CH0 004

0057665

CANBERRA

CH-004
Batch Data Report
For
233-S ISOCS NDA Assays

Measurement and Analysis by: _____ **Date:** 1/26/02

Data Review by: _____ **Date:** 1/26/02

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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 Nov 5, 2001 through Jan 8, 2002.

All measurements in this batch are 55 gallon drums. The batch includes 15 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 V3b spreadsheet. The Analysis V3b spreadsheet includes both a Pu mass with the 3 sigma TMU included and a Pu mass with the 3 sigma measurement uncertainty included.

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.

During the period of these measurements, the software on the ISOCS system was reloaded from a system backup. The backup contained an earlier energy calibration. This does not cause a problem in the assay measurements and is discussed in a memo included on pages 5 through 8 of this report.

3. Quality Control Results

Daily background and QC check source measurements are performed on the system. Charts for these measurements are on pages 9 - 14 of this report. The control charts cover the period from Oct 28, 2001 – Jan 8, 2002. All measurements for this period are in control.

A replicate count was performed on drum number 233S-01-0043. 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)	21.1
1.96 * Sqrt(unc(orig)^2+unc(rep)^2)	329.9

4. Summary of Results

Full data packages for each drum are included as an attachment beginning on page 15. The following data is a summary of the total TRU activity results and plutonium gram values for each assay. The Pu Mass plus 3 sigma values in the table are based on counting statistics. Pu Mass plus 3 sigma TMU values are reported on the final spreadsheets included in the data packages.

Drum ID		Drum Net Weight (kg)		TRU Act nCi/g		TMU Uncert (nCi/g)		Pu Mass (g)	Pu Mass(g) + 3 sigma
233S-01-0043		67.9		5.03E+3	+/-	2.40E+3		1.92E+0	2.38E+0
233S-01-0043		Replicate		4.96E+3	+/-	2.37E+3		1.90E+0	2.34E+0
233S-01-0100		165.8		9.66E+2	+/-	3.63E+3		9.67E-1	1.21E+0
233S-01-0101		130.0		5.29E+2	+/-	2.53E+2		3.87E-1	4.87E-1
233S-01-0102		161.9		3.36E+3	+/-	2.01E+3		5.07E+0	6.29E+0
233S-01-0103		127.2		1.04E+3	+/-	4.95E+2		7.41E-1	9.29E-1
233S-01-0104		112.0		2.71E+3	+/-	2.15E+3		2.19E+0	2.79E+0
233S-01-0105		54.6		1.53E+3	+/-	4.78E+2		5.88E-1	7.31E-1
233S-01-0106		125.1		5.89E+3	+/-	3.64E+3		5.75E+0	7.11E+0
233S-01-0108		145.6		3.28E+2	+/-	5.48E+2		3.86E-1	4.96E-1
233S-01-0109		111.9		2.66E+2	+/-	1.88E+2		2.24E-1	2.86E-1
233S-01-0110		142.3		3.26E+3	+/-	6.02E+3		3.68E+0	4.55E+0
233S-01-0119		86.7		2.03E+3	+/-	1.36E+3		1.34E+0	1.68E+0
233S-01-0121		126.0		2.37E+3	+/-	2.15E+3		2.04E+0	2.53E+0
233S-01-0122		82.3		3.96E+2	+/-	2.25E+2		2.60E-1	3.29E-1
233S-01-0123		107.1		3.83E+3	+/-	2.88E+3		3.01E+0	3.72E+0

Software Reload Memo

From: Michael G. Cantaloub
To: Bruce Gillespie
Date: 1/25/02

SUBJ: SOFTWARE RELOAD

The energy calibration used for Inspector/Detector combination 7219 was initially performed on 2/27/01. On 11/29/01, as part of routine maintenance, a new energy calibration was performed and applied to the detector. On 1/7/02, the software on the laptop computer used for operating the detector had an unrecoverable fault. To rectify the situation the software was reloaded from backup files. As a consequence of the reload, the 11/19/01 energy calibration was lost and written over by the original 2/27/01 calibration. As such, there is a "window" from 11/29/01 until 1/7/02 where items where the 11/29/01 energy calibration is used. All items assayed after 1/08/02 use the 2/27/01. The difference in energy calibration is minimal.

The 2/27/01 energy calibration is of the form: Energy = 0.10490 + 0.2499·(Channel).

The 11/29/01 energy calibration is of the form: Energy = 0.02252 + 0.2500·(Channel)

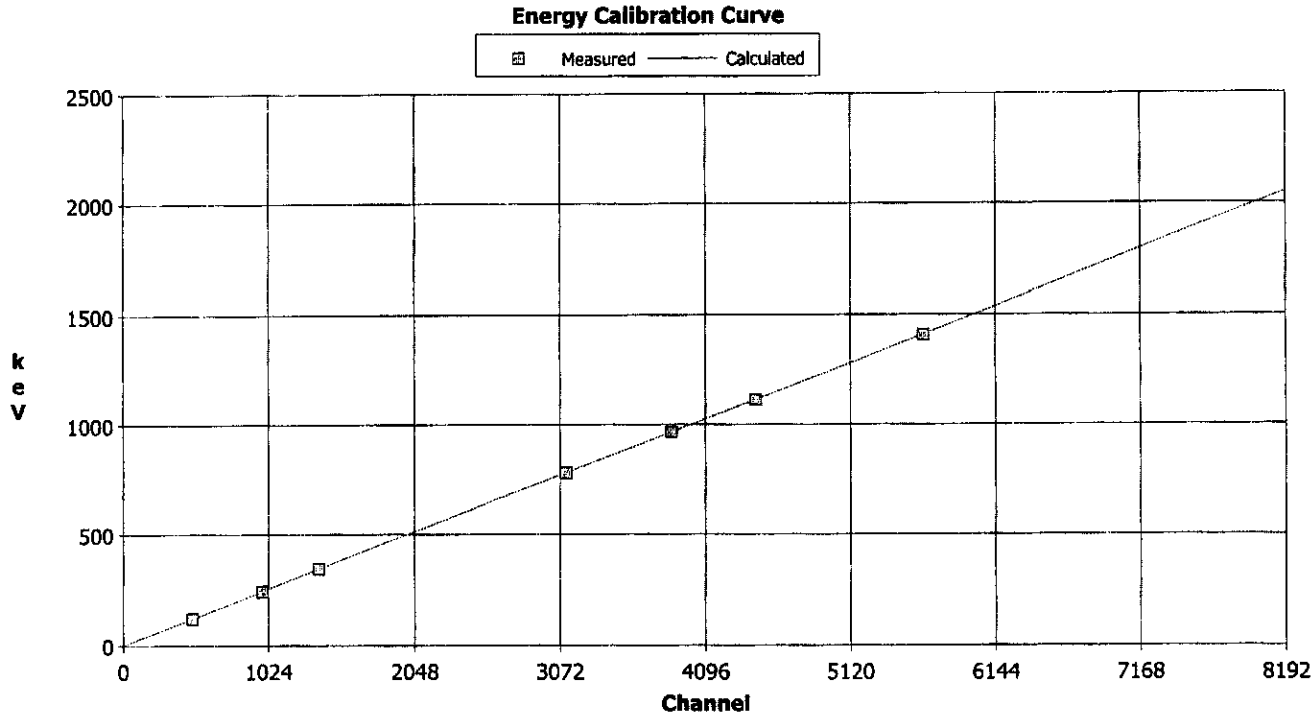
The difference between the calibrations with respect to properly identifying a peak emission is negligible. The table below shows the difference between the two calibrations at select energies or channels.

Energy (keV)	Cal Date 2/27/01	Cal Date 11/29/01	Difference in Energy
60	15.0989	15.02252	0.51%
120	30.0929	30.02252	0.23%
320	80.0729	80.02252	0.06%
420	105.0629	105.0225	0.04%
660	165.0389	165.0225	0.01%

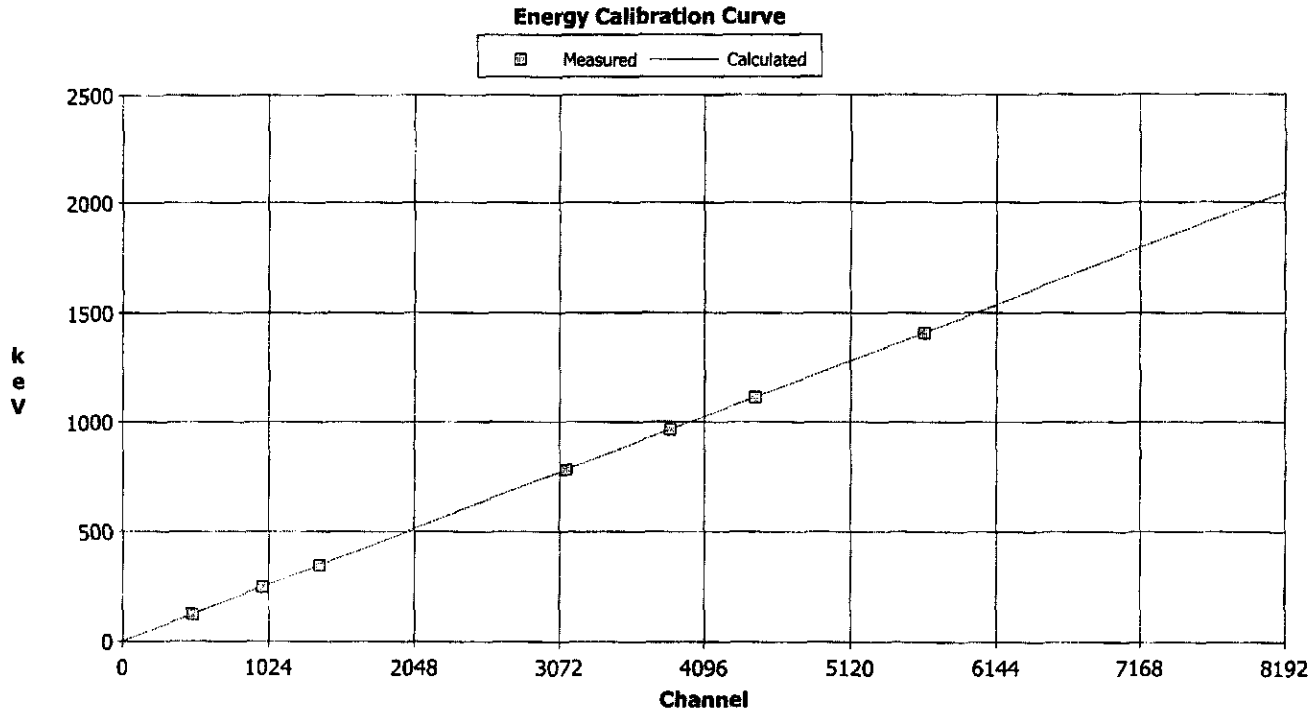
Likewise, the difference in system resolution as indicated by the peak full width at half maximum (FWHM) is minimal.

Overall, the there is nothing to suggest that the change in energy calibration due to the software reload has any impact on the final assay results.

Item Assayed	Assay Date	Energy Calibration Date
0123	11/05/01	02/27/01
0101	11/08/01	02/27/01
0108	11/13/01	02/27/01
0100	11/15/01	02/27/01
0119	12/11/01	11/29/01
0105	12/11/01	11/29/01
0109	12/11/01	11/29/01
0110	12/11/01	11/29/01
0122	12/11/01	11/29/01
0103	12/12/01	11/29/01
0121	12/12/01	11/29/01
0106	12/27/01	11/29/01
0043	01/08/02	02/27/01
0043RC	01/08/02	02/27/01
0102	01/08/02	02/27/01
0104	01/08/02	02/27/01

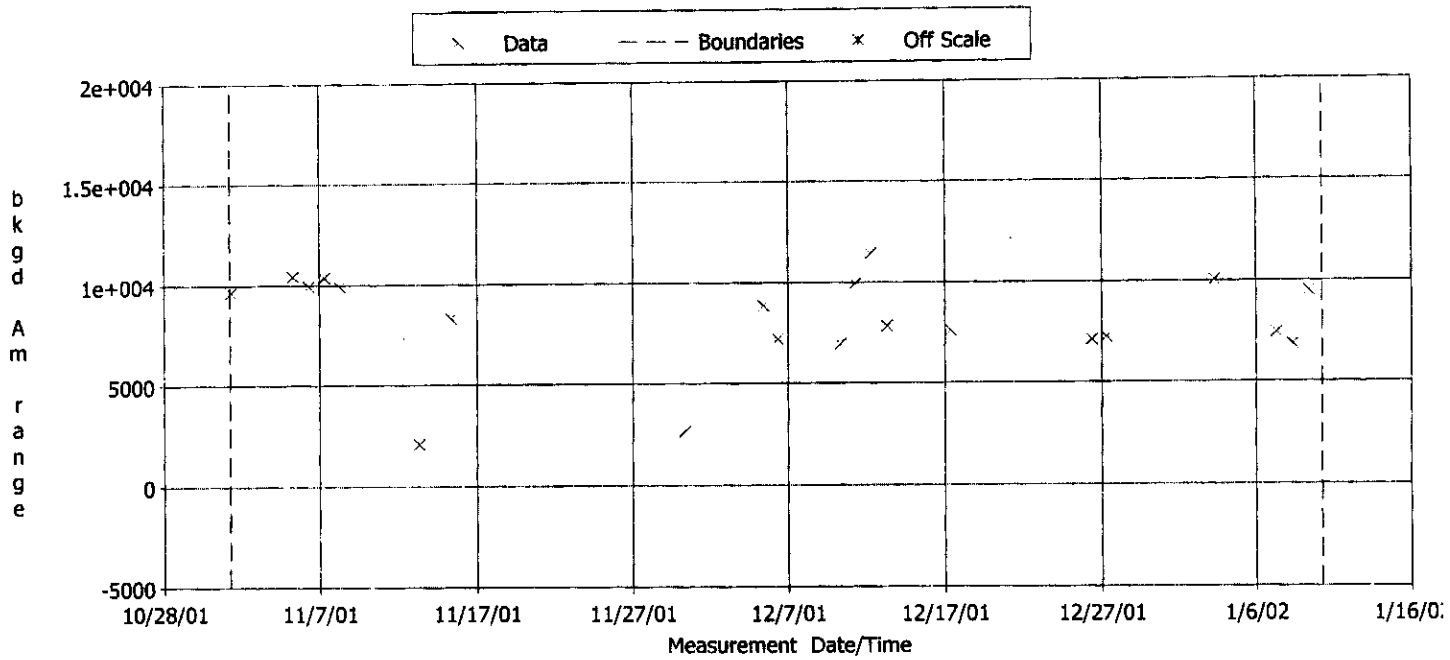


Datasource: C:\GENIE2K\CAMFILES\Eu-152 Source 1-03-02 1048.CNF
Energy = 2.252e-002 keV + 2.500e-001*Ch
FWHM = 9.410e-001 keV + 3.045e-002*E^1/2
Lo Tail = 1.404e+000 keV - 2.590e-004*E

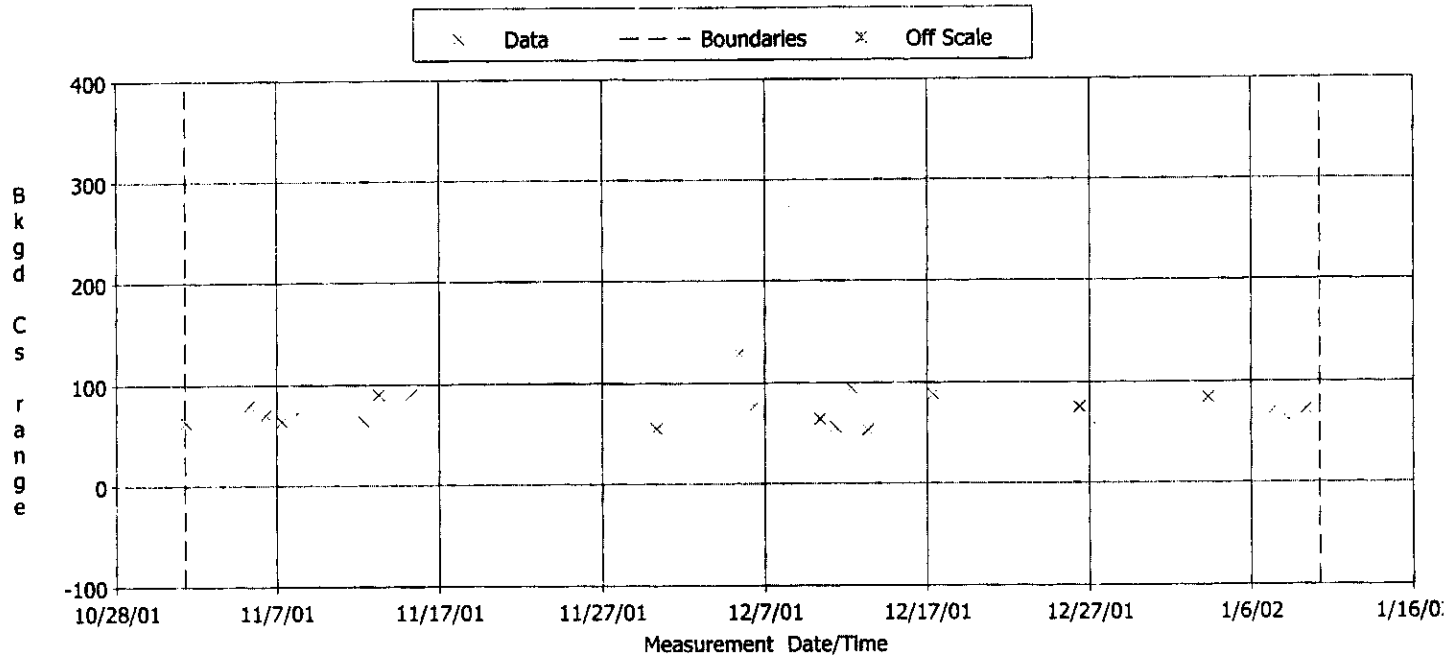


Datasource: C:\GENIE2K\CAMFILES\Eu-152 Source 1-08-02 1064.CNF
Energy = 1.049e-001 keV + 2.499e-001*Ch
FWHM = 8.879e-001 keV + 3.126e-002*E^1/2
Lo Tail = 9.617e-001 keV + 1.287e-005*E

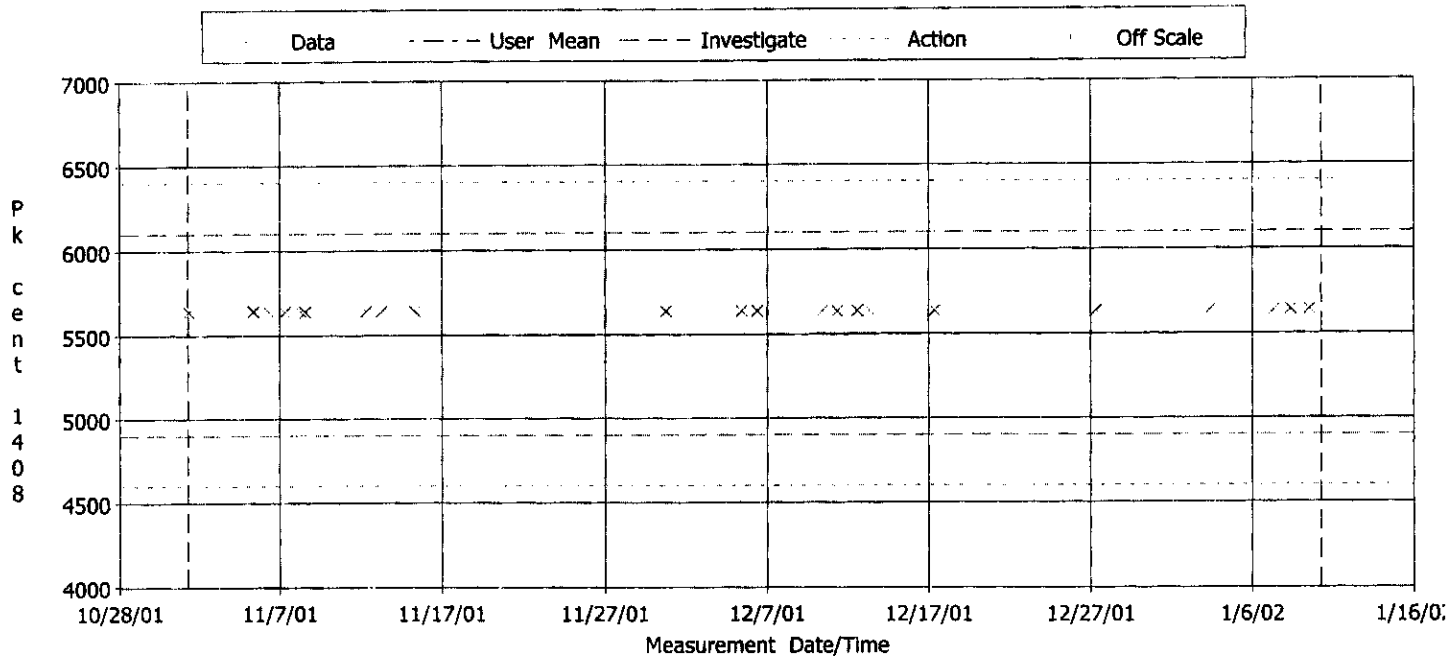
Control Charts



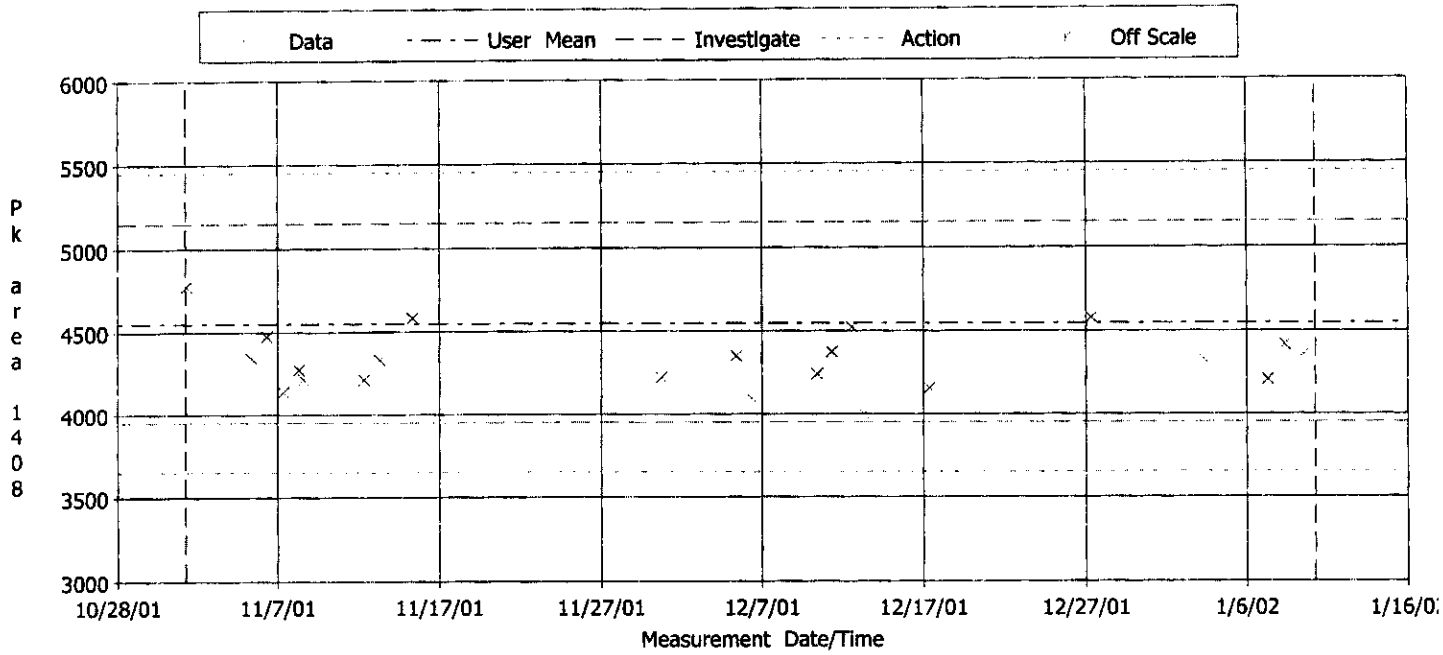
QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf
Parameter Description : bkgd Am range (counts)
Selection Dates : 11/01/01 6:00:00 AM - 1/10/02 6:00:00 AM
Lower/Upper Boundaries : 0.000 - 15000.000



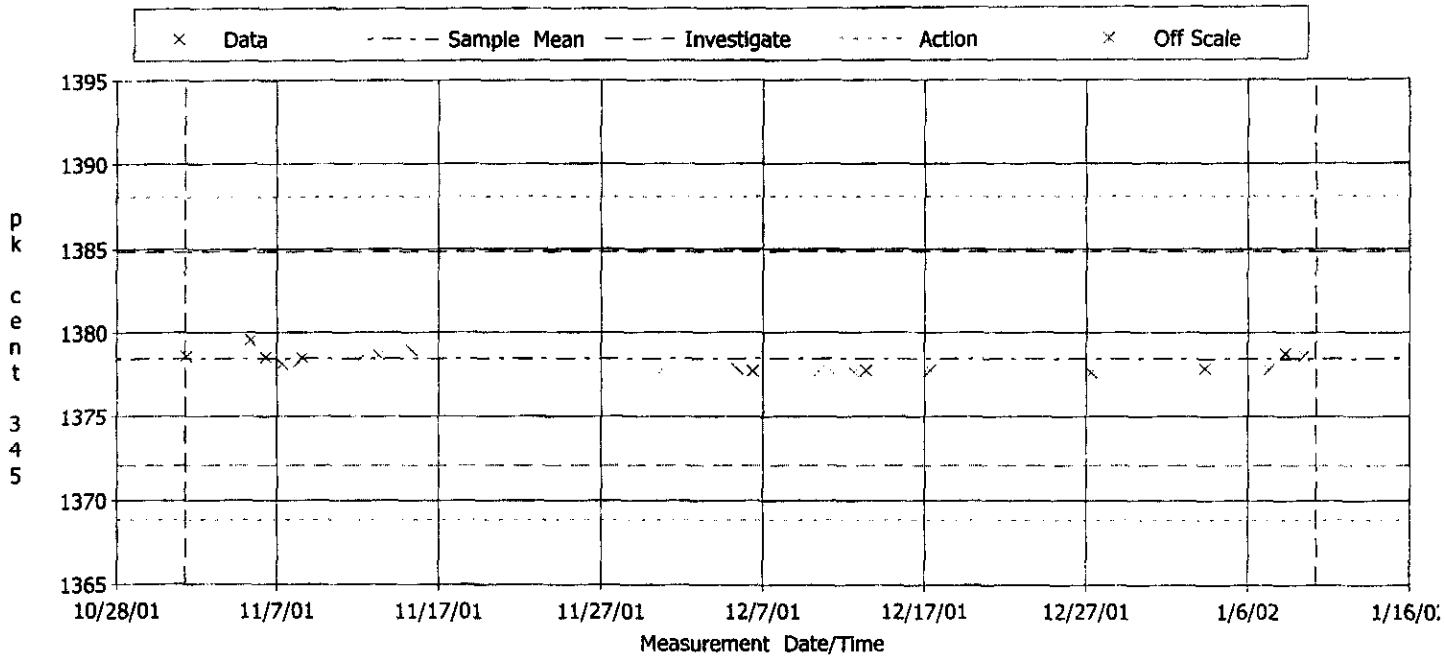
QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf
Parameter Description : Bkgd Cs range (counts)
Selection Dates : 11/01/01 6:00:00 AM - 1/10/02 6:00:00 AM
Lower/Upper Boundaries : 0.000 - 300.000



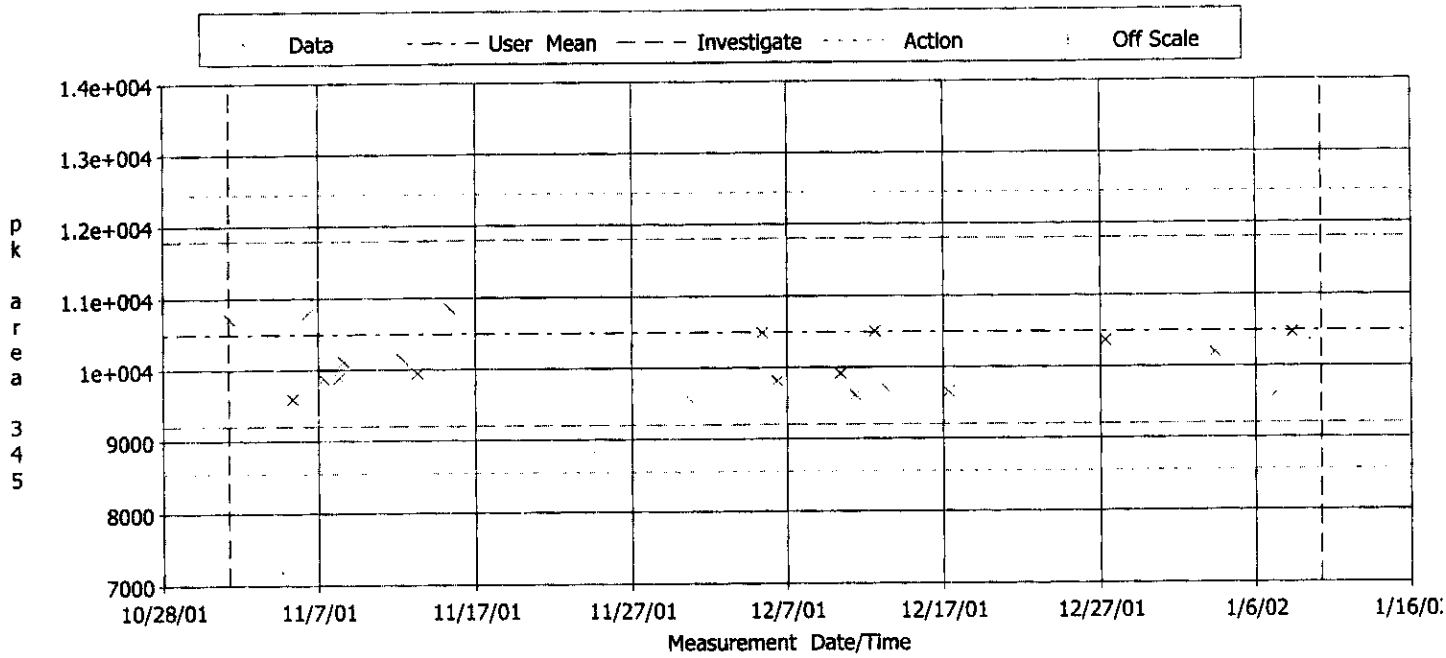
QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk cent 1408 (ch)
Selection Dates : 11/01/01 6:00:00 AM - 1/10/02 6:00:00 AM
User Mean +/- Std Dev : 5500.000 +/- 3.00e+002



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk area 1408 (counts)
Selection Dates : 11/01/01 6:00:00 AM - 1/10/02 6:00:00 AM
User Mean +/- Std Dev : 4550.000 +/- 3.00e+002



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk cent 345 (ch)
Selection Dates : 11/01/01 6:00:00 AM - 1/10/02 6:00:00 AM
Sample Mean +/- Std Dev : 1378.445 +/- 3.196

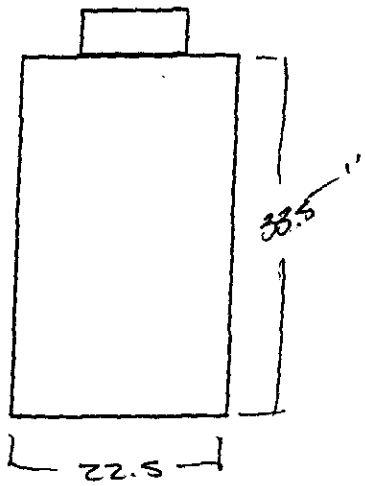


QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk area 345 (counts)
Selection Dates : 11/01/01 6:00:00 AM - 1/10/02 6:00:00 AM
User Mean +/- Std Dev : 10500.000 +/- 6.50e+002

Data Packages

Bldg 233s
NDA Item Description Sheet
Bottle Geometry

11-1-01



Put Dimensions on Bottle

GROSS 94.25
TARE 26.3088
NET 67.94
.326

Item ID: ~~2335-01-0045~~ 0043 MW 11-1-01

Weight (kg): 207.35

Material Description: SAMPLES IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24"

Detector Filters: ~~NONE~~ .0312

Dose Rate: <.5

Comments: 4 MEASUREMENT TOTAL 1800 SEC 0920
RECOUNTED 1-8-02 1066
LOSE FIRST COUNT & ADDED FILTER
MW 1-8-02

```
#Date & Time: Tue Jan 08 11:20:18 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0043
~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=0.3263    ~3con=1
~1Absor=0.0312    ~1Amater=CADMIUM  ~1Aden=8.642
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0043

File Name: 1066

Assay Date: 8-Jan-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.52E+03	1.20E+02
Am-241	1.47E+03	1.15E+02
Np-237	6.23E-01	3.01E-02
U-238		
U-235		
Cs-137	6.15E-03	3.14E-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): 149.47

Width (in): 22.5

Depth for TMU (in): 4

Depth (in): 22.5

% Volume: 50

Am-241 Calcs:

Measured	1.47E+03	+/-	4.44E+03	Calc from Pu-239
Calculated	2.10E+03	+/-	2.28E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.16E+02	+/-	2.59E+02
Pu-239	1.52E+03	+/-	6.39E+02
Pu-240	7.92E+02	+/-	3.33E+02
Pu-241	2.96E+03	+/-	1.24E+03
Pu-242	8.00E-01	+/-	3.36E-01
Am-241	2.10E+03	+/-	2.28E+03
Np-237	6.23E-01	+/-	2.59E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	6.15E-03	+/-	2.56E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		5.03E+03	+/-	2.40E+03	Calc from Pu-239 Act
Pu (g):	1.92E+00	**Pu (g) + 3 sigma TMU:**		4.35E+00	
		Pu(g) + 3 sigma:		2.38E+00	

Comments:

Cal from Pu due to lower uncert.

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

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

.eport Generated On : 1/08/02 4:17:36 PM

ample Title : 233s-01-0043
pectrum Description :
ample Identification : 1066
ample Size : 67.9 kg

ample Taken On : 1/08/02 11:10:00 AM
cquisition Started : 1/08/02 11:21:19 AM

ive Time: 1800.0 seconds Real Time: 1815.4 seconds

ISOCS Calabration : 233S-01-0043
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/08/02

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	1.36E+005	498.77	2.48E+004
M 2	292.36	73.17	4.64E+003	286.41	8.60E+003
m 3	301.04	75.34	8.23E+003	417.21	1.02E+004
M 4	340.36	85.17	4.47E+003	179.74	1.54E+004
m 5	348.04	87.09	4.69E+003	174.71	1.73E+004
m 6	355.56	88.97	1.83E+003	108.67	1.74E+004
m 7	363.56	90.97	1.99E+003	117.56	1.75E+004
m 8	370.98	92.82	2.99E+003	154.36	1.75E+004
m 9	379.90	95.05	1.11E+004	369.72	1.76E+004
m 10	387.12	96.85	4.81E+003	269.22	1.77E+004
m 11	396.24	99.13	3.48E+004	1036.78	1.79E+004
m 12	404.52	101.20	6.42E+003	263.99	1.80E+004
m 13	413.54	103.46	2.22E+004	703.89	1.82E+004
m 14	418.75	104.76	1.90E+003	239.28	1.83E+004
M 15	445.61	111.47	7.55E+003	422.07	1.78E+004
m 16	459.33	114.90	4.89E+003	268.64	2.15E+004
M 17	502.82	125.77	5.43E+003	112.37	1.08E+004
m 18	518.89	129.79	1.03E+004	127.62	1.08E+004
M 19	577.70	144.48	1.57E+003	177.02	1.60E+004
m 20	596.23	149.11	4.95E+003	374.74	2.76E+004
M 21	644.57	161.20	1.01E+003	241.22	1.22E+004
m 22	660.48	165.17	1.37E+003	309.42	1.32E+004
m 23	680.03	170.06	8.03E+002	190.93	1.29E+004
24	782.00	195.54	3.70E+002	152.66	7.04E+003
M 25	815.65	203.95	1.74E+003	69.46	6.82E+003
m 26	833.56	208.43	1.47E+004	129.79	6.21E+003
M 27	1071.53	267.90	4.79E+002	83.11	3.61E+003
m 28	1088.08	272.04	6.14E+002	90.84	4.77E+003
M 29	1201.99	300.50	1.04E+004	124.08	3.70E+003
m 30	1249.01	312.26	6.13E+004	415.02	2.49E+003
31	1293.00	323.25	8.88E+002	94.02	1.77E+003
M 32	1332.18	333.04	2.66E+003	55.52	1.29E+003
m 33	1363.41	340.85	7.21E+003	83.31	1.19E+003

m 34	1381.45	345.36	1.71E+003	44.75	9.73E+002
M 35	1475.51	368.86	1.04E+003	46.71	9.20E+002
m 36	1502.10	375.51	6.04E+003	163.64	7.48E+002
m 37	1522.72	380.66	9.69E+002	43.25	5.66E+002
M 38	1573.07	393.25	1.64E+003	76.94	5.69E+002
m 39	1595.48	398.84	2.09E+003	95.03	5.51E+002
M 40	1659.85	414.93	5.49E+003	64.37	6.30E+002
m 41	1691.99	422.97	3.01E+002	22.00	7.08E+002
42	1806.17	451.50	4.72E+002	36.95	2.55E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2046.00	511.44	2.38E+002	35.58	2.35E+002
44	2335.00	583.66	1.28E+002	22.69	1.10E+002
45	2438.00	609.41	1.47E+002	23.83	9.85E+001
46	2476.00	618.90	1.67E+002	22.05	8.52E+001
47	2612.00	652.89	7.76E+001	20.65	1.02E+002
48	2650.12	662.42	1.09E+003	43.81	1.48E+002
49	2757.00	689.13	5.08E+001	14.22	5.72E+001
50	2891.32	722.70	3.89E+002	28.16	8.70E+001
51	3648.00	911.81	6.89E+001	16.26	4.91E+001
52	5850.00	1462.13	6.27E+002	27.84	2.69E+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	0.990	661.65*	85.12	6.15022E-003	3.14476E-004
NP-237	0.999	300.17*	6.20	6.01742E-001	2.99054E-002
		312.00*	36.00	6.23147E-001	3.00841E-002
		340.60*	4.20	6.55533E-001	3.12911E-002
Pu-239	0.992	129.28*	0.01	9.76768E+002	1.64437E+002
		375.00*	0.00	1.52932E+003	1.24982E+002
		413.70*	0.00	1.52011E+003	1.19949E+002
		451.50* @	0.00	1.07987E+003	9.44876E+001
AM-241	1.000	59.54*	35.70	3.13894E+003	2.49940E+002
		125.28*	0.00	8.77370E+002	4.61853E+001
		335.40*	0.00	2.02866E+003	1.03893E+002
		662.42* @	0.00	1.45418E+003	7.42522E+001
		722.70*	0.00	1.46661E+003	1.15342E+002
PU-241	0.987	114.00*	0.02	1.92251E+002	1.48707E+001
		332.60*	0.00	3.47230E+002	1.77825E+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	0.990	1.875000E-003	3.573900E-004
NP-237	0.999	6.259652E-001	1.755637E-002
Pu-239 @	0.992	1.405716E+003	7.658311E+001
AM-241 @	1.000	1.010852E+003	4.034031E+001
PU-241	0.987	1.848270E+002	1.175616E+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	1.54E+000 +/- 8.39E-002

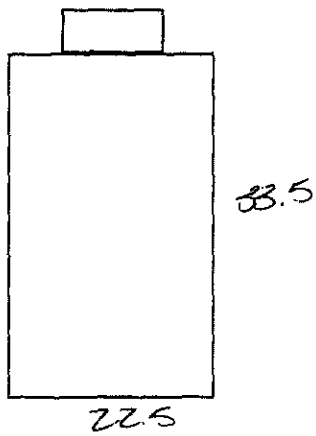
****
**** N U C L I D E M D A R E P O R T *****
****

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.7203E-004	2.43E-004	1.0486E-004
		1332.49	100.00	2.4300E-004		-2.2661E-004
	CS-134	475.35	1.46	3.0386E-002	3.37E-004	1.2566E-002
		563.23	8.38	4.5741E-003		-1.0792E-003
		569.32	15.43	2.4543E-003		-7.9529E-004
		604.70	97.60	4.2800E-004		-6.1279E-004
		795.84	85.40	3.3669E-004		9.3177E-005
		801.93	8.73	3.2869E-003		1.3665E-003
		1038.57	1.00	2.7051E-002		1.6121E-002
		1167.94	1.80	1.4793E-002		-5.5451E-003
		1365.15	3.04	7.5262E-003		9.9958E-004
+	CS-137	661.65*	85.12	5.5245E-004	5.52E-004	6.1502E-003
+	NP-237	300.17*	6.20	1.6546E-002	2.38E-003	6.0174E-001
		312.00*	36.00	2.3848E-003		6.2315E-001
		340.60*	4.20	1.4826E-002		6.5553E-001
+	Pu-239	129.28*	0.01	4.6055E+001	3.29E+001	9.7677E+002
		375.00*	0.00	3.2879E+001		1.5293E+003
		413.70*	0.00	3.3063E+001		1.5201E+003
		451.50*	0.00	2.3096E+002		1.0799E+003
+	AM-241	59.54*	35.70	2.5516E+001	2.55E+001	3.1389E+003
		125.28*	0.00	7.8748E+001		8.7737E+002
		335.40*	0.00	1.2945E+002		2.0287E+003
		662.42*	0.00	1.3062E+002		1.4542E+003
		722.70*	0.00	2.5948E+002		1.4666E+003
+	PU-241	114.00*	0.02	2.6957E+001	2.22E+001	1.9225E+002
		332.60*	0.00	2.2156E+001		3.4723E+002
	CM-243	209.70	3.27	7.6268E-002	1.09E-002	2.1670E-002
		228.18	10.56	1.4496E-002		-6.3543E-003
		277.60	14.00	1.0906E-002		4.1748E-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

REPLICATE



Put Dimensions on Bottle

GROSS 94.25
TARE 26.308
NET 67.94
.3263

Item ID: 233-01-004/3 REPLICATE

Weight (kg): 207.35

Material Description: SAMPLES IN DRUMS

Packaging: 55 GAL DRUM

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: <.5

Comments: 4/ COUNTS TO TOTAL 1800SEC 0934
/ RECOUNTED 1800SEC 1067
1-8-02 MW

```
#Date & Time: Tue Jan 08 11:20:18 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0043
~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=0.3263    ~3con=1
~1Absor=0.0312    ~1Amater=CADMIUM  ~1Aden=8.642
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0043 REP

File Name: 1067

Assay Date: 8-Jan-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.50E+03	1.18E+02
Am-241	1.44E+03	1.15E+02
Np-237	6.20E-01	2.99E-02
U-238		
U-235		
Cs-137	6.14E-03	3.13E-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): 149.47

Width (in): 22.5

Depth for TMU (in): 4

Depth (in): 22.5

% Volume: 50

Am-241 Calcs:

Measured	1.44E+03	+/-	4.35E+03	Calc from Pu-239
Calculated	2.07E+03	+/-	2.24E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.07E+02	+/-	2.55E+02
Pu-239	1.50E+03	+/-	6.30E+02
Pu-240	7.81E+02	+/-	3.28E+02
Pu-241	2.92E+03	+/-	1.23E+03
Pu-242	7.89E-01	+/-	3.32E-01
Am-241	2.07E+03	+/-	2.24E+03
Np-237	6.20E-01	+/-	2.57E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	6.14E-03	+/-	2.55E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	4.96E+03	+/-	2.37E+03	Calc from Pu-239 Act
Pu (g): 1.90E+00	**Pu (g) + 3 sigma TMU:**		4.29E+00	
	Pu(g) + 3 sigma:		2.34E+00	

Comments:

Calc from Pu used due to lower uncert.

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

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

eport Generated On : 1/08/02 4:33:56 PM

ample Title : 233s-01-0043 Replicate
pectrum Description :
ample Identification : 1067
ample Size : 67.9 kg

ample Taken On : 1/08/02 11:59:00 AM
cquisition Started : 1/08/02 11:59:25 AM

ive Time: 1800.0 seconds Real Time: 1815.4 seconds

ISOCS Calabration : 233S-01-0043
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/08/02

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	1.35E+005	496.51	2.44E+004
	2	301.00	75.33	1.37E+004	320.62	1.70E+004
M	3	340.29	85.15	4.71E+003	208.93	1.55E+004
m	4	347.96	87.07	4.55E+003	198.54	1.55E+004
m	5	354.31	88.65	1.86E+003	123.72	1.62E+004
m	6	361.48	90.45	1.89E+003	119.18	1.63E+004
m	7	369.36	92.41	3.25E+003	167.51	1.63E+004
m	8	376.66	94.24	3.12E+003	387.31	1.64E+004
m	9	380.75	95.26	9.28E+003	469.77	1.64E+004
m	10	388.16	97.11	5.12E+003	357.46	1.72E+004
m	11	396.33	99.15	3.44E+004	1201.68	1.74E+004
m	12	404.49	101.20	6.50E+003	305.99	1.69E+004
m	13	413.45	103.43	2.20E+004	806.21	1.78E+004
m	14	418.66	104.74	2.35E+003	238.24	1.52E+004
M	15	445.79	111.52	6.85E+003	118.54	1.32E+004
m	16	459.45	114.93	5.85E+003	113.09	2.06E+004
m	17	470.05	117.58	1.65E+003	94.12	1.92E+004
M	18	502.81	125.77	5.46E+003	112.63	1.09E+004
m	19	518.88	129.78	9.94E+003	126.21	1.09E+004
M	20	577.20	144.36	1.59E+003	176.54	1.55E+004
m	21	596.02	149.06	5.64E+003	383.45	2.64E+004
m	22	612.54	153.19	1.25E+003	120.98	3.11E+004
M	23	643.52	160.93	9.75E+002	81.51	1.20E+004
m	24	660.30	165.13	1.35E+003	82.35	1.57E+004
m	25	680.41	170.15	9.39E+002	77.98	1.47E+004
	26	781.00	195.29	6.89E+002	191.61	8.99E+003
M	27	815.76	203.98	1.69E+003	69.90	6.15E+003
m	28	833.61	208.44	1.48E+004	129.51	6.02E+003
M	29	1072.41	268.12	4.20E+002	134.74	3.61E+003
m	30	1088.16	272.06	4.62E+002	130.87	5.09E+003
M	31	1201.95	300.49	1.06E+004	126.61	3.76E+003
m	32	1249.00	312.25	6.10E+004	423.85	2.43E+003
	33	1292.00	323.00	6.43E+002	92.25	1.85E+003

M 34	1332.11	333.02	2.61E+003	79.13	1.33E+003
m 35	1363.45	340.86	7.03E+003	170.20	1.03E+003
m 36	1381.36	345.33	1.67E+003	58.62	9.17E+002
M 37	1475.49	368.86	1.10E+003	45.55	8.25E+002
m 38	1502.10	375.51	6.12E+003	152.58	7.39E+002
m 39	1522.67	380.65	9.68E+002	42.01	6.58E+002
M 40	1573.14	393.26	1.54E+003	40.53	6.44E+002
m 41	1595.53	398.86	1.98E+003	44.66	5.28E+002
M 42	1660.05	414.98	5.42E+003	63.31	6.36E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
m 43	1691.47	422.84	3.21E+002	20.86	6.09E+002
44	1806.17	451.50	5.63E+002	37.94	2.42E+002
45	2046.00	511.44	1.95E+002	42.83	3.16E+002
46	2335.00	583.66	1.48E+002	23.83	1.05E+002
47	2440.00	609.91	7.22E+001	17.65	8.28E+001
48	2478.00	619.40	1.73E+002	21.62	8.43E+001
49	2613.00	653.14	8.50E+001	22.11	1.15E+002
50	2650.12	662.42	1.09E+003	43.58	1.74E+002
51	2757.00	689.13	1.03E+002	20.51	7.46E+001
52	2891.32	722.70	3.81E+002	28.08	9.76E+001
53	3648.00	911.81	6.80E+001	13.41	3.40E+001
54	5850.00	1462.13	5.25E+002	24.88	1.93E+001
55	7068.00	1766.53	4.30E+001	6.56	0.00E+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
CS-137	0.990	661.65*	85.12	6.13982E-003	3.13211E-004
NP-237	0.999	300.17*	6.20	6.14980E-001	3.05607E-002
		312.00*	36.00	6.20333E-001	2.99638E-002
		340.60*	4.20	6.39156E-001	3.33991E-002
Pu-239	0.992	129.28*	0.01	9.40024E+002	1.58275E+002
		375.00*	0.00	1.54822E+003	1.25465E+002
		413.70*	0.00	1.49903E+003	1.18276E+002
		451.50* @	0.00	1.28737E+003	1.00345E+002
AM-241	1.000	59.54*	35.70	3.12122E+003	2.48530E+002
		125.28*	0.00	8.82401E+002	4.64260E+001
		335.40*	0.00	1.99070E+003	1.10955E+002
		662.42* @	0.00	1.45173E+003	7.39531E+001
		722.70*	0.00	1.43809E+003	1.14729E+002
PU-241	0.986	114.00*	0.02	2.29827E+002	1.32689E+001
		332.60*	0.00	3.40731E+002	1.89913E+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	0.990	1.953099E-003	3.565328E-004
NP-237	0.999	6.239500E-001	1.801590E-002
Pu-239 @	0.992	1.389328E+003	7.560819E+001
AM-241 @	1.000	9.899273E+002	4.046550E+001
PU-241	0.986	2.106261E+002	1.111177E+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

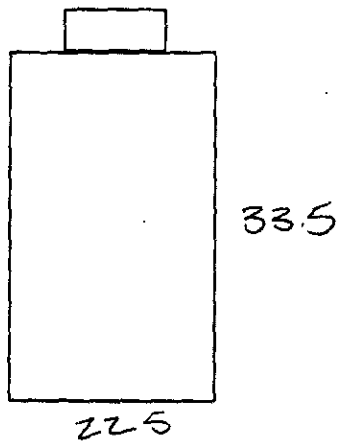
Nuclide	Mass (g)
Pu-239	1.52E+000 +/- 8.29E-002

****
**** 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	2.7970E-004	2.17E-004	-2.4034E-004
		1332.49	100.00	2.1680E-004		-1.5131E-004
	CS-134	475.35	1.46	2.9369E-002	3.30E-004	-3.2958E-002
		563.23	8.38	4.6262E-003		-2.5252E-005
		569.32	15.43	2.5197E-003		-8.1415E-004
		604.70	97.60	4.3043E-004		-5.2874E-004
		795.84	85.40	3.2968E-004		-1.5360E-004
		801.93	8.73	3.4202E-003		-2.1255E-003
		1038.57	1.00	2.7289E-002		-1.8810E-002
		1167.94	1.80	1.5923E-002		-5.4474E-003
		1365.15	3.04	6.6399E-003		5.8241E-003
+	CS-137	661.65*	85.12	5.4628E-004	5.46E-004	6.1398E-003
+	NP-237	300.17*	6.20	1.6682E-002	2.36E-003	6.1498E-001
		312.00*	36.00	2.3594E-003		6.2033E-001
		340.60*	4.20	1.3784E-002		6.3916E-001
+	Pu-239	129.28*	0.01	4.6196E+001	3.27E+001	9.4002E+002
		375.00*	0.00	3.2676E+001		1.5482E+003
		413.70*	0.00	3.3206E+001		1.4990E+003
		451.50*	0.00	2.2884E+002		1.2874E+003
+	AM-241	59.54*	35.70	2.5348E+001	2.53E+001	3.1212E+003
		125.28*	0.00	7.9037E+001		8.8240E+002
		335.40*	0.00	1.3154E+002		1.9907E+003
		662.42*	0.00	1.2916E+002		1.4517E+003
		722.70*	0.00	2.6044E+002		1.4381E+003
+	PU-241	114.00*	0.02	2.6331E+001	2.25E+001	2.2983E+002
		332.60*	0.00	2.2514E+001		3.4073E+002
	CM-243	209.70	3.27	7.6242E-002	1.09E-002	2.6195E-002
		228.18	10.56	1.4572E-002		4.6953E-003
		277.60	14.00	1.0892E-002		-4.2060E-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 192.136
TARE 26.308
NET 165.828
.7964

Item ID: 2336-01-0100

Weight (kg): 422.7

Material Description: Samples in Drum

Packaging: Drum

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: Rotating Count 1800 Sec 964

```
#Date & Time: Mon Jan 07 15:15:19 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0100
~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=0.7964    ~3con=1
~sd1=24
```

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID:	233s-01-0100	**Assay Date:**	15-Nov-01
File Name:	964	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	3.14E+02	2.58E+01		
Am-241	3.62E+02	3.15E+01		
Np-237	4.88E-02	2.41E-03		
U-238				
U-235				
Cs-137	1.20E-03	8.32E-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):	364.12	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	3.62E+02	+/-	3.62E+03	Use Meas
Calculated	4.35E+02	+/-	8.81E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.27E+02	+/-	1.03E+02
Pu-239	3.14E+02	+/-	2.54E+02
Pu-240	1.64E+02	+/-	1.33E+02
Pu-241	6.11E+02	+/-	4.96E+02
Pu-242	1.65E-01	+/-	1.34E-01
Am-241	3.62E+02	+/-	3.62E+03
Np-237	4.88E-02	+/-	3.94E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.20E-03	+/-	9.71E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	9.66E+02	+/-	3.63E+03	Calc from Pu-239 Act
Pu (g):	9.67E-01	**Pu (g) + 3 sigma TMU:**	3.32E+00	
		Pu(g) + 3 sigma:	1.21E+00	

Comments:

Errors:

Analyst: Martin Winterrose **Date:** 1/24/02

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

Report Generated On : 1/07/02 3:23:34 PM

Sample Title : 233s-01-0100 RT
Spectrum Description :
Sample Identification : 0964
Sample Size : 165.8 kg

Sample Taken On : 11/15/01 1:32:00 PM
Acquisition Started : 11/15/01 1:32:53 PM

Live Time: 1800.0 seconds Real Time: 1854.1 seconds

ISOCS Calabration : 233S-01-0100
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/07/02

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	239.30	59.91	1.45E+006	51277.7	2.03E+004
2	293.01	73.33	1.91E+003	132.31	8.55E+003
3	301.12	75.36	3.55E+003	166.04	8.46E+003
4	340.23	85.13	1.73E+003	94.29	7.94E+003
5	348.35	87.16	1.03E+003	98.01	7.82E+003
6	379.72	95.00	2.92E+003	165.10	7.34E+003
7	396.17	99.12	1.16E+004	401.14	7.08E+003
8	413.82	103.53	6.49E+003	297.20	6.77E+003
9	445.89	111.54	2.05E+003	116.74	6.64E+003
10	459.38	114.91	1.09E+003	140.11	6.38E+003
11	494.72	123.74	3.99E+002	91.63	5.68E+003
12	502.63	125.72	2.10E+003	83.90	5.51E+003
13	518.81	129.76	6.70E+003	106.86	5.19E+003
14	576.43	144.16	2.12E+002	58.27	4.16E+003
15	595.90	149.03	6.24E+002	62.75	3.93E+003
16	815.76	203.98	7.58E+002	46.43	1.74E+003
17	833.72	208.47	2.91E+003	65.94	1.61E+003
18	1201.96	300.50	1.18E+003	43.71	6.89E+002
19	1249.11	312.28	6.99E+003	89.12	5.54E+002
20	1332.75	333.18	8.03E+002	36.22	4.72E+002
21	1343.96	335.98	3.66E+002	29.71	4.62E+002
22	1363.51	340.87	8.16E+002	70.60	4.46E+002
23	1379.32	344.82	4.06E+002	90.55	4.31E+002
24	1474.21	368.54	2.09E+002	28.67	3.30E+002
25	1501.92	375.46	2.00E+003	48.98	3.08E+002
26	1522.43	380.59	3.25E+002	57.24	2.88E+002
27	1534.16	383.52	2.29E+002	42.62	2.79E+002
28	1573.35	393.32	6.40E+002	30.03	2.56E+002
29	1596.12	399.01	2.19E+002	20.95	2.35E+002
30	1656.36	414.06	1.74E+003	45.18	2.06E+002
31	1663.96	415.96	2.99E+002	24.28	2.02E+002
32	1692.46	423.08	1.20E+002	17.07	1.78E+002
33	1807.64	451.87	2.29E+002	19.04	1.21E+002

34	2044.43	511.05	1.17E+002	15.14	9.40E+001
35	2334.32	583.50	9.40E+001	12.89	6.44E+001
36	2439.17	609.70	1.50E+002	14.71	6.30E+001
37	2649.78	662.34	3.32E+002	20.43	5.98E+001
38	2890.10	722.39	8.50E+001	12.27	5.31E+001
39	3647.12	911.59	6.11E+001	10.02	3.70E+001
40	5850.21	1462.18	5.84E+002	24.82	9.29E+000
41	7068.32	1766.61	2.66E+001	6.82	2.01E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.981	661.65*	85.12	1.20301E-003	8.31788E-005
NP-237	0.997	300.17*	6.20	4.72701E-002	2.87642E-003
		312.00*	36.00	4.87587E-002	2.41205E-003
		340.60*	4.20	4.99268E-002	4.89856E-003
		375.00*	0.68	7.79406E-001	3.92763E-002
		415.60*	1.75	4.66313E-002	4.24618E-003
Pu-239	0.992	129.28*	0.01	3.65930E+002	6.17152E+001
		375.00*	0.00	3.34947E+002	2.70935E+001
		413.70*	0.00	3.13962E+002	2.58227E+001
		451.50* @	0.00	3.38344E+002	3.10506E+001
AM-241	0.994	59.54*	35.70	3.61529E+002	3.14548E+001
		125.28*	0.00	1.87121E+002	1.17470E+001
		335.40*	0.00	1.89404E+002	1.77120E+001
		662.42* @	0.00	2.84445E+002	1.96521E+001
		722.70*	0.00	2.06015E+002	3.04045E+001
PU-241	0.969	114.00*	0.02	1.99218E+001	2.78206E+000
		332.60*	0.00	7.08467E+001	4.60417E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.981	3.427398E-004	9.130203E-005
NP-237	0.997	4.806329E-002	1.600620E-003
Pu-239 @	0.992	3.287910E+002	9.602138E+000
AM-241 @	0.994	2.034056E+002	8.934701E+000
PU-241	0.969	3.354229E+001	2.381124E+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 *****
****

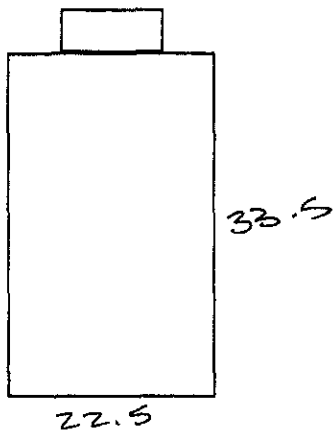
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.8590E-004	1.59E-004	1.0260E-004
		1332.49	100.00	1.5864E-004		5.1650E-005
	CS-134	475.35	1.46	1.6266E-002	2.19E-004	1.2217E-002
		563.23	8.38	2.6750E-003		1.8343E-003
		569.32	15.43	1.4570E-003		9.8216E-004
		604.70	97.60	2.7194E-004		-1.3599E-004
		795.84	85.40	2.1930E-004		-1.0173E-004
		801.93	8.73	2.1134E-003		-1.4019E-004
		1038.57	1.00	1.7610E-002		-5.7416E-004
		1167.94	1.80	1.0185E-002		-6.2967E-003
		1365.15	3.04	4.8496E-003		6.8581E-003
+	CS-137	661.65*	85.12	1.4028E-004	1.40E-004	1.2030E-003
+	NP-237	300.17*	6.20	5.0070E-003	7.82E-004	4.7270E-002
		312.00*	36.00	7.8228E-004		4.8759E-002
		340.60*	4.20	6.1767E-003		4.9927E-002
		375.00*	0.68	3.2794E-002		7.7941E-001
		415.60*	1.75	1.0723E-002		4.6631E-002
+	Pu-239	129.28*	0.01	1.8464E+001	1.25E+001	3.6593E+002
		375.00*	0.00	1.4093E+001		3.3495E+002
		413.70*	0.00	1.2499E+001		3.1396E+002
		451.50*	0.00	7.9455E+001		3.3834E+002
+	AM-241	59.54*	35.70	1.6624E-001	1.66E-001	3.6153E+002
		125.28*	0.00	3.1035E+001		1.8712E+002
		335.40*	0.00	5.3085E+001		1.8940E+002
		662.42*	0.00	3.3169E+001		2.8444E+002
		722.70*	0.00	8.8658E+001		2.0601E+002
+	PU-241	114.00*	0.02	6.8467E+000	6.85E+000	1.9922E+001
		332.60*	0.00	9.1666E+000		7.0847E+001
	CM-243	209.70	3.27	2.8703E-002	3.99E-003	2.1870E-001
		228.18	10.56	6.0668E-003		7.1242E-004
		277.60	14.00	3.9873E-003		-5.0719E-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	8.79E-001 +/- 2.57E-002

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



GROSS 156.31
TARE 26.308
NET 130.01

Put Dimensions on Bottle

.6244

.5956

2835-01-0101

Item ID: ~~343 ⇒ MW 11-8-01~~

Weight (kg): 343.9

Material Description: Samples in Drum

Packaging: 55 Gal Drum

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: 4 Counts for 1800 Sec Total .0044

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0101

File Name: 944

Assay Date: 8-Nov-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.60E+02	1.39E+01
Am-241	1.98E+02	1.72E+01
Np-237	4.71E-02	2.33E-03
U-238		
U-235		
Cs-137	3.96E-04	1.10E-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): 286.02

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	1.98E+02	+/-	6.00E+02	Calc from Pu-239
Calculated	2.21E+02	+/-	2.40E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.47E+01	+/-	2.73E+01
Pu-239	1.60E+02	+/-	6.74E+01
Pu-240	8.32E+01	+/-	3.51E+01
Pu-241	3.11E+02	+/-	1.31E+02
Pu-242	8.41E-02	+/-	3.55E-02
Am-241	2.21E+02	+/-	2.40E+02
Np-237	4.71E-02	+/-	1.96E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	3.96E-04	+/-	1.97E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		5.29E+02	+/-	2.53E+02	Calc from Pu-239 Act
Pu (g):	3.87E-01	**Pu (g) + 3 sigma TMU:**		8.76E-01	
		Pu(g) + 3 sigma:		4.87E-01	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Mon Jan 07 16:20:48 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0101
~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=0.5956    ~3con=1
~sd1=24
```

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

Report Generated On : 1/07/02 4:23:03 PM

Sample Title : 233s-01-0101 @270
Spectrum Description :
Sample Identification : 0944
Sample Size : 130.0 kg

Sample Taken On : 11/08/01 10:39:00 AM
Acquisition Started : 11/08/01 10:39:09 AM

Live Time: 1800.0 seconds Real Time: 1839.9 seconds

ISOCS Calabration : 233S-01-0101
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/07/02

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	1.06E+006	36840.0	1.53E+004
2	292.08	73.10	1.66E+003	98.86	6.41E+003
3	301.13	75.36	3.35E+003	117.44	6.36E+003
4	340.26	85.14	1.25E+003	214.71	6.09E+003
5	379.81	95.03	2.08E+003	114.10	5.71E+003
6	396.09	99.10	8.24E+003	227.59	5.53E+003
7	413.62	103.48	4.31E+003	174.02	5.33E+003
8	445.75	111.51	1.58E+003	96.51	5.25E+003
9	460.12	115.10	1.09E+003	79.72	5.03E+003
10	477.66	119.48	2.40E+002	103.22	4.75E+003
11	502.55	125.70	1.32E+003	85.35	4.37E+003
12	518.53	129.69	4.00E+003	92.10	4.12E+003
13	595.27	148.88	4.02E+002	56.20	3.13E+003
14	833.57	208.43	1.93E+003	69.40	1.14E+003
15	1201.67	300.42	1.16E+003	40.99	4.58E+002
16	1248.69	312.18	6.75E+003	85.28	3.72E+002
17	1332.11	333.02	4.28E+002	27.79	3.29E+002
18	1343.31	335.82	2.05E+002	24.53	3.24E+002
19	1363.12	340.77	6.90E+002	52.44	3.15E+002
20	1378.35	344.58	1.90E+002	45.96	3.03E+002
21	1409.24	352.30	1.40E+002	19.02	2.50E+002
22	1474.71	368.66	1.34E+002	18.40	2.41E+002
23	1501.62	375.39	1.09E+003	36.82	2.30E+002
24	1522.07	380.50	1.74E+002	24.58	2.16E+002
25	1532.35	383.07	1.67E+002	19.09	2.09E+002
26	1572.60	393.13	3.33E+002	22.51	1.79E+002
27	1594.83	398.68	1.98E+002	18.69	1.66E+002
28	1655.97	413.96	8.70E+002	33.03	1.44E+002
29	1663.58	415.86	2.61E+002	22.02	1.40E+002
30	1807.21	451.76	1.08E+002	14.64	1.01E+002
31	2044.31	511.02	1.25E+002	15.24	8.32E+001
32	2333.38	583.26	8.51E+001	12.34	5.97E+001
33	2438.13	609.44	1.67E+002	15.42	5.84E+001

34	2647.26	661.70	1.05E+002	28.95	5.31E+001
35	2650.38	662.48	8.59E+001	29.44	5.56E+001
36	2890.14	722.41	4.89E+001	9.98	3.72E+001
37	5848.34	1461.71	5.21E+002	23.45	6.67E+000
38	7064.62	1765.68	5.54E+001	8.72	2.87E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	3.96485E-004	1.09859E-004
NP-237	0.998	300.17*	6.20	4.63707E-002	2.77569E-003
		312.00*	36.00	4.71414E-002	2.33103E-003
		340.60*	4.20	4.25367E-002	3.78752E-003
		375.00*	0.68	4.30669E-001	2.39032E-002
		415.60*	1.75	4.14464E-002	3.89753E-003
Pu-239	0.994	129.28*	0.01	1.95581E+002	3.31469E+001
		375.00*	0.00	1.85078E+002	1.55775E+001
		413.70*	0.00	1.59792E+002	1.38703E+001
		451.50* @	0.00	1.63112E+002	2.30274E+001
AM-241	0.995	59.54*	35.70	1.98194E+002	1.71813E+001
		125.28*	0.00	1.04946E+002	8.46382E+000
		335.40*	0.00	1.06734E+002	1.37086E+001
		662.42* @	0.00	7.66316E+001	2.63585E+001
		722.70*	0.00	1.23786E+002	2.55297E+001
PU-241	0.957	114.00*	0.02	1.73824E+001	1.58152E+000
		332.60*	0.00	3.80408E+001	3.04438E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	3.964846E-004	1.098585E-004
NP-237	0.998	4.530788E-002	1.489721E-003
Pu-239 @	0.994	1.724798E+002	5.631107E+000
AM-241 @	0.995	1.195853E+002	6.427901E+000
PU-241	0.957	2.177264E+001	1.403448E+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	2.0695E-004	1.49E-004	1.1999E-004
		1332.49	100.00	1.4858E-004		-8.0184E-005
	CS-134	475.35	1.46	1.5943E-002	2.30E-004	-8.4809E-003
		563.23	8.38	2.5400E-003		-1.2445E-003
		569.32	15.43	1.4591E-003		5.8918E-004
		604.70	97.60	2.8803E-004		9.5862E-005
		795.84	85.40	2.2979E-004		1.8764E-004
		801.93	8.73	2.1912E-003		-8.9819E-004
		1038.57	1.00	1.6686E-002		1.1280E-002
		1167.94	1.80	1.1526E-002		-4.8920E-003
		1365.15	3.04	4.7235E-003		-2.2888E-003
+	CS-137	661.65*	85.12	1.3803E-004	1.38E-004	3.9648E-004
+	NP-237	300.17*	6.20	4.0975E-003	6.46E-004	4.6371E-002
		312.00*	36.00	6.4623E-004		4.7141E-002
		340.60*	4.20	5.2577E-003		4.2537E-002
		375.00*	0.68	2.8927E-002		4.3067E-001
		415.60*	1.75	9.1975E-003		4.1446E-002
+	Pu-239	129.28*	0.01	1.4746E+001	1.07E+001	1.9558E+002
		375.00*	0.00	1.2431E+001		1.8508E+002
		413.70*	0.00	1.0740E+001		1.5979E+002
		451.50*	0.00	7.4689E+001		1.6311E+002
+	AM-241	59.54*	35.70	1.0772E-001	1.08E-001	1.9819E+002
		125.28*	0.00	2.4613E+001		1.0495E+002
		335.40*	0.00	4.4987E+001		1.0673E+002
		662.42*	0.00	3.3340E+001		7.6632E+001
		722.70*	0.00	7.8632E+001		1.2379E+002
+	PU-241	114.00*	0.02	5.2945E+000	5.29E+000	1.7382E+001
		332.60*	0.00	7.7421E+000		3.8041E+001
	CM-243	209.70	3.27	2.3032E-002	3.40E-003	5.9813E-002
		228.18	10.56	4.9856E-003		4.1236E-003
		277.60	14.00	3.3984E-003		-8.1912E-004

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

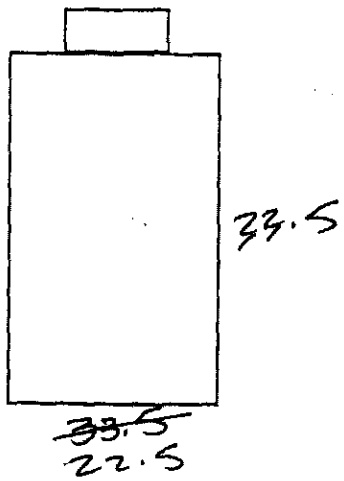
N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	3.62E-001 +/- 1.18E-002

~~Height~~ MW

~~10'30~~ MW

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



Put Dimensions on Bottle

188.18
26308
161.87
.741585

Item ID: 7335-01-0102

Weight (kg): 414 / NRT 356.12

Material Description: PACKAGES IN DRUM

Packaging: DRUM

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: <1.5

Comments: RECOUNT 1800 SEC 1068
RECOUNT DUE TO FILL LOSS

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID:	233s-01-0102	**Assay Date:**	8-Jan-02
File Name:	1068	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.68E+03	1.35E+02		
Am-241	1.17E+02	9.28E+00		
Np-237	1.56E-02	1.07E-03		
U-238				
U-235				
Cs-137	5.25E-03	2.45E-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):	356	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	1.17E+02	+/-	1.17E+03	Use Meas
Calculated	2.33E+03	+/-	4.72E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.82E+02	+/-	5.53E+02
Pu-239	1.68E+03	+/-	1.36E+03
Pu-240	8.77E+02	+/-	7.11E+02
Pu-241	3.28E+03	+/-	2.66E+03
Pu-242	8.86E-01	+/-	7.18E-01
Am-241	1.17E+02	+/-	1.17E+03
Np-237	1.56E-02	+/-	1.26E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	5.25E-03	+/-	4.24E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	3.36E+03	+/-	2.01E+03	Calc from Pu-239 Act
Pu (g):	5.07E+00	**Pu (g) + 3 sigma TMU:**	1.74E+01	
		Pu(g) + 3 sigma:	6.29E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Thu Jan 24 13:48:45 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0102
~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=0.0416    ~d1.2=22.5      ~d1.3=33.5      ~1mater=CSTEEL   ~1den=7.86
~d3.1=33        ~3mater=SAMPLEHS ~3den=0.74136   ~3con=1
~sd1=24
```

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

Report Generated On : 1/24/02 1:51:16 PM

Sample Title : 233s-01-0102 RC
Spectrum Description :
Sample Identification : 1068
Sample Size : 161.9 kg

Sample Taken On : 1/08/02 1:02:00 PM
Acquisition Started : 1/08/02 1:02:23 PM

Live Time: 1800.0 seconds Real Time: 1837.2 seconds

ISOCS Calabration : 233S-01-0102
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/24/02

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	8.67E+005	1228.77	1.40E+005
M	2	292.40	73.18	4.07E+003	104.15	1.36E+004
m	3	301.00	75.33	7.47E+003	123.04	1.50E+004
M	4	340.40	85.18	3.59E+003	429.31	1.89E+004
m	5	349.79	87.53	1.07E+003	147.91	2.08E+004
M	6	380.19	95.12	6.05E+003	205.89	2.47E+004
m	7	396.09	99.09	1.88E+004	535.18	2.88E+004
m	8	403.91	101.05	1.57E+003	118.91	2.81E+004
m	9	413.53	103.45	8.44E+003	324.28	2.72E+004
m	10	418.31	104.65	2.87E+003	227.15	2.78E+004
M	11	445.81	111.52	4.68E+003	116.13	1.79E+004
m	12	459.90	115.04	3.09E+003	148.41	2.56E+004
m	13	466.74	116.75	2.34E+003	146.77	2.54E+004
M	14	502.70	125.74	1.90E+003	101.05	1.32E+004
m	15	518.71	129.74	1.36E+004	191.96	1.28E+004
M	16	578.76	144.75	1.06E+003	450.22	1.39E+004
m	17	595.54	148.94	1.25E+003	333.35	2.27E+004
M	18	815.78	203.98	2.99E+003	161.81	7.12E+003
m	19	833.51	208.42	5.31E+003	264.08	6.85E+003
	20	1200.67	300.17	3.06E+002	92.54	2.86E+003
	21	1247.99	312.00	2.47E+003	121.96	3.53E+003
	22	1296.00	324.00	9.08E+002	147.37	4.50E+003
M	23	1332.67	333.16	3.70E+003	69.41	2.91E+003
m	24	1365.70	341.42	4.41E+002	40.00	2.81E+003
m	25	1381.47	345.36	3.50E+003	66.93	2.82E+003
M	26	1475.02	368.74	1.22E+003	46.16	2.47E+003
m	27	1501.69	375.40	1.09E+004	102.71	1.95E+003
m	28	1522.26	380.54	2.15E+003	50.92	1.58E+003
	29	1574.00	393.48	3.79E+003	99.44	1.35E+003
M	30	1656.34	414.06	1.03E+004	189.76	7.92E+002
m	31	1691.78	422.91	6.98E+002	33.87	5.81E+002
	32	1806.17	451.50	1.23E+003	54.31	4.43E+002
	33	2045.00	511.19	2.75E+002	49.77	4.00E+002

	34	2477.00	619.15	1.27E+002	24.51	1.40E+002
M	35	2585.05	646.16	7.40E+001	12.01	1.33E+002
m	36	2610.50	652.52	8.23E+001	12.11	1.65E+002
	37	2650.12	662.42	1.56E+003	53.99	2.45E+002
	38	2891.32	722.70	3.31E+002	25.28	8.05E+001
	39	3484.00	870.82	6.76E+001	17.73	6.34E+001
	40	3648.00	911.81	8.75E+001	16.67	5.25E+001
	41	5850.00	1462.13	6.18E+002	26.78	1.80E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.990	661.65*	85.12	5.25361E-003	2.45421E-004
NP-237	0.999	300.17*	6.20	1.11091E-002	3.39897E-003
		312.00*	36.00	1.55973E-002	1.07160E-003
		340.60*	4.20	2.44946E-002	2.49189E-003
Pu-239	0.997	129.28*	0.01	6.32479E+002	1.06565E+002
		375.00*	0.00	1.65038E+003	1.28215E+002
		413.70*	0.00	1.68321E+003	1.35032E+002
		451.50* @	0.00	1.65641E+003	9.77776E+001
AM-241	1.000	59.54*	35.70	1.16668E+002	9.28140E+000
		125.28*	0.00	1.42617E+002	1.02538E+001
		335.40*	0.00	1.72713E+003	8.70354E+001
		662.42* @	0.00	1.24219E+003	5.79312E+001
		722.70*	0.00	7.45585E+002	6.14598E+001
PU-241	0.982	114.00*	0.02	4.63498E+001	3.35966E+000
		332.60*	0.00	2.95619E+002	1.48971E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.990	4.645831E-003	2.467009E-004
NP-237	0.999	1.653106E-002	9.455744E-004
Pu-239 @	0.997	1.219255E+003	7.005997E+001
AM-241 @	1.000	1.437066E+002	6.818373E+000
PU-241	0.982	5.722384E+001	3.277840E+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

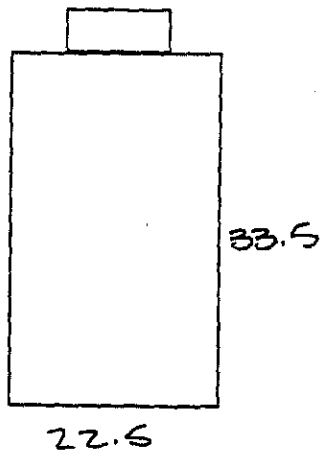
Nuclide	Mass (g)
Pu-239	3.18E+000 +/- 1.83E-001

****
***** 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	1.7650E-004	1.46E-004	1.8565E-004
		1332.49	100.00	1.4637E-004		2.9683E-005
	CS-134	475.35	1.46	2.1464E-002	2.27E-004	-3.5964E-002
		563.23	8.38	3.2169E-003		-5.4722E-004
		569.32	15.43	1.7246E-003		-7.5299E-004
		604.70	97.60	2.8914E-004		1.5599E-004
		795.84	85.40	2.2661E-004		-5.9707E-005
		801.93	8.73	2.1846E-003		-3.8417E-003
		1038.57	1.00	1.7005E-002		1.0300E-002
		1167.94	1.80	9.9531E-003		5.4975E-003
		1365.15	3.04	4.1908E-003		-2.0536E-003
+	CS-137	661.65*	85.12	4.1546E-004	4.15E-004	5.2536E-003
+	NP-237	300.17*	6.20	1.0942E-002	2.33E-003	1.1109E-002
		312.00*	36.00	2.3290E-003		1.5597E-002
		340.60*	4.20	1.3823E-002		2.4495E-002
+	Pu-239	129.28*	0.01	2.4553E+001	2.19E+001	6.3248E+002
		375.00*	0.00	3.1643E+001		1.6504E+003
		413.70*	0.00	2.1902E+001		1.6832E+003
		451.50*	0.00	1.8731E+002		1.6564E+003
+	AM-241	59.54*	35.70	3.5532E-001	3.55E-001	1.1667E+002
		125.28*	0.00	4.0340E+001		1.4262E+002
		335.40*	0.00	1.1856E+002		1.7271E+003
		662.42*	0.00	9.8233E+001		1.2422E+003
		722.70*	0.00	1.3647E+002		7.4559E+002
+	PU-241	114.00*	0.02	1.1201E+001	1.12E+001	4.6350E+001
		332.60*	0.00	2.0293E+001		2.9562E+002
	CM-243	209.70	3.27	4.2915E-002	6.68E-003	3.1484E-003
		228.18	10.56	1.0321E-002		8.1875E-003
		277.60	14.00	6.6826E-003		-2.5406E-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

Item ID: 2335-01-0103

Weight (kg): 337.60

Material Description: Packages in Drum

Packaging: 55 Drum

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: 1800 Size 10 16

Gross 153.45
Tare 26.3
Net 127.15

.6107

.5825

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0103

File Name: 1016

Assay Date: 12-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	3.13E+02	2.65E+01
Am-241	3.85E+02	3.95E+01
Np-237	6.99E-02	3.44E-03
U-238		
U-235		
Cs-137	6.75E-04	1.88E-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): 279.73

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	3.85E+02	+/-	1.17E+03	Calc from Pu-239
Calculated	4.33E+02	+/-	4.70E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.27E+02	+/-	5.34E+01
Pu-239	3.13E+02	+/-	1.32E+02
Pu-240	1.63E+02	+/-	6.87E+01
Pu-241	6.09E+02	+/-	2.57E+02
Pu-242	1.65E-01	+/-	6.94E-02
Am-241	4.33E+02	+/-	4.70E+02
Np-237	6.99E-02	+/-	2.90E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	6.75E-04	+/-	3.36E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.04E+03	+/-	4.95E+02	Calc from Pu-239 Act
Pu (g):	7.41E-01	**Pu (g) + 3 sigma TMU:**		1.68E+00	
		Pu(g) + 3 sigma:		9.29E-01	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Mon Jan 07 16:36:38 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0103
~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=0.5825    ~3con=1
~sd1=24
```

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

Report Generated On : 1/07/02 4:38:58 PM

Sample Title : 233s-01-0103
Spectrum Description :
Sample Identification : 1016
Sample Size : 127.2 kg

Sample Taken On : 12/12/01 12:05:00 PM
Acquisition Started : 12/12/01 12:15:29 PM

Live Time: 1800.0 seconds Real Time: 1885.2 seconds

ISOCS Calabration : 233S-01-0103
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/07/02

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	239.06	59.80	2.34E+006	70122.4	4.07E+004
2	291.87	73.00	2.38E+003	134.29	1.59E+004
3	300.91	75.26	4.84E+003	129.91	1.54E+004
4	339.83	85.00	1.71E+003	251.19	1.39E+004
5	396.16	99.08	1.57E+004	591.01	1.11E+004
6	413.39	103.39	1.03E+004	402.11	1.01E+004
7	445.12	111.32	2.25E+003	121.53	8.60E+003
8	459.43	114.90	1.67E+003	101.59	8.20E+003
9	477.07	119.31	1.93E+003	94.83	7.71E+003
10	494.34	123.63	9.25E+002	99.58	7.19E+003
11	502.35	125.63	3.39E+003	106.79	6.96E+003
12	518.38	129.64	6.34E+003	110.58	6.49E+003
13	577.55	144.43	3.64E+002	76.37	5.40E+003
14	586.62	146.70	5.21E+002	73.70	5.25E+003
15	595.55	148.93	1.16E+003	85.29	5.10E+003
16	659.78	164.99	3.88E+002	57.89	4.02E+003
17	832.98	208.30	5.14E+003	141.00	2.21E+003
18	1201.27	300.39	1.64E+003	51.32	9.20E+002
19	1248.13	312.11	9.89E+003	115.33	7.56E+002
20	1331.41	332.93	9.19E+002	38.86	5.38E+002
21	1342.57	335.72	6.34E+002	36.29	5.20E+002
22	1362.55	340.72	1.03E+003	100.50	4.76E+002
23	1378.42	344.69	4.73E+002	95.24	4.60E+002
24	1473.01	368.34	2.84E+002	36.50	3.67E+002
25	1500.93	375.32	2.06E+003	69.25	3.41E+002
26	1521.19	380.39	3.04E+002	54.70	3.18E+002
27	1532.95	383.33	3.14E+002	37.81	3.12E+002
28	1572.30	393.16	6.35E+002	29.96	2.91E+002
29	1594.00	398.59	3.35E+002	23.90	2.67E+002
30	1655.22	413.90	1.69E+003	56.23	2.42E+002
31	1662.82	415.80	4.06E+002	32.50	2.37E+002
32	1690.58	422.74	1.09E+002	17.11	2.00E+002
33	1805.61	451.50	2.38E+002	19.73	1.62E+002

34	2043.73	511.04	1.55E+002	16.45	1.15E+002
35	2332.82	583.33	9.59E+001	13.61	7.50E+001
36	2436.89	609.35	1.27E+002	14.44	7.14E+001
37	2646.44	661.75	1.78E+002	49.15	6.74E+001
38	2649.72	662.57	2.49E+002	51.01	6.73E+001
39	2887.68	722.07	1.51E+002	14.78	5.27E+001
40	5845.27	1461.59	5.88E+002	24.85	7.96E+000
41	7063.93	1766.31	4.56E+001	7.98	2.42E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	6.74936E-004	1.87933E-004
NP-237	0.999	300.17*	6.20	6.66173E-002	3.83052E-003
		312.00*	36.00	6.99141E-002	3.44047E-003
		340.60*	4.20	6.39169E-002	6.92348E-003
		375.00*	0.68	8.19213E-001	4.54064E-002
		415.60*	1.75	6.50805E-002	5.85443E-003
Pu-239	0.996	129.28*	0.01	3.39724E+002	5.73497E+001
		375.00*	0.00	3.52054E+002	2.96139E+001
		413.70*	0.00	3.12816E+002	2.65397E+001
		451.50* @	0.00	3.62081E+002	3.31727E+001
AM-241	0.997	59.54*	35.70	5.70116E+002	4.84236E+001
		125.28*	0.00	2.95946E+002	1.70986E+001
		335.40*	0.00	3.33121E+002	2.46014E+001
		662.42* @	0.00	2.23916E+002	4.63732E+001
		722.70*	0.00	3.85131E+002	3.95152E+001
PU-241	0.971	114.00*	0.02	2.97784E+001	2.42909E+000
		332.60*	0.00	8.24800E+001	5.20141E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	6.749358E-004	1.879335E-004
NP-237	0.999	6.748036E-002	2.219325E-003
Pu-239 @	0.996	3.252044E+002	1.012990E+001
AM-241 @	0.997	3.342978E+002	1.276234E+001
PU-241	0.971	3.921439E+001	2.200914E+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 *****
****

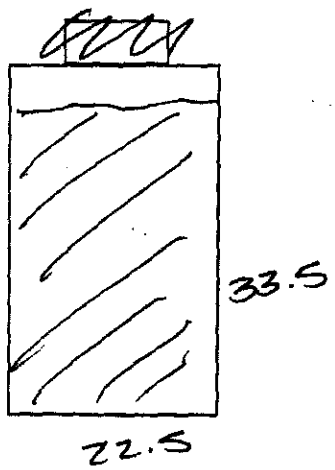
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.0882E-004	1.53E-004	1.4747E-004
		1332.49	100.00	1.5303E-004		1.1034E-004
	CS-134	475.35	1.46	1.9686E-002	2.34E-004	1.3494E-003
		563.23	8.38	2.7730E-003		-7.2405E-004
		569.32	15.43	1.5667E-003		1.2194E-004
		604.70	97.60	3.1206E-004		-1.0935E-004
		795.84	85.40	2.3435E-004		9.3218E-005
		801.93	8.73	2.3861E-003		-3.1715E-003
		1038.57	1.00	1.8303E-002		9.2609E-003
		1167.94	1.80	1.1495E-002		3.4251E-003
		1365.15	3.04	5.0800E-003		-3.2035E-004
+	CS-137	661.65*	85.12	1.5546E-004	1.55E-004	6.7494E-004
+	NP-237	300.17*	6.20	5.8408E-003	9.24E-004	6.6617E-002
		312.00*	36.00	9.2386E-004		6.9914E-002
		340.60*	4.20	6.4916E-003		6.3917E-002
		375.00*	0.68	3.5249E-002		8.1921E-001
		415.60*	1.75	1.1890E-002		6.5081E-002
+	Pu-239	129.28*	0.01	2.0209E+001	1.39E+001	3.3972E+002
		375.00*	0.00	1.5148E+001		3.5205E+002
		413.70*	0.00	1.3869E+001		3.1282E+002
		451.50*	0.00	9.4126E+001		3.6208E+002
+	AM-241	59.54*	35.70	2.2935E-001	2.29E-001	5.7012E+002
		125.28*	0.00	3.4088E+001		2.9595E+002
		335.40*	0.00	5.7208E+001		3.3312E+002
		662.42*	0.00	3.6724E+001		2.2392E+002
		722.70*	0.00	9.3044E+001		3.8513E+002
+	PU-241	114.00*	0.02	7.5503E+000	7.55E+000	2.9778E+001
		332.60*	0.00	9.9322E+000		8.2480E+001
	CM-243	209.70	3.27	3.5019E-002	4.54E-003	2.5633E-001
		228.18	10.56	6.8689E-003		-4.8153E-004
		277.60	14.00	4.5443E-003		-4.8456E-004

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

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

Nuclide	Mass (g)
Pu-239	6.67E-001 +/- 2.08E-002

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



Put Dimensions on Bottle

(138.27
26.308
111.964
.512952

Item ID: 2336-01-0104

Weight (kg): 304.2 / NET 246.32

Material Description: PACKAGES IN DRUM

Packaging: DRUM

Detector Distance (in): 24

Detector Filters: L. HONE

Dose Rate: <.5

Comments: 1. 1800 1065
NOTE RECOUNTED ON 1-8-02, ORIGINAL
COUNT NOT SAVED. 0927

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0104

File Name: 1065

Assay Date: 8-Jan-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.05E+03	8.68E+01		
Am-241	6.89E+02	7.32E+01		
Np-237	1.21E-01	5.93E-03		
U-238				
U-235				
Cs-137				
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): 246.32

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	6.89E+02	+/-	2.09E+03	Use Meas
Calculated	1.45E+03	+/-	1.57E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	4.25E+02	+/-	1.79E+02
Pu-239	1.05E+03	+/-	4.42E+02
Pu-240	5.47E+02	+/-	2.30E+02
Pu-241	2.04E+03	+/-	8.60E+02
Pu-242	5.52E-01	+/-	2.32E-01
Am-241	6.89E+02	+/-	2.09E+03
Np-237	1.21E-01	+/-	5.02E-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):		2.71E+03	+/-	2.15E+03	Calc from Pu-239 Act
Pu (g):	2.19E+00	**Pu (g) + 3 sigma TMU:**		4.95E+00	
		Pu(g) + 3 sigma:		2.73E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
Date & Time: Tue Jan 08 15:51:57 2002
g=SIMPLE_CYLINDER
description=233S-01-0104
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=0.5129    ~3con=1
sd1=24
```

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

eport Generated On : 1/08/02 3:54:37 PM

ample Title : 233s-01-0104
pectrum Description :
ample Identification : 1065
ample Size : 112.0 kg

ample Taken On : 1/08/02 10:11:00 AM
cquisition Started : 1/08/02 10:11:34 AM

ive Time: 1800.0 seconds Real Time: 1953.5 seconds

ISOCS Calabration : 233S-01-0104
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/08/02

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
M	1	239.36	59.92	4.57E+006	5195.70	5.83E+005
m	2	247.22	61.89	2.22E+004	319.90	2.73E+005
M	3	292.46	73.20	4.09E+003	150.70	3.28E+004
m	4	301.06	75.35	8.48E+003	166.17	3.53E+004
M	5	370.66	92.74	1.39E+003	167.43	3.11E+004
m	6	380.14	95.11	1.21E+004	469.39	3.13E+004
m	7	389.35	97.41	5.69E+003	536.60	3.08E+004
m	8	396.36	99.16	4.14E+004	1455.06	2.87E+004
m	9	405.07	101.34	7.11E+003	397.30	2.64E+004
m	10	413.42	103.43	2.39E+004	896.63	2.40E+004
m	11	418.67	104.74	3.70E+003	288.53	2.20E+004
M	12	445.81	111.52	7.65E+003	198.51	1.96E+004
m	13	457.71	114.50	4.21E+003	195.62	1.83E+004
m	14	462.84	115.78	3.86E+003	177.06	1.77E+004
m	15	468.94	117.30	2.28E+003	131.78	1.71E+004
m	16	477.17	119.36	6.14E+003	165.53	1.63E+004
m	17	493.83	123.52	1.56E+003	100.80	1.58E+004
m	18	502.68	125.73	7.05E+003	180.81	1.50E+004
m	19	518.74	129.75	1.89E+004	408.42	1.32E+004
M	20	577.98	144.55	9.69E+002	164.08	1.15E+004
m	21	595.99	149.05	3.37E+003	320.78	2.12E+004
M	22	645.21	161.35	5.65E+002	71.01	7.18E+003
m	23	660.92	165.28	5.94E+002	68.50	8.32E+003
	24	785.00	196.29	2.72E+002	126.96	5.06E+003
M	25	815.68	203.96	2.36E+003	101.12	4.56E+003
m	26	833.54	208.42	9.36E+003	312.14	4.33E+003
	27	1072.00	268.02	2.44E+002	70.43	1.79E+003
	28	1200.67	300.17	2.67E+003	110.22	2.61E+003
	29	1247.99	312.00	1.66E+004	169.99	2.64E+003
	30	1292.00	323.00	1.84E+002	64.99	1.39E+003
M	31	1332.38	333.09	2.57E+003	123.18	1.44E+003
m	32	1363.76	340.93	1.99E+003	100.02	1.28E+003
m	33	1381.57	345.38	2.13E+003	105.79	1.20E+003

M 34	1474.83	368.69	8.82E+002	43.40	1.01E+003
m 35	1501.87	375.45	6.25E+003	171.66	8.76E+002
m 36	1522.64	380.64	1.26E+003	51.09	7.35E+002
M 37	1573.35	393.31	1.97E+003	119.53	6.10E+002
m 38	1595.78	398.92	6.04E+002	44.50	5.31E+002
M 39	1656.59	414.12	5.46E+003	148.99	4.93E+002
m 40	1692.15	423.00	4.00E+002	27.86	4.35E+002
41	1806.17	451.50	6.40E+002	40.66	2.63E+002
42	2047.00	511.69	2.24E+002	37.48	2.70E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2334.00	583.41	1.14E+002	28.97	1.65E+002
44	2439.00	609.66	1.26E+002	22.87	1.07E+002
45	2477.00	619.15	1.10E+002	23.78	1.14E+002
46	2650.12	662.42	8.23E+002	40.58	1.40E+002
47	2891.32	722.70	2.57E+002	26.12	1.03E+002
48	3648.00	911.81	8.08E+001	15.69	4.42E+001
49	5851.00	1462.38	5.48E+002	27.08	3.45E+001
50	7066.00	1766.03	2.51E+001	9.21	1.69E+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
NP-237	1.000	300.17*	6.20	1.11893E-001	7.10824E-003
		312.00*	36.00	1.21206E-001	5.92679E-003
		340.60*	4.20	1.28141E-001	8.76492E-003
Pu-239	0.996	129.28*	0.01	1.02586E+003	1.73659E+002
		375.00*	0.00	1.10724E+003	9.06408E+001
		413.70*	0.00	1.04955E+003	8.67866E+001
		451.50* @	0.00	1.01222E+003	7.55960E+001
AM-241	0.997	59.54*	35.70	1.09585E+003	8.70782E+001
		125.28*	0.00	6.22504E+002	3.40997E+001
		335.40*	0.00	1.39733E+003	9.35137E+001
		662.42* @	0.00	7.75775E+002	4.53429E+001
		722.70*	0.00	6.89465E+002	7.31954E+001
PU-241	0.996	114.00*	0.02	7.64612E+001	5.48473E+000
		332.60*	0.00	2.39170E+002	1.60060E+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
X	CS-137	0.990		
	NP-237	1.000	1.196712E-001	4.039741E-003
	Pu-239 @	0.996	1.071232E+003	5.896187E+001
	AM-241 @	0.997	7.072123E+002	2.794135E+001
	PU-241	0.996	8.083899E+001	5.212838E+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

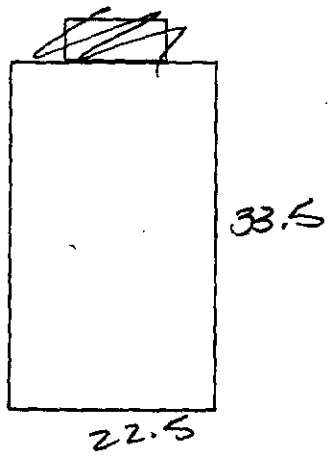
Nuclide	Mass (g)
Pu-239	1.93E+000 +/- 1.06E-001

****
**** 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	2.1051E-004	1.79E-004	1.0378E-004
		1332.49	100.00	1.7906E-004		4.3793E-005
	CS-134	475.35	1.46	2.1850E-002	2.44E-004	5.4421E-003
		563.23	8.38	3.2924E-003		9.7945E-004
		569.32	15.43	1.7805E-003		8.7568E-004
		604.70	97.60	3.1134E-004		-9.6331E-005
		795.84	85.40	2.4445E-004		8.3315E-005
		801.93	8.73	2.3233E-003		-3.1772E-003
		1038.57	1.00	1.9295E-002		-5.7119E-003
		1167.94	1.80	1.1576E-002		5.4693E-003
		1365.15	3.04	5.3720E-003		-3.6973E-003
	CS-137	661.65*	85.12	3.8750E-004	3.87E-004	3.2810E-003
+	NP-237	300.17*	6.20	1.3552E-002	2.69E-003	1.1189E-001
		312.00*	36.00	2.6891E-003		1.2121E-001
		340.60*	4.20	1.0929E-002		1.2814E-001
+	Pu-239	129.28*	0.01	2.9175E+001	2.04E+001	1.0259E+003
		375.00*	0.00	2.4899E+001		1.1072E+003
		413.70*	0.00	2.0358E+001		1.0496E+003
		451.50*	0.00	1.7006E+002		1.0122E+003
+	AM-241	59.54*	35.70	8.5133E-001	8.51E-001	1.0958E+003
		125.28*	0.00	5.0511E+001		6.2250E+002
		335.40*	0.00	9.7425E+001		1.3973E+003
		662.42*	0.00	9.1621E+001		7.7577E+002
		722.70*	0.00	1.8921E+002		6.8947E+002
+	PU-241	114.00*	0.02	1.1481E+001	1.15E+001	7.6461E+001
		332.60*	0.00	1.6676E+001		2.3917E+002
	CM-243	209.70	3.27	4.8189E-002	6.24E-003	5.2492E-003
		228.18	10.56	9.3186E-003		1.1518E-002
		277.60	14.00	6.2378E-003		-5.2518E-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 80.90
TARE 26.308
NET 54.60
.2422

Item ID: 2335-01-0105

Weight (kg): 178

Material Description: Samples in Drum

Packaging: 55 Gal

Detector Distance (in): 24

Detector Filters: None

Dose Rate: 2.5

Comments: 1800 SEL 1010

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0105

File Name: 1010

Assay Date: 11-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	5.78E+02	4.71E+01
Am-241	4.15E+02	3.55E+01
Np-237	3.71E-02	1.89E-03
U-238		
U-235		
Cs-137	1.91E-03	1.33E-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): 120.12

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	4.15E+02	+/-	4.48E+02	Use Meas
Calculated	8.00E+02	+/-	5.30E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.34E+02	+/-	5.60E+01
Pu-239	5.78E+02	+/-	1.38E+02
Pu-240	3.01E+02	+/-	7.20E+01
Pu-241	1.13E+03	+/-	2.69E+02
Pu-242	3.04E-01	+/-	7.27E-02
Am-241	4.15E+02	+/-	4.48E+02
Np-237	3.71E-02	+/-	8.51E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.91E-03	+/-	4.46E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.53E+03	+/-	4.78E+02	Calc from Pu-239 Act
Pu (g):	5.88E-01	**Pu (g) + 3 sigma TMU:**		1.01E+00	
		Pu(g) + 3 sigma:		7.31E-01	

Comments:

Errors:

Analyst: Martin D Winterrose

Date: 1/24/02

```
#Date & Time: Thu Jan 10 10:37:00 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0105
~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=0.2622    ~3con=1
~sd1=24
```

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

Report Generated On : 1/10/02 10:40:37 AM

Sample Title : 233s-01-0105
Spectrum Description :
Sample Identification : 1010
Sample Size : 54.6 kg

Sample Taken On : 12/11/01 1:33:00 PM
Acquisition Started : 12/11/01 1:33:43 PM

Live Time: 1800.0 seconds Real Time: 1872.9 seconds

ISOCS Calabration : 233S-01-0105
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/10/02

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	239.07	59.80	2.03E+006	64451.1	3.08E+004
2	292.77	73.23	1.99E+003	97.12	1.22E+004
3	300.78	75.23	3.77E+003	125.32	1.19E+004
4	339.90	85.01	1.27E+003	183.00	1.12E+004
5	395.99	99.04	1.37E+004	591.19	9.21E+003
6	413.51	103.42	7.46E+003	322.16	8.57E+003
7	445.02	111.30	2.52E+003	147.00	7.56E+003
8	461.10	115.32	1.48E+003	179.32	7.12E+003
9	476.53	119.18	8.84E+002	139.54	6.67E+003
10	502.40	125.64	2.25E+003	119.23	5.95E+003
11	518.42	129.65	8.69E+003	118.33	5.41E+003
12	576.90	144.27	2.98E+002	78.18	4.29E+003
13	587.79	146.99	3.09E+002	89.42	4.15E+003
14	595.38	148.89	7.28E+002	67.23	4.04E+003
15	815.22	203.86	9.87E+002	48.50	1.64E+003
16	832.97	208.30	3.33E+003	68.80	1.50E+003
17	1201.19	300.37	6.17E+002	37.68	6.40E+002
18	1248.09	312.10	3.71E+003	65.82	5.73E+002
19	1331.55	332.97	9.98E+002	39.17	4.77E+002
20	1342.76	335.77	3.98E+002	31.01	4.65E+002
21	1364.19	341.13	3.82E+002	64.79	4.41E+002
22	1379.92	345.06	8.18E+002	72.16	4.21E+002
23	1473.24	368.40	2.39E+002	26.15	3.22E+002
24	1500.75	375.27	2.38E+003	53.09	3.04E+002
25	1520.97	380.33	4.22E+002	57.07	2.91E+002
26	1533.25	383.40	3.15E+002	44.40	2.79E+002
27	1571.70	393.02	8.36E+002	33.24	2.73E+002
28	1655.27	413.91	2.12E+003	49.38	2.17E+002
29	1662.87	415.81	1.51E+002	20.99	2.06E+002
30	1690.81	422.80	1.39E+002	17.78	1.87E+002
31	1806.12	451.63	2.48E+002	19.69	1.39E+002
32	2043.38	510.96	1.68E+002	16.75	1.13E+002
33	2332.01	583.13	7.58E+001	12.50	6.98E+001

34	2437.46	609.49	1.63E+002	15.76	6.61E+001
35	2647.99	662.13	3.22E+002	20.05	6.06E+001
36	2887.30	721.97	1.04E+002	13.06	4.82E+001
37	3645.01	911.43	7.45E+001	11.01	3.53E+001
38	5845.32	1461.61	5.97E+002	25.03	6.85E+000
39	7062.75	1766.02	4.53E+001	7.92	2.60E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.991	661.65*	85.12	1.90642E-003	1.33173E-004
NP-237	0.998	300.17*	6.20	3.52396E-002	2.74160E-003
		312.00*	36.00	3.71345E-002	1.89348E-003
		340.60*	4.20	3.41795E-002	6.00418E-003
		375.00*	0.68	1.37548E+000	6.79772E-002
		415.60*	1.75	3.56296E-002	5.17591E-003
Pu-239	0.996	129.28*	0.01	5.28908E+002	8.91001E+001
		375.00*	0.00	5.91107E+002	4.74583E+001
		413.70*	0.00	5.78226E+002	4.71071E+001
		451.50* @	0.00	5.63326E+002	4.98135E+001
AM-241	0.997	59.54*	35.70	4.14778E+002	3.54952E+001
		125.28*	0.00	2.20302E+002	1.58310E+001
		335.40*	0.00	2.99617E+002	2.72058E+001
		662.42* @	0.00	4.50763E+002	3.14644E+001
		722.70*	0.00	4.16602E+002	5.40203E+001
PU-241	0.940	114.00*	0.02	2.85830E+001	3.78986E+000
		332.60*	0.00	1.28100E+002	7.82135E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.991	7.600245E-004	1.430728E-004
NP-237	0.998	3.633403E-002	1.447632E-003
Pu-239 @	0.996	5.588477E+002	1.578632E+001
AM-241 @	0.997	2.710596E+002	1.242493E+001
PU-241	0.940	4.750580E+001	3.410568E+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 *****
****

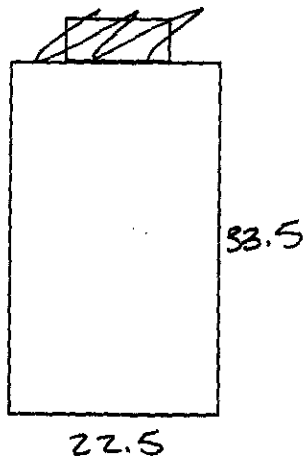
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	3.4390E-004	2.71E-004	8.8465E-005
		1332.49	100.00	2.7107E-004		-3.5112E-005
	CS-134	475.35	1.46	2.7596E-002	3.74E-004	4.4834E-003
		563.23	8.38	4.4145E-003		1.3656E-004
		569.32	15.43	2.4080E-003		-1.4930E-003
		604.70	97.60	4.9501E-004		7.1451E-005
		795.84	85.40	3.7445E-004		-1.7104E-004
		801.93	8.73	3.7098E-003		-3.4645E-003
		1038.57	1.00	3.0727E-002		1.2681E-002
		1167.94	1.80	1.8217E-002		-1.4148E-003
		1365.15	3.04	7.9765E-003		-2.8438E-003
+	CS-137	661.65*	85.12	2.3073E-004	2.31E-004	1.9064E-003
+	NP-237	300.17*	6.20	6.8727E-003	1.14E-003	3.5240E-002
		312.00*	36.00	1.1415E-003		3.7135E-002
		340.60*	4.20	8.9739E-003		3.4180E-002
		375.00*	0.68	4.8502E-002		1.3755E+000
		415.60*	1.75	1.6445E-002		3.5630E-002
+	Pu-239	129.28*	0.01	2.1003E+001	1.94E+001	5.2891E+002
		375.00*	0.00	2.0844E+001		5.9111E+002
		413.70*	0.00	1.9403E+001		5.7823E+002
		451.50*	0.00	1.3044E+002		5.6333E+002
+	AM-241	59.54*	35.70	1.6730E-001	1.67E-001	4.1478E+002
		125.28*	0.00	3.5462E+001		2.2030E+002
		335.40*	0.00	7.7577E+001		2.9962E+002
		662.42*	0.00	5.4556E+001		4.5076E+002
		722.70*	0.00	1.4064E+002		4.1660E+002
+	PU-241	114.00*	0.02	7.6273E+000	7.63E+000	2.8583E+001
		332.60*	0.00	1.3389E+001		1.2810E+002
	CM-243	209.70	3.27	3.7239E-002	5.01E-003	3.1330E-001
		228.18	10.56	7.7250E-003		1.4608E-003
		277.60	14.00	5.0102E-003		-3.7127E-004

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

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

Nuclide	Mass (g)
Pu-239	4.92E-001 +/- 1.39E-002

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



Put Dimensions on Bottle

G - 151.36
T - 26.308
N - 125.055
.6006

Item ID: 2335-01-0106

Weight (kg): 333

Material Description: Sample in Drum

Packaging: 55 Gal Drum

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments:

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0106

File Name: 1045

Assay Date: 27-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	2.47E+03	1.94E+02
Am-241	1.13E+03	9.58E+01
Np-237	1.45E-01	7.04E-03
U-238		
U-235		
Cs-137	1.63E-03	2.14E-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): 275.121

Width (in): 22.5

Depth for TMU (in): 4

Depth (in): 22.5

% Volume: 50

Am-241 Calcs:

Measured	1.13E+03	+/-	3.42E+03	Use Meas
Calculated	3.42E+03	+/-	3.70E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.00E+03	+/-	4.21E+02
Pu-239	2.47E+03	+/-	1.04E+03
Pu-240	1.29E+03	+/-	5.41E+02
Pu-241	4.81E+03	+/-	2.02E+03
Pu-242	1.30E+00	+/-	5.46E-01
Am-241	1.13E+03	+/-	3.42E+03
Np-237	1.45E-01	+/-	6.02E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.63E-03	+/-	7.05E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		5.89E+03	+/-	3.64E+03	Calc from Pu-239 Act
Pu (g):	5.75E+00	**Pu (g) + 3 sigma TMU:**		1.30E+01	
		Pu(g) + 3 sigma:		7.11E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Thu Dec 27 11:21:29 2001
~g=SIMPLE_CYLINDER
~description=233S-01-0106
~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=0.6006    ~3con=1
~sd1=24
```

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

Report Generated On : 12/27/01 11:22:59 AM

Sample Title : 233s-01-0106
Spectrum Description :
Sample Identification : 1045
Sample Size : 125.1 kg

Sample Taken On : 12/27/01 10:43:00 AM
Acquisition Started : 12/27/01 11:22:52 AM

Live Time: 1800.0 seconds Real Time: 1977.5 seconds

ISOCS Calabration : 233S-01-0106
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	239.03	59.79	4.49E+006	132351.	9.93E+004
2	291.79	72.98	6.39E+003	268.02	4.39E+004
3	300.78	75.23	1.31E+004	305.70	4.24E+004
4	339.95	85.02	4.30E+003	476.53	3.84E+004
5	395.87	99.01	4.89E+004	1772.62	3.18E+004
6	413.52	103.42	2.53E+004	1304.78	2.89E+004
7	445.24	111.35	1.07E+004	509.00	2.47E+004
8	459.90	115.02	5.84E+003	603.85	2.33E+004
9	476.93	119.28	3.90E+003	369.77	2.16E+004
10	494.24	123.60	1.74E+003	179.02	1.96E+004
11	502.90	125.77	9.06E+003	526.49	1.86E+004
12	518.26	129.61	3.98E+004	763.37	1.65E+004
13	577.28	144.37	1.40E+003	193.13	1.39E+004
14	587.67	146.96	1.27E+003	321.81	1.36E+004
15	595.31	148.87	3.16E+003	178.04	1.34E+004
16	644.36	161.14	1.40E+003	148.21	1.21E+004
17	659.59	164.95	8.48E+002	107.03	1.17E+004
18	686.25	171.62	7.13E+002	120.97	1.10E+004
19	757.36	189.40	7.21E+002	85.50	9.11E+003
20	783.23	195.86	9.88E+002	84.49	8.45E+003
21	814.94	203.79	5.54E+003	110.23	8.09E+003
22	832.88	208.28	1.56E+004	150.89	7.60E+003
23	1022.28	255.64	9.01E+002	57.85	4.61E+003
24	1071.30	267.89	3.87E+002	58.93	4.12E+003
25	1201.02	300.33	3.24E+003	136.22	3.52E+003
26	1248.06	312.09	2.00E+004	153.15	3.18E+003
27	1294.31	323.66	4.36E+002	74.13	2.79E+003
28	1331.59	332.98	5.52E+003	125.81	2.46E+003
29	1342.79	335.78	2.26E+003	93.78	2.36E+003
30	1364.39	341.18	2.39E+003	290.45	2.16E+003
31	1380.17	345.12	4.72E+003	333.55	2.02E+003
32	1473.09	368.36	1.53E+003	121.34	1.52E+003
33	1500.65	375.25	1.43E+004	154.25	1.40E+003

34	1520.86	380.30	2.32E+003	373.02	1.29E+003
35	1533.73	383.52	1.08E+003	312.43	1.20E+003
36	1571.92	393.07	4.83E+003	88.89	1.03E+003
37	1594.68	398.76	6.98E+002	37.98	9.22E+002
38	1655.08	413.86	1.30E+004	118.96	7.48E+002
39	1663.33	415.93	8.37E+002	44.59	7.20E+002
40	1690.67	422.76	9.45E+002	39.50	6.21E+002
41	1706.51	426.72	2.29E+002	23.36	5.63E+002
42	1806.03	451.61	1.58E+003	44.62	3.86E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2043.57	511.00	2.19E+002	24.92	2.16E+002
44	2437.10	609.40	2.19E+002	18.98	1.31E+002
45	2474.92	618.86	1.84E+002	18.02	1.22E+002
46	2583.31	645.96	1.22E+002	15.53	1.12E+002
47	2610.14	652.67	8.80E+001	14.56	1.08E+002
48	2645.38	661.48	4.17E+002	53.07	1.02E+002
49	2648.46	662.25	1.25E+003	62.65	1.02E+002
50	2753.62	688.55	9.21E+001	13.10	8.40E+001
51	2887.14	721.93	4.14E+002	23.24	7.08E+001
52	3075.68	769.08	9.79E+001	13.09	5.85E+001
53	3644.09	911.20	6.57E+001	10.84	4.05E+001
54	4481.79	1120.67	8.36E+001	11.04	3.02E+001
55	5845.01	1461.53	5.88E+002	25.07	1.06E+001
56	7062.38	1765.92	6.86E+001	9.38	4.75E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	1.63069E-003	2.13806E-004
NP-237	0.998	300.17*	6.20	1.35351E-001	8.65715E-003
		312.00*	36.00	1.45348E-001	7.03732E-003
		340.60*	4.20	1.53107E-001	1.99008E-002
		375.45*	0.68	5.85437E+000	2.65681E-001
		415.76*	1.75	1.37842E-001	9.28317E-003
Pu-239	0.997	129.28*	0.01	2.18349E+003	3.69026E+002
		375.00*	0.00	2.51590E+003	1.95902E+002
		413.70*	0.00	2.47316E+003	1.94404E+002
		451.50* @	0.00	2.47223E+003	1.19367E+002
AM-241	0.998	59.54*	35.70	1.13043E+003	9.58382E+001
		125.28*	0.00	8.08277E+002	6.11238E+001
		335.40*	0.00	1.22063E+003	7.61974E+001
		662.42* @	0.00	1.15859E+003	6.83921E+001
		722.70*	0.00	1.08781E+003	6.95937E+001
PU-241	0.963	114.00*	0.02	1.06381E+002	1.24287E+001
		332.60*	0.00	5.09015E+002	2.64865E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	1.630695E-003	2.138058E-004
NP-237	0.998	1.411904E-001	4.579893E-003
Pu-239 @	0.997	2.372407E+003	6.321552E+001
AM-241 @	0.998	1.025175E+003	3.638803E+001
PU-241	0.963	1.790396E+002	1.125153E+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 *****
****

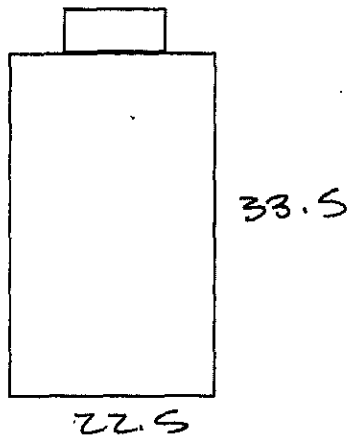
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.1153E-004	1.97E-004	8.3763E-005
		1332.49	100.00	1.9724E-004		7.3219E-005
	CS-134	475.35	1.46	2.6801E-002	2.67E-004	-1.6495E-002
		563.23	8.38	3.7974E-003		1.0458E-003
		569.32	15.43	2.1167E-003		8.1097E-005
		604.70	97.60	3.9501E-004		-2.1756E-004
		795.84	85.40	2.6748E-004		-1.0267E-006
		801.93	8.73	2.7115E-003		4.7252E-004
		1038.57	1.00	2.1046E-002		1.6480E-002
		1167.94	1.80	1.1403E-002		1.3531E-003
		1365.15	3.04	5.7773E-003		1.7632E-003
+	CS-137	661.65*	85.12	1.9460E-004	1.95E-004	1.6307E-003
+	NP-237	300.17*	6.20	1.1629E-002	1.92E-003	1.3535E-001
		312.00*	36.00	1.9249E-003		1.4535E-001
		340.60*	4.20	1.4023E-002		1.5311E-001
		375.45*	0.68	7.2259E-002		5.8544E+000
		415.76*	1.75	2.0996E-002		1.3784E-001
+	Pu-239	129.28*	0.01	3.2941E+001	2.47E+001	2.1835E+003
		375.00*	0.00	3.1053E+001		2.5159E+003
		413.70*	0.00	2.4681E+001		2.4732E+003
		451.50*	0.00	1.4719E+002		2.4722E+003
+	AM-241	59.54*	35.70	3.7004E-001	3.70E-001	1.1304E+003
		125.28*	0.00	5.6823E+001		8.0828E+002
		335.40*	0.00	1.2372E+002		1.2206E+003
		662.42*	0.00	4.5912E+001		1.1586E+003
		722.70*	0.00	1.0993E+002		1.0878E+003
+	PU-241	114.00*	0.02	1.2991E+001	1.30E+001	1.0638E+002
		332.60*	0.00	2.1560E+001		5.0902E+002
	CM-243	209.70	3.27	6.4223E-002	8.27E-003	1.1570E+000
		228.18	10.56	1.3066E-002		-2.8463E-003
		277.60	14.00	8.2742E-003		-1.8734E-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	4.79E+000 +/- 1.28E-001

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



Put Dimensions on Bottle

GROSS 171.090
TARE 26.308
NET 145.59
.6992

Item ID: 2335-01-0108

Weight (kg): 378.2

Material Description: Samples in Drum

Packaging: 55 gal Drum

Detector Distance (in): 24

Detector Filters: ~~LS~~ ~~Mylar~~ NONE

Dose Rate: <.5

Comments: 4 Counts TOTAL 1800 SEC
0956

233-S Item Analysis

Spreadsheet Version 3.0b 1/14/02

Sample Info:

Item ID: 233s-01-0108 **Assay Date:** 13-Nov-01

File Name: 956 **File Name:**

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.43E+02	1.35E+01		
Am-241	5.30E+01	4.22E+00		
Np-237	9.79E-03	6.06E-04		
U-238				
U-235				
Cs-137	7.80E-04	8.94E-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): 320.298 Depth for TMU (in): 4 % Volume: 50

Am-241 Calcs:

Measured	5.30E+01	+/-	5.30E+02	Use Meas
Calculated	1.97E+02	+/-	4.01E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	5.78E+01	+/-	4.69E+01
Pu-239	1.43E+02	+/-	1.16E+02
Pu-240	7.43E+01	+/-	6.03E+01
Pu-241	2.78E+02	+/-	2.25E+02
Pu-242	7.50E-02	+/-	6.09E-02
Am-241	5.30E+01	+/-	5.30E+02
Np-237	9.79E-03	+/-	7.91E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	7.80E-04	+/-	6.35E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		3.28E+02	+/-	5.48E+02	Calc from Pu-239 Act
Pu (g):	3.86E-01	**Pu (g) + 3 sigma TMU:**		1.33E+00	
		Pu(g) + 3 sigma:		4.96E-01	

Comments: Errors:

Analyst: Martin Winterrose **Date:** 1/24/02

```
#Date & Time: Thu Jan 24 14:28:29 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0108
~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=0.667     ~3con=1
~sd1=24
```

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

Report Generated On : 1/24/02 2:32:50 PM

Sample Title : 233s-01-0108 @270
Spectrum Description :
Sample Identification : 0956
Sample Size : 145.6 kg

Sample Taken On : 11/13/01 1:30:00 PM
Acquisition Started : 11/13/01 1:30:55 PM

Live Time: 1800.0 seconds Real Time: 1811.5 seconds

ISOCS Calabration : 233S-01-0108
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/24/02

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	2.72E+005	686.76	4.35E+004
	2	301.00	75.33	3.80E+003	197.99	7.85E+003
	3	340.00	85.08	1.90E+003	210.86	9.14E+003
M	4	379.87	95.04	9.35E+002	98.12	6.21E+003
m	5	396.20	99.12	3.27E+003	247.35	8.96E+003
m	6	412.90	103.30	1.55E+003	160.17	8.75E+003
m	7	417.66	104.49	5.16E+002	109.72	8.01E+003
	8	447.00	111.82	4.71E+002	130.31	5.27E+003
M	9	502.41	125.67	5.27E+002	76.96	4.06E+003
m	10	518.77	129.75	2.21E+003	237.57	4.36E+003
M	11	815.68	203.96	3.50E+002	56.93	1.01E+003
m	12	833.44	208.40	7.72E+002	113.40	9.82E+002
	13	1200.67	300.17	2.46E+002	45.93	5.13E+002
	14	1247.99	312.00	1.44E+003	56.45	4.83E+002
M	15	1332.25	333.06	3.84E+002	54.36	3.71E+002
m	16	1363.65	340.91	1.79E+002	29.37	3.64E+002
m	17	1380.91	345.22	3.19E+002	46.29	3.44E+002
M	18	1501.59	375.38	8.36E+002	29.92	2.58E+002
m	19	1522.07	380.50	1.62E+002	16.23	2.41E+002
m	20	1533.28	383.30	1.21E+002	14.85	2.05E+002
	21	1574.00	393.48	2.82E+002	33.48	2.10E+002
	22	1654.92	413.70	8.00E+002	43.05	2.46E+002
	23	1806.17	451.50	1.04E+002	26.75	1.63E+002
	24	2047.00	511.69	1.86E+002	30.57	1.62E+002
	25	2333.00	583.17	7.06E+001	23.46	1.19E+002
	26	2439.00	609.66	1.50E+002	22.10	8.55E+001
	27	2650.12	662.42	2.15E+002	23.66	7.45E+001
	28	3648.00	911.81	9.13E+001	16.77	4.47E+001
	29	4485.00	1120.99	6.65E+001	14.25	3.55E+001
	30	5850.00	1462.13	5.86E+002	24.76	4.71E+000
	31	7067.00	1766.28	5.03E+001	10.56	1.37E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.990	661.65*	85.12	7.79636E-004	8.94125E-005
NP-237	1.000	300.17*	6.20	9.61309E-003	1.85557E-003
		312.00*	36.00	9.78837E-003	6.05846E-004
		340.60*	4.20	1.07595E-002	1.83404E-003
Pu-239	0.997	129.28*	0.01	1.06723E+002	2.12855E+001
		375.00*	0.00	1.37936E+002	1.17254E+001
		413.70*	0.00	1.42511E+002	1.35158E+001
		451.50* @	0.00	1.52995E+002	3.96487E+001
AM-241	1.000	59.54*	35.70	5.29924E+001	4.21721E+000
		125.28*	0.00	4.13720E+001	6.36248E+000
		335.40*	0.00	1.94095E+002	2.89702E+001
		662.42* @	0.00	1.84341E+002	2.11352E+001
		722.70	0.00		
PU-241	0.927	114.00*	0.02	7.87073E+000	2.22276E+000
		332.60*	0.00	3.32216E+001	4.95860E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.990	5.654619E-004	9.060078E-005
NP-237	1.000	9.860162E-003	5.494712E-004
Pu-239 @	0.997	1.350038E+002	8.177297E+000
AM-241 @	1.000	5.064034E+001	3.493801E+000
PU-241	0.927	1.066215E+001	2.030762E+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

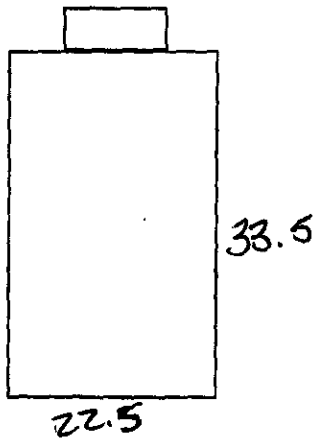
Nuclide	Mass (g)
Pu-239	3.17E-001 +/- 1.92E-002

****
***** 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	1.8970E-004	1.51E-004	7.5578E-005
		1332.49	100.00	1.5146E-004		-1.4006E-005
	CS-134	475.35	1.46	1.5609E-002	2.19E-004	4.2211E-004
		563.23	8.38	2.4078E-003		-2.1297E-003
		569.32	15.43	1.3495E-003		9.8896E-004
		604.70	97.60	2.6786E-004		-1.8527E-004
		795.84	85.40	2.1852E-004		-1.6933E-005
		801.93	8.73	2.0132E-003		3.0274E-005
		1038.57	1.00	1.6291E-002		-1.6518E-002
		1167.94	1.80	9.8508E-003		-8.3725E-003
		1365.15	3.04	4.6101E-003		-8.4570E-003
+	CS-137	661.65*	85.12	2.3198E-004	2.32E-004	7.7964E-004
+	NP-237	300.17*	6.20	5.6619E-003	9.57E-004	9.6131E-003
		312.00*	36.00	9.5659E-004		9.7884E-003
		340.60*	4.20	5.5000E-003		1.0759E-002
+	Pu-239	129.28*	0.01	1.4989E+001	1.28E+001	1.0672E+002
		375.00*	0.00	1.2774E+001		1.3794E+002
		413.70*	0.00	1.9515E+001		1.4251E+002
		451.50*	0.00	1.2313E+002		1.5300E+002
+	AM-241	59.54*	35.70	2.8761E-001	2.88E-001	5.2992E+001
		125.28*	0.00	2.3484E+001		4.1372E+001
		335.40*	0.00	4.6740E+001		1.9409E+002
		662.42*	0.00	5.4851E+001		1.8434E+002
		722.70	0.00	1.7107E+002		1.0953E+002
+	PU-241	114.00*	0.02	7.1106E+000	7.11E+000	7.8707E+000
		332.60*	0.00	8.0000E+000		3.3222E+001
	CM-243	209.70	3.27	1.7302E-002	2.65E-003	-4.8422E-004
		228.18	10.56	4.1697E-003		4.0553E-005
		277.60	14.00	2.6469E-003		-1.5161E-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 138.18
TARE 26.308
NET 111.87

Item ID: 2335-01-0109

Weight (kg): 304 LBS

.5373

Material Description: Samples in Drum

Packaging: 55 Drum

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: / 1800 SIZE 1009

233-S Item Analysis

Spreadsheet Version 3.0b 1/14/02

Sample Info:

Item ID:	233s-01-0109	**Assay Date:**	11-Dec-01
File Name:	1009	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.07E+02	9.95E+00		
Am-241	5.95E+01	5.13E+00		
Np-237	1.18E-02	6.56E-04		
U-238				
U-235				
Cs-137	8.14E-04	7.21E-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):	246.114	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	5.95E+01	+/-	1.80E+02	Use Meas
Calculated	1.49E+02	+/-	1.62E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	4.35E+01	+/-	1.84E+01
Pu-239	1.07E+02	+/-	4.54E+01
Pu-240	5.60E+01	+/-	2.37E+01
Pu-241	2.09E+02	+/-	8.85E+01
Pu-242	5.65E-02	+/-	2.39E-02
Am-241	5.95E+01	+/-	1.80E+02
Np-237	1.18E-02	+/-	4.92E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	8.14E-04	+/-	3.43E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	2.66E+02	+/-	1.88E+02	Calc from Pu-239 Act
Pu (g):	2.24E-01	**Pu (g) + 3 sigma TMU:**	5.08E-01	
		Pu(g) + 3 sigma:	2.86E-01	

Comments:

Errors:

Analyst: Martin Winterrose **Date:** 1/24/02

```
#Date & Time: Fri Jan 11 10:58:04 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0109
~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=0.5373    ~3con=1
~sd1=24
```

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

Report Generated On : 1/11/02 10:59:21 AM

Sample Title : 233s-01-0109
Spectrum Description :
Sample Identification : 1009
Sample Size : 111.9 kg

Sample Taken On : 12/11/01 12:28:00 PM
Acquisition Started : 12/11/01 12:28:52 PM

Live Time: 1800.0 seconds Real Time: 1813.1 seconds

ISOCS Calabration : 233S-01-0109
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/11/02

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	239.10	59.81	3.01E+005	9955.18	5.40E+003
2	340.14	85.07	7.29E+002	100.13	4.18E+003
3	395.89	99.01	2.89E+003	135.93	4.12E+003
4	413.60	103.44	1.37E+003	88.38	4.05E+003
5	445.10	111.32	6.11E+002	72.09	3.88E+003
6	458.76	114.73	1.90E+002	80.72	3.80E+003
7	502.65	125.71	4.11E+002	68.86	3.44E+003
8	518.57	129.69	2.00E+003	72.05	3.29E+003
9	814.88	203.78	2.52E+002	30.29	8.66E+002
10	833.22	208.36	7.24E+002	37.25	8.25E+002
11	1201.34	300.41	2.69E+002	24.75	3.83E+002
12	1248.07	312.09	1.57E+003	44.08	3.40E+002
13	1331.79	333.03	2.04E+002	21.95	2.72E+002
14	1343.17	335.87	1.08E+002	19.19	2.63E+002
15	1363.73	341.01	1.71E+002	29.14	2.47E+002
16	1379.68	345.00	2.30E+002	30.78	2.38E+002
17	1407.64	351.99	1.39E+002	18.33	2.29E+002
18	1500.85	375.30	6.73E+002	29.84	1.91E+002
19	1520.62	380.24	1.03E+002	19.07	1.84E+002
20	1533.00	383.34	9.22E+001	16.92	1.82E+002
21	1572.20	393.14	2.06E+002	19.20	1.65E+002
22	1655.52	413.97	5.42E+002	27.03	1.52E+002
23	1805.91	451.58	8.08E+001	13.68	1.10E+002
24	2044.08	511.13	1.53E+002	16.10	8.51E+001
25	2332.69	583.30	1.04E+002	13.47	7.05E+001
26	2437.18	609.42	1.64E+002	15.43	6.48E+001
27	2646.68	661.81	1.98E+002	16.42	6.05E+001
28	3644.94	911.42	1.02E+002	12.11	3.41E+001
29	4482.24	1120.78	5.67E+001	9.56	2.83E+001
30	5845.39	1461.62	5.42E+002	23.96	6.29E+000
31	7062.16	1765.87	6.45E+001	9.06	2.15E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	8.14082E-004	7.20943E-005
NP-237	0.995	300.17*	6.20	1.16036E-002	1.20490E-003
		312.00*	36.00	1.18313E-002	6.55611E-004
		340.60*	4.20	1.13828E-002	2.00794E-003
		375.00*	0.68	2.86393E-001	1.79097E-002
		415.60*	1.75	9.29613E-002	6.02504E-003
Pu-239	0.995	129.28*	0.01	1.03973E+002	1.78544E+001
		375.00*	0.00	1.23077E+002	1.09492E+001
		413.70*	0.00	1.07429E+002	9.95447E+000
		451.50* @	0.00	1.32072E+002	2.29588E+001
AM-241	0.997	59.54*	35.70	5.95481E+001	5.12676E+000
		125.28*	0.00	3.46075E+001	6.02913E+000
		335.40*	0.00	6.05607E+001	1.11312E+001
		662.42* @	0.00	1.92485E+002	1.70384E+001
		722.70	0.00		
PU-241	0.980	114.00*	0.02	3.22403E+000	1.38091E+000
		332.60*	0.00	1.95703E+001	2.29272E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	6.011769E-004	7.372712E-005
NP-237	0.995	1.170244E-002	5.522459E-004
Pu-239 @	0.995	1.044412E+002	3.957322E+000
AM-241 @	0.997	5.034035E+001	3.685367E+000
PU-241	0.980	7.575401E+000	1.182918E+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 *****
****

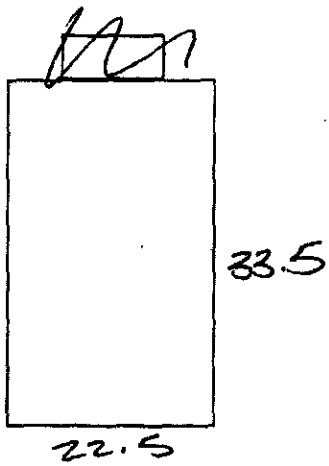
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.1422E-004	1.68E-004	2.2640E-005
		1332.49	100.00	1.6775E-004		-7.5268E-005
	CS-134	475.35	1.46	1.8651E-002	2.33E-004	-4.6182E-003
		563.23	8.38	2.9204E-003		2.2560E-003
		569.32	15.43	1.6046E-003		-4.6506E-004
		604.70	97.60	3.1534E-004		-9.7200E-005
		795.84	85.40	2.3260E-004		9.9074E-005
		801.93	8.73	2.1701E-003		1.1734E-004
		1038.57	1.00	2.1511E-002		1.2290E-002
		1167.94	1.80	1.1302E-002		-6.7448E-003
		1365.15	3.04	5.7874E-003		7.1341E-004
+	CS-137	661.65*	85.12	1.5964E-004	1.60E-004	8.1408E-004
+	NP-237	300.17*	6.20	4.0429E-003	6.65E-004	1.1604E-002
		312.00*	36.00	6.6544E-004		1.1831E-002
		340.60*	4.20	5.0430E-003		1.1383E-002
		375.00*	0.68	2.8545E-002		2.8639E-001
		415.60*	1.75	1.0310E-002		9.2961E-002
+	Pu-239	129.28*	0.01	1.4004E+001	1.19E+001	1.0397E+002
		375.00*	0.00	1.2267E+001		1.2308E+002
		413.70*	0.00	1.1914E+001		1.0743E+002
		451.50*	0.00	8.4213E+001		1.3207E+002
+	AM-241	59.54*	35.70	6.8245E-002	6.82E-002	5.9548E+001
		125.28*	0.00	2.3174E+001		3.4608E+001
		335.40*	0.00	4.3823E+001		6.0561E+001
		662.42*	0.00	3.7747E+001		1.9249E+002
		722.70	0.00	1.8104E+002		-1.2319E+001
+	PU-241	114.00*	0.02	4.9108E+000	4.91E+000	3.2240E+000
		332.60*	0.00	7.5998E+000		1.9570E+001
	CM-243	209.70	3.27	1.8412E-002	2.91E-003	5.7043E-002
		228.18	10.56	4.6735E-003		1.2131E-003
		277.60	14.00	2.9138E-003		4.7944E-004

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

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

Nuclide	Mass (g)
Pu-239	1.88E-001 +/- 7.14E-003

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



Put Dimensions on Bottle

GROSS 168.63
TARE 26.308
NET 142.32
.6836

Item ID: 2335-01-0110

Weight (kg): 371 LBS

Material Description: Packages in Drum

Packaging: 55 Gal Drum

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: 1800 Stu 1011

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0110

File Name: 1011

Assay Date: 11-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.39E+03	1.10E+02
Am-241	5.86E+02	6.46E+01
Np-237	3.44E-01	1.65E-02
U-238		
U-235		
Cs-137	2.78E-03	1.71E-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): 313.104

Width (in): 22.5

Depth for TMU (in): 4

Depth (in): 22.5

% Volume: 50

Am-241 Calcs:

Measured	5.86E+02	+/-	5.86E+03	Use Meas
Calculated	1.92E+03	+/-	3.89E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	5.63E+02	+/-	4.56E+02
Pu-239	1.39E+03	+/-	1.12E+03
Pu-240	7.23E+02	+/-	5.86E+02
Pu-241	2.70E+03	+/-	2.19E+03
Pu-242	7.31E-01	+/-	5.92E-01
Am-241	5.86E+02	+/-	5.86E+03
Np-237	3.44E-01	+/-	2.78E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.78E-03	+/-	2.24E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		3.26E+03	+/-	6.02E+03	Calc from Pu-239 Act
Pu (g):	3.68E+00	**Pu (g) + 3 sigma TMU:**		1.26E+01	
		Pu(g) + 3 sigma:		4.55E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Fri Jan 11 11:12:08 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0110
~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=0.6836    ~3con=1
~sd1=24
```

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

.eport Generated On : 1/11/02 11:16:57 AM

ample Title : 233s-01-0110
pectrum Description :
ample Identification : 1011
ample Size : 142.3 kg

ample Taken On : 12/11/01 2:42:00 PM
cquisition Started : 12/11/01 2:42:39 PM

ive Time: 1800.0 seconds Real Time: 1901.6 seconds

ISOCS Calabration : 233S-01-0110
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/11/02

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
M 1	239.18	59.83	2.70E+006	4020.24	3.55E+005
m 2	247.24	61.84	1.15E+004	228.03	1.68E+005
M 3	292.19	73.08	5.41E+003	1477.90	3.13E+004
m 4	300.92	75.27	1.10E+004	2855.51	3.38E+004
M 5	340.20	85.09	4.20E+003	170.18	3.02E+004
m 6	347.68	86.96	8.17E+003	202.47	4.16E+004
m 7	368.38	92.13	2.44E+003	131.64	4.76E+004
m 8	379.97	95.03	1.75E+004	332.14	4.76E+004
m 9	395.61	98.94	4.48E+004	772.72	4.31E+004
m 10	404.00	101.04	5.18E+003	172.05	4.26E+004
m 11	413.23	103.35	1.94E+004	462.94	4.06E+004
m 12	417.94	104.52	3.99E+003	322.62	3.85E+004
M 13	442.98	110.79	4.15E+003	347.77	2.09E+004
m 14	446.77	111.73	7.02E+003	389.60	2.06E+004
m 15	457.29	114.37	4.16E+003	253.86	2.07E+004
m 16	461.75	115.48	4.22E+003	235.79	1.93E+004
m 17	467.73	116.97	2.32E+003	143.05	1.88E+004
m 18	476.45	119.16	3.66E+003	142.62	1.93E+004
m 19	493.54	123.43	1.47E+003	110.23	1.83E+004
m 20	502.33	125.63	5.31E+003	176.86	1.77E+004
m 21	518.34	129.63	1.85E+004	498.70	1.64E+004
M 22	576.97	144.29	1.17E+003	169.70	1.23E+004
m 23	586.56	146.69	6.86E+002	132.37	1.80E+004
m 24	595.28	148.87	2.36E+003	272.49	1.80E+004
M 25	643.66	160.96	7.01E+002	227.86	1.15E+004
m 26	659.45	164.91	7.91E+002	212.57	1.86E+004
m 27	684.78	171.25	6.92E+002	188.51	1.68E+004
M 28	783.52	195.94	6.62E+002	73.06	8.23E+003
m 29	815.10	203.83	2.51E+003	113.65	7.84E+003
m 30	832.94	208.29	1.06E+004	366.43	6.73E+003
31	1088.00	272.07	3.95E+002	88.77	2.84E+003
32	1200.40	300.17	8.01E+003	142.66	3.77E+003
33	1247.69	312.00	4.81E+004	250.33	3.58E+003

34	1293.00	323.33	2.01E+002	76.37	1.86E+003
M 35	1331.55	332.97	3.17E+003	104.26	1.48E+003
m 36	1362.50	340.71	5.72E+003	169.26	1.58E+003
m 37	1380.42	345.19	2.59E+003	89.75	1.48E+003
M 38	1473.77	368.53	9.83E+002	45.61	1.28E+003
m 39	1500.85	375.30	8.22E+003	197.77	1.10E+003
m 40	1521.28	380.41	1.45E+003	53.78	9.59E+002
M 41	1572.09	393.11	2.39E+003	107.19	7.65E+002
m 42	1594.39	398.69	1.58E+003	76.46	6.82E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
M 43	1655.93	414.08	7.47E+003	84.23	7.39E+002
m 44	1690.41	422.70	5.43E+002	27.45	4.45E+002
45	1805.60	451.50	7.85E+002	44.62	3.11E+002
46	2045.00	511.36	1.85E+002	34.08	2.36E+002
47	2334.00	583.62	1.12E+002	24.26	1.31E+002
48	2437.00	609.38	1.47E+002	23.32	1.13E+002
49	2475.00	618.88	9.68E+001	26.67	1.53E+002
50	2649.13	662.42	7.34E+002	39.01	2.00E+002
51	2890.21	722.70	2.31E+002	24.51	9.45E+001
52	3645.00	911.43	7.54E+001	14.66	4.46E+001
53	5845.00	1461.53	5.69E+002	27.61	4.07E+001
54	7063.00	1766.08	8.04E+001	9.86	3.61E+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	0.990	661.65*	85.12	2.77590E-003	1.71366E-004
NP-237	1.000	300.17*	6.20	3.29515E-001	1.69486E-002
		312.00*	36.00	3.44097E-001	1.65492E-002
		340.60*	4.20	3.60000E-001	1.97857E-002
Pu-239	0.998	129.28*	0.01	1.02561E+003	1.74408E+002
		375.00*	0.00	1.41543E+003	1.14343E+002
		413.70*	0.00	1.38892E+003	1.09550E+002
		451.50* @	0.00	1.19770E+003	8.26678E+001
AM-241	0.999	59.54*	35.70	6.85542E+002	5.44922E+001
		125.28*	0.00	4.78373E+002	2.81378E+001
		335.40*	0.00	1.68050E+003	9.60933E+001
		662.42* @	0.00	6.56346E+002	4.04796E+001
		722.70*	0.00	5.85963E+002	6.46131E+001
PU-241	0.998	114.00*	0.02	7.75069E+001	6.35663E+000
		332.60*	0.00	2.87637E+002	1.64475E+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	0.990	3.893052E-004	1.963690E-004
NP-237	1.000	3.430504E-001	1.016028E-002
Pu-239 @	0.998	1.337459E+003	7.204006E+001
AM-241 @	0.999	5.642968E+002	2.274158E+001
PU-241	0.998	9.226262E+001	5.950763E+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

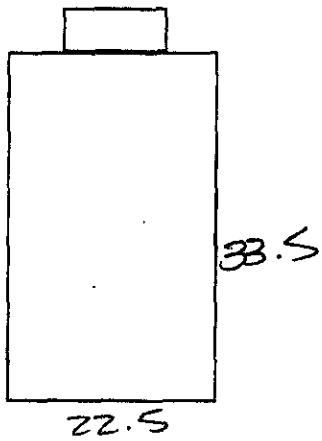
Nuclide	Mass (g)
Pu-239	3.07E+000 +/- 1.65E-001

****
**** 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	2.0607E-004	1.61E-004	-3.3828E-005
		1332.49	100.00	1.6080E-004		2.1081E-004
	CS-134	475.35	1.46	2.2152E-002	2.38E-004	3.7430E-003
		563.23	8.38	3.2226E-003		6.6669E-004
		569.32	15.43	1.7579E-003		-3.4630E-003
		604.70	97.60	3.1977E-004		-4.5364E-005
		795.84	85.40	2.3803E-004		-5.0733E-005
		801.93	8.73	2.4043E-003		-6.2799E-004
		1038.57	1.00	1.9267E-002		-1.1395E-002
		1167.94	1.80	1.1478E-002		4.2078E-003
		1365.15	3.04	4.6671E-003		2.7281E-003
+	CS-137	661.65*	85.12	3.5913E-004	3.59E-004	2.7759E-003
+	NP-237	300.17*	6.20	1.5154E-002	2.86E-003	3.2952E-001
		312.00*	36.00	2.8649E-003		3.4410E-001
		340.60*	4.20	1.1811E-002		3.6000E-001
+	Pu-239	129.28*	0.01	3.3126E+001	2.40E+001	1.0256E+003
		375.00*	0.00	2.7037E+001		1.4154E+003
		413.70*	0.00	2.4006E+001		1.3889E+003
		451.50*	0.00	1.7835E+002		1.1977E+003
+	AM-241	59.54*	35.70	7.0583E-001	7.06E-001	6.8554E+002
		125.28*	0.00	5.6031E+001		4.7837E+002
		335.40*	0.00	9.6404E+001		1.6805E+003
		662.42*	0.00	8.4913E+001		6.5635E+002
		722.70*	0.00	1.6691E+002		5.8596E+002
+	PU-241	114.00*	0.02	1.2536E+001	1.25E+001	7.7507E+001
		332.60*	0.00	1.6501E+001		2.8764E+002
	CM-243	209.70	3.27	5.5487E-002	7.86E-003	1.1966E-002
		228.18	10.56	1.1807E-002		-8.0006E-003
		277.60	14.00	7.8599E-003		3.8273E-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 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

248.5
-57.86
190.64
86.65 kg

Item ID: 2335-01-0119

Weight (kg): 248.5

Material Description: Samples in Drum (3997)

Packaging: 55 Gal

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: Drum Rotating 1800 Sec 100S

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0119

File Name: 1005

Assay Date: 10-Dec-01

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	8.32E+02	6.98E+01
Am-241	4.26E+02	6.33E+01
Np-237	4.19E-02	2.15E-03
U-238		
U-235		
Cs-137	2.27E-03	1.66E-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): 190.64

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	4.26E+02	+/-	1.29E+03	Use Meas
Calculated	1.15E+03	+/-	1.25E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	3.37E+02	+/-	1.42E+02
Pu-239	8.32E+02	+/-	3.50E+02
Pu-240	4.34E+02	+/-	1.83E+02
Pu-241	1.62E+03	+/-	6.82E+02
Pu-242	4.38E-01	+/-	1.84E-01
Am-241	4.26E+02	+/-	1.29E+03
Np-237	4.19E-02	+/-	1.74E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.27E-03	+/-	9.50E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	2.03E+03	+/-	1.36E+03	Calc from Pu-239 Act
Pu (g):	1.34E+00	**Pu (g) + 3 sigma TMU:**	3.04E+00	
		Pu(g) + 3 sigma:	1.68E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Fri Jan 11 11:30:56 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0119
~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=0.397     ~3con=1
~sd1=24
```

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

Report Generated On : 1/11/02 11:33:28 AM

Sample Title : 233s-01-0119
Spectrum Description :
Sample Identification : 1005
Sample Size : 86.7 kg

Sample Taken On : 12/10/01 2:23:00 PM
Acquisition Started : 12/10/01 2:23:33 PM

Live Time: 1800.0 seconds Real Time: 1853.6 seconds

ISOCS Calabration : 233S-01-0119
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/11/02

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	1.54E+006	1632.66	2.35E+005
M	2	292.32	73.12	2.78E+003	99.21	1.23E+004
m	3	300.72	75.21	5.24E+003	117.65	1.27E+004
	4	341.00	85.29	3.56E+003	357.53	2.61E+004
M	5	379.79	94.99	7.03E+003	187.42	1.87E+004
m	6	389.60	97.44	3.36E+003	194.96	1.77E+004
m	7	395.98	99.03	2.16E+004	451.47	1.69E+004
m	8	404.70	101.22	4.22E+003	148.51	1.57E+004
m	9	413.02	103.30	1.05E+004	297.11	1.48E+004
m	10	417.90	104.51	3.07E+003	201.71	1.44E+004
m	11	443.86	111.01	3.23E+003	342.50	1.29E+004
m	12	447.50	111.92	2.42E+003	337.18	1.33E+004
m	13	458.58	114.69	3.67E+003	129.43	1.27E+004
m	14	465.34	116.38	2.33E+003	104.76	1.17E+004
m	15	474.75	118.73	1.32E+003	81.32	1.18E+004
m	16	492.27	123.11	1.05E+003	79.66	1.06E+004
m	17	502.26	125.61	3.92E+003	121.94	1.02E+004
m	18	518.36	129.63	1.37E+004	315.39	9.64E+003
	19	595.00	148.80	2.92E+003	244.00	1.13E+004
M	20	643.52	160.93	7.05E+002	67.04	5.41E+003
m	21	658.74	164.73	4.24E+002	60.91	5.59E+003
	22	783.00	195.81	3.48E+002	92.30	2.72E+003
M	23	815.16	203.85	1.76E+003	74.78	2.97E+003
m	24	832.91	208.29	7.09E+003	219.39	2.67E+003
	25	1200.40	300.17	8.24E+002	65.90	1.12E+003
	26	1247.69	312.00	5.27E+003	96.99	1.10E+003
	27	1287.00	321.83	1.79E+002	55.61	8.88E+002
M	28	1331.31	332.91	1.82E+003	102.74	8.13E+002
m	29	1362.64	340.74	6.92E+002	49.00	7.85E+002
m	30	1380.36	345.17	1.49E+003	88.76	8.31E+002
M	31	1473.69	368.51	5.48E+002	29.58	6.54E+002
m	32	1500.62	375.24	4.25E+003	66.18	5.64E+002
m	33	1521.34	380.42	8.25E+002	32.58	4.52E+002

M 34	1571.91	393.07	1.39E+003	39.74	4.18E+002
m 35	1594.42	398.70	1.81E+002	19.66	3.78E+002
M 36	1655.02	413.85	3.94E+003	120.35	2.67E+002
m 37	1690.63	422.75	2.62E+002	22.04	2.94E+002
38	1805.60	451.50	4.01E+002	35.43	2.26E+002
39	2043.00	510.86	2.27E+002	36.65	2.21E+002
40	2332.00	583.12	1.17E+002	19.06	7.55E+001
41	2437.00	609.38	1.20E+002	21.92	9.94E+001
42	2649.13	662.42	5.07E+002	33.38	1.48E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2890.21	722.70	1.41E+002	20.51	7.20E+001
44	3645.00	911.43	8.35E+001	13.91	3.45E+001
45	5846.00	1461.78	6.12E+002	28.25	3.47E+001
46	7063.00	1766.08	6.78E+001	9.00	3.15E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.990	661.65*	85.12	2.26954E-003	1.65585E-004
NP-237	1.000	300.17*	6.20	3.75244E-002	3.50362E-003
		312.00*	36.00	4.19077E-002	2.14683E-003
		340.60*	4.20	4.87163E-002	4.12121E-003
Pu-239	0.998	129.28*	0.01	7.74035E+002	1.31180E+002
		375.00*	0.00	8.25328E+002	6.49331E+001
		413.70*	0.00	8.32042E+002	6.97655E+001
		451.50* @	0.00	7.01024E+002	6.77569E+001
AM-241	1.000	59.54*	35.70	3.88631E+002	3.09149E+001
		125.28*	0.00	3.58893E+002	2.06749E+001
		335.40*	0.00	1.07591E+003	7.89362E+001
		662.42* @	0.00	5.36619E+002	3.91247E+001
		722.70*	0.00	4.25662E+002	6.32838E+001
PU-241	0.992	114.00*	0.02	6.84468E+001	4.44663E+000
		332.60*	0.00	1.84155E+002	1.35109E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.990	6.468212E-004	1.791994E-004
NP-237	1.000	4.203026E-002	1.672917E-003
Pu-239 @	0.998	8.221301E+002	4.468824E+001
AM-241 @	1.000	3.836817E+002	1.626444E+001
PU-241	0.992	7.333688E+001	4.232511E+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

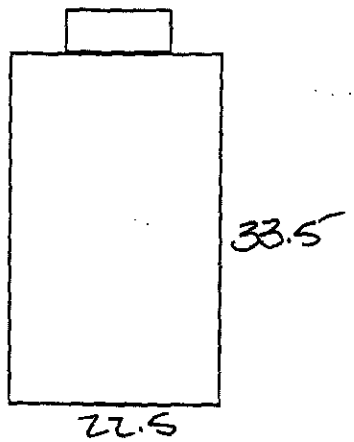
Nuclide	Mass (g)
Pu-239	1.15E+000 +/- 6.25E-002

****
***** 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	2.4371E-004	2.03E-004	-1.6648E-004
		1332.49	100.00	2.0257E-004		-4.1558E-005
	CS-134	475.35	1.46	2.1730E-002	2.94E-004	-2.4894E-002
		563.23	8.38	3.3217E-003		-5.4756E-004
		569.32	15.43	1.8215E-003		-8.9771E-004
		604.70	97.60	3.4655E-004		1.5691E-004
		795.84	85.40	2.9419E-004		1.9706E-004
		801.93	8.73	2.7185E-003		-1.0917E-003
		1038.57	1.00	2.1197E-002		-9.3562E-003
		1167.94	1.80	1.4177E-002		8.2067E-003
		1365.15	3.04	5.7314E-003		2.8705E-003
+	CS-137	661.65*	85.12	3.7495E-004	3.75E-004	2.2695E-003
+	NP-237	300.17*	6.20	9.0057E-003	1.70E-003	3.7524E-002
		312.00*	36.00	1.7025E-003		4.1908E-002
		340.60*	4.20	9.3666E-003		4.8716E-002
+	Pu-239	129.28*	0.01	2.5912E+001	1.66E+001	7.7404E+002
		375.00*	0.00	2.2001E+001		8.2533E+002
		413.70*	0.00	1.6647E+001		8.3204E+002
		451.50*	0.00	1.7283E+002		7.0102E+002
+	AM-241	59.54*	35.70	8.8519E-001	8.85E-001	3.8863E+002
		125.28*	0.00	4.3233E+001		3.5889E+002
		335.40*	0.00	8.0146E+001		1.0759E+003
		662.42*	0.00	8.8655E+001		5.3662E+002
		722.70*	0.00	1.7426E+002		4.2566E+002
+	PU-241	114.00*	0.02	9.8166E+000	9.82E+000	6.8447E+001
		332.60*	0.00	1.3718E+001		1.8415E+002
	CM-243	209.70	3.27	4.1592E-002	4.82E-003	-2.1490E-003
		228.18	10.56	7.6196E-003		-1.1903E-003
		277.60	14.00	4.8218E-003		-5.0433E-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: 152.27
TARE: 26.3
NET: 125.97

Item ID: 2335-01-0121

Weight (~~kg~~ LBS): 335

.577121

Material Description: SAMPLES IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: <1.5

Comments: 1800 SEC 10 15

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0121

File Name: 1015

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)	8.70E+02	6.91E+01		
Am-241	6.96E+02	5.53E+01		
Np-237	4.31E-02	2.21E-03		
U-238				
U-235				
Cs-137	2.75E-03	1.65E-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): 277.134

Depth for TMU (in): 4

% Volume: 50

Am-241 Calcs:

Measured	6.96E+02	+/-	2.11E+03	Use Meas
Calculated	1.20E+03	+/-	1.30E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	3.53E+02	+/-	1.48E+02
Pu-239	8.70E+02	+/-	3.66E+02
Pu-240	4.53E+02	+/-	1.91E+02
Pu-241	1.69E+03	+/-	7.12E+02
Pu-242	4.58E-01	+/-	1.92E-01
Am-241	6.96E+02	+/-	2.11E+03
Np-237	4.31E-02	+/-	1.79E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.75E-03	+/-	1.15E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		2.37E+03	+/-	2.15E+03	Calc from Pu-239 Act
Pu (g):	2.04E+00	**Pu (g) + 3 sigma TMU:**		4.61E+00	
		Pu(g) + 3 sigma:		2.53E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Fri Jan 11 11:41:29 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0121
~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=0.5771    ~3con=1
~sd1=24
```

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

Report Generated On : 1/11/02 11:43:40 AM

Sample Title : 233s-01-0121
Spectrum Description :
Sample Identification : 1015
Sample Size : 126.0 kg

Sample Taken On : 12/12/01 10:00:00 AM
Acquisition Started : 12/12/01 10:01:08 AM

Live Time: 1800.0 seconds Real Time: 1897.6 seconds

ISOCS Calabration : 233S-01-0121
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/11/02

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
M	1	221.54	55.42	8.39E+004	519.60	4.02E+005
m	2	228.37	57.12	1.41E+005	678.85	3.76E+005
m	3	239.15	59.82	2.87E+006	4730.48	2.44E+005
m	4	247.53	61.92	9.13E+003	201.91	1.12E+005
M	5	292.29	73.11	3.38E+003	125.93	2.19E+004
m	6	300.93	75.27	6.10E+003	142.54	2.13E+004
	7	341.00	85.29	9.94E+002	261.82	2.15E+004
M	8	380.02	95.04	7.20E+003	173.86	2.49E+004
m	9	395.93	99.02	2.61E+004	472.69	2.70E+004
m	10	404.16	101.08	4.01E+003	136.01	2.54E+004
m	11	413.17	103.33	1.48E+004	350.67	2.35E+004
m	12	417.83	104.50	2.37E+003	228.13	2.28E+004
m	13	445.69	111.47	4.67E+003	123.35	2.08E+004
m	14	458.70	114.72	3.48E+003	116.80	1.97E+004
m	15	465.53	116.42	2.30E+003	101.05	1.90E+004
m	16	476.84	119.25	3.34E+003	101.96	1.81E+004
m	17	492.74	123.23	9.02E+002	78.95	1.69E+004
m	18	502.18	125.59	4.89E+003	124.18	1.62E+004
m	19	518.54	129.68	1.38E+004	262.45	1.53E+004
M	20	578.12	144.58	4.29E+002	120.66	6.07E+003
m	21	595.74	148.98	1.85E+003	241.68	1.40E+004
M	22	643.88	161.02	5.97E+002	231.47	7.73E+003
m	23	659.36	164.89	6.36E+002	224.07	9.48E+003
	24	784.00	196.06	5.99E+002	171.63	6.40E+003
M	25	815.11	203.83	1.76E+003	88.25	4.31E+003
m	26	833.01	208.31	6.48E+003	253.49	3.85E+003
	27	1200.40	300.17	9.06E+002	79.58	1.73E+003
	28	1247.69	312.00	6.08E+003	113.77	1.81E+003
	29	1294.00	323.58	1.85E+002	66.22	1.33E+003
M	30	1331.61	332.98	2.12E+003	116.74	1.14E+003
m	31	1363.31	340.91	8.85E+002	57.00	1.24E+003
m	32	1380.66	345.25	1.87E+003	102.86	1.08E+003
M	33	1473.83	368.54	6.91E+002	40.35	1.03E+003

m 34	1500.78	375.28	5.31E+003	182.01	8.43E+002
m 35	1521.50	380.46	1.10E+003	50.87	6.88E+002
M 36	1571.93	393.07	1.66E+003	44.33	6.43E+002
m 37	1594.38	398.69	2.27E+002	22.34	5.70E+002
M 38	1655.39	413.94	4.70E+003	68.52	4.99E+002
m 39	1690.75	422.78	3.19E+002	21.93	3.23E+002
40	1805.60	451.50	5.74E+002	39.66	2.63E+002
41	2045.00	511.36	2.09E+002	36.49	2.47E+002
42	2333.00	583.37	1.42E+002	28.20	1.41E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2438.00	609.63	1.43E+002	27.72	1.61E+002
44	2611.00	652.89	7.64E+001	19.23	8.96E+001
45	2649.13	662.42	7.22E+002	36.96	1.72E+002
46	2890.21	722.70	2.07E+002	22.49	8.25E+001
47	5846.00	1461.78	5.94E+002	27.47	2.78E+001
48	7061.00	1765.58	4.50E+001	12.17	2.00E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.990	661.65*	85.12	2.75251E-003	1.65417E-004
NP-237	1.000	300.17*	6.20	3.68615E-002	3.69474E-003
		312.00*	36.00	4.31013E-002	2.21286E-003
		340.60*	4.20	5.52755E-002	4.38317E-003
Pu-239	0.998	129.28*	0.01	7.38731E+002	1.24831E+002
		375.00*	0.00	9.09844E+002	7.67747E+001
		413.70*	0.00	8.70379E+002	6.91257E+001
		451.50* @	0.00	8.73859E+002	6.94581E+001
AM-241	0.999	59.54*	35.70	6.95708E+002	5.53035E+001
		125.28*	0.00	4.27219E+002	2.33779E+001
		335.40*	0.00	1.11387E+003	8.05094E+001
		662.42* @	0.00	6.50815E+002	3.90723E+001
		722.70*	0.00	5.31097E+002	5.98302E+001
PU-241	0.992	114.00*	0.02	6.22693E+001	3.98702E+000
		332.60*	0.00	1.90652E+002	1.37801E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.990	6.786778E-004	1.850532E-004
NP-237	1.000	4.363714E-002	1.742038E-003
Pu-239 @	0.998	8.664232E+002	4.750589E+001
AM-241 @	0.999	4.903448E+002	1.969353E+001
PU-241	0.992	6.570323E+001	3.838776E+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

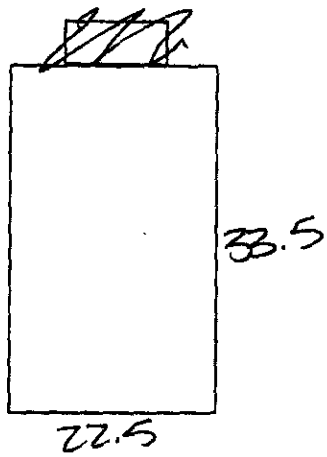
Nuclide	Mass (g)
Pu-239	1.76E+000 +/- 9.65E-002

****
***** 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	2.0568E-004	1.67E-004	1.8165E-004
		1332.49	100.00	1.6661E-004		1.2542E-004
	CS-134	475.35	1.46	2.1417E-002	2.44E-004	1.5766E-003
		563.23	8.38	3.1514E-003		-2.5713E-004
		569.32	15.43	1.7228E-003		-4.3567E-005
		604.70	97.60	3.3184E-004		-9.4816E-005
		795.84	85.40	2.4431E-004		-1.8822E-004
		801.93	8.73	2.4811E-003		1.2155E-003
		1038.57	1.00	2.1351E-002		2.0260E-002
		1167.94	1.80	1.1407E-002		2.6789E-003
		1365.15	3.04	4.9362E-003		-8.1137E-004
+	CS-137	661.65*	85.12	3.2874E-004	3.29E-004	2.7525E-003
+	NP-237	300.17*	6.20	9.9734E-003	1.95E-003	3.6861E-002
		312.00*	36.00	1.9505E-003		4.3101E-002
		340.60*	4.20	1.0406E-002		5.5275E-002
+	Pu-239	129.28*	0.01	3.0980E+001	1.98E+001	7.3873E+002
		375.00*	0.00	2.3600E+001		9.0984E+002
		413.70*	0.00	1.9762E+001		8.7038E+002
		451.50*	0.00	1.6260E+002		8.7386E+002
+	AM-241	59.54*	35.70	5.5888E-001	5.59E-001	6.9571E+002
		125.28*	0.00	5.2015E+001		4.2722E+002
		335.40*	0.00	8.3954E+001		1.1139E+003
		662.42*	0.00	7.7730E+001		6.5081E+002
		722.70*	0.00	1.5234E+002		5.3110E+002
+	PU-241	114.00*	0.02	1.1715E+001	1.17E+001	6.2269E+001
		332.60*	0.00	1.4370E+001		1.9065E+002
	CM-243	209.70	3.27	4.0535E-002	5.43E-003	-6.1821E-003
		228.18	10.56	8.4760E-003		-3.2329E-003
		277.60	14.00	5.4272E-003		2.8242E-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 233-S
NDA Item Description Sheet
Bottle or Cylinder Geometry



Put Dimensions on Bottle

GROSS 108.63
TARE 26.308
NET 82.32
~~.3954~~ M
.3771

Item ID: 2335-01-0122

Weight (kg): 230 LBS

Material Description: SAMPLES IN DRUMS

Packaging: SS DRUM

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: <.5

Comments: / 1800 SIEL 1008

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID:	233s-01-0122	**Assay Date:**	11-Dec-01
File Name:	1008	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.70E+02	1.49E+01		
Am-241	6.88E+01	5.89E+00		
Np-237	9.79E-03	5.67E-04		
U-238				
U-235				
Cs-137	9.61E-04	8.38E-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):	181.104	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	6.88E+01	+/-	2.08E+02	Use Meas
Calculated	2.35E+02	+/-	2.55E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.89E+01	+/-	2.91E+01
Pu-239	1.70E+02	+/-	7.17E+01
Pu-240	8.85E+01	+/-	3.74E+01
Pu-241	3.31E+02	+/-	1.40E+02
Pu-242	8.94E-02	+/-	3.77E-02
Am-241	6.88E+01	+/-	2.08E+02
Np-237	9.79E-03	+/-	4.08E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.61E-04	+/-	4.05E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	3.96E+02	+/-	2.25E+02	Calc from Pu-239 Act
Pu (g):	2.60E-01	**Pu (g) + 3 sigma TMU:**	5.90E-01	
		Pu(g) + 3 sigma:	3.29E-01	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Fri Jan 11 11:55:06 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0122
~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=0.3771    ~3con=1
~sd1=24
```

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

Report Generated On : 1/11/02 11:56:25 AM

Sample Title : 233s-01-0122
Spectrum Description :
Sample Identification : 1008
Sample Size : 82.3 kg

Sample Taken On : 12/11/01 11:28:00 AM
Acquisition Started : 12/11/01 11:29:08 AM

Live Time: 1800.0 seconds Real Time: 1815.2 seconds

ISOCS Calabration : 233S-01-0122
Energy Calibration Used Done On : 11/29/01
Efficiency Calibration Used Done On : 1/11/02

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	239.11	59.81	3.61E+005	11414.5	6.19E+003
2	339.69	84.96	8.41E+002	84.48	4.33E+003
3	349.94	87.52	3.27E+002	74.97	4.34E+003
4	395.98	99.04	3.78E+003	143.71	4.28E+003
5	413.73	103.47	1.70E+003	109.23	4.21E+003
6	445.02	111.30	6.81E+002	82.01	4.04E+003
7	459.16	114.83	4.30E+002	87.72	3.94E+003
8	503.14	125.83	6.41E+002	63.84	3.58E+003
9	518.30	129.62	3.04E+003	79.70	3.43E+003
10	814.70	203.73	3.78E+002	36.84	9.54E+002
11	832.90	208.28	9.46E+002	40.85	8.90E+002
12	1200.87	300.29	2.01E+002	23.51	3.99E+002
13	1248.24	312.14	1.21E+003	39.65	3.53E+002
14	1331.73	333.01	3.29E+002	26.21	2.87E+002
15	1342.92	335.81	1.39E+002	21.04	2.86E+002
16	1380.31	345.16	2.57E+002	35.74	2.63E+002
17	1408.48	352.20	1.58E+002	19.32	2.42E+002
18	1500.43	375.20	9.34E+002	34.48	2.07E+002
19	1521.09	380.36	1.45E+002	20.57	1.87E+002
20	1532.55	383.23	1.42E+002	18.37	1.87E+002
21	1572.32	393.17	3.14E+002	22.11	1.72E+002
22	1655.19	413.89	7.86E+002	31.11	1.39E+002
23	1806.18	451.64	1.17E+002	14.83	1.08E+002
24	2043.54	511.00	1.30E+002	15.12	9.02E+001
25	2436.95	609.37	1.72E+002	15.74	6.74E+001
26	2646.81	661.84	2.09E+002	17.02	6.07E+001
27	2888.39	722.24	2.64E+001	9.37	4.11E+001
28	3644.34	911.27	7.36E+001	10.78	2.66E+001
29	5845.50	1461.65	5.91E+002	24.95	9.34E+000
30	7062.62	1765.98	5.74E+001	8.57	2.98E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	9.61451E-004	8.38351E-005
NP-237	0.860	300.17*	6.20	9.28865E-003	1.17403E-003
		312.00*	36.00	9.79414E-003	5.67188E-004
		340.60	4.20		
		375.00*	0.68	4.31452E-001	2.48052E-002
		415.60*	1.75	1.47070E-001	8.42070E-003
Pu-239	0.996	129.28*	0.01	1.59885E+002	2.71727E+001
		375.00*	0.00	1.85415E+002	1.58516E+001
		413.70*	0.00	1.69958E+002	1.48786E+001
		451.50* @	0.00	2.10347E+002	2.78235E+001
AM-241	0.997	59.54*	35.70	6.88461E+001	5.88822E+000
		125.28*	0.00	5.44279E+001	6.02468E+000
		335.40*	0.00	8.40310E+001	1.33100E+001
		662.42* @	0.00	2.27330E+002	1.98128E+001
		722.70*	0.00	8.18452E+001	2.91529E+001
PU-241	0.975	114.00*	0.02	7.31142E+000	1.54401E+000
		332.60*	0.00	3.39726E+001	3.13545E+000

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	6.900965E-004	8.546655E-005
NP-237	0.860	9.693710E-003	5.101802E-004
Pu-239 @	0.996	1.652242E+002	5.510188E+000
AM-241 @	0.997	6.416013E+001	3.977331E+000
PU-241	0.975	1.251483E+001	1.385172E+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 *****
****

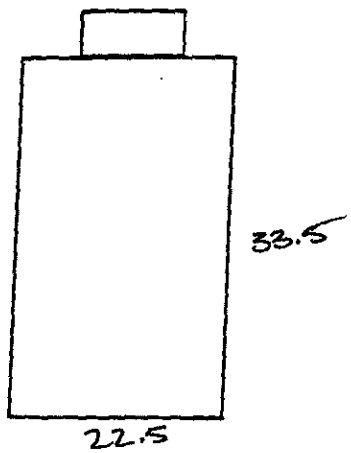
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.2745E-004	2.18E-004	-7.8060E-005
		1332.49	100.00	2.1849E-004		-4.1919E-005
	CS-134	475.35	1.46	2.0065E-002	2.91E-004	-5.9364E-003
		563.23	8.38	3.1370E-003		-1.2479E-005
		569.32	15.43	1.7589E-003		1.2541E-003
		604.70	97.60	3.6968E-004		2.2898E-005
		795.84	85.40	2.9124E-004		-1.0482E-004
		801.93	8.73	2.8288E-003		1.2012E-004
		1038.57	1.00	2.5347E-002		6.7444E-003
		1167.94	1.80	1.2747E-002		-5.7360E-003
		1365.15	3.04	6.3424E-003		2.7474E-003
+	CS-137	661.65*	85.12	1.7889E-004	1.79E-004	9.6145E-004
+	NP-237	300.17*	6.20	4.4159E-003	7.28E-004	9.2887E-003
		312.00*	36.00	7.2802E-004		9.7941E-003
		340.60	4.20	1.2490E-002		3.2263E-002
		375.00*	0.68	3.2168E-002		4.3145E-001
		415.60*	1.75	1.0770E-002		1.4707E-001
+	Pu-239	129.28*	0.01	1.4501E+001	1.24E+001	1.5988E+002
		375.00*	0.00	1.3824E+001		1.8541E+002
		413.70*	0.00	1.2446E+001		1.6996E+002
		451.50*	0.00	9.1515E+001		2.1035E+002
+	AM-241	59.54*	35.70	7.0285E-002	7.03E-002	6.8846E+001
		125.28*	0.00	2.3869E+001		5.4428E+001
		335.40*	0.00	4.9250E+001		8.4031E+001
		662.42*	0.00	4.2299E+001		2.2733E+002
		722.70*	0.00	1.0084E+002		8.1845E+001
+	PU-241	114.00*	0.02	5.0103E+000	5.01E+000	7.3114E+000
		332.60*	0.00	8.4092E+000		3.3973E+001
	CM-243	209.70	3.27	2.0527E-002	3.23E-003	6.1618E-002
		228.18	10.56	5.0240E-003		2.7557E-003
		277.60	14.00	3.2330E-003		-7.6397E-005

+ = 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	2.19E-001 +/- 7.32E-003

Bldg 233s
NDA Item Description Sheet
Bottle Geometry



Put Dimensions on Bottle

GROSS 130.36
TARE 23.308
NET 107.05
~~.5142~~
.4904

Item ID: 2335-01-0123

Weight (kg): 293.4 LBS

Material Description: SAMPLES IN DRUM

Packaging: 55 GAL DRUM

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: <.5

Comments: 4 MEASUREMENTS COMBINED FOR 1800SEC TOTAL
0928

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID:	233s-01-0123	**Assay Date:**	5-Nov-01
File Name:	928	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	1.51E+03	1.19E+02		
Am-241	9.18E+02	7.30E+01		
Np-237	1.27E-01	6.22E-03		
U-238				
U-235				
Cs-137	5.15E-03	2.59E-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):	235.51	Depth for TMU (in):	4	% Volume:	50

Am-241 Calcs:

Measured	9.18E+02	+/-	2.78E+03	Use Meas
Calculated	2.09E+03	+/-	2.26E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.12E+02	+/-	2.57E+02
Pu-239	1.51E+03	+/-	6.34E+02
Pu-240	7.86E+02	+/-	3.30E+02
Pu-241	2.94E+03	+/-	1.23E+03
Pu-242	7.94E-01	+/-	3.34E-01
Am-241	9.18E+02	+/-	2.78E+03
Np-237	1.27E-01	+/-	5.27E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	5.15E-03	+/-	2.14E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		3.83E+03	+/-	2.88E+03	Calc from Pu-239 Act
Pu (g):	3.01E+00	**Pu (g) + 3 sigma TMU:**		6.80E+00	
		Pu(g) + 3 sigma:		3.72E+00	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 1/24/02

```
#Date & Time: Fri Jan 11 12:18:59 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0123
~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=0.4904    ~3con=1
~sd1=24
```

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

Report Generated On : 1/11/02 12:30:13 PM

Sample Title : 233s-01-0123 @270
Spectrum Description :
Sample Identification : 0928
Sample Size : 107.1 kg

Sample Taken On : 11/05/01 3:37:00 PM
Acquisition Started : 11/05/01 3:37:35 PM

Live Time: 1800.0 seconds Real Time: 1958.0 seconds

ISOCS Calabration : 233S-01-0123
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/11/02

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	4.68E+006	2838.49	7.34E+005
M	2	292.43	73.19	5.17E+003	156.51	3.55E+004
m	3	301.00	75.33	1.02E+004	176.03	3.87E+004
	4	341.00	85.33	1.94E+003	278.08	2.85E+004
M	5	380.05	95.09	1.80E+004	457.10	4.30E+004
m	6	388.45	97.19	3.91E+003	379.84	4.23E+004
m	7	396.07	99.09	5.75E+004	1291.58	3.92E+004
m	8	404.66	101.24	7.13E+003	265.37	3.54E+004
m	9	413.38	103.42	2.80E+004	701.64	3.18E+004
m	10	418.61	104.72	6.63E+003	292.03	3.04E+004
M	11	443.26	110.88	4.96E+003	387.65	2.19E+004
m	12	446.88	111.79	8.31E+003	404.88	2.04E+004
m	13	454.76	113.76	2.07E+003	159.08	1.95E+004
m	14	459.99	115.06	6.77E+003	200.21	1.89E+004
m	15	465.38	116.41	5.10E+003	173.12	1.93E+004
m	16	471.58	117.96	2.20E+003	126.66	1.76E+004
m	17	477.58	119.46	5.27E+003	146.80	1.71E+004
m	18	493.70	123.49	1.98E+003	101.09	1.59E+004
m	19	502.65	125.73	7.89E+003	164.97	1.61E+004
m	20	518.72	129.74	3.13E+004	493.88	1.42E+004
M	21	577.93	144.54	1.72E+003	234.37	1.32E+004
m	22	586.65	146.72	1.37E+003	188.05	1.60E+004
m	23	595.77	149.00	2.66E+003	329.61	1.47E+004
M	24	644.23	161.11	1.68E+003	406.29	1.37E+004
m	25	660.13	165.08	8.77E+002	209.53	1.61E+004
m	26	684.62	171.20	8.86E+002	214.38	1.38E+004
M	27	758.18	189.59	5.79E+002	64.90	6.10E+003
m	28	784.49	196.16	9.38E+002	66.32	8.22E+003
M	29	815.70	203.96	3.55E+003	78.50	5.83E+003
m	30	833.53	208.42	9.42E+003	107.48	5.47E+003
	31	1024.00	256.02	4.07E+002	86.04	2.54E+003
	32	1072.00	268.02	3.14E+002	79.92	2.20E+003
	33	1200.67	300.17	2.42E+003	108.14	2.85E+003

	34	1247.99	312.00	1.73E+004	166.07	2.65E+003
	35	1288.00	322.00	1.56E+002	78.74	1.92E+003
M	36	1332.54	333.13	3.50E+003	147.24	1.36E+003
m	37	1363.76	340.93	2.26E+003	102.24	1.43E+003
m	38	1381.43	345.35	3.11E+003	133.26	1.27E+003
M	39	1474.44	368.59	1.13E+003	46.75	1.26E+003
m	40	1501.84	375.44	8.72E+003	188.64	1.01E+003
m	41	1522.53	380.61	1.79E+003	57.53	8.56E+002
M	42	1573.21	393.28	2.97E+003	194.14	6.93E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
m 43	1595.67	398.89	6.31E+002	51.35	6.07E+002
M 44	1656.59	414.12	7.74E+003	83.48	6.12E+002
m 45	1691.82	422.92	5.55E+002	27.23	5.10E+002
46	1806.17	451.50	1.03E+003	51.13	3.39E+002
47	2045.00	511.19	2.70E+002	36.00	2.22E+002
48	2334.00	583.41	1.46E+002	20.02	8.33E+001
49	2439.00	609.66	8.50E+001	19.96	1.03E+002
50	2477.00	619.15	7.26E+001	23.23	1.41E+002
51	2650.12	662.42	1.27E+003	49.58	1.91E+002
52	2891.32	722.70	2.76E+002	26.24	1.06E+002
53	3650.00	912.31	5.91E+001	15.31	5.39E+001
54	5850.00	1462.13	6.07E+002	26.73	2.07E+001
55	7067.00	1766.28	4.13E+001	8.76	8.67E+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	0.990	661.65*	85.12	5.15298E-003	2.58637E-004
NP-237	1.000	300.17*	6.20	1.02256E-001	6.71946E-003
		312.00*	36.00	1.27497E-001	6.21722E-003
		340.60*	4.20	1.47554E-001	9.54450E-003
Pu-239	0.996	129.28*	0.01	1.57064E+003	2.64870E+002
		375.00*	0.00	1.56687E+003	1.25483E+002
		413.70*	0.00	1.50929E+003	1.18940E+002
		451.50* @	0.00	1.65625E+003	1.04795E+002
AM-241	1.000	59.54*	35.70	9.17882E+002	7.30116E+001
		125.28*	0.00	6.40342E+002	3.37723E+001
		335.40*	0.00	1.92146E+003	1.20789E+002
		662.42* @	0.00	1.21839E+003	6.10646E+001
		722.70*	0.00	7.53147E+002	7.53430E+001
PU-241	0.999	114.00*	0.02	3.44933E+001	3.25861E+000
		332.60*	0.00	3.28881E+002	2.06745E+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	0.990	1.978488E-003	2.835151E-004
NP-237	1.000	1.217532E-001	4.117085E-003
Pu-239 @	0.996	1.539813E+003	8.207497E+001
AM-241 @	1.000	7.505907E+002	2.765652E+001
PU-241	0.999	3.851515E+001	3.220916E+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	2.66E+000 +/- 1.42E-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	2.2280E-004	1.66E-004	2.3585E-004
		1332.49	100.00	1.6644E-004		-1.3091E-005
	CS-134	475.35	1.46	2.3086E-002	2.52E-004	9.6669E-003
		563.23	8.38	3.2753E-003		-9.2250E-004
		569.32	15.43	1.7647E-003		-2.1738E-004
		604.70	97.60	3.1878E-004		-1.8897E-004
		795.84	85.40	2.5155E-004		4.5754E-005
		801.93	8.73	2.4661E-003		-6.9932E-005
		1038.57	1.00	1.8821E-002		-2.0075E-002
		1167.94	1.80	1.2112E-002		3.5116E-003
		1365.15	3.04	5.6188E-003		4.2779E-003
+	CS-137	661.65*	85.12	4.7235E-004	4.72E-004	5.1530E-003
+	NP-237	300.17*	6.20	1.3476E-002	2.47E-003	1.0226E-001
		312.00*	36.00	2.4731E-003		1.2750E-001
		340.60*	4.20	1.1635E-002		1.4755E-001
+	Pu-239	129.28*	0.01	2.7904E+001	2.30E+001	1.5706E+003
		375.00*	0.00	2.7112E+001		1.5669E+003
		413.70*	0.00	2.2984E+001		1.5093E+003
		451.50*	0.00	2.1512E+002		1.6563E+003
+	AM-241	59.54*	35.70	1.1847E+000	1.18E+000	9.1788E+002
		125.28*	0.00	4.8140E+001		6.4034E+002
		335.40*	0.00	9.5663E+001		1.9215E+003
		662.42*	0.00	1.1168E+002		1.2184E+003
		722.70*	0.00	1.9005E+002		7.5315E+002
+	PU-241	114.00*	0.02	1.0843E+001	1.08E+001	3.4493E+001
		332.60*	0.00	1.6374E+001		3.2888E+002
	CM-243	209.70	3.27	4.9632E-002	6.73E-003	1.4044E-003
		228.18	10.56	9.9899E-003		-3.3196E-003
		277.60	14.00	6.7343E-003		-3.8059E-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