CH0009

0057670

CANBERRA

CH-009
Batch Data Report
For
233-S ISOCS NDA Assays

Measurement and Analysis by: _____ **Date:** 11 MAR 02
Martin Winterrose

Data Review by: _____ **Date:** 11 MAR 02
Michael G. Cantaloub

RECEIVED
MAR 2002

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

COGEMA GROUP

1. Introduction

This report documents results for twenty (20) individual items assayed by Canberra Hanford using the In Situ Object Counting System (ISOCS). All measurements were performed in accordance with the "Sampling and Analysis Plan for the 233-S Plutonium Concentration Facility" (DOE/RL-97-87 Rev. 1) and the Canberra Hanford Quality Control Plan and procedure. The individual items were assayed at the 233-S facility during the time period from January 23 to February 27, 2002.

2. Technical Information

The items were assayed within the assay trailer at the 233-S facility grounds. Assays were conducted in one of two manners: For smaller items, a single sample average spectrum was obtained by measuring the item, manually rotating it 180 degrees then continuing data acquisition. For larger items, two separate spectra were obtained and the assay results averaged or summed as appropriate. Total count times were fixed at 1800 seconds live time.

Items were placed on a cart within a reduced background area of the trailer. The detector was positioned a minimum of 24 inches from the item with the detector face visually centered on the largest surface area of the package. The detector sides were shielded with a lead collimator to minimize scatter and background.

Individual ISOCS efficiency calibrations were created for each item. Box, pipe, cylinder and flat plate geometry models were used. An item's composition was determined as best as possible through a combination of the item's packaging description, visual inspection, and package handling. Some items proved very easy to model (e.g. flat plate) while others more difficult. Model matrices were varied or the expected activity distribution adjusted to obtain reasonable correlation between the low and high energy Pu-239 and Am-241 emissions. This was not always a viable option, however; as many assays identified only a single Pu-239 and/or Am-241 emission peak.

Final package results were calculated using the Analysis V3b spreadsheet. Data analysis was conservative. Method selections (e.g. measured Am-241 versus Am-241 calculated from the measured Pu-239) normally favored higher final results. This is especially so in this batch as the majority of items measured were determined TRU based upon Pu-239 MDA valves rather than a measured Pu-239 emission.

Several analysis spreadsheets show a "Density > 1" error. This is due almost exclusively to propagating the TMU associated with a flat plate or plates using "Box" assumptions. For metal sheets or straps, the activity is assumed to be limited to the metal's surface (as a thin dirt layer) not distributed within the plate metal and as such, the 'flag' does not show the results to be in error.

3. Quality Control Results

Daily background and quality control (QC) check source measurements were performed on the system prior to each day's measurements. Charts for these measurements are on pages 5 - 11. The control charts cover the period of January 01, 2002 to February 28, 2002. During the time period, the system was operating properly. The peak area and centroid control charts indicate a very stable system.

Of note, and as previously discussed on Batch Reports CH007 and CH008, on January 17, a higher than normal background resulted from the Eu-152 QCC source being brought into the vicinity of the detector as the daily background was finishing. The situation was repeated on February 5, 2002,

Finally, on 24 February, the beginning of day background was performed without high voltage applied to the detector. This produced a "zero" background. Background returned to 'normal' after the recount.

With respect to the QCC, the only observed discrepancy was on January 21, when the QCC source was placed at 24" rather than 28" from the detector. Upon recount at the proper distance, the results were satisfactory. This was reported in a previous batch data report.

Package 4430 was randomly selected for replicate measurement and was assayed on February 25, 2002. Due to its unusual size, a single characterization consisted of the average from two counts. The table below shows the comparison results for the average 414 keV emission of Pu-239. The replicate satisfies the quality requirements.

Replicate Analysis	Package 4430
| Pu-239(orig) – Pu-239(rep) |	0.085
$1.96 * \sqrt{[unc(orig)]^2 + [unc(rep)]^2}$	3.01

4. Summary of Results

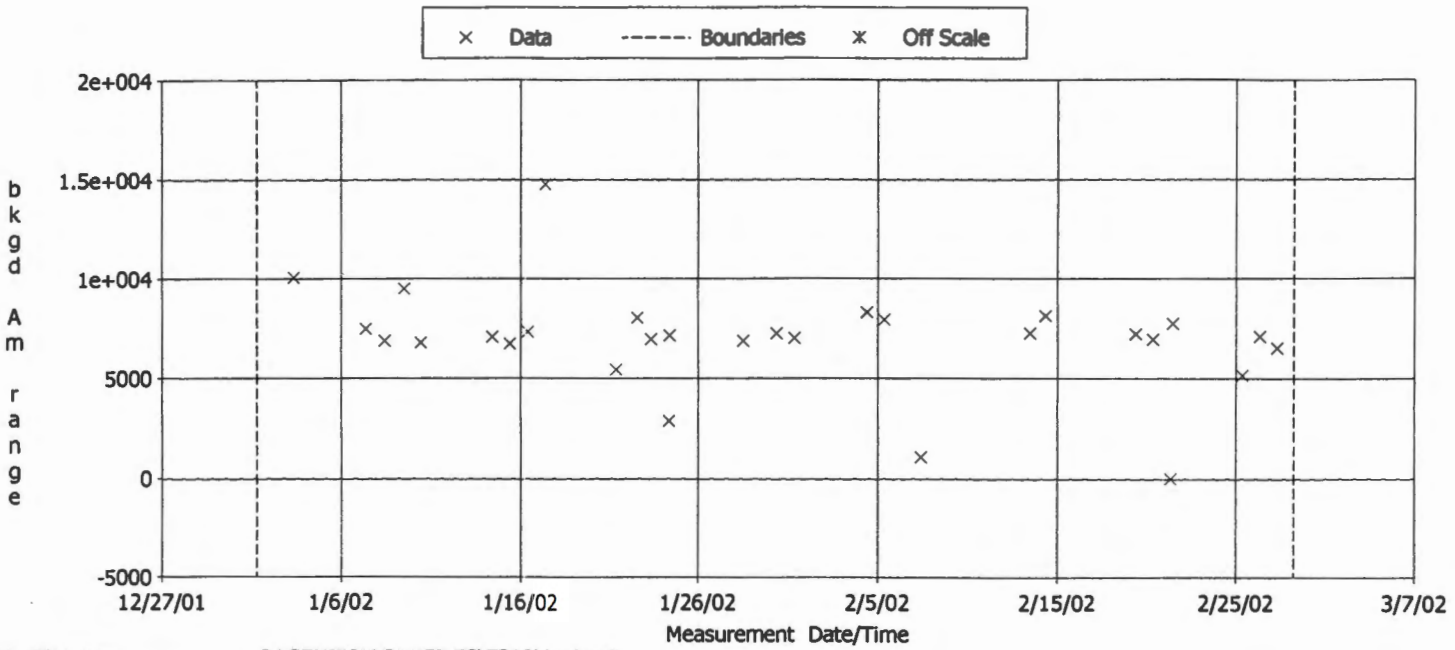
Full data packages for each item are included as an attachment beginning on page 12. The following table (page 4) summarizes the total TRU activity results and plutonium gram values for each item. The 'Pu Mass + 3-sigma' values in the table are based solely on counting statistics. The 'Pu Mass + 3-sigma TMU' values are not included here, but are reported on the final result spreadsheets.

Summary of package assay results for Data Batch Report CH009

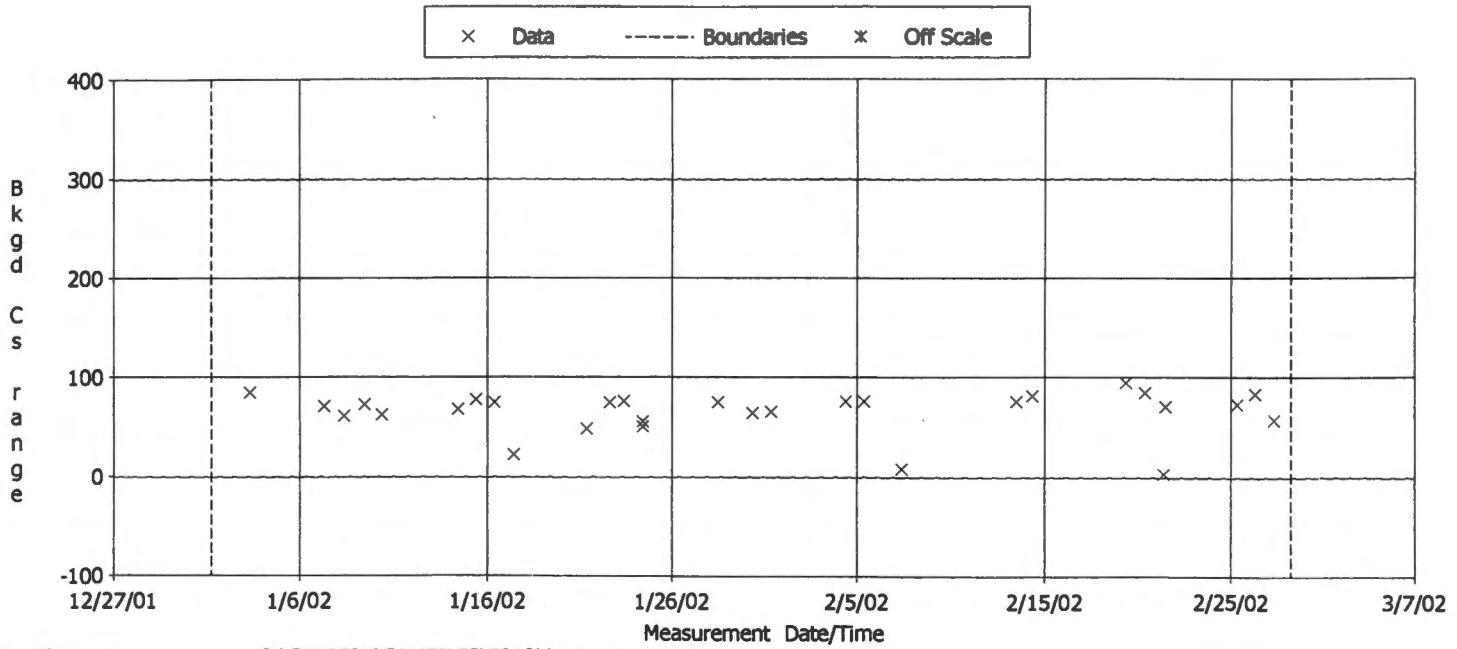
Package Item ID	Assay Weight (kg)	TRU Act (nCi/g)		TRU TMU (nCi/g)	Pu Mass (g)	Pu Mass(g) + 3 sigma	Description, calculation notes
1765	10.9	1.19E+03	±	3.28E+02	7.29E-02	7.29E-02	Misc. Pipes; Pu-239 MDA
4536	6.35	1.01E+02	±	9.41E+00	6.15E-03	6.15E-03	Angle Iron; Pu-239 MDA
1699	15.45	1.15E+02	±	1.61E+01	1.72E-02	1.72E-02	Misc. Pipes; Pu-239 MDA
1695	19.1	9.43E+01	±	1.31E+01	1.73E-02	1.73E-02	Misc. Pipes; Pu-239 MDA
1392	22.3	1.36E+02	±	1.27E+01	2.97E-02	2.97E-02	Hold down strap; Pu-239 MDA
1391	18.2	1.70E+02	±	1.59E+01	2.98E-02	2.98E-02	Hold down strap; Pu-239 MDA
3014	2.95	2.52E+02	±	1.15E+02	9.19E-03	9.19E-03	Misc. Pipes; Am-241
4004	0.9	3.65E+03	±	8.20E+02	1.86E-02	2.58E-02	Misc. Pipes
4063	3.18	5.45E+02	±	1.79E+02	9.75E-03	1.45E-02	Misc. Pipes
4104	2.27	8.36E+02	±	3.80E+02	8.97E-03	8.97E-03	Pipe with flange; Pu-239 MDA
4351	2.72	1.97E+02	±	1.11E+02	3.02E-03	7.08E-03	Misc. Pipes
4352	4.32	3.63E+02	±	1.65E+02	8.52E-03	8.52E-03	Misc. Pipes; Pu-239 MDA
4354	4.09	3.80E+02	±	1.73E+02	8.45E-03	8.45E-03	Misc. Pipes; Pu-239 MDA
4365	5.0	2.40E+02	±	3.84E+01	8.44E-03	8.44E-03	Misc. Pipes; Pu-239 MDA
4369	4.45	2.68E+02	±	1.22E+02	1.55E-02	1.55E-02	Pipe; Pu-239 MDA
4428	6.59	1.76E+02	±	2.35E+01	1.04E-02	1.04E-02	Vessel; Pu-239 MDA
4429	7.27	1.91E+02	±	2.78E+01	1.05E-02	1.05E-02	Vessel; Pu-239 MDA
4430	17.3	1.82E+01	±	8.99E+00	1.77E-03	2.52E-03	Valve & Flange
4430 R	17.3	1.79E+01	±	8.85E+00	1.74E-03	2.48E-03	
4434	9.8	1.42E+02	±	3.46E+01	6.78E-03	1.21E-02	Vessel
3045	2.27	4.37E+02	±	1.49E+02	5.59E-03	1.00E-02	Misc. Pipes

17	TRU packages
3	LLW packages

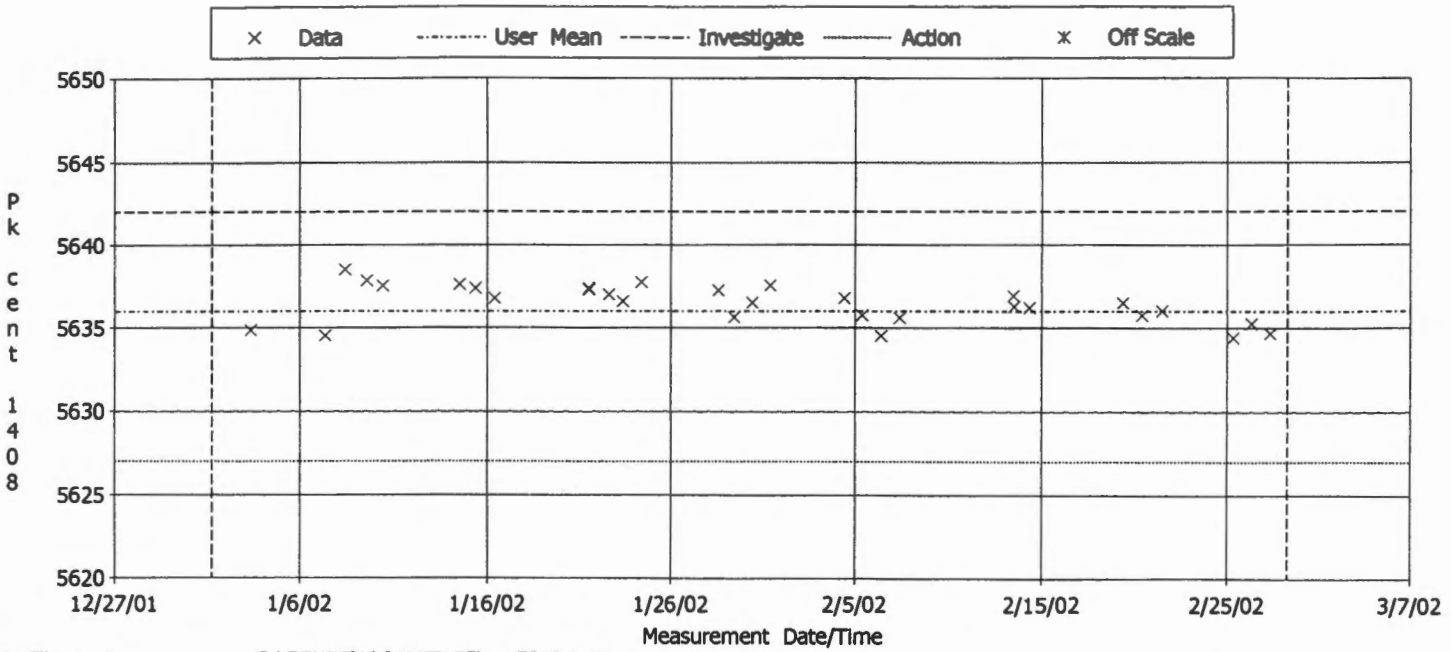
Control Charts



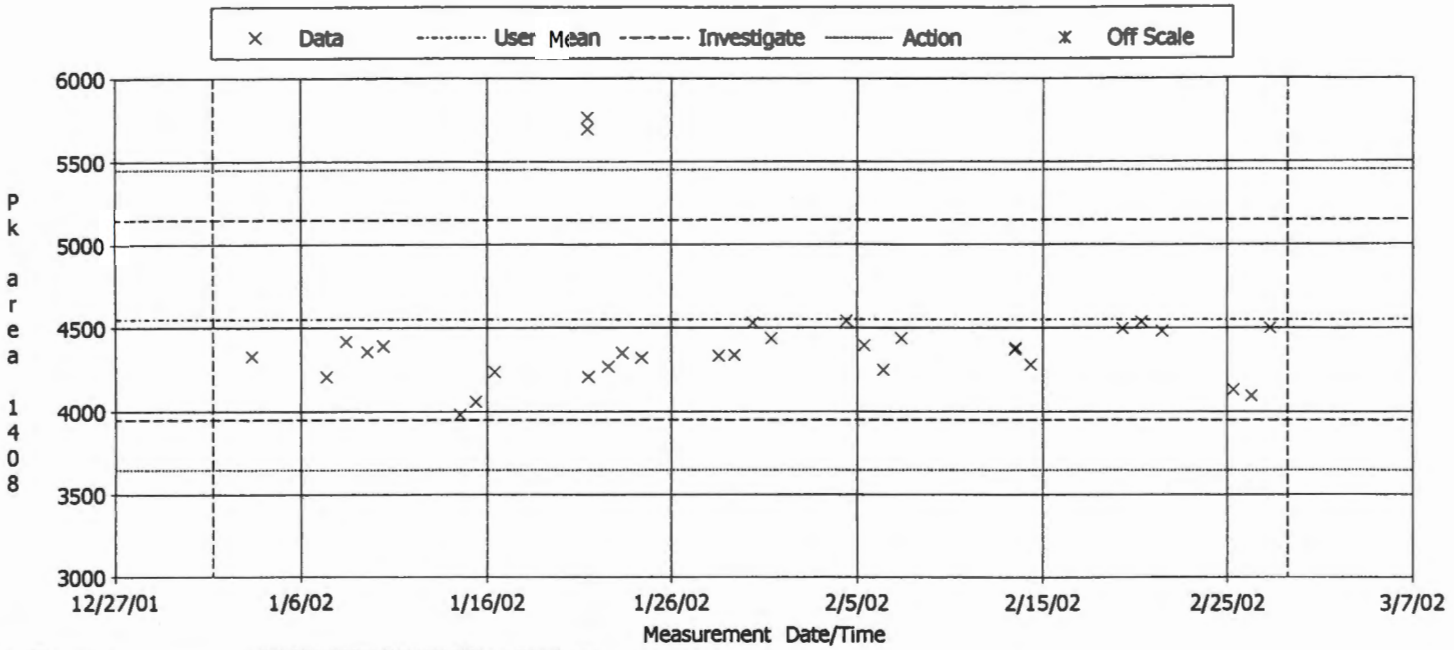
QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf
Parameter Description : bkgd Am range (counts)
Selection Dates : 1/01/02 6:00:00 AM - 2/28/02 6:00:00 AM
Lower/Upper Boundaries : 0.000 - 15000.000



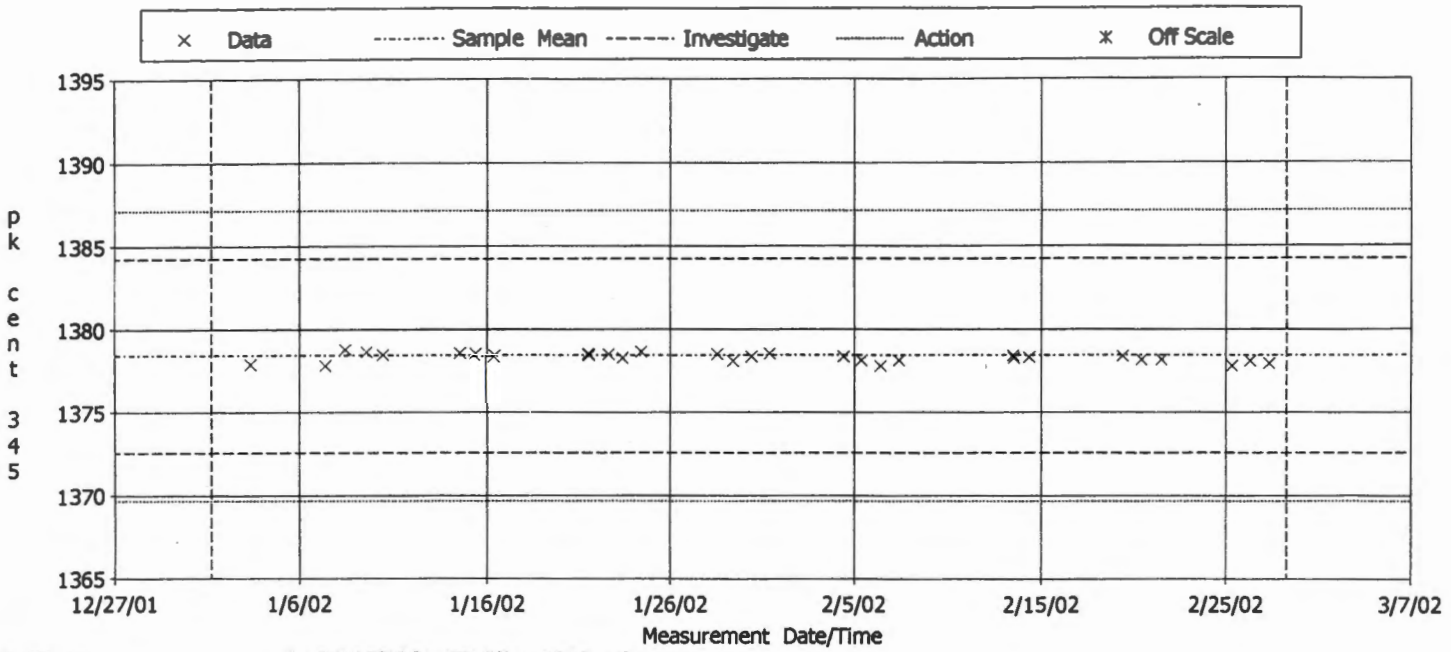
QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf
Parameter Description : Bkgd Cs range (counts)
Selection Dates : 1/01/02 6:00:00 AM - 2/28/02 6:00:00 AM
Lower/Upper Boundaries : 0.000 - 300.000



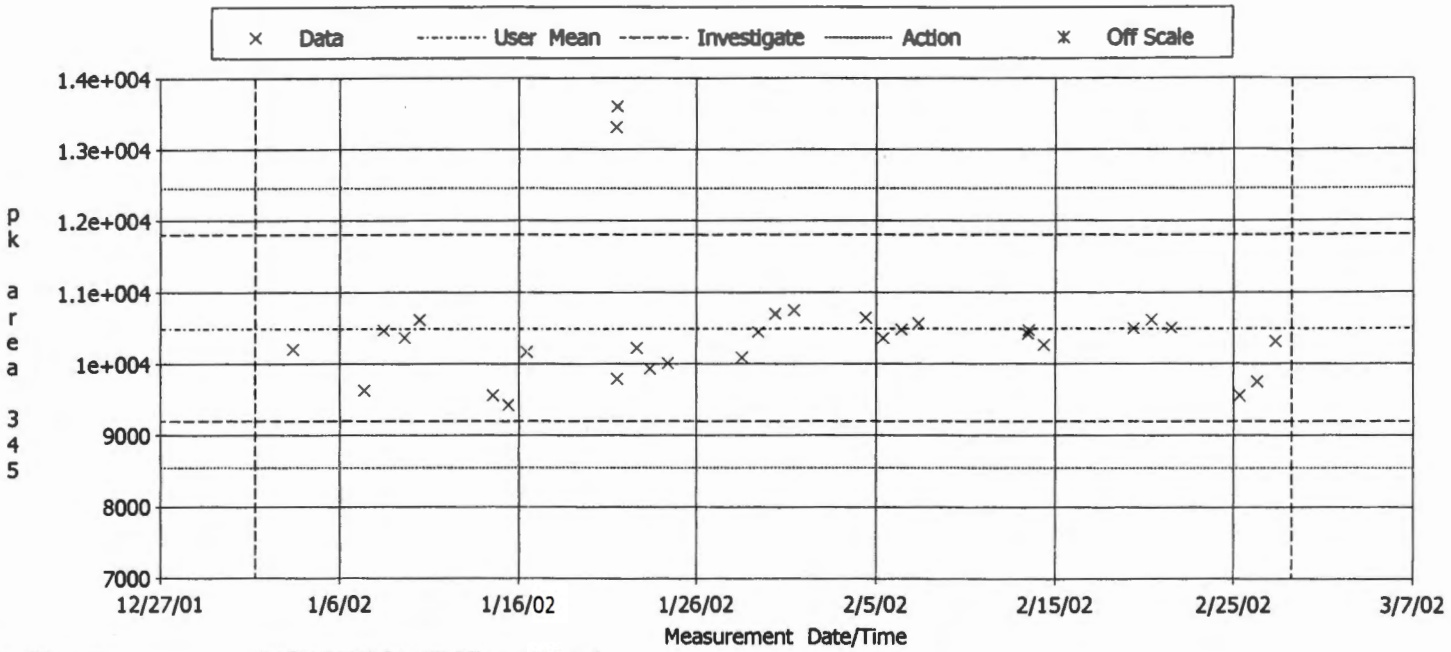
QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk cent 1408 (ch)
Selection Dates : 1/01/02 6:00:00 AM - 2/28/02 6:00:00 AM
User Mean +/- Std Dev : 5636.000 +/- 3.000



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : Pk area 1408 (counts)
Selection Dates : 1/01/02 6:00:00 AM - 2/28/02 6:00:00 AM
User Mean +/- Std Dev : 4550.000 +/- 3.00e+002



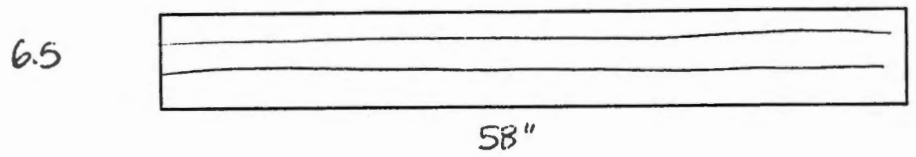
QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk cent 345 (ch)
Selection Dates : 1/01/02 6:00:00 AM - 2/28/02 6:00:00 AM
Sample Mean +/- Std Dev : 1378.401 +/- 2.907



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf
Parameter Description : pk area 345 (counts)
Selection Dates : 1/01/02 6:00:00 AM - 2/28/02 6:00:00 AM
User Mean +/- Std Dev : 10500.000 +/- 6.50e+002

Data Packages

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 1765

Weight (kg): 24 lb (10.9kg)

Material Description: PIPES/ CONDUIT

Packaging: 3 LATERS POLY

Detector Distance (in): 50"

Detector Filters: none

Dose Rate: < 0.5 mr/hr

Comments: SIDE A 1800sec 1303
SIDE B 1800sec 1304

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 1765

File Name: 1303

Assay Date: 27-Feb-02

File Name: 1304

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	3.65E+02		3.53E+02	
Pu-239 (414)				
Am-241	4.61E+03	3.86E+02	6.83E+03	5.68E+02
Np-237				
U-238				
U-235				
Cs-137				
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Average

Dimensions:

Length (in): 58

Width (in): 6

Depth (in): 6

Weight (lbs): 24

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	5.72E+03	+/-	2.58E+03	Calc from Pu-239
Calculated	4.97E+02	+/-	3.14E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.45E+02	+/-	3.27E+01
Pu-239	3.59E+02	+/-	8.06E+01
Pu-240	1.87E+02	+/-	4.20E+01
Pu-241	6.99E+02	+/-	1.57E+02
Pu-242	1.89E-01	+/-	4.24E-02
Am-241	4.97E+02	+/-	3.14E+02
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	0.00E+00	+/-	0.00E+00
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.19E+03	+/-	3.28E+02	Calc from Pu-239 MDA
Pu (g):	7.29E-02	**Pu (g) + 3 sigma TMU:**	1.22E-01	
		Pu(g) + 3 sigma:	7.29E-02	

Comments:

PU mda provides lower TRU value and uncertianty.

Errors:

Analyst: Martin Winterrose

Date: 2/27/02

```
#Date & Time: Wed Feb 27 10:44:09 2002
~g=PIPE
~description=1765_PIPE
~comment=PIPES_OR_STRAP
~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=0.28      ~d1.2=6         ~d1.3=29        ~d1.4=29        ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=29        ~d2.3=29        ~2mater=DRYDIRT  ~2den=1.6       ~2con=1
~sd1=50
```

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

Report Generated On : 2/27/02 11:16:14 AM

Sample Title : 1765 Side A recount
Spectrum Description :
Sample Identification : 1303
Sample Size : 10.9 kg

Sample Taken On : 2/27/02 10:45:00 AM
Acquisition Started : 2/27/02 10:46:04 AM

Live Time: 1800.0 seconds Real Time: 1803.0 seconds

ISOCS Calabration : 1765 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/27/02

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	207.84	52.05	1.72E+002	53.46	2.15E+003
2	239.26	59.90	2.05E+004	538.32	2.17E+003
3	340.16	85.12	8.72E+002	60.56	2.51E+003
4	351.34	87.91	1.85E+002	55.14	2.53E+003
5	1408.87	352.21	1.27E+002	16.03	1.36E+002
6	2044.60	511.09	1.31E+002	15.04	7.89E+001
7	2437.43	609.26	2.11E+002	16.33	5.23E+001
8	2646.64	661.55	1.05E+002	13.14	4.11E+001
9	4483.98	1120.73	5.57E+001	9.48	2.39E+001
10	5633.94	1408.13	2.34E+001	6.69	6.84E+000
11	5846.53	1461.26	5.05E+002	23.24	8.97E+000
12	7064.28	1765.60	4.20E+001	7.79	1.20E+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
AM-241	0.988	59.54*	35.70	4.61316E+003	3.85987E+002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.21450E+003	2.84957E+002
		722.70	0.00		

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

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
X	CS-137	1.000		
	AM-241 @	0.988	4.613160E+003	3.859867E+002

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

Errors quoted at 1.000 sigma

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

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	4.2820E-003	3.62E-003	5.2978E-003
		1332.49	100.00	3.6224E-003		2.3681E-003
	CS-134	475.35	1.46	3.7131E-001	5.27E-003	1.7706E-001
		563.23	8.38	5.7882E-002		7.6749E-003
		569.32	15.43	3.1841E-002		-1.0826E-002
		604.70	97.60	7.0298E-003		-5.1055E-004
		795.84	85.40	5.2717E-003		-1.1650E-003
		801.93	8.73	5.0595E-002		-4.9095E-003
		1038.57	1.00	4.3941E-001		4.1301E-001
		1167.94	1.80	2.2185E-001		1.1379E-001
		1365.15	3.04	1.1788E-001		6.9325E-002
	CS-137	661.65*	85.12	2.8953E-003	2.90E-003	9.3658E-003
	NP-237	300.17	6.20	1.0900E-001	1.66E-002	4.6124E-002
		312.00	36.00	1.6609E-002		-4.9480E-003
		340.60	4.20	1.4386E-001		-1.1738E-002
		375.00	0.68	8.4973E-001		2.6544E-001
		415.60	1.75	3.1521E-001		-2.6811E-002
	Pu-239	129.28	0.01	5.2933E+002	3.65E+002	3.0246E+002
		375.00	0.00	3.6517E+002		1.1407E+002
		413.70	0.00	3.6727E+002		-1.7944E+002
		451.50	0.00	2.8785E+003		1.9793E+003
+	AM-241	59.54*	35.70	4.9246E+001	4.92E+001	4.6132E+003
		125.28	0.00	9.2022E+002		-9.4243E+000
		335.40	0.00	1.2490E+003		4.4463E+002
		662.42*	0.00	6.8458E+002		2.2145E+003
		722.70	0.00	3.7468E+003		6.2403E+002
	PU-241	114.00	0.02	2.4075E+002	2.10E+002	1.9328E+002
		332.60	0.00	2.0972E+002		-1.3939E+002
	CM-243	209.70	3.27	2.3495E-001	4.62E-002	-4.2583E-001
		228.18	10.56	6.8418E-002		5.9480E-002
		277.60	14.00	4.6211E-002		3.9011E-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)

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

eport Generated On : 2/27/02 11:48:12 AM

ample Title : 1765 Side B recount
pectrum Description :
ample Identification : 1304
ample Size : 10.9 kg

ample Taken On : 2/27/02 11:17:00 AM
cquisition Started : 2/27/02 11:18:02 AM

ive Time: 1800.0 seconds Real Time: 1803.4 seconds

ISOCS Calabration : 1765 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/27/02

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	200.01	50.09	2.21E+002	56.75	2.42E+003
2	239.24	59.90	3.04E+004	751.82	2.26E+003
3	340.36	85.17	9.64E+002	61.18	2.46E+003
4	349.58	87.47	2.32E+002	54.03	2.48E+003
5	372.37	93.17	1.80E+002	57.92	2.50E+003
6	1407.81	351.94	1.33E+002	15.90	1.25E+002
7	2043.86	510.90	1.13E+002	13.79	7.75E+001
8	2332.95	583.15	7.22E+001	11.32	5.10E+001
9	2438.18	609.45	1.64E+002	15.08	5.39E+001
10	2647.56	661.78	9.46E+001	12.66	4.45E+001
11	7064.49	1765.65	5.91E+001	8.83	1.40E+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
AM-241	0.988	59.54*	35.70	6.82510E+003	5.68059E+002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	1.99221E+003	2.73721E+002
		722.70	0.00		

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

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
X	CS-137	0.999		
	AM-241 @	0.988	6.825103E+003	5.680594E+002

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

Errors quoted at 1.000 sigma

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

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	4.3208E-003	3.54E-003	3.5328E-003
		1332.49	100.00	3.5435E-003		8.5384E-004
	CS-134	475.35	1.46	3.6779E-001	5.03E-003	2.0772E-001
		563.23	8.38	5.5584E-002		-3.2892E-004
		569.32	15.43	3.1187E-002		-5.2435E-003
		604.70	97.60	6.7651E-003		-3.3202E-003
		795.84	85.40	5.0327E-003		-1.2448E-003
		801.93	8.73	4.8576E-002		-3.7183E-002
		1038.57	1.00	3.7064E-001		1.7094E-001
		1167.94	1.80	2.3094E-001		-2.4453E-001
		1365.15	3.04	1.0469E-001		6.7416E-003
	CS-137	661.65*	85.12	3.0037E-003	3.00E-003	8.4257E-003
	NP-237	300.17	6.20	1.0685E-001	1.74E-002	4.6437E-003
		312.00	36.00	1.7414E-002		-6.7084E-003
		340.60	4.20	1.4119E-001		-4.3860E-003
		375.00	0.68	8.2227E-001		-5.5793E-001
		415.60	1.75	3.4660E-001		-1.0957E-003
	Pu-239	129.28	0.01	5.2929E+002	3.53E+002	-2.2022E+002
		375.00	0.00	3.5337E+002		-2.3977E+002
		413.70	0.00	3.9211E+002		-2.3122E+002
		451.50	0.00	2.8681E+003		-7.9278E+002
+	AM-241	59.54*	35.70	5.0308E+001	5.03E+001	6.8251E+003
		125.28	0.00	9.2280E+002		1.7676E+002
		335.40	0.00	1.2503E+003		7.9732E+002
		662.42*	0.00	7.1020E+002		1.9922E+003
		722.70	0.00	3.8814E+003		4.0353E+003
	PU-241	114.00	0.02	2.3712E+002	2.15E+002	3.7363E-001
		332.60	0.00	2.1503E+002		-2.0641E+001
	CM-243	209.70	3.27	2.3822E-001	4.60E-002	-8.9968E-002
		228.18	10.56	6.9938E-002		6.5702E-002
		277.60	14.00	4.6021E-002		2.4664E-002

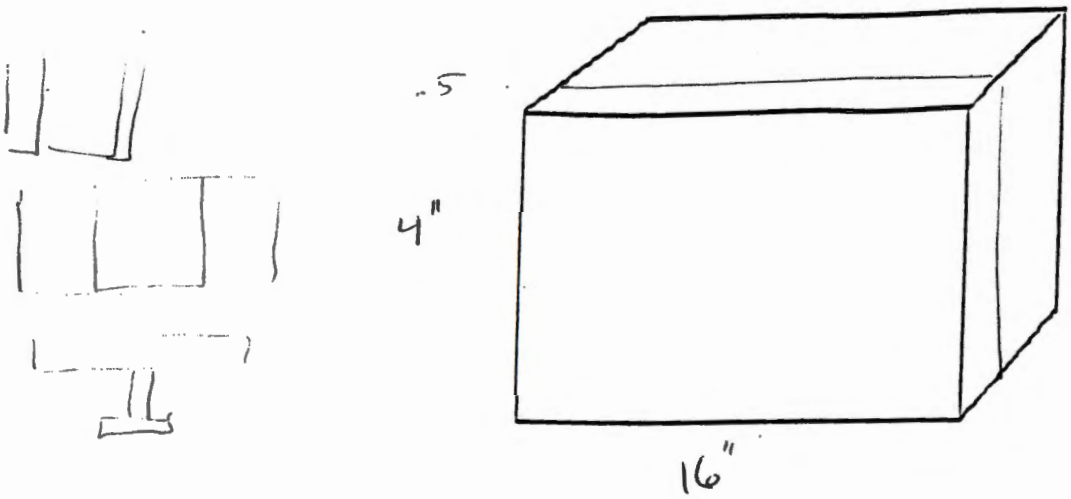
+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

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

Nuclide	Mass (g)

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

RECTANGULAR PLANE



Put Dimensions on Box

Item ID: 4536

Weight (kg): 14 lb (6.35 kg)

Material Description: 1/8 INCH ANGLE IRON

Packaging: 3 LAYERS

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: < 0.5 mR/hr

Comments: A 900 1137
B 1800 1138

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4536

File Name: 1138

Assay Date: 23-Jan-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	5.19E+01	
Pu-239 (414)		
Am-241	9.79E-01	9.85E-02
Np-237	2.14E-03	4.50E-04
U-238		
U-235	1.05E-03	3.80E-04
Cs-137	1.22E-04	2.23E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Surface only

Item Type: Box

Calcs: Use 1st

Dimensions:

Length (in): 16

Weight (lbs): 14

Width (in): 4

Depth for TMU (in): 4

Depth (in): 0.5

% Volume: 100

Am-241 Calcs:

Measured	9.79E-01	+/-	2.64E-01	Use Meas
Calculated	7.18E+01	+/-	3.45E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.10E+01	+/-	3.18E+00
Pu-239	5.19E+01	+/-	7.85E+00
Pu-240	2.70E+01	+/-	4.09E+00
Pu-241	1.01E+02	+/-	1.53E+01
Pu-242	2.73E-02	+/-	4.13E-03
Am-241	9.79E-01	+/-	2.64E-01
Np-237	2.14E-03	+/-	4.98E-04
U-238	0.00E+00	+/-	0.00E+00
U-235	1.05E-03	+/-	3.94E-04
Cs-137	1.22E-04	+/-	2.23E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.01E+02	+/-	9.41E+00	Calc from Pu-239 MDA
Pu (g):	6.15E-03	**Pu (g) + 3 sigma TMU:**		8.94E-03	
		Pu(g) + 3 sigma:		6.15E-03	

Comments:

Density error due to geometry

Errors:Density > 1,

Analyst: Martin Winterrose

Date: 2/8/02

```
Date & Time: Wed Jan 23 10:35:18 2002
g=RECTANGULAR_PLANE
description=PLATE
comment=STEEL_PLATE
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=   59.540,   88.030,  122.060,  165.850,  391.690,  661.650,#
               898.020, 1173.220, 1332.490, 1836.010,
Error in %=     10.000,   10.000,   10.000,    8.000,    8.000,    6.000,#
                 6.000,    4.000,    4.000,    4.000,
d1.1=0.025     ~d1.2=16        ~d1.3=4         ~1mater=POLYPROP ~1den=0.91
d2.1=0.025     ~2mater=DRYDIRT  ~2den=1.6       ~2con=0.5
d3.1=0.5       ~3mater=304SS    ~3den=7.81
d4.1=0.025     ~4mater=DRYDIRT  ~4den=1.6       ~4con=0.5
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 : 2/12/02 8:57:41 AM

Sample Title : 4536 Side B
Spectrum Description :
Sample Identification : 1138
Sample Size : 6.3 kg

Sample Taken On : 1/23/02 10:53:00 AM
Acquisition Started : 1/23/02 10:53:51 AM

Live Time: 1800.0 seconds Real Time: 1803.2 seconds

ISOCS Calabration : PLATE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 1/23/02

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	197.20	49.39	1.72E+002	52.64	2.29E+003
2	239.29	59.91	2.61E+004	726.49	2.13E+003
3	340.01	85.08	7.07E+002	60.03	2.43E+003
4	351.29	87.90	1.64E+002	54.34	2.45E+003
5	744.48	186.17	6.43E+001	22.84	6.35E+002
6	1248.71	312.18	7.15E+001	14.16	1.55E+002
7	2044.64	511.10	1.46E+002	15.28	7.18E+001
8	2333.86	583.38	9.32E+001	12.43	5.10E+001
9	2438.84	609.62	9.64E+001	12.66	5.08E+001
10	2647.72	661.82	6.22E+001	10.97	4.84E+001
11	3647.00	911.56	5.55E+001	9.83	2.68E+001
12	5848.28	1461.70	5.32E+002	23.73	7.76E+000
13	7067.05	1766.29	4.03E+001	7.70	2.91E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	1.22369E-003	2.22649E-004
U-235	0.641	143.76	10.50		
		185.71*	54.00	1.04738E-003	3.79718E-004
		205.31	4.70		
NP-237	0.584	300.17	6.20		
		312.00*	36.00	2.14211E-003	4.49751E-004
		340.60	4.20		
		375.00	0.68		
		415.60	1.75		
AM-241	0.994	59.54*	35.70	9.79469E-001	9.84913E-002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.89335E+002	5.26383E+001
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	1.219549E-003	2.226249E-004
U-235	0.641	1.047383E-003	3.797176E-004
NP-237	0.584	2.142114E-003	4.497513E-004
AM-241 @	0.994	9.794692E-001	9.849128E-002

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

Errors quoted at 1.000 sigma

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

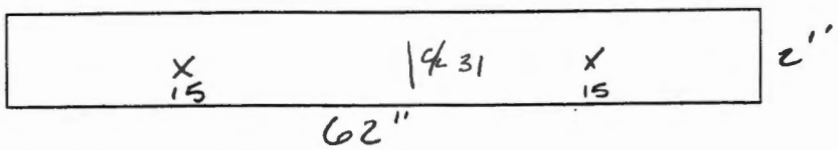
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.0187E-003	9.64E-004	3.7219E-004
		1332.49	100.00	9.6397E-004		3.7721E-004
	CS-134	475.35	1.46	7.1168E-002	1.21E-003	7.1844E-002
		563.23	8.38	1.2452E-002		7.4787E-003
		569.32	15.43	6.6742E-003		3.3616E-003
		604.70	97.60	1.2887E-003		-1.8826E-004
		795.84	85.40	1.2144E-003		-2.1488E-004
		801.93	8.73	1.3054E-002		1.0326E-002
		1038.57	1.00	1.0233E-001		1.0053E-001
		1167.94	1.80	5.4425E-002		-1.4656E-002
		1365.15	3.04	3.0908E-002		-9.4393E-003
+	CS-137	661.65*	85.12	6.9019E-004	6.90E-004	1.2237E-003
+	NP-237	300.17	6.20	1.8513E-002	1.82E-003	4.0590E-003
		312.00*	36.00	1.8194E-003		2.1421E-003
		340.60	4.20	2.7633E-002		2.0603E-002
		375.00	0.68	1.5573E-001		3.9118E-002
		415.60	1.75	6.3443E-002		5.5798E-002
	Pu-239	129.28	0.01	5.1870E+001	5.19E+001	3.2616E+000
		375.00	0.00	6.6923E+001		1.6811E+001
		413.70	0.00	7.1598E+001		-2.1591E+001
		451.50	0.00	5.4544E+002		-1.4669E+001
+	AM-241	59.54*	35.70	8.1716E-003	8.17E-003	9.7947E-001
		125.28	0.00	8.3344E+001		8.0073E+001
		335.40	0.00	2.2371E+002		1.0616E+002
		662.42*	0.00	1.6319E+002		2.8934E+002
		722.70	0.00	8.6613E+002		5.9046E+002
	PU-241	114.00	0.02	1.5649E+001	1.56E+001	7.5766E+000
		332.60	0.00	3.7809E+001		9.2465E+000
	CM-243	209.70	3.27	4.1940E-002	8.29E-003	-1.2891E-002
		228.18	10.56	1.2341E-002		7.4478E-003
		277.60	14.00	8.2901E-003		-1.9597E-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)
U-235	3.02E-003 +/- 1.09E-003

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: ~~16969~~ 16099 W M

Weight (kg): 34 15.45 kg

Material Description: 4" pipes 1"

Packaging: 3 + Lumber

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: <.5

Comments: A- 900 ~~1268~~ 1263
Modeled @ 2" pipe +15 1800 ~~65~~ 64
900 ~~66~~ 65
1800 ~~67~~ 66

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 1699

File Name: 1264

Assay Date: 21-Feb-02

File Name: 1266

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	5.99E+01		5.97E+01	
Pu-239 (414)				
Am-241	3.23E-01	1.04E-01		
Np-237	1.64E-03	3.94E-04	1.63E-03	3.96E-04
U-238				
U-235				
Cs-137	4.80E-03	3.45E-04	4.62E-03	3.38E-04
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Average

Dimensions:

Length (in): 62

Width (in): 2

Depth (in): 2

Weight (lbs): 34

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	1.62E-01	+/-	8.89E-02	Use Meas
Calculated	8.28E+01	+/-	5.22E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.42E+01	+/-	5.44E+00
Pu-239	5.98E+01	+/-	1.34E+01
Pu-240	3.12E+01	+/-	7.00E+00
Pu-241	1.16E+02	+/-	2.61E+01
Pu-242	3.15E-02	+/-	7.07E-03
Am-241	1.62E-01	+/-	8.89E-02
Np-237	1.64E-03	+/-	3.34E-04
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	4.71E-03	+/-	5.79E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.15E+02	+/-	1.61E+01	Calc from Pu-239 MDA
Pu (g):	1.72E-02	**Pu (g) + 3 sigma TMU:**		2.88E-02	
		Pu(g) + 3 sigma:		1.72E-02	

Comments:

PU MDA used due to matrix density.

Errors:

Analyst: Martin Winterrose

Date: 2/21/02

```
Date & Time: Thu Feb 21 12:11:35 2002
g=PIPE
description=1699_PIPE
comment=FOUR_1"_PIPES_-_5_FT_LENGTH
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=0.154     ~d1.2=2         ~d1.3=31        ~d1.4=31        ~1mater=304SS    ~1den=7.81
d2.1=0.133     ~d2.2=31        ~d2.3=31        ~2mater=DRYDIRT  ~2den=1.6       ~2con=1
sd1=24          ~sd3=15
```

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

Report Generated On : 2/21/02 12:47:37 PM

Sample Title : 1699 Side A 1800
Spectrum Description :
Sample Identification : 1264
Sample Size : 15.4 kg

Sample Taken On : 2/21/02 12:32:00 PM
Acquisition Started : 2/21/02 12:32:30 PM

Live Time: 1800.0 seconds Real Time: 1802.5 seconds

ISOCS Calabration : 1699 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/21/02

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	199.70	50.01	1.73E+002	38.91	1.71E+003
2	238.65	59.75	1.28E+002	39.71	2.08E+003
3	340.38	85.17	9.61E+002	63.15	2.58E+003
4	351.56	87.97	1.68E+002	55.98	2.61E+003
5	447.01	111.82	1.34E+002	49.94	2.72E+003
6	455.85	114.03	1.53E+002	49.71	2.69E+003
7	1248.66	312.17	5.86E+001	13.80	1.38E+002
8	2045.23	511.25	1.20E+002	14.15	6.64E+001
9	2437.73	609.34	6.18E+001	10.94	4.38E+001
10	2647.47	661.76	2.88E+002	18.61	4.01E+001
11	7064.19	1765.58	3.83E+001	7.33	1.14E+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	1.000	661.65*	85.12	4.79890E-003	3.45297E-004
NP-237	0.584	300.17	6.20		
		312.00*	36.00	1.64248E-003	3.94415E-004
		340.60	4.20		
		375.00	0.68		
		415.60	1.75		
AM-241	0.998	59.54*	35.70	3.23084E-001	1.03745E-001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	1.13467E+003	8.15860E+001
		722.70	0.00		
PU-241	0.794	114.00*	0.02	9.63019E+000	3.17180E+000
		332.60	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	4.797534E-003	3.450539E-004
NP-237	0.584	1.642482E-003	3.944149E-004
AM-241 @	0.998	3.230837E-001	1.037446E-001
PU-241	0.794	9.630188E+000	3.171799E+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	8.1475E-004	7.70E-004	-2.0573E-004
		1332.49	100.00	7.6994E-004		2.8615E-004
	CS-134	475.35	1.46	6.5525E-002	8.83E-004	-1.7931E-003
		563.23	8.38	1.0767E-002		7.2072E-003
		569.32	15.43	5.4784E-003		-2.5195E-003
		604.70	97.60	1.0485E-003		-1.0530E-004
		795.84	85.40	8.8328E-004		-1.1500E-004
		801.93	8.73	9.0884E-003		1.9663E-003
		1038.57	1.00	7.0062E-002		3.9530E-002
		1167.94	1.80	4.4924E-002		1.6267E-002
		1365.15	3.04	2.3272E-002		2.1380E-002
+	CS-137	661.65*	85.12	5.3656E-004	5.37E-004	4.7989E-003
+	NP-237	300.17	6.20	1.7812E-002	1.61E-003	1.0768E-002
		312.00*	36.00	1.6066E-003		1.6425E-003
		340.60	4.20	2.4343E-002		1.7408E-002
		375.00	0.68	1.3936E-001		-4.3663E-002
		415.60	1.75	5.9976E-002		6.9004E-003
	Pu-239	129.28	0.01	6.8783E+001	5.99E+001	-6.2910E+001
		375.00	0.00	5.9891E+001		-1.8764E+001
		413.70	0.00	7.0500E+001		7.3153E+001
		451.50	0.00	5.3253E+002		-1.6992E+002
+	AM-241	59.54*	35.70	5.4367E-001	5.44E-001	3.2308E-001
		125.28	0.00	1.1499E+002		2.5037E+001
		335.40	0.00	2.0609E+002		1.2607E+002
		662.42*	0.00	1.2687E+002		1.1347E+003
		722.70	0.00	6.3678E+002		7.3173E+001
+	PU-241	114.00*	0.02	1.5352E+001	1.54E+001	9.6302E+000
		332.60	0.00	3.3712E+001		-3.1563E+001
	CM-243	209.70	3.27	3.8844E-002	7.43E-003	2.5507E-003
		228.18	10.56	1.1626E-002		1.6270E-003
		277.60	14.00	7.4257E-003		-1.3127E-002

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

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

Nuclide	Mass (g)

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

.eport Generated On : 2/21/02 1:26:40 PM

ample Title : 1699 Side B 1800
pectrum Description :
ample Identification : 1266
ample Size : 15.4 kg

ample Taken On : 2/21/02 1:10:00 PM
cquisition Started : 2/21/02 1:11:34 PM

ive Time: 1800.0 seconds Real Time: 1802.4 seconds

ISOCS Calabration : 1699 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/21/02

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	340.66	85.24	9.35E+002	60.67	2.55E+003
2	350.73	87.76	3.12E+002	58.54	2.57E+003
3	476.68	119.24	1.27E+002	46.28	2.57E+003
4	1249.11	312.28	5.83E+001	13.85	1.54E+002
5	2044.43	511.05	1.24E+002	16.29	6.87E+001
6	2437.87	609.37	8.34E+001	11.77	3.97E+001
7	2647.26	661.70	2.77E+002	18.29	3.74E+001
8	7065.10	1765.80	2.77E+001	6.61	2.33E+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	1.000	661.65*	85.12	4.61830E-003	3.38045E-004
NP-237	0.582	300.17	6.20		
		312.00*	36.00	1.63349E-003	3.95812E-004
		340.60	4.20		
		375.00	0.68		
		415.60	1.75		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	4.618300E-003	3.380449E-004
NP-237	0.582	1.633489E-003	3.958117E-004

? = 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 *****
****

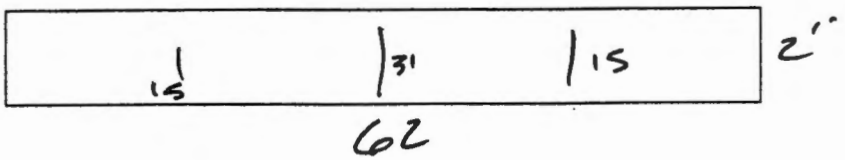
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	7.7491E-004	7.04E-004	-1.6391E-003
		1332.49	100.00	7.0438E-004		6.4134E-004
	CS-134	475.35	1.46	6.7986E-002	9.07E-004	2.0552E-002
		563.23	8.38	1.0413E-002		-1.2967E-002
		569.32	15.43	5.7982E-003		2.5873E-003
		604.70	97.60	1.0779E-003		4.2457E-004
		795.84	85.40	9.0727E-004		-5.6297E-004
		801.93	8.73	8.9743E-003		4.2436E-004
		1038.57	1.00	7.9013E-002		-7.5718E-003
		1167.94	1.80	4.6109E-002		7.3600E-003
		1365.15	3.04	1.8749E-002		-1.7609E-002
+	CS-137	661.65*	85.12	5.1979E-004	5.20E-004	4.6183E-003
+	NP-237	300.17	6.20	1.7102E-002	1.70E-003	2.2300E-003
		312.00*	36.00	1.6951E-003		1.6335E-003
		340.60	4.20	2.3396E-002		2.2027E-003
		375.00	0.68	1.3893E-001		2.9067E-003
		415.60	1.75	5.5701E-002		-8.3262E-003
	Pu-239	129.28	0.01	6.8453E+001	5.97E+001	3.6152E+001
		375.00	0.00	5.9705E+001		1.2492E+000
		413.70	0.00	6.6184E+001		1.1412E+001
		451.50	0.00	5.0183E+002		-1.7484E+002
	AM-241	59.54	35.70	8.8279E-001	8.83E-001	4.8209E-001
		125.28	0.00	1.1476E+002		-1.8405E+001
		335.40	0.00	2.0291E+002		2.2948E+001
		662.42	0.00	3.8397E+002		9.0533E+002
		722.70	0.00	6.7834E+002		4.9814E+002
	PU-241	114.00	0.02	2.5845E+001	2.58E+001	1.8804E+001
		332.60	0.00	3.4729E+001		-2.2464E+001
	CM-243	209.70	3.27	3.9436E-002	7.89E-003	9.9728E-003
		228.18	10.56	1.1351E-002		9.1737E-003
		277.60	14.00	7.8909E-003		6.4863E-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)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 1605

Weight (kg): 42 LBS 19.09 kg

Material Description: 4 1" PIPES

Packaging: 3 + LAYERS

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: 2.5

Comments: MODELED AS 2" PIPE

A-1 900 1267
A-2 1800 68
B-1 900 69
B-2 1800 70

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID:	1695	**Assay Date:**	21-Feb-02
File Name:	1268	**File Name:**	1270

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	4.74E+01		5.02E+01	
Pu-239 (414)				
Am-241	2.56E-01	8.46E-02	2.62E-01	8.77E-02
Np-237	1.25E-03	3.22E-04		
U-238				
U-235	9.29E-04	2.87E-04		
Cs-137	3.64E-03	2.70E-04	3.57E-03	2.71E-04
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Average

Dimensions:

Length (in):	62	Width (in):	2	Depth (in):	2
Weight (lbs):	42	Depth for TMU (in):	4	% Volume:	100

Am-241 Calcs:

Measured	2.59E-01	+/-	1.31E-01	Use Meas
Calculated	6.75E+01	+/-	4.26E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.98E+01	+/-	4.44E+00
Pu-239	4.88E+01	+/-	1.10E+01
Pu-240	2.54E+01	+/-	5.71E+00
Pu-241	9.50E+01	+/-	2.13E+01
Pu-242	2.57E-02	+/-	5.77E-03
Am-241	2.59E-01	+/-	1.31E-01
Np-237	6.25E-04	+/-	1.75E-04
U-238	0.00E+00	+/-	0.00E+00
U-235	4.65E-04	+/-	1.52E-04
Cs-137	3.61E-03	+/-	4.46E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		9.43E+01	+/-	1.31E+01	Calc from Pu-239 MDA
Pu (g):	1.73E-02	**Pu (g) + 3 sigma TMU:**		2.90E-02	
		Pu(g) + 3 sigma:		1.73E-02	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/21/02

```
#Date & Time: Thu Feb 21 13:53:25 2002
~g=PIPE
~description=1695_PIPE
~comment=FOUR_1"_PIPES_-_5_FT_LENGTH
~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=0.154     ~d1.2=2         ~d1.3=31        ~d1.4=31        ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=31        ~d2.3=31        ~2mater=DRYDIRT  ~2den=1.6       ~2con=1
~sd1=24          ~sd3=15
```

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

Report Generated On : 2/21/02 2:27:27 PM

Sample Title : 1695 Side A 1800
Spectrum Description :
Sample Identification : 1268
Sample Size : 19.1 kg

Sample Taken On : 2/21/02 2:11:00 PM
Acquisition Started : 2/21/02 2:12:21 PM

Live Time: 1800.0 seconds Real Time: 1802.5 seconds

ISOCS Calabration : 1695 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/21/02

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	238.39	59.68	1.23E+002	39.56	2.07E+003
2	340.41	85.18	8.56E+002	61.43	2.57E+003
3	745.11	186.32	7.34E+001	22.37	5.67E+002
4	1249.36	312.34	5.51E+001	13.93	1.49E+002
5	2044.72	511.12	1.37E+002	14.82	7.03E+001
6	2647.32	661.72	2.70E+002	18.10	4.19E+001
7	3647.24	911.62	5.99E+001	9.67	2.35E+001
8	7063.59	1765.43	2.69E+001	6.65	2.69E+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	1.000	661.65*	85.12	3.64115E-003	2.70112E-004
U-235	0.650	143.76	10.50		
		185.71*	54.00	9.29445E-004	2.86618E-004
		205.31	4.70		
NP-237	0.581	300.17	6.20		
		312.00*	36.00	1.24900E-003	3.21533E-004
		340.60	4.20		
		375.00	0.68		
		415.60	1.75		
AM-241	0.999	59.54*	35.70	2.55859E-001	8.45529E-002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	8.60930E+002	6.38240E+001
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	3.640071E-003	2.699327E-004
U-235	0.650	9.294450E-004	2.866176E-004
NP-237	0.581	1.249003E-003	3.215332E-004
AM-241 @	0.999	2.558590E-001	8.455285E-002

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

Errors quoted at 1.000 sigma

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

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	6.6978E-004	6.02E-004	2.9361E-004
		1332.49	100.00	6.0163E-004		1.6887E-004
	CS-134	475.35	1.46	5.1902E-002	7.62E-004	3.0565E-002
		563.23	8.38	8.3827E-003		-6.5970E-003
		569.32	15.43	4.6566E-003		2.2461E-003
		604.70	97.60	8.2049E-004		2.1510E-004
		795.84	85.40	7.6242E-004		4.6534E-005
		801.93	8.73	6.9457E-003		-3.7210E-003
		1038.57	1.00	6.7414E-002		1.0417E-002
		1167.94	1.80	3.7694E-002		-4.2109E-003
		1365.15	3.04	1.9144E-002		2.1483E-003
+	CS-137	661.65*	85.12	4.4348E-004	4.43E-004	3.6412E-003
+	NP-237	300.17	6.20	1.4144E-002	1.35E-003	1.8185E-002
		312.00*	36.00	1.3487E-003		1.2490E-003
		340.60	4.20	2.0506E-002		-7.4983E-003
		375.00	0.68	1.1032E-001		-4.8582E-002
		415.60	1.75	4.2508E-002		-1.0049E-002
	Pu-239	129.28	0.01	5.5701E+001	4.74E+001	-5.8501E+000
		375.00	0.00	4.7410E+001		-2.0878E+001
		413.70	0.00	4.9906E+001		1.2351E+001
		451.50	0.00	4.2094E+002		-9.4663E+001
+	AM-241	59.54*	35.70	4.4495E-001	4.45E-001	2.5586E-001
		125.28	0.00	9.3147E+001		-4.4822E+001
		335.40	0.00	1.6322E+002		-8.2337E+001
		662.42*	0.00	1.0486E+002		8.6093E+002
		722.70	0.00	5.1719E+002		6.8332E+001
	PU-241	114.00	0.02	2.0847E+001	2.08E+001	1.9641E+000
		332.60	0.00	2.7249E+001		-1.9467E+001
	CM-243	209.70	3.27	3.1234E-002	6.11E-003	5.3020E-003
		228.18	10.56	9.1708E-003		6.8396E-003
		277.60	14.00	6.1143E-003		3.6274E-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)
U-235	8.06E-003 +/- 2.48E-003

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

Report Generated On : 2/21/02 3:01:21 PM

Sample Title : 1695 Side B 1800
Spectrum Description :
Sample Identification : 1270
Sample Size : 19.1 kg

Sample Taken On : 2/21/02 2:45:00 PM
Acquisition Started : 2/21/02 2:46:15 PM

Live Time: 1800.0 seconds Real Time: 1802.4 seconds

ISOCS Calabration : 1695 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/21/02

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	237.37	59.43	1.20E+002	39.06	2.06E+003
2	340.53	85.21	1.09E+003	60.85	2.54E+003
3	350.66	87.74	2.28E+002	54.85	2.56E+003
4	535.29	133.88	1.33E+002	44.10	2.19E+003
5	2044.03	510.95	1.31E+002	14.55	6.09E+001
6	2437.87	609.37	7.40E+001	11.05	4.77E+001
7	2647.30	661.71	2.64E+002	18.26	3.84E+001
8	7064.39	1765.63	3.67E+001	7.30	2.06E+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	1.000	661.65*	85.12	3.57168E-003	2.71011E-004
AM-241	0.999	59.54*	35.70	2.62068E-001	8.76808E-002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	8.44503E+002	6.40383E+001
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	3.570568E-003	2.708389E-004
AM-241 @	0.999	2.620678E-001	8.768080E-002

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

Errors quoted at 1.000 sigma

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

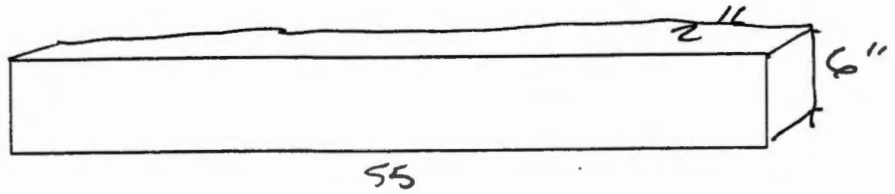
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	6.8671E-004	6.10E-004	-4.1648E-005
		1332.49	100.00	6.1033E-004		-7.9620E-005
	CS-134	475.35	1.46	5.1381E-002	7.18E-004	-1.5464E-002
		563.23	8.38	8.1769E-003		-1.1532E-002
		569.32	15.43	4.7403E-003		-2.5163E-003
		604.70	97.60	8.2937E-004		-3.4245E-007
		795.84	85.40	7.1813E-004		1.2800E-004
		801.93	8.73	7.4164E-003		-3.7718E-003
		1038.57	1.00	6.1295E-002		2.1897E-002
		1167.94	1.80	3.6163E-002		3.8543E-004
		1365.15	3.04	1.8199E-002		7.4710E-003
+	CS-137	661.65*	85.12	4.2591E-004	4.26E-004	3.5717E-003
	NP-237	300.17	6.20	1.4092E-002	2.37E-003	8.2183E-003
		312.00	36.00	2.3674E-003		1.1966E-003
		340.60	4.20	1.9418E-002		4.4385E-003
		375.00	0.68	1.1673E-001		9.7995E-003
		415.60	1.75	4.5736E-002		-4.1429E-003
	Pu-239	129.28	0.01	5.6004E+001	5.02E+001	-7.5386E+000
		375.00	0.00	5.0165E+001		4.2113E+000
		413.70	0.00	5.2486E+001		2.4308E+000
		451.50	0.00	4.0083E+002		2.9888E+002
+	AM-241	59.54*	35.70	4.6655E-001	4.67E-001	2.6207E-001
		125.28	0.00	9.3899E+001		5.8896E+001
		335.40	0.00	1.6120E+002		-7.7711E+001
		662.42*	0.00	1.0071E+002		8.4450E+002
		722.70	0.00	5.2980E+002		2.3627E+002
	PU-241	114.00	0.02	2.0953E+001	2.10E+001	5.5567E-001
		332.60	0.00	2.7904E+001		-7.6687E+000
	CM-243	209.70	3.27	3.2222E-002	6.09E-003	1.8513E-002
		228.18	10.56	8.8091E-003		-5.1995E-003
		277.60	14.00	6.0925E-003		-4.9883E-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)

Bldg 233-S
NDA Item Description Sheet
~~Pipe~~ Geometry
RECTANGULAR PLANE



Put Dimensions on Pipe

Item ID: 1392

Weight (kg): 50 LBS 22.27 kg

Material Description: HARD DOWN

Packaging: 3 LAYERS

Detector Distance (in): 50"

Detector Filters: NONE

Dose Rate: <.5

Comments:
~~A 1800 1259~~
B 1800 1260
A 1800 1259

22.27 kg

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 1392

File Name: 1260

Assay Date: 21-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	7.03E+01	
Pu-239 (414)		
Am-241	4.11E-01	3.38E-02
Np-237		
U-238		
U-235		
Cs-137	2.82E-03	4.08E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Surface only

Item Type: Box

Calcs: Use 1st

Dimensions:

Length (in): 55

Weight (lbs): 50

Width (in): 6

Depth for TMU (in): 4

Depth (in): 2

% Volume: 100

Am-241 Calcs:

Measured	4.11E-01	+/-	1.08E-01	Use Meas
Calculated	9.73E+01	+/-	4.67E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.85E+01	+/-	4.31E+00
Pu-239	7.03E+01	+/-	1.06E+01
Pu-240	3.66E+01	+/-	5.54E+00
Pu-241	1.37E+02	+/-	2.07E+01
Pu-242	3.70E-02	+/-	5.60E-03
Am-241	4.11E-01	+/-	1.08E-01
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.82E-03	+/-	4.96E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.36E+02	+/-	1.27E+01	Calc from Pu-239 MDA
Pu (g):	2.97E-02	**Pu (g) + 3 sigma TMU:**		4.33E-02	
		Pu(g) + 3 sigma:		2.97E-02	

Comments:

Errors are due to matrix and geometry. Values are good.

Errors:Density > 1,

Analyst: Martin Winterrose

Date: 2/21/02

```
#Date & Time: Thu Feb 21 08:31:00 2002
~g=RECTANGULAR_PLANE
~description=1392_HOLDDOWN
~comment=ANGLE_IRON
~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=0.024     ~d1.2=55        ~d1.3=6         ~1mater=POLYPROP ~1den=0.91
~d2.1=0.024     ~2mater=POLYPROP ~2den=0.91
~d3.1=0.0312    ~3mater=DRYDIRT  ~3den=1.6       ~3con=1
~d4.1=2         ~4mater=304SS    ~4den=7.81
~d5.1=0.0312    ~5mater=DRYDIRT  ~5den=1.6       ~5con=1
~d6.1=0.024     ~6mater=POLYPROP ~6den=0.91
~sd1=50
```

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

Report Generated On : 2/21/02 9:54:58 AM

Sample Title : 1392 Side B
Spectrum Description :
Sample Identification : 1260
Sample Size : 22.7 kg

Sample Taken On : 2/21/02 9:39:00 AM
Acquisition Started : 2/21/02 9:39:52 AM

Live Time: 1800.0 seconds Real Time: 1802.5 seconds

ISOCS Calabration : 1392 HOLDDOWN
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/21/02

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	239.32	59.92	8.04E+003	167.30	2.01E+003
2	340.41	85.18	8.67E+002	62.10	2.36E+003
3	350.61	87.73	1.65E+002	55.03	2.37E+003
4	2044.61	511.09	1.59E+002	15.45	6.62E+001
5	2437.68	609.33	1.04E+002	14.29	3.90E+001
6	2647.05	661.65	8.30E+001	11.71	4.18E+001
7	3645.84	911.27	6.56E+001	10.22	2.34E+001
8	7065.19	1765.83	5.33E+001	8.41	1.23E+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	1.000	661.65*	85.12	2.82076E-003	4.07892E-004
AM-241	0.994	59.54*	35.70	4.11498E-001	3.37986E-002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	6.66953E+002	9.64269E+001
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	2.819019E-003	4.078206E-004
AM-241 @	0.994	4.114984E-001	3.379860E-002

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

Errors quoted at 1.000 sigma

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

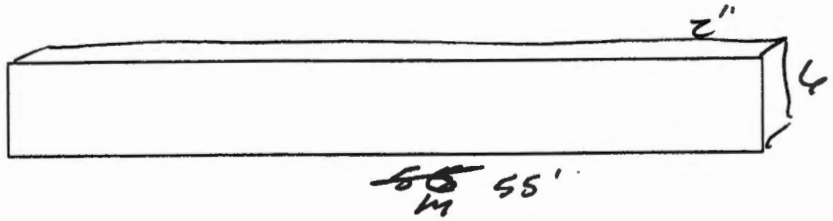
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.9811E-003	1.67E-003	1.4979E-003
		1332.49	100.00	1.6729E-003		1.2880E-003
	CS-134	475.35	1.46	1.1491E-001	2.17E-003	-9.1313E-002
		563.23	8.38	1.8883E-002		-3.7166E-002
		569.32	15.43	1.1155E-002		-3.2826E-003
		604.70	97.60	2.3470E-003		-5.2254E-004
		795.84	85.40	2.1698E-003		1.4904E-004
		801.93	8.73	2.0647E-002		-1.0977E-003
		1038.57	1.00	1.6270E-001		-1.0220E-001
		1167.94	1.80	1.1082E-001		-1.0410E-001
		1365.15	3.04	5.6203E-002		3.0069E-002
+	CS-137	661.65*	85.12	1.1148E-003	1.11E-003	2.8208E-003
	NP-237	300.17	6.20	3.0426E-002	5.23E-003	4.2154E-003
		312.00	36.00	5.2290E-003		3.6598E-003
		340.60	4.20	4.2363E-002		-3.1451E-003
		375.00	0.68	2.4227E-001		1.0137E-001
		415.60	1.75	9.9424E-002		-2.9262E-002
	Pu-239	129.28	0.01	7.0250E+001	7.03E+001	-1.9861E+000
		375.00	0.00	1.0411E+002		4.3565E+001
		413.70	0.00	1.1356E+002		-7.3197E+001
		451.50	0.00	8.8836E+002		2.1947E+002
+	AM-241	59.54*	35.70	1.0812E-002	1.08E-002	4.1150E-001
		125.28	0.00	1.1096E+002		2.7111E+000
		335.40	0.00	3.7300E+002		1.7466E+002
		662.42*	0.00	2.6358E+002		6.6695E+002
		722.70	0.00	1.4577E+003		1.3992E+003
	PU-241	114.00	0.02	2.0533E+001	2.05E+001	2.7878E-001
		332.60	0.00	6.3935E+001		3.3093E+001
	CM-243	209.70	3.27	6.2977E-002	1.29E-002	1.0047E-002
		228.18	10.56	1.8751E-002		5.0620E-003
		277.60	14.00	1.2864E-002		1.1781E-002

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

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

Nuclide	Mass (g)

Bldg 233-S
NDA Item Description Sheet
~~Pipe~~ Geometry
RECTANGULAR PLANE



Put Dimensions on Pipe

Item ID: 1391

Weight (kg): 40 lbs 18.18 Kg

Material Description: HOLD DOWNS

Packaging: 3 LAYERS

Detector Distance (in): 50

Detector Filters: NONE

Dose Rate: <.5

Comments: A 1800 1261
B 1800 1267

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 1391

File Name: 1261

Assay Date: 21-Feb-02

File Name: 1262

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	8.79E+01		8.79E+01	
Pu-239 (414)				
Am-241	7.27E-01	6.10E-02	7.27E-01	6.10E-02
Np-237				
U-238				
U-235				
Cs-137	2.41E-03	4.30E-04	2.41E-03	4.30E-04
Co-60				

Item Parameters:

Contamination: Container

Item Type: Box

Calcs: Average

Dimensions:

Length (in): 55

Width (in): 6

Depth (in): 2

Weight (lbs): 40

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	7.27E-01	+/-	1.87E-01	Use Meas
Calculated	1.22E+02	+/-	5.84E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	3.56E+01	+/-	5.39E+00
Pu-239	8.79E+01	+/-	1.33E+01
Pu-240	4.58E+01	+/-	6.93E+00
Pu-241	1.71E+02	+/-	2.59E+01
Pu-242	4.63E-02	+/-	7.00E-03
Am-241	7.27E-01	+/-	1.87E-01
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.41E-03	+/-	3.88E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.70E+02	+/-	1.59E+01	Calc from Pu-239 MDA
Pu (g):	2.98E-02	**Pu (g) + 3 sigma TMU:**		4.33E-02	
		Pu(g) + 3 sigma:		2.98E-02	

Comments:

Error due to matrix and geometry. Pu-239 MDA acceptable for characterization.

Errors:Density > 1,

Analyst: Martin Winterrose

Date: 2/21/02

```
#Date & Time: Thu Feb 21 10:43:23 2002
~g=RECTANGULAR_PLANE
~description=1391_HOLDDOWN
~comment=ANGLE_IRON
~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=0.024     ~d1.2=55        ~d1.3=6         ~1mater=POLYPROP ~1den=0.91
~d2.1=0.024     ~2mater=POLYPROP ~2den=0.91
~d3.1=0.0312    ~3mater=DRYDIRT  ~3den=1.6       ~3con=1
~d4.1=2         ~4mater=304SS    ~4den=7.81
~d5.1=0.0312    ~5mater=DRYDIRT  ~5den=1.6       ~5con=1
~d6.1=0.024     ~6mater=POLYPROP ~6den=0.91
~sd1=50
```

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

Report Generated On : 2/21/02 11:15:23 AM

Sample Title : 1391 Side A
Spectrum Description :
Sample Identification : 1261
Sample Size : 18.2 kg

Sample Taken On : 2/21/02 10:44:00 AM
Acquisition Started : 2/21/02 10:45:13 AM

Live Time: 1800.0 seconds Real Time: 1802.7 seconds

ISOCS Calabration : 1391 HOLDDOWN
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/21/02

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	201.68	50.51	2.44E+002	45.39	1.91E+003
2	239.26	59.90	1.14E+004	303.22	2.05E+003
3	340.05	85.09	8.87E+002	58.72	2.35E+003
4	350.36	87.67	1.85E+002	53.05	2.37E+003
5	1408.73	352.17	1.08E+002	15.15	1.36E+002
6	2044.95	511.18	1.22E+002	17.03	6.76E+001
7	2333.20	583.21	6.04E+001	11.60	5.34E+001
8	2438.04	609.42	1.36E+002	14.02	5.27E+001
9	2646.00	661.39	5.69E+001	9.98	4.36E+001
10	3645.44	911.17	6.68E+001	10.23	2.52E+001
11	7064.89	1765.75	4.86E+001	7.88	5.36E-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	0.997	661.65*	85.12	2.41462E-003	4.30456E-004
AM-241	0.995	59.54*	35.70	7.27311E-001	6.09616E-002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	5.70923E+002	1.01767E+002
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.997	2.411542E-003	4.304069E-004
AM-241 @	0.995	7.273110E-001	6.096160E-002

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

Errors quoted at 1.000 sigma

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

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.4641E-003	1.92E-003	-1.3538E-003
		1332.49	100.00	1.9212E-003		-1.4552E-003
	CS-134	475.35	1.46	1.5603E-001	2.79E-003	-6.7554E-002
		563.23	8.38	2.7568E-002		-3.1495E-003
		569.32	15.43	1.5074E-002		6.8042E-003
		604.70	97.60	2.9049E-003		-4.0652E-004
		795.84	85.40	2.7854E-003		-6.1808E-004
		801.93	8.73	2.8848E-002		1.5466E-003
		1038.57	1.00	2.3137E-001		1.4773E-001
		1167.94	1.80	1.3720E-001		-2.2294E-002
		1365.15	3.04	6.8610E-002		3.4752E-002
+	CS-137	661.65*	85.12	1.4188E-003	1.42E-003	2.4146E-003
	NP-237	300.17	6.20	3.7988E-002	6.29E-003	-6.9932E-003
		312.00	36.00	6.2871E-003		-3.9547E-003
		340.60	4.20	5.5420E-002		1.9787E-002
		375.00	0.68	3.3367E-001		1.4261E-001
		415.60	1.75	1.2659E-001		-1.1709E-002
	Pu-239	129.28	0.01	8.7853E+001	8.79E+001	3.3264E+001
		375.00	0.00	1.4339E+002		6.1285E+001
		413.70	0.00	1.4897E+002		9.3171E+001
		451.50	0.00	1.0987E+003		2.2917E+002
+	AM-241	59.54*	35.70	1.3653E-002	1.37E-002	7.2731E-001
		125.28	0.00	1.3927E+002		-5.3718E+001
		335.40	0.00	4.8858E+002		8.5217E+002
		662.42*	0.00	3.3547E+002		5.7092E+002
		722.70	0.00	1.7396E+003		2.5566E+001
	PU-241	114.00	0.02	2.5664E+001	2.57E+001	5.0072E+000
		332.60	0.00	8.0890E+001		3.2803E+001
	CM-243	209.70	3.27	8.1029E-002	1.63E-002	4.7248E-002
		228.18	10.56	2.4376E-002		-7.1946E-003
		277.60	14.00	1.6319E-002		-2.7053E-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)

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

Report Generated On : 2/21/02 11:16:31 AM

Sample Title : 1391 Side B
Spectrum Description :
Sample Identification : 1262
Sample Size : 18.2 kg

Sample Taken On : 2/21/02 11:16:00 AM
Acquisition Started : 2/21/02 11:16:27 AM

Live Time: 1800.0 seconds Real Time: 1802.7 seconds

ISOCS Calabration : 1391 HOLDDOWN
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/21/02

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	201.68	50.51	2.44E+002	45.39	1.91E+003
2	239.26	59.90	1.14E+004	303.17	2.05E+003
3	340.05	85.09	8.87E+002	58.72	2.35E+003
4	350.36	87.67	1.85E+002	53.05	2.37E+003
5	1408.73	352.17	1.08E+002	15.15	1.36E+002
6	2044.95	511.18	1.22E+002	17.03	6.76E+001
7	2333.20	583.21	6.04E+001	11.60	5.34E+001
8	2438.04	609.42	1.36E+002	14.02	5.27E+001
9	2646.00	661.39	5.69E+001	9.98	4.36E+001
10	3645.44	911.17	6.68E+001	10.23	2.52E+001
11	7064.89	1765.75	4.86E+001	7.88	5.36E-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	0.997	661.65*	85.12	2.41460E-003	4.30454E-004
AM-241	0.995	59.54*	35.70	7.27378E-001	6.09654E-002
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	5.70920E+002	1.01767E+002
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.997	2.411529E-003	4.304045E-004
AM-241 @	0.995	7.273777E-001	6.096543E-002

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

Errors quoted at 1.000 sigma

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

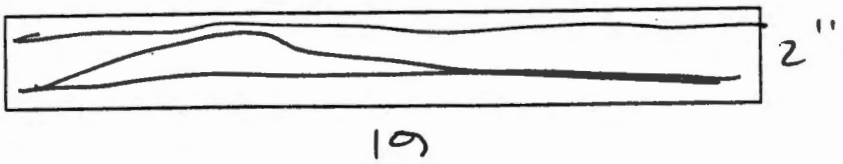
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.4641E-003	1.92E-003	-1.3538E-003
		1332.49	100.00	1.9212E-003		-1.4552E-003
	CS-134	475.35	1.46	1.5603E-001	2.79E-003	-6.7553E-002
		563.23	8.38	2.7568E-002		-3.1495E-003
		569.32	15.43	1.5074E-002		6.8041E-003
		604.70	97.60	2.9048E-003		-4.0651E-004
		795.84	85.40	2.7854E-003		-6.1807E-004
		801.93	8.73	2.8848E-002		1.5466E-003
		1038.57	1.00	2.3137E-001		1.4773E-001
		1167.94	1.80	1.3720E-001		-2.2294E-002
		1365.15	3.04	6.8610E-002		3.4752E-002
+	CS-137	661.65*	85.12	1.4188E-003	1.42E-003	2.4146E-003
	NP-237	300.17	6.20	3.7988E-002	6.29E-003	-6.9932E-003
		312.00	36.00	6.2871E-003		-3.9547E-003
		340.60	4.20	5.5420E-002		1.9787E-002
		375.00	0.68	3.3367E-001		1.4261E-001
		415.60	1.75	1.2659E-001		-1.1709E-002
	Pu-239	129.28	0.01	8.7852E+001	8.79E+001	3.3264E+001
		375.00	0.00	1.4339E+002		6.1285E+001
		413.70	0.00	1.4897E+002		9.3171E+001
		451.50	0.00	1.0987E+003		2.2916E+002
+	AM-241	59.54*	35.70	1.3653E-002	1.37E-002	7.2738E-001
		125.28	0.00	1.3927E+002		-5.3718E+001
		335.40	0.00	4.8858E+002		8.5216E+002
		662.42*	0.00	3.3546E+002		5.7092E+002
		722.70	0.00	1.7396E+003		2.5565E+001
	PU-241	114.00	0.02	2.5663E+001	2.57E+001	5.0072E+000
		332.60	0.00	8.0889E+001		3.2803E+001
	CM-243	209.70	3.27	8.1028E-002	1.63E-002	4.7248E-002
		228.18	10.56	2.4376E-002		-7.1946E-003
		277.60	14.00	1.6318E-002		-2.7053E-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)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 3014

Weight (kg): 6.5 2.95kg

Material Description: 4 1" pipes

Packaging: 3 layers

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: <.5

Comments: A 900 1309
B 1800 1310

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 3014

File Name: 1310

Assay Date: 27-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	1.67E+02	
Pu-239 (414)		
Am-241	7.55E+01	6.40E+00
Np-237		
U-238		
U-235		
Cs-137	7.92E-03	7.82E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 19

Width (in): 2

Depth (in): 2

Weight (lbs): 6.5

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	7.55E+01	+/-	3.44E+01	Use Meas
Calculated	2.31E+02	+/-	1.46E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.77E+01	+/-	1.52E+01
Pu-239	1.67E+02	+/-	3.75E+01
Pu-240	8.70E+01	+/-	1.95E+01
Pu-241	3.25E+02	+/-	7.30E+01
Pu-242	8.79E-02	+/-	1.97E-02
Am-241	7.55E+01	+/-	3.44E+01
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	7.92E-03	+/-	1.18E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	2.52E+02	+/-	1.15E+02	Calc from Am-241 Act
Pu (g):	9.19E-03	**Pu (g) + 3 sigma TMU:**	1.54E-02	
		Pu(g) + 3 sigma:	9.19E-03	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/27/02

```
#Date & Time: Wed Feb 27 14:08:32 2002
~g=PIPE
~description=3014_PIPE
~comment=4_1"_PIPES
~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=0.154     ~d1.2=2         ~d1.3=9.5       ~d1.4=9.5       ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=9.5       ~d2.3=9.5       ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/27/02 2:44:31 PM

Sample Title : 3014 Side B
Spectrum Description :
Sample Identification : 1310
Sample Size : 3.0 kg

Sample Taken On : 2/27/02 2:29:00 PM
Acquisition Started : 2/27/02 2:29:25 PM

Live Time: 1800.0 seconds Real Time: 1802.4 seconds

ISOCS Calabration : 3014 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/27/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.27	59.90	1.49E+004	439.27	1.61E+003
2	340.41	85.18	8.09E+002	57.97	1.89E+003
3	350.44	87.69	1.57E+002	52.90	1.91E+003
4	2044.53	511.07	1.42E+002	14.42	6.11E+001
5	2437.38	609.25	1.05E+002	12.74	4.21E+001
6	2647.00	661.64	1.56E+002	14.66	3.80E+001

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

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	7.91676E-003	7.82427E-004
AM-241	0.993	59.54*	35.70	7.55385E+001	6.40012E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	1.87188E+003	1.84931E+002
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	7.597289E-003	7.826026E-004
AM-241 @	0.993	7.553847E+001	6.400122E+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 *****
****

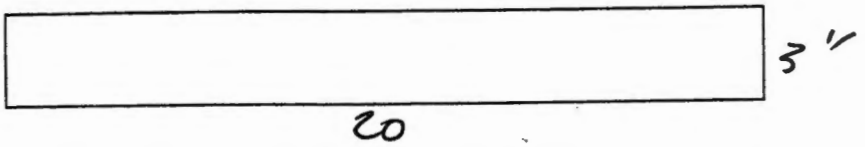
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.3504E-003	2.10E-003	-2.7064E-003
		1332.49	100.00	2.1033E-003		-1.5506E-003
	CS-134	475.35	1.46	1.7816E-001	2.61E-003	1.8747E-001
		563.23	8.38	2.9624E-002		1.2001E-002
		569.32	15.43	1.6490E-002		5.1687E-003
		604.70	97.60	3.4231E-003		1.9519E-003
		795.84	85.40	2.6058E-003		-3.3177E-004
		801.93	8.73	2.5576E-002		-2.4022E-002
		1038.57	1.00	2.2279E-001		5.5783E-002
		1167.94	1.80	1.3277E-001		1.0433E-001
		1365.15	3.04	7.2787E-002		-7.3758E-002
+	CS-137	661.65*	85.12	1.5887E-003	1.59E-003	7.9168E-003
	NP-237	300.17	6.20	4.6867E-002	8.06E-003	1.8092E-002
		312.00	36.00	8.0618E-003		-5.8029E-004
		340.60	4.20	6.5102E-002		1.3536E-002
		375.00	0.68	3.9109E-001		-8.8750E-002
		415.60	1.75	1.5748E-001		8.9329E-002
	Pu-239	129.28	0.01	1.6695E+002	1.67E+002	1.3147E+002
		375.00	0.00	1.6807E+002		-3.8140E+001
		413.70	0.00	1.8056E+002		4.9341E+001
		451.50	0.00	1.4464E+003		9.0963E+002
+	AM-241	59.54*	35.70	9.5814E-001	9.58E-001	7.5538E+001
		125.28	0.00	2.7945E+002		1.6844E+002
		335.40	0.00	5.6909E+002		7.3102E+002
		662.42*	0.00	3.7565E+002		1.8719E+003
		722.70	0.00	1.8193E+003		-7.9757E+002
	PU-241	114.00	0.02	6.1793E+001	6.18E+001	-1.5940E+001
		332.60	0.00	9.4651E+001		-7.6592E+001
	CM-243	209.70	3.27	1.0354E-001	2.04E-002	8.9821E-002
		228.18	10.56	2.9618E-002		-1.9973E-002
		277.60	14.00	2.0445E-002		1.3166E-002

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

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

Nuclide	Mass (g)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4004

Weight (kg): 2 LBS .909kg

Material Description: 5 1/2 TO 3/4 PIPES

Packaging: 3 LAYERS

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: <.5

Comments: Modeled a 1 2" pipe A 900 1293
B 1800 1294

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4004

File Name: 1294

Assay Date: 26-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.10E+03	1.40E+02
Am-241	3.54E+03	3.02E+02
Np-237	7.09E-02	6.57E-03
U-238		
U-235		
Cs-137	8.78E-02	4.88E-03
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 20

Width (in): 4

Depth (in): 2

Weight (lbs): 2

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	3.54E+03	+/-	1.61E+03	Calc from Pu-239
Calculated	1.52E+03	+/-	7.89E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	4.46E+02	+/-	7.61E+01
Pu-239	1.10E+03	+/-	1.88E+02
Pu-240	5.74E+02	+/-	9.78E+01
Pu-241	2.15E+03	+/-	3.66E+02
Pu-242	5.80E-01	+/-	9.88E-02
Am-241	1.52E+03	+/-	7.89E+02
Np-237	7.09E-02	+/-	1.03E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	8.78E-02	+/-	1.10E-02
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	3.65E+03	+/-	8.20E+02	Calc from Pu-239 Act
Pu (g):	1.86E-02	**Pu (g) + 3 sigma TMU:**	2.82E-02	
		Pu(g) + 3 sigma:	2.58E-02	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/26/02

```
#Date & Time: Tue Feb 26 14:27:30 2002
~g=PIPE
~description=4004_PIPE
~comment=2"_PIPE
~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=0.154     ~d1.2=2         ~d1.3=10        ~d1.4=10        ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=10        ~d2.3=10        ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/26/02 3:01:19 PM

Sample Title : 4004 Side B
Spectrum Description :
Sample Identification : 1294
Sample Size : 0.9 kg

Sample Taken On : 2/26/02 2:45:00 PM
Acquisition Started : 2/26/02 2:46:09 PM

Live Time: 1800.0 seconds Real Time: 1808.8 seconds

ISOCS Calabration : 4004 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	2.13E+005	6537.65	3.18E+003
2	340.31	85.16	7.34E+002	59.09	2.34E+003
3	395.77	99.01	8.79E+002	58.53	2.32E+003
4	414.01	103.57	2.89E+002	49.24	2.28E+003
5	445.27	111.39	1.65E+002	60.73	2.33E+003
6	501.91	125.54	1.45E+002	44.36	2.07E+003
7	518.59	129.71	7.15E+002	49.59	1.98E+003
8	1201.21	300.31	5.25E+001	14.24	1.71E+002
9	1248.60	312.15	2.63E+002	20.83	1.62E+002
10	1332.15	333.03	6.94E+001	14.86	1.62E+002
11	1408.40	352.09	1.06E+002	14.95	1.47E+002
12	1501.27	375.30	1.79E+002	17.35	1.27E+002
13	1655.76	413.91	1.35E+002	15.33	9.98E+001
14	2044.15	510.98	1.54E+002	17.86	7.10E+001
15	2332.65	583.08	6.72E+001	11.35	5.49E+001
16	2437.46	609.27	1.08E+002	13.04	4.53E+001
17	2647.16	661.68	5.31E+002	24.35	3.74E+001
18	7063.69	1765.45	5.14E+001	8.27	2.66E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	8.77680E-002	4.87913E-003
NP-237	0.860	300.17*	6.20	8.05207E-002	2.21941E-002
		312.00*	36.00	7.09645E-002	6.57042E-003
		340.60	4.20		
		375.00*	0.68	2.83715E+000	3.02411E-001
		415.60*	1.75	8.79755E-001	1.06284E-001
Pu-239	0.964	129.28*	0.01	1.17046E+003	2.12610E+002
		375.00*	0.00	1.21926E+003	1.51133E+002
		413.70*	0.00	1.01667E+003	1.40067E+002
		451.50 @	0.00		
AM-241	0.995	59.54*	35.70	3.54310E+003	3.01878E+002
		125.28*	0.00	3.86449E+002	1.20013E+002
		335.40	0.00		
		662.42* @	0.00	2.07523E+004	1.15228E+003
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	8.431151E-002	4.896138E-003
NP-237	0.860	7.129151E-002	6.293372E-003
Pu-239 @	0.964	1.107086E+003	6.598746E+001
AM-241 @	0.995	8.172654E+002	1.115231E+002

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

Errors quoted at 1.000 sigma

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

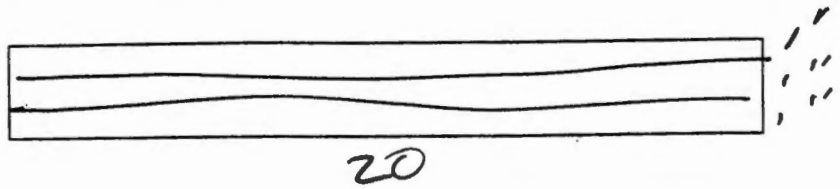
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	8.2725E-003	7.80E-003	-5.5979E-003
		1332.49	100.00	7.8018E-003		7.0960E-003
	CS-134	475.35	1.46	6.1648E-001	9.46E-003	-1.1265E-001
		563.23	8.38	1.0752E-001		8.6418E-002
		569.32	15.43	5.4284E-002		-3.8757E-002
		604.70	97.60	1.1187E-002		-4.3992E-003
		795.84	85.40	9.4625E-003		2.0600E-003
		801.93	8.73	9.0159E-002		6.0069E-002
		1038.57	1.00	7.5750E-001		-6.7647E-001
		1167.94	1.80	4.7329E-001		-2.2565E-001
		1365.15	3.04	2.2472E-001		6.6257E-002
+	CS-137	661.65*	85.12	5.1488E-003	5.15E-003	8.7768E-002
+	NP-237	300.17*	6.20	9.7411E-002	1.67E-002	8.0521E-002
		312.00*	36.00	1.6708E-002		7.0965E-002
		340.60	4.20	2.6580E-001		1.1764E-001
		375.00*	0.68	8.7366E-001		2.8372E+000
		415.60*	1.75	3.2036E-001		8.7976E-001
+	Pu-239	129.28*	0.01	3.4321E+002	3.43E+002	1.1705E+003
		375.00*	0.00	3.7545E+002		1.2193E+003
		413.70*	0.00	3.7022E+002		1.0167E+003
		451.50	0.00	4.9917E+003		-9.4448E+002
+	AM-241	59.54*	35.70	4.4159E+000	4.42E+000	3.5431E+003
		125.28*	0.00	5.7347E+002		3.8645E+002
		335.40	0.00	2.2792E+003		-8.4518E+002
		662.42*	0.00	1.2174E+003		2.0752E+004
		722.70	0.00	6.5728E+003		1.9150E+003
	PU-241	114.00	0.02	2.1806E+002	2.18E+002	1.0114E+001
		332.60	0.00	3.9133E+002		3.2508E+002
	CM-243	209.70	3.27	3.9870E-001	7.58E-002	1.2134E-001
		228.18	10.56	1.0821E-001		6.7197E-003
		277.60	14.00	7.5802E-002		-1.8480E-002

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

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

Nuclide	Mass (g)
Pu-239	1.62E-002 +/- 9.68E-004

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4063

Weight (kg): 7 lbs 3.18 kg

Material Description: 3 1" Pipe

Packaging: 3 Layer

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: Model as 3" Pipe A 900 1295
With thinner wall B 1800 1296

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4063

File Name: 1295

Assay Date: 26-Feb-02

File Name: 1296

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	1.76E+02	4.05E+01	1.53E+02	3.47E+01
Pu-239 (414)				
Am-241	5.90E+02	5.03E+01	1.05E+03	8.94E+01
Np-237	1.58E-02	2.20E-03	2.39E-02	2.64E-03
U-238				
U-235				
Cs-137				
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Average

Dimensions:

Length (in): 20

Weight (lbs): 7

Width (in): 3

Depth for TMU (in): 4

Depth (in): 1.5

% Volume: 100

Am-241 Calcs:

Measured	8.19E+02	+/-	3.70E+02	Calc from Pu-239
Calculated	2.28E+02	+/-	1.70E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.67E+01	+/-	1.85E+01
Pu-239	1.65E+02	+/-	4.56E+01
Pu-240	8.57E+01	+/-	2.37E+01
Pu-241	3.20E+02	+/-	8.87E+01
Pu-242	8.66E-02	+/-	2.40E-02
Am-241	2.28E+02	+/-	1.70E+02
Np-237	1.98E-02	+/-	2.81E-03
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):	5.45E+02	+/-	1.79E+02	Calc from Pu-239 Act
Pu (g):	9.75E-03	**Pu (g) + 3 sigma TMU:**	1.78E-02	
		Pu(g) + 3 sigma:	1.45E-02	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/26/02

```
#Date & Time: Tue Feb 26 15:16:55 2002
~g=PIPE
~description=4063_PIPE
~comment=3_1"_PIPES
~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=0.131     ~d1.2=3         ~d1.3=10        ~d1.4=10        ~1mater=304SS    ~1den=7.81
~d2.1=0.109     ~d2.2=10        ~d2.3=10        ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/26/02 3:48:31 PM

Sample Title : 4063 Side A
Spectrum Description :
Sample Identification : 1295
Sample Size : 3.2 kg

Sample Taken On : 2/26/02 3:18:00 PM
Acquisition Started : 2/26/02 3:18:54 PM

Live Time: 900.0 seconds Real Time: 904.2 seconds

ISOCS Calabration : 4063 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	199.61	49.99	3.58E+002	82.29	2.86E+003
2	239.24	59.90	1.07E+005	3285.04	1.53E+003
3	339.95	85.06	3.79E+002	39.15	1.08E+003
4	349.78	87.52	1.39E+002	37.09	1.09E+003
5	396.03	99.08	3.16E+002	37.61	1.09E+003
6	412.93	103.30	1.68E+002	34.18	1.08E+003
7	518.11	129.59	1.99E+002	31.10	9.51E+002
8	1248.45	312.12	1.04E+002	13.58	7.43E+001
9	1500.27	375.05	3.24E+001	8.99	4.74E+001
10	2044.99	511.19	6.82E+001	10.22	3.25E+001
11	2437.54	609.29	7.29E+001	10.29	2.16E+001
12	2647.03	661.65	2.51E+001	7.41	1.56E+001
13	7063.21	1765.33	2.33E+001	6.01	4.09E-001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
NP-237	0.606	300.17	6.20		
		312.00*	36.00	1.57987E-002	2.20126E-003
		340.60	4.20		
		375.00*	0.68	2.89938E-001	8.14750E-002
		415.60	1.75		
Pu-239	0.726	129.28*	0.01	1.76463E+002	4.04814E+001
		375.00*	0.00	1.24600E+002	3.58902E+001
		413.70	0.00		
		451.50 @	0.00		
AM-241	0.994	59.54*	35.70	5.90476E+002	5.02885E+001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	5.59336E+002	1.66078E+002
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
X	CS-137	1.000		
	NP-237	0.606	1.573928E-002	2.200778E-003
	Pu-239 @	0.726	1.528176E+002	2.223935E+001
	AM-241 @	0.994	5.904760E+002	5.028853E+001

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

Errors quoted at 1.000 sigma

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

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	3.1895E-003	2.75E-003	-1.6014E-003
		1332.49	100.00	2.7461E-003		-3.2148E-003
	CS-134	475.35	1.46	2.4525E-001	4.00E-003	-3.2105E-001
		563.23	8.38	4.0231E-002		1.1152E-002
		569.32	15.43	2.1835E-002		1.9045E-002
		604.70	97.60	4.7068E-003		1.8410E-003
		795.84	85.40	4.0001E-003		-9.8192E-004
		801.93	8.73	3.8978E-002		-2.1246E-002
		1038.57	1.00	3.0729E-001		-7.6132E-002
		1167.94	1.80	1.8759E-001		3.8786E-002
		1365.15	3.04	9.7060E-002		-6.7647E-003
	CS-137	661.65*	85.12	1.9872E-003	1.99E-003	2.3656E-003
+	NP-237	300.17	6.20	6.8525E-002	6.52E-003	-6.1731E-002
		312.00*	36.00	6.5219E-003		1.5799E-002
		340.60	4.20	9.9199E-002		6.2134E-002
		375.00*	0.68	3.1118E-001		2.8994E-001
		415.60	1.75	2.1994E-001		4.0433E-002
+	Pu-239	129.28*	0.01	1.2966E+002	1.30E+002	1.7646E+002
		375.00*	0.00	1.3373E+002		1.2460E+002
		413.70	0.00	2.5514E+002		-1.1893E+002
		451.50	0.00	2.0173E+003		-7.8083E+002
+	AM-241	59.54*	35.70	1.0180E+000	1.02E+000	5.9048E+002
		125.28	0.00	3.6470E+002		9.2406E+001
		335.40	0.00	8.0888E+002		-5.1765E+001
		662.42*	0.00	4.6986E+002		5.5934E+002
		722.70	0.00	2.9728E+003		3.6181E+003
	PU-241	114.00	0.02	7.9909E+001	7.99E+001	3.3601E+001
		332.60	0.00	1.3264E+002		4.2535E-001
	CM-243	209.70	3.27	1.4998E-001	2.92E-002	6.5243E-003
		228.18	10.56	4.2019E-002		1.8985E-002
		277.60	14.00	2.9198E-002		1.1136E-002

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

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

Nuclide	Mass (g)
Pu-239	7.84E-003 +/- 1.14E-003

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

Report Generated On : 2/26/02 3:57:36 PM

Sample Title : 4063 Side B
Spectrum Description :
Sample Identification : 1296
Sample Size : 3.2 kg

Sample Taken On : 2/26/02 3:35:00 PM
Acquisition Started : 2/26/02 3:42:24 PM

Live Time: 900.0 seconds Real Time: 906.7 seconds

ISOCS Calabration : 4063 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	1.90E+005	5850.81	2.15E+003
2	339.78	85.02	4.33E+002	40.07	1.16E+003
3	350.09	87.60	1.24E+002	38.03	1.15E+003
4	379.61	94.98	1.47E+002	35.28	1.15E+003
5	396.35	99.16	4.34E+002	40.98	1.14E+003
6	412.62	103.23	2.21E+002	36.58	1.12E+003
7	518.35	129.65	1.72E+002	30.74	9.71E+002
8	834.76	208.73	5.70E+001	14.59	1.70E+002
9	1201.62	300.41	3.62E+001	10.20	7.78E+001
10	1248.53	312.14	1.57E+002	15.59	7.19E+001
11	1499.72	374.91	3.45E+001	9.70	5.66E+001
12	2045.54	511.32	5.31E+001	9.92	2.53E+001
13	2649.36	662.23	2.82E+001	7.41	1.22E+001
14	7063.92	1765.51	2.56E+001	6.13	2.85E-001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
NP-237	0.811	300.17*	6.20	3.13602E-002	8.96107E-003
		312.00*	36.00	2.39346E-002	2.63539E-003
		340.60	4.20		
		375.00*	0.68	3.08488E-001	8.79318E-002
		415.60	1.75		
Pu-239	0.725	129.28*	0.01	1.52760E+002	3.74268E+001
		375.00*	0.00	1.32572E+002	3.87083E+001
		413.70	0.00		
		451.50 @	0.00		
AM-241	0.994	59.54*	35.70	1.04882E+003	8.93628E+001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	6.29647E+002	1.66577E+002
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
X	CS-137	0.987		
	NP-237	0.811	2.448777E-002	2.527644E-003
	Pu-239 @	0.725	1.417880E+002	2.258963E+001
	AM-241 @	0.994	1.048824E+003	8.936282E+001

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

Errors quoted at 1.000 sigma

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

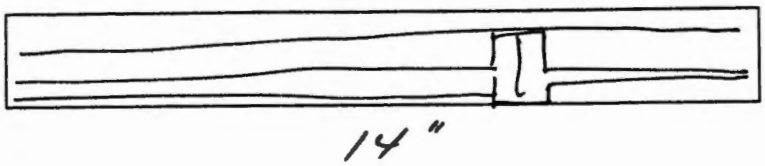
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	3.6393E-003	3.25E-003	2.9782E-003
		1332.49	100.00	3.2495E-003		3.3410E-004
	CS-134	475.35	1.46	2.6707E-001	4.12E-003	9.5343E-002
		563.23	8.38	4.3297E-002		1.2844E-002
		569.32	15.43	2.4424E-002		1.0474E-002
		604.70	97.60	4.3455E-003		3.2711E-003
		795.84	85.40	4.1184E-003		2.7299E-003
		801.93	8.73	3.6195E-002		-2.2567E-002
		1038.57	1.00	3.3544E-001		4.6504E-002
		1167.94	1.80	2.0929E-001		9.7684E-003
		1365.15	3.04	8.7882E-002		-1.4221E-001
	CS-137	661.65*	85.12	1.7866E-003	1.79E-003	2.6630E-003
+	NP-237	300.17*	6.20	3.7885E-002	6.42E-003	3.1360E-002
		312.00*	36.00	6.4197E-003		2.3935E-002
		340.60	4.20	9.8985E-002		7.4371E-002
		375.00*	0.68	3.3762E-001		3.0849E-001
		415.60	1.75	2.3676E-001		1.7489E-001
+	Pu-239	129.28*	0.01	1.3091E+002	1.31E+002	1.5276E+002
		375.00*	0.00	1.4509E+002		1.3257E+002
		413.70	0.00	2.7810E+002		2.9020E+002
		451.50	0.00	1.9225E+003		-1.7981E+003
+	AM-241	59.54*	35.70	1.2050E+000	1.20E+000	1.0488E+003
		125.28	0.00	3.6860E+002		1.1083E+002
		335.40	0.00	8.2899E+002		-1.6513E+002
		662.42*	0.00	4.2243E+002		6.2965E+002
		722.70	0.00	2.7749E+003		1.9886E+003
	PU-241	114.00	0.02	8.1311E+001	8.13E+001	6.7079E+001
		332.60	0.00	1.3716E+002		-1.4590E+002
	CM-243	209.70	3.27	1.5596E-001	2.80E-002	2.0602E-002
		228.18	10.56	4.1808E-002		-5.7635E-003
		277.60	14.00	2.7979E-002		-1.9562E-002

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

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

Nuclide	Mass (g)
Pu-239	7.27E-003 +/- 1.16E-003

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4104

Weight (kg): 5 2.27kg

Material Description: 2 1/2" PIPE W FLANGE

Packaging: 3 LAYERS

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: <.5

Comments: MODELED AS 1.5" pipe A 900 1301
B 1000 1302

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

Sample Info:

Item ID:	4104	**Assay Date:**	27-Feb-02
File Name:	1302	**File Name:**	

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	2.12E+02			
Pu-239 (414)				
Am-241	2.51E+02	2.10E+01		
Np-237				
U-238				
U-235				
Cs-137	3.98E-03	6.74E-04		
Co-60				

Item Parameters:

Contamination: Internal Item Type: Pipe or Duct Calcs: Use 1st

Dimensions:

Length (in):	14	Width (in):	1.5	Depth (in):	1.5
Weight (lbs):	5	Depth for TMU (in):	4	% Volume:	100

Am-241 Calcs:

Measured	2.51E+02	+/-	1.14E+02	Use Meas
Calculated	2.93E+02	+/-	1.85E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	8.59E+01	+/-	1.93E+01
Pu-239	2.12E+02	+/-	4.76E+01
Pu-240	1.10E+02	+/-	2.48E+01
Pu-241	4.13E+02	+/-	9.27E+01
Pu-242	1.12E-01	+/-	2.50E-02
Am-241	2.51E+02	+/-	1.14E+02
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	3.98E-03	+/-	8.07E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	8.36E+02	+/-	3.80E+02	Calc from Am-241 Act
Pu (g):	8.97E-03	**Pu (g) + 3 sigma TMU:**	1.50E-02	
		Pu(g) + 3 sigma:	8.97E-03	

Comments: Errors:

Analyst: Martin Winterrose **Date:** 2/27/02

```
#Date & Time: Wed Feb 27 09:55:13 2002
~g=PIPE
~description=4104_PIPE
~comment=2_1/2"_PIPE_WITH_FLANGE
~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=0.154     ~d1.2=1.5       ~d1.3=7         ~d1.4=7         ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=7         ~d2.3=7         ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/27/02 10:31:53 AM

Sample Title : 4104 Side B
Spectrum Description :
Sample Identification : 1302
Sample Size : 2.3 kg

Sample Taken On : 2/27/02 10:16:00 AM
Acquisition Started : 2/27/02 10:16:46 AM

Live Time: 1800.0 seconds Real Time: 1803.6 seconds

ISOCS Calabration : 4104 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/27/02

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	198.77	49.78	2.55E+002	63.12	2.53E+003
2	239.24	59.90	4.34E+004	1157.75	2.11E+003
3	340.01	85.08	8.07E+002	69.46	2.17E+003
4	350.17	87.62	1.41E+002	51.09	2.19E+003
5	396.00	99.07	1.69E+002	45.11	2.19E+003
6	1408.74	352.18	1.29E+002	15.60	1.18E+002
7	2043.62	510.84	1.25E+002	14.00	6.46E+001
8	2332.86	583.13	7.48E+001	11.61	5.30E+001
9	2437.86	609.37	1.66E+002	15.40	5.61E+001
10	2647.10	661.66	6.40E+001	10.65	4.18E+001
11	3646.16	911.35	6.45E+001	10.19	3.14E+001
12	4483.24	1120.55	6.18E+001	9.69	2.42E+001
13	7063.18	1765.33	5.35E+001	8.41	2.18E+000

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

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	3.98273E-003	6.73867E-004
AM-241	0.993	59.54*	35.70	2.50747E+002	2.10157E+001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	9.41695E+002	1.59312E+002
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	2.922246E-003	6.796181E-004
AM-241 @	0.993	2.507466E+002	2.101567E+001

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

Errors quoted at 1.000 sigma

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

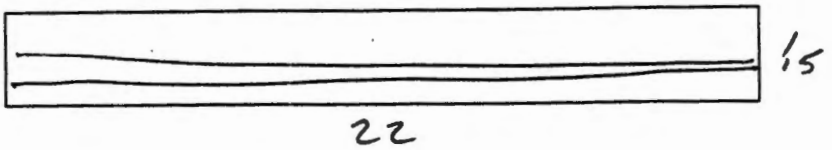
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	3.5420E-003	2.62E-003	2.3431E-003
		1332.49	100.00	2.6212E-003		4.0120E-004
	CS-134	475.35	1.46	2.0801E-001	3.71E-003	-1.1916E-001
		563.23	8.38	4.0167E-002		-3.6168E-002
		569.32	15.43	2.2962E-002		3.6912E-003
		604.70	97.60	4.6922E-003		-1.4727E-003
		795.84	85.40	3.7080E-003		-2.4708E-004
		801.93	8.73	3.4993E-002		-2.1687E-002
		1038.57	1.00	3.0851E-001		3.4975E-001
		1167.94	1.80	1.8086E-001		-7.1507E-002
		1365.15	3.04	8.5132E-002		-7.2357E-002
+	CS-137	661.65*	85.12	2.0397E-003	2.04E-003	3.9827E-003
	NP-237	300.17	6.20	6.2818E-002	1.01E-002	3.7581E-002
		312.00	36.00	1.0053E-002		3.2228E-003
		340.60	4.20	8.9152E-002		-6.9968E-003
		375.00	0.68	4.9852E-001		-5.2896E-001
		415.60	1.75	2.0177E-001		-3.9492E-002
	Pu-239	129.28	0.01	2.1175E+002	2.12E+002	6.1671E+001
		375.00	0.00	2.1424E+002		-2.2732E+002
		413.70	0.00	2.3461E+002		3.8086E+001
		451.50	0.00	1.8047E+003		-3.8884E+002
+	AM-241	59.54*	35.70	1.2496E+000	1.25E+000	2.5075E+002
		125.28	0.00	3.5715E+002		7.0442E+000
		335.40	0.00	7.5754E+002		1.2276E+002
		662.42*	0.00	4.8228E+002		9.4170E+002
		722.70	0.00	2.7187E+003		2.5360E+003
	PU-241	114.00	0.02	7.8448E+001	7.84E+001	1.6670E+001
		332.60	0.00	1.2471E+002		-1.7803E+002
	CM-243	209.70	3.27	1.3226E-001	2.80E-002	-1.0892E-002
		228.18	10.56	3.7618E-002		-2.0880E-002
		277.60	14.00	2.8003E-002		1.8151E-002

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

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

Nuclide	Mass (g)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4351

Weight (kg): 6 2.72

Material Description: 3 1/2" pipes

Packaging: 3 layers

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: <.5

Comments: A 900 1299
B 1800 ~~1300~~ 1300

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4351

File Name: 1300

Assay Date: 27-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	5.94E+01	2.67E+01
Pu-239 (414)		
Am-241	2.33E+02	1.95E+01
Np-237	3.85E-03	1.13E-03
U-238		
U-235		
Cs-137	3.33E-03	5.68E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 22

Width (in): 1.5

Depth (in): 1.5

Weight (lbs): 6

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	2.33E+02	+/-	1.06E+02	Calc from Pu-239
Calculated	8.22E+01	+/-	1.05E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.41E+01	+/-	1.21E+01
Pu-239	5.94E+01	+/-	2.98E+01
Pu-240	3.09E+01	+/-	1.55E+01
Pu-241	1.16E+02	+/-	5.81E+01
Pu-242	3.13E-02	+/-	1.57E-02
Am-241	8.22E+01	+/-	1.05E+02
Np-237	3.85E-03	+/-	1.21E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	3.33E-03	+/-	6.79E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.97E+02	+/-	1.11E+02	Calc from Pu-239 Act
Pu (g):	3.02E-03	**Pu (g) + 3 sigma TMU:**	7.56E-03	
		Pu(g) + 3 sigma:	7.08E-03	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/27/02

```
#Date & Time: Wed Feb 27 08:59:42 2002
~g=PIPE
~description=4351_PIPE
~comment=3_1/2"_PIPES
~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=0.154     ~d1.2=1.5       ~d1.3=11        ~d1.4=11        ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=11        ~d2.3=11        ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/27/02 9:36:10 AM

Sample Title : 4351 Side B
Spectrum Description :
Sample Identification : 1300
Sample Size : 2.7 kg

Sample Taken On : 2/27/02 9:20:00 AM
Acquisition Started : 2/27/02 9:21:04 AM

Live Time: 1800.0 seconds Real Time: 1803.6 seconds

ISOCS Calabration : 4351 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/27/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.25	59.90	4.37E+004	1156.87	2.14E+003
2	340.14	85.11	7.16E+002	55.27	2.24E+003
3	349.53	87.46	2.00E+002	49.92	2.25E+003
4	518.39	129.66	1.13E+002	47.32	1.97E+003
5	1249.02	312.26	4.39E+001	12.67	1.39E+002
6	1408.46	352.10	1.47E+002	16.47	1.37E+002
7	2044.40	511.04	1.34E+002	14.58	6.45E+001
8	2437.70	609.33	1.87E+002	15.97	4.99E+001
9	2647.16	661.68	6.17E+001	10.34	3.76E+001
10	4481.74	1120.18	6.17E+001	9.72	2.13E+001
11	7062.96	1765.27	5.86E+001	8.80	1.73E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	3.32652E-003	5.67768E-004
NP-237	0.604	300.17	6.20		
		312.00*	36.00	3.85006E-003	1.12672E-003
		340.60	4.20		
		375.00	0.68		
		415.60	1.75		
Pu-239	0.461	129.28*	0.01	5.93898E+001	2.67134E+001
		375.00	0.00		
		413.70	0.00		
		451.50 @	0.00		
AM-241	0.993	59.54*	35.70	2.33146E+002	1.95273E+001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	7.86537E+002	1.34229E+002
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	2.340471E-003	5.736724E-004
NP-237	0.604	3.850060E-003	1.126725E-003
Pu-239 @	0.461	5.938983E+001	2.671338E+001
AM-241 @	0.993	2.331455E+002	1.952730E+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 *****
****

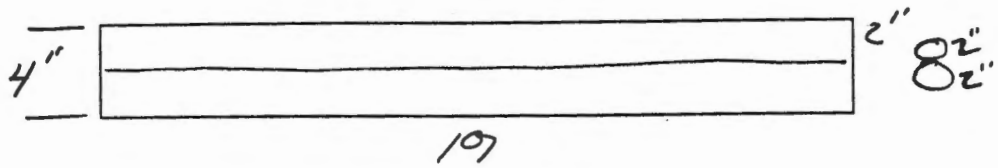
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.9858E-003	2.54E-003	3.7385E-003
		1332.49	100.00	2.5377E-003		-1.5629E-004
	CS-134	475.35	1.46	2.0069E-001	3.14E-003	-1.4530E-001
		563.23	8.38	3.2311E-002		-5.2148E-002
		569.32	15.43	1.9620E-002		8.4860E-003
		604.70	97.60	4.0773E-003		-4.4706E-004
		795.84	85.40	3.1417E-003		-2.1283E-003
		801.93	8.73	3.2914E-002		-1.2081E-002
		1038.57	1.00	2.5506E-001		-5.2810E-002
		1167.94	1.80	1.6107E-001		1.1825E-001
		1365.15	3.04	7.4301E-002		8.1566E-003
+	CS-137	661.65*	85.12	1.6863E-003	1.69E-003	3.3265E-003
+	NP-237	300.17	6.20	5.4697E-002	5.05E-003	-1.2317E-002
		312.00*	36.00	5.0529E-003		3.8501E-003
		340.60	4.20	7.7885E-002		5.0692E-002
		375.00	0.68	4.6165E-001		5.1641E-002
		415.60	1.75	1.7966E-001		-8.6681E-002
+	Pu-239	129.28*	0.01	1.0962E+002	1.10E+002	5.9390E+001
		375.00	0.00	1.9839E+002		2.2192E+001
		413.70	0.00	2.0388E+002		1.2593E+002
		451.50	0.00	1.6104E+003		9.4762E+002
+	AM-241	59.54*	35.70	1.1620E+000	1.16E+000	2.3315E+002
		125.28	0.00	3.1303E+002		2.8999E+002
		335.40	0.00	6.5261E+002		2.4981E+002
		662.42*	0.00	3.9872E+002		7.8654E+002
		722.70	0.00	2.2330E+003		-3.1696E+002
	PU-241	114.00	0.02	6.9047E+001	6.90E+001	1.4764E+001
		332.60	0.00	1.0870E+002		-9.4378E+001
	CM-243	209.70	3.27	1.1589E-001	2.36E-002	2.6913E-002
		228.18	10.56	3.4220E-002		8.6344E-003
		277.60	14.00	2.3649E-002		2.9726E-002

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

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

Nuclide	Mass (g)
Pu-239	2.61E-003 +/- 1.17E-003

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4362

Weight (kg): 9.5 lbs 4.32kg

Material Description: 2 2" Pipes

Packaging: 3 + layer

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: A 900 1287
B 1800 1288

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4352

File Name: 1288

Assay Date: 26-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	1.06E+02	
Pu-239 (414)		
Am-241	1.09E+02	9.16E+00
Np-237	2.05E-03	6.86E-04
U-238		
U-235		
Cs-137	2.46E-03	3.77E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 19

Weight (lbs): 9.5

Width (in): 4

Depth for TMU (in): 4

Depth (in): 2

% Volume: 100

Am-241 Calcs:

Measured	1.09E+02	+/-	4.96E+01	Use Meas
Calculated	1.47E+02	+/-	9.26E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	4.30E+01	+/-	9.64E+00
Pu-239	1.06E+02	+/-	2.38E+01
Pu-240	5.52E+01	+/-	1.24E+01
Pu-241	2.06E+02	+/-	4.63E+01
Pu-242	5.58E-02	+/-	1.25E-02
Am-241	1.09E+02	+/-	4.96E+01
Np-237	2.05E-03	+/-	7.23E-04
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.46E-03	+/-	4.66E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	3.63E+02	+/-	1.65E+02	Calc from Am-241 Act
Pu (g):	8.52E-03	**Pu (g) + 3 sigma TMU:**	1.43E-02	
		Pu(g) + 3 sigma:	8.52E-03	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/26/02

```
#Date & Time: Tue Feb 26 11:13:50 2002
~g=PIPE
~description=4352_PIPE
~comment=2"_PIPE
~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=0.133     ~d1.2=2         ~d1.3=9.5       ~d1.4=9.5       ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=9.5       ~d2.3=9.5       ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/26/02 11:48:28 AM

Sample Title : 4352 Side B
Spectrum Description :
Sample Identification : 1288
Sample Size : 4.3 kg

Sample Taken On : 2/26/02 11:32:00 AM
Acquisition Started : 2/26/02 11:33:27 AM

Live Time: 1800.0 seconds Real Time: 1803.7 seconds

ISOCS Calabration : 4352 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.25	59.90	5.52E+004	1494.29	2.00E+003
2	340.37	85.17	8.55E+002	54.48	2.07E+003
3	350.43	87.68	2.25E+002	47.57	2.09E+003
4	394.71	98.75	1.97E+002	46.88	2.09E+003
5	1247.03	311.76	3.84E+001	12.75	1.42E+002
6	2045.76	511.38	1.17E+002	15.81	5.08E+001
7	2437.57	609.30	1.14E+002	13.05	4.67E+001
8	2647.11	661.67	7.43E+001	11.16	4.29E+001
9	4482.59	1120.39	5.63E+001	9.63	1.73E+001
10	7062.58	1765.18	4.02E+001	7.40	1.50E+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	1.000	661.65*	85.12	2.45688E-003	3.77129E-004
NP-237	0.604	300.17	6.20		
		312.00*	36.00	2.04692E-003	6.86265E-004
		340.60	4.20		
		375.00	0.68		
		415.60	1.75		
AM-241	0.994	59.54*	35.70	1.09162E+002	9.16309E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	5.80916E+002	8.91561E+001
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	1.995198E-003	3.790564E-004
NP-237	0.604	2.046921E-003	6.862648E-004
AM-241 @	0.994	1.091623E+002	9.163085E+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 *****
****

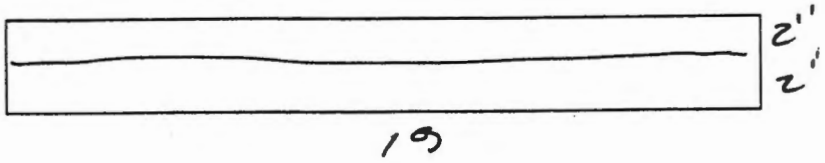
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.7646E-003	1.46E-003	3.1686E-004
		1332.49	100.00	1.4622E-003		-2.4166E-004
	CS-134	475.35	1.46	1.1690E-001	1.80E-003	-6.6115E-002
		563.23	8.38	2.0542E-002		-1.8088E-002
		569.32	15.43	1.1503E-002		-6.1906E-003
		604.70	97.60	2.2586E-003		4.2184E-004
		795.84	85.40	1.7965E-003		1.2699E-003
		801.93	8.73	1.8102E-002		7.3168E-003
		1038.57	1.00	1.5395E-001		2.4819E-002
		1167.94	1.80	9.9725E-002		1.1596E-001
		1365.15	3.04	4.5848E-002		1.2691E-002
+	CS-137	661.65*	85.12	1.0976E-003	1.10E-003	2.4569E-003
+	NP-237	300.17	6.20	3.0690E-002	3.09E-003	-1.6750E-003
		312.00*	36.00	3.0922E-003		2.0469E-003
		340.60	4.20	4.5637E-002		2.3114E-002
		375.00	0.68	2.6462E-001		-4.8477E-003
		415.60	1.75	1.0424E-001		6.9148E-003
	Pu-239	129.28	0.01	1.0579E+002	1.06E+002	8.0905E+001
		375.00	0.00	1.1372E+002		-2.0833E+000
		413.70	0.00	1.1848E+002		-6.2530E+001
		451.50	0.00	9.1671E+002		-5.5585E+001
+	AM-241	59.54*	35.70	4.1647E-001	4.16E-001	1.0916E+002
		125.28	0.00	1.7536E+002		-1.8288E+001
		335.40	0.00	3.9078E+002		-2.3091E+001
		662.42*	0.00	2.5953E+002		5.8092E+002
		722.70	0.00	1.3638E+003		9.2332E+002
	PU-241	114.00	0.02	3.8408E+001	3.84E+001	2.4666E+001
		332.60	0.00	6.7044E+001		9.7305E+000
	CM-243	209.70	3.27	6.8004E-002	1.43E-002	1.1533E-002
		228.18	10.56	1.9783E-002		8.9396E-003
		277.60	14.00	1.4267E-002		5.9162E-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)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4354

Weight (kg): 09 4.09

Material Description: 2 2" PIPES

Packaging: BLANKET

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: <.5

Comments: A 900 1288
B 1800 1290

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4354

File Name: 1290

Assay Date: 26-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	1.11E+02	
Pu-239 (414)		
Am-241	1.14E+02	9.63E+00
Np-237		
U-238		
U-235		
Cs-137	2.08E-03	3.64E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 19

Weight (lbs): 9

Width (in): 4

Depth for TMU (in): 4

Depth (in): 2

% Volume: 100

Am-241 Calcs:

Measured	1.14E+02	+/-	5.19E+01	Use Meas
Calculated	1.54E+02	+/-	9.70E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	4.50E+01	+/-	1.01E+01
Pu-239	1.11E+02	+/-	2.49E+01
Pu-240	5.78E+01	+/-	1.30E+01
Pu-241	2.16E+02	+/-	4.85E+01
Pu-242	5.84E-02	+/-	1.31E-02
Am-241	1.14E+02	+/-	5.19E+01
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.08E-03	+/-	4.32E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		3.80E+02	+/-	1.73E+02	Calc from Am-241 Act
Pu (g):	8.45E-03	**Pu (g) + 3 sigma TMU:**		1.41E-02	
		Pu(g) + 3 sigma:		8.45E-03	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/26/02

```
#Date & Time: Tue Feb 26 12:37:12 2002
~g=PIPE
~description=4354_PIPE
~comment=2"_PIPE
~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=0.133     ~d1.2=2         ~d1.3=9.5       ~d1.4=9.5       ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=9.5       ~d2.3=9.5       ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/26/02 1:23:05 PM

Sample Title : 4354 Side B
Spectrum Description :
Sample Identification : 1290
Sample Size : 4.1 kg

Sample Taken On : 2/26/02 1:07:00 PM
Acquisition Started : 2/26/02 1:07:57 PM

Live Time: 1800.0 seconds Real Time: 1803.7 seconds

ISOCS Calabration : 4354 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	5.47E+004	1525.41	2.03E+003
2	340.08	85.10	7.87E+002	53.25	2.06E+003
3	351.12	87.86	1.20E+002	49.73	2.08E+003
4	396.01	99.08	1.98E+002	44.75	2.08E+003
5	1408.49	352.11	8.92E+001	13.92	1.08E+002
6	2044.41	511.04	1.56E+002	16.52	6.04E+001
7	2437.81	609.36	1.19E+002	13.43	4.54E+001
8	2647.76	661.83	5.97E+001	10.25	3.91E+001
9	7063.73	1765.46	2.93E+001	6.73	1.82E+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	0.999	661.65*	85.12	2.08400E-003	3.64088E-004
AM-241	0.994	59.54*	35.70	1.14360E+002	9.62969E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	4.92751E+002	8.60763E+001
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	1.600336E-003	3.663157E-004
AM-241 @	0.994	1.143601E+002	9.629691E+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 *****
****

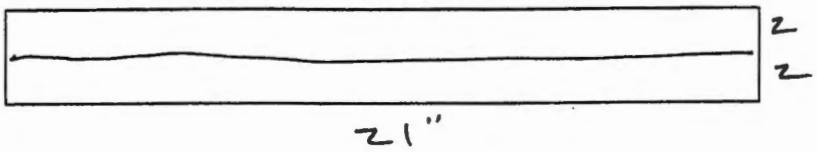
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.0384E-003	1.53E-003	1.6502E-003
		1332.49	100.00	1.5314E-003		-5.7011E-004
	CS-134	475.35	1.46	1.2731E-001	1.97E-003	1.4212E-001
		563.23	8.38	2.1121E-002		1.4460E-002
		569.32	15.43	1.0973E-002		-1.5476E-002
		604.70	97.60	2.3449E-003		-5.7781E-004
		795.84	85.40	1.9729E-003		9.5759E-004
		801.93	8.73	2.0609E-002		-6.1815E-003
		1038.57	1.00	1.8106E-001		1.4807E-001
		1167.94	1.80	1.0632E-001		-3.7640E-002
		1365.15	3.04	5.2860E-002		-8.8174E-003
+	CS-137	661.65*	85.12	1.1116E-003	1.11E-003	2.0840E-003
	NP-237	300.17	6.20	3.3856E-002	5.43E-003	1.9155E-002
		312.00	36.00	5.4328E-003		4.2740E-003
		340.60	4.20	4.6262E-002		-1.8401E-002
		375.00	0.68	2.7193E-001		-3.6183E-002
		415.60	1.75	1.0877E-001		-3.6462E-003
	Pu-239	129.28	0.01	1.1080E+002	1.11E+002	4.8218E+001
		375.00	0.00	1.1686E+002		-1.5550E+001
		413.70	0.00	1.2690E+002		9.6834E+001
		451.50	0.00	9.5816E+002		-3.9571E+002
+	AM-241	59.54*	35.70	4.4344E-001	4.43E-001	1.1436E+002
		125.28	0.00	1.8477E+002		-5.0846E+001
		335.40	0.00	4.0382E+002		-2.3991E+002
		662.42*	0.00	2.6282E+002		4.9275E+002
		722.70	0.00	1.3908E+003		-9.9323E+001
	PU-241	114.00	0.02	3.9879E+001	3.99E+001	1.4111E+001
		332.60	0.00	6.9219E+001		-5.4072E+001
	CM-243	209.70	3.27	7.3039E-002	1.47E-002	1.8769E-002
		228.18	10.56	2.1234E-002		-1.9635E-002
		277.60	14.00	1.4740E-002		2.2957E-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)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4365

Weight (kg): 11 5 kg

Material Description: 2 2" PIPES

Packaging: 3 LAYER

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: A 900 1291
B 1800 1292

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4365

File Name: 1292

Assay Date: 26-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	9.07E+01			
Pu-239 (414)				
Am-241	6.51E+01	5.50E+00		
Np-237				
U-238				
U-235				
Cs-137	1.04E-03	4.44E-04		
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 21

Width (in): 4

Depth (in): 2

Weight (lbs): 11

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	6.51E+01	+/-	2.96E+01	Use Meas
Calculated	1.26E+02	+/-	7.92E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	3.68E+01	+/-	8.25E+00
Pu-239	9.07E+01	+/-	2.04E+01
Pu-240	4.73E+01	+/-	1.06E+01
Pu-241	1.77E+02	+/-	3.97E+01
Pu-242	4.77E-02	+/-	1.07E-02
Am-241	6.51E+01	+/-	2.96E+01
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.04E-03	+/-	4.59E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		2.40E+02	+/-	3.84E+01	Calc from Pu-239 MDA
Pu (g):	8.44E-03	**Pu (g) + 3 sigma TMU:**		1.41E-02	
		Pu(g) + 3 sigma:		8.44E-03	

Comments:

Pu MDA used to be ~~conservitive~~ CONSERVATIVE.

Errors:

Analyst: Martin Winterrose

Date: 2/26/02

```
#Date & Time: Tue Feb 26 13:36:36 2002
~g=PIPE
~description=4365_PIPE
~comment=2"_PIPE
~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=0.133     ~d1.2=2         ~d1.3=10.5      ~d1.4=10.5      ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=10.5      ~d2.3=10.5      ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/26/02 2:09:55 PM

Sample Title : 4365 Side B
Spectrum Description :
Sample Identification : 1292
Sample Size : 5.0 kg

Sample Taken On : 2/26/02 1:54:00 PM
Acquisition Started : 2/26/02 1:54:48 PM

Live Time: 1800.0 seconds Real Time: 1803.3 seconds

ISOCS Calabration : 4365 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	3.71E+004	1054.52	1.84E+003
2	339.89	85.05	7.14E+002	51.02	2.03E+003
3	396.72	99.25	1.54E+002	43.74	2.07E+003
4	2044.75	511.13	1.20E+002	13.96	6.54E+001
5	2437.16	609.20	9.47E+001	12.06	4.61E+001
6	2646.35	661.48	3.58E+001	15.34	4.33E+001
7	2649.81	662.34	3.06E+001	15.69	4.39E+001
8	7063.37	1765.37	4.35E+001	7.65	2.17E+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	0.999	661.65*	85.12	1.03540E-003	4.44351E-004
AM-241	0.994	59.54*	35.70	6.51263E+001	5.49537E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.08809E+002	1.07391E+002
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	1.035401E-003	4.443510E-004
AM-241 @	0.994	6.512631E+001	5.495370E+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 *****
****

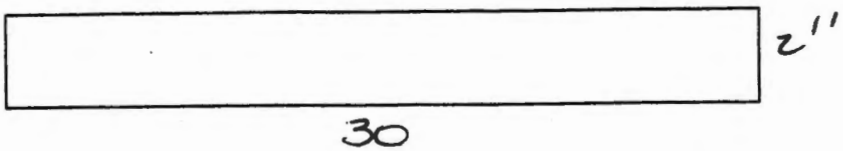
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.5402E-003	1.20E-003	1.4560E-003
		1332.49	100.00	1.1979E-003		-1.0049E-003
	CS-134	475.35	1.46	1.0255E-001	1.64E-003	6.2708E-004
		563.23	8.38	1.8172E-002		3.4594E-004
		569.32	15.43	1.0241E-002		1.9069E-003
		604.70	97.60	1.8901E-003		1.1672E-003
		795.84	85.40	1.6444E-003		3.9266E-004
		801.93	8.73	1.6529E-002		-2.1159E-002
		1038.57	1.00	1.4036E-001		3.8784E-002
		1167.94	1.80	8.1913E-002		-1.6155E-002
		1365.15	3.04	3.6781E-002		-3.5485E-002
+	CS-137	661.65*	85.12	9.6292E-004	9.63E-004	1.0354E-003
	NP-237	300.17	6.20	2.8568E-002	4.47E-003	2.0829E-002
		312.00	36.00	4.4676E-003		1.8156E-003
		340.60	4.20	3.8540E-002		-1.8776E-002
		375.00	0.68	2.1903E-001		-8.7347E-002
		415.60	1.75	8.9436E-002		4.1643E-002
	Pu-239	129.28	0.01	9.0690E+001	9.07E+001	5.7853E+001
		375.00	0.00	9.4129E+001		-3.7537E+001
		413.70	0.00	1.0632E+002		1.0974E+001
		451.50	0.00	8.0212E+002		2.2903E+001
+	AM-241	59.54*	35.70	3.5491E-001	3.55E-001	6.5126E+001
		125.28	0.00	1.5179E+002		1.1502E+001
		335.40	0.00	3.3415E+002		2.9776E+002
		662.42*	0.00	2.2922E+002		2.0881E+002
		722.70	0.00	1.1720E+003		-9.4818E+002
	PU-241	114.00	0.02	3.2915E+001	3.29E+001	-7.5347E+000
		332.60	0.00	5.6710E+001		-3.6248E+001
	CM-243	209.70	3.27	5.8282E-002	1.20E-002	3.5910E-002
		228.18	10.56	1.7308E-002		2.7662E-005
		277.60	14.00	1.1965E-002		-4.6441E-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)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4360

Weight (kg): 10 4.45Kg

Material Description: 1 2" PIPE

Packaging: 3 LUMBERS

Detector Distance (in): 30"

Detector Filters: NONE

Dose Rate: <.5

Comments: A 900 1305
B 1800 1306

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4369

File Name: 1306

Assay Date: 27-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	1.83E+02		3.53E+02	
Pu-239 (414)				
Am-241	8.05E+01	6.71E+00	6.83E+03	5.68E+02
Np-237				
U-238				
U-235				
Cs-137	4.29E-03	6.22E-04		
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 30

Width (in): 2

Depth (in): 2

Weight (lbs): 10

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	8.05E+01	+/-	3.66E+01	Use Meas
Calculated	2.53E+02	+/-	1.60E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	7.42E+01	+/-	1.66E+01
Pu-239	1.83E+02	+/-	4.11E+01
Pu-240	9.54E+01	+/-	2.14E+01
Pu-241	3.56E+02	+/-	8.00E+01
Pu-242	9.63E-02	+/-	2.16E-02
Am-241	8.05E+01	+/-	3.66E+01
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	4.29E-03	+/-	7.85E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	2.68E+02	+/-	1.22E+02	Calc from Am-241 Act	
Pu (g):	1.55E-02	**Pu (g) + 3 sigma TMU:**	2.59E-02		
		Pu(g) + 3 sigma:	1.55E-02		

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/27/02

```
#Date & Time: Wed Feb 27 12:21:15 2002
~g=PIPE
~description=4369_PIPE
~comment=2"_PIPE
~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=0.154     ~d1.2=2         ~d1.3=15        ~d1.4=15        ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=15        ~d2.3=15        ~2mater=DRYDIRT  ~2den=1.6       ~2con=1
~sd1=30
```

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

Report Generated On : 2/27/02 12:54:33 PM

Sample Title : 4369 Side B
Spectrum Description :
Sample Identification : 1306
Sample Size : 4.4 kg

Sample Taken On : 2/27/02 12:38:00 PM
Acquisition Started : 2/27/02 12:39:23 PM

Live Time: 1800.0 seconds Real Time: 1802.7 seconds

ISOCS Calabration : 4369 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/27/02

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	197.03	49.35	1.53E+002	45.35	1.95E+003
2	239.23	59.89	1.45E+004	362.56	2.02E+003
3	340.26	85.14	8.83E+002	68.59	2.34E+003
4	350.35	87.66	2.82E+002	56.07	2.35E+003
5	1408.98	352.23	1.18E+002	15.18	1.20E+002
6	2044.46	511.05	1.27E+002	15.82	5.98E+001
7	2437.75	609.34	1.49E+002	14.19	4.97E+001
8	2646.68	661.56	8.19E+001	11.61	4.32E+001
9	3645.59	911.21	6.21E+001	9.93	2.25E+001
10	7064.38	1765.63	4.62E+001	7.92	2.23E+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	1.000	661.65*	85.12	4.28550E-003	6.22483E-004
AM-241	0.993	59.54*	35.70	8.05373E+001	6.70846E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	1.01328E+003	1.47157E+002
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	3.944882E-003	6.230220E-004
AM-241 @	0.993	8.053731E+001	6.708459E+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 *****
****

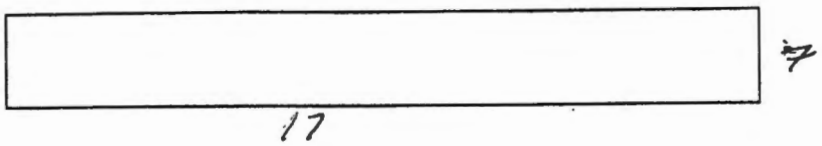
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	2.4328E-003	2.43E-003	-2.2872E-003
		1332.49	100.00	2.4559E-003		-5.7783E-004
	CS-134	475.35	1.46	1.9282E-001	3.20E-003	-2.1957E-001
		563.23	8.38	3.2683E-002		-2.6540E-002
		569.32	15.43	1.8433E-002		-9.0015E-003
		604.70	97.60	3.7611E-003		1.0651E-004
		795.84	85.40	3.1990E-003		1.8238E-004
		801.93	8.73	3.0514E-002		-1.7568E-002
		1038.57	1.00	2.3773E-001		-3.0025E-001
		1167.94	1.80	1.3813E-001		-1.2896E-004
		1365.15	3.04	7.1376E-002		-7.8459E-003
+	CS-137	661.65*	85.12	1.7431E-003	1.74E-003	4.2855E-003
	NP-237	300.17	6.20	5.1373E-002	8.37E-003	4.8254E-002
		312.00	36.00	8.3746E-003		3.6277E-003
		340.60	4.20	6.6669E-002		-6.7013E-002
		375.00	0.68	4.2588E-001		2.1928E-001
		415.60	1.75	1.7283E-001		5.1982E-002
	Pu-239	129.28	0.01	1.8968E+002	1.83E+002	1.3618E+002
		375.00	0.00	1.8302E+002		9.4236E+001
		413.70	0.00	1.9151E+002		-1.6111E+002
		451.50	0.00	1.4771E+003		5.3891E+002
+	AM-241	59.54*	35.70	1.1744E+000	1.17E+000	8.0537E+001
		125.28	0.00	3.1829E+002		1.9963E+002
		335.40	0.00	5.7662E+002		2.0952E+002
		662.42*	0.00	4.1216E+002		1.0133E+003
		722.70	0.00	2.1685E+003		-5.3269E+001
	PU-241	114.00	0.02	7.0350E+001	7.04E+001	-1.6796E+001
		332.60	0.00	1.0055E+002		-2.9460E+001
	CM-243	209.70	3.27	1.1362E-001	2.23E-002	-1.7996E-002
		228.18	10.56	3.3304E-002		1.0026E-002
		277.60	14.00	2.2263E-002		-3.1345E-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)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 41428

Weight (kg): 14.5 6.59 Kg

Material Description: VESSEL

Packaging: 3 LAYERS

Detector Distance (in): ~~Not~~ 24"

Detector Filters: NONE

Dose Rate: <.5

Comments: A 900 1277
B 1800 1278

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4428

File Name: 1278

Assay Date: 25-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	8.46E+01	
Pu-239 (414)		
Am-241	1.26E+01	1.05E+00
Np-237		
U-238		
U-235		
Cs-137	2.43E-03	3.25E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 17

Width (in): 7

Depth (in): 7

Weight (lbs): 14.5

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	1.26E+01	+/-	5.73E+00	Use Meas
Calculated	1.17E+02	+/-	7.39E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	3.43E+01	+/-	7.70E+00
Pu-239	8.46E+01	+/-	1.90E+01
Pu-240	4.41E+01	+/-	9.90E+00
Pu-241	1.65E+02	+/-	3.70E+01
Pu-242	4.45E-02	+/-	1.00E-02
Am-241	1.26E+01	+/-	5.73E+00
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.43E-03	+/-	4.24E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.76E+02	+/-	2.35E+01	Calc from Pu-239 MDA
Pu (g): 1.04E-02	**Pu (g) + 3 sigma TMU:**		1.74E-02	
	Pu(g) + 3 sigma:		1.04E-02	

Comments:

Pu-238 MDA - consistent with other vessel measurements.

Errors:

Analyst: Martin Winterrose

Date: 2/25/02

```
#Date & Time: Mon Feb 25 10:17:34 2002
~g=PIPE
~description=4428_VESSEL
~comment=VESSEL
~Ccollimator=50MM-180D
~crpn=4
~Detector=7219
~Convergence in %=1            ~MDRPN=4
~Lunit=IN  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
~at=20        ~ap=760       ~rh=50
~Energies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
                300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
               4000.000,
~Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                  8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                  4.000,
~d1.1=0.25      ~d1.2=7         ~d1.3=8.5       ~d1.4=8.5       ~1mater=TITAINUM ~1den=4.54
~d2.1=0.133     ~d2.2=8.5       ~d2.3=8.5       ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/25/02 10:51:15 AM

Sample Title : 4428 Side B
Spectrum Description :
Sample Identification : 1278
Sample Size : 6.6 kg

Sample Taken On : 2/25/02 10:35:00 AM
Acquisition Started : 2/25/02 10:36:08 AM

Live Time: 1800.0 seconds Real Time: 1802.8 seconds

ISOCS Calabration : 4428 VESSEL
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/25/02

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	239.26	59.90	2.26E+004	548.57	1.77E+003
2	340.49	85.20	7.68E+002	56.68	2.10E+003
3	349.62	87.48	2.53E+002	60.49	2.12E+003
4	415.93	104.05	1.40E+002	46.38	2.14E+003
5	574.25	143.62	1.05E+002	36.93	1.60E+003
6	2043.24	510.75	1.16E+002	14.56	5.51E+001
7	2333.99	583.41	7.25E+001	11.44	4.71E+001
8	2437.46	609.27	9.57E+001	12.28	4.44E+001
9	2647.29	661.71	8.94E+001	11.62	3.93E+001
10	3181.01	795.10	2.05E+001	6.95	1.97E+001
11	3645.12	911.09	4.64E+001	9.15	2.12E+001
12	7062.95	1765.27	4.32E+001	7.68	1.87E+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	1.000	661.65*	85.12	2.42647E-003	3.24580E-004
AM-241	0.994	59.54*	35.70	1.26048E+001	1.04744E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	5.73725E+002	7.67294E+001
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	2.373159E-003	3.245437E-004
AM-241 @	0.994	1.260482E+001	1.047443E+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 *****
****

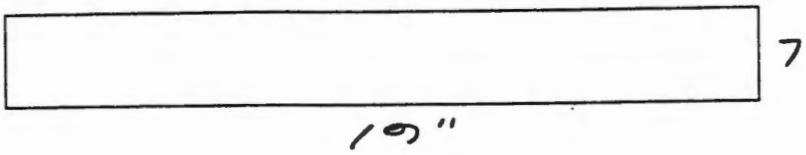
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.5057E-003	1.21E-003	-1.1381E-004
		1332.49	100.00	1.2081E-003		7.7441E-004
	CS-134	475.35	1.46	9.7916E-002	1.46E-003	-3.4621E-002
		563.23	8.38	1.7449E-002		3.7271E-003
		569.32	15.43	8.5419E-003		-8.1198E-003
		604.70	97.60	1.7448E-003		-1.5964E-004
		795.84	85.40	1.4633E-003		-9.1068E-004
		801.93	8.73	1.4228E-002		7.7026E-003
		1038.57	1.00	1.2297E-001		6.2141E-002
		1167.94	1.80	8.6802E-002		1.0849E-002
		1365.15	3.04	4.0300E-002		5.0967E-003
+	CS-137	661.65*	85.12	8.6459E-004	8.65E-004	2.4265E-003
	NP-237	300.17	6.20	2.5964E-002	4.22E-003	6.9585E-003
		312.00	36.00	4.2157E-003		1.6824E-003
		340.60	4.20	3.6526E-002		-1.2516E-002
		375.00	0.68	2.1460E-001		1.8544E-001
		415.60	1.75	8.4963E-002		2.2554E-003
	Pu-239	129.28	0.01	8.4583E+001	8.46E+001	-1.7206E+000
		375.00	0.00	9.2225E+001		7.9690E+001
		413.70	0.00	1.0067E+002		1.9525E+001
		451.50	0.00	7.8392E+002		3.3946E+002
+	AM-241	59.54*	35.70	1.1095E-001	1.11E-001	1.2605E+001
		125.28	0.00	1.3812E+002		-7.6108E+001
		335.40	0.00	3.0954E+002		1.0687E+002
		662.42*	0.00	2.0443E+002		5.7373E+002
		722.70	0.00	1.0481E+003		3.7388E+002
	PU-241	114.00	0.02	2.8749E+001	2.87E+001	9.2394E+000
		332.60	0.00	5.2468E+001		-3.1146E+001
	CM-243	209.70	3.27	5.7510E-002	1.13E-002	-2.3101E-002
		228.18	10.56	1.6784E-002		-1.0531E-002
		277.60	14.00	1.1350E-002		4.3147E-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)

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4429

Weight (kg): 16 LBS 7.27 Kg

Material Description: VESSEL

Packaging: 3 + ALUM

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: <.5

Comments: A 900s 1273
B 1800s 1274

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4429

File Name: 1274

Assay Date: 25-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)	7.78E+01	
Pu-239 (414)		
Am-241	4.07E+01	1.48E+00
Np-237		
U-238		
U-235		
Cs-137	1.90E-03	2.84E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 19

Width (in): 7

Depth (in): 7

Weight (lbs): 16

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	4.07E+01	+/-	1.83E+01	Use Meas
Calculated	1.08E+02	+/-	6.80E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	3.15E+01	+/-	7.08E+00
Pu-239	7.78E+01	+/-	1.75E+01
Pu-240	4.05E+01	+/-	9.10E+00
Pu-241	1.52E+02	+/-	3.40E+01
Pu-242	4.09E-02	+/-	9.19E-03
Am-241	4.07E+01	+/-	1.83E+01
Np-237	0.00E+00	+/-	0.00E+00
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.90E-03	+/-	3.55E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.91E+02	+/-	2.78E+01	Calc from Pu-239 MDA
Pu (g):	1.05E-02	**Pu (g) + 3 sigma TMU:**	1.76E-02	
		Pu(g) + 3 sigma:	1.05E-02	

Comments: Am-241 value from 125 keV peak rather than 59.6 keV peak.

Errors:

Analyst: Martin Winterrose

Date: 2/25/02

```
#Date & Time: Mon Feb 25 08:33:05 2002
~g=PIPE
~description=4429_VESSEL
~comment=VESSEL
~Ccollimator=50MM-180D
~crpn=4
~Detector=7219
~Convergence in %=1            ~MDRPN=4
~Lunit=IN  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
~at=20        ~ap=760        ~rh=50
~Energies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
                300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
               4000.000,
~Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                  8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                  4.000,
~d1.1=0.25      ~d1.2=7         ~d1.3=9.5       ~d1.4=9.5       ~1mater=TITAINUM ~1den=4.54
~d2.1=0.133     ~d2.2=9.5       ~d2.3=9.5       ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/25/02 9:07:41 AM

Sample Title : 4429 Side B
Spectrum Description :
Sample Identification : 1274
Sample Size : 7.3 kg

Sample Taken On : 2/25/02 8:51:00 AM
Acquisition Started : 2/25/02 8:52:34 AM

Live Time: 1800.0 seconds Real Time: 1803.4 seconds

ISOCS Calabration : 4429 VESSEL
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/25/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	4.25E+004	1124.58	2.08E+003
2	340.79	85.27	6.66E+002	53.42	2.19E+003
3	350.06	87.59	1.90E+002	51.39	2.20E+003
4	501.29	125.39	1.16E+002	41.79	2.06E+003
5	1407.47	351.86	8.88E+001	13.89	1.08E+002
6	2044.68	511.11	1.18E+002	14.08	6.45E+001
7	2437.53	609.29	1.12E+002	13.13	4.87E+001
8	2646.54	661.52	7.66E+001	11.18	4.04E+001
9	7063.64	1765.44	4.01E+001	7.65	1.48E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	1.89888E-003	2.83682E-004
AM-241	0.995	59.54*	35.70	2.19115E+001	1.83529E+000
		125.28*	0.00	4.07382E+001	1.48337E+001
		335.40	0.00		
		662.42* @	0.00	4.48979E+002	6.70641E+001
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	1.805008E-003	2.837405E-004
AM-241 @	0.995	2.219533E+001	1.821405E+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 *****
****

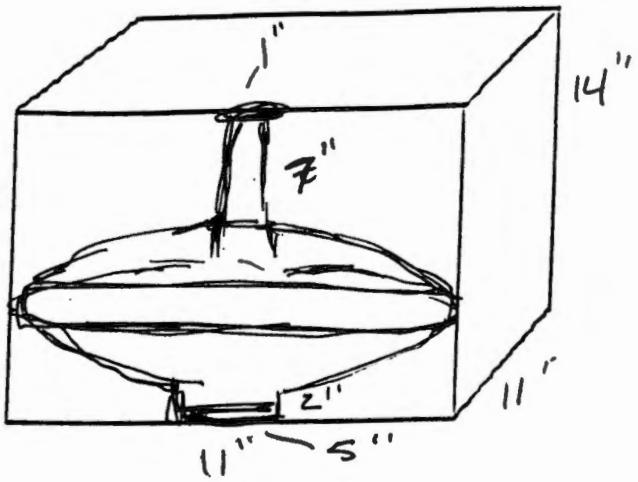
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	1.2508E-003	9.97E-004	-3.2834E-004
		1332.49	100.00	9.9684E-004		-9.1844E-004
	CS-134	475.35	1.46	8.9669E-002	1.47E-003	3.1589E-002
		563.23	8.38	1.5273E-002		-1.2675E-002
		569.32	15.43	8.5961E-003		1.1832E-003
		604.70	97.60	1.6158E-003		1.6354E-004
		795.84	85.40	1.4658E-003		-6.1277E-004
		801.93	8.73	1.3715E-002		-2.1557E-003
		1038.57	1.00	1.1304E-001		-8.3966E-002
		1167.94	1.80	7.2691E-002		4.3475E-002
		1365.15	3.04	3.3928E-002		-2.1628E-002
+	CS-137	661.65*	85.12	8.0039E-004	8.00E-004	1.8989E-003
	NP-237	300.17	6.20	2.4649E-002	3.99E-003	3.4177E-003
		312.00	36.00	3.9904E-003		-5.9526E-004
		340.60	4.20	3.4460E-002		3.7615E-002
		375.00	0.68	1.8926E-001		7.9385E-002
		415.60	1.75	8.1624E-002		-2.1832E-002
	Pu-239	129.28	0.01	7.7767E+001	7.78E+001	-9.5938E+000
		375.00	0.00	8.1335E+001		3.4116E+001
		413.70	0.00	9.6334E+001		5.0760E+001
		451.50	0.00	7.1928E+002		2.2508E+002
+	AM-241	59.54*	35.70	1.1086E-001	1.11E-001	2.1911E+001
		125.28*	0.00	7.5178E+001		4.0738E+001
		335.40	0.00	2.8747E+002		2.7309E+001
		662.42*	0.00	1.8925E+002		4.4898E+002
		722.70	0.00	9.9450E+002		6.5079E+002
	PU-241	114.00	0.02	2.6229E+001	2.62E+001	-1.2488E+001
		332.60	0.00	4.8309E+001		-2.3353E+001
	CM-243	209.70	3.27	5.4610E-002	1.10E-002	2.3310E-002
		228.18	10.56	1.4945E-002		-2.8060E-003
		277.60	14.00	1.0951E-002		1.1202E-002

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

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

Nuclide	Mass (g)

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



Put Dimensions on Box

.6222

Item ID: 4430

Weight (kg): 38 LBS 17.3

Material Description: Valve/Flanges

Packaging: 3 layer Alum

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: <.5

Comments: A ~~1800~~ 1800 1279
B 1800 1280

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4430

File Name: 1279

Assay Date: 25-Feb-02

File Name: 1280

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	5.83E+00	1.13E+00	5.16E+00	1.07E+00
Am-241	2.02E+01	1.73E+00	3.12E+00	2.63E-01
Np-237	9.03E-04	7.50E-05	5.65E-04	5.82E-05
U-238				
U-235				
Cs-137	1.15E-04	1.95E-05	6.79E-05	1.72E-05
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Box

Calcs: Average

Dimensions:

Length (in): 14

Width (in): 11

Depth (in): 11

Weight (lbs): 38

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	1.16E+01	+/-	5.84E+01	Calc from Pu-239
Calculated	7.60E+00	+/-	8.52E+00	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.23E+00	+/-	9.72E-01
Pu-239	5.49E+00	+/-	2.40E+00
Pu-240	2.86E+00	+/-	1.25E+00
Pu-241	1.07E+01	+/-	4.67E+00
Pu-242	2.89E-03	+/-	1.26E-03
Am-241	7.60E+00	+/-	8.52E+00
Np-237	7.34E-04	+/-	3.06E-04
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.16E-05	+/-	3.99E-05
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.82E+01	+/-	8.99E+00	Calc from Pu-239 Act
Pu (g):	1.77E-03	**Pu (g) + 3 sigma TMU:**	4.08E-03	
		Pu(g) + 3 sigma:	2.52E-03	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/26/02

```
Date & Time: Tue Feb 26 09:14:32 2002
g=SPHERE
description=4430_VALVE
comment=VALVE
Ccollimator=50MM-180D
crpn=4
Detector=7219
Convergence in %=1            ~MDRPN=4
Lunit=CM  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
at=20        ~ap=760       ~rh=50
Energies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
               300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
              4000.000,
Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                 8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                 4.000,
d1.1=0.25      d1.2=10        ~1mater=304SS    ~1den=7.81
d2.1=0.113     ~2mater=DRYDIRT  ~2den=1.6       ~2con=1
3mater=DRYAIR   ~3den=0.00129
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 : 2/26/02 9:58:05 AM

Sample Title : 4430 Side A
Spectrum Description :
Sample Identification : 1279
Sample Size : 17.3 kg

Sample Taken On : 2/25/02 11:26:00 AM
Acquisition Started : 2/25/02 11:26:34 AM

Live Time: 1800.0 seconds Real Time: 1813.4 seconds

ISOCS Calabration : 4430 VALVE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.20	59.89	3.46E+005	11001.0	4.45E+003
2	339.89	85.05	7.09E+002	61.84	2.51E+003
3	396.11	99.10	9.92E+002	58.65	2.48E+003
4	413.30	103.40	3.90E+002	51.74	2.44E+003
5	502.63	125.72	1.93E+002	44.94	2.19E+003
6	518.27	129.63	4.20E+002	47.16	2.09E+003
7	1201.42	300.36	5.37E+001	14.58	1.67E+002
8	1248.59	312.15	3.24E+002	22.01	1.61E+002
9	1379.68	344.91	3.63E+001	12.22	1.17E+002
10	1501.58	375.38	1.08E+002	14.39	1.11E+002
11	1655.66	413.88	7.45E+001	13.21	8.73E+001
12	2044.86	511.15	1.17E+002	15.32	5.58E+001
13	2437.34	609.24	6.52E+001	11.30	4.92E+001
14	2647.37	661.73	6.49E+001	10.81	3.78E+001
15	7062.25	1765.09	3.25E+001	6.93	4.34E-001

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

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	1.15368E-004	1.95469E-005
NP-237	0.860	300.17*	6.20	8.49366E-004	2.34388E-004
		312.00*	36.00	9.02909E-004	7.49772E-005
		340.60	4.20		
		375.00*	0.68	1.78300E-002	2.49435E-003
		415.60*	1.75	5.04712E-003	9.18738E-004
Pu-239	0.967	129.28*	0.01	6.54094E+000	1.32089E+000
		375.00*	0.00	7.66237E+000	1.17648E+000
		413.70*	0.00	5.83259E+000	1.12980E+000
		451.50 @	0.00		
AM-241	0.995	59.54*	35.70	2.01586E+001	1.72509E+000
		125.28*	0.00	4.83741E+000	1.14816E+000
		335.40	0.00		
		662.42* @	0.00	2.72781E+001	4.62118E+000
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	7.501644E-005	1.995812E-005
NP-237	0.860	8.921770E-004	7.127464E-005
Pu-239 @	0.967	6.271308E+000	5.479563E-001
AM-241 @	0.995	9.540873E+000	9.558145E-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	9.5386E-005	8.22E-005	1.6066E-005
		1332.49	100.00	8.2223E-005		9.8312E-006
	CS-134	475.35	1.46	6.4493E-003	1.03E-004	2.2329E-003
		563.23	8.38	1.0770E-003		4.8683E-004
		569.32	15.43	5.9594E-004		4.2551E-004
		604.70	97.60	1.0937E-004		7.0882E-006
		795.84	85.40	1.0346E-004		-6.6630E-005
		801.93	8.73	9.9499E-004		2.3559E-004
		1038.57	1.00	9.1278E-003		3.5557E-003
		1167.94	1.80	5.1246E-003		-1.9030E-003
		1365.15	3.04	2.3644E-003		1.3042E-003
+	CS-137	661.65*	85.12	5.5628E-005	5.56E-005	1.1537E-004
+	NP-237	300.17*	6.20	9.9549E-004	1.72E-004	8.4937E-004
		312.00*	36.00	1.7224E-004		9.0291E-004
		340.60	4.20	2.4830E-003		1.9617E-003
		375.00*	0.68	8.5018E-003		1.7830E-002
		415.60*	1.75	3.1274E-003		5.0471E-003
+	Pu-239	129.28*	0.01	3.3554E+000	3.36E+000	6.5409E+000
		375.00*	0.00	3.6536E+000		7.6624E+000
		413.70*	0.00	3.6141E+000		5.8326E+000
		451.50	0.00	5.1612E+001		8.1980E+000
+	AM-241	59.54*	35.70	1.8215E-002	1.82E-002	2.0159E+001
		125.28*	0.00	5.5189E+000		4.8374E+000
		335.40	0.00	2.1370E+001		4.5937E+000
		662.42*	0.00	1.3153E+001		2.7278E+001
		722.70	0.00	7.3157E+001		3.8805E+001
	PU-241	114.00	0.02	2.0046E+000	2.00E+000	1.3479E+000
		332.60	0.00	3.6798E+000		-8.7360E-001
	CM-243	209.70	3.27	4.0346E-003	7.36E-004	1.4584E-003
		228.18	10.56	1.0678E-003		-1.6902E-004
		277.60	14.00	7.3635E-004		-6.1576E-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	1.75E-003 +/- 1.53E-004

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

Report Generated On : 2/26/02 9:56:42 AM

Sample Title : 4430 Side B
Spectrum Description :
Sample Identification : 1280
Sample Size : 17.3 kg

Sample Taken On : 2/26/02 9:07:00 AM
Acquisition Started : 2/26/02 9:08:24 AM

Live Time: 1800.0 seconds Real Time: 1804.5 seconds

ISOCS Calabration : 4430 VALVE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.22	59.89	5.36E+004	1512.68	2.34E+003
2	340.45	85.19	8.91E+002	56.42	2.31E+003
3	350.52	87.71	2.04E+002	54.27	2.32E+003
4	395.83	99.03	2.38E+002	48.21	2.34E+003
5	518.50	129.69	1.98E+002	42.74	2.05E+003
6	1248.17	312.05	2.03E+002	18.52	1.41E+002
7	1408.72	352.17	9.51E+001	14.61	1.12E+002
8	1500.41	375.08	7.01E+001	12.89	1.10E+002
9	1655.52	413.85	6.59E+001	12.63	9.22E+001
10	2044.60	511.09	1.27E+002	15.86	6.53E+001
11	2334.00	583.42	6.39E+001	10.98	5.62E+001
12	2437.78	609.35	1.18E+002	13.51	4.80E+001
13	2646.57	661.53	3.82E+001	9.58	3.56E+001
14	3645.20	911.11	4.19E+001	8.93	2.56E+001
15	7064.10	1765.56	6.17E+001	8.87	1.74E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	6.78669E-005	1.71550E-005
NP-237	0.654	300.17	6.20		
		312.00*	36.00	5.65108E-004	5.82388E-005
		340.60	4.20		
		375.00*	0.68	1.15268E-002	2.17877E-003
		415.60*	1.75	4.46418E-003	8.74748E-004
Pu-239	0.966	129.28*	0.01	3.08011E+000	8.42157E-001
		375.00*	0.00	4.95359E+000	9.87387E-001
		413.70*	0.00	5.15894E+000	1.06705E+000
		451.50 @	0.00		
AM-241	0.994	59.54*	35.70	3.11950E+000	2.63031E-001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	1.60468E+001	4.05598E+000
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	5.467352E-005	1.719010E-005
NP-237	0.654	5.690953E-004	5.814975E-005
Pu-239 @	0.966	3.838869E+000	4.837669E-001
AM-241 @	0.994	3.119502E+000	2.630306E-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	9.3430E-005	8.61E-005	-7.8694E-005
		1332.49	100.00	8.6077E-005		6.8278E-005
	CS-134	475.35	1.46	6.4759E-003	1.09E-004	4.7884E-003
		563.23	8.38	1.0653E-003		6.3627E-004
		569.32	15.43	5.7025E-004		-3.9872E-004
		604.70	97.60	1.2337E-004		-3.1053E-005
		795.84	85.40	1.0868E-004		-2.8856E-005
		801.93	8.73	1.0073E-003		-6.5226E-004
		1038.57	1.00	9.6034E-003		8.5252E-003
		1167.94	1.80	5.6253E-003		-1.6427E-003
		1365.15	3.04	2.7880E-003		1.5956E-003
+	CS-137	661.65*	85.12	5.4114E-005	5.41E-005	6.7867E-005
+	NP-237	300.17	6.20	1.7800E-003	1.61E-004	9.1592E-004
		312.00*	36.00	1.6134E-004		5.6511E-004
		340.60	4.20	2.5111E-003		1.1741E-003
		375.00*	0.68	8.4815E-003		1.1527E-002
		415.60*	1.75	3.2084E-003		4.4642E-003
+	Pu-239	129.28*	0.01	3.3221E+000	3.32E+000	3.0801E+000
		375.00*	0.00	3.6449E+000		4.9536E+000
		413.70*	0.00	3.7077E+000		5.1589E+000
		451.50	0.00	5.1706E+001		3.0785E+001
+	AM-241	59.54*	35.70	1.3260E-002	1.33E-002	3.1195E+000
		125.28	0.00	9.2995E+000		3.1398E+000
		335.40	0.00	2.1370E+001		-6.2416E-001
		662.42*	0.00	1.2795E+001		1.6047E+001
		722.70	0.00	7.1773E+001		3.6655E+001
	PU-241	114.00	0.02	1.9666E+000	1.97E+000	7.7376E-001
		332.60	0.00	3.5766E+000		-4.3297E+000
	CM-243	209.70	3.27	3.9520E-003	7.62E-004	3.1562E-004
		228.18	10.56	1.1268E-003		6.0179E-005
		277.60	14.00	7.6235E-004		3.5912E-004

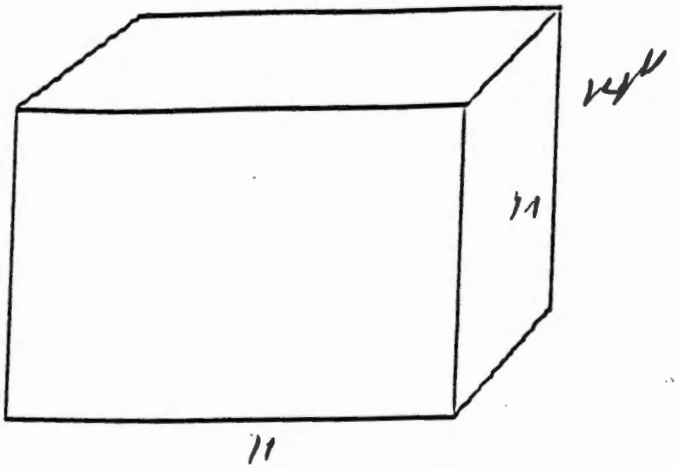
+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

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

Nuclide	Mass (g)
Pu-239	1.07E-003 +/- 1.35E-004

Replicate

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



Put Dimensions on Box

Item ID: 4430

Weight (kg): .38

Material Description: Valve

Packaging: 3 Layer

Detector Distance (in): 24

Detector Filters: None

Dose Rate: <.5

Comments: A 1800 1285
B 1800 1286

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4430 Replicate

File Name: 1285

Assay Date: 26-Feb-02

File Name: 1286

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)				
Pu-239 (414)	7.49E+00	1.21E+00	3.33E+00	9.29E-01
Am-241	4.34E+01	3.70E+00	4.04E+00	3.40E-01
Np-237	1.58E-03	1.06E-04	5.46E-04	5.79E-05
U-238				
U-235	9.70E-05	3.38E-05		
Cs-137	9.31E-05	1.90E-05	7.98E-05	1.79E-05
Co-60				

Item Parameters:

Contamination: Internal

Item Type: Box

Calcs: Average

Dimensions:

Length (in): 14

Width (in): 11

Depth (in): 11

Weight (lbs): 38

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	2.37E+01	+/-	1.19E+02	Calc from Pu-239
Calculated	7.49E+00	+/-	8.38E+00	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.19E+00	+/-	9.56E-01
Pu-239	5.41E+00	+/-	2.36E+00
Pu-240	2.82E+00	+/-	1.23E+00
Pu-241	1.05E+01	+/-	4.59E+00
Pu-242	2.85E-03	+/-	1.24E-03
Am-241	7.49E+00	+/-	8.38E+00
Np-237	1.06E-03	+/-	4.42E-04
U-238	0.00E+00	+/-	0.00E+00
U-235	4.85E-05	+/-	2.62E-05
Cs-137	8.64E-05	+/-	3.80E-05
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.79E+01	+/-	8.85E+00	Calc from Pu-239 Act
Pu (g):	1.74E-03	**Pu (g) + 3 sigma TMU:**		4.02E-03	
		Pu(g) + 3 sigma:		2.48E-03	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/26/02

```
#Date & Time: Tue Feb 26 09:14:32 2002
~g=SPHERE
~description=4430_VALVE
~comment=VALVE
~Ccollimator=50MM-180D
~crpn=4
~Detector=7219
~Convergence in %=1            ~MDRPN=4
~Lunit=CM  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
~at=20        ~ap=760       ~rh=50
~Energies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
                300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
               4000.000,
~Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                  8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                  4.000,
~d1.1=0.25      ~d1.2=10        ~1mater=304SS    ~1den=7.81
~d2.1=0.113     ~2mater=DRYDIRT  ~2den=1.6       ~2con=1
~3mater=DRYAIR   ~3den=0.00129
~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 : 2/26/02 10:19:56 AM

Sample Title : 4430 Side A rep
Spectrum Description :
Sample Identification : 1285
Sample Size : 17.3 kg

Sample Taken On : 2/26/02 9:48:00 AM
Acquisition Started : 2/26/02 10:19:51 AM

Live Time: 1800.0 seconds Real Time: 1824.7 seconds

ISOCS Calabration : 4430 VALVE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	7.46E+005	23244.6	7.91E+003
2	340.37	85.17	8.60E+002	73.78	3.04E+003
3	349.08	87.35	2.41E+002	61.63	3.04E+003
4	378.94	94.81	4.72E+002	62.91	2.95E+003
5	395.99	99.07	1.65E+003	78.76	2.88E+003
6	413.22	103.38	7.29E+002	59.79	2.81E+003
7	446.30	111.64	2.25E+002	53.94	2.83E+003
8	503.15	125.85	1.32E+002	56.56	2.45E+003
9	518.72	129.74	7.47E+002	55.55	2.34E+003
10	744.22	186.10	6.41E+001	22.09	5.83E+002
11	833.49	208.41	2.05E+002	23.09	3.80E+002
12	1201.65	300.42	9.21E+001	15.68	1.70E+002
13	1248.31	312.08	5.66E+002	26.90	1.39E+002
14	1331.27	332.81	4.53E+001	13.81	1.39E+002
15	1362.18	340.54	5.50E+001	15.47	1.37E+002
16	1379.32	344.82	4.88E+001	13.96	1.36E+002
17	1501.14	375.27	1.43E+002	16.25	1.07E+002
18	1655.89	413.94	9.57E+001	13.63	8.24E+001
19	2044.36	511.03	1.22E+002	14.43	5.82E+001
20	2333.41	583.27	5.92E+001	10.69	4.59E+001
21	2438.02	609.41	1.35E+002	13.92	4.92E+001
22	2647.50	661.77	5.24E+001	10.57	4.75E+001
23	3645.31	911.14	4.79E+001	9.34	2.21E+001
24	7063.26	1765.35	5.56E+001	8.51	3.01E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	9.31311E-005	1.90128E-005
U-235	0.651	143.76	10.50		
		185.71*	54.00	9.70352E-005	3.37526E-005
		205.31	4.70		
NP-237	0.996	300.17*	6.20	1.45761E-003	2.57916E-004
		312.00*	36.00	1.57631E-003	1.06267E-004
		340.60*	4.20	1.38125E-003	3.93745E-004
		375.00*	0.68	2.34817E-002	2.86556E-003
		415.60*	1.75	6.48060E-003	9.61370E-004
Pu-239	0.965	129.28*	0.01	1.16171E+001	2.13307E+000
		375.00*	0.00	1.00912E+001	1.38716E+000
		413.70*	0.00	7.48917E+000	1.21666E+000
		451.50 @	0.00		
AM-241	0.995	59.54*	35.70	4.33690E+001	3.70169E+000
		125.28*	0.00	3.30341E+000	1.42199E+000
		335.40	0.00		
		662.42* @	0.00	2.20203E+001	4.49508E+000
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	5.736996E-005	1.982278E-005
U-235	0.651	9.703522E-005	3.375257E-005
NP-237	0.996	1.521245E-003	9.507548E-005
Pu-239 @	0.965	9.065275E+000	6.429982E-001
AM-241 @	0.995	8.455509E+000	1.327414E+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	9.3430E-005	8.73E-005	1.0692E-004
		1332.49	100.00	8.7322E-005		9.2929E-005
	CS-134	475.35	1.46	6.6333E-003	1.03E-004	-1.5139E-003
		563.23	8.38	1.1143E-003		3.2547E-004
		569.32	15.43	5.9595E-004		2.7288E-004
		604.70	97.60	1.2397E-004		-3.0975E-005
		795.84	85.40	1.0305E-004		-3.0537E-005
		801.93	8.73	1.0933E-003		1.2704E-003
		1038.57	1.00	9.1723E-003		1.5344E-003
		1167.94	1.80	4.9840E-003		-3.8904E-004
		1365.15	3.04	2.3645E-003		8.2751E-004
+	CS-137	661.65*	85.12	6.1825E-005	6.18E-005	9.3131E-005
+	NP-237	300.17*	6.20	1.0041E-003	1.60E-004	1.4576E-003
		312.00*	36.00	1.6034E-004		1.5763E-003
		340.60*	4.20	1.4367E-003		1.3813E-003
		375.00*	0.68	8.3636E-003		2.3482E-002
		415.60*	1.75	3.0438E-003		6.4806E-003
+	Pu-239	129.28*	0.01	3.5440E+000	3.52E+000	1.1617E+001
		375.00*	0.00	3.5942E+000		1.0091E+001
		413.70*	0.00	3.5175E+000		7.4892E+000
		451.50	0.00	5.2632E+001		-6.0059E+000
+	AM-241	59.54*	35.70	2.4224E-002	2.42E-002	4.3369E+001
		125.28*	0.00	5.8256E+000		3.3034E+000
		335.40	0.00	2.3321E+001		2.9611E+000
		662.42*	0.00	1.4618E+001		2.2020E+001
		722.70	0.00	7.3612E+001		4.1139E+001
	PU-241	114.00	0.02	2.0971E+000	2.10E+000	1.6475E+000
		332.60	0.00	3.8851E+000		1.8302E-001
	CM-243	209.70	3.27	4.2339E-003	7.70E-004	3.1483E-003
		228.18	10.56	1.1549E-003		6.5683E-004
		277.60	14.00	7.7017E-004		4.7325E-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)
U-235	7.61E-004 +/- 2.65E-004
Pu-239	2.53E-003 +/- 1.79E-004

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

Report Generated On : 2/26/02 10:52:21 AM

Sample Title : 4430 Side B rep
Spectrum Description :
Sample Identification : 1286
Sample Size : 17.3 kg

Sample Taken On : 2/26/02 10:21:00 AM
Acquisition Started : 2/26/02 10:22:09 AM

Live Time: 1800.0 seconds Real Time: 1805.1 seconds

ISOCS Calabration : 4430 VALVE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/26/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	198.11	49.62	2.37E+003	361.72	3.73E+003
2	239.23	59.89	6.94E+004	1947.73	2.40E+003
3	340.02	85.08	8.12E+002	57.13	2.27E+003
4	349.27	87.39	1.67E+002	51.81	2.28E+003
5	414.41	103.67	1.48E+002	46.56	2.27E+003
6	518.08	129.58	2.31E+002	44.10	2.03E+003
7	1202.16	300.55	4.28E+001	14.15	1.74E+002
8	1248.39	312.10	1.96E+002	18.56	1.60E+002
9	1501.04	375.24	1.12E+002	14.60	1.10E+002
10	1655.27	413.79	4.25E+001	11.41	9.53E+001
11	2045.47	511.30	1.19E+002	14.16	5.62E+001
12	2437.60	609.31	1.21E+002	13.30	4.58E+001
13	2646.54	661.52	4.49E+001	9.97	3.74E+001
14	3644.78	911.00	6.21E+001	10.19	3.11E+001
15	4481.82	1120.20	5.03E+001	9.38	2.36E+001
16	7062.98	1765.28	4.18E+001	7.66	1.13E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.999	661.65*	85.12	7.97591E-005	1.78945E-005
NP-237	0.860	300.17*	6.20	6.77923E-004	2.26354E-004
		312.00*	36.00	5.46007E-004	5.79110E-005
		340.60	4.20		
		375.00*	0.68	1.84390E-002	2.53549E-003
		415.60*	1.75	2.88068E-003	7.81769E-004
Pu-239	0.968	129.28*	0.01	3.59988E+000	9.14583E-001
		375.00*	0.00	7.92412E+000	1.19944E+000
		413.70*	0.00	3.32900E+000	9.29944E-001
		451.50 @	0.00		
AM-241	0.994	59.54*	35.70	4.03529E+000	3.40059E-001
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	1.88586E+001	4.23075E+000
		722.70	0.00		

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	0.999	6.269258E-005	1.795092E-005
NP-237	0.860	5.515169E-004	5.601449E-005
Pu-239 @	0.968	4.172371E+000	4.962711E-001
AM-241 @	0.994	4.035286E+000	3.400587E-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 *****
****

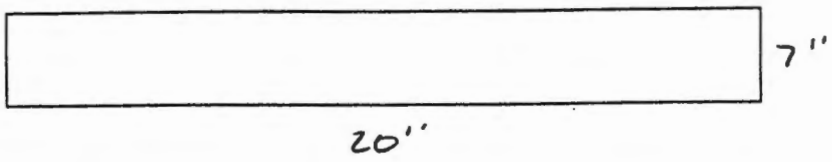
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	8.5672E-005	8.57E-005	-6.5160E-005
		1332.49	100.00	8.8547E-005		3.2979E-005
	CS-134	475.35	1.46	6.4626E-003	1.05E-004	2.2962E-004
		563.23	8.38	1.1393E-003		4.7536E-004
		569.32	15.43	6.3244E-004		-4.4066E-004
		604.70	97.60	1.1931E-004		3.7426E-005
		795.84	85.40	1.0469E-004		-3.3390E-005
		801.93	8.73	9.6128E-004		-9.2655E-004
		1038.57	1.00	8.9028E-003		4.2319E-004
		1167.94	1.80	4.8093E-003		-3.6370E-003
		1365.15	3.04	2.4406E-003		-6.0723E-004
+	CS-137	661.65*	85.12	5.5362E-005	5.54E-005	7.9759E-005
+	NP-237	300.17*	6.20	1.0148E-003	1.71E-004	6.7792E-004
		312.00*	36.00	1.7129E-004		5.4601E-004
		340.60	4.20	2.5499E-003		-1.2048E-004
		375.00*	0.68	8.4683E-003		1.8439E-002
		415.60*	1.75	3.2583E-003		2.8807E-003
+	Pu-239	129.28*	0.01	3.3057E+000	3.31E+000	3.5999E+000
		375.00*	0.00	3.6392E+000		7.9241E+000
		413.70*	0.00	3.7653E+000		3.3290E+000
		451.50	0.00	5.1612E+001		8.4276E+000
+	AM-241	59.54*	35.70	1.3425E-002	1.34E-002	4.0353E+000
		125.28	0.00	9.2431E+000		-3.3862E+000
		335.40	0.00	2.2323E+001		-7.0087E+000
		662.42*	0.00	1.3090E+001		1.8859E+001
		722.70	0.00	7.2699E+001		4.7427E+001
	PU-241	114.00	0.02	1.9796E+000	1.98E+000	1.7004E+000
		332.60	0.00	3.8517E+000		9.2968E-001
	CM-243	209.70	3.27	3.9082E-003	7.91E-004	-7.7749E-004
		228.18	10.56	1.0786E-003		-3.5616E-004
		277.60	14.00	7.9064E-004		4.5969E-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	1.16E-003 +/- 1.38E-004

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 4434

Weight (kg): 21.5 G.B

Material Description: VESSEL

Packaging: 3 LAYERS + ALUM

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: <.5

Comments: A 900 1275
B 1800 1276

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 4434

File Name: 1276

Assay Date: 25-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	3.73E+01	9.84E+00
Am-241	7.06E+01	5.96E+00
Np-237	2.49E-03	4.59E-04
U-238		
U-235		
Cs-137	1.15E-03	2.00E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 20

Weight (lbs): 21.5

Width (in): 7

Depth for TMU (in): 4

Depth (in): 7

% Volume: 100

Am-241 Calcs:

Measured	7.06E+01	+/-	3.21E+01	Use Meas
Calculated	5.16E+01	+/-	3.98E+01	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.51E+01	+/-	4.34E+00
Pu-239	3.73E+01	+/-	1.07E+01
Pu-240	1.94E+01	+/-	5.58E+00
Pu-241	7.25E+01	+/-	2.09E+01
Pu-242	1.96E-02	+/-	5.64E-03
Am-241	7.06E+01	+/-	3.21E+01
Np-237	2.49E-03	+/-	5.37E-04
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.15E-03	+/-	2.38E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		1.42E+02	+/-	3.46E+01	Calc from Pu-239 Act
Pu (g):	6.78E-03	**Pu (g) + 3 sigma TMU:**		1.26E-02	
		Pu(g) + 3 sigma:		1.21E-02	

Comments:

Errors:

Analyst: Martin Winterrose

Date: ~~2/25/01~~ mx 3/1/02 2/25/02

```
#Date & Time: Mon Feb 25 09:29:36 2002
~g=PIPE
~description=4434_VESSEL
~comment=VESSEL
~Ccollimator=50MM-180D
~crpn=4
~Detector=7219
~Convergence in %=1            ~MDRPN=4
~Lunit=IN  ~Tunit=C  ~Dunit=G/CU.C    ~Punit=MM.HG
~at=20        ~ap=760       ~rh=50
~Energies kev=   50.000,  100.000,  128.000,  130.000,  150.000,  200.000,#
                300.000,  500.000,  700.000, 1000.000, 1400.000, 2000.000,#
               4000.000,
~Error in %=     10.000,   10.000,   10.000,   10.000,   10.000,    8.000,#
                  8.000,    6.000,    6.000,    4.000,    4.000,    4.000,#
                  4.000,
~d1.1=0.25      ~d1.2=7         ~d1.3=10        ~d1.4=10        ~1mater=TITAINUM ~1den=4.54
~d2.1=0.133     ~d2.2=10        ~d2.3=10        ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/25/02 10:03:24 AM

Sample Title : 4434 Side B
Spectrum Description :
Sample Identification : 1276
Sample Size : 9.8 kg

Sample Taken On : 2/25/02 9:47:00 AM
Acquisition Started : 2/25/02 9:48:15 AM

Live Time: 1800.0 seconds Real Time: 1807.8 seconds

ISOCS Calabration : 4434 VESSEL
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/25/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.23	59.89	1.82E+005	5207.00	2.96E+003
2	340.32	85.16	6.65E+002	56.54	2.34E+003
3	350.60	87.73	2.72E+002	53.01	2.36E+003
4	395.90	99.05	4.70E+002	51.76	2.36E+003
5	413.45	103.43	1.86E+002	48.37	2.34E+003
6	518.26	129.63	2.14E+002	42.98	2.07E+003
7	835.13	208.82	5.69E+001	17.47	3.31E+002
8	1248.52	312.13	8.20E+001	14.62	1.38E+002
9	1501.03	375.24	6.53E+001	12.52	1.06E+002
10	1655.39	413.82	4.45E+001	11.22	8.31E+001
11	2043.91	510.92	1.42E+002	15.67	6.09E+001
12	2437.06	609.17	1.12E+002	12.95	4.94E+001
13	2647.17	661.68	6.20E+001	10.64	3.50E+001
14	7063.08	1765.30	3.61E+001	7.22	1.46E+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	1.000	661.65*	85.12	1.14840E-003	2.00492E-004
NP-237	0.654	300.17	6.20		
		312.00*	36.00	2.48870E-003	4.59345E-004
		340.60	4.20		
		375.00*	0.68	1.15691E-001	2.27520E-002
		415.60*	1.75	3.22372E-002	8.24464E-003
Pu-239	0.967	129.28*	0.01	3.51389E+001	9.19714E+000
		375.00*	0.00	4.97180E+001	1.02712E+001
		413.70*	0.00	3.72543E+001	9.84198E+000
		451.50 @	0.00		
AM-241	0.994	59.54*	35.70	7.06344E+001	5.96454E+000
		125.28	0.00		
		335.40	0.00		
		662.42* @	0.00	2.71533E+002	4.73995E+001
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	8.496654E-004	2.020487E-004
NP-237	0.654	2.487557E-003	4.588942E-004
Pu-239 @	0.967	3.841889E+001	4.970627E+000
AM-241 @	0.994	7.063438E+001	5.964539E+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 *****
****

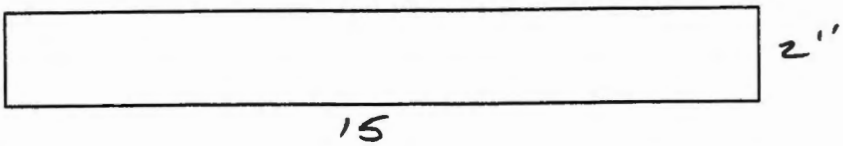
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	8.9193E-004	8.44E-004	-1.4747E-004
		1332.49	100.00	8.4399E-004		6.1432E-004
	CS-134	475.35	1.46	6.4525E-002	1.11E-003	5.0177E-002
		563.23	8.38	1.1382E-002		-1.5043E-003
		569.32	15.43	6.0951E-003		-3.7307E-003
		604.70	97.60	1.2537E-003		2.9576E-005
		795.84	85.40	1.1076E-003		-7.3444E-004
		801.93	8.73	1.0376E-002		1.5585E-003
		1038.57	1.00	9.0317E-002		7.9774E-002
		1167.94	1.80	4.7911E-002		-4.6612E-003
		1365.15	3.04	2.7707E-002		-3.8191E-003
+	CS-137	661.65*	85.12	5.6050E-004	5.60E-004	1.1484E-003
+	NP-237	300.17	6.20	1.7323E-002	1.74E-003	-2.7349E-003
		312.00*	36.00	1.7402E-003		2.4887E-003
		340.60	4.20	2.5778E-002		1.4408E-003
		375.00*	0.68	8.9574E-002		1.1569E-001
		415.60*	1.75	3.2707E-002		3.2237E-002
+	Pu-239	129.28*	0.01	3.5152E+001	3.52E+001	3.5139E+001
		375.00*	0.00	3.8494E+001		4.9718E+001
		413.70*	0.00	3.7798E+001		3.7254E+001
		451.50	0.00	5.2831E+002		-1.0529E+002
+	AM-241	59.54*	35.70	9.9118E-002	9.91E-002	7.0634E+001
		125.28	0.00	9.6948E+001		4.7681E+001
		335.40	0.00	2.1833E+002		-5.1523E+001
		662.42*	0.00	1.3253E+002		2.7153E+002
		722.70	0.00	7.4305E+002		4.1349E+002
	PU-241	114.00	0.02	2.0095E+001	2.01E+001	1.5962E+001
		332.60	0.00	3.8105E+001		3.8228E+000
	CM-243	209.70	3.27	4.1420E-002	7.77E-003	5.9843E-003
		228.18	10.56	1.1946E-002		2.2987E-003
		277.60	14.00	7.7652E-003		6.9166E-006

+ = 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	6.05E-003 +/- 7.83E-004

Bldg 233-S
NDA Item Description Sheet
Pipe Geometry



Put Dimensions on Pipe

Item ID: 3045

Weight (kg): ~~3.15 LBS~~ 5 LBS 2.27 kg

Material Description: 4 1/2" PIPES

Packaging: 3 LAYERS

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: <.5

Comments: MODELED AS 2" PIPE A 900 1307
B 1800 1308

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 3045

File Name: 1308

Assay Date: 27-Feb-02

File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.32E+02	3.51E+01
Am-241	7.54E+02	6.36E+01
Np-237	1.95E-02	2.12E-03
U-238		
U-235		
Cs-137	6.06E-03	7.94E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Pipe or Duct

Calcs: Use 1st

Dimensions:

Length (in): 15

Width (in): 2

Depth (in): 2

Weight (lbs): 5

Depth for TMU (in): 4

% Volume: 100

Am-241 Calcs:

Measured	7.54E+02	+/-	3.43E+02	Calc from Pu-239
Calculated	1.83E+02	+/-	1.42E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	5.35E+01	+/-	1.55E+01
Pu-239	1.32E+02	+/-	3.82E+01
Pu-240	6.88E+01	+/-	1.99E+01
Pu-241	2.57E+02	+/-	7.43E+01
Pu-242	6.95E-02	+/-	2.01E-02
Am-241	1.83E+02	+/-	1.42E+02
Np-237	1.95E-02	+/-	3.04E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	6.06E-03	+/-	1.04E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):		4.37E+02	+/-	1.49E+02	Calc from Pu-239 Act
Pu (g):	5.59E-03	**Pu (g) + 3 sigma TMU:**		1.04E-02	
		Pu(g) + 3 sigma:		1.00E-02	

Comments:

Errors:

Analyst: Martin Winterrose

Date: 2/27/02

```
#Date & Time: Wed Feb 27 13:21:17 2002
~g=PIPE
~description=3045_PIPE
~comment=4_1"_PIPES
~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=0.154     ~d1.2=2         ~d1.3=7.5       ~d1.4=7.5       ~1mater=304SS    ~1den=7.81
~d2.1=0.133     ~d2.2=7.5       ~d2.3=7.5       ~2mater=DRYDIRT  ~2den=1.6       ~2con=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 : 2/27/02 1:54:20 PM

Sample Title : 3045 Side B
Spectrum Description :
Sample Identification : 1308
Sample Size : 2.3 kg

Sample Taken On : 2/27/02 1:38:00 PM
Acquisition Started : 2/27/02 1:39:10 PM

Live Time: 1800.0 seconds Real Time: 1805.8 seconds

ISOCS Calabration : 3045 PIPE
Energy Calibration Used Done On : 2/27/01
Efficiency Calibration Used Done On : 2/27/02

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

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.25	59.90	1.20E+005	3383.69	2.49E+003
2	340.07	85.09	9.16E+002	71.72	2.10E+003
3	351.25	87.89	2.12E+002	55.05	2.11E+003
4	395.67	98.99	3.76E+002	47.66	2.10E+003
5	414.80	103.77	2.08E+002	44.23	2.08E+003
6	502.37	125.66	1.41E+002	41.55	1.90E+003
7	519.08	129.83	2.66E+002	42.07	1.82E+003
8	1248.16	312.04	1.84E+002	17.98	1.37E+002
9	1408.00	351.99	9.85E+001	14.08	9.72E+001
10	1501.64	375.39	4.05E+001	11.42	9.37E+001
11	1654.42	413.58	4.50E+001	11.41	7.81E+001
12	2043.36	510.78	1.26E+002	17.40	4.76E+001
13	2438.31	609.48	1.02E+002	12.48	4.71E+001
14	2647.27	661.71	9.37E+001	11.93	3.84E+001
15	7064.55	1765.67	3.49E+001	7.17	5.31E-001

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

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	6.05564E-003	7.94492E-004
NP-237	0.606	300.17	6.20		
		312.00*	36.00	1.95054E-002	2.11782E-003
		340.60	4.20		
		375.00*	0.68	2.51769E-001	7.18654E-002
		415.60	1.75		
Pu-239	0.961	129.28*	0.01	1.70331E+002	3.92814E+001
		375.00*	0.00	1.08197E+002	3.16336E+001
		413.70*	0.00	1.32375E+002	3.51353E+001
		451.50 @	0.00		
AM-241	0.995	59.54*	35.70	7.54214E+002	6.35680E+001
		125.28*	0.00	1.46801E+002	4.39775E+001
		335.40	0.00		
		662.42* @	0.00	1.43182E+003	1.87813E+002
		722.70	0.00		

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

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg)	Wt mean Activity Uncertainty
CS-137	1.000	4.603225E-003	8.089167E-004
NP-237	0.606	1.943075E-002	2.117201E-003
Pu-239 @	0.961	1.367908E+002	1.773327E+001
AM-241 @	0.995	3.434145E+002	3.616625E+001

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

Errors quoted at 1.000 sigma

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

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg)	Nuclide MDA (uCi/kg)	Activity (uCi/kg)
	CO-60	1173.22	100.00	3.0250E-003	3.03E-003	-1.8392E-003
		1332.49	100.00	3.0827E-003		2.1158E-003
	CS-134	475.35	1.46	2.1874E-001	3.31E-003	-3.8724E-002
		563.23	8.38	3.7362E-002		-3.4216E-002
		569.32	15.43	2.0758E-002		1.8969E-002
		604.70	97.60	4.0154E-003		-2.0136E-003
		795.84	85.40	3.3121E-003		-3.3672E-003
		801.93	8.73	3.6207E-002		3.6888E-002
		1038.57	1.00	3.1667E-001		-2.3938E-001
		1167.94	1.80	1.7779E-001		-5.1003E-002
		1365.15	3.04	8.1947E-002		-1.0706E-001
+	CS-137	661.65*	85.12	2.0381E-003	2.04E-003	6.0556E-003
+	NP-237	300.17	6.20	6.6635E-002	6.05E-003	4.3596E-002
		312.00*	36.00	6.0536E-003		1.9505E-002
		340.60	4.20	8.9719E-002		-5.0160E-002
		375.00*	0.68	2.9688E-001		2.5177E-001
		415.60	1.75	2.2570E-001		1.5104E-001
+	Pu-239	129.28*	0.01	1.2885E+002	1.28E+002	1.7033E+002
		375.00*	0.00	1.2758E+002		1.0820E+002
		413.70*	0.00	1.2903E+002		1.3237E+002
		451.50	0.00	1.8210E+003		6.4203E+002
+	AM-241	59.54*	35.70	1.4728E+000	1.47E+000	7.5421E+002
		125.28*	0.00	2.1490E+002		1.4680E+002
		335.40	0.00	7.5971E+002		-1.4639E+001
		662.42*	0.00	4.8190E+002		1.4318E+003
		722.70	0.00	2.5392E+003		4.3347E+001
	PU-241	114.00	0.02	8.1119E+001	8.11E+001	-1.8992E+001
		332.60	0.00	1.2863E+002		1.6686E+001
	CM-243	209.70	3.27	1.4380E-001	2.78E-002	1.1579E-001
		228.18	10.56	3.9191E-002		-3.7002E-003
		277.60	14.00	2.7801E-002		3.5651E-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	5.01E-003 +/- 6.49E-004