	0.00	8.00828E+002	6.97352E+001
PU-241	0.981	114.00*	0.02	7.68854E+001	4.67900E+000
		332.60*	0.00	3.11833E+002	1.55936E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.977	2.504062E-003	2.539465E-004
NP-237	0.996	7.761293E-002	2.636030E-003
Pu-239 @	0.992	1.407837E+003	3.762531E+001
AM-241 @	1.000	5.334504E+002	1.750261E+001
PU-241	0.981	9.629176E+001	4.481599E+000

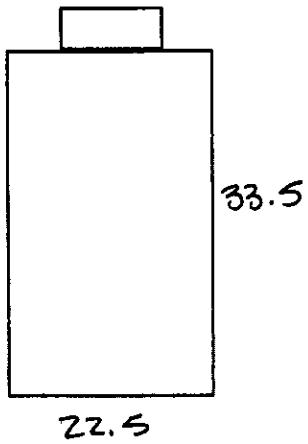
? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	2.60E+000 +/- 6.96E-002

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

GROSS 104.1136
TARE 26.308
NET 77.82
.3738

Item ID: 2335-01-0030

Weight (kg): 229.1

Material Description: SAMPLE IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24

Detector Filters: 1 CAD

Dose Rate: <.5

Comments: 4 COUNTS 1800 SEC TOTAL
0961

```
Date & Time: Thu Dec 20 14:34:24 2001
g=SIMPLE_CYLINDER
description=233S-01-0030
comment=DRUM_WITH_SAMPLES
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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.3738    ~3con=1
~2Absor=0.0312    ~2Amater=CADMIUM  ~2Aden=8.642
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0030

File Name: 951

Assay Date: 12-Nov-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	4.54E+03	3.59E+02		
Am-241	1.51E+03	1.20E+02		
Np-237	5.01E-01	2.41E-02		
U-238				
U-235				
Cs-137	9.67E-03	4.07E-04		
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 171.2

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	1.51E+03	+/-	4.57E+03	Use Meas
Calculated	6.28E+03	+/-	6.80E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.84E+03	+/-	7.73E+02
Pu-239	4.54E+03	+/-	1.91E+03
Pu-240	2.37E+03	+/-	9.94E+02
Pu-241	8.84E+03	+/-	3.72E+03
Pu-242	2.39E+00	+/-	1.00E+00
Am-241	1.51E+03	+/-	4.57E+03
Np-237	5.01E-01	+/-	2.08E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.67E-03	+/-	4.01E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.03E+04	+/-	5.11E+03	Calc from Pu-239 Act
Pu (g):	6.58E+00	**Pu (g) + 3 sigma TMU:**		1.49E+01	
		Pu(g) + 3 sigma:		8.14E+00	

Comments:

Net weight used

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

eport Generated On : 12/18/01 4:15:08 PM

ample Title : 233s-01-0030 @270
pectrum Description :
ample Identification : 0951
ample Size : 77.8 kg

ample Taken On : 11/12/01 3:34:00 PM
cquisition Started : 11/12/01 3:34:38 PM

ive Time: 1800.0 seconds Real Time: 1823.5 seconds

ISOCS Calabration : 233S-01-0030
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 11/12/01

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	237.82	59.54	1.23E+005	454.34	2.37E+004
M	2	292.28	73.15	7.92E+003	352.25	1.46E+004
m	3	301.04	75.34	1.49E+004	552.64	1.75E+004
	4	341.00	85.33	3.68E+003	268.85	2.26E+004
M	5	396.21	99.13	4.40E+004	826.84	4.54E+004
m	6	413.98	103.57	2.80E+004	542.53	3.23E+004
M	7	445.62	111.47	1.46E+004	164.79	2.88E+004
m	8	460.95	115.30	1.07E+004	156.61	3.70E+004
M	9	502.71	125.74	7.90E+003	146.48	2.13E+004
m	10	518.79	129.76	4.41E+004	229.97	2.12E+004
M	11	577.64	144.47	2.93E+003	315.87	2.14E+004
m	12	586.62	146.71	2.72E+003	294.87	2.33E+004
m	13	595.87	149.02	4.65E+003	451.58	2.33E+004
m	14	611.34	152.89	5.22E+002	98.58	2.43E+004
M	15	645.93	161.53	2.56E+003	462.72	1.99E+004
m	16	659.90	165.03	1.91E+003	260.79	3.26E+004
m	17	686.69	171.72	1.68E+003	219.70	3.28E+004
	18	719.00	179.80	6.60E+002	226.26	1.50E+004
M	19	758.49	189.67	8.88E+002	183.91	1.48E+004
m	20	783.93	196.02	1.70E+003	323.18	1.53E+004
M	21	815.66	203.95	7.32E+003	214.02	1.15E+004
m	22	833.54	208.42	2.02E+004	524.06	1.02E+004
	23	1023.00	255.77	1.09E+003	174.51	8.10E+003
	24	1071.00	267.77	2.79E+002	150.38	6.85E+003
	25	1200.67	300.17	8.86E+003	176.69	6.60E+003
	26	1247.99	312.00	5.62E+004	281.47	5.69E+003
M	27	1285.54	321.38	9.11E+002	68.03	4.13E+003
m	28	1294.67	323.67	1.40E+003	66.86	5.36E+003
M	29	1332.45	333.11	7.65E+003	92.40	3.42E+003
m	30	1344.10	336.02	3.64E+003	68.77	3.50E+003
m	31	1363.57	340.89	6.87E+003	86.22	3.07E+003
m	32	1381.32	345.32	6.78E+003	85.81	2.52E+003
M	33	1474.56	368.62	2.56E+003	67.23	2.13E+003

m 34	1501.72	375.41	2.08E+004	282.99	1.88E+003
m 35	1521.98	380.48	3.74E+003	82.37	1.53E+003
m 36	1532.56	383.12	3.30E+003	74.44	1.44E+003
M 37	1573.02	393.23	6.76E+003	179.79	1.24E+003
m 38	1595.47	398.84	2.02E+003	68.82	1.14E+003
M 39	1656.47	414.09	1.87E+004	238.86	8.15E+002
m 40	1691.67	422.88	1.48E+003	46.39	5.76E+002
m 41	1707.89	426.94	3.29E+002	26.40	5.27E+002
42	1806.17	451.50	2.21E+003	67.01	5.37E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2046.00	511.44	3.56E+002	45.03	3.93E+002
44	2334.00	583.41	1.77E+002	29.69	1.81E+002
45	2439.00	609.66	1.94E+002	30.63	1.99E+002
46	2477.00	619.15	2.31E+002	32.96	2.01E+002
M 47	2562.16	640.44	4.98E+001	13.37	2.38E+002
m 48	2585.55	646.28	1.24E+002	14.81	2.84E+002
m 49	2612.21	652.95	1.52E+002	15.05	2.30E+002
50	2650.12	662.42	1.94E+003	54.22	2.02E+002
51	2755.00	688.63	1.03E+002	22.92	1.15E+002
52	2891.32	722.70	6.57E+002	38.18	1.72E+002
53	3078.00	769.35	7.44E+001	21.09	1.13E+002
54	3646.00	911.31	6.17E+001	18.50	7.73E+001
55	4485.00	1120.99	7.48E+001	17.01	5.72E+001
56	5102.00	1275.19	5.77E+001	15.57	5.33E+001
57	7066.00	1766.03	9.12E+001	10.39	4.79E+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	0.977	661.65*	85.12	9.67095E-003	4.07434E-004
NP-237	1.000	300.17*	6.20	4.51013E-001	2.35454E-002
		312.00*	36.00	5.01398E-001	2.41039E-002
		340.60*	4.20	5.48345E-001	2.63107E-002
Pu-239	0.992	129.28*	0.01	3.53895E+003	5.94463E+002
		375.00*	0.00	4.61940E+003	3.61703E+002
		413.70*	0.00	4.54289E+003	3.59343E+002
		451.50* @	0.00	4.43593E+003	2.19827E+002
AM-241	1.000	59.54*	35.70	1.51204E+003	1.20400E+002
		125.28*	0.00	1.07630E+003	5.57921E+001
		335.40*	0.00	2.44566E+003	1.22981E+002
		662.42* @	0.00	2.28664E+003	9.61372E+001
		722.70*	0.00	2.19137E+003	1.44068E+002
PU-241	0.940	114.00*	0.02	3.42942E+002	1.92396E+001
		332.60*	0.00	8.76886E+002	4.23524E+001

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	0.977	3.657661E-003	4.480760E-004
NP-237	1.000	4.967566E-001	1.418541E-002
Pu-239 @	0.992	4.419048E+003	2.342903E+002
AM-241 @	1.000	1.421810E+003	4.451970E+001
PU-241	0.940	4.342801E+002	1.751685E+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 T O T A L S

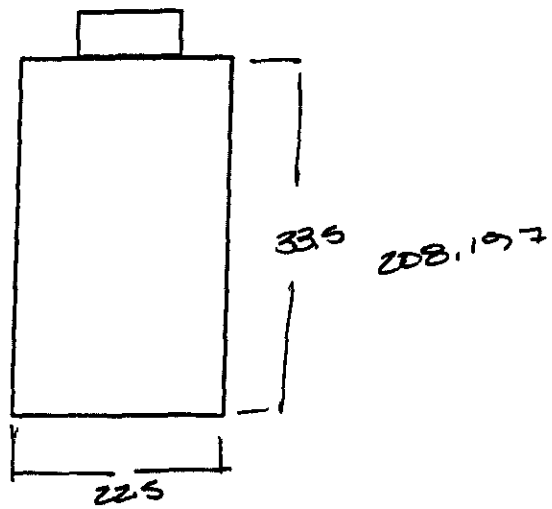
Nuclide	Mass (g)
Pu-239	5.55E+000 +/- 2.94E-001

****
**** 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	2.5569E-004	2.44E-004	-1.8383E-004
		1332.49	100.00	2.4375E-004		1.4646E-004
	CS-134	475.35	1.46	3.3516E-002	3.26E-004	-1.7157E-002
		563.23	8.38	5.0035E-003		1.0309E-003
		569.32	15.43	2.6555E-003		1.1764E-003
		604.70	97.60	4.8913E-004		-3.6745E-004
		795.84	85.40	3.2557E-004		-4.9121E-004
		801.93	8.73	3.4104E-003		5.5183E-004
		1038.57	1.00	2.6594E-002		-9.2048E-003
		1167.94	1.80	1.4655E-002		1.5011E-002
		1365.15	3.04	7.3942E-003		3.4579E-003
+	CS-137	661.65*	85.12	5.3468E-004	5.35E-004	9.6710E-003
+	NP-237	300.17*	6.20	2.5165E-002	4.48E-003	4.5101E-001
		312.00*	36.00	4.4776E-003		5.0140E-001
		340.60*	4.20	2.0772E-002		5.4835E-001
+	Pu-239	129.28*	0.01	5.4496E+001	3.29E+001	3.5390E+003
		375.00*	0.00	4.5386E+001		4.6194E+003
		413.70*	0.00	3.2878E+001		4.5429E+003
		451.50*	0.00	3.2093E+002		4.4359E+003
+	AM-241	59.54*	35.70	1.1760E+001	1.18E+001	1.5120E+003
		125.28*	0.00	9.2928E+001		1.0763E+003
		335.40*	0.00	1.8693E+002		2.4457E+003
		662.42*	0.00	1.2642E+002		2.2866E+003
		722.70*	0.00	3.1955E+002		2.1914E+003
+	PU-241	114.00*	0.02	2.8725E+001	2.87E+001	3.4294E+002
		332.60*	0.00	3.1475E+001		8.7689E+002
	CM-243	209.70	3.27	8.4488E-002	1.21E-002	1.0190E-002
		228.18	10.56	1.7155E-002		-7.3911E-003
		277.60	14.00	1.2055E-002		-2.4971E-002

+ = 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

Bldg 233s
NDA Item Description Sheet
Bottle Geometry



Put Dimensions on Bottle

GROSS 145.340
TARE 26.308
NET 119.033

Item ID: 2335-01-0031

Weight (kg): 319.75 Lbs 145.340 .5717

Material Description: SAMPLES IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: <1.5

Comments: 4 COUNTS FOR A TOTAL OF 1800 SEC WITH COMBINED RESULTS 09/4

```
Date & Time: Thu Dec 20 14:36:40 2001
g=SIMPLE_CYLINDER
description=233S-01-0031
comment=DRUM_WITH_SAMPLES
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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.5717    ~3con=1
~sd1=24
```

233-S Item Analysis Spreadsheet Version 3.0b 1/14/02

Sample Info:

Item ID:	233s-01-0031	**Assay Date:**	31-Oct-01
File Name:	914	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	6.75E+02	5.40E+01		
Am-241	1.01E+02	9.03E+00		
Np-237	8.49E-02	4.14E-03		
U-238				
U-235				
Cs-137	6.40E-04	1.68E-04		
Co-60				

Item Parameters:

Contamination: Internal Item Type: Barrel Calcs: Use 1st

Dimensions:

Length (in):	33.5	Width (in):	22.5	Depth (in):	22.5
Weight (lbs):	261.85	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	1.01E+02	+/-	3.06E+02	Use Meas
Calculated	9.34E+02	+/-	1.01E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.73E+02	+/-	1.15E+02
Pu-239	6.75E+02	+/-	2.84E+02
Pu-240	3.52E+02	+/-	1.48E+02
Pu-241	1.31E+03	+/-	5.52E+02
Pu-242	3.55E-01	+/-	1.49E-01
Am-241	1.01E+02	+/-	3.06E+02
Np-237	8.49E-02	+/-	3.52E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	6.40E-04	+/-	3.13E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.40E+03	+/-	4.57E+02	Calc from Pu-239 Act
Pu (g):	1.50E+00	**Pu (g) + 3 sigma TMU:**		3.38E+00	
		Pu(g) + 3 sigma:		1.85E+00	

Comments: Net weight used

Errors:

Analyst: Martin Winterrose **Date:** 3/20/02

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

Report Generated On : 12/18/01 4:24:07 PM

Sample Title : 233s-01-0031 @ 270
Spectrum Description :
Sample Identification : 0914
Sample Size : 119.0 kg

Sample Taken On : 10/31/01 9:03:00 AM
Acquisition Started : 10/31/01 9:04:13 AM

Live Time: 1800.0 seconds Real Time: 1842.8 seconds

ISOCS Calabration : 233S-01-0031
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 10/31/01

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	239.26	59.90	9.72E+005	39592.5	1.64E+004
2	292.98	73.33	3.05E+003	133.96	8.53E+003
3	301.05	75.34	5.71E+003	167.16	8.60E+003
4	340.47	85.20	2.05E+003	255.41	8.79E+003
5	379.82	95.03	3.34E+003	129.60	8.68E+003
6	396.06	99.09	1.17E+004	307.37	8.57E+003
7	414.00	103.57	5.32E+003	254.36	8.38E+003
8	445.66	111.48	2.73E+003	157.69	8.57E+003
9	460.30	115.14	1.56E+003	185.83	8.34E+003
10	502.70	125.74	1.96E+003	110.24	7.48E+003
11	518.84	129.77	8.81E+003	124.57	7.14E+003
12	576.46	144.17	3.34E+002	88.29	6.22E+003
13	588.02	147.06	3.54E+002	88.75	6.07E+003
14	595.59	148.95	7.13E+002	79.65	5.95E+003
15	644.56	161.19	2.94E+002	65.60	5.26E+003
16	783.73	195.97	3.60E+002	55.06	3.66E+003
17	815.78	203.98	1.27E+003	62.64	3.33E+003
18	833.65	208.45	3.32E+003	71.35	3.13E+003
19	1202.08	300.53	2.25E+003	60.86	1.42E+003
20	1249.17	312.30	1.24E+004	117.73	1.19E+003
21	1332.87	333.21	1.59E+003	50.50	9.31E+002
22	1344.09	336.02	6.52E+002	39.75	9.09E+002
23	1364.11	341.02	1.49E+003	114.12	8.67E+002
24	1380.21	345.04	1.16E+003	165.98	8.16E+002
25	1474.62	368.64	4.14E+002	43.19	6.15E+002
26	1500.35	375.07	5.42E+002	114.47	5.76E+002
27	1502.08	375.50	3.68E+003	119.07	5.72E+002
28	1522.06	380.50	7.44E+002	75.84	5.38E+002
29	1534.12	383.51	5.31E+002	57.21	5.19E+002
30	1573.22	393.28	1.28E+003	41.29	4.59E+002
31	1595.84	398.93	4.07E+002	25.44	3.91E+002
32	1656.48	414.09	3.71E+003	64.70	3.33E+002
33	1664.73	416.15	4.92E+002	30.93	3.17E+002

34	1692.13	423.00	2.25E+002	22.50	2.83E+002
35	1807.56	451.85	4.09E+002	25.36	2.08E+002
36	2045.44	511.30	1.28E+002	16.31	1.30E+002
37	2334.55	583.55	9.24E+001	13.61	1.05E+002
38	2439.34	609.74	1.43E+002	15.55	8.90E+001
39	2646.07	661.41	1.69E+002	43.88	6.41E+001
40	2649.16	662.18	1.62E+003	57.62	6.34E+001
41	2889.86	722.33	1.51E+002	16.01	4.73E+001
42	3647.82	911.76	7.08E+001	10.64	3.32E+001

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	5850.04	1462.14	5.78E+002	24.79	6.40E+000
44	7067.30	1766.35	4.73E+001	8.07	2.59E+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	6.42272E-004	1.68066E-004
NP-237	0.996	300.17*	6.20	8.86030E-002	4.89925E-003
		312.00*	36.00	8.49314E-002	4.13934E-003
		340.60*	4.20	9.05313E-002	8.09906E-003
		375.45*	0.68	1.43160E+000	7.82851E-002
		415.76*	1.75	7.74602E-002	5.82318E-003
Pu-239	0.993	129.28*	0.01	3.95210E+002	6.65887E+001
		375.00*	0.00	9.06340E+001	2.03827E+001
		413.70*	0.00	6.74768E+002	5.39706E+001
		451.50* @	0.00	6.12925E+002	4.49602E+001
AM-241	0.995	59.54*	35.70	1.01164E+002	9.03371E+000
		125.28*	0.00	1.41130E+002	1.04860E+001
		335.40*	0.00	3.33997E+002	2.56338E+001
		662.42* @	0.00	1.45825E+003	6.91051E+001
		722.70*	0.00	3.86027E+002	4.26975E+001
PU-241	0.953	114.00*	0.02	2.19951E+001	2.88503E+000
		332.60*	0.00	1.39104E+002	7.86188E+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	6.422724E-004	1.680664E-004
NP-237	0.996	8.657191E-002	2.626819E-003
Pu-239 @	0.993	1.811058E+002	1.833141E+001
AM-241 @	0.995	1.384872E+002	6.534608E+000
PU-241	0.953	3.589370E+001	2.708423E+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 *****
****

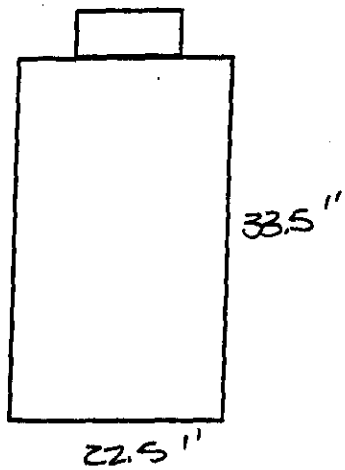
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.9597E-004	1.53E-004	-8.0907E-005
		1332.49	100.00	1.5266E-004		-2.1471E-004
	CS-134	475.35	1.46	2.1069E-002	2.29E-004	-1.8193E-002
		563.23	8.38	3.0726E-003		1.9467E-004
		569.32	15.43	1.7320E-003		1.0227E-003
		604.70	97.60	3.1083E-004		1.1436E-004
		795.84	85.40	2.2910E-004		-1.1355E-005
		801.93	8.73	2.3004E-003		-2.5158E-003
		1038.57	1.00	1.7808E-002		1.1975E-002
		1167.94	1.80	1.0920E-002		1.0392E-002
		1365.15	3.04	5.0708E-003		2.4101E-003
+	CS-137	661.65*	85.12	1.5191E-004	1.52E-004	6.4227E-004
+	NP-237	300.17*	6.20	6.9997E-003	1.12E-003	8.8603E-002
		312.00*	36.00	1.1189E-003		8.4931E-002
		340.60*	4.20	8.4826E-003		9.0531E-002
		375.45*	0.68	4.4387E-002		1.4316E+000
		415.76*	1.75	1.3472E-002		7.7460E-002
+	Pu-239	129.28*	0.01	1.7764E+001	1.59E+001	3.9521E+002
		375.00*	0.00	1.9123E+001		9.0634E+001
		413.70*	0.00	1.5921E+001		6.7477E+002
		451.50*	0.00	1.0464E+002		6.1292E+002
+	AM-241	59.54*	35.70	6.2238E-002	6.22E-002	1.0116E+002
		125.28*	0.00	2.9237E+001		1.4113E+002
		335.40*	0.00	7.3259E+001		3.3400E+002
		662.42*	0.00	3.5753E+001		1.4583E+003
		722.70*	0.00	8.8868E+001		3.8603E+002
+	PU-241	114.00*	0.02	6.0433E+000	6.04E+000	2.1995E+001
		332.60*	0.00	1.2650E+001		1.3910E+002
	CM-243	209.70	3.27	3.4028E-002	5.45E-003	2.2050E-001
		228.18	10.56	7.9109E-003		-1.4872E-003
		277.60	14.00	5.4478E-003		-6.0630E-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	3.48E-001 +/- 3.52E-002

Bldg 233s
NDA Item Description Sheet
Bottle Geometry



Put Dimensions on Bottle

1 Log
GROSS 122.72
TARE 26.308
NET 96.419
.4631

Item ID: 2835-01-0042

Weight (kg): 270 lbs

Material Description: Samples in Drum

Packaging: 55 gal Drum

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: 4 Counts totaling 1800 sec 09/17

```
Date & Time: Thu Dec 20 14:39:05 2001
g=SIMPLE_CYLINDER
description=233S-01-0042
comment=DRUM_WITH_SAMPLES
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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.4631    ~3con=1
~sd1=24
```

233-S Item Analysis Spreadsheet Version 3.0b 1/14/02

Sample Info:

Item ID:	233s-01-0042	**Assay Date:**	31-Oct-01
File Name:	917	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	3.81E+02	3.17E+01		
Am-241	1.88E+02	1.50E+01		
Np-237	3.64E-03	4.69E-04		
U-238				
U-235				
Cs-137	7.96E-04	9.86E-05		
Co-60				

Item Parameters:

Contamination:	Internal	Item Type:	Barrel	Calcs:	Use 1st

Dimensions:

Length (in):	33.5	Width (in):	22.5	Depth (in):	22.5
Weight (lbs):	212.1	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	1.88E+02	+/-	5.69E+02	Use Meas
Calculated	5.27E+02	+/-	5.71E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.54E+02	+/-	6.50E+01
Pu-239	3.81E+02	+/-	1.60E+02
Pu-240	1.98E+02	+/-	8.36E+01
Pu-241	7.42E+02	+/-	3.12E+02
Pu-242	2.00E-01	+/-	8.44E-02
Am-241	1.88E+02	+/-	5.69E+02
Np-237	3.64E-03	+/-	1.57E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	7.96E-04	+/-	3.43E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		9.22E+02	+/-	6.01E+02	Calc from Pu-239 Act
Pu (g):	6.84E-01	**Pu (g) + 3 sigma TMU:**		1.55E+00	
		Pu(g) + 3 sigma:		8.54E-01	

Comments:

Net weight used

Errors:

Analyst: Martin Winterrose **Date:** 3/20/02

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

Report Generated On : 12/27/01 11:28:53 AM

Sample Title : 233s-01-0042 @ 270
Spectrum Description :
Sample Identification : 0917
Sample Size : 96.4 kg

Sample Taken On : 10/31/01 1:34:00 PM
Acquisition Started : 10/31/01 1:34:50 PM

Live Time: 1800.0 seconds Real Time: 1826.4 seconds

ISOCS Calabration : 233S-01-0042
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 12/20/01

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	237.82	59.54	7.20E+005	1028.02	9.16E+004
M	2	292.46	73.20	1.82E+003	71.77	6.78E+003
m	3	301.00	75.33	3.56E+003	85.93	7.54E+003
M	4	340.28	85.15	1.58E+003	77.71	7.43E+003
m	5	350.73	87.76	5.17E+002	69.32	1.01E+004
M	6	380.13	95.11	3.85E+003	150.95	9.29E+003
m	7	396.22	99.13	1.33E+004	378.70	1.28E+004
m	8	414.02	103.58	7.00E+003	210.76	1.16E+004
M	9	445.64	111.48	3.03E+003	80.85	8.03E+003
m	10	461.44	115.43	2.23E+003	77.52	1.08E+004
M	11	502.66	125.73	1.10E+003	64.61	4.91E+003
m	12	518.86	129.78	7.63E+003	99.81	5.14E+003
M	13	578.79	144.75	4.10E+002	198.95	3.99E+003
m	14	595.93	149.04	6.72E+002	192.70	7.27E+003
M	15	816.00	204.04	8.85E+002	73.93	1.35E+003
m	16	833.64	208.45	1.64E+003	125.88	1.25E+003
	17	1247.99	312.00	4.66E+002	55.79	6.61E+002
M	18	1332.97	333.24	8.07E+002	34.28	4.37E+002
m	19	1345.16	336.29	2.82E+002	17.37	6.06E+002
	20	1377.12	344.27	6.69E+002	56.06	5.96E+002
M	21	1474.47	368.60	2.33E+002	19.15	3.28E+002
m	22	1501.88	375.45	2.01E+003	44.07	3.27E+002
m	23	1522.33	380.56	3.89E+002	21.96	3.01E+002
m	24	1533.03	383.24	2.88E+002	19.81	2.90E+002
	25	1574.00	393.48	7.48E+002	43.37	2.66E+002
	26	1654.92	413.70	1.84E+003	52.86	2.44E+002
	27	1692.00	422.97	1.46E+002	23.28	1.25E+002
	28	1806.17	451.50	2.61E+002	29.57	1.53E+002
	29	2045.00	511.19	1.94E+002	27.54	1.33E+002
	30	2334.00	583.41	7.87E+001	18.70	7.73E+001
	31	2439.00	609.66	1.39E+002	25.81	1.16E+002
	32	2650.12	662.42	1.83E+002	22.00	7.75E+001
	33	2891.32	722.70	6.00E+001	15.99	5.20E+001

34	3647.00	911.56	7.94E+001	15.45	4.26E+001
35	7068.00	1766.53	5.88E+001	9.62	7.25E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.977	661.65*	85.12	7.95642E-004	9.86262E-005
NP-237	0.642	300.17	6.20		
		312.00*	36.00	3.64244E-003	4.69208E-004
		340.60	4.20		
Pu-239	0.992	129.28*	0.01	4.31711E+002	7.27015E+001
		375.00*	0.00	3.82827E+002	3.06880E+001
		413.70*	0.00	3.80872E+002	3.16793E+001
		451.50* @	0.00	4.45059E+002	5.33728E+001
AM-241	1.000	59.54*	35.70	1.88154E+002	1.49684E+001
		125.28*	0.00	1.01645E+002	7.71750E+000
		335.40*	0.00	1.64510E+002	1.26985E+001
		662.42* @	0.00	1.88125E+002	2.33141E+001
		722.70*	0.00	1.75335E+002	4.70193E+001
PU-241	0.929	114.00*	0.02	4.13719E+001	2.66084E+000
		332.60*	0.00	8.02261E+001	5.06939E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.977	2.431037E-004	1.018011E-004
NP-237	0.642	3.642436E-003	4.692084E-004
Pu-239 @	0.992	3.860754E+002	2.109368E+001
AM-241 @	1.000	1.306447E+002	5.986107E+000
PU-241	0.929	4.976426E+001	2.356017E+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

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	6.00E-001 +/- 3.28E-002

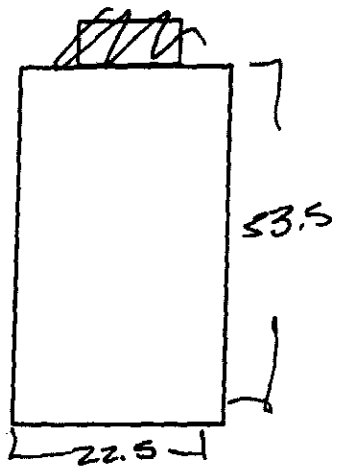
****
***** N U C L I D E M D A R E P O R T *****
****

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.1935E-004	1.94E-004	1.2073E-005
		1332.49	100.00	1.9351E-004		7.0756E-005
	CS-134	475.35	1.46	1.9754E-002	2.72E-004	3.0269E-003
		563.23	8.38	2.9108E-003		1.8138E-003
		569.32	15.43	1.5269E-003		-3.2474E-004
		604.70	97.60	3.1290E-004		-8.1952E-005
		795.84	85.40	2.7213E-004		1.2205E-004
		801.93	8.73	2.6766E-003		-1.6141E-003
		1038.57	1.00	2.1176E-002		-1.8759E-002
		1167.94	1.80	1.2048E-002		-4.2204E-003
		1365.15	3.04	5.0909E-003		-3.1330E-003
+	CS-137	661.65*	85.12	2.5903E-004	2.59E-004	7.9564E-004
+	NP-237	300.17	6.20	7.6885E-003	1.34E-003	4.8929E-003
		312.00*	36.00	1.3428E-003		3.6424E-003
		340.60	4.20	1.3570E-002		-2.4726E-003
+	Pu-239	129.28*	0.01	1.9030E+001	1.65E+001	4.3171E+002
		375.00*	0.00	1.6534E+001		3.8283E+002
		413.70*	0.00	2.1509E+001		3.8087E+002
		451.50*	0.00	1.4362E+002		4.4506E+002
+	AM-241	59.54*	35.70	4.9947E-001	4.99E-001	1.8815E+002
		125.28*	0.00	3.0231E+001		1.0164E+002
		335.40*	0.00	6.8375E+001		1.6451E+002
		662.42*	0.00	6.1247E+001		1.8813E+002
		722.70*	0.00	1.4234E+002		1.7533E+002
+	PU-241	114.00*	0.02	9.0120E+000	9.01E+000	4.1372E+001
		332.60*	0.00	9.9387E+000		8.0226E+001
	CM-243	209.70	3.27	2.4093E-002	3.28E-003	-3.6979E-003
		228.18	10.56	5.3139E-003		2.6589E-003
		277.60	14.00	3.2775E-003		-1.8406E-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

Bldg 233s
NDA Item Description Sheet
Bottle Geometry

10/29/01



Put Dimensions on Bottle

Item ID: 2335-01-0044

Weight (kg): 210

95.45
26.308
69.146
208.099
.332

Material Description: SAMPLES IN DRUM

Packaging: 3 LAYER POLY

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: 1.5

Comments: COMBINED COUNTS FOR 1800 SEC
TOTAL IN 450 SEC WITH ROTATION
1-0 0 90
2 90
3 180
4 270

```
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~comment=DRUM_WITH_SAMPLES
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~crpn=4
~Detector=7219
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~Lunit=IN  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
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               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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.322     ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0044

File Name: 901

Assay Date: 29-Oct-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.24E+03	1.47E+02		
Am-241	6.80E+02	5.41E+01		
Np-237	7.61E-02	4.77E-03		
U-238				
U-235	1.15E-02	2.80E-03		
Cs-137	3.21E+00	1.01E-01		
Co-60	9.71E-04	7.69E-05		

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 152.12

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	6.80E+02	+/-	2.06E+03	Use Meas
Calculated	1.72E+03	+/-	1.89E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	5.03E+02	+/-	2.16E+02
Pu-239	1.24E+03	+/-	5.32E+02
Pu-240	6.46E+02	+/-	2.77E+02
Pu-241	2.41E+03	+/-	1.04E+03
Pu-242	6.53E-01	+/-	2.80E-01
Am-241	6.80E+02	+/-	2.06E+03
Np-237	7.61E-02	+/-	3.17E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	1.15E-02	+/-	5.51E-03
Cs-137	3.21E+00	+/-	1.33E+00
Co-60	9.71E-04	+/-	4.08E-04

Results:

Total TRU Activity(nCi/g):	3.07E+03	+/-	2.15E+03	Calc from Pu-239 Act
Pu (g):	1.60E+00	**Pu (g) + 3 sigma TMU:**	3.65E+00	
		Pu(g) + 3 sigma:	2.16E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

.eport Generated On : 12/31/01 10:49:59 AM

ample Title : 233s-01-0044 @ 270
pectrum Description :
ample Identification : 0901
ample Size : 69.1 kg

ample Taken On : 10/29/01 3:01:00 PM
cquisition Started : 10/29/01 3:09:57 PM

ive Time: 1800.0 seconds Real Time: 1971.2 seconds

ISOCS Calabration : 233S-01-0044
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 12/27/01

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	237.82	59.54	2.66E+006	2058.99	4.36E+005
M	2	292.32	73.16	2.17E+004	230.50	6.77E+004
m	3	300.99	75.33	3.98E+004	268.80	7.07E+004
M	4	340.37	85.17	1.91E+004	1103.49	6.89E+004
m	5	350.28	87.65	6.89E+003	413.54	8.50E+004
M	6	380.12	95.10	1.13E+004	377.11	7.68E+004
m	7	396.01	99.07	3.48E+004	895.08	1.06E+005
m	8	413.84	103.53	1.74E+004	478.84	1.08E+005
M	9	445.99	111.57	7.76E+003	341.80	7.06E+004
m	10	461.69	115.49	6.58E+003	292.55	9.28E+004
m	11	477.32	119.40	3.50E+003	214.35	9.64E+004
m	12	502.39	125.66	5.63E+003	272.67	9.63E+004
m	13	518.78	129.76	2.15E+004	767.00	9.25E+004
	14	595.00	148.81	1.04E+003	546.88	7.94E+004
	15	742.68	185.71	1.52E+003	536.96	7.63E+004
M	16	815.83	203.99	1.99E+003	177.73	4.98E+004
m	17	833.56	208.43	4.14E+003	189.23	6.10E+004
	18	1200.67	300.17	9.50E+002	320.74	3.25E+004
	19	1247.99	312.00	8.74E+003	354.82	3.46E+004
M	20	1332.88	333.22	1.89E+003	211.74	3.76E+004
m	21	1344.74	336.18	1.03E+003	135.56	4.23E+004
m	22	1364.16	341.03	9.87E+002	132.91	4.16E+004
m	23	1381.53	345.38	1.82E+003	201.26	3.93E+004
	24	1501.87	375.45	5.61E+003	352.88	3.27E+004
	25	1574.00	393.48	1.77E+003	314.85	2.88E+004
	26	1654.92	413.70	5.29E+003	468.90	4.51E+004
	27	2647.04	661.65	6.36E+005	827.73	1.08E+004
	28	2891.32	722.70	1.15E+003	57.27	4.66E+002
	29	4693.97	1173.22	1.64E+002	20.27	5.95E+001
	30	5103.00	1275.44	1.26E+002	19.36	5.55E+001
M	31	5296.70	1323.85	1.66E+002	16.48	4.31E+001
m	32	5335.41	1333.52	1.84E+002	18.10	2.16E+001
	33	7068.00	1766.53	6.58E+001	9.57	6.25E+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
CO-60	0.979	1173.22*	100.00	8.84295E-004	1.11364E-004
		1332.49*	100.00	1.05013E-003	1.06425E-004
CS-137	1.000	661.65*	85.12	3.20998E+000	1.01112E-001
U-235	0.766	143.76	10.50		
		185.71*	54.00	7.97438E-003	2.84604E-003
		205.31*	4.70	1.18959E-001	1.56288E-002
NP-237	0.999	300.17*	6.20	4.72894E-002	1.61299E-002
		312.00*	36.00	7.60859E-002	4.77305E-003
		340.60*	4.20	7.64734E-002	1.08892E-002
Pu-239	0.961	129.28*	0.01	1.25996E+003	2.16286E+002
		375.00*	0.00	1.20395E+003	1.19829E+002
		413.70*	0.00	1.24058E+003	1.46532E+002
		451.50 @	0.00		
AM-241	1.000	59.54*	35.70	6.79511E+002	5.40517E+001
		125.28*	0.00	5.36651E+002	3.67599E+001
		335.40*	0.00	6.70528E+002	9.39126E+001
		662.42* @	0.00	7.58981E+005	2.38192E+004
		722.70*	0.00	3.92[illegible]E+003	2.30[illegible]E+002
PU-241	0.923	114.00*	0.02	1.25353E+002	8.77278E+000
		332.60*	0.00	2.10255E+002	2.55543E+001

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
CO-60	0.979	9.709708E-004	7.694067E-005
CS-137	1.000	3.207262E+000	1.007392E-001
U-235	0.766	1.153668E-002	2.799994E-003
NP-237	0.999	7.417361E-002	4.219315E-003
Pu-239 @	0.961	1.225052E+003	8.525147E+001
AM-241 @	1.000	6.421890E+002	2.869351E+001
PU-241	0.923	1.343038E+002	8.297450E+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 T O T A L S

Nuclide	Mass (g)
U-235	3.62E-001 +/- 8.79E-002
Pu-239	1.37E+000 +/- 9.51E-002

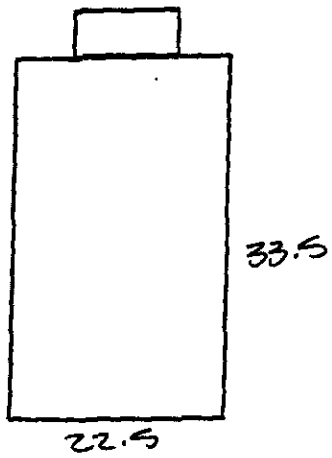
****
**** N U C L I D E M D A R E P O R T *****
****

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
+	CO-60	1173.22*	100.00	2.9207E-004	1.39E-004	8.8430E-004
		1332.49*	100.00	1.3860E-004		1.0501E-003
	CS-134	475.35	1.46	3.0338E-001	5.26E-004	5.2495E-001
		563.23	8.38	3.4733E-002		-1.4642E-002
		569.32	15.43	1.8710E-002		1.2119E-002
		604.70	97.60	2.8863E-003		3.2927E-004
		795.84	85.40	5.2648E-004		7.4565E-004
		801.93	8.73	4.8357E-003		2.8119E-003
		1038.57	1.00	3.5967E-002		7.0835E-003
		1167.94	1.80	2.4587E-002		-3.5696E-003
		1365.15	3.04	8.1092E-003		5.1765E-003
+	CS-137	661.65*	85.12	3.7014E-003	3.70E-003	3.2100E+000
+	NP-237	300.17*	6.20	5.2425E-002	9.83E-003	4.7289E-002
		312.00*	36.00	9.8308E-003		7.6086E-002
		340.60*	4.20	7.3722E-002		7.6473E-002
+	Pu-239	129.28*	0.01	8.3255E+001	8.33E+001	1.2600E+003
		375.00*	0.00	2.4417E+002		1.2040E+003
		413.70*	0.00	3.5799E+002		1.2406E+003
		451.50	0.00	2.4312E+003		1.4532E+003
+	AM-241	59.54*	35.70	1.0538E+000	1.05E+000	6.7951E+002
		125.28*	0.00	1.3784E+002		5.3665E+002
		335.40*	0.00	6.2695E+002		6.7053E+002
		662.42*	0.00	8.7518E+002		7.5898E+005
		722.70*	0.00	5.2831E+002		3.9286E+003
+	PU-241	114.00*	0.02	2.7047E+001	2.70E+001	1.2535E+002
		332.60*	0.00	1.0078E+002		2.1025E+002
	CM-243	209.70	3.27	1.4358E-001	2.92E-002	4.8449E-002
		228.18	10.56	4.1452E-002		4.4827E-002
		277.60	14.00	2.9211E-002		-1.5743E-002

+ = 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

Bldg 233s
NDA Item Description Sheet
Bottle Geometry

4-1-01



Put Dimensions on Bottle

GROSS 110.136
TARE 26.302
NET 83.828
.4102

Item ID: 2335-01-0045

Weight (kg): 242.3

Material Description: SAMPLE IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: <.5

Comments: 4 COUNTS TOTALING 1800 SEC 0921

1000-010802-0001

```
#Date & Time: Thu Dec 27 13:57:24 2001
~g=SIMPLE_CYLINDER
~description=233S-01-0045
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.4026    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0045

File Name: 921

Assay Date: 1-Nov-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.44E+03	1.14E+02
Am-241	1.21E+03	1.05E+02
Np-237	1.84E-01	8.89E-03
U-238		
U-235		
Cs-137	1.36E-01	4.50E-03
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Weight (lbs): 184.42

Width (in): 22.5

Depth for TMU (in): 4

Depth (in): 22.5

% Volume: 50

Am-241 Calcs:

Measured	1.21E+03	+/-	3.66E+03	Use Meas
Calculated	1.99E+03	+/-	2.16E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	5.84E+02	+/-	2.45E+02
Pu-239	1.44E+03	+/-	6.05E+02
Pu-240	7.50E+02	+/-	3.15E+02
Pu-241	2.80E+03	+/-	1.18E+03
Pu-242	7.58E-01	+/-	3.19E-01
Am-241	1.21E+03	+/-	3.66E+03
Np-237	1.84E-01	+/-	7.63E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.36E-01	+/-	5.61E-02
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		3.98E+03	+/-	3.73E+03	Calc from Pu-239 Act
Pu (g):	2.25E+00	**Pu (g) + 3 sigma TMU:**		5.08E+00	
		Pu(g) + 3 sigma:		2.78E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

.eport Generated On : 12/31/01 11:36:44 AM

ample Title : 233s-01-0045 @ 270
pectrum Description :
ample Identification : 0921
ample Size : 83.8 kg

ample Taken On : 11/01/01 1:27:00 PM
cquisition Started : 11/01/01 1:28:00 PM

ive Time: 1800.0 seconds Real Time: 1997.3 seconds

ISOCS Calabration : 233S-01-0045
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 12/27/01

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	239.21	59.89	4.84E+006	169041.	1.12E+005
2	292.03	73.09	5.33E+003	243.17	4.71E+004
3	301.08	75.35	1.16E+004	259.67	4.48E+004
4	339.95	85.07	3.72E+003	608.50	3.60E+004
5	379.69	95.00	1.06E+004	442.10	3.03E+004
6	396.01	99.08	4.17E+004	1192.19	2.75E+004
7	413.83	103.53	2.07E+004	1011.07	2.44E+004
8	445.49	111.44	7.78E+003	378.63	2.18E+004
9	460.04	115.08	4.55E+003	426.24	2.06E+004
10	477.11	119.34	5.08E+003	476.55	1.91E+004
11	502.52	125.70	6.41E+003	323.32	1.68E+004
12	518.70	129.74	2.47E+004	218.29	1.53E+004
13	577.07	144.33	8.43E+002	138.08	1.21E+004
14	586.81	146.76	7.80E+002	193.63	1.19E+004
15	595.66	148.97	2.69E+003	118.12	1.17E+004
16	644.47	161.17	8.06E+002	113.05	1.06E+004
17	659.98	165.05	9.11E+002	107.38	1.03E+004
18	680.78	170.25	4.11E+002	114.99	1.04E+004
19	782.55	195.68	5.54E+002	79.30	8.30E+003
20	815.59	203.94	3.12E+003	96.69	7.70E+003
21	833.54	208.42	1.10E+004	131.83	7.32E+003
22	1201.97	300.50	3.76E+003	92.29	3.78E+003
23	1248.95	312.24	2.24E+004	161.74	3.33E+003
24	1332.33	333.08	3.02E+003	81.53	3.00E+003
25	1343.59	335.89	1.22E+003	62.64	2.95E+003
26	1363.67	340.91	2.57E+003	217.20	2.87E+003
27	1380.05	345.00	2.17E+003	301.12	2.79E+003
28	1474.72	368.66	8.37E+002	63.88	2.39E+003
29	1501.78	375.43	7.38E+003	102.09	2.30E+003
30	1521.60	380.38	1.07E+003	131.24	2.24E+003
31	1533.66	383.40	9.77E+002	127.47	2.19E+003
32	1572.96	393.22	2.28E+003	64.79	2.06E+003
33	1595.46	398.84	7.93E+002	48.59	1.98E+003

34	1656.32	414.05	6.60E+003	92.35	1.84E+003
35	1664.57	416.11	8.87E+002	51.47	1.83E+003
36	1691.43	422.82	4.32E+002	46.23	1.75E+003
37	1807.49	451.83	8.01E+002	46.10	1.60E+003
38	2648.18	661.93	2.93E+004	308.15	2.95E+002
39	2888.80	722.07	3.54E+002	20.93	6.61E+001
40	3647.04	911.57	7.17E+001	10.66	3.38E+001
41	3877.90	969.26	4.80E+001	10.13	2.98E+001
42	5849.60	1462.03	5.51E+002	24.16	1.14E+001

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	7067.60	1766.43	3.59E+001	7.47	2.55E+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	1.35633E-001	4.50001E-003
NP-237	0.997	300.17*	6.20	1.76478E-001	9.55262E-003
		312.00*	36.00	1.83861E-001	8.88831E-003
		340.60*	4.20	1.86860E-001	1.79922E-002
		375.45*	0.68	3.44619E+000	1.59181E-001
		415.76*	1.75	1.67981E-001	1.19503E-002
Pu-239	0.992	129.28*	0.01	1.43043E+003	2.40500E+002
		375.00*	0.00	1.48099E+003	1.16021E+002
		413.70*	0.00	1.44172E+003	1.14341E+002
		451.50* @	0.00	1.44584E+003	1.00695E+002
AM-241	0.995	59.54*	35.70	1.20854E+003	1.04894E+002
		125.28*	0.00	6.02678E+002	4.21447E+001
		335.40*	0.00	7.45371E+002	5.17653E+001
		662.42* @	0.00	3.20696E+004	1.06047E+003
		722.70*	0.00	1.10526E+003	7.36763E+001
PU-241	0.959	114.00*	0.02	8.65616E+001	9.37673E+000
		332.60*	0.00	3.16058E+002	1.70613E+001

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	1.323825E-001	4.486709E-003
NP-237	0.997	1.783765E-001	5.444480E-003
Pu-239 @	0.992	1.426437E+003	3.825811E+001
AM-241 @	0.995	7.685344E+002	2.873255E+001
PU-241	0.959	1.398002E+002	8.217467E+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 *****
****

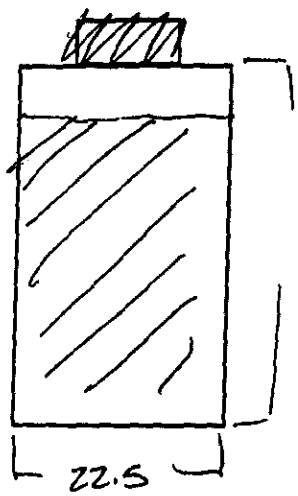
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.5444E-004	2.13E-004	1.0942E-004
		1332.49	100.00	2.1265E-004		-2.2765E-004
	CS-134	475.35	1.46	6.9205E-002	3.06E-004	-2.2324E-002
		563.23	8.38	8.3861E-003		-1.4258E-003
		569.32	15.43	4.5251E-003		8.0413E-004
		604.70	97.60	7.2902E-004		2.2560E-004
		795.84	85.40	3.0616E-004		-1.0796E-004
		801.93	8.73	3.0118E-003		-1.2655E-003
		1038.57	1.00	2.4561E-002		1.3286E-002
		1167.94	1.80	1.3331E-002		-1.1569E-002
		1365.15	3.04	5.8181E-003		-2.6505E-003
+	CS-137	661.65*	85.12	3.8210E-004	3.82E-004	1.3563E-001
+	NP-237	300.17*	6.20	1.3556E-002	2.22E-003	1.7648E-001
		312.00*	36.00	2.2247E-003		1.8386E-001
		340.60*	4.20	1.8303E-002		1.8686E-001
		375.45*	0.68	1.0532E-001		3.4462E+000
		415.76*	1.75	3.8148E-002		1.6798E-001
+	Pu-239	129.28*	0.01	3.3495E+001	3.35E+001	1.4304E+003
		375.00*	0.00	4.5259E+001		1.4810E+003
		413.70*	0.00	4.4196E+001		1.4417E+003
		451.50*	0.00	3.4075E+002		1.4458E+003
+	AM-241	59.54*	35.70	3.8944E-001	3.89E-001	1.2085E+003
		125.28*	0.00	5.6964E+001		6.0268E+002
		335.40*	0.00	1.5642E+002		7.4537E+002
		662.42*	0.00	9.0344E+001		3.2070E+004
		722.70*	0.00	1.2658E+002		1.1053E+003
+	PU-241	114.00*	0.02	1.2754E+001	1.28E+001	8.6562E+001
		332.60*	0.00	2.6939E+001		3.1606E+002
	CM-243	209.70	3.27	6.6151E-002	9.97E-003	8.9911E-001
		228.18	10.56	1.4606E-002		-6.6236E-003
		277.60	14.00	9.9674E-003		-7.9496E-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	1.93E+000 +/- 5.17E-002

Bldg 233s
NDA Item Description Sheet
Bottle Geometry



Put Dimensions on Bottle

GROSS. 86.1825
TARE. 26.308
NET. 59.87

Item ID: 2335-01-0047

Density 0.28756

Weight (kg): 190285

Material Description: Samples in Drum

Packaging: 55 gal Drum

Detector Distance (in): 24"

Detector Filters: 1 Cu

Dose Rate: 6/2

Comments: 4 Counts with 90° Rotation in Between.
Combined total counts

1 0°	888
2 90°	888
3 180°	888
4 270°	888

```
#Date & Time: Mon Dec 31 11:46:28 2001
~g=SIMPLE_CYLINDER
~description=233S-01-0047
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.2875    ~3con=1
~2Absor=0.0312    ~2Amater=CADMIUM  ~2Aden=8.642
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0047

File Name: 888

Assay Date: 25-Oct-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	3.32E+03	2.66E+02
Am-241	2.74E+03	1.74E+02
Np-237	1.17E+00	5.63E-02
U-238		
U-235		
Cs-137	5.68E-01	1.80E-02
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 131.71

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	2.74E+03	+/-	2.95E+03	Use Meas
Calculated	4.59E+03	+/-	3.04E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.34E+03	+/-	3.20E+02
Pu-239	3.32E+03	+/-	7.91E+02
Pu-240	1.73E+03	+/-	4.12E+02
Pu-241	6.46E+03	+/-	1.54E+03
Pu-242	1.75E+00	+/-	4.16E-01
Am-241	2.74E+03	+/-	2.95E+03
Np-237	1.17E+00	+/-	2.67E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	5.68E-01	+/-	1.28E-01
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		9.13E+03	+/-	3.10E+03	Calc from Pu-239 Act
Pu (g):	3.70E+00	**Pu (g) + 3 sigma TMU:**		6.34E+00	
		Pu(g) + 3 sigma:		4.59E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 12/31/01 11:54:47 AM

Sample Title : 233S-01-0047 @ 270
Spectrum Description :
Sample Identification : 0888
Sample Size : 59.9 kg

Sample Taken On : 10/25/01 10:57:00 AM
Acquisition Started : 10/25/01 10:57:41 AM

Live Time: 1800.0 seconds Real Time: 1833.6 seconds

ISOCS Calabration : 233S-01-0047
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 12/31/01

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	237.82	59.54	1.66E+005	528.44	3.20E+004
M	2	292.41	73.18	9.44E+003	457.46	1.84E+004
m	3	301.12	75.36	1.70E+004	686.72	1.90E+004
	4	341.00	85.33	3.66E+003	268.76	2.35E+004
M	5	396.61	99.23	3.68E+004	657.05	4.25E+004
m	6	413.73	103.50	2.81E+004	496.23	3.88E+004
M	7	445.81	111.52	9.28E+003	152.23	2.95E+004
m	8	459.45	114.93	6.13E+003	145.40	3.88E+004
M	9	493.44	123.42	2.34E+003	153.73	2.26E+004
m	10	502.74	125.75	1.03E+004	346.20	2.65E+004
m	11	518.84	129.77	1.64E+004	530.39	2.56E+004
M	12	577.62	144.46	2.10E+003	332.57	3.04E+004
m	13	596.14	149.09	6.70E+003	550.29	5.77E+004
M	14	644.98	161.30	1.20E+003	129.27	2.93E+004
m	15	659.93	165.03	2.16E+003	132.30	4.43E+004
m	16	680.21	170.10	1.34E+003	126.31	4.08E+004
M	17	758.60	189.69	3.12E+002	223.38	1.72E+004
m	18	783.49	195.91	6.53E+002	391.55	2.39E+004
	19	834.00	208.54	2.01E+004	329.53	2.36E+004
M	20	1071.86	267.98	4.97E+002	84.29	9.81E+003
m	21	1087.34	271.85	7.68E+002	86.59	1.23E+004
	22	1200.67	300.17	1.91E+004	283.35	1.53E+004
	23	1247.99	312.00	1.10E+005	395.68	1.15E+004
	24	1294.00	323.50	5.74E+002	136.63	6.01E+003
M	25	1332.05	333.01	3.87E+003	83.34	7.23E+003
m	26	1343.72	335.92	2.76E+003	75.09	7.33E+003
m	27	1363.53	340.88	1.32E+004	121.87	6.80E+003
m	28	1381.62	345.40	2.65E+003	72.28	5.72E+003
M	29	1475.57	368.88	1.57E+003	83.66	6.17E+003
m	30	1502.20	375.53	9.46E+003	313.18	6.03E+003
m	31	1522.24	380.54	1.33E+003	78.87	5.92E+003
m	32	1532.64	383.14	1.11E+003	72.42	6.14E+003
M	33	1573.26	393.29	2.54E+003	149.22	5.28E+003

m 34	1595.41	398.83	3.93E+003	217.71	5.72E+003
35	1654.92	413.70	1.14E+004	205.36	6.78E+003
36	1806.17	451.50	9.82E+002	164.50	6.13E+003
37	2478.00	619.40	2.41E+002	72.32	1.37E+003
38	2613.00	653.14	1.94E+002	92.19	1.84E+003
39	2647.04	661.65	9.41E+004	316.22	1.26E+003
M 40	2756.39	688.98	1.35E+002	34.71	1.16E+002
m 41	2781.50	695.25	1.27E+002	31.93	1.39E+002
42	2891.32	722.70	6.77E+002	37.67	1.70E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	3648.00	911.81	9.51E+001	15.36	3.39E+001
44	7069.00	1766.78	4.47E+001	9.79	1.23E+001

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	1.000	661.65*	85.12	5.68450E-001	1.79922E-002
NP-237	1.000	300.17*	6.20	1.16766E+000	5.89303E-002
		312.00*	36.00	1.17443E+000	5.63108E-002
		340.60*	4.20	1.26335E+000	5.96623E-002
Pu-239	0.992	129.28*	0.01	1.69858E+003	2.90408E+002
		375.00*	0.00	2.52555E+003	2.11915E+002
		413.70*	0.00	3.31775E+003	2.65897E+002
		451.50* @	0.00	2.37679E+003	4.08928E+002
AM-241	1.000	59.54*	35.70	4.86827E+003	3.87538E+002
		125.28*	0.00	1.83411E+003	1.07965E+002
		335.40*	0.00	2.22397E+003	1.20039E+002
		662.42* @	0.00	1.34407E+005	4.23862E+003
		722.70*	0.00	2.73517E+003	1.73843E+002
PU-241	0.969	114.00*	0.02	2.67089E+002	1.58499E+001
		332.60*	0.00	5.32684E+002	2.74217E+001

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	1.000	5.590203E-001	1.792904E-002
NP-237	1.000	1.200476E+000	3.362884E-002
Pu-239 @	0.992	2.554541E+003	1.439347E+002
AM-241 @	1.000	2.229490E+003	7.162327E+001
PU-241	0.969	3.336010E+002	1.372252E+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 T O T A L S

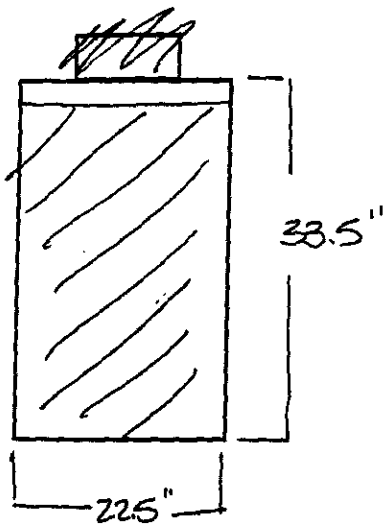
Nuclide	Mass (g)
Pu-239	2.47E+000 +/- 1.39E-001

****
***** 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	3.2646E-004	2.96E-004	2.7733E-004
		1332.49	100.00	2.9583E-004		-3.3796E-005
	CS-134	475.35	1.46	1.4547E-001	4.10E-004	9.7875E-002
		563.23	8.38	1.6566E-002		-1.6722E-002
		569.32	15.43	8.8224E-003		2.0764E-003
		604.70	97.60	1.3987E-003		2.2217E-003
		795.84	85.40	4.0997E-004		-5.8344E-004
		801.93	8.73	3.9651E-003		-1.4441E-003
		1038.57	1.00	3.2408E-002		6.8953E-004
		1167.94	1.80	1.8462E-002		1.0305E-002
		1365.15	3.04	8.7988E-003		8.1914E-003
+	CS-137	661.65*	85.12	1.5447E-003	1.54E-003	5.6845E-001
+	NP-237	300.17*	6.20	4.9768E-002	7.64E-003	1.1677E+000
		312.00*	36.00	7.6393E-003		1.1744E+000
		340.60*	4.20	3.7012E-002		1.2633E+000
+	Pu-239	129.28*	0.01	7.7252E+001	7.73E+001	1.6986E+003
		375.00*	0.00	9.7185E+001		2.5256E+003
		413.70*	0.00	1.6942E+002		3.3178E+003
		451.50*	0.00	1.2926E+003		2.3768E+003
+	AM-241	59.54*	35.70	3.2494E+001	3.25E+001	4.8683E+003
		125.28*	0.00	1.3480E+002		1.8341E+003
		335.40*	0.00	3.2352E+002		2.2240E+003
		662.42*	0.00	3.6525E+002		1.3441E+005
		722.70*	0.00	3.7286E+002		2.7352E+003
+	PU-241	114.00*	0.02	4.0017E+001	4.00E+001	2.6709E+002
		332.60*	0.00	5.4771E+001		5.3268E+002
	CM-243	209.70	3.27	1.2161E-001	2.06E-002	1.5560E+000
		228.18	10.56	2.8490E-002		4.9180E-003
		277.60	14.00	2.0568E-002		5.6418E-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

Bldg 233s
NDA Item Description Sheet
Bottle Geometry



Put Dimensions on Bottle

GROSS WT. 91.172 kg
TARE WT. 26.308 kg
NET WT. 64.864.

Item ID: 2335-01-0048

DENSITY = .3116

GROSS Weight (kg): 201 LBS 91.172 kg

Material Description: FILL TO 90 +% WITH PACKAGES.

Packaging: STEEL 55 gal DRUM

Detector Distance (in): 24"

Detector Filters: 1 CAD

Dose Rate: 1/0.5

Comments: 4 COUNTS COMBINED, 480 SEC EACH WITH 90° ROTATION.

1 0°
2 90°
3 180°
4 270°

```
#Date & Time: Mon Dec 31 12:08:21 2001
~g=SIMPLE_CYLINDER
~description=233S-01-0048
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.3116    ~3con=1
~2Absor=0.0312    ~2Amater=CADMIUM  ~2Aden=8.642
~sd1=24
```

233-S Item Analysis Spreadsheet Version 3.0b 1/14/02

Sample Info:

Item ID:	233s-01-0048	**Assay Date:**	25-Oct-01
File Name:	887	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.62E+03	1.30E+02		
Am-241	2.26E+03	1.23E+02		
Np-237	1.00E+00	4.82E-02		
U-238				
U-235				
Cs-137	1.15E+00	3.78E-02		
Co-60				

Item Parameters:

Contamination: Internal Item Type: Barrel Calcs: Use 1st

Dimensions:

Length (in):	33.5	Width (in):	22.5	Depth (in):	22.5
Weight (lbs):	142.7	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	2.26E+03	+/-	2.44E+03	Calc from Pu-239
Calculated	2.24E+03	+/-	1.48E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.55E+02	+/-	1.56E+02
Pu-239	1.62E+03	+/-	3.85E+02
Pu-240	8.42E+02	+/-	2.01E+02
Pu-241	3.15E+03	+/-	7.50E+02
Pu-242	8.50E-01	+/-	2.03E-01
Am-241	2.24E+03	+/-	1.48E+03
Np-237	1.00E+00	+/-	2.29E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.15E+00	+/-	2.59E-01
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		5.35E+03	+/-	1.55E+03	Calc from Pu-239 Act
Pu (g):	1.95E+00	**Pu (g) + 3 sigma TMU:**		3.35E+00	
		Pu(g) + 3 sigma:		2.42E+00	

Comments:

Np-237 Error does not affect final values.

Errors:High Np-237 ratio,

Analyst: Martin Winterrose **Date:** 3/20/02

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

:eport Generated On : 12/31/01 12:10:20 PM

:ample Title : 233S-01-0048
:pectrum Description :
:ample Identification : 0887
ample Size : 64.9 kg

ample Taken On : 10/25/01 9:25:00 AM
.cquisition Started : 10/25/01 9:49:14 AM

ive Time: 1800.0 seconds Real Time: 1838.0 seconds

ISOCS Calabration : 233S-01-0048
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 12/31/01

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	239.30	59.91	1.16E+005	3679.53	1.43E+004
2	292.91	73.31	8.37E+003	426.69	1.52E+004
3	301.06	75.35	1.58E+004	472.76	1.55E+004
4	340.39	85.17	7.06E+003	321.53	1.70E+004
5	348.67	87.24	3.78E+003	297.43	1.73E+004
6	396.31	99.15	2.44E+004	773.38	1.86E+004
7	413.75	103.51	1.60E+004	580.79	1.89E+004
8	445.90	111.54	6.16E+003	283.63	2.09E+004
9	459.29	114.89	3.52E+003	306.87	2.10E+004
10	502.63	125.72	7.39E+003	365.45	2.15E+004
11	518.76	129.75	1.38E+004	179.00	2.15E+004
12	575.78	144.00	1.01E+003	155.40	2.16E+004
13	587.08	146.83	1.45E+003	199.06	2.15E+004
14	595.90	149.03	3.04E+003	164.86	2.15E+004
15	605.91	151.53	3.63E+002	148.66	2.14E+004
16	643.45	160.92	5.28E+002	150.56	2.11E+004
17	659.73	164.98	1.06E+003	150.07	2.10E+004
18	783.22	195.85	7.05E+002	127.83	2.02E+004
19	833.65	208.45	1.67E+004	274.71	1.89E+004
20	1088.01	272.02	7.60E+002	117.99	1.44E+004
21	1201.96	300.50	1.66E+004	178.34	1.13E+004
22	1249.03	312.26	9.72E+004	539.32	9.96E+003
23	1332.20	333.05	3.21E+003	109.95	9.15E+003
24	1343.41	335.85	2.05E+003	98.47	9.05E+003
25	1363.47	340.86	1.12E+004	307.00	8.88E+003
26	1378.23	344.55	8.91E+002	329.08	8.71E+003
27	1476.03	368.99	1.10E+003	83.10	8.06E+003
28	1501.88	375.45	6.57E+003	234.04	7.93E+003
29	1503.54	375.87	1.97E+003	758.82	7.93E+003
30	1522.35	380.57	1.13E+003	162.57	7.85E+003
31	1533.83	383.44	1.16E+003	99.09	7.75E+003
32	1573.22	393.28	2.22E+003	89.79	7.65E+003
33	1595.50	398.85	3.37E+003	96.72	7.59E+003

34	1656.31	414.05	5.76E+003	111.50	7.43E+003
35	1664.54	416.10	4.06E+003	102.48	7.44E+003
36	1807.74	451.89	7.34E+002	80.41	6.98E+003
37	2477.22	619.21	1.87E+002	41.14	1.72E+003
38	2584.27	645.96	1.21E+002	39.62	9.47E+002
39	2648.23	661.95	1.99E+005	1985.58	4.35E+002
40	2889.61	722.27	5.87E+002	26.50	8.88E+001
41	3647.92	911.79	6.66E+001	10.86	3.45E+001
42	4005.63	1001.19	2.71E+001	7.89	2.85E+001

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	5103.72	1275.62	6.31E+001	9.85	2.20E+001
44	5849.49	1462.00	5.51E+002	24.68	1.07E+001
45	7067.29	1766.35	4.08E+001	7.57	4.48E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.996	661.65*	85.12	1.14615E+000	3.78442E-002
PA-234M	0.999	1001.03*	0.59	2.48146E-002	7.25864E-003
NP-237	0.997	300.17*	6.20	9.77795E-001	4.83201E-002
		312.00*	36.00	1.00139E+000	4.81884E-002
		340.60*	4.20	1.02804E+000	5.53797E-002
		375.45*	0.68	3.91955E+000	2.22083E-001
		415.76*	1.75	9.85655E-001	4.76357E-002
Pu-239	0.992	129.28*	0.01	1.39505E+003	2.34928E+002
		375.00*	0.00	1.68441E+003	1.43066E+002
		413.70*	0.00	1.61545E+003	1.29926E+002
		451.50* @	0.00	1.70332E+003	1.98071E+002
AM-241	0.994	59.54*	35.70	3.01278E+003	2.57808E+002
		125.28*	0.00	1.28717E+003	8.90896E+001
		335.40*	0.00	1.58762E+003	1.06377E+002
		662.42* @	0.00	2.71000E+005	8.91802E+003
		722.70*	0.00	2.25998E+003	1.23427E+002
PU-241	0.971	114.00*	0.02	1.51145E+002	1.55214E+001
		332.60*	0.00	4.25045E+002	2.46304E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.996	1.139037E+000	3.771805E-002
PA-234M	0.999	2.481459E-002	7.258640E-003
NP-237	0.997	9.908422E-001	2.468049E-002
Pu-239 @	0.992	1.444871E+003	4.420813E+001
AM-241 @	0.994	1.681578E+003	5.821729E+001
PU-241	0.971	2.289988E+002	1.313152E+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 *****
****

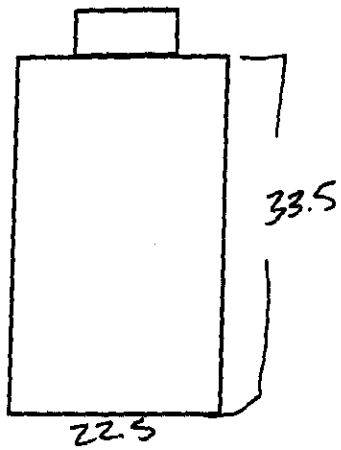
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	3.1701E-004	2.63E-004	1.2792E-004
		1332.49	100.00	2.6346E-004		-1.8971E-004
	CS-134	475.35	1.46	1.9328E-001	3.91E-004	4.2862E-001
		563.23	8.38	2.1070E-002		1.0854E-002
		569.32	15.43	1.1149E-002		-2.6870E-003
		604.70	97.60	1.7205E-003		1.6208E-003
		795.84	85.40	3.9067E-004		-2.5773E-004
		801.93	8.73	3.8554E-003		-1.1672E-003
		1038.57	1.00	2.9796E-002		1.5167E-002
		1167.94	1.80	1.7961E-002		1.3001E-002
		1365.15	3.04	7.6825E-003		-3.6760E-003
+	CS-137	661.65*	85.12	5.7543E-004	5.75E-004	1.1461E+000
+	NP-237	300.17*	6.20	2.9258E-002	4.81E-003	9.7780E-001
		312.00*	36.00	4.8116E-003		1.0014E+000
		340.60*	4.20	4.0635E-002		1.0280E+000
		375.45*	0.68	2.4879E-001		3.9196E+000
		415.76*	1.75	9.8174E-002		9.8565E-001
+	Pu-239	129.28*	0.01	6.9529E+001	6.95E+001	1.3951E+003
		375.00*	0.00	1.0692E+002		1.6844E+003
		413.70*	0.00	1.1316E+002		1.6154E+003
		451.50*	0.00	9.0756E+002		1.7033E+003
+	AM-241	59.54*	35.70	1.4557E+001	1.46E+001	3.0128E+003
		125.28*	0.00	1.1919E+002		1.2872E+003
		335.40*	0.00	3.4570E+002		1.5876E+003
		662.42*	0.00	1.3606E+002		2.7100E+005
		722.70*	0.00	1.7921E+002		2.2600E+003
+	PU-241	114.00*	0.02	2.9069E+001	2.91E+001	1.5114E+002
		332.60*	0.00	5.9228E+001		4.2505E+002
	CM-243	209.70	3.27	1.2142E-001	2.21E-002	1.2713E+000
		228.18	10.56	3.0141E-002		-1.8391E-002
		277.60	14.00	2.2132E-002		-7.6902E-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	1.51E+000 +/- 4.63E-002

Bldg 233s
NDA Item Description Sheet
Bottle Geometry



Put Dimensions on Bottle

GROSS 92.532
~~NET~~ WTD 10/14/01 26.308
TARE
NET 66.224
.3180

Item ID: 2335-01-0040

Weight (kg): 204

Material Description: SAMPLES IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: 1/.5

Comments: 4 COUNTS @ 450 MC FOR 14 TOTAL
OF 1800 SOL

1 @ 0 0891
2 @ 90
3 @ 180
4 @ 270

1000-010802-0001

```
#Date & Time: Wed Jan 02 08:44:44 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0049
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.318     ~3con=1
~sd1=24
```

233-S Item Analysis Spreadsheet Version 3.0b 1/14/02

Sample Info:

Item ID:	233s-01-0049	**Assay Date:**	25-Oct-01
File Name:	891	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.98E+03	1.66E+02		
Am-241	8.62E+02	9.18E+01		
Np-237	8.36E-02	4.26E-03		
U-238				
U-235				
Cs-137	1.52E-01	4.87E-03		
Co-60				

Item Parameters:

Contamination: Internal Item Type: Barrel Calcs: Use 1st

Dimensions:

Length (in):	33.5	Width (in):	22.5	Depth (in):	22.5
Weight (lbs):	145.69	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	8.62E+02	+/-	2.61E+03	Use Meas
Calculated	2.74E+03	+/-	2.97E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	8.02E+02	+/-	3.38E+02
Pu-239	1.98E+03	+/-	8.34E+02
Pu-240	1.03E+03	+/-	4.34E+02
Pu-241	3.85E+03	+/-	1.62E+03
Pu-242	1.04E+00	+/-	4.39E-01
Am-241	8.62E+02	+/-	2.61E+03
Np-237	8.36E-02	+/-	3.47E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.52E-01	+/-	6.28E-02
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	4.68E+03	+/-	2.79E+03	Calc from Pu-239 Act
Pu (g):	2.44E+00	**Pu (g) + 3 sigma TMU:**	5.52E+00	
		Pu(g) + 3 sigma:	3.05E+00	

Comments: Errors:

Analyst: Martin Winterrose **Date:** 3/20/02

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

Report Generated On : 1/02/02 8:48:06 AM

Sample Title : 233S-01-0049@270
Spectrum Description :
Sample Identification : 0891
Sample Size : 66.2 kg

Sample Taken On : 10/25/01 3:22:00 PM
Acquisition Started : 10/25/01 3:23:07 PM

Live Time: 1800.0 seconds Real Time: 1897.2 seconds

ISOCS Calabration : 233S-01-0049
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/02/02

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	237.82	59.54	2.60E+006	2085.07	4.89E+005
M	2	292.46	73.20	6.03E+003	148.41	3.42E+004
m	3	300.88	75.30	1.07E+004	168.09	3.44E+004
	4	341.00	85.33	2.32E+003	320.25	3.33E+004
M	5	379.95	95.06	1.63E+004	331.79	3.93E+004
m	6	395.81	99.02	4.79E+004	741.36	5.30E+004
m	7	413.92	103.55	2.26E+004	373.39	4.36E+004
M	8	445.58	111.46	1.15E+004	154.09	2.74E+004
m	9	461.93	115.55	9.86E+003	146.31	4.14E+004
m	10	475.41	118.92	2.94E+003	122.63	3.58E+004
M	11	502.55	125.70	3.69E+003	155.34	1.67E+004
m	12	518.64	129.72	2.97E+004	822.49	1.50E+004
M	13	579.40	144.91	1.91E+003	379.81	1.68E+004
m	14	595.41	148.91	3.07E+003	422.39	2.71E+004
	15	644.00	161.05	9.11E+002	228.33	1.36E+004
M	16	758.66	189.71	4.78E+002	154.46	8.08E+003
m	17	784.39	196.14	7.60E+002	225.68	9.48E+003
M	18	815.73	203.97	3.53E+003	171.78	6.39E+003
m	19	833.46	208.40	6.87E+003	290.47	7.68E+003
	20	1023.00	255.77	4.56E+002	126.16	4.57E+003
	21	1200.67	300.17	1.25E+003	120.87	3.94E+003
	22	1247.99	312.00	9.26E+003	162.16	4.25E+003
M	23	1332.35	333.08	3.38E+003	162.76	3.27E+003
m	24	1344.47	336.11	1.35E+003	76.65	3.05E+003
m	25	1364.02	341.00	1.29E+003	75.66	3.11E+003
m	26	1381.54	345.38	3.10E+003	148.71	2.76E+003
M	27	1474.62	368.64	8.51E+002	50.53	2.48E+003
m	28	1501.64	375.39	8.69E+003	238.59	2.63E+003
m	29	1521.95	380.47	1.68E+003	69.21	2.42E+003
m	30	1532.53	383.11	1.55E+003	63.88	2.25E+003
	31	1574.00	393.48	2.85E+003	116.65	2.52E+003
M	32	1656.33	414.05	8.13E+003	250.83	2.09E+003
m	33	1688.00	422.91	4.66E+003	43.05	1.96E+003

34	1806.17	451.50	9.55E+002	79.40	1.53E+003
35	2647.04	661.65	2.90E+004	179.36	7.08E+002
36	2891.32	722.70	2.43E+002	24.76	1.02E+002
37	3648.00	911.81	8.80E+001	18.28	6.00E+001
38	7070.00	1767.03	4.65E+001	11.94	1.95E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	1.51846E-001	4.87059E-003
NP-237	0.999	300.17*	6.20	6.43252E-002	6.96906E-003
		312.00*	36.00	8.36414E-002	4.25861E-003
		340.60*	4.20	1.03765E-001	7.74856E-003
Pu-239	0.993	129.28*	0.01	1.80399E+003	3.06986E+002
		375.00*	0.00	1.93606E+003	1.58471E+002
		413.70*	0.00	1.97962E+003	1.66163E+002
		451.50* @	0.00	1.92851E+003	1.77242E+002
AM-241	1.000	59.54*	35.70	6.82995E+002	5.43291E+001
		125.28*	0.00	3.63066E+002	2.33076E+001
		335.40*	0.00	9.12000E+002	6.71013E+001
		662.42* @	0.00	3.59031E+004	1.14753E+003
		722.70*	0.00	8.61937E+002	9.18123E+001
PU-241	0.917	114.00*	0.02	1.93964E+002	1.08650E+001
		332.60*	0.00	3.90846E+002	2.62219E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	1.498245E-001	4.854011E-003
NP-237	0.999	8.296432E-002	3.290025E-003
Pu-239 @	0.993	1.938095E+003	1.074278E+002
AM-241 @	1.000	4.779280E+002	1.991927E+001
PU-241	0.917	2.228130E+002	1.003745E+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

NUCLIDE TOTALS

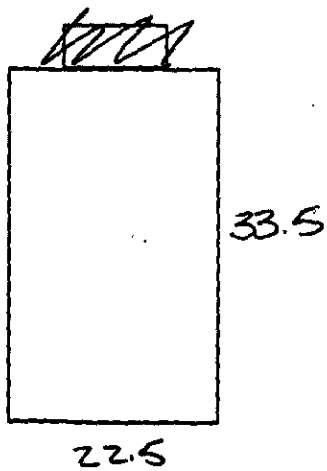
Nuclide	Mass (g)
Pu-239	2.07E+000 +/- 1.15E-001

****
***** 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	3.3144E-004	2.73E-004	1.8908E-004
		1332.49	100.00	2.7326E-004		1.6315E-004
	CS-134	475.35	1.46	7.1915E-002	3.48E-004	2.1302E-002
		563.23	8.38	8.3792E-003		7.2864E-004
		569.32	15.43	4.5871E-003		1.5022E-003
		604.70	97.60	7.3454E-004		-5.4527E-004
		795.84	85.40	3.4805E-004		3.5823E-005
		801.93	8.73	3.3939E-003		-3.8368E-003
		1038.57	1.00	2.7791E-002		-5.7265E-003
		1167.94	1.80	1.7708E-002		1.1066E-002
		1365.15	3.04	7.7619E-003		-1.3031E-003
+	CS-137	661.65*	85.12	9.9158E-004	9.92E-004	1.5185E-001
+	NP-237	300.17*	6.20	1.9774E-002	3.90E-003	6.4325E-002
		312.00*	36.00	3.9009E-003		8.3641E-002
		340.60*	4.20	2.1049E-002		1.0376E-001
+	Pu-239	129.28*	0.01	3.4838E+001	3.48E+001	1.8040E+003
		375.00*	0.00	5.3798E+001		1.9361E+003
		413.70*	0.00	5.2433E+001		1.9796E+003
		451.50*	0.00	4.9132E+002		1.9285E+003
+	AM-241	59.54*	35.70	1.1460E+000	1.15E+000	6.8300E+002
		125.28*	0.00	5.9510E+001		3.6307E+002
		335.40*	0.00	1.7592E+002		9.1200E+002
		662.42*	0.00	2.3445E+002		3.5903E+004
		722.70*	0.00	2.3437E+002		8.6194E+002
+	PU-241	114.00*	0.02	1.8685E+001	1.87E+001	1.9396E+002
		332.60*	0.00	3.1045E+001		3.9085E+002
	CM-243	209.70	3.27	6.1025E-002	9.59E-003	-1.8507E-002
		228.18	10.56	1.4102E-002		-9.2850E-003
		277.60	14.00	9.5944E-003		-7.6541E-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

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

GROSS 138.63
TARE 26.3
NET 112.33
.5395

Item ID: 233S-01-0086

Weight (~~kg~~ LBS): 305

Material Description: Packages in Drum

Packaging: 55 GAL Drum

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: <.5

Comments: 1800 SRL 1014

```
#Date & Time: Wed Jan 02 09:05:33 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0085
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.5395    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0085

File Name: 1014

Assay Date: 12-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.65E+03	1.30E+02		
Am-241	8.84E+02	6.08E+01		
Np-237	5.29E-02	2.62E-03		
U-238				
U-235				
Cs-137	3.06E-03	1.74E-04		
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 247.126

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	8.84E+02	+/-	2.68E+03	Use Meas
Calculated	2.29E+03	+/-	2.48E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.70E+02	+/-	2.82E+02
Pu-239	1.65E+03	+/-	6.95E+02
Pu-240	8.62E+02	+/-	3.62E+02
Pu-241	3.22E+03	+/-	1.35E+03
Pu-242	8.71E-01	+/-	3.66E-01
Am-241	8.84E+02	+/-	2.68E+03
Np-237	5.29E-02	+/-	2.20E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	3.06E-03	+/-	1.27E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	4.07E+03	+/-	2.80E+03	Calc from Pu-239 Act
Pu (g):	3.46E+00	**Pu (g) + 3 sigma TMU:**	7.82E+00	
		Pu(g) + 3 sigma:	4.28E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 1/02/02 9:07:00 AM

Sample Title : 233s-01-0085
Spectrum Description :
Sample Identification : 1014
Sample Size : 112.3 kg

Sample Taken On : 12/12/01 8:55:00 AM
Acquisition Started : 12/12/01 8:56:04 AM

Live Time: 1800.0 seconds Real Time: 1858.4 seconds

ISOCS Calabration : 233S-01-0085
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/02/02

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	239.09	59.81	1.37E+006	42905.1	2.48E+004
2	291.92	73.01	4.86E+003	233.12	1.37E+004
3	300.95	75.27	9.28E+003	287.86	1.37E+004
4	340.35	85.12	3.54E+003	161.93	1.46E+004
5	348.44	87.15	1.50E+003	163.71	1.45E+004
6	395.96	99.03	3.09E+004	1274.00	1.38E+004
7	413.76	103.48	1.71E+004	1002.04	1.34E+004
8	445.26	111.36	7.16E+003	328.32	1.25E+004
9	459.83	115.00	4.50E+003	472.86	1.20E+004
10	502.34	125.63	6.12E+003	294.38	1.02E+004
11	518.39	129.64	2.76E+004	210.58	9.50E+003
12	577.24	144.36	1.16E+003	169.94	8.40E+003
13	586.67	146.72	1.15E+003	221.25	8.23E+003
14	595.45	148.91	3.42E+003	120.20	8.08E+003
15	643.36	160.89	9.29E+002	96.75	7.18E+003
16	659.48	164.92	7.35E+002	94.97	6.85E+003
17	686.39	171.65	6.01E+002	93.10	6.32E+003
18	758.36	189.64	5.38E+002	67.68	5.06E+003
19	783.78	196.00	7.68E+002	72.30	4.65E+003
20	814.62	203.71	3.52E+003	187.52	4.43E+003
21	833.05	208.32	1.40E+004	154.39	4.00E+003
22	1022.43	255.67	5.03E+002	46.93	2.31E+003
23	1071.05	267.83	3.85E+002	45.57	2.03E+003
24	1191.67	297.99	2.18E+002	43.01	1.76E+003
25	1201.07	300.34	1.05E+003	54.62	1.73E+003
26	1248.16	312.12	7.09E+003	93.00	1.55E+003
27	1293.75	323.52	4.19E+002	68.97	1.38E+003
28	1331.47	332.95	3.90E+003	90.27	1.27E+003
29	1342.68	335.75	1.60E+003	70.12	1.23E+003
30	1365.06	341.35	1.01E+003	90.30	1.14E+003
31	1380.46	345.20	3.27E+003	126.36	1.08E+003
32	1472.81	368.29	8.62E+002	99.05	7.86E+002
33	1500.77	375.28	9.34E+003	141.34	7.08E+002

34	1520.93	380.32	1.63E+003	204.54	6.52E+002
35	1533.12	383.37	1.10E+003	169.45	6.15E+002
36	1572.11	393.12	3.08E+003	60.47	5.58E+002
37	1594.69	398.76	2.04E+002	24.79	5.14E+002
38	1655.26	413.91	8.43E+003	94.87	4.16E+002
39	1663.50	415.97	2.16E+002	27.94	3.93E+002
40	1690.42	422.70	5.84E+002	30.48	3.30E+002
41	1708.01	427.10	1.64E+002	20.52	2.86E+002
42	1806.17	451.64	1.07E+003	36.35	2.10E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2043.09	510.88	1.50E+002	18.75	1.34E+002
44	2332.34	583.21	1.10E+002	14.32	9.62E+001
45	2437.36	609.47	1.43E+002	15.63	9.21E+001
46	2475.80	619.08	9.73E+001	13.56	8.72E+001
47	2583.40	645.98	6.97E+001	12.35	7.01E+001
48	2648.57	662.28	7.51E+002	35.67	7.65E+001
49	2887.81	722.10	3.23E+002	19.88	5.59E+001
50	4482.46	1120.83	6.71E+001	10.21	3.30E+001
51	5845.77	1461.72	6.02E+002	25.10	1.03E+001
52	7062.59	1765.98	5.30E+001	8.39	1.69E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.984	661.65*	85.12	3.05550E-003	1.74115E-004
NP-237	0.997	300.17*	6.20	4.51261E-002	3.19656E-003
		312.00*	36.00	5.28998E-002	2.62256E-003
		340.60*	4.20	6.67566E-002	6.70529E-003
		375.45*	0.68	3.93361E+000	1.83343E-001
		415.76*	1.75	3.67262E-002	4.98542E-003
Pu-239	0.996	129.28*	0.01	1.53051E+003	2.57253E+002
		375.00*	0.00	1.69046E+003	1.32849E+002
		413.70*	0.00	1.65443E+003	1.30497E+002
		451.50* @	0.00	1.72625E+003	8.95940E+001
AM-241	0.997	59.54*	35.70	3.45626E+002	2.95147E+001
		125.28*	0.00	5.52759E+002	3.77545E+001
		335.40*	0.00	8.89190E+002	5.69047E+001
		662.42* @	0.00	7.22455E+002	4.11222E+001
		722.70*	0.00	8.84416E+002	6.07977E+001
PU-241	0.964	114.00*	0.02	8.28572E+001	9.79818E+000
		332.60*	0.00	3.70358E+002	1.93262E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.984	7.945886E-004	1.939389E-004
NP-237	0.997	4.930315E-002	1.808467E-003
Pu-239 @	0.996	1.615867E+003	4.260083E+001
AM-241 @	0.997	5.345788E+002	2.029078E+001
PU-241	0.964	1.416452E+002	8.739187E+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 *****
****

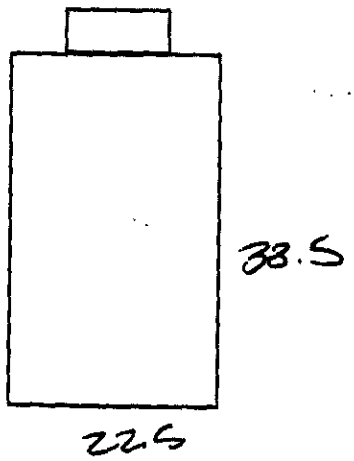
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.9199E-004	1.50E-004	-1.3469E-004
		1332.49	100.00	1.5043E-004		7.1729E-005
	CS-134	475.35	1.46	2.3350E-002	2.53E-004	-2.1515E-002
		563.23	8.38	3.3296E-003		6.9649E-004
		569.32	15.43	1.7977E-003		-1.0747E-003
		604.70	97.60	3.5483E-004		-1.8558E-004
		795.84	85.40	2.5256E-004		1.1207E-005
		801.93	8.73	2.5478E-003		4.9687E-004
		1038.57	1.00	1.9752E-002		-1.6931E-003
		1167.94	1.80	1.0821E-002		-6.9456E-003
		1365.15	3.04	5.7643E-003		1.5807E-003
+	CS-137	661.65*	85.12	1.7666E-004	1.77E-004	3.0555E-003
+	NP-237	300.17*	6.20	8.3973E-003	1.39E-003	4.5126E-002
		312.00*	36.00	1.3886E-003		5.2900E-002
		340.60*	4.20	1.0538E-002		6.6757E-002
		375.45*	0.68	5.3290E-002		3.9336E+000
		415.76*	1.75	1.6144E-002		3.6726E-002
+	Pu-239	129.28*	0.01	2.5331E+001	1.91E+001	1.5305E+003
		375.00*	0.00	2.2901E+001		1.6905E+003
		413.70*	0.00	1.9139E+001		1.6544E+003
		451.50*	0.00	1.1341E+002		1.7262E+003
+	AM-241	59.54*	35.70	1.8517E-001	1.85E-001	3.4563E+002
		125.28*	0.00	4.2718E+001		5.5276E+002
		335.40*	0.00	9.2224E+001		8.8919E+002
		662.42*	0.00	4.1769E+001		7.2245E+002
		722.70*	0.00	1.0258E+002		8.8442E+002
+	PU-241	114.00*	0.02	9.4474E+000	9.45E+000	8.2857E+001
		332.60*	0.00	1.5988E+001		3.7036E+002
	CM-243	209.70	3.27	5.5351E-002	5.99E-003	1.0359E+000
		228.18	10.56	9.6463E-003		-1.1028E-002
		277.60	14.00	5.9887E-003		-5.4162E-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	2.93E+000 +/- 7.72E-002

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

GROSS: 149.86
TARE: 26.30
NET: 123.56
.5934

Item ID: 2335-01-0093

Weight (kg): 329.7

Material Description: PACKAGES IN DRUMS

Packaging: 55 GAL DRUMS

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: <.5

Comments: 1800 SEC 1017

```
#Date & Time: Wed Jan 02 10:11:13 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0093
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLES  ~3den=0.5934    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0093

File Name: 1017

Assay Date: 12-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	5.11E+02	4.61E+01
Am-241	5.48E+02	4.36E+01
Np-237	7.71E-02	3.79E-03
U-238		
U-235		
Cs-137		
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 271.83

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	5.48E+02	+/-	1.66E+03	Use Meas
Calculated	7.07E+02	+/-	7.69E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.07E+02	+/-	8.75E+01
Pu-239	5.11E+02	+/-	2.16E+02
Pu-240	2.66E+02	+/-	1.12E+02
Pu-241	9.95E+02	+/-	4.20E+02
Pu-242	2.69E-01	+/-	1.14E-01
Am-241	5.48E+02	+/-	1.66E+03
Np-237	7.71E-02	+/-	3.20E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	0.00E+00	+/-	0.00E+00
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.53E+03	+/-	1.68E+03	Calc from Pu-239 Act
Pu (g):	1.17E+00	**Pu (g) + 3 sigma TMU:**		2.66E+00	
		Pu(g) + 3 sigma:		1.49E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 1/02/02 10:12:44 AM

Sample Title : 233s-01-0093
Spectrum Description :
Sample Identification : 1017
Sample Size : 123.6 kg

Sample Taken On : 12/12/01 1:40:00 PM
Acquisition Started : 12/12/01 1:41:22 PM

Live Time: 1800.0 seconds Real Time: 1890.8 seconds

ISOCS Calabration : 233S-01-0093
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/02/02

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	238.03	59.54	2.71E+006	1999.49	3.51E+005
M	2	292.39	73.13	2.61E+003	112.72	1.73E+004
m	3	300.79	75.23	5.50E+003	130.57	1.74E+004
M	4	396.22	99.10	2.34E+004	533.06	2.36E+004
m	5	413.54	103.43	1.59E+004	357.05	2.17E+004
M	6	445.49	111.42	4.78E+003	165.25	1.30E+004
m	7	460.22	115.10	3.88E+003	137.79	1.45E+004
m	8	476.59	119.19	2.58E+003	105.79	1.34E+004
m	9	502.19	125.59	4.30E+003	148.15	1.19E+004
m	10	518.45	129.66	1.03E+004	305.53	1.08E+004
M	11	577.24	144.36	6.07E+002	153.36	5.48E+003
m	12	586.70	146.72	5.34E+002	140.29	8.27E+003
m	13	595.42	148.90	1.45E+003	302.95	8.04E+003
	14	658.00	164.55	2.88E+002	153.49	6.19E+003
	15	833.00	208.31	5.18E+003	122.54	2.78E+003
	16	1200.40	300.17	1.62E+003	84.79	1.53E+003
	17	1247.69	312.00	1.07E+004	123.55	1.24E+003
M	18	1331.44	332.94	1.29E+003	42.70	7.45E+002
m	19	1342.93	335.81	6.94E+002	33.59	8.08E+002
m	20	1362.63	340.74	1.27E+003	40.77	7.08E+002
m	21	1380.47	345.20	9.79E+002	36.63	5.80E+002
M	22	1473.98	368.58	4.35E+002	28.01	5.58E+002
m	23	1500.84	375.30	3.07E+003	72.32	4.98E+002
m	24	1521.40	380.44	5.14E+002	29.92	4.21E+002
m	25	1531.49	382.96	4.87E+002	28.52	4.06E+002
M	26	1572.03	393.10	1.03E+003	90.47	3.37E+002
m	27	1594.19	398.64	3.75E+002	37.96	3.49E+002
M	28	1655.51	413.97	2.68E+003	121.62	2.99E+002
m	29	1690.30	422.67	1.63E+002	19.68	2.93E+002
	30	1805.60	451.50	3.17E+002	38.32	2.63E+002
	31	2044.00	511.11	2.70E+002	35.01	2.09E+002
	32	2332.00	583.12	1.02E+002	20.88	1.02E+002
	33	2436.00	609.13	1.19E+002	9826.88	1.51E+002

34	2649.13	662.42	4.59E+002	31.46	1.32E+002
35	2890.21	722.70	1.45E+002	20.33	6.90E+001
36	3645.00	911.43	8.10E+001	13.92	3.40E+001
37	7061.00	1765.58	5.50E+001	8.91	6.00E+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
NP-237	1.000	300.17*	6.20	6.73818E-002	4.79140E-003
		312.00*	36.00	7.71283E-002	3.79455E-003
		340.60*	4.20	8.12272E-002	4.57756E-003
Pu-239	0.995	129.28*	0.01	5.18158E+002	8.83545E+001
		375.00*	0.00	5.39588E+002	4.35123E+001
		413.70*	0.00	5.10729E+002	4.61216E+001
		451.50* @	0.00	4.97627E+002	6.32295E+001
AM-241	1.000	59.54*	35.70	5.48118E+002	4.35999E+001
		125.28*	0.00	3.51220E+002	2.08889E+001
		335.40*	0.00	3.74862E+002	2.51817E+001
		662.42* @	0.00	4.26265E+002	3.21430E+001
		722.70*	0.00	3.82243E+002	5.48769E+001
PU-241	0.958	114.00*	0.02	6.36097E+001	4.12555E+000
		332.60*	0.00	1.18977E+002	6.81463E+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
X	CS-137	0.977		
	NP-237	1.000	7.570398E-002	2.494291E-003
	Pu-239 @	0.995	5.251065E+002	2.979607E+001
	AM-241 @	1.000	3.831997E+002	1.454499E+001
	PU-241	0.958	7.845952E+001	3.529198E+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 T O T A L S

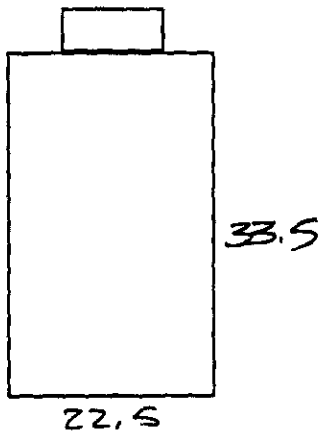
Nuclide	Mass (g)
Pu-239	1.05E+000 +/- 5.94E-002

****
***** 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	2.0358E-004	1.72E-004	6.4142E-005
		1332.49	100.00	1.7235E-004		1.0039E-004
	CS-134	475.35	1.46	1.9390E-002	2.60E-004	-1.0334E-002
		563.23	8.38	3.0173E-003		-3.9800E-003
		569.32	15.43	1.6877E-003		1.6229E-004
		604.70	97.60	3.2040E-004		4.3974E-005
		795.84	85.40	2.5981E-004		1.0407E-004
		801.93	8.73	2.4583E-003		-3.9779E-003
		1038.57	1.00	2.1344E-002		8.8829E-003
		1167.94	1.80	1.0945E-002		7.1248E-004
		1365.15	3.04	5.4894E-003		4.4918E-003
	CS-137	661.65*	85.12	3.0859E-004	3.09E-004	1.8028E-003
+	NP-237	300.17*	6.20	1.0301E-002	1.64E-003	6.7382E-002
		312.00*	36.00	1.6368E-003		7.7128E-002
		340.60*	4.20	8.0895E-003		8.1227E-002
+	Pu-239	129.28*	0.01	2.4445E+001	1.58E+001	5.1816E+002
		375.00*	0.00	1.8744E+001		5.3959E+002
		413.70*	0.00	1.5843E+001		5.1073E+002
		451.50*	0.00	1.7947E+002		4.9763E+002
+	AM-241	59.54*	35.70	7.5417E-001	7.54E-001	5.4812E+002
		125.28*	0.00	4.1660E+001		3.5122E+002
		335.40*	0.00	7.2857E+001		3.7486E+002
		662.42*	0.00	7.2964E+001		4.2626E+002
		722.70*	0.00	1.4923E+002		3.8224E+002
+	PU-241	114.00*	0.02	9.2081E+000	9.21E+000	6.3610E+001
		332.60*	0.00	1.1951E+001		1.1898E+002
	CM-243	209.70	3.27	3.5329E-002	4.68E-003	2.2111E-001
		228.18	10.56	7.1512E-003		2.8792E-003
		277.60	14.00	4.6770E-003		-4.7379E-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

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

GROSS 128.4
TARE 26.308
NET 102.10
.4904

Item ID: 2335-01-0094

Weight (kg): 282.5

Material Description: Samples in Drum

Packaging: 55 Gal Drum

Detector Distance (in): 24

Detector Filters: ~~Lead~~ MW CD .0312

Dose Rate: 1/2.5

Comments: 4 Counts Total 1800 Size 0288

```
#Date & Time: Wed Jan 02 10:28:35 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0094
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.4904    ~3con=1
~2Absor=0.0312    ~2Amater=CADMIUM  ~2Aden=8.642
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0094

File Name: 938

Assay Date: 7-Nov-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	5.81E+03	4.55E+02		
Am-241	4.32E+03	3.44E+02		
Np-237	7.72E-01	3.70E-02		
U-238				
U-235				
Cs-137	1.50E-02	8.36E-04		
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 224.62

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	4.32E+03	+/-	1.31E+04	Use Meas
Calculated	8.04E+03	+/-	8.70E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.35E+03	+/-	9.89E+02
Pu-239	5.81E+03	+/-	2.44E+03
Pu-240	3.03E+03	+/-	1.27E+03
Pu-241	1.13E+04	+/-	4.75E+03
Pu-242	3.06E+00	+/-	1.28E+00
Am-241	4.32E+03	+/-	1.31E+04
Np-237	7.72E-01	+/-	3.20E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.50E-02	+/-	6.24E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.55E+04	+/-	1.34E+04	Calc from Pu-239 Act	
Pu (g):	1.10E+01	**Pu (g) + 3 sigma TMU:**	2.50E+01		
		Pu(g) + 3 sigma:	1.36E+01		

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 1/02/02 10:30:17 AM

Sample Title : 233s-01-0094 @270
Spectrum Description :
Sample Identification : 0938
Sample Size : 102.1 kg

Sample Taken On : 11/07/01 12:08:00 PM
Acquisition Started : 11/07/01 12:08:50 PM

Live Time: 1800.0 seconds Real Time: 1833.4 seconds

ISOCS Calabration : 233S-01-0094
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/02/02

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	237.82	59.54	1.48E+005	512.74	3.27E+004
M	2	292.33	73.16	1.16E+004	495.14	2.13E+004
m	3	300.97	75.32	2.05E+004	727.70	2.37E+004
	4	340.00	85.08	5.06E+003	316.40	3.13E+004
M	5	396.24	99.13	6.34E+004	878.51	6.23E+004
m	6	413.92	103.55	4.39E+004	606.31	5.29E+004
M	7	445.53	111.45	1.95E+004	193.38	4.10E+004
m	8	460.45	115.18	1.41E+004	184.95	5.50E+004
M	9	502.73	125.75	1.15E+004	174.71	3.02E+004
m	10	518.74	129.75	5.49E+004	260.68	3.01E+004
M	11	577.68	144.48	4.14E+003	333.51	3.07E+004
m	12	586.48	146.68	3.66E+003	298.78	3.65E+004
m	13	595.72	148.99	7.46E+003	537.43	3.67E+004
m	14	610.59	152.70	8.22E+002	115.50	3.71E+004
M	15	644.40	161.15	3.79E+003	552.53	3.32E+004
m	16	660.09	165.07	2.83E+003	381.28	4.61E+004
m	17	684.60	171.20	2.29E+003	320.31	3.54E+004
	18	718.00	179.55	1.02E+003	238.95	1.87E+004
M	19	758.57	189.69	1.49E+003	112.55	1.88E+004
m	20	783.94	196.02	2.33E+003	114.42	1.98E+004
m	21	805.37	201.38	4.60E+002	97.94	1.87E+004
m	22	815.65	203.95	1.04E+004	204.86	1.71E+004
m	23	833.42	208.39	3.42E+004	540.82	1.64E+004
	24	1023.00	255.77	1.23E+003	167.66	9.30E+003
M	25	1071.65	267.93	1.04E+003	79.56	8.60E+003
m	26	1086.93	271.75	7.19E+002	74.62	9.50E+003
	27	1200.67	300.17	1.45E+004	222.44	1.03E+004
	28	1247.99	312.00	8.90E+004	356.39	9.38E+003
	29	1294.00	323.50	2.35E+003	167.03	6.37E+003
M	30	1332.17	333.04	1.14E+004	235.39	4.77E+003
m	31	1343.81	335.95	5.35E+003	128.29	4.43E+003
m	32	1363.39	340.84	1.10E+004	226.28	4.00E+003
m	33	1381.20	345.29	9.59E+003	201.75	3.21E+003

M 34	1474.61	368.64	3.86E+003	83.49	3.09E+003
m 35	1501.58	375.38	2.84E+004	333.38	2.69E+003
m 36	1521.88	380.45	5.25E+003	98.47	2.13E+003
m 37	1532.29	383.05	4.50E+003	87.41	1.90E+003
M 38	1572.86	393.19	8.97E+003	205.72	1.88E+003
m 39	1595.33	398.81	3.24E+003	90.86	1.61E+003
M 40	1656.41	414.07	2.52E+004	149.41	1.42E+003
m 41	1691.51	422.84	1.88E+003	45.94	1.01E+003
m 42	1707.64	426.88	4.38E+002	28.73	9.33E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	1806.17	451.50	2.89E+003	78.46	7.68E+002
44	2045.00	511.19	2.63E+002	43.28	4.27E+002
45	2334.00	583.41	1.58E+002	31.47	2.37E+002
46	2438.00	609.41	1.67E+002	25.91	1.68E+002
47	2477.00	619.15	4.14E+002	40.31	2.69E+002
M 48	2562.06	640.41	1.31E+002	16.43	2.35E+002
m 49	2584.59	646.04	1.90E+002	19.01	2.50E+002
m 50	2612.27	652.96	3.03E+002	23.63	2.45E+002
m 51	2636.19	658.94	8.68E+001	20.60	2.40E+002
m 52	2649.81	662.34	3.26E+003	150.23	2.24E+002
53	2756.00	688.88	1.81E+002	31.56	1.80E+002
54	2891.32	722.70	1.04E+003	39.86	1.38E+002
55	3024.00	755.86	1.14E+002	21.12	8.29E+001
56	3079.00	769.60	2.63E+002	27.93	1.10E+002
57	3484.00	870.82	1.20E+002	19.16	6.61E+001
58	7067.00	1766.28	6.14E+001	10.56	1.06E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.981	661.65*	85.12	1.49881E-002	8.36361E-004
NP-237	1.000	300.17*	6.20	7.20573E-001	3.64764E-002
		312.00*	36.00	7.71598E-001	3.70205E-002
		340.60*	4.20	8.46959E-001	4.29173E-002
Pu-239	0.992	129.28*	0.01	5.12191E+003	8.60301E+002
		375.00*	0.00	6.03975E+003	4.71095E+002
		413.70*	0.00	5.81410E+003	4.55184E+002
		451.50* @	0.00	5.47360E+003	2.61079E+002
AM-241	1.000	59.54*	35.70	4.32152E+003	3.44063E+002
		125.28*	0.00	1.85595E+003	9.41279E+001
		335.40*	0.00	3.47343E+003	1.82026E+002
		662.42* @	0.00	3.54386E+003	1.97521E+002
		722.70*	0.00	3.16224E+003	1.55656E+002
PU-241	0.951	114.00*	0.02	5.60228E+002	3.12593E+001
		332.60*	0.00	1.25909E+003	6.43915E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.981	4.427832E-003	8.891851E-004
NP-237	1.000	7.728652E-001	2.222687E-002
Pu-239 @	0.992	5.821729E+003	3.059452E+002
AM-241 @	1.000	2.496928E+003	7.202492E+001
PU-241	0.951	6.935166E+002	2.812083E+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

NUCLIDE TOTALS

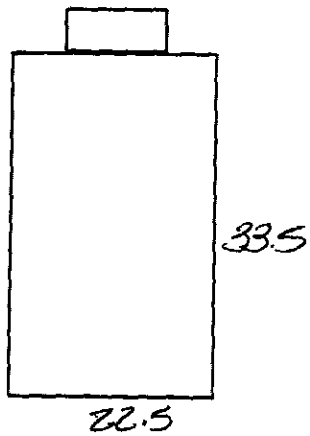
Nuclide	Mass (g)
Pu-239	9.59E+000 +/- 5.04E-001

****
***** 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	2.4470E-004	1.81E-004	3.7537E-005
		1332.49	100.00	1.8077E-004		-2.4319E-004
	CS-134	475.35	1.46	3.5848E-002	2.98E-004	-4.8774E-002
		563.23	8.38	5.3222E-003		1.8781E-003
		569.32	15.43	2.8222E-003		3.2438E-004
		604.70	97.60	4.8322E-004		-4.3533E-004
		795.84	85.40	2.9835E-004		-1.2379E-004
		801.93	8.73	2.8955E-003		-2.7010E-003
		1038.57	1.00	2.3639E-002		8.7986E-003
		1167.94	1.80	1.3132E-002		-2.8880E-003
		1365.15	3.04	6.3208E-003		8.2153E-003
+	CS-137	661.65*	85.12	3.3272E-004	3.33E-004	1.4988E-002
+	NP-237	300.17*	6.20	3.0638E-002	5.58E-003	7.2057E-001
		312.00*	36.00	5.5799E-003		7.7160E-001
		340.60*	4.20	2.2851E-002		8.4696E-001
+	Pu-239	129.28*	0.01	7.5647E+001	4.11E+001	5.1219E+003
		375.00*	0.00	5.1829E+001		6.0398E+003
		413.70*	0.00	4.1093E+001		5.8141E+003
		451.50*	0.00	3.6200E+002		5.4736E+003
+	AM-241	59.54*	35.70	3.2528E+001	3.25E+001	4.3215E+003
		125.28*	0.00	1.3032E+002		1.8560E+003
		335.40*	0.00	2.0273E+002		3.4734E+003
		662.42*	0.00	7.8669E+001		3.5439E+003
		722.70*	0.00	2.4397E+002		3.1622E+003
+	PU-241	114.00*	0.02	4.3329E+001	3.59E+001	5.6023E+002
		332.60*	0.00	3.5877E+001		1.2591E+003
	CM-243	209.70	3.27	1.0879E-001	1.48E-002	2.9108E-002
		228.18	10.56	2.1336E-002		5.1727E-004
		277.60	14.00	1.4822E-002		1.2681E-002

+ = 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

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

GROSS 153.4
TARE 26.308
NET 127.10

.6104

Item ID: 2335-01-0095

Weight (kg): 33.5

Material Description: Samples in drums

Packaging: 55 Gal Drums

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: 4 Counts for 1800 sec Total 0937

```
#Date & Time: Wed Jan 02 10:39:18 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0095
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLES  ~3den=0.6104    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0095

File Name: 937

Assay Date: 7-Nov-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.17E+03	9.29E+01
Am-241	9.47E+02	8.18E+01
Np-237	2.00E-01	9.68E-03
U-238		
U-235		
Cs-137	4.39E-04	1.26E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 279.62

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	9.47E+02	+/-	2.87E+03	Use Meas
Calculated	1.62E+03	+/-	1.75E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	4.74E+02	+/-	1.99E+02
Pu-239	1.17E+03	+/-	4.92E+02
Pu-240	6.10E+02	+/-	2.56E+02
Pu-241	2.28E+03	+/-	9.58E+02
Pu-242	6.16E-01	+/-	2.59E-01
Am-241	9.47E+02	+/-	2.87E+03
Np-237	2.00E-01	+/-	8.28E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	4.39E-04	+/-	2.20E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	3.20E+03	+/-	2.93E+03	Calc from Pu-239 Act	
Pu (g):	2.77E+00	**Pu (g) + 3 sigma TMU:**	6.26E+00		
		Pu(g) + 3 sigma:	3.43E+00		

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 1/02/02 10:41:34 AM

Sample Title : 233s-01-0095 @270
Spectrum Description :
Sample Identification : 0937
Sample Size : 127.1 kg

Sample Taken On : 11/07/01 10:04:00 AM
Acquisition Started : 11/07/01 10:10:09 AM

Live Time: 1800.0 seconds Real Time: 1994.8 seconds

ISOCS Calabration : 233S-01-0095
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/02/02

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	239.15	59.87	4.90E+006	166636.	1.26E+005
2	292.84	73.29	4.65E+003	195.40	5.61E+004
3	300.84	75.29	9.48E+003	242.00	5.23E+004
4	340.03	85.09	3.04E+003	701.53	3.96E+004
5	396.07	99.09	4.30E+004	1404.56	2.82E+004
6	413.60	103.47	2.51E+004	1100.57	2.43E+004
7	445.34	111.40	7.60E+003	330.16	2.04E+004
8	459.76	115.01	4.00E+003	337.60	1.91E+004
9	476.83	119.27	7.29E+003	513.92	1.74E+004
10	502.43	125.67	7.63E+003	371.17	1.44E+004
11	518.52	129.69	2.08E+004	216.70	1.28E+004
12	576.65	144.22	8.54E+002	156.80	9.57E+003
13	587.70	146.98	7.05E+002	161.12	9.34E+003
14	595.51	148.93	2.69E+003	137.52	9.17E+003
15	643.67	160.97	5.81E+002	108.58	8.16E+003
16	659.84	165.01	7.75E+002	101.35	7.82E+003
17	679.21	169.85	4.30E+002	82.31	7.88E+003
18	783.33	195.87	4.78E+002	66.10	5.57E+003
19	815.28	203.86	2.51E+003	82.08	5.06E+003
20	833.24	208.35	1.23E+004	129.48	4.74E+003
21	1022.46	255.64	3.95E+002	43.66	2.95E+003
22	1071.63	267.93	3.15E+002	54.45	2.74E+003
23	1201.59	300.41	4.63E+003	82.53	2.08E+003
24	1248.60	312.15	2.77E+004	228.22	1.81E+003
25	1291.99	323.00	3.83E+002	54.69	1.56E+003
26	1331.93	332.98	2.82E+003	69.62	1.45E+003
27	1343.17	335.79	1.58E+003	62.78	1.40E+003
28	1363.30	340.82	3.18E+003	257.31	1.29E+003
29	1379.15	344.78	1.68E+003	290.75	1.19E+003
30	1474.16	368.52	9.23E+002	68.20	8.55E+002
31	1485.83	371.44	1.40E+002	38.29	8.24E+002
32	1501.18	375.28	5.92E+003	194.77	7.85E+002
33	1502.63	375.64	2.42E+003	1199.02	7.80E+002

34	1521.33	380.31	1.07E+003	130.80	7.34E+002
35	1533.29	383.30	8.46E+002	113.04	7.03E+002
36	1572.71	393.16	2.14E+003	52.47	6.02E+002
37	1595.03	398.73	8.38E+002	36.72	5.55E+002
38	1655.84	413.93	6.20E+003	83.14	4.35E+002
39	1664.10	415.99	1.16E+003	43.54	4.20E+002
40	1691.39	422.82	4.22E+002	35.71	3.70E+002
41	1807.03	451.72	7.30E+002	31.06	2.38E+002
42	2044.61	511.09	1.47E+002	17.42	1.41E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2333.77	583.36	1.10E+002	15.12	9.96E+001
44	2438.39	609.51	1.45E+002	15.69	9.65E+001
45	2475.96	618.89	9.84E+001	13.87	8.93E+001
46	2647.23	661.70	1.13E+002	32.19	8.00E+001
47	2650.36	662.48	6.76E+002	39.27	7.97E+001
48	2888.18	721.92	3.65E+002	21.23	6.36E+001
49	3877.33	969.12	5.22E+001	9.82	2.97E+001
50	4484.21	1120.79	5.78E+001	9.97	3.34E+001
51	5847.95	1461.62	5.21E+002	23.54	1.30E+001
52	7065.24	1765.84	4.75E+001	7.97	2.11E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	4.39101E-004	1.25962E-004
NP-237	0.999	300.17*	6.20	1.90895E-001	9.81813E-003
		312.00*	36.00	1.99516E-001	9.67806E-003
		340.60*	4.20	2.01614E-001	1.88164E-002
		375.45*	0.68	2.40382E+000	1.32247E-001
		415.76*	1.75	1.89656E-001	1.05817E-002
Pu-239	0.995	129.28*	0.01	1.04306E+003	1.75471E+002
		375.00*	0.00	1.03304E+003	8.66168E+001
		413.70*	0.00	1.17236E+003	9.28662E+001
		451.50* @	0.00	1.13607E+003	6.57153E+001
AM-241	0.996	59.54*	35.70	9.46543E+002	8.18225E+001
		125.28*	0.00	6.20615E+002	4.26103E+001
		335.40*	0.00	8.48610E+002	5.19300E+001
		662.42* @	0.00	6.21568E+002	4.10353E+001
		722.70*	0.00	9.53019E+002	6.26709E+001
PU-241	0.964	114.00*	0.02	6.53631E+001	6.56546E+000
		332.60*	0.00	2.57737E+002	1.36334E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	4.391006E-004	1.259622E-004
NP-237	0.999	1.938300E-001	5.517592E-003
Pu-239 @	0.995	1.062101E+003	3.019874E+001
AM-241 @	0.996	7.849678E+002	2.746627E+001
PU-241	0.964	1.015780E+002	5.915283E+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 *****
****

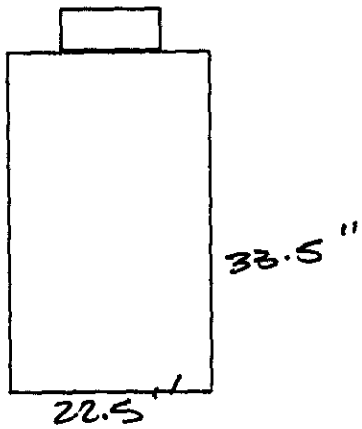
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.0438E-004	2.04E-004	8.4988E-005
		1332.49	100.00	2.0663E-004		5.9200E-005
	CS-134	475.35	1.46	2.1880E-002	2.47E-004	-1.4223E-002
		563.23	8.38	3.1188E-003		-4.5782E-003
		569.32	15.43	1.8019E-003		1.3995E-003
		604.70	97.60	3.2487E-004		-1.7838E-004
		795.84	85.40	2.4726E-004		-1.2165E-004
		801.93	8.73	2.5110E-003		9.9906E-005
		1038.57	1.00	1.9905E-002		4.2714E-003
		1167.94	1.80	1.1241E-002		7.7495E-003
		1365.15	3.04	5.9367E-003		-8.7671E-004
+	CS-137	661.65*	85.12	1.7240E-004	1.72E-004	4.3910E-004
+	NP-237	300.17*	6.20	8.8651E-003	1.44E-003	1.9090E-001
		312.00*	36.00	1.4428E-003		1.9952E-001
		340.60*	4.20	1.0787E-002		2.0161E-001
		375.45*	0.68	5.4070E-002		2.4038E+000
		415.76*	1.75	1.6068E-002		1.8966E-001
+	Pu-239	129.28*	0.01	2.6578E+001	1.89E+001	1.0431E+003
		375.00*	0.00	2.3236E+001		1.0330E+003
		413.70*	0.00	1.8850E+001		1.1724E+003
		451.50*	0.00	1.1607E+002		1.1361E+003
+	AM-241	59.54*	35.70	3.2032E-001	3.20E-001	9.4654E+002
		125.28*	0.00	4.5632E+001		6.2062E+002
		335.40*	0.00	9.4757E+001		8.4861E+002
		662.42*	0.00	4.0695E+001		6.2157E+002
		722.70*	0.00	1.0386E+002		9.5302E+002
+	PU-241	114.00*	0.02	1.0553E+001	1.06E+001	6.5363E+001
		332.60*	0.00	1.6442E+001		2.5774E+002
	CM-243	209.70	3.27	5.3140E-002	6.66E-003	8.7636E-001
		228.18	10.56	9.8949E-003		1.0802E-003
		277.60	14.00	6.6575E-003		-1.2324E-002

+ = 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	2.18E+000 +/- 6.19E-002

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



GROSS 141.40
TARE 26.308
NET 115.101

Put Dimensions on Bottle

.5528

Item ID: 2335-01-0096

Weight (kg): 311.1

Material Description: Samples in Drum

Packaging: 55 Gal Drum

Detector Distance (in): 24'

Detector Filters: None

Dose Rate: <.5

Comments: 4 Counts TOTAL 1800 SEC 0934/3 0933 11-6-01

```
#Date & Time: Wed Jan 02 10:55:09 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0096
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLES  ~3den=0.5528    ~3con=1
~sd1=24
```

233-S Item Analysis Spreadsheet Version 3.0b 1/14/02

Sample Info:

Item ID: 23s-01-0096
File Name: 933

Assay Date: 6-Nov-01
File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	5.56E+02	4.47E+01
Am-241	4.33E+02	3.77E+01
Np-237	6.03E-02	2.97E-03
U-238		
U-235		
Cs-137		
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal
Item Type: Barrel
Calcs: Use 1st

Dimensions:

Length (in): 33.5
Weight (lbs): 253.22
Width (in): 22.5
Depth for TMU (in): 4
Depth (in): 22.5
% Volume: 50

Am-241 Calcs:

Measured	4.33E+02	+/-	1.31E+03	Use Meas
Calculated	7.69E+02	+/-	8.33E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.25E+02	+/-	9.47E+01
Pu-239	5.56E+02	+/-	2.34E+02
Pu-240	2.89E+02	+/-	1.22E+02
Pu-241	1.08E+03	+/-	4.55E+02
Pu-242	2.92E-01	+/-	1.23E-01
Am-241	4.33E+02	+/-	1.31E+03
Np-237	6.03E-02	+/-	2.51E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	0.00E+00	+/-	0.00E+00
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.50E+03	+/-	1.34E+03	Calc from Pu-239 Act
Pu (g):	1.19E+00	**Pu (g) + 3 sigma TMU:**		2.69E+00	
		Pu(g) + 3 sigma:		1.48E+00	

Comments:

Errors:

Analyst: Martin Winterrose
Date: 3/20/02

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

Report Generated On : 1/02/02 10:56:14 AM

Sample Title : 233s-01-0096 @270
Spectrum Description :
Sample Identification : 0933
Sample Size : 115.1 kg

Sample Taken On : 11/06/01 2:28:00 PM
Acquisition Started : 11/06/01 2:28:09 PM

Live Time: 1800.0 seconds Real Time: 1887.7 seconds

ISOCS Calabration : 233S-01-0096
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/02/02

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	239.24	59.89	2.24E+006	79772.5	3.88E+004
2	292.96	73.32	2.96E+003	130.26	1.50E+004
3	300.97	75.32	5.32E+003	144.23	1.48E+004
4	340.52	85.21	2.01E+003	210.17	1.31E+004
5	396.26	99.14	1.82E+004	577.80	1.05E+004
6	413.77	103.51	1.07E+004	430.72	9.70E+003
7	445.47	111.44	3.07E+003	165.54	9.11E+003
8	460.02	115.07	1.90E+003	204.14	8.63E+003
9	476.61	119.22	9.14E+002	215.86	8.12E+003
10	502.58	125.71	3.49E+003	191.04	7.20E+003
11	518.67	129.73	1.02E+004	127.88	6.47E+003
12	576.47	144.17	3.58E+002	93.76	5.11E+003
13	586.72	146.74	3.90E+002	90.39	4.97E+003
14	595.54	148.94	1.30E+003	78.18	4.85E+003
15	643.54	160.94	3.65E+002	60.45	4.18E+003
16	659.78	165.00	3.98E+002	61.69	3.95E+003
17	815.53	203.92	1.28E+003	57.13	2.34E+003
18	833.45	208.40	5.67E+003	87.75	2.17E+003
19	1202.02	300.51	1.35E+003	51.18	9.29E+002
20	1248.92	312.23	8.18E+003	95.47	8.06E+002
21	1332.33	333.08	1.43E+003	45.96	6.55E+002
22	1343.54	335.88	6.88E+002	37.12	6.43E+002
23	1363.92	340.97	9.84E+002	92.39	6.12E+002
24	1380.20	345.04	9.42E+002	121.07	5.87E+002
25	1474.85	368.70	4.30E+002	36.99	4.49E+002
26	1501.39	375.33	2.81E+003	294.07	4.13E+002
27	1502.55	375.62	1.73E+003	441.74	4.11E+002
28	1521.69	380.40	5.64E+002	61.61	3.81E+002
29	1533.63	383.39	4.91E+002	45.68	3.60E+002
30	1573.15	393.26	1.01E+003	36.47	3.20E+002
31	1595.05	398.74	2.59E+002	22.68	2.84E+002
32	1656.34	414.06	2.85E+003	56.33	2.31E+002
33	1664.60	416.12	3.03E+002	25.18	2.17E+002

34	1691.72	422.90	1.81E+002	19.86	2.05E+002
35	1807.49	451.83	3.54E+002	22.59	1.59E+002
36	2044.13	510.97	2.17E+002	18.85	1.03E+002
37	2333.86	583.38	1.18E+002	13.96	8.04E+001
38	2438.65	609.57	8.86E+001	12.73	7.88E+001
39	2650.52	662.52	3.50E+002	21.35	6.24E+001
40	2889.66	722.29	1.57E+002	15.03	5.18E+001
41	5849.37	1461.97	5.91E+002	24.97	6.87E+000
42	7066.33	1766.11	4.55E+001	8.09	1.14E+000

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
NP-237	0.997	300.17*	6.20	5.72350E-002	3.50748E-003
		312.00*	36.00	6.03379E-002	2.96893E-003
		340.60*	4.20	6.41518E-002	6.71602E-003
		375.45*	0.68	1.17392E+000	1.33279E-001
		415.76*	1.75	5.11482E-002	4.74399E-003
Pu-239	0.993	129.28*	0.01	5.19621E+002	8.74857E+001
		375.00*	0.00	5.04489E+002	6.55709E+001
		413.70*	0.00	5.55684E+002	4.47450E+001
		451.50* @	0.00	5.68196E+002	4.25366E+001
AM-241	0.995	59.54*	35.70	4.33178E+002	3.77096E+001
		125.28*	0.00	2.87172E+002	2.09849E+001
		335.40*	0.00	3.78298E+002	2.69803E+001
		662.42* @	0.00	3.34112E+002	2.28963E+001
		722.70*	0.00	4.25490E+002	4.27674E+001
PU-241	0.959	114.00*	0.02	3.12894E+001	3.77386E+000
		332.60*	0.00	1.33832E+002	7.60274E+000

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
X	CS-137	0.970		
	NP-237	0.997	5.810740E-002	1.955938E-003
	Pu-239 @	0.993	5.322611E+002	1.705859E+001
	AM-241 @	0.995	3.491763E+002	1.429366E+001
	PU-241	0.959	5.156066E+001	3.380321E+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 *****
****

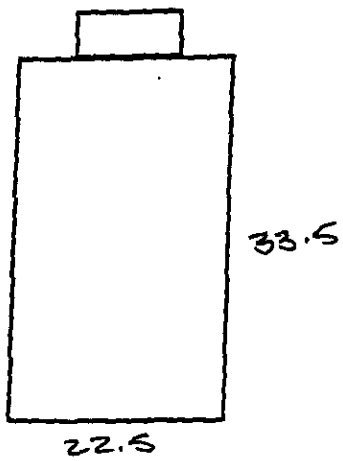
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.9919E-004	1.73E-004	-3.8605E-005
		1332.49	100.00	1.7348E-004		5.5809E-005
	CS-134	475.35	1.46	1.9703E-002	2.47E-004	2.1283E-002
		563.23	8.38	3.0580E-003		2.6062E-004
		569.32	15.43	1.6995E-003		-1.0621E-005
		604.70	97.60	2.8648E-004		6.7371E-005
		795.84	85.40	2.4739E-004		-6.7129E-005
		801.93	8.73	2.3930E-003		-2.0975E-003
		1038.57	1.00	1.9844E-002		9.2145E-003
		1167.94	1.80	1.1363E-002		7.2257E-003
		1365.15	3.04	5.2957E-003		-2.0681E-003
	CS-137	661.65*	85.12	1.5917E-004	1.59E-004	1.4131E-003
+	NP-237	300.17*	6.20	6.1089E-003	9.94E-004	5.7235E-002
		312.00*	36.00	9.9379E-004		6.0338E-002
		340.60*	4.20	7.6781E-003		6.4152E-002
		375.45*	0.68	4.0639E-002		1.1739E+000
		415.76*	1.75	1.2014E-002		5.1148E-002
+	Pu-239	129.28*	0.01	1.9146E+001	1.43E+001	5.1962E+002
		375.00*	0.00	1.7465E+001		5.0449E+002
		413.70*	0.00	1.4302E+001		5.5568E+002
		451.50*	0.00	9.8614E+001		5.6820E+002
+	AM-241	59.54*	35.70	1.7756E-001	1.78E-001	4.3318E+002
		125.28*	0.00	3.2693E+001		2.8717E+002
		335.40*	0.00	6.6396E+001		3.7830E+002
		662.42*	0.00	3.7636E+001		3.3411E+002
		722.70*	0.00	9.7999E+001		4.2549E+002
+	PU-241	114.00*	0.02	7.1780E+000	7.18E+000	3.1289E+001
		332.60*	0.00	1.1434E+001		1.3383E+002
	CM-243	209.70	3.27	3.6648E-002	4.62E-003	4.1300E-001
		228.18	10.56	6.9179E-003		-4.6588E-003
		277.60	14.00	4.6202E-003		-3.0940E-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	9.88E-001 +/- 3.17E-002

Bldg 233s
NDA Item Description Sheet
Bottle Geometry



Put Dimensions on Bottle

GROSS 137.27
TARE 26.308
NET 110.96
.5329

Item ID: 2335-01-0097

Weight (kg): 302.663

Material Description: SAMPLES IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: 4.5

Comments: 4 COUNT FOR A TOTAL OF 1800 SEC 0937 (MW) 11-6-01

1000-010802-0001

```
#Date & Time: Wed Jan 02 11:02:21 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0097
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLES  ~3den=0.5329    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0097

File Name: 932

Assay Date: 6-Nov-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	6.78E+02	5.81E+01
Am-241	4.62E+02	3.68E+01
Np-237	1.07E-01	5.20E-03
U-238		
U-235		
Cs-137		
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 244.11

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	4.62E+02	+/-	1.40E+03	Use Meas
Calculated	9.38E+02	+/-	1.02E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.75E+02	+/-	1.16E+02
Pu-239	6.78E+02	+/-	2.86E+02
Pu-240	3.53E+02	+/-	1.49E+02
Pu-241	1.32E+03	+/-	5.56E+02
Pu-242	3.57E-01	+/-	1.50E-01
Am-241	4.62E+02	+/-	1.40E+03
Np-237	1.07E-01	+/-	4.42E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	0.00E+00	+/-	0.00E+00
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.77E+03	+/-	1.44E+03	Calc from Pu-239 Act
Pu (g): 1.40E+00	**Pu (g) + 3 sigma TMU:**		3.17E+00	
	Pu(g) + 3 sigma:		1.76E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 1/02/02 11:03:54 AM

Sample Title : 233s-01-0097 @270
Spectrum Description :
Sample Identification : 0932
Sample Size : 111.0 kg

Sample Taken On : 11/06/01 11:45:00 AM
Acquisition Started : 11/06/01 11:45:58 AM

Live Time: 1800.0 seconds Real Time: 1882.2 seconds

ISOCS Calabration : 233S-01-0097
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/02/02

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	237.82	59.54	2.28E+006	1875.27	3.38E+005
M	2	292.46	73.20	3.29E+003	109.74	1.53E+004
m	3	301.07	75.35	6.14E+003	123.99	1.81E+004
	4	341.00	85.33	3.80E+003	277.92	2.10E+004
M	5	380.17	95.12	7.42E+003	207.67	2.01E+004
m	6	396.25	99.14	2.70E+004	541.28	2.84E+004
m	7	413.74	103.51	1.55E+004	321.26	2.37E+004
M	8	445.82	111.52	5.08E+003	171.47	1.24E+004
m	9	460.71	115.24	3.88E+003	135.57	1.47E+004
m	10	476.74	119.25	1.98E+003	93.38	1.37E+004
m	11	502.46	125.68	3.80E+003	133.50	1.29E+004
m	12	518.75	129.75	1.16E+004	327.34	1.13E+004
M	13	578.34	144.64	5.44E+002	118.90	6.30E+003
m	14	587.97	147.05	5.68E+002	94.83	1.00E+004
m	15	596.55	149.19	8.90E+002	144.72	9.97E+003
M	16	646.06	161.57	3.68E+002	317.09	4.48E+003
m	17	660.76	165.24	3.94E+002	163.31	9.43E+003
M	18	815.69	203.96	1.28E+003	53.50	2.92E+003
m	19	833.57	208.43	4.44E+003	76.03	3.17E+003
	20	1200.67	300.17	2.37E+003	88.53	1.62E+003
	21	1247.99	312.00	1.43E+004	141.63	1.42E+003
	22	1292.00	323.00	3.81E+002	72.06	1.20E+003
M	23	1332.29	333.07	1.50E+003	78.33	9.34E+002
m	24	1343.91	335.97	7.78E+002	46.14	9.09E+002
m	25	1363.57	340.89	1.84E+003	90.55	8.36E+002
m	26	1381.48	345.36	1.33E+003	69.17	7.67E+002
M	27	1474.99	368.73	5.16E+002	31.00	5.87E+002
m	28	1501.78	375.43	3.81E+003	93.25	5.11E+002
m	29	1522.27	380.55	7.03E+002	35.19	4.43E+002
m	30	1532.67	383.15	5.68E+002	31.32	4.22E+002
M	31	1572.88	393.20	1.22E+003	85.98	4.11E+002
m	32	1595.54	398.86	4.68E+002	39.59	3.92E+002
M	33	1656.65	414.13	3.44E+003	122.10	3.07E+002

m 34	1691.73	422.90	2.51E+002	21.54	2.35E+002
35	1806.17	451.50	3.97E+002	31.13	1.73E+002
36	2044.00	510.94	2.07E+002	28.96	1.62E+002
37	2334.00	583.41	1.18E+002	20.56	8.40E+001
38	2439.00	609.66	1.42E+002	23.28	1.00E+002
39	2650.12	662.42	3.58E+002	28.69	1.20E+002
40	2891.32	722.70	1.30E+002	21.62	9.01E+001
41	3647.00	911.56	6.00E+001	15.58	5.20E+001
42	7068.00	1766.53	3.68E+001	9.04	1.22E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
NP-237	1.000	300.17*	6.20	1.00948E-001	6.16382E-003
		312.00*	36.00	1.06581E-001	5.20384E-003
		340.60*	4.20	1.21085E-001	8.18772E-003
Pu-239	0.992	129.28*	0.01	5.93042E+002	1.00962E+002
		375.00*	0.00	6.91603E+002	5.59512E+001
		413.70*	0.00	6.77800E+002	5.81223E+001
		451.50* @	0.00	6.44472E+002	5.65185E+001
AM-241	1.000	59.54*	35.70	4.62038E+002	3.67530E+001
		125.28*	0.00	3.14438E+002	1.88095E+001
		335.40*	0.00	4.32795E+002	3.26357E+001
		662.42* @	0.00	3.46206E+002	2.98081E+001
		722.70*	0.00	3.57002E+002	6.04549E+001
PU-241	0.946	114.00*	0.02	6.40721E+001	4.13303E+000
		332.60*	0.00	1.42779E+002	9.99170E+000

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
X	CS-137	0.977		
	NP-237	1.000	1.074523E-001	3.576785E-003
	Pu-239 @	0.992	6.723260E+002	3.743577E+001
	AM-241 @	1.000	3.629890E+002	1.446502E+001
	PU-241	0.946	7.557152E+001	3.819185E+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

NUCLIDE TOTALS

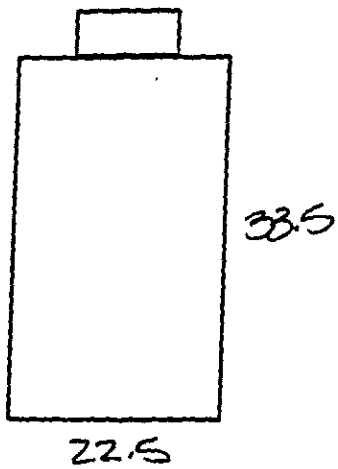
Nuclide	Mass (g)
Pu-239	1.20E+000 +/- 6.70E-002

****
***** 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	2.2315E-004	1.72E-004	8.4187E-005
		1332.49	100.00	1.7170E-004		4.2658E-005
	CS-134	475.35	1.46	1.9140E-002	2.60E-004	1.1580E-003
		563.23	8.38	2.9663E-003		1.9028E-003
		569.32	15.43	1.5941E-003		6.7110E-004
		604.70	97.60	3.0752E-004		1.5805E-005
		795.84	85.40	2.6025E-004		1.7271E-005
		801.93	8.73	2.4468E-003		-7.5007E-004
		1038.57	1.00	1.9359E-002		-1.3732E-002
		1167.94	1.80	1.2080E-002		1.4704E-002
		1365.15	3.04	5.8299E-003		1.1257E-003
	CS-137	661.65*	85.12	3.0153E-004	3.02E-004	1.4642E-003
+	NP-237	300.17*	6.20	1.0499E-002	1.88E-003	1.0095E-001
		312.00*	36.00	1.8773E-003		1.0658E-001
		340.60*	4.20	9.0431E-003		1.2108E-001
+	Pu-239	129.28*	0.01	2.5397E+001	1.66E+001	5.9304E+002
		375.00*	0.00	1.9580E+001		6.9160E+002
		413.70*	0.00	1.6587E+001		6.7780E+002
		451.50*	0.00	1.3223E+002		6.4447E+002
+	AM-241	59.54*	35.70	7.4062E-001	7.41E-001	4.6204E+002
		125.28*	0.00	4.3895E+001		3.1444E+002
		335.40*	0.00	7.9496E+001		4.3279E+002
		662.42*	0.00	7.1296E+001		3.4621E+002
		722.70*	0.00	1.7367E+002		3.5700E+002
+	PU-241	114.00*	0.02	9.3794E+000	9.38E+000	6.4072E+001
		332.60*	0.00	1.3753E+001		1.4278E+002
	CM-243	209.70	3.27	3.6678E-002	5.25E-003	4.9234E-003
		228.18	10.56	7.8504E-003		-3.0774E-003
		277.60	14.00	5.2534E-003		-4.3729E-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

Bldg 233s
NDA Item Description Sheet
~~Bottle~~ Geometry
Drum



Put Dimensions on Bottle

GROSS 133.63
TARE 26.308
NET 107.32
.5155

Item ID: 233S-01-0098

Weight (kg): 2.94 133.63 kg

Material Description: Samples in Drum

Packaging: 55 Gal Drum

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: <.5

Comments: 4 Counts Combined to Total 1800 Sec 0931

1000-010802-0001

```
#Date & Time: Wed Jan 02 11:13:21 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0098
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.5155    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0098

File Name: 931

Assay Date: 6-Nov-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	5.15E+03	4.04E+02
Am-241	3.43E+03	2.73E+02
Np-237	6.86E-01	3.29E-02
U-238		
U-235		
Cs-137	1.39E-02	5.43E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 236.104

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	3.43E+03	+/-	1.04E+04	Use Meas
Calculated	7.13E+03	+/-	7.71E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.09E+03	+/-	8.77E+02
Pu-239	5.15E+03	+/-	2.16E+03
Pu-240	2.68E+03	+/-	1.13E+03
Pu-241	1.00E+04	+/-	4.21E+03
Pu-242	2.71E+00	+/-	1.14E+00
Am-241	3.43E+03	+/-	1.04E+04
Np-237	6.86E-01	+/-	2.85E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.39E-02	+/-	5.76E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.34E+04	+/-	1.07E+04	Calc from Pu-239 Act
Pu (g):	1.03E+01	**Pu (g) + 3 sigma TMU:**		2.33E+01	
		Pu(g) + 3 sigma:		1.27E+01	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 1/02/02 11:15:50 AM

Sample Title : 233s-01-0098 @270
Spectrum Description :
Sample Identification : 0931
Sample Size : 107.3 kg

Sample Taken On : 11/06/01 9:43:00 AM
Acquisition Started : 11/06/01 9:44:16 AM

Live Time: 1800.0 seconds Real Time: 2339.0 seconds

ISOCS Calabration : 233S-01-0098
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/02/02

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	237.82	59.54	1.32E+007	4707.58	2.56E+006
M	2	292.29	73.15	1.45E+004	406.21	2.43E+005
m	3	300.97	75.32	3.44E+004	431.89	2.91E+005
M	4	396.05	99.09	1.55E+005	1633.60	2.21E+005
m	5	413.72	103.50	9.32E+004	1003.62	1.69E+005
M	6	445.67	111.49	3.73E+004	450.78	1.04E+005
m	7	461.13	115.35	3.23E+004	391.13	1.24E+005
m	8	476.77	119.26	5.14E+004	536.57	1.05E+005
m	9	502.27	125.63	2.21E+004	303.00	9.11E+004
m	10	518.57	129.71	8.57E+004	835.02	7.63E+004
M	11	577.54	144.44	5.59E+003	484.21	5.14E+004
m	12	586.21	146.61	4.24E+003	368.94	6.77E+004
m	13	595.59	148.95	8.26E+003	640.58	6.54E+004
M	14	645.77	161.49	2.77E+003	618.13	3.93E+004
m	15	659.82	165.01	2.06E+003	332.04	6.77E+004
m	16	686.05	171.56	2.92E+003	426.25	6.32E+004
M	17	758.05	189.55	1.84E+003	383.31	2.49E+004
m	18	784.10	196.07	2.68E+003	454.06	4.10E+004
M	19	815.46	203.90	1.02E+004	219.86	2.44E+004
m	20	833.33	208.37	3.15E+004	536.75	2.29E+004
	21	978.67	244.69	6.56E+002	225.93	1.49E+004
	22	1023.00	255.77	1.67E+003	216.65	1.34E+004
	23	1072.00	268.02	8.79E+002	185.19	1.11E+004
	24	1200.67	300.17	1.61E+004	269.12	1.41E+004
	25	1247.99	312.00	9.08E+004	380.54	1.35E+004
	26	1295.00	323.75	9.93E+002	119.11	5.20E+003
M	27	1332.21	333.05	1.10E+004	288.98	6.99E+003
m	28	1343.81	335.95	5.32E+003	153.33	7.04E+003
m	29	1363.38	340.84	1.14E+004	291.51	6.63E+003
m	30	1381.18	345.29	9.57E+003	250.52	5.39E+003
M	31	1474.46	368.60	3.76E+003	91.86	4.57E+003
m	32	1485.46	371.35	1.31E+003	64.42	4.68E+003
m	33	1500.00	375.38	2.84E+004	573.48	4.30E+003

m 34	1521.72	380.41	5.49E+003	112.14	3.64E+003
m 35	1532.22	383.04	4.63E+003	98.71	3.67E+003
M 36	1572.86	393.19	9.14E+003	286.82	3.13E+003
m 37	1595.27	398.79	3.19E+003	117.15	2.73E+003
M 38	1656.50	414.09	2.59E+004	151.06	2.27E+003
m 39	1691.56	422.86	1.94E+003	50.00	2.03E+003
m 40	1707.75	426.90	5.62E+002	36.43	1.99E+003
41	1806.17	451.50	3.01E+003	85.72	1.08E+003
42	1895.00	473.70	2.71E+002	59.67	7.72E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2046.00	511.44	5.00E+002	52.71	5.34E+002
44	2334.00	583.41	2.16E+002	34.88	2.76E+002
45	2438.00	609.41	1.41E+002	32.69	2.47E+002
46	2477.00	619.15	3.05E+002	32.66	2.34E+002
M 47	2562.70	640.57	6.75E+001	15.06	2.87E+002
m 48	2585.34	646.23	1.29E+002	16.17	3.83E+002
m 49	2612.34	652.98	2.65E+002	19.23	3.40E+002
50	2650.12	662.42	3.36E+003	77.41	5.40E+002
51	2756.00	688.88	1.70E+002	27.24	1.57E+002
52	2891.32	722.70	9.26E+002	45.52	2.62E+002
53	3026.00	756.36	1.05E+002	23.08	1.10E+002
54	3078.00	769.35	1.30E+002	27.37	1.60E+002
55	3487.00	871.57	1.08E+002	24.61	1.17E+002
56	5103.00	1275.44	1.23E+002	18.94	5.26E+001
57	7066.00	1766.03	5.20E+001	10.50	1.30E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.977	661.65*	85.12	1.39260E-002	5.43019E-004
NP-237	1.000	300.17*	6.20	6.98810E-001	3.56813E-002
		312.00*	36.00	6.86258E-001	3.29371E-002
		340.60*	4.20	7.58418E-001	4.01561E-002
Pu-239	0.993	129.28*	0.01	4.78207E+003	8.04274E+002
		375.00*	0.00	5.21562E+003	4.07995E+002
		413.70*	0.00	5.15496E+003	4.03540E+002
		451.50* @	0.00	4.94180E+003	2.39356E+002
AM-241	1.000	59.54*	35.70	3.43446E+003	2.73184E+002
		125.28*	0.00	2.00989E+003	1.01218E+002
		335.40*	0.00	2.99613E+003	1.64201E+002
		662.42* @	0.00	3.29272E+003	1.28085E+002
		722.70*	0.00	2.58245E+003	1.49692E+002
PU-241	0.936	114.00*	0.02	5.93704E+002	3.29357E+001
		332.60*	0.00	1.06274E+003	5.69459E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.977	3.643139E-003	6.215028E-004
NP-237	1.000	7.097218E-001	2.072840E-002
Pu-239 @	0.993	5.139472E+003	2.702287E+002
AM-241 @	1.000	2.431321E+003	7.203310E+001
PU-241	0.936	7.112738E+002	2.851061E+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

NUCLIDE TOTALS

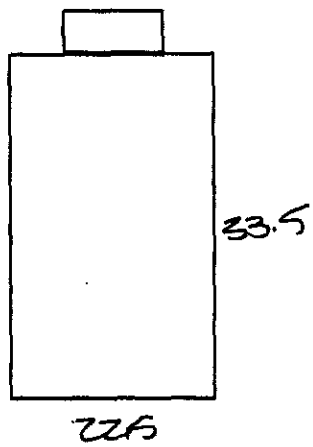
Nuclide	Mass (g)
Pu-239	8.90E+000 +/- 4.68E-001

****
***** 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	2.2375E-004	2.04E-004	-3.5373E-004
		1332.49	100.00	2.0403E-004		-6.4105E-005
	CS-134	475.35	1.46	4.0348E-002	2.73E-004	2.3289E-002
		563.23	8.38	4.7780E-003		7.8543E-004
		569.32	15.43	2.7203E-003		1.7581E-004
		604.70	97.60	4.3894E-004		4.3560E-005
		795.84	85.40	2.7310E-004		-4.2276E-004
		801.93	8.73	2.9079E-003		1.3591E-003
		1038.57	1.00	2.5140E-002		4.2665E-003
		1167.94	1.80	1.3004E-002		1.1560E-002
		1365.15	3.04	6.0730E-003		1.0350E-003
+	CS-137	661.65*	85.12	7.1059E-004	7.11E-004	1.3926E-002
+	NP-237	300.17*	6.20	3.3980E-002	5.80E-003	6.9881E-001
		312.00*	36.00	5.8037E-003		6.8626E-001
		340.60*	4.20	2.5476E-002		7.5842E-001
+	Pu-239	129.28*	0.01	7.1865E+001	4.47E+001	4.7821E+003
		375.00*	0.00	5.6529E+001		5.2156E+003
		413.70*	0.00	4.4680E+001		5.1550E+003
		451.50*	0.00	3.5992E+002		4.9418E+003
+	AM-241	59.54*	35.70	2.5776E+000	2.58E+000	3.4345E+003
		125.28*	0.00	1.2788E+002		2.0099E+003
		335.40*	0.00	2.2158E+002		2.9961E+003
		662.42*	0.00	1.6802E+002		3.2927E+003
		722.70*	0.00	3.1799E+002		2.5825E+003
+	PU-241	114.00*	0.02	3.0110E+001	3.01E+001	5.9370E+002
		332.60*	0.00	3.7679E+001		1.0627E+003
	CM-243	209.70	3.27	1.0145E-001	1.40E-002	1.7982E-002
		228.18	10.56	2.1118E-002		-3.6982E-003
		277.60	14.00	1.4047E-002		-3.1248E-002

+ = 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

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



GROSS 156
TARE 26.308
NET 129.692
16229

Put Dimensions on Bottle

Item ID: 2335-01-0099

Weight (kg): 343.2

Material Description: Samples in Drum

Packaging: 55 Gal Drum

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: <.5

Comments:

```
#Date & Time: Wed Jan 02 11:35:05 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0099
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLES  ~3den=0.6229    ~3con=1
~sd1=24
```

233-S Item Analysis Spreadsheet Version 3.0b 1/14/02

Sample Info:

Item ID:	233s-01-0099	**Assay Date:**	8-Nov-01
File Name:	943	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	3.43E+02	2.82E+01		
Am-241	2.97E+02	3.57E+01		
Np-237	5.52E-02	2.75E-03		
U-238				
U-235				
Cs-137	1.42E-03	9.47E-05		
Co-60				

Item Parameters:

Contamination: Internal Item Type: Barrel Calcs: Use 1st

Dimensions:

Length (in):	33.5	Width (in):	22.5	Depth (in):	22.5
Weight (lbs):	285.32	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	2.97E+02	+/-	8.99E+02	Use Meas
Calculated	4.75E+02	+/-	5.15E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.39E+02	+/-	5.86E+01
Pu-239	3.43E+02	+/-	1.45E+02
Pu-240	1.79E+02	+/-	7.53E+01
Pu-241	6.69E+02	+/-	2.81E+02
Pu-242	1.81E-01	+/-	7.61E-02
Am-241	2.97E+02	+/-	8.99E+02
Np-237	5.52E-02	+/-	2.29E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.42E-03	+/-	5.93E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	9.59E+02	+/-	9.16E+02	Calc from Pu-239 Act	
Pu (g):	8.29E-01	**Pu (g) + 3 sigma TMU:**	1.88E+00		
		Pu(g) + 3 sigma:	1.03E+00		

Comments: Errors:

Analyst: Martin Winterrose **Date:** 3/20/02

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

Report Generated On : 1/02/02 11:36:12 AM

Sample Title : 233s-01-0099 @ 270
Spectrum Description :
Sample Identification : 0943
Sample Size : 129.7 kg

Sample Taken On : 11/08/01 11:40:00 AM
Acquisition Started : 11/08/01 11:41:05 AM

Live Time: 1800.0 seconds Real Time: 1851.3 seconds

ISOCS Calabration : 233S-01-0099
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/02/02

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	239.24	59.90	1.37E+006	48472.6	1.96E+004
2	292.04	73.09	2.28E+003	135.65	8.61E+003
3	301.09	75.35	4.49E+003	162.85	8.59E+003
4	340.05	85.09	1.64E+003	177.96	8.21E+003
5	396.23	99.13	1.36E+004	557.13	7.47E+003
6	413.69	103.49	8.24E+003	390.21	7.20E+003
7	445.67	111.49	2.29E+003	147.89	7.12E+003
8	460.15	115.10	1.52E+003	154.95	6.83E+003
9	502.60	125.71	2.64E+003	150.81	5.75E+003
10	518.64	129.72	7.26E+003	140.50	5.30E+003
11	576.92	144.29	2.77E+002	75.64	4.37E+003
12	659.58	164.95	2.79E+002	54.56	3.35E+003
13	815.44	203.90	8.62E+002	50.17	1.95E+003
14	833.39	208.39	4.58E+003	80.02	1.79E+003
15	1201.66	300.42	1.27E+003	48.04	7.15E+002
16	1248.75	312.19	7.71E+003	106.41	6.06E+002
17	1291.68	322.92	1.54E+002	24.03	5.09E+002
18	1332.20	333.05	9.29E+002	38.34	4.95E+002
19	1343.39	335.84	5.31E+002	33.65	4.80E+002
20	1363.06	340.76	7.99E+002	91.27	4.56E+002
21	1379.54	344.88	5.46E+002	97.28	4.16E+002
22	1474.72	368.66	3.00E+002	27.09	3.09E+002
23	1501.52	375.36	2.00E+003	196.67	2.89E+002
24	1503.25	375.80	2.77E+002	210.46	2.88E+002
25	1521.38	380.33	3.11E+002	46.59	2.74E+002
26	1533.17	383.27	3.70E+002	36.74	2.65E+002
27	1573.00	393.23	6.70E+002	30.57	2.36E+002
28	1595.27	398.79	2.37E+002	21.41	2.17E+002
29	1655.92	413.95	1.82E+003	45.76	1.78E+002
30	1664.16	416.01	3.72E+002	25.27	1.73E+002
31	1691.23	422.77	1.46E+002	17.65	1.57E+002
32	1806.69	451.63	1.94E+002	18.60	1.34E+002
33	2041.34	511.02	1.31E+002	18.21	9.91E+001

34	2333.33	583.25	7.89E+001	12.42	7.98E+001
35	2438.16	609.45	1.69E+002	15.68	7.27E+001
36	2649.29	662.21	3.68E+002	21.58	5.87E+001
37	2888.61	722.02	1.15E+002	13.31	4.99E+001
38	3646.72	911.49	7.64E+001	10.85	3.55E+001
39	5848.50	1461.75	5.62E+002	24.49	7.50E+000
40	7065.52	1765.91	6.99E+001	9.34	3.61E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.988	661.65*	85.12	1.42478E-003	9.47224E-005
NP-237	0.998	300.17*	6.20	5.20171E-002	3.19233E-003
		312.00*	36.00	5.52117E-002	2.74714E-003
		340.60*	4.20	5.05267E-002	6.22715E-003
		375.45*	0.68	8.10680E-001	8.71988E-002
		415.76*	1.75	6.06026E-002	4.81935E-003
Pu-239	0.994	129.28*	0.01	3.63688E+002	6.14679E+001
		375.00*	0.00	3.48387E+002	4.34763E+001
		413.70*	0.00	3.43403E+002	2.81584E+001
		451.50* @	0.00	3.00975E+002	3.11283E+001
AM-241	0.995	59.54*	35.70	2.63476E+002	2.29248E+001
		125.28*	0.00	2.14461E+002	1.60527E+001
		335.40*	0.00	2.83259E+002	2.22927E+001
		662.42* @	0.00	3.36880E+002	2.23781E+001
		722.70*	0.00	2.96872E+002	3.56953E+001
PU-241	0.957	114.00*	0.02	2.48214E+001	2.86305E+000
		332.60*	0.00	8.45970E+001	5.27781E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.988	3.716629E-004	1.050816E-004
NP-237	0.998	5.451123E-002	1.826970E-003
Pu-239 @	0.994	3.498372E+002	1.170163E+001
AM-241 @	0.995	2.490025E+002	1.079554E+001
PU-241	0.957	3.841233E+001	2.516610E+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 *****
****

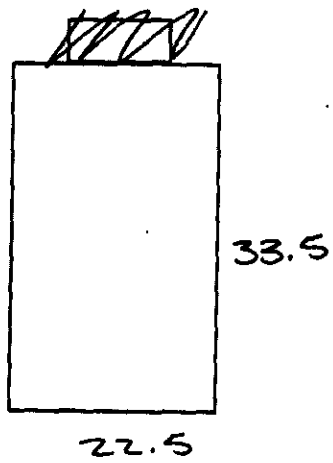
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.0113E-004	1.58E-004	-3.5175E-005
		1332.49	100.00	1.5815E-004		-3.9126E-005
	CS-134	475.35	1.46	1.8379E-002	2.51E-004	-1.8162E-002
		563.23	8.38	3.0504E-003		2.5939E-003
		569.32	15.43	1.5755E-003		-1.4861E-003
		604.70	97.60	2.9819E-004		-1.7549E-004
		795.84	85.40	2.5083E-004		2.1859E-004
		801.93	8.73	2.2696E-003		-3.6517E-003
		1038.57	1.00	1.9837E-002		-1.9979E-002
		1167.94	1.80	1.1205E-002		8.9680E-003
		1365.15	3.04	4.9615E-003		-5.0426E-003
+	CS-137	661.65*	85.12	1.4826E-004	1.48E-004	1.4248E-003
+	NP-237	300.17*	6.20	5.2196E-003	8.39E-004	5.2017E-002
		312.00*	36.00	8.3950E-004		5.5212E-002
		340.60*	4.20	6.4492E-003		5.0527E-002
		375.45*	0.68	3.3067E-002		8.1068E-001
		415.76*	1.75	1.0437E-002		6.0603E-002
+	Pu-239	129.28*	0.01	1.7111E+001	1.22E+001	3.6369E+002
		375.00*	0.00	1.4210E+001		3.4839E+002
		413.70*	0.00	1.2176E+001		3.4340E+002
		451.50*	0.00	8.7476E+001		3.0097E+002
+	AM-241	59.54*	35.70	1.2609E-001	1.26E-001	2.6348E+002
		125.28*	0.00	2.8862E+001		2.1446E+002
		335.40*	0.00	5.5872E+001		2.8326E+002
		662.42*	0.00	3.5056E+001		3.3688E+002
		722.70*	0.00	9.2217E+001		2.9687E+002
+	PU-241	114.00*	0.02	6.3152E+000	6.32E+000	2.4821E+001
		332.60*	0.00	9.6806E+000		8.4597E+001
	CM-243	209.70	3.27	3.2642E-002	4.21E-003	3.0654E-001
		228.18	10.56	6.2414E-003		-5.2261E-003
		277.60	14.00	4.2054E-003		1.0248E-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	7.32E-001 +/- 2.45E-002

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



GROSS 127.5
TARE 26.308
NET 101.192
DENSITY .474585

Put Dimensions on Bottle

Item ID: 2335-01-0130

Weight (kg): 280.5

Material Description: SAMPLE IN DRUM

Packaging: 55 gal DRUM

Detector Distance (in): 24

Detector Filters: 6.5 N

Dose Rate: _____

Comments: 1800 / ~~1800~~ SEC 1003 1002
DRUM ON ROTATED FOR COUNT
2 REPLICATE
1800 SEC 1004

```
#Date & Time: Wed Jan 02 12:52:23 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0130
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLES  ~3den=0.47438   ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0130

File Name: 1003

Assay Date: 10-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.38E+02	1.23E+01		
Am-241	8.27E+01	7.12E+00		
Np-237	2.61E-02	1.33E-03		
U-238				
U-235				
Cs-137	9.65E-04	7.87E-05		
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Width (in): 22.5

Depth (in): 22.5

Weight (lbs): 222.62

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	8.27E+01	+/-	2.50E+02	Use Meas
Calculated	1.90E+02	+/-	2.07E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	5.57E+01	+/-	2.35E+01
Pu-239	1.38E+02	+/-	5.81E+01
Pu-240	7.16E+01	+/-	3.03E+01
Pu-241	2.68E+02	+/-	1.13E+02
Pu-242	7.24E-02	+/-	3.06E-02
Am-241	8.27E+01	+/-	2.50E+02
Np-237	2.61E-02	+/-	1.08E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.65E-04	+/-	4.06E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	3.48E+02	+/-	2.60E+02	Calc from Pu-239 Act
Pu (g):	2.59E-01	**Pu (g) + 3 sigma TMU:**	5.87E-01	
		Pu(g) + 3 sigma:	3.28E-01	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 1/02/02 12:53:42 PM

Sample Title : 233s-01-0130
Spectrum Description :
Sample Identification : 1003
Sample Size : 101.2 kg

Sample Taken On : 12/10/01 12:31:00 PM
Acquisition Started : 12/10/01 12:31:55 PM

Live Time: 1800.0 seconds Real Time: 1817.8 seconds

ISOCS Calabration : 233S-01-0130
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/02/02

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	239.08	59.80	4.32E+005	14384.7	7.04E+003
2	340.11	85.07	9.45E+002	112.65	4.51E+003
3	379.52	94.92	1.16E+003	90.90	4.55E+003
4	395.84	99.00	4.17E+003	167.01	4.52E+003
5	413.58	103.44	1.99E+003	150.38	4.46E+003
6	444.99	111.29	9.16E+002	75.05	4.30E+003
7	460.05	115.06	5.26E+002	78.62	4.20E+003
8	491.32	122.87	1.98E+002	61.14	3.94E+003
9	504.27	126.11	5.20E+002	114.49	3.82E+003
10	518.31	129.62	2.56E+003	124.80	3.69E+003
11	832.97	208.30	9.37E+002	49.04	1.03E+003
12	1200.98	300.32	6.24E+002	32.28	4.51E+002
13	1248.04	312.09	3.47E+003	62.80	3.96E+002
14	1331.80	333.03	2.91E+002	24.48	3.02E+002
15	1342.94	335.81	1.55E+002	21.59	2.90E+002
16	1362.87	340.80	3.76E+002	35.32	2.68E+002
17	1378.28	344.65	1.87E+002	32.11	2.41E+002
18	1407.54	351.97	1.13E+002	17.56	2.03E+002
19	1500.61	375.24	8.39E+002	32.83	1.96E+002
20	1521.26	380.40	1.35E+002	18.31	1.75E+002
21	1531.28	382.91	1.45E+002	17.64	1.75E+002
22	1572.27	393.16	2.49E+002	20.05	1.64E+002
23	1594.22	398.65	1.27E+002	16.59	1.56E+002
24	1655.17	413.89	6.88E+002	29.65	1.56E+002
25	1663.42	415.95	1.16E+002	16.88	1.55E+002
26	1805.79	451.55	7.70E+001	13.47	1.14E+002
27	2042.56	510.75	1.23E+002	15.21	9.60E+001
28	2332.51	583.25	6.53E+001	11.84	6.34E+001
29	2437.32	609.46	1.39E+002	14.94	6.12E+001
30	2646.92	661.87	2.31E+002	17.35	5.25E+001
31	3644.12	911.21	7.85E+001	10.88	3.29E+001
32	5845.02	1461.53	5.24E+002	23.57	7.79E+000
33	7062.54	1765.96	5.38E+001	8.38	1.04E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.998	661.65*	85.12	9.65303E-004	7.87493E-005
NP-237	0.999	300.17*	6.20	2.68673E-002	1.90093E-003
		312.00*	36.00	2.61047E-002	1.33445E-003
		340.60*	4.20	2.50876E-002	2.62588E-003
		375.45*	0.68	3.59330E-001	2.11750E-002
		415.76*	1.75	2.01734E-002	3.04150E-003
Pu-239	0.996	129.28*	0.01	1.29869E+002	2.27071E+001
		375.00*	0.00	1.54421E+002	1.33521E+001
		413.70*	0.00	1.37503E+002	1.22633E+001
		451.50* @	0.00	1.27227E+002	2.27933E+001
AM-241	0.997	59.54*	35.70	8.26582E+001	7.12311E+000
		125.28*	0.00	4.24115E+001	9.56566E+000
		335.40*	0.00	8.71043E+001	1.28047E+001
		662.42* @	0.00	2.28241E+002	1.86096E+001
		722.70	0.00		
PU-241	0.960	114.00*	0.02	8.63901E+000	1.37344E+000
		332.60*	0.00	2.78862E+001	2.68654E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.998	6.632305E-004	8.174073E-005
NP-237	0.999	2.560691E-002	9.565205E-004
Pu-239 @	0.996	1.368048E+002	5.006653E+000
AM-241 @	0.997	7.142341E+001	5.217359E+000
PU-241	0.960	1.262710E+001	1.222903E+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 *****
****

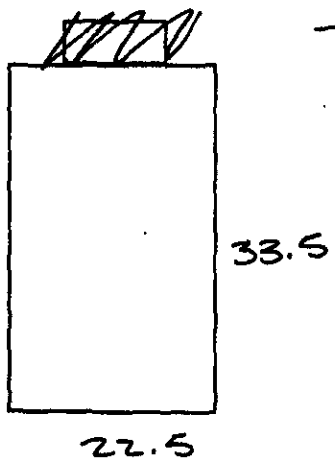
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.3637E-004	1.79E-004	8.1182E-005
		1332.49	100.00	1.7946E-004		7.7008E-005
	CS-134	475.35	1.46	1.8587E-002	2.53E-004	-5.5958E-003
		563.23	8.38	3.0464E-003		2.4357E-003
		569.32	15.43	1.6574E-003		-8.0902E-004
		604.70	97.60	3.1338E-004		-5.6601E-005
		795.84	85.40	2.5283E-004		2.6657E-004
		801.93	8.73	2.6216E-003		3.3332E-004
		1038.57	1.00	2.1744E-002		6.6899E-003
		1167.94	1.80	1.2856E-002		3.1399E-004
		1365.15	3.04	6.2664E-003		-8.7189E-004
+	CS-137	661.65*	85.12	1.5244E-004	1.52E-004	9.6530E-004
+	NP-237	300.17*	6.20	4.3711E-003	7.17E-004	2.6867E-002
		312.00*	36.00	7.1727E-004		2.6105E-002
		340.60*	4.20	5.2606E-003		2.5088E-002
		375.45*	0.68	2.9049E-002		3.5933E-001
		415.76*	1.75	1.0513E-002		2.0173E-002
+	Pu-239	129.28*	0.01	1.4474E+001	1.22E+001	1.2987E+002
		375.00*	0.00	1.2484E+001		1.5442E+002
		413.70*	0.00	1.2174E+001		1.3750E+002
		451.50*	0.00	8.6692E+001		1.2723E+002
+	AM-241	59.54*	35.70	7.5231E-002	7.52E-002	8.2658E+001
		125.28*	0.00	2.3694E+001		4.2411E+001
		335.40*	0.00	4.6094E+001		8.7104E+001
		662.42*	0.00	3.6045E+001		2.2824E+002
		722.70	0.00	2.1042E+002		2.4325E+002
+	PU-241	114.00*	0.02	4.9939E+000	4.99E+000	8.6390E+000
		332.60*	0.00	8.0127E+000		2.7886E+001
	CM-243	209.70	3.27	2.0582E-002	3.20E-003	2.9455E-002
		228.18	10.56	4.9688E-003		4.2858E-004
		277.60	14.00	3.2022E-003		-1.3390E-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	2.23E-001 +/- 8.17E-003

Bldg 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



REPLICATE

GROSS 127.5
TARE 26.308
NET 101.192
DENSITY .474585

Put Dimensions on Bottle

Item ID: 2335-01-0130

Weight (kg): 280.5

Material Description: SAMPLE IN DRUM

Packaging: 55 gal DRUM

Detector Distance (in): 24

Detector Filters: 6.5 M

Dose Rate: _____

Comments: 1800 / ~~1800~~ SEC 1003 1002
DRUM ON ROTATED FOR COUNT
2 REPLICATE
1800 SEC 1004

```
#Date & Time: Wed Jan 02 12:52:23 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0130
~comment=DRUM_WITH_SAMPLES
~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=0.0625    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLES  ~3den=0.47438   ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0130

File Name: 1004

Assay Date: 10-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.51E+02	1.33E+01
Am-241	1.10E+02	2.68E+01
Np-237	2.53E-02	1.53E-03
U-238		
U-235		
Cs-137	7.82E-04	7.15E-05
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5

Weight (lbs): 222.62

Width (in): 22.5

Depth for TMU (in): 4

Depth (in): 22.5

% Volume: 50

Am-241 Calcs:

Measured	1.10E+02	+/-	3.33E+02	Use Meas
Calculated	2.09E+02	+/-	2.27E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.12E+01	+/-	2.58E+01
Pu-239	1.51E+02	+/-	6.37E+01
Pu-240	7.87E+01	+/-	3.32E+01
Pu-241	2.94E+02	+/-	1.24E+02
Pu-242	7.95E-02	+/-	3.35E-02
Am-241	1.10E+02	+/-	3.33E+02
Np-237	2.53E-02	+/-	1.05E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	7.82E-04	+/-	3.30E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		4.01E+02	+/-	3.42E+02	Calc from Pu-239 Act
Pu (g):	2.85E-01	**Pu (g) + 3 sigma TMU:**		6.45E-01	
		Pu(g) + 3 sigma:		3.60E-01	

Comments:

1st count and replicate agree and are acceptable.

Errors:

Analyst: Martin Winterrose

Date: 3/20/02

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

Report Generated On : 1/02/02 12:54:44 PM

Sample Title : 233s-01-0130 Replicate
Spectrum Description :
Sample Identification : 1004
Sample Size : 101.2 kg

Sample Taken On : 12/10/01 1:12:00 PM
Acquisition Started : 12/10/01 1:13:05 PM

Live Time: 1800.0 seconds Real Time: 1817.7 seconds

ISOCS Calabration : 233S-01-0130
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/02/02

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	239.08	59.80	4.28E+005	14683.8	7.02E+003
2	340.35	85.12	1.16E+003	74.23	4.56E+003
3	348.41	87.14	6.61E+002	70.85	4.56E+003
4	379.67	94.96	1.26E+003	80.20	4.51E+003
5	395.78	98.99	4.21E+003	104.84	4.46E+003
6	413.59	103.44	2.00E+003	132.04	4.38E+003
7	445.14	111.33	7.76E+002	84.32	4.19E+003
8	459.60	114.94	5.32E+002	79.28	4.09E+003
9	502.27	125.61	7.98E+002	65.57	3.73E+003
10	518.40	129.64	2.55E+003	77.71	3.58E+003
11	832.99	208.31	9.64E+002	46.69	1.02E+003
12	1201.14	300.36	6.02E+002	32.36	4.42E+002
13	1248.25	312.14	3.36E+003	124.78	3.84E+002
14	1331.42	332.94	3.09E+002	24.61	3.11E+002
15	1342.62	335.74	1.10E+002	20.86	3.03E+002
16	1362.60	340.73	4.05E+002	45.54	2.83E+002
17	1378.27	344.65	1.68E+002	40.66	2.67E+002
18	1500.73	375.27	8.35E+002	32.62	2.08E+002
19	1521.06	380.35	1.57E+002	19.59	1.88E+002
20	1531.76	383.03	1.17E+002	17.69	1.87E+002
21	1571.81	393.04	2.39E+002	20.20	1.82E+002
22	1594.25	398.66	1.16E+002	16.40	1.68E+002
23	1655.01	413.85	7.56E+002	30.65	1.49E+002
24	1663.25	415.91	1.52E+002	17.98	1.45E+002
25	1805.78	451.55	8.93E+001	14.33	1.08E+002
26	2044.05	511.12	1.51E+002	17.13	9.10E+001
27	2332.52	583.25	7.52E+001	12.52	7.10E+001
28	2436.91	609.36	1.44E+002	14.88	5.83E+001
29	2646.64	661.80	1.87E+002	16.03	5.28E+001
30	2888.87	722.36	3.89E+001	9.42	3.60E+001
31	3180.72	795.34	2.76E+001	8.28	2.95E+001
32	4482.35	1120.80	6.02E+001	10.05	2.78E+001
33	5845.11	1461.55	5.21E+002	23.40	8.02E+000

34	7062.83	1766.04	4.68E+001	8.05	2.50E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	7.82305E-004	7.15135E-005
NP-237	0.999	300.17*	6.20	2.59388E-002	1.87342E-003
		312.00*	36.00	2.52651E-002	1.52977E-003
		340.60*	4.20	2.70226E-002	3.28340E-003
		375.45*	0.68	3.57176E-001	2.10428E-002
		415.76*	1.75	2.64224E-002	3.30091E-003
Pu-239	0.996	129.28*	0.01	1.29071E+002	2.20277E+001
		375.00*	0.00	1.53495E+002	1.32704E+001
		413.70*	0.00	1.51269E+002	1.33061E+001
		451.50* @	0.00	1.47523E+002	2.43668E+001
AM-241	0.997	59.54*	35.70	8.19946E+001	7.09693E+000
		125.28*	0.00	6.54853E+001	6.24915E+000
		335.40*	0.00	6.20324E+001	1.20792E+001
		662.42* @	0.00	1.84972E+002	1.69016E+001
		722.70*	0.00	1.09715E+002	2.67729E+001
PU-241	0.968	114.00*	0.02	8.75244E+000	1.38826E+000
		332.60*	0.00	2.96054E+001	2.73694E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	4.765407E-004	7.377501E-005
NP-237	0.999	2.579802E-002	1.055022E-003
Pu-239 @	0.996	1.392272E+002	4.738515E+000
AM-241 @	0.997	7.229639E+001	4.314910E+000
PU-241	0.968	1.301968E+001	1.238098E+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	2.1873E-004	1.77E-004	-9.1435E-005
		1332.49	100.00	1.7679E-004		6.9048E-005
	CS-134	475.35	1.46	1.8786E-002	2.59E-004	2.2850E-003
		563.23	8.38	2.7828E-003		-2.9449E-003
		569.32	15.43	1.6243E-003		1.2574E-003
		604.70	97.60	3.2611E-004		-3.3359E-005
		795.84	85.40	2.5891E-004		1.2952E-004
		801.93	8.73	2.5474E-003		-8.2693E-004
		1038.57	1.00	2.2184E-002		3.1249E-002
		1167.94	1.80	1.2340E-002		-2.6614E-003
		1365.15	3.04	5.6478E-003		1.5427E-003
+	CS-137	661.65*	85.12	1.5289E-004	1.53E-004	7.8231E-004
+	NP-237	300.17*	6.20	4.3330E-003	7.06E-004	2.5939E-002
		312.00*	36.00	7.0649E-004		2.5265E-002
		340.60*	4.20	5.3953E-003		2.7023E-002
		375.45*	0.68	2.9881E-002		3.5718E-001
		415.76*	1.75	1.0180E-002		2.6422E-002
+	Pu-239	129.28*	0.01	1.4255E+001	1.19E+001	1.2907E+002
		375.00*	0.00	1.2841E+001		1.5350E+002
		413.70*	0.00	1.1899E+001		1.5127E+002
		451.50*	0.00	8.4190E+001		1.4752E+002
+	AM-241	59.54*	35.70	7.5140E-002	7.51E-002	8.1995E+001
		125.28*	0.00	2.3548E+001		6.5485E+001
		335.40*	0.00	4.7068E+001		6.2032E+001
		662.42*	0.00	3.6151E+001		1.8497E+002
		722.70*	0.00	8.6355E+001		1.0971E+002
+	PU-241	114.00*	0.02	4.9393E+000	4.94E+000	8.7524E+000
		332.60*	0.00	8.1295E+000		2.9605E+001
	CM-243	209.70	3.27	2.0410E-002	3.30E-003	2.1085E-002
		228.18	10.56	4.8445E-003		-1.3012E-003
		277.60	14.00	3.3037E-003		2.9065E-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	2.27E-001 +/- 7.73E-003